



# Introduction to Health Assessment for the Nursing Professional - Part II



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This resource is **part of a series**. Part I of the first Introduction to Health Assessment for the Nursing Professional can be found at: <https://pressbooks.library.torontomu.ca/assessmentnursing/>

Other related resources are noted below.

This book is **best viewed via the online, Pressbooks format so that you can view the videos and interactive activities**. However, a PDF format is made available.

“Introduction to Health Assessment for the Nursing Professional” is an open educational resource (OER) created for undergraduate nursing students at the introductory level. Educators co-curated this OER in collaboration with students for students. This resource is a unique contribution to nursing education as content is theoretically informed by health promotion in the Canadian context and by an inclusive approach to health assessment that incorporates culturally-responsive techniques related to race/ethnicity, gender/sex/sexual orientation, body sizes/types, and ability/disability. It is the first health assessment resource that is informed by clinical judgment with the goal to facilitate students’ clinical decision making and ability to prioritize care by recognizing and acting on cues and signs of clinical deterioration. Interactive clinical judgment activities and formative assessments to evaluate a student’s learning are integrated throughout the resource. The integration of clinical judgment throughout this resource will support students’ capacity to enhance patient safety and equitable health outcomes as well as their success in writing national nursing exams to become licensed to work as a Nurse.

All of these resources build on existing open resources specific to health assessment including:

The complete subjective health assessment: <https://ecampusontario.pressbooks.pub/healthassessment/>

Vital sign measurement across the lifespan: <https://pressbooks.library.ryerson.ca/vitalsign2nd/>

Physical examination techniques: A nurse's guide: <https://pressbooks.library.ryerson.ca/ippa/>  
Introduction to communication in nursing: <https://pressbooks.library.ryerson.ca/communicationnursing/>  
Documentation in nursing: 1st Canadian edition: <https://pressbooks.library.ryerson.ca/documentation/>

All of the listed OER are published under an open license. Thus, you can use them for free or modify them to suit your student and course needs with appropriate attribution. In the future, we will be adding additional chapters to the “Introduction to Health Assessment for the Nursing Professional” OER.

## Licensing

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This project is made possible with funding by the Government of Ontario and through eCampusOntario's support of the Virtual Learning Strategy. To learn more about the Virtual Learning Strategy visit: <https://vls.ecampusontario.ca>

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If you are having problems accessing any content within the book, please contact: Dr. Jennifer Lapum at [jlalum@ryerson.ca](mailto:jlalum@ryerson.ca). Please let us know which page you are having difficulty with and include which browser, operating system, and assistive technology you are using.

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# PAIN ASSESSMENT

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# Learning Outcomes

1. Apply subjective assessment skills.
2. Apply objective assessment skills.
3. Use clinical judgement.
4. Integrate an inclusive approach to pain assessment.

# Introduction to Pain

Almost everyone has experienced the physical sensation of pain. You may have felt a headache, a backache, or pain from a paper cut or a burn from touching a hot surface.

Consider the last time you experienced pain. What did it feel like? How did it affect you? (e.g., physically, emotionally, socially). Was there tissue damage? These questions help us understand the nature of pain and how it affects each person.

**Pain** is a **complex phenomenon**, so we need to understand how it is conceptualized, classified, and the various types of pain. All of these components influence best practices related to pain assessment. It is important to be aware of the [RNAO \(2013\)](https://rnao.ca/bpg/guidelines/assessment-and-management-pain) best practice guidelines related to pain assessment and management. These guidelines provide information and resources related to assessment, planning, implementation and evaluation of pain, among other recommendations.

Let's begin by exploring the phenomenon of physical pain.

## References

RNAO (2013). Assessment and management of pain. 3rd edition.  
<https://rnao.ca/bpg/guidelines/assessment-and-management-pain>

# Conceptualizing Pain

The International Association for the Study of Pain [IASP] (2020) recently redefined their 1979 definition of pain as “an **unpleasant** and **sensory experience** associated with, or resembling that associated with, **actual** or **potential tissue damage**.” The IASP’s definitions are widely known and accepted, and highlight the emotional, the sensory, and the potential tissue damage associated with pain.

However, pain researchers and clinicians continue to critique and expand on the IASP’s definition because it has the potential to overshadow important components. Additional considerations include:

- More emphasis on the subjective nature of pain in terms of how it is personalized to the client.
- The need to emphasize the **somatic nature of pain** in terms of how it is embedded within the body (Cohen et al., 2018).
- A more **comprehensive descriptor** of pain than “unpleasant”, which may act to minimize what may be described as quite distressing for some (Craig & MacKenzie, 2021).
- The **cognitive** and **social features** of pain (Craig & MacKenzie, 2021) in terms of how pain affects one’s cognitive capacity (how one thinks, reasons, and remembers) and social functioning (engaging in social interactions and interpersonal relationships).
- Also, keep in mind, that not all physical pain is associated with tissue damage.

By expanding and critiquing how pain is conceptualized, we can obtain a more comprehensive and inclusive understanding of what pain is and as a result, how it is best assessed and managed. What is important to take away from these definitions is that **pain is complex and multifaceted**.

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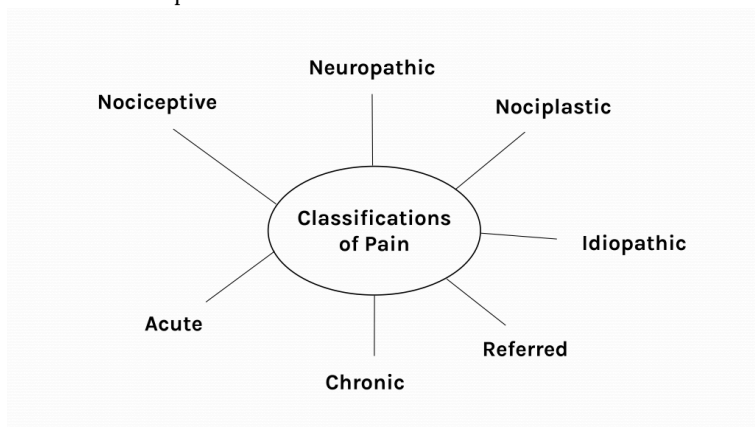
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# Classifying Pain

Pain can be classified in many ways. The next sections present several classifications. It is important to recognize that these are not mutually exclusive, and a person may experience multiple classifications of pain at the same time. See **Figure 1** for classifications of pain.



**Figure 1:** Classifications of pain.

## Acute Pain

Acute pain is **short or limited in duration** and often **caused by something specific**. Types of acute pain are surgical pain during the operative and postoperative period, a headache, bee sting, labour pains, menstrual pain, and injuries such as an ankle sprain, fracture, or burn. Although acute pain can shift into chronic pain, it typically follows a **predictable trajectory** and **subsides when the cause of pain is resolved** or healed. Acute pain can last anywhere from a moment to upwards of three to six months. Beyond this timeframe, it is typically considered chronic pain.

The intensity of acute pain can range from mild to severe. The intensity may also influence the signs and symptoms of pain that are associated with sympathetic nervous stimulation and the fight or flight response including the stimulation of hormones such as cortisol and adrenaline.

The cascade of **signs and symptoms** during the acute pain period may include:

- Changes in vital signs: tachycardia, tachypnea, shallow breathing, elevated blood pressure, and elevated temperature. Sometimes oxygen saturations can decrease, particularly when clients are breathing fast and shallow and as such not taking a full inspiration. Prolonged changes in these vital signs can lead to ischemia, thus pain management is essential.
- With increased body temperature, the nervous system stimulates the sweat glands to help cool the body. Thus, clients may experience diaphoresis.
- Digestive enzymes and peristalsis are reduced which leads to difficulty with digestion and gastrointestinal upset including nausea, vomiting, and constipation.
- Other signs of pain may include increased blood glucose levels and pupil dilation.

## Chronic Pain

Definitions of chronic pain have evolved and become more specific, but this kind of pain is still referred to as **pain that continues to occur and recurs** (persistent and recurrent) for about **three months or more** (Treede et al., 2019). Some definitions suggest six months or more, but in general it is fine to refer to persistent or recurrent pain that lasts three to six months or longer as chronic pain. Another conceptualization of chronic pain (when associated with an injury) is a type of pain that **persists beyond the typical or expected healing**

**time.** For some, chronic pain never goes away: it may be experienced daily or recur regularly.

Common types of chronic pain include back pain, migraines, arthritis, cancer-related pain, **fibromyalgia**, and postsurgical and posttraumatic pain.

Chronic pain can be categorized in two broad ways:

- Secondary chronic pain refers to a type of pain that manifests as a result of a disease or condition such as arthritis, cancer, or ear infection – it is “secondary” to these pathological conditions (Treede et al., 2019). It can also be pain that is secondary to, or a result of, treatment such as cancer-related treatment.
- Primary chronic pain is a more recent classification. It is a type of pain based on a condition that is often poorly understood and cannot be accounted for by another cause or disease process (Nicholas et al., 2019; Treede et al., 2019, 2015). Common types of primary chronic pain include many types of neck and back pain, fibromyalgia syndrome, and irritable bowel syndrome (Nicholas et al., 2019).

In patients with chronic pain, the physiological and vital sign changes are not necessarily evident because the body adapts to the pain to a certain extent. The **effects of chronic pain** typically include cognitive and social changes, such as:

- Sleep disruptions.
- Mood disturbances including depression.
- Interference with daily activities.
- Cognitive impairment including the ability to think clearly.
- Social and relational effects.

## Nociceptive Pain

**Nociceptive pain** involves a **noxious stimulus** (mechanical, thermal, or chemical) that activates nociceptors with the potential to cause non-neural tissue injury (Bonezzi et al., 2020). This is a common type of pain that many of us have experienced and is often categorized as:

- Mechanical (e.g., stubbing your toe, receiving a needle, straining a muscle).
- Thermal (e.g., touching a hot surface like a stove).
- Chemical (e.g., exposure to a chemical such as bleach).

(Bonezzi et al., 2020).

These stimuli activate the nociceptors, which are receptors in the periphery of the **somatosensory nervous system** (IASP, 2021). Considering these stimuli, it makes sense that nociceptive pain is described as localized with a specific location in the body. Nociceptive pain can be categorized as somatic and visceral. Somatic refers to a type of pain that originates in peripheral tissues such as the skin, bone, muscles, tendons, or ligaments, whereas visceral refers to a type of pain that originates in the body's internal organs (e.g., heart, intestines, appendix, kidneys) (Bonezzi et al., 2020).

## Neuropathic Pain

**Neuropathic pain** originates from a “**lesion or disease of the somatosensory nervous system**” (IASP, 2021). Neuropathic pain has a different subjective sensation than nociceptive pain and is often described as burning, stabbing, numbness, tingling, and shooting (electric-shock like) with sensitivity to touch and temperature. As such, the client's qualitative description of their pain is important to

assess in order to help you better understand the causative factors. Causes can be related to trauma along a nerve, conditions such as carpal tunnel syndrome, spinal cord injury, stroke, diabetes, and multiple sclerosis, and infections such as herpes simplex virus (cold sore) or varicella-zoster virus (shingles).

## Nociplastic Pain

**Nociplastic pain** originates from “**altered nociception**” with **unclear evidence of actual or potential tissue damage** (IASP, 2021). This classification of pain has no obvious nociceptor activation or neuropathy, but involves altered nociceptive function, which can be confirmed by sensory testing (Kosek et al., 2016). To be clear: although there is no obvious tissue damage (e.g., a cut in the skin) or nociceptor activation (a stimulus that has caused pressure or extreme temperature to activate the neurons), there is an inference of altered nociceptive function that can be confirmed through sensory testing such as measuring the brain’s electrical activity (Kosek et al., 2016). This classification is relatively new compared to nociceptive and neuropathic pain and was introduced in 2016 (Kosek et al., 2016). The theory is that nociplastic pain is associated with chronic pain conditions such as fibromyalgia and irritable bowel syndrome (Kosek et al., 2016; Bonezzi et al., 2020). It requires careful consideration in terms of assessment and management because of the complexity in how it presents subjectively as well as the lack of **biomarkers** (Fitzcharles et al., 2021).

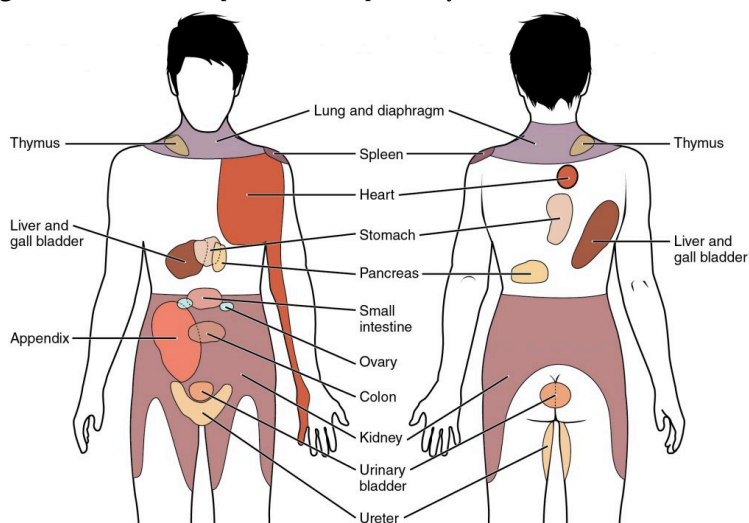
## Idiopathic Pain

**Idiopathic pain** or pain of an **unknown origin** can also be considered a fourth classification. With this type of pain there is

no obvious pathology. Although the origin and the cause may be unknown, the pain is very real for clients. Your assessment here becomes extremely important to help understand the client's pain.

## Referred Pain

**Referred pain** is pain felt at a bodily location that is different from the site of origin. For example, the site of origin of cardiac ischemia (lack of oxygen to the heart muscle, commonly referred to as chest pain) is the heart. However, cardiac ischemia can be felt in referred locations such as pain down the left arm or in the jaw or neck. This kind of pain referral has a neural basis in which the site of origin shares common neural pathways with another part of the body. See **Figure 2** for common pain referral pathways.



**Figure 2:** Common pain referral pathways

Attribution statement: Gordon Betts, J., Young, K.A., Wise, J.A., Johnson, E., Poe, B., Kruse, D.H., Korol, O., Johnson, J.E., Womble, M., & DeSaix, P. (2013). The Autonomic Nervous System. In *Anatomy and Physiology*. OpenStax. Creative Commons Attribution License v4.0.

Book URL: <https://openstax.org/books/anatomy-and-physiology/pages/1-introduction> Section URL: <https://openstax.org/books/anatomy-and-physiology/pages/15-2-autonomic-reflexes-and-homeostasis>

## Activity: Check Your Understanding



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=36#h5p-34>

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# Reflecting on Your Own Biases

**Everyone has biases**, meaning preconceived notions about something (such as pain) or someone. Biases can be related to race/ethnicity, gender/sex, age, and medical conditions, and they can develop as a result of various factors including culture, personal experiences, and popular media.

When we first see a client, we tend to make assumptions about the presence and even the severity of pain based on cues that are readily available to us (e.g., facial expression, body positioning, vocalizations) (Riva et al., 2011). These **assumptions are rooted in our biases** regarding what pain looks and even sounds like. These biases may emerge from our own personal experiences. Our initial impressions of a client's pain can form what is called an “anchor” or have an “anchor effect” in which all additional assessments of the client's pain are influenced by these initial impressions (Riva et al., 2011). These assumptions can also be based on racist ideas (discussed further in the next section) or on ageist ideas, for example that older people or newborns do not feel pain. Another biased assumption is that people living with cognitive impairment (such as dementia) do not feel pain in the same way as others because they may have difficulty articulating that pain. These assumptions can mean that pain is underassessed and undertreated in certain populations.

It is also very important to be aware that some people may openly talk about their pain and cry out in agony, while others may be stoic and hide their pain. Some people may stay home in bed when they are in pain while others may continue with their daily life and go to work.

**Unexplored biases can have a strong influence on pain assessment.** This is particularly important considering that

healthcare professionals have been found to underestimate pain in comparison with the client's own self-report (Seers et al., 2018). As such, it is vital that you constantly reflect upon and explore your biases related to pain and pain assessment.

For example, try to explore your own inherent biases related to what pain looks like by reflecting on the following questions:

- How would someone know that you are in pain?
- Could they tell by your facial expression or body position?
- What behaviours would you display if you were in pain? Would you be quiet, grimacing, or smiling? Would you isolate yourself? Would you be trying to sleep, walk around, or talk to others?
- Would you tell someone you were in pain or keep it to yourself? How bad would the pain have to be for you to be concerned or for you to tell someone?
- Would you exaggerate or minimize the level of pain (or pain of a family member) when describing it to a healthcare provider due to fear of discrimination?

Your answers to these questions form part of your cultural bias. If you are not aware of your cultural biases, you may judge the validity of another person's pain based on your own answers. Ultimately, a person's pain should be acknowledged, respected, and acted upon (RNAO, 2013).

What we might leave you with is: although your own personal experiences inform your biases, these experiences may also provide you insight into a client's pain.

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# Racism and Pain Assessment

**Racism is killing people**, and the silence around racism is killing people (Jones, 2021).

Some Canadians, including leaders, are beginning to recognize racism as real, present, and as a public health issue, but many remain silent on the issue and deny the presence of systemic racism in Canada and in healthcare.

**Systemic racism** includes processes embedded in practices and policies that disadvantage and oppress non-dominant racialized groups (Williams et al., 2019). Social institutions perpetuate racial hierarchies and socialize members of society to accept that non-dominant racialized groups are inferior (Williams et al., 2019). Racism, such as anti-Black racism, affects non-dominant groups from birth to death, and is evidenced in Canadian healthcare by the disparities affecting non-dominant racialized groups (Dryden & Nnorom, 2021).

Some examples to reflect upon:

- Disparities are visible through elevated risks of prematurity and low birthweight, lower income, and lack of access to education, resources, and opportunities for non-dominant racialized groups – all affecting their health and well-being (Williams et al., 2019).
- The stress of racism is very real. It is a vicious circle that perpetuates racial inequities negatively affecting mental and physical health in many ways for nondominant racial groups (Levy et al., 2013).
- A specific example is research funding. Cystic fibrosis mainly affects white people and receives 7–11 times more funding than sickle cell disease, which mainly affects Black people with sub-Saharan African ancestry (Power-Hays & McGann, 2020). This is a clear example of systemic racism: sickle cell disease affects substantially more North Americans, but receives substantially

less research funding.

- Some racism is blatant (verbal slurs), but it is also important to consider subtle racism, such as a healthcare professional's overuse of medication as a restraint or way to control a client.

It is essential to keep in mind that **racial disparities can NOT be explained by biological differences** (Dryden & Nnorom, 2021). Yet, racism – and accompanying ideas about biological differences – continues to be systemically engrained in healthcare practices and perpetuates inequities. This includes practices surrounding pain assessment and pain management. Racism and systemic inequities have led to undiagnosed pain in non-dominant racialized groups (Morais et al., 2022), including sub-optimal and even catastrophic outcomes for Black people when their pain is not believed or recognized (Akinlade, 2020). Racism and inequities in pain assessment and management is clearly manifested in the treatment of Black clients with sickle cell disease (Power-Hays & McGann, 2020). Pain among this population is often dismissed, leading to reduced quality of life and increased mortality rates: Black people describe being labelled as drug seekers when reaching out for pain management and purposefully dressing nicely before seeking help to minimize racist attitudes (Power-Hays & McGann, 2020).

These general **racist attitudes** contribute to **racialized disparities in pain assessment and pain management** (Morais et al., 2022). Additionally, long-held myths and stereotypes that Black people are subhuman were historically used to justify slavery, and these beliefs have also led to pain practices that are clearly not evidence-based.

Reflect on the following examples:

- Hoffman and colleagues (2016) discuss the false and dangerous belief that Black people are different biologically (e.g., thicker skin, fewer nerve endings) and thus, feel less pain. This will lead to an inaccurate assessment of pain and also to disparities and inequities in pain management (Hoffman et al., 2016).

- Another example highlights the existence of racial bias in pain perception. In a multi-stage experiment, participants were shown a series of Black and white faces in pain. The researchers found that white participants had more stringent thresholds to perceive pain on Black versus white faces and would perceive pain earlier on white versus Black faces (Mende-Siedlecki et al., 2019). In addition to affecting assessment practices in terms of observations, this effect is likely to result in Black clients being provided less medication, or to be given non-narcotic pain medication, compared to white clients who often receive narcotic pain medications (Mende-Siedlecki et al., 2019).
- Another study found that Indigenous clients in Canada reported feeling judged by healthcare providers and reporting discrimination when in pain or requesting medication for conditions involving chronic pain (Nelson & Wilson, 2018). This kind of experience has negative effects on the quality of care that Indigenous clients receive, and may result in them choosing not to access needed services.
- Another example of anti-Indigenous racism involves Joyce Echaquan, an Atikamekw client in Quebec. She had gone to the emergency room for stomach pain and described being overmedicated by healthcare providers (APTN News, n.d.). The coroner concluded that systemic racism played a role in how Joyce was treated and in her death (Richardson, 2021). This case highlights the importance of individualized pain assessment and listening, believing, and responding to the client.

These are just some of many examples of systemic racism that the nursing profession must challenge. It is important to recognize that pain in non-dominant racialized people may go undetected, undiagnosed, untreated, and undertreated. Moreover, these individuals may be fearful to seek out healthcare services because of past treatment and **racial trauma**. Many Black and Indigenous

people fear hospitals due to the stigma and institutionalized racism they face.

When **assessing pain**, healthcare providers must **be aware of and remain sensitive to racism**. When we see racism, we need to name it. It's killing people. We need to speak up. Have a discussion. **Act and advocate**. Advocating takes courage. Start with reflecting and having conversations with others. Voice what you are seeing and collaborate with others to challenge racism.

## Clinical Tip

Always remember: pain is what the client tells you it is.

This is important for all nurses and healthcare professionals to recall because people hold unconscious biases without evidence to support them. A beginning place for change is to identify and sit with your bias – even if you believe people from all races are equal, you may still have bias (Akinlade, 2020).

Anti-racist training can help you understand and address your biases, understand how privilege (such as white privilege) perpetuates pain inequities in care, and learn how to take a critical perspective in your practice (Morais et al., 2022). In fact, anti-racist training can help you understand more than just privilege related to race, but other types of privilege too. In addition to recognizing each other's humanity, we must advocate against racist practices including pain assessment. Remaining silent in the face of

racism is the “sound of privilege”, and with racism – “silence is loud” (Jones, 2021, p. 5).

## Activity: Check Your Understanding



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=40#h5p-4>

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# Pain Assessment

You have an important role to play in screening for and assessing pain (RNAO, 2013).

You will often be the first person to recognize that a client is in pain as a result of your assessment including observations. Nurses also spend sustained periods of time with clients, so clients are more likely to share this information with you than with other healthcare professionals. If they say they are in pain, **believe them**. Trust will disintegrate if clients feel you do not believe them.

**Unassessed pain** can lead to inadequate pain management and/or untreated pain. This is a serious problem because it can affect many body systems as well as a client's cognitive capacity and quality of life, and even whether they live or die.

Pain can be difficult to assess because it is a personal experience that **affects clients in different ways**. Clients may also have difficulty articulating their pain and describing what it feels like. Sometimes pain is invisible, making it difficult to recognize, particularly in someone with chronic pain. The next sections explore the dimensions of pain so that you can develop an understanding of how pain may appear.

## Dimensions of Pain Assessment

Pain has many dimensions in terms of how it affects a person (see **Table 1**). The various dimensions of pain can involve various descriptions and considerations (Cleeland, 2009). It is important to be aware that these dimensions are not necessarily separate; for example, the subjective dimension includes cognitive, psychological, and social features. Consider the many dimensions in terms of your pain assessment of the client and which pain

assessment tools may be best in certain situations and populations (this will be discussed in more detail later).

**Table 1:** Dimensions of pain and related considerations.

Dimension	Considerations
<p><b>Subjective</b></p> <p>A report of pain by the person who is experiencing it is important because they know their pain best and how to describe it. This is sometimes referred to as the sensory dimension of pain, which includes a client communicating the intensity of pain and other descriptors.</p>	<ul style="list-style-type: none"> <li>• A subjective assessment of pain is often referred to as a self-report. This commonly includes a verbal self-report, but also can involve pointing or a written self-report.</li> <li>• Subjective description of pain is only one way to express pain, and inability to communicate by no means indicates that a person is not experiencing pain (International Association for the Study of Pain, 2020).</li> </ul>
<p><b>Physiological</b></p> <p>Common physiological responses from pain may include tensing of muscles, pupil dilation, dry mouth, and a change in vital signs.</p>	<ul style="list-style-type: none"> <li>• With acute pain, physiological responses can be important to consider, particularly with certain populations who are pre-verbal or non-verbal.</li> <li>• However, it is important to note that vital signs cannot discriminate between pain and other states of distress such as fear. Additionally, underlying disease processes and medications such as sedation can affect vital signs.</li> </ul>

<p><b>Behavioural</b></p> <p>Behaviours associated with pain can include facial and bodily responses such as grimacing, moaning, crying, fidgeting, guarding, and laying still. Other behaviours associated with pain include change in sleep patterns and eating patterns.</p>	<ul style="list-style-type: none"> <li>• Behavioural dimensions of pain vary widely among clients. Don't assume someone isn't in pain if they are not demonstrating any of these behaviours. The presence of these behaviours may be more apparent with acute versus chronic pain.</li> <li>• Some responses are based on developmental stages and cultural influences. For example, a common behavioural response to pain among infants is grimacing and crying. Another consideration is related to culture and gender. For example, when young boys experience pain, parents often respond by saying "don't cry, be a big boy." Among individuals identifying as male, this can lead to more inhibited expressions of pain. Additionally, people with physical disabilities may exhibit pain behaviours in different ways.</li> </ul>
<p><b>Cognition</b></p> <p>Pain can affect a person's cognitive functioning in terms of their ability to think, reason, acquire and remember knowledge, attention span, and learning.</p>	<ul style="list-style-type: none"> <li>• Cognitive dimensions of pain will vary based on a client's developmental stage.</li> <li>• Effects of pain on cognition can be assessed based on self-reports and empirical tests.</li> </ul>
<p><b>Psychological and social</b></p> <p>Clients may become anxious, irritable and upset, or have a flat affect (lack of reaction on the face). Chronic pain can affect a client's identity and social relationships and can lead to social withdrawal and depression.</p>	<ul style="list-style-type: none"> <li>• It is important to assess a client's psychological and social response to pain. This can help you understand how pain affects them, their coping strategies, and priorities of care. For example, depression is a serious issue that can affect overall health and well-being.</li> </ul>

<p><b>Reactive</b> This dimension refers to the ways that pain interferes with daily functioning (Cleeland, 2009).</p>	<ul style="list-style-type: none"><li>• Reactive dimensions are important to assess in order to understand interference with activities such as walking, sleep, relationships, and mood (Cleeland, 2009).</li></ul>
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## Contextualizing Inclusivity

Sex and gender biases and discrimination pervade every aspect of social life, including pain assessment in healthcare. In one study, individuals were shown video clips of female and male faces expressing pain. The authors concluded that females tend to be perceived as in less pain than men (Zhang et al., 2021). This experiment did not involve healthcare professionals, but this kind of gender bias can pervade all settings including healthcare. A systematic review revealed that healthcare providers do not take women's pain as seriously as men's pain and often psychologized women's pain ("it's all in her head") (Samulowitz et al., 2018). Gender bias influences perceptions of women being more sensitive and emotional to pain and also influences treatment options (Laitner et al., 2021; Samulowitz et al., 2018). For example, healthcare providers are more likely to recommend surgical interventions for men than women (Laitner et al., 2021). Women are also less likely to be prescribed opioids as pain medications and are more likely to be prescribed

antidepressants and to be given mental health referrals for pain compared to men (Samulowitz et al., 2018).

## Activity: Check Your Understanding



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# Timing and Frequency of Screening for and Assessment of Pain

All clients should be **screened for the presence of pain**. If pain is present, then you should **assess the pain**.

**Timing and frequency** of screening for and assessment of pain depends on **several factors**. It can be useful to check with the unit/institution where you work about pain assessment frequency. You should perform routine screening for and assessment of pain at specific times and during certain situations such as:

- **Admission** to a healthcare setting.
- **Primary** healthcare visit.
- **Start of shift** when first assessing a client.
- **Change** in the client's condition (e.g., change in vital signs) or other potential physiological or behavioural signs of pain. Oftentimes, pain is assessed with each set of vital signs.
- **Prior to** a procedure or activity to establish a **baseline** (e.g., walking for the first time postoperatively) as well as during and after a procedure or activity.
- **After** treatment (e.g., after the provision of pain medication such as **analgesics**) and continued reassessment until treatment takes effect. Reassessment is often based on the medication's onset of action (how long the medication takes to begin taking effect), peak effectiveness (how long it takes for the medication to be at its maximum concentration in the body, thus its greatest therapeutic effect) and duration (length of time that a medication produces a therapeutic effect) (Chippewa Valley Technical College, n.d.). Continued reassessment of pain may be needed so that you can

determine whether additional treatment is required.

- When there is a **written order** for pain assessment. For example, physicians and nurse practitioners sometimes provide written orders for pain assessments (e.g., pain assessment every four hours or pain assessment every eight hours).

Pain assessments are often **repeated to evaluate the effectiveness** of treatment and medication. First, you should assess the client's baseline and review the client's chart to get a full picture of the client's pain. The timing of repeat pain assessments will depend on several factors (see **Table 2**). Always **compare your findings to the client's baseline**.

**Table 2:** Pain reassessment.

Factor	Consideration
Time for the medication to take effect.	<p>Some over-the-counter oral pain medications can start taking effect in 15–30 minutes, but peak effectiveness usually takes one hour and up to two hours. Typically, pain is reassessed between <b>30–60 minutes after oral medication</b> is given.</p> <p>Intravenous quick acting opioid pain relievers (e.g., morphine) can take effect within 1–2 minutes with peak effects between 5–15 minutes. Opioids may have even quicker peak effects, e.g., 2–5 minutes for fentanyl (Vahedi et al., 2019).</p>
Specific situation	<p>In acute situations where you are attempting to control the pain quickly with an intravenous medication, you may reassess within <b>2–5 minutes</b>. Additionally, you should assess for adverse effects such as respiratory depression with opioid administration. Do not assume that a client is not in pain because their eyes are closed, or because they are smiling or talking.</p> <p>In other situations, a client may be given an oral pain medication at bedtime; thus, you may not reassess until they wake up or in the morning. You might ask the client to ring their call bell if the pain has not subsided in an hour.</p>

## Contextualizing Inclusivity

Consider forms of pain management other than traditional Western medications when making decisions

regarding pain reassessment. For example, **cannabis** is now legal in Canada, and prescription of medical cannabis has become more common, particularly for cancer pain and neurological conditions such as multiple sclerosis (Health Canada, 2016). Cannabis may be taken alone or in conjunction with other medications and can be taken through inhalation or oral ingestion (foods/oils/capsules). Based on the onset of action (Health Canada, 2016), reassessment may be appropriate within 15 minutes, or within 30 minutes with oral ingestion. As a nurse, you will need to assess the many other forms of pain management that a client may choose to use (e.g., mindfulness meditation, acupuncture, play for children) and assess effectiveness as needed.

An **open-ended and inclusive question** to ask clients is: Tell me about the ways you manage your pain?

Some Indigenous clients may choose to utilize **traditional medicines** instead of, or along with, Western medications. To learn more about treating Indigenous clients using traditional medicines, see [Pain, Pain Killers and Indigenous Peoples: Choose the right medicine for you in partnership with your physician](#).

## Activity: Check Your Understanding



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<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=44#h5p-10>

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# Subjective Assessment Overview

A **subjective assessment** is an important component of evaluating a client's pain. It is often referred to as a **self-report** because the client is reporting and describing their own pain as opposed to your observations as a nurse (objective assessment).

A **cultural humility approach** can help you better understand the meaning of a client's pain. This kind of approach involves having an authentic conversation with the client. How do they understand pain? Some people reserve the word "pain" to describe severe sensations, so they might not refer to a mild symptom as pain. Others may associate pain with vulnerability and use alternative words to describe it. Therefore, if they initially tell you they are not in pain, try rephrasing your question using words such as discomfort, hurt, tenderness, and sensations. When probing further about their pain, it is also a best practice to use the words the client uses.

Another issue is that some clients believe "good" clients do not "complain" about pain. Thus, it is important to show that you care when you ask about the client's pain and use a professional and serious tone. It may be helpful to use permission statements depending on the situation. For example, you may say "pain is common after this procedure, do you have any pain?"

## Contextualizing Inclusivity

Although subjective assessment is an important way to evaluate pain, be aware that not everyone can verbally communicate their pain (e.g., clients who are pre-verbal or non-verbal). Therefore, you should use other types of assessment that focus on **behavioural** and **physiological cues**.

Always remember: **Pain is what the client tells you it is**. This important adage is worth repeating, because unconscious bias and/or long-held myths that have no evidence to support them still influence practice. In addition to institutional racism, there are out-dated beliefs that newborns and elderly do not feel as much pain as others, and that people who use illegal substances do not require pain management.

It's your job to advocate and ensure that decisions are made based on evidence. The client's subjective experience is as important as your objective assessment, because you can't always observe pain.

The **main components** of a subjective assessment include:

- Presence of pain: do they have pain? If so, how long have they had it?
- Location of pain: where is it located?
- Severity/quantity of pain: how bad is the pain?
- Descriptors of pain: how do they describe the pain? Is it



constant or intermittent?

- Associated factors and triggers of pain: are there any associated signs or symptoms with the pain? Is there anything that triggers their pain or makes it worse? What were they doing when the pain started?
- Impact of pain: how is it affecting them?
- Management of pain: have they tried to manage or treat it?

## Priorities of Care

Certain cues require prompt and urgent action. New onset and severe pain are critical findings that require prompt action. This is especially true for chest pain, which could be **angina**, and is considered a first-level priority of care. In this case, ask a colleague to notify the physician or nurse practitioner while you keep the client at rest, assess pulse, blood pressure, and oxygen saturations. Depending on the setting and if appropriate, adhere to existing directives such as order an electrocardiogram and blood work, administer oxygen, initiate intravenous access, and give nitroglycerin and morphine. If you are in a home setting and/or do not have access to these treatments, call 911 if this is new onset angina for the client as they may be having a myocardial infarction. The client can chew and swallow acetylsalicylic acid (usually low-dose ASA, 81 mg) as long as there are no contraindications; this can be helpful to prevent the clot from getting bigger.

## Clinical Tip: Opioid Use, Stigma, and Language Examples

**Opioid** misuse is a serious issue across Canada. Although opioids are beneficial when treating certain types of pain when used as prescribed, the risk for misuse has been described as a crisis in Canada as well as in other countries. Opioid misuse is also a stigmatizing condition and as a result can influence individuals to avoid treatment or not discuss their opioid use.

Try to use a cultural humility and harm reduction approach during your subjective health assessment, with non-judgemental and supporting language and an open interviewing approach. Specific strategies include:

- Do not judge clients or belittle them for their decisions.
- Avoid objectifying language in which people are labeled, such as “addict” and “abuser.”
- Use supportive language such as “substance use disorder” or “a client who uses drugs/substances.”
- Ask questions with an open mind so that you can better understand their opioid use and the reasons behind it.
- Support the agency of clients in making their own decisions even if you disagree with them.
- Use a harm-reduction approach including non-

coercive strategies in which you help them minimize harm in their opioid use.

- Let them know about available supports and resources if they become interested in stopping their use.

Some clients may refuse opioid medications for fear of addiction or because of a history of opioid misuse. Thus, a client-centred and interprofessional approach to pain management is important.

**Check out this additional Video to support your learning:** [Language. How do you talk about addiction?](#) [7:37]

## Activity: Check Your Understanding



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<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=46#h5p-23>

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# Pain Assessment Tools

**Pain assessment tools** are used to explore the relevant dimensions of pain in an organized way. Many have been developed: you should choose one that has been validated (RNAO, 2013). The following sections explore a few different types of pain assessment tools and discuss which may be most appropriate in various contexts.

Choice of the **correct tool** is informed by several factors:

- The reason for assessing. For example, are you assessing the pain to obtain an overview or comprehensive perspective of the pain? Are you assessing the pain to determine the effectiveness of a treatment?
- The client's developmental stage. There are validated tools based on a client's capacity to cognitively appraise their pain and communicate it.
- The client's health status. At times, you will need a quick assessment of pain because the client's health status is critical, or the client is deteriorating. Other times, you will need a more comprehensive understanding of the pain.
- The institution and unit. Many units specify the pain assessment tools to be used so that consistency of assessment is maintained; they may also offer training for all healthcare providers in that specific tool.
- Culture. Some people from different cultural backgrounds in terms of ethnicity and language may not be able to cognitively appraise their pain using some of the common pain tools. Thus, it is important to recognize the limits of pain tools.

## Contextualizing Inclusivity

Everyone experiences pain, but not everyone has the cognitive or language capacity to understand it and optimally communicate it (e.g., newborns, infants, toddlers). Children as young as four can self-report their pain using tools that are appropriate to their developmental stage (Freund & Bolick, 2019). Other pain assessment approaches involve observing behavioural cues (e.g., crying) and physiological measures (e.g., heart rate, blood pressure). When appropriate, a combination of self-report and observation is best (Parker & Brown, 2019). With all children, but particularly those who are cognitively or developmentally delayed, you should partner with their caregiver (e.g., parent) as they are familiar with the child's baseline behavioural cues (Freund & Bolick, 2019).

Let's check out some of the tools!

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# Unidimensional Pain Assessment Tools

**Unidimensional pain tools** assess **one element of pain**, typically **intensity**, which refers to the magnitude or the severity of pain. These unidimensional tools are important because they can be used to:

- Provide a baseline of the severity of a client's pain.
- Determine the need for pain management/treatment.
- Evaluate treatment effectiveness.

For example, if a client has pain, you might manage the pain through repositioning or medication, and then reassess the pain again. Unidimensional pain tools are effective at evaluating pain over time between one time period to the next. However, it is important to note that because they have only one focus, they neglect other dimensions of the pain experience (Lapkin et al., 2021). Another issue is that tools should be selected for each client based on cognitive and cultural factors.

The next sections explore four unidimensional pain tools involving self-report, and that focus on assessing pain intensity.

## Numeric Rating Scale

The Numeric Rating Scale (NRS) is a widely used **11-point pain scale from zero to ten** (Slomp, 2019). When using the NRS, you commonly ask clients: “On a scale of zero to ten with zero being no pain and ten being the worst pain imaginable, how do you rate your pain?”

The NRS tool is used because:



- It is simple to use.
- It gives a quick assessment of the client's pain intensity and provides a baseline.
- It is useful for frequent or repeat pain assessments such as after a treatment or medication is provided.

It is the most commonly used pain tool to **evaluate pain intensity**. However, it is not appropriate to use with young children. The general consensus has been that it can be used with children as young as eight and possibly younger (von Baeyer, 2009). A more recent systematic review found a strong recommendation for its use with children as young as six when assessing acute pain (Bernie et al., 2019). Use of this tool for any client should be based on their developmental age and capacity to engage with numbers. Again, keep in mind that the NRS is unidimensional: it only measures pain intensity at a specific time period (Slomp, 2019).

## Visual Analogue Scale

The Visual Analogue Scale (VAS) provides a **horizontal (or vertical line) with two anchors**. The left side (or bottom) is marked “no pain” and the right side (or top) is marked “worst imaginable pain.” Clients may use their finger to point where on the line where their pain is; digital versions are also now available (see **Figure 3**).

The VAS is used for similar reasons as the NRS, but it is useful when clients do not resonate with rating pain according to numbers. It is best used with adults considering that a recent systematic review found a weak recommendation for its use with children when assessing acute or chronic pain (Bernie et al., 2019).



**Figure 3:** Example of VAS

## Verbal Descriptor Tool

The Verbal Descriptor Tool (VDT) provides an opportunity for clients to **describe the intensity of their pain using words** (Pathak et al., 2018). The client is asked: “Which word best describes your pain intensity?” (Karcioglu et al., 2018). Various versions of the VDT have been developed (see **Figure 4**): the descriptors often have numbers associated with them, and additional modifiers of the descriptors such as “very mild” and “very severe” can be added.

The VDT is also used for similar reasons as the NRS, but as with the VAS it is useful when a client does not resonate with rating pain according to numbers and prefers descriptors.



**Figure 4:** Verbal Descriptor Tool

## FACES Pain Scales

Several pain scales involving faces have been developed specifically for children to rate the intensity of their pain. Young children do not have the same cognitive and linguistic capacity as adults, so these types of scales are more developmentally appropriate, particularly for those aged 3–7 years and even older depending on their developmental age. The two most common are the Wong-Baker FACES Pain Rating Scale and the FACES Pain Scale – Revised Version (FPS-R).

The **Wong-Baker FACES Pain Rating Scale (Figure 5)** is a self-assessment tool that must be understood by the patient, so they are able to choose the face that best illustrates the physical pain they are experiencing. The tool is not for use with infants or patients who are unresponsive. It is not a tool to be used by a third person (i.e., parents, healthcare professionals, or caregivers) to assess the patient's pain. This tool has actually been used across the lifespan as well including in adolescents and adults.

Ask the child to **choose the face that best shows the physical pain** they are experiencing. You may need to explain what the faces

mean: Face 0 doesn't hurt at all, Face 2 hurts just a little bit, Face 4 hurts a little bit more, Face 6 hurts even more, Face 8 hurts a whole lot, and Face 10 hurts as much as you can imagine.



©1983 Wong-Baker FACES Foundation. www.WongBakerFACES.org  
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**Figure 5:** Wong-Baker FACES® Pain Rating Scale Wong-Baker FACES Foundation (2019).

Similarly, the [Faces Pain Scale – Revised Version](#) (FPS-R) provides a series of six faces with different expressions to illustrate pain (Hicks et al., 2001) – check out the FPS-R by clicking on the link. This **revised version does not include faces with smiles or tears**, which can help remove bias; for example, a smiling face may be interpreted as happiness, which does not necessarily mean the individual is not in pain.

When using this scale, say to the child something like: “These faces show how much something can hurt. This face [point to left-most face] shows no pain. The faces show more and more pain [point to each from left to right] up to this one [point to right-most face] – it shows very much pain. Point to the face that shows how much you hurt” you feel right now (Hicks et al., 2001, p. 176).

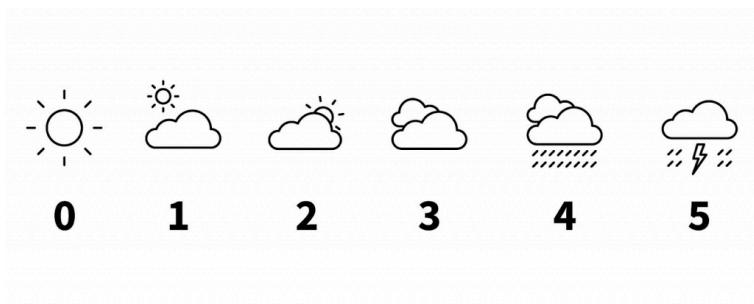
Based on the findings of a systematic review, the [FPS-R](#) is recommended for children as young as seven for acute pain (Birnie et al., 2019).

## Contextualizing Inclusivity

Like all tools, including pain tools, the FACES pain scale may not translate to all cultures. The Northern Pain Scale is another adapted version of the FACES scale. It was translated into Inuktitut and recreated with facial expressions and dress to reflect the culture of Inuk people in Canada (Ellis et al., 2011). As a nurse, it is important to consider the use of culturally relevant pain tools.

## Sun-Cloud-Pain Scale

Another scale that may be more relevant to assess pain and other symptoms in clients from certain cultures is the **Sun-Cloud-Pain Scale**. On this scale, 0 indicates that the client feels very well, whereas 5 indicates that the client is feeling very unwell specific to their pain (see **Figure 6**) (Lapum et al., 2019).



**Figure 6:** Sun-Cloud-Pain Scale. Graphic created using icons by Linseed Studio from the Noun Project.

## Activity: Check Your Understanding



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=50#h5p-24>

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# Multidimensional Pain Assessment Tools

Multidimensional pain assessment tools are used to assess the **many ways that pain affects a person**. Although unidimensional pain assessment tools are typically used to assess pain intensity, particularly when frequent measurements are needed, multidimensional pain assessment tools are used to obtain a **comprehensive understanding of pain**.

Many different multidimensional pain assessment tools may be used depending on the client population, the reason for the assessment, and the unit/hospital/area of care you work. For example, when treating certain populations such as pre-verbal and non-verbal clients, your assessment may focus on behavioural cues. When treating clients with chronic pain, you may focus on understanding the many ways that pain affects a person including psychologically, socially, and functionally.

The following sections explore:

1. PQRSTU mnemonic.
2. Brief Pain Inventory.
3. Pain scales related to cognitive impairment.
4. FLACC Pain Tool.
5. Behavioural Pain Scale and Critical Care Pain Observation Tool.

Let's check out these tools!



# PQRSTU Mnemonic

The **PQRSTU mnemonic** is a **multidimensional pain assessment tool** that is commonly used in practice to evaluate several components of pain beyond just intensity (see **Table 3**). It is used when first assessing a client's report of pain on initial assessment. It is generally used for adolescents and adults, but you may be able to simplify some of the questions for younger children, possibly age five and up. For example, you might use the word "hurt" or "owwie."

The order of questions you ask will depend on the client's responses and also on priority. What do you need to know first? When a client first reports pain, you will usually ask about the region (where it is located) and the intensity. Pay attention to responses that appear not to align. For example, if a client responds to the question about the quantity of pain by saying "the pain isn't too bad," but then rates the severity of their pain as being 8/10, you should probe further in a non-confrontational manner. You might say, "I noticed you rated your pain fairly high, at 8/10, but you said it isn't too bad. Can you tell me more about that?"

The PQRSTU mnemonic is similar to the **McCaffrey Initial Pain Assessment Tool**, which assesses the various components of pain beyond intensity (e.g., location, quality) as well as how the client expresses their pain and how pain affects them (e.g., sleep, emotions) (McCaffrey & Pasero, 1999). Here is a link to the McCaffrey Initial Pain Assessment Tool: <https://nida.nih.gov/sites/default/files/McCaffreyInitialPainAssessmentTool.pdf>

**Table 3:** PQRSTU mnemonic (Adapted from <https://ecampusontario.pressbooks.pub/healthassessment/>)

PQRSTU	Questions Related to Pain
Provocative Palliative	What makes your pain worse? What makes your pain feel better?
Quality	What does the pain feel like? Note: If the client struggles to answer this question, you can provide suggestions such as “aching,” “stabbing,” “sharp,” “burning.”
Quantity	How bad is your pain? <b>Note:</b> for example, the client may say “very bad.”
Region and Radiation	Where do you feel the pain? Can you point to where you feel the pain? Do you feel the pain elsewhere? Does it radiate anywhere?
Severity (used interchangeably with intensity)	How would you rate your pain on a scale of 0 to 10, with 0 being no pain and 10 being the worst pain you’ve ever experienced?

Timing	When did the pain start? What were you doing when the pain started? Where were you when the pain started? Is the pain constant or does it come and go? If the pain is intermittent, when did it last occur? How long does the pain last? Is there a time of day when it is the worst?
Treatment	Have you taken anything to help relieve the pain? Have you tried any treatments at home for the pain?
Understanding	What do you think is causing the pain? How has it affected your usual activities or daily life? What concerns do you have about your pain?

## Activity: Check Your Understanding



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=54#h5p-25>

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# Brief Pain Inventory

The **Brief Pain Inventory (BPI)** (is a commonly used multidimensional tool for assessing pain in clinical environments (Cleeland, 2009). It was originally developed to assess cancer-related pain, but it is also a valid and reliable measure with other conditions (Cleeland, 2009). For example, a systematic review found a moderate quality of evidence for its clinical use related to postoperative pain assessment (Lapkin et al, 2021).

In comparison to the PQRSTU mnemonic, the **BPI provides a more comprehensive evaluation of pain** and has been more widely tested (Cleeland, 2009):

- It focuses on assessing pain intensity over the past week and interference with a client's daily life.
- It takes 5–10 minutes to complete.
- It can be self-administered by clients who are literate or administered by healthcare professionals when the client has reduced literacy.
- It can be translated into other languages for clients who do not speak English, and has already been validated in many languages including French, Japanese, Chinese, Korean, Italian, Russian, German, and Spanish, among others.

Because of its focus on **assessing pain over time** and **interference with daily lives**, it is commonly used in primary care and for assessing chronic pain. A [long version](#) and [short version](#) are available; the shorter version has become the standard in clinical practice (Cleeland, 2009) – thus we encourage you to review the short version and understand it. Here is a link to a [user guide](#) with information about the tool's development, scoring, **psychometric testing**, and relevant literature.

## Clinical Tip

Provide clients with enough time to complete the BPI. The tool is often used at in-patient units and for clients with chronic pain, who may require additional time because pain can affect cognitive functioning. Many in-patient oncology units have clients complete the BPI on admission, and then weekly, to evaluate their pain over periods of time.

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# Pain Scales: Clients with Cognitive Impairment

Assessment of pain in clients who are **cognitively impaired** requires a different approach because they may not be able to optimally communicate their pain via self-report. Instead, you **may need to use observational tools** that incorporate and sometimes rely on dimensions of pain such as behavioural and physiological cues (Lichtner et al., 2014). For example, clients with late-stage dementia often have limited cognitive capacity and are unable to understand and answer questions.

Systematic use of pain assessment tools enables better evaluation and management of pain in individuals who are cognitively impaired (Ludvigsson et al., 2020). However, to date no one tool has been widely adopted and internationally recognized for assessing pain in clients who are cognitively impaired (Kunz et al., 2020).

Over the last 30 years, many clinicians and researchers have developed and evaluated various tools for this population. One commonly used tool is the Abbey Pain Scale, and another more recent tool is the Pain Assessment in Impaired Cognition (PAIC15). All tools should be used with caution considering the complexity of psychometric testing of the validation and clinical utility of pain assessment tools with clients who have cognitive impairments like dementia (Lichtner et al., 2014).

## Abbey Pain Scale

Development of the Abbey Pain Scale began in the 1990s, with the goal of **assessing pain in people with late-stage dementia whose communication is severely impaired** (Abbey, 2004). The scale is

appropriate for clinical practice because it is simple and efficient to use and can be used by various healthcare providers; it is not time consuming and is effective with a reasonable degree of validity.

As shown in **Figure 7**, the scale is based on **behavioural observations** including:

- Vocalization.
- Facial expression.
- Changes in body language.
- Behavioural changes.
- Physiological changes.
- Physical changes.

The tool is a movement-based assessment, and therefore should be performed while moving a client such as assisting them to sit or bathing them (Abbey et al., 1998; 2002). Movement can induce pain, so assessment during movement is most informative. Higher scores indicate higher pain levels.

The Abbey Pain Scale is commonly used in long-term care settings where reassessment over time is frequently required.



**Abbey Pain Scale**  
For measurement of pain in people with dementia who cannot verbalise.

**How to use scale:** While observing the resident, score questions 1 to 6

**Name of resident:** .....

**Name and designation of person completing the scale:** .....

**Date:** ..... **Time:** .....

**Latest pain relief given was:** ..... **at** ..... **hrs.**

**Q1. Vocalisation**  
eg: whimpering, groaning, crying  
Absent 0 Mild 1 Moderate 2 Severe 3      **Q1**

**Q2. Facial expression**  
eg: looking tense, frowning, grimacing, looking frightened  
Absent 0 Mild 1 Moderate 2 Severe 3      **Q2**

**Q3. Change in body language**  
eg: fidgeting, rocking, guarding part of body, withdrawn  
Absent 0 Mild 1 Moderate 2 Severe 3      **Q3**

**Q4. Behavioural Change**  
eg: increased confusion, refusing to eat, alteration in usual patterns  
Absent 0 Mild 1 Moderate 2 Severe 3      **Q4**

**Q5. Physiological change**  
eg: temperature, pulse or blood pressure outside normal limits, perspiring, flushing or pallor  
Absent 0 Mild 1 Moderate 2 Severe 3      **Q5**

**Q6. Physical changes**  
eg: skin tears, pressure areas, arthritis, contractures, previous injuries.  
Absent 0 Mild 1 Moderate 2 Severe 3      **Q6**

**Add scores for 1 – 6 and record here**  **Total Pain Score**

**Now tick the box that matches the Total Pain Score**

0 – 2 No pain	3 – 7 Mild	8 – 13 Moderate	14+ Severe
------------------	---------------	--------------------	---------------

**Finally, tick the box which matches the type of pain**

Chronic	Acute	Acute on Chronic
---------	-------	------------------

Dementia Care Australia Pty Ltd  
Website: [www.dementiacareaustralia.com](http://www.dementiacareaustralia.com)

Abbey, J; De Bellis, A; Piller, N; Esterman, A; Giles, L; Parker, D and Lowcay, B.  
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**Figure 7: Abbey Pain Scale.**

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Abbey, J; De Bellis, A; Piller, N; Esterman, A; Giles, L; Parker, D and Lowcay, B.

Funded by the JH & JD Gunn Medical Research Foundation 1998 – 2002

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## Clinical Tip

Nurses play an important role in assessing pain with clients who are cognitively impaired, because they provide the most regular care and are aware of the client's baseline behaviours. It is important to assess pain regularly when establishing a baseline. Remember that the Abbey Pain Scale is designed to be used when the client is in movement: you can assess pain while assisting the client with bathing, dressing, or transferring to a chair. The assessment is quick, so you can use it frequently, for example hourly and then every four hours over a 24-hour period until an effective pain-relieving intervention is achieved.

## Pain Assessment in Clients with Impaired Cognition (PAIC<sub>15</sub>)

The [PAIC<sub>15</sub> Scale](#) is a recently developed and interesting tool for use with individuals who are **cognitively impaired**, particularly those with dementia. It was developed through a large multidisciplinary

collaboration of clinical, research, and methodological experts, including nurses, from several European countries (Kunz et al., 2020). The team of experts developed this new meta-tool over a period of seven years, during which team members empirically evaluated items from all existing pain-related observational tools (including the Abbey Pain Scale) and reached consensus on the 15 most promising items, based on validity and reliability (Kunz et al., 2020).

As shown in **Figure 8**, the PAIC15 includes of **15 descriptors with five items** each for:

- Facial expression.
- Body movements.
- Vocalization.

The PAIC15 is helpful when you have limited time with the client, as you can quickly assess pain either at rest or with movement. You can go to the PAIC15 Scale website for [additional information](#) about the tool and free [online training](#).

Name of the patient: \_\_\_\_\_

Date: \_\_\_\_\_

## Pain Assessment in Impaired Cognition (PAIC 15)

Item	Meaning of Items	Not at all	Slight degree	Moderate degree	Great degree	Not scorable
<b>FACIAL EXPRESSION</b>						
<b>Frowning</b>	lowering and drawing brows together	0	1	2	3	x
<b>Narrowing eyes</b>	narrowed eyes with tension around the eyes	0	1	2	3	x
<b>Raising upper lip</b>	upper lip raised, nose may be wrinkled	0	1	2	3	x
<b>Opening mouth</b>	the lips are parted, jaw is dropped	0	1	2	3	x
<b>Looking tense</b>	facial display of strain or worry	0	1	2	3	x
<b>BODY MOVEMENTS</b>						
<b>Freezing</b>	stiffening, avoiding movement, holding breath	0	1	2	3	x
<b>Guarding</b>	protecting affected area, holding body part, avoiding touch, moving away	0	1	2	3	x
<b>Resisting care</b>	resisting being moved or resisting care, being uncooperative	0	1	2	3	x
<b>Rubbing</b>	tugging or massaging affected area	0	1	2	3	x
<b>Restlessness</b>	fidgeting, wringing hands, rocking back and forth	0	1	2	3	x
<b>VOCALIZATION</b>						
<b>Using pain-related words</b>	using pain words, like "ouch", "ow", or "that hurts"	0	1	2	3	x
<b>Shouting</b>	using a loud voice to express words	0	1	2	3	x
<b>Groaning</b>	making a deep, inarticulate sound	0	1	2	3	x
<b>Mumbling</b>	uttering words and/or sounds indistinctly	0	1	2	3	x
<b>Complaining</b>	expressing being unhappy, sick, uncomfortable, and/or in pain	0	1	2	3	x
<b>SUM=</b>						

In which situation did you observe the person?

☐

At rest

☐

During an activity of daily living (ADL), please describe:

☐

During guided movement, please describe:



PAIC15

**Figure 8:**

PAIC-15

(Attribution:

Abbey, J; De

Bellis, A;

Piller, N;

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# FLACC Pain Tool

The **Face, Legs, Activity, Cry, and Consolability** (FLACC) tool was originally designed to **assess pain in nonverbal (young) children**, based on **observations of behaviours** (Merkel et al., 1997). As suggested by its name, the tool includes five categories:

- Face.
- Legs.
- Activity.
- Cry.
- Consolability.

The maximum total score is 10, with scores for each category ranging from 0 to 2 (Merkel et al., 1997). This is helpful, because the FLACC findings can be easily compared to those of other common pain rating systems that are rated out of 10, such as the NRS (Voepel-Lewis et al., 2010).

The FLACC tool can be used with **children as young as 2 months of age or any child who is too distressed or sedated to accurately self-report** (Freund & Bolick, 2019). It has demonstrated good psychometric testing (Voepel-Lewis, 2010) and has been translated into several languages including French and Chinese, so it can be used across many client populations (Voepel-Lewis, 2010). It has also been used in practice with non-verbal adults with cognitive impairment and critically ill adults (Voepel-Lewis, 2010).

A **revised FLACC pain assessment tool** is also available, with additional behavioural descriptors for clients with cognitive impairment (Malviya et al., 2005). To **compare the FLACC and the revised FLACC**, check out the **table** at this link: <https://www.connectedcare.sickkids.ca/quick-hits/2019/8/29/volume6-efnk4-ny48-max8h-45bm7>

## Clinical Tip

Like all behavioural tools, the FLACC **cannot distinguish between pain and other forms of distress** (Parker & Brown, 2019). Think critically when interpreting behaviours that may be pain-related and when making treatment decisions based on the FLACC total score. You should observe the client for at least 2–5 minutes before assigning a score (Parker et al., 2019).

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# Pain Assessment in Critical Care

A vital part of client care is assessing pain assessment in those who are **critically ill and/or in intensive care**. If they are alert and oriented, they may be able to self-report. They can do so verbally or by pointing to a number if they cannot speak, but clients are often too critically ill to communicate. Additionally, they may be unable to self-report due to factors such as altered levels of consciousness, distress, sedation, and mechanical ventilatory support (Gélinas, 2016; Suzuki, 2017).

In this context, the **nurse's observations of pain indicators** are **vital to pain assessment**. These observations are most often focusing on the **behavioural dimensions** of pain. Typically, **physiological pain indicators** do not provide a valid assessment of pain because vital signs are influenced by the client's condition (i.e., pathological processes) and medications (i.e., **sedation** and **vasopressors**) that are often used in critical care situations.

Of the many tools used in clinical practice, the Behavioral Pain Scale and the Critical Care Pain Observation Tool are recommended for assessing pain intensity, and often used in critical care (Suzuki, 2017). They are also the most validated and translated tools (Kerbage et al., 2021).

## Behavioral Pain Scale (BPS)

The development and psychometric testing of the BPS was published in 2001 by Payen and colleagues (2001), and used for **assessment of pain in critically ill clients who are on mechanical ventilation**. It is user-friendly and has strong psychometric

properties in terms of assessing pain in non-communicative critical care clients (Payen & Gélinas, 2014).

The BPS incorporates **three items**:

- Facial expression.
- Upper limb movement.
- Compliance with ventilation.

(Payen et al., 2001).

Each item is scored from one to four with higher scores indicating more pain. The cut-off score for when pain is identified as present is greater than five (Payen et al., 2007).

See external link to view the tool: <https://www.mdcalc.com/calc/3622/behavioral-pain-scale-bps-pain-assessment-intubated-patients>

## Critical-Care Pain Observation Tool (CPOT)

The CPOT was developed for assessing **pain in ventilated and non-ventilated clients** (Gélinas et al., 2006). It was initially developed in French and later translated into English (Gélinas et al., 2009) and other languages.

The CPOT has **four components**:

- Facial expression.
- Body movement.
- Muscle tension.
- Compliance with the ventilator for intubated clients or vocalization for extubated clients.

Each of these sections is scored from 0 to 2, yielding a total score from 0 to 8 (Gélinas et al., 2006). The cut-off score indicating pain is a score of greater than two (Gélinas et al., 2009).

### **Tips for using the CPOT:**

- While at rest, observe the client's facial expression, body movements, and presence of vocalization for one minute.
- Next, perform a passive range of motion of the lower arm (flexion and extension of elbow) while holding the client's hand and elbow to assess for muscle tension.
- Upon movement (such as turning them on their side), observe the client's facial expression, body movements, and presence of vocalization.

(Kaiser Permanente National Patient Care Services, 2011).

Check out this external link for the CPOT: <https://kpnursing.org/professionaldevelopment/CPOTHandout.pdf>

For more information, check out this video on the [Critical-Care Pain Observation Tool: How to use it in your ICU](#) Additional guidelines and instructions on using the tool can be located at: <https://kpnursing.org/professionaldevelopment/CPOTHandout.pdf>

### **Clinical Tip**

Use critical thinking when assessing pain in a critical care client, because self-reporting is often compromised. In critical care, you will encounter situations where pain indicators other than behavioural responses should be considered. Behavioural pain assessment tools should only

be used when the client's motor function is intact: consider other practices for clients with limited or altered motor function such as in cases of deep sedation, paralysis, and brain injury (Gélinas, 2016). Another limitation of behavioural pain assessment tools is they only evaluate the presence of pain and no other characteristics such as intensity (Kerbage et al., 2021).

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# Summary: Subjective Assessment and Pain Assessment Tools

Subjective assessment of pain is an integral step of pain management. Be aware of your own biases concerning pain: do not make assumptions. The main focus of subjective assessment is self-report, which can be elicited through a verbal account or having the client point or write it down.

The use of pain tools is also important in combination with subjective and objective forms of assessment. Many tools are available to assess pain; we have introduced you to a few, but you will come across others in your clinical practice and from reading the literature. **Best practices in tool selection** should focus on the reason for the assessment, developmental considerations, and the client situation and acuity. Another part of decision-making considering tool selection is related to where you work, as units and areas of care will commonly identify specific tools and procedures in using these tools. They may also provide training related to tool implementation, with the goal of ensuring all healthcare practitioners use it consistently and as it was designed. See summary in **Table 4**.

**Table 4:** Summary of pain tools.

Tools	Description
Numerical Rating Scale	Most commonly used tool with older children and adults who are able to rate their pain on a scale of zero to 10. Recall: this tool focuses on rating of pain severity only.
PQRSTU mnemonic	Commonly used in many settings and populations when a more comprehensive understanding of pain is needed, beyond intensity.
Brief Pain Inventory	Used to elicit a more comprehensive understanding of pain and is often used in primary care settings, in-patient units, and to assess chronic pain.
Abbey Pain Scale and PAIC15	Commonly used for older clients with cognitive impairments such as dementia.
FACES Pain Scale-Revised Version	Often used with young children, who can point to the face that corresponds to their pain level
FLACC Pain Tool	Used with pre-verbal or non-verbal children as young as 2 months of age or any children who are too distressed or sedated to accurately self-report. It has also been used with other populations including non-verbal adults with cognitive impairment and critically ill adults.
Behavioral Pain Scale and the Critical-Care Pain Observation Tool.	Common tools used in critical care that have a focus on behavioural dimensions of pain.

## Clinical Tip

Pain intensity ratings are often categorized by healthcare providers as follows:

- 1–3: Mild pain.
- 4–6: Moderate pain.
- 7–10: Severe pain (and sometimes a 10 or above may be described as very severe).

These **ratings** and **categories** can be useful to provide a baseline for pre- and post-pain treatment so you know whether treatment has been effective for this specific client. However, the **categories above are qualitative descriptors** that have a subjective element to them and the **potential for bias**. For example, you might categorize a client's pain as moderate if they have rated it a five, but if asked, the client might describe their pain as severe. Therefore, it is important to engage in comprehensive assessments that are client-centred and be **careful about making judgements** about the “number” the client provides.

Determining whether treatment is needed is dependent on the **acuity of the situation** and the **specific client**. Each situation is different in terms of an acceptable level of pain. For example:

- In an acute care situation when a client is having



angina pain, treatment should result in no pain. With angina pain, think about the pathological processes leading to the pain (i.e., narrowing coronary arteries in which insufficient blood and oxygen is feeding the heart muscle). Treatment should resolve this pathological process and result in no pain.

- In a client who has chronic pain related to arthritis, typically treatment should result in no pain or to a level that is manageable for the client and does not significantly interfere with their functioning.

Depending on the situation, remember that treatment includes many possibilities such as medication, repositioning, activity, distraction, and other modalities.

## Priorities of Care

Some of the main priorities of care related to pain assessment include:

- **Angina pain:** this is a critical finding that requires immediate action.
- A **significant increase** in pain, particularly when rated higher on intensity scales and the pain does not respond to treatment (e.g., medication). An increase

in pain should prompt you to think critically about what is going on and what could be causing the increase. In this case, a full subjective and objective assessment of the pain is required and it should be promptly reported to the physician or nurse practitioner.

- **Inadequately managed postoperative pain** is of concern because of the physiological effects of pain on the body, such as tachycardia and hypoxia. Additionally, poorly controlled postoperative pain has been correlated with prolonged opioid use (Goesling et al., 2016). Thus, if the prescribed medications are not controlling the pain, you should do a full subjective and objective assessment of the pain and discuss with the healthcare team alternative medications and pain management approaches.
- **Pain upon movement with a suspected fracture.** Complications associated with fractures include **hemorrhage** and blood vessel damage, which can cause **ischemia** distal to the fracture due to a disruption in blood flow, nerve damage, and **pulmonary embolism** (usually associated with hip and pelvis fractures). Therefore, during the acute period you should immobilize the affected area/limb and continually assess peripheral blood flow (temperature, pulses), quality of breathing, breath sounds, respiration rate, and heart rate. When blood flow is disrupted distal to the periphery, this can cause cool skin temperature and decreased pulse force or absent pulse in the affected limb. Notify the physician or nurse practitioner of this pain and any associated critical findings immediately.

- **Back pain associated with potential spinal cord compression:** this is a serious issue that may require urgent intervention. The client should remain at rest while you report findings to the physician or nurse practitioner. Compression may be suspected with new onset and severe back pain associated with loss of bladder and/or bowel function and numbness and tingling in the arms and/or legs.

## Activity: Check Your Understanding



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<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=66#h5p-37>

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# Objective Assessment

It is always important to perform an objective assessment following a subjective assessment, but this is particularly the case for infants, young children, and non-verbal clients who may have difficulties with self-reporting.

The type of objective assessment used will depend on the location of the pain, the related body systems, and the acuity of the situation. Specific focused assessments on a body system may be necessary. For example, if a client describes knee pain, you should do a focused assessment on the musculoskeletal system. If a client describes chest pain, you should do a focused assessment on the cardiovascular and the respiratory system and possibly the musculoskeletal system.

The objective assessment does not follow a specific order; it depends on the acuity of the situation and the stability of the client. Common components of an objective assessment of pain include:

- **Full set of vital signs.**

Vital signs can be affected by pain, particularly acute pain. Collection and assessment of vital sign data may provide important information related to the client's stability and the potential for clinical deterioration. Vital signs are also an important component of pain tools that include physiological measures; these can be particularly helpful in clients who are pre-verbal or non-verbal such as newborns, young children, clients that may have a developmental challenge, and clients who are unconscious. However, vital sign changes cannot help you differentiate between pain and other forms of distress such as fear and anxiety. You should always consider the context when interpreting vital signs, because they can be affected by level of consciousness, medications, and sedation. Therefore, your clinical judgement will be based on a comprehensive subjective and objective assessment, along with

critical thinking.

- **Inspection of the area.**

Typically, you will inspect the area on the body where a client indicates they are having pain. Inspection is performed bilaterally in which you compare the left side to the right side. For example, if a client is having eye pain, you should compare the left eye to the right eye. Inspect for and note any abnormalities such as discoloration (e.g., redness), bruising, swelling, scarring, incisions, masses, deformities, asymmetry, lesions, non-intact skin, and pressure injuries. With chest pain, you should also inspect for cardiac heaves (forceful movements observed on the skin over the chest wall) and epigastric pulsations. With abdominal pain, you should also inspect for abdominal contour and peristaltic movements.

- **Palpation of the area.**

After conducting a subjective assessment, you should palpate the area (and related areas) in which the client is having pain. Palpation is performed bilaterally: compare the left side to the right side. For example, if a client is having left shoulder pain, you should palpate the right shoulder first and then the painful left shoulder. Similarly, if a client is having abdominal pain, you should palpate the painful area last. During palpation, you should assess skin temperature, swelling, masses, deformities, and **crepitation** if associated with a joint. You should also observe any signs of pain during palpation, such as a change in respiration (e.g., holding their breath), facial grimacing, withdrawing their body/limb, and guarding.

- **Auscultation and percussion.**

Perform auscultation and percussion when a client is describing chest or abdominal pain. For example, with chest pain, you should auscultate the lungs, and the apical pulse and cardiac valves. With abdominal pain, you should auscultate the

abdomen for bowel sounds and percuss the abdominal area.

## Clinical Tip

Always compare the right and left side of the body when inspecting and palpating, because the best standard of comparison is the client's own anatomy. The presence of a bilateral versus a unilateral finding is often of clinical significance. For example, the left ankle should be symmetrical with the right ankle. The presence of edema in one ankle versus both ankles is meaningful when making judgements about the underlying pathology.

When palpating an area, be aware of responses that may be categorized as allodynia or hyperalgesia. For example, if you press gently on an area (a stimulus that does not normally result in pain) and the client communicates pain, this is considered allodynia. Additionally, if you press firmly on an area (a stimulus that would normally result in pain) and the client communicates an exaggerated response to the pain, this is considered hyperalgesia. These conditions are different, but may coexist in the presence of diseases such as migraines and diabetes.

# Clinical Judgement: Case Study

A 78-year-old client in a long-term care home tells a personal support worker (PSW) that they are going to stay in bed and skip breakfast. The PSW asks “are you sure?” The client smiles and says “yes dear, thank you.” The PSW asks the client if they can bring them breakfast and the client states “no.” The PSW notifies the nurse who says “I am going to check on the client since they just had hip surgery three weeks ago and were just transferred back home here a week ago. If I recall, their pain was fully assessed and controlled last evening before bed.”



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=70#h5p-21>

# Key Takeaways

- Pain is a complex phenomenon that is often conceptualized as an unpleasant, sensory experience associated with, or resembling that associated with, actual or potential tissue damage.
- Although self-report is generally considered the gold standard, pain can affect individuals in many ways, so a multifaceted approach to assessment is required.
- If you are not aware of your cultural biases, you may judge the validity of another person's pain based on your own answers.
- Always remember: pain is what the client tells you it is. This is an important tip because of the unconscious bias and myths concerning pain that result in institutional racism and ageism.
- Pain assessments are often repeated to evaluate the effectiveness of treatment and medication.
- Choosing the correct pain tool, and using a combination of subjective and objective assessments along with critical thinking, are vital to the accuracy of your assessment.



# INTEGUMENTARY SYSTEM

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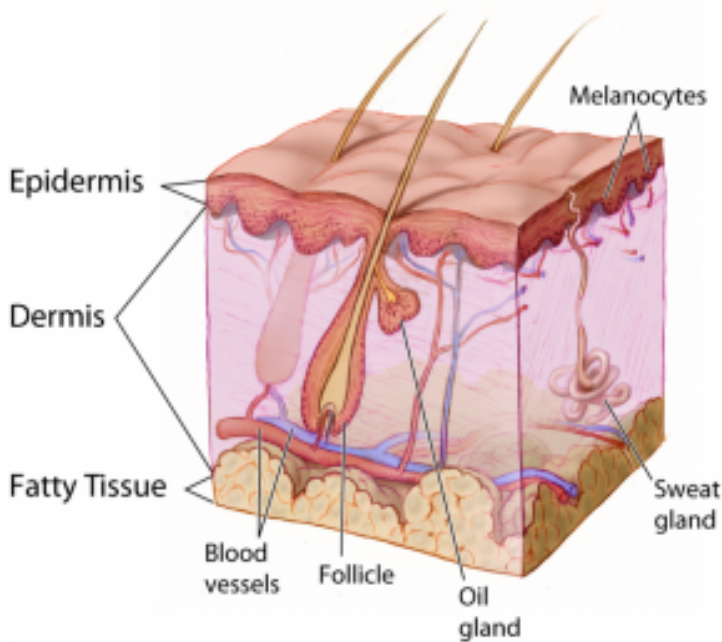
# Learning Outcomes

1. Apply subjective assessment skills.
2. Apply objective assessment skills.
3. Use clinical judgment.
4. Integrate health promotion interventions into actions.
5. Integrate an inclusive approach to integumentary assessment.

# Introduction to Integumentary System

The integumentary system includes the skin, hair, nails, and **sebaceous** and sweat glands. It has important functions including thermoregulation, sensory functioning, ensuring fluid balance, serving as a protective barrier to external substances, and providing immune defense against foreign bodies.

The integument can be an indicator of the client's general health status. For example, the integumentary system can signal other systemic functions of the body like **diaphoresis** during cardiac events, **cyanosis** related to respiratory insufficiency and other conditions, and **pallor** during times of stress and other conditions. As a nurse, it is important to hone your assessment skills and pay close attention to potential cues that may signal underlying concerns that require your intervention. See **Figure 1** for an anatomical overview of the integumentary system.



**Figure 1:** Integumentary system anatomy.

(Image in public domain and adapted from the National Cancer Institute: [https://commons.wikimedia.org/wiki/File:Anatomy\\_The\\_Skin\\_-\\_NCI\\_Visuals\\_Online.jpg](https://commons.wikimedia.org/wiki/File:Anatomy_The_Skin_-_NCI_Visuals_Online.jpg))

You have already learned about the anatomy and physiology of the integumentary system: for a quick overview see <https://youtu.be/OxPICkTKhzY>

You need a basic understanding of disease-specific presentations to effectively interpret findings from your assessment. Be alert to signs and symptoms of greater systemic issues that may require further assessment and possibly immediate intervention. For example, Cullen's sign (**Figure 2**) is a serious concern: it appears as bruising and edema of the subcutaneous fatty tissue around the

navel and can be an indication of acute pancreatic trauma and/or internal bleeding. Certain skin symptoms can also prompt the use of personal protective equipment (PPE); for example, small flat red spots that appear on the face and spread down the body may be an indication of **measles (Figure 3)**, necessitating airborne precautions.



**Figure 2:** Cullen's sign.

(Attribution: Photo by Herbert L. Fred, MD and Hendrik A. van Dijk - <http://cnx.org/content/m14904/latest/>, CC BY 2.0, <https://commons.wikimedia.org/w/index.php?curid=5038484>)



**Figure 3:** Measles.

(Attribution: This photo is in the public domain in the United States because it is a work prepared by an officer or employee of the United States Government as part of that person's official duties under the terms of Title 17, Chapter 1, Section 105 of the US Code. [https://commons.wikimedia.org/wiki/File:Measles\\_child\\_Philippines.jpg](https://commons.wikimedia.org/wiki/File:Measles_child_Philippines.jpg))

Contextualization of integumentary issues in relation to other symptomatology like fever, cough, and inflammation can provide insight into underlying conditions. **Table 1** provides some general descriptions related to the integument and underlying pathophysiology. With experience, you will learn to identify patterns, recognize cues, and begin to discriminate between **benign** skin conditions and skin conditions that require further investigation.

**Table 1:** General descriptions of integument pathophysiology.

<b>Integumentary grouping</b>	<b>Examples</b>	<b>Com</b>
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<p><b>Skin trauma</b></p> <p>Trauma can affect a single or multiple layers of the skin as a result of injury or illness.</p>	<p>Burns, scars, cuts, tears of the skin, keloids (thick, raised scars).</p>  <p>Keloid. (Attribution: Photo by Htirgan – Own work, CC BY-SA 3.0, <a href="https://commons.wikimedia.org/w/index.php?curid=32782658">https://commons.wikimedia.org/w/index.php?curid=32782658</a>)</p>	<p>Swe blee skin ligh</p>
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### Infections

Bacterial, viral, fungal, and parasitic skin infections are caused by various pathogens and can range from mild to severe. Many skin infections require treatment.



### Shingles.

(Attribution: Photo by James Heilman, MD – Own work, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=14082247>)

Viral: Human papillomavirus (HPV), herpes zoster virus, warts, COVID-19, shingles.

Bacterial: Staphylococcus-aureus, Methicillin-resistant Staphylococcus aureus (MRSA), impetigo, cellulitis, boils, and abscesses.

Fungal (typically skin and mucosal surfaces): Tinea corporis (ringworm), tinea pedis (athlete's foot), candidosis (yeast infection), nail fungus.


Parasitic: Lice, bedbugs.

Other stings and bites that can cause infection: Spider bites, ticks, animal bites.





Tick bite with bull's-eye rash (an early sign of Lyme disease).

(Attribution: CDC / James Gathany – <https://phil.cdc.gov/Details.aspx?pid=9874>, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=91609710>)

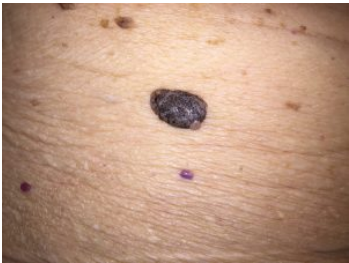
<p><b>Auto-immune and/or inflammatory disorders causing lesions/eruptions (acute and chronic)</b></p> <p>Regional or generalized, may involve inflammation of the skin.</p>	<p><b>Psoriasis, eczema, seborrheic dermatitis, vitiligo, lupus, alopecia.</b></p>  <p>Alopecia.</p> <p>(Attribution: Photo by Abbassyma at English Wikipedia - Transferred from en.wikipedia to Commons, Public Domain,  <a href="https://commons.wikimedia.org/w/index.php?curid=3121007">https://commons.wikimedia.org/w/index.php?curid=3121007</a>)</p>	<p>Eczema          definition          dermatitis          (deep          color          hair)</p>
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<p><b>Metabolic and nutritional disorders</b></p> <p>Poor nutrition or absorption issues can lead to vitamin deficiencies. Excess vitamins can also lead to cutaneous abnormalities.</p>	<p>Vitamin A, C, D, E, K, B1, B2, B3, B6, B9, B12, iron, zinc, and selenium deficiencies.</p> <p>Vitamin A, E, and selenium excess.</p>	<p>Vari nutr dern hyp</p>
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<p><b>Vascular disorders</b> Cutaneous vascular disorders commonly involve arteries, veins, and/or lymphatic vessels.</p>	<p>Ulcers, <b>cherry angiomas</b>, venous insufficiency.</p>  <p>Venous insufficiency. (Attribution: Photo by Ashashyou – Own work, CC BY-SA 4.0, <a href="https://commons.wikimedia.org/w/index.php?curid=122884459">https://commons.wikimedia.org/w/index.php?curid=122884459</a>)</p>  <p>Cherry angioma.</p>	<p>Vari insu the s retu (dep due Va angi begi beco over</p>
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<p><b>Psychological and neurological disorders</b></p> <p>Involve interactions between the mind and skin.</p>	<p>Persistent <b>pruritus</b> and <b>prurigo</b>, neuropathic pain (often related to shingles), trichotillomania (a psychiatric condition resulting in compulsive hair pulling).</p>	<p>Irresistible urge to scratch, anxiety, compulsive pulling</p>
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<p><b>Systemic disorders</b></p> <p>The integumentary system can be involved in clinical manifestation of some systemic disorders.</p>	<p>Gout, arthritis, Addison disease, Cushing syndrome, thyroid disease, chronic liver disease, hepatitis, diabetic ulcers.</p>	<p>Vari syste</p> <p>Ge (A Own <a href="http://di.">http://di.</a> <a href="http://di.">inde</a></p>
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<p><b>Neoplastics (abnormal growths) and cancer</b></p> <p>Benign <b>cutaneous neoplasms</b> are very common. Some abnormal growths are benign (non-cancerous). However, some neoplasms become <b>malignant</b> and require intervention.</p>	<p>Benign: Freckles, <b>lentigo</b>, <b>café-au-lait spots</b>, <b>nevi</b>, <b>seborrheic keratosis</b>, wart, <b>cutaneous cysts</b>.</p> <p>Malignant: <b>Atypical nevi</b>, <b>basal cell carcinoma</b>, <b>squamous cell carcinoma</b>, <b>melanoma</b>.</p>  <p>Seborrheic keratosis (the large brown raised lesion).</p>	<p>Vari caus palp skin Ba (A Heil 3.0, <a href="#">or</a></p>
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<p><b>Skin disorders caused by external agents</b></p> <p>Cutaneous adverse reactions can occur because of reactions to drugs or other external agents. Adverse reactions can also occur from heat and cold exposures.</p>	<p>Steven-Johnson syndrome and toxic epidermal necrolysis are rare life-threatening skin disorders where the skin peels and blisters often caused by a medications and infections. Toxic erythema from chemotherapy is a skin reaction including eruptions of red/purple rash and plaques. Photosensitivity is a skin sensitivity when exposed to the sun caused by medications like chemotherapy drugs, HIV medications and antibiotics, frostbite.</p>	<p>Skin after like</p>
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\*genetic disorders not listed

Clinical Tip

Did you know that some dermatological conditions are emergencies? For example, necrotizing fasciitis (a rare bacterial infection also known as flesh-eating disease) can

spread very quickly throughout the body, at a rate of 1 inch per hour. Symptoms include erythema, warmth to the touch, swelling, severe pain, and fever. If not treated immediately, it can lead to **sepsis**, **shock**, organ failure, and even death. As a nurse, you must report these findings to the physician or nurse practitioner so immediate treatment can be started.

## Knowledge Bites: Pathophysiology

How do you distinguish between common viral and bacterial infections? Common characteristics of a bacterial infection are inflammation, **exudate** (such as pus), erythema, swelling, pain, odour. Common characteristics of a viral infection are a grouping/cluster of lesions, generally asymmetrical (one side of body), and specific regions on the body (e.g., mouth, nose, feet, hands).

## Activity: Check Your Understanding

Name the integument pathophysiology images:



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=1031#h5p-53>

# Starting Your Assessment

The integumentary system has fundamental characteristics that you will notice immediately. With more experience, you will learn what to consider during your subjective and objective assessment. See **Table 2** for descriptions of clinical manifestations related to integumentary issues.

**Table 2:** Clinical manifestations of integumentary issues.

Manifestation	Considerations	Examples
<b>Pattern/ distribution</b> Is there a pattern to what you are seeing?	Integumentary issues are rarely random or evenly distributed across the body. Consider the pattern or distribution of the integumental variation.	Rashes that are ring-shaped, linear, or clustered around a blood vessel.
<b>Morphology</b> What is the structure/constitution of what you are seeing?	Consider whether it is presented discretely (singular; e.g., a lesion, growth, tumour), as a grouping/cluster (e.g., infestation, rash), or confluent (small lesions <b>coalescing</b> into a larger lesion).	Pus-filled blisters, movable, squishy lumps, <b>vesicular</b> .
<b>Location</b> Where is the variation located on the body?	Consider nearby anatomical landmarks and other considerations such as moisture, heat, and other exposure (e.g., urine, stool, saliva) in the region.	Rashes around the mouth, around genitalia, limited to the trunk, or on the bottom of feet and palms of hands. Skin breakdown over bony prominences or under compression stockings.
<b>Texture</b> What is the texture of the variation?	Consider whether the variation is dry or wet, scaling or crusted.	Lesions that have crusts, rashes that are scaly in appearance or flaking.
<b>Symmetry</b> Is the integumentary variation distributed symmetrically?	Examine the symmetry of the variation. Is it distributed evenly on the body? Is there an asymmetrical distribution? Is there a generalized variation or is it localized to a specific region?	Rashes that only appear on one side of the body. Skin eruption that is generalized all over the body. Itchiness that is localized to one region of the body.

<b>Colour</b> What colour is the variation?	The colour of the variation (whether generalized or localized to a specific variation) is meaningful. Note the colour and any changes in colour.	Centralized cyanosis. Erythemic rash.
<b>Sensation</b> Is the client experiencing any loss of sensation or <b>dysesthesia</b> ?	Numbness or tingling could be the result of innervation of the integument.	Numbness in extremities. Tingling at the site of a vesicle. Burning sensation associated with a rash.
<b>Other</b> Is the skin weeping? Is blood involved? Consider any odour, size, and changes.	Consider other issues related to the integument, e.g., is the client experiencing fever, nausea, vomiting, anorexia, fatigue? (these types of issues can sometimes suggest a systemic cause).	Weeping: Crusting, hyperkeratosis, or scale. Blood vessels: Visible blood vessels, increased superficial vasculature (telangiectasia). Odour: Foul-smelling ulcers may be infected. Time: What did it look like when it started? Did it change? Size: Petechiae (< 2 mm), purpura (>2 mm), and ecchymosis (1–2 cm).

## Priorities of Care

Always assess levels of acuity related to the integument.  
Certain conditions require immediate attention, while

others may require prompt or gradual interventions.

**Necrosis** (black tissue) is a form of tissue death that is typically associated with a pathological process and requires immediate intervention. Factors that can lead to necrosis include prolonged compression, bacterial infection, injury, disease, and environmental conditions. Necrotic tissue cannot be revived and normally requires debridement (removal).

Depending on the severity, clients with **acute trauma to the integument, burns, or frost exposure** may require urgent intervention. Lacerations and burns can rid the body of fluids and may require immediate fluid replacement (with intravenous). Any **infections that spread quickly** also require immediate intervention. Understanding the cues that prompt critical interventions is an important nursing skill.

## Contextualizing Inclusivity

Persons experiencing homelessness have a higher prevalence of skin infections and non-melanoma skin cancers compared to the general population (Adly et al., 2021). They may find it difficult to access clean water, sanitation, and hygiene facilities. Use a person-centred and non-judgmental approach to help clients manage

integumentary conditions. For example, you could link clients to organizations that provide clean clothing, water, and sanitation if needed. As a nurse, you should use a critical lens to identify health inequities, and this includes advocating for systemic changes to improve health conditions for all.

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# Subjective Assessment

Assessments of the integumentary system may be uncomfortable, embarrassing, or evoke anxiety for the client. It is possible that the client has been avoiding consultation with a healthcare provider for some time and the condition has advanced. The client may be fearful of the outcome of the assessment, for example, with concerns of malignancy.

During your assessment, try to:

- Attend to their concerns and ensure open communication with the client while commending them for seeking care. Ignoring their stress or delayed consultation may reinforce that they should be fearful of their integumentary concern and this could affect their follow-up care.
- Show unconditional positive regard for the client and empathy for their situation; this will help you collaborate with the client.
- Be clear about next steps and what the client can anticipate during their consultation; this is imperative to a positive therapeutic approach.

Start the conversation with “what brings you here today” and pay attention to their response. The client may identify a particular symptom such as itchiness, swelling, or a lump. Their responses should prompt further questions to help you better understand the underlying issue. A systematic way to approach this line of questioning is to use the [PQRSTU](#) mnemonic, which can help ensure you have covered the important basics.

As a critical thinker, you should also consider what else may warrant further inquiry beyond the PQRSTU mnemonic. For example, you might ask about previous environmental exposures, medications (including name, dose, frequency, reason it was prescribed, how long they have been taking the medication), herbal

remedies, supplements, allergies, non-prescribed substance use, and exposure to **contagions**.

You can motivate the client to make lifestyle changes by ending the conversation with collaborative dialogue around health promotion strategies such as appropriate sunscreen application, regularly cleaning nail tools, and education about vitamins. Depending on the context, you might engage in this kind of discussion during the subjective assessment or after the objective assessment. A section on “Health Promotion Considerations and Interventions” is provided later in this chapter.

## Contextualizing Inclusivity

Western health assessment textbooks have been criticized for reinforcing a Euro-centric view of disease by largely focusing on ailments of white skin, and overlooking variations of black and brown skin. This kind of **systemic racism** can narrow the scope of knowledge of healthcare providers and can result in conditions being missed, further marginalizing racialized populations. Inclusive care requires more attention to black and brown skin variations, and this textbook is a first step. You can also access supplementary tools such as [Mind the Gap](#) to help you recognize clinical signs in black and brown skin.

Depending on the reason for seeking care, the healthcare context, and the nature of the client’s visit, you may choose to start with screening questions about general health or enter immediately into

a focused examination of the integument. Use your clinical judgement about the appropriateness of your questions and try to use a balanced approach between your own workload, the timing of visit, the urgency of the issue, and the nature of the healthcare setting. **Table 3** provides some examples of symptoms, questions, and clinical tips.

**Table 3:** Common symptoms, questions, and clinical tips.

Symptoms	Questions	Clinical Tips
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<p><b>Pruritus</b> refers to itching. It is sometimes associated with a rash.</p>	<p>You might start by asking: Do you currently or have you recently had any itching on your skin?</p> <p>If the client's response is affirmative, ask: Do you have the itching now?</p> <p>Additional <b>probes</b> may include:</p> <p>Region: Where is it?</p> <p>Radiation: Has it spread anywhere else?</p> <p>Understanding: Do you know what has caused it?</p> <p>Timing: When did it start? What were you doing when it started? Is it constant or intermittent? How long does it last?</p> <p>Provocative: What makes the itchiness worse?</p> <p>Palliative: What relieves it?</p> <p>Quality: How would you describe the itchiness?</p> <p>Quantity: How bad is it?</p> <p>Severity: How would you rate the</p>	<p>Assess whether the itching is localized or generalized.</p> <p><b>Localized pruritus</b> is limited to one area/region and is commonly the result of a reaction like an allergy or insect bites, scabies, parasites or fungal infestations. It can also be associated with dry skin (xerosis), as with eczema and psoriasis.</p> <p><b>Generalized pruritus</b> is widespread itching that is not specific to one area/region. It can be an indication of systemic disease (kidney, liver, thyroid, rheumatic disease) or be caused by a medication reaction (e.g., opioids).</p> <p>Also assess for secondary infections, which can occur when there is breakdown of the skin from repeated scratching.</p>
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	<p>itchiness on a scale of 1 to 10? 0 being no itchiness and 10 being the most itchy you have ever experienced.</p> <p>Treatment: Have you treated it with anything? Did it help?</p>	
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<p><b>Skin rashes</b> can vary in qualities such as colour, texture, and pattern.</p>	<p>You might start by asking: Do you currently or have you recently had any rashes on your skin?</p> <p>If the client's response is affirmative, ask: Do you have any rashes now?</p> <p>Additional <b>probes</b> may include:</p> <p>Region: Where is it?</p> <p>Radiation: Has it spread?</p> <p>Understand: Do you know what is causing it?</p> <p>Timing: When did it start? What were you doing when it started?</p> <p>Provocative: What brings on the rash?</p> <p>Palliative: What makes it better?</p> <p>Quality: How would you describe the rash?</p> <p>Quantity: How bad is it?</p> <p>Treatment: Have you treated it with anything? Did it help?</p>	<p>Identifying skin rashes involves many considerations. With experience, you will begin to recognize common rashes and their morphology.</p> <p>Consider whether the rash is <b>acute</b> (new onset) or <b>chronic</b> (lasting more than 6 weeks) as this will give you important information about the timeline and possible exposures or underlying conditions.</p> <p>Many environmental exposures can cause skin rashes like contact dermatitis, a skin condition characterized by swelling, pain, redness, and sometimes lesions. Plants, insects, chemicals, plastics, detergents, pesticides are all possible causes. Thus, it is important to ask the client questions surrounding these factors such as have you had a recent change in the soap/body wash, lotions or laundry detergent that you use or have you been gardening or walking in the woods or long grass? Infections like scabies, lice, fleas, and bed bugs can also cause rash and pruritus.</p>
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<p><b>Nevi</b> are moles.</p>	<p>You might start by asking: Have you noticed any abnormal looking moles, new moles, or changes in your moles?</p> <p>If the answer is affirmative, ask the client to describe the change.</p> <p>Additional <b>probes</b> if the response is affirmative:</p> <p>Region: Where is it located?</p> <p>Quality: What does it look like? Has it changed in colour? Have you observed it growing in size?</p> <p>Other questions: Is it itchy? Has it had any discharge like blood? Is there pain associated with the mole? Do you have any moles that do not look like your other moles?</p>	<p>Most moles are <b>benign</b> (harmless). However, new moles and moles that are painful or bleed warrant further questioning. Consider the location of the mole and whether it is a region that is exposed to ultraviolet radiation from the sun. If a mole bleeds, investigate whether it is due to scratching or whether it bleeds on its own.</p> <p>It is important to ask whether the client has any moles that do not look like their other moles. This is a telling finding and can inform your objective assessment. There is a mnemonic to assess moles (<b>to be discussed in the Objective assessment section</b>).</p>
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<p><b>Skin discolouration and skin temperature changes.</b></p>	<p>You might start by asking: Have you noticed any changes in skin colour or skin temperature on any areas of your body?</p> <p>If the answer is affirmative, ask the client to describe the change.</p> <p>Additional <b>probes</b> if the response is affirmative:</p> <p>Region/radiation: Where is it located? Have you noticed it anywhere else?</p> <p>Quality/quantity: Can you describe what it looks like or feels like? How bad is it?</p> <p>Provocative/palliative: What makes it better? What makes it worse?</p> <p>Timing/treatment: When did you notice it? Is it constant or intermittent? If intermittent, how long does it last for? Have you tried treating it with anything? Have you sought treatment for it? Is it</p>	<p>Hormonal changes during pregnancy can cause patchy regions of dark skin pigmentation (melasma). Other skin variations associated with pregnancy include linea nigra (a darkened vertical line that runs down the abdomen) and striae (also known as stretch marks), which are indented streaks that appear on the abdomen and breasts during pregnancy – linea nigra and striae are normal findings that are part of pregnancy. Some of these variations resolve after pregnancy (e.g., linea nigra) or lighten in colour (e.g., striae) and are not of concern.</p> <div> </div> <p>Linea nigra. (Attribution: Photo by Warinhari – Own work, CC BY-SA 4.0, <a href="https://commons.wikimedia.org/w/index.php?curid=47136053">https://commons.wikimedia.org/w/index.php?curid=47136053</a>)</p> <div> </div> <p>Striae. (Attribution: Photo by Emilmiller123 – Otto J. Placik, M.D., CC BY-SA 3.0,</p>
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	<p>affected by position change (e.g., standing all day or elevating your feet? Is it worse at the end of the day?</p> <p>Understanding: Do you know what is causing it?</p>	<p><a href="https://commons.wikimedia.org/w/index.php?curid=6972012">https://commons.wikimedia.org/w/index.php?curid=6972012</a>, cropped for OER)</p>
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<p><b>Ulcers</b> are open sores on the skin.</p>	<p>You might start by asking: Have you noticed any sores anywhere on your body, such as on your legs or feet, that are slow to heal?</p> <p>Additional <b>probes</b> if the response is affirmative:</p> <p>Region/radiation: Where are they located? Have you noticed them anywhere else?</p> <p>Quality: What do they look like? Are the sores open? Are they wet or dry? Do you notice a discharge? If so, what colour is it?</p> <p>Timing: When did the sore begin? Do you know how it developed</p> <p>Treatment: Have you treated it with anything</p> <p>Understanding: Do you know what is causing it?</p>	<p>These sores are often caused by an injury to the skin, even a minor injury. Because ulcers are open to the air, they can act as an entry point for bacteria and can become infected and increase in size.</p> <p>They can be associated with a variety of conditions. For example, they may begin as a pressure injury over a bony prominence with clients who have mobility issues. They can also be associated with peripheral vascular diseases including arterial and venous issues (more will be discussed on these conditions in a later chapter).</p>
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<p><b>Nail changes</b> can include changes in consistency, texture, and colour.</p>	<p>You might start by asking: Have you noticed any changes in your nails on your hands or feet?</p> <p>If the client's response is affirmative, ask: Tell me about the changes?</p> <p>Additional <b>probes</b> may include:</p> <p>Region: What nails are involved?</p> <p>Radiation: Have you noticed it spreading?</p> <p>Quality: How would you describe it?</p> <p>Quantity: How bad is it?</p> <p>Provocative: Is there anything that makes it worse</p> <p>Palliative: Is there anything that makes it better?</p> <p>Timing: When did you notice the change beginning? Is it constant or intermittent? If intermittent, how long does it last?</p> <p>Understanding: Do you know what is causing the change?</p>	<p>Changes to the nails may be the result of a trauma to the nail or could be a sign of disease. A detailed subjective assessment will inform how to proceed with care.</p> <p><b>Colour changes</b> can include white lines, darkening of the nail, or cyanosis.</p> <p><b>Texture changes</b> to the nail can include a thickening of the nail, as with fungal infections. A thickening and overgrowth that looks like a ram's horn is called onychogryphosis. Pitted nails can be a sign of psoriasis, atopic dermatitis, or alopecia. A ridge or deep groove in the nail is often referred to as Beau's line; it is typically a sign that the nail has stopped or slowed in growth.</p> <p>Changes to the <b>shape of the nail</b> are also noteworthy. Clubbed nails refers to nails that start to curve, and the nails can become spongy; clubbing can be a sign of cardiopulmonary disease. Spoon-shaped nails often have a tip in the centre of the nail that runs downward. This can be a sign of malnourishment, as with iron and vitamin deficiency.</p> <p><b>Lifting of the nail</b> can be the result of a fungal infection or trauma from cleaning or manicuring the nails.</p> <p><b>Onycholysis</b> refers to a nail separating from the underlying tissue. <b>Ingrown toenail</b> refers to a nail growing into tissue; this causes pain, inflammation, and swelling, and can lead to infection.</p>
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<p><b>Alopecia</b> refers to hair loss, which can include thinning of the hair or complete loss of the hair on any part of the body.</p>	<p>You might start by asking: Have you noticed any hair loss on your body or head?</p> <p>If the client's response is affirmative, ask: Tell me about it?</p> <p>Additional <b>probes</b> may include:</p> <p>Region: Where have you noticed it?</p> <p>Region: Has it spread anywhere?</p> <p>Timing: When did it start? What was going on in your life when it began? Was it abrupt or did it come on slowly</p> <p>Understanding: Do you know what might be causing it</p> <p>Provocative: What brings on the hair loss?</p> <p>Palliative: Does anything make it better?</p> <p>Quality: How would you describe the hair loss?</p> <p>Quantity: How bad is it?</p> <p>Severity: How would you rate the hair loss on a scale of 0 to 10, with 0 being</p>	<p>Consider whether the hair loss was sudden or gradual. Sudden onset of hair loss can be related to alopecia areata, an autoimmune response in which the body mistakenly attacks the hair follicles. Telogen effluvium is excessive diffuse hair loss. When abrupt, it can be brought on by a triggering life event (stress, traumatic event) or by drugs, thyroid disease, or labour/birth. It is often temporary but can continue for 3–6 months after the event.</p> <p>Hair loss can be damaging to the client's self-concept so it is important to treat them with empathy.</p>
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	<p>no loss at all and 10 being very bad hair loss?</p> <p>Treatment: Have you treated it with anything? Has it worked?</p>	
<p><b>Other integumentary-related</b> symptoms can include xerosis (dry skin), seborrhea (oily skin), bruising, fatigue and fever.</p>	<p>Always ask one question at a time. You might start by asking:</p> <p>Have you experienced any body fatigue? (Or fever, bruising, dry or oily skin?)</p> <p>Use variations of the PQRSTU mnemonic to assess symptoms further if the client's response is affirmative.</p>	<p>Symptoms of fatigue and fever can be related to other body systems and non-integumentary issues. To determine whether they are integumentary-related, explore these symptoms along with any other associated symptoms.</p>

<p><b>Personal and family history</b> of integumentary conditions and diseases.</p> <p>Some common issues associated with the integumentary system include eczema and psoriasis.</p>	<p>You might start by asking:</p> <p>Do you have any chronic conditions or diseases that affect your skin, hair, and nails? Do you have a familial history of conditions or diseases that affect the skin, hair, and nails? Do you have a family member with skin cancer?</p> <p>If the client's response is affirmative, begin with an open-ended probe: Tell me about the condition/disorder/disease?</p> <p>If the client has a personal history, <b>probing questions</b> might include:</p> <p>Timing: When did you begin experiencing symptoms related to this condition? When were you diagnosed? Are the symptoms constant or intermittent?</p> <p>Quality/quantity: How does it affect you? What</p>	<p>A previous history of illness (including current illness) can be an important finding that warrants further assessment. Immune deficiencies (sometimes referred to as being immuno-compromised) can decrease the body's defences against harmful matter, rendering persons more susceptible to integumentary conditions. With auto-immune disorders, the body mistakes its own cells for foreign cells and activates an immune response. Many auto-immune disorders involve the integumental system, including lupus, scleroderma, Grave's disease, psoriasis, and rheumatoid arthritis. Common symptoms related to auto-immune disease include fatigue, joint pain and inflammation, digestive issues, and swollen lymph nodes.</p> <p>A first-degree relative (parent, sibling) with a history of skin cancer is an important finding in your subjective assessment. Family history is important because of genetic susceptibility, but also because of shared lifestyle including environmental and behavioural factors. Always take a detailed history including age of onset, type of skin cancer, and treatment outcomes.</p> <p>Family history can provide some insights into predisposition to other conditions related to the integumental system, such as <b>rosacea</b>.</p>
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	<p>symptoms do you have? How bad are the symptoms</p> <p>Treatment: How is it treated? Have you had any surgeries? Do you take medication?</p> <p>Provocative/palliative: Does anything make it worse? Does anything make it better?</p> <p>Understanding: What personal or family history do you think is important for me to understand?</p>	
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## Priorities of Care

Personal protective equipment (PPE) like gloves may be necessary for skin variations that expel bodily fluids like blood or pus. Some lesions can expel with pressure when punctured and a face shield may be necessary.

Urticaria (hives) are itchy patches and bumps that are sometime raised and look swollen. They may look lighter or



darker than one's normal skin colour on clients with darker tones and they look red and dark pink with white centres on clients with lighter skin tones. They are sometimes caused by an allergic reaction to food, medications, or a bug bite. Although they often disappear with no treatment or an antihistamine, in rare cases they could be associated with a severe allergic reaction (anaphylaxis) including symptoms of dyspnea (difficulty breathing), wheezing, tightness or swelling of the throat. Anaphylaxis is a life-threatening condition and needs to be reported and treated immediately; administration of epinephrine is a priority if anaphylaxis is suspected.



Urticaria: Image free to use for non-commercial

purposes, from: <https://www.atlasdermatologico.com.br/index.jsf>

## Knowledge Bites

Certain medications can cause photoreactions, which are skin reactions caused by exposure to sunlight. Consumption of certain medications can lead to photosensitivity (sensitivity to sun exposure), photo-allergy (inflammation/allergic reaction after exposure to sun), and phototoxicity (hazardous sensitivity to sunlight that causes damage to tissue). Medications with these possible side effects include antibiotics, antihistamines, psychiatric agents, and cardiovascular drugs, as well as some topical medications.

Vitamins and some herbal remedies can also cause photoreactions and other integumentary responses. For example, niacin (vitamin B3) toxicity can cause flushing (reddened skin, itching, tingling). Excess vitamin A can cause itching, scaling, cheilitis (dry chapped lips), and even hair loss. Excess vitamin B6 can cause skin eruptions, typically after sun exposure. **St. John's wort** can cause hives and/or other skin reactions. Other screening questions pertinent to a subjective assessment relate to personal care routines, sun exposure, and exposure to other irritants.

## Contextualizing Inclusivity

Malnutrition is associated with social determinants of health such as socioeconomic status, as well as many conditions. For example, it can be associated with alcoholism, either because of inadequate dietary intake accompanied by overconsumption of alcohol that does not contain nutrients or due to malabsorption from gastrointestinal conditions secondary to alcoholism. Persons living with alcoholism often have deficiencies in vitamin A, B1, B2, B6, C, E, and niacin, as well as other nutrient depletions like magnesium, potassium, and zinc. Chronic alcoholism can lead to skin changes related to liver disease, such as jaundice (yellowing of skin and sclera) due to bilirubin build up, hyperpigmentation, and generalized pruritus. Recognizing the signs of alcoholism is an important first step in seeking treatment. Family members are often the first to identify a problem. Always build a therapeutic relationship with the client, including unconditional positive regard; this will help establish trust and connect the client with appropriate supports.

## Activity: Check Your Understanding



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=1035#h5p-54>



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=1035#h5p-56>

# Objective Assessment

Your subjective assessment should segue into your objective assessment. Typically, you will identify priority areas to examine based on your discussion with your client. For example, you may do a focused assessment of a rash, lesion, or itchy patch of skin. Depending on the healthcare context and purpose of your assessment, you may also do a general scan of the integumental system as a baseline comparison to gauge any abnormalities, or as an overview to assess any further abnormalities not identified in the subjective assessment.

Prepare before conducting your objective assessment. For example:

- Tell the client what the objective assessment will entail: how long it will take, how much touching will be involved and where, whether they will need to remove clothing, will they be in a comfortable position. (Tip: Think about things you would like to know going into an assessment).
- Prepare the environment: ensure the temperature is comfortable and the room is bright. Always ensure privacy by drawing the curtains and/or closing the door. If the room temperature is not modifiable, do your best to minimize exposing the client and keep them covered as much as possible. This keeps the client comfortable and preserves their dignity. Prepare your equipment in advance so you are not distracted with locating items while conducting your assessment. Objective assessments of the integumental system usually require pen light, gloves, pen, measuring tape, magnifying glass, and swabs and/or cotton pads. Draping may also be required depending on the region being exposed.

Objective assessment of the integumentary system includes inspection and palpation of the skin, nails, and hair.

## Contextualizing Inclusivity

A person-centred approach and cultural humility is imperative when providing care considering that an objective assessment of the integumentary system may involve asking the client to expose different body parts and/or hair. For example, some Muslim women wear head coverings as a part of their Islamic faith, and head coverings can vary greatly: some women may choose to cover their hair and neck only, whereas others may choose to cover every part of their body except for their eyes. Some Muslim women also choose to limit their encounters with the opposite gender, including healthcare professionals. Do not assume a Muslim women's level of comfort: some Muslim women may find it acceptable to reveal parts of their body in front of males if it serves a medical purpose. You should assess their needs at the beginning of a healthcare encounter. If a Muslim woman expresses discomfort with revealing parts of their body and/or hair, you might offer accommodations including a healthcare provider of the same gender, having a female colleague in the room, asking if the client would like a chaperone (friend or family member) to be present in the exam room, or allowing the patient to drape themselves so only a portion of their skin and/or hair is exposed. Ultimately, you should use an individualized approach: assess what each client is comfortable with and conduct the assessment accordingly.

# Skin: Inspection

Inspection of the skin can be performed with the client sitting upright on the exam table or lying in a supine position. If you are doing a focused assessment, position the client so that you have the best visibility of the affected area. Use a bright light or a pen light if needed. Shadows and dark lighting may alter your visualization of the affected area and provide information about the elevation of a lump.

If you are doing a complete assessment, use a systematic approach and proceed **cephalocaudally** to ensure comprehensiveness. If the client has identified a specific concern, inspect that area first. If you are doing a complete assessment when the client has no specific concerns, inspect the face, arms/hands, back, abdomen, chest, and legs/feet. Always inspect the **anterior** and **posterior side**; for example, for the arms, ask the client to raise their hands/arms in front of them with their palms facing down and then turn palms up so that you can inspect both sides. Similarly, for the legs, inspect the anterior and then have the client roll over so that you can inspect the posterior. You may need to seek assistance to reposition a client that is immobile or has difficulty moving.

Keep in mind that the best control for comparison is the client's own body, so **always compare bilaterally**.



## Clinical Tip

Commonly overlooked areas for skin inspection include behind the knees, in **skin folds**, and between digits (fingers and toes). Other important areas to check are bony prominences (e.g., hips, spine, ankles), especially if the client has mobility issues. If the client is unable to reach these areas, encouraging family members to assist with checks can be helpful.

Skin inspection involves the following steps:

1. **Inspect the skin for colour** using both a generalized and localized approach. To visualize general colour, step back and take note of their general appearance; for a localized approach, inspect specific regions. Mucous membranes, palms, sclera, and regions around the mouth can all be telltale signs for centralized colour variations. Always examine distal extremities for discolouration. **Table 4** lists common colour variations. Skin colour varies widely from dark to light shades including black, brown, yellow, and white shades. These colours are affected by many factors. The biggest factor is how much **melanin** is produced by the body's melanocytes; this also affects hair and eye colour. Additionally, the circulating hemoglobin affects skin colour and the underlying connective tissue.
  - Normally, skin colour is evenly distributed with no

variations; clients with darker skin tones will have lighter coloured palms and soles of feet. You may observe birthmarks, which are visible upon birth and include a wide array of sizes and colours (brown, black, blue, red, pink and purple). Most are flat and some fade over time. You should document them describing their location and description particularly since some can look like bruising.

- If you notice variation in skin colour, note the location, colour, and other characteristics of the discolouration.

**Table 4:** Colour variations.

Colour Variation	Skin Tone Variations and Clinical Tips
<p><b>Pallor</b> is a lightening of the skin compared to the client's typical complexion. It is commonly due to a lack of oxygen-rich blood near the surface of the skin.</p>	<p>Among clients with darker skin tones, pallor may present as ashen (grey) colouring. Pallor may also present as a yellowish colour among persons with browner skin tones. Among clients with lighter skin tones, the skin appears pale and less pink. To check for pallor, look at the mucus membranes, nail beds, conjunctiva, and/or palms of hands. These are all highly vascularized regions that tend to be a pink colour. With pallor, they look pale.</p>
<p><b>Cyanosis</b> is a bluish/whitish/greyish discolouration of the skin, usually due to a lack of oxygen in the blood. Peripheral cyanosis occurs in the distal extremities, while central cyanosis is generalized in the trunk and head of the body.</p>	<p>With darker skin tones, cyanosis may present as a whitish/greyish colour. For clients with yellow undertones to their skin, cyanosis may be a greenish/grey colour. For persons with lighter skin tones, cyanosis is generally a bluish/purple hue. Centralized cyanosis is generally most pronounced around the mouth (tongue, lips, oral cavity) and mucous membranes. Cheeks, nose and ears are also good landmarks to check for centralized cyanosis as these are highly vascularized regions with thin skin.</p>
<p><b>Erythema</b> is a reddening/darkening of the skin, typically due to increased blood flow to the capillaries.</p>	<p>With darker skin tones, erythema may appear reddish/purple in colour. With very dark skin tones, it may be difficult to visualize. With lighter skin tones, erythema is typically dark pink to red. When you check for erythema, look for other signs like inflammation and warmth.</p>

**Brawny** is a brown-reddish discolouration, typically associated with venous insufficiency. Red blood cells accumulate in the interstitial spaces and can cause **hemosiderin staining** from the blood leaking out of capillaries.

With darker skin tones, brawny may appear even darker than the rest of the skin, with a brown-reddish hue. With lighter skin tones, the skin is a dark brown-reddish colour. Brawny generally appears in lower extremities and regions of the body that have pooling due to venous insufficiency.

**Jaundice** is a yellowing discolouration of skin, sclera, and mucous membranes. It is typically brought on by a buildup of **bilirubin** and breakdown of red blood cells in the body.



(Attribution: Photo by By James Heilman, MD – Own work, CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=9389660>)

In persons with darker skin tones, discolouration may be subtle or go unnoticed but visible in the sclera as shown in image below. In persons with lighter skin tones, jaundice can appear yellow or even orange in colour. Jaundice is typically confirmed by blood test or urinalysis.



(Attribution: Photo by Unknown author – CDC / Dr. Thomas F. Sellers / Emory University, Public Domain, <https://commons.wikimedia.org/w/index.php?curid=4394119>)

**Vitiligo** is a condition where the skin loses pigmentation in certain regions (patchy).



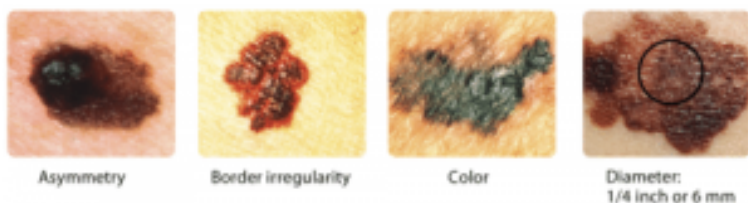
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from: <https://www.atlasdermatologico.com.br/index.jsf>

Vitiligo can affect persons with all skin tones, but it is more visible among persons with darker skin tones due to contrast. Common regions for vitiligo near the mouth and eyes or on the fingers, wrists, armpits, or groin.

2. **Inspect the skin for nevi (moles).** If the client has expressed concern about specific moles, check them first. Otherwise, inspect the face, arms/hands, back, chest, abdomen, and legs/feet for the presence of nevi. If you observe any, use the ABCDE mole screening mnemonic (**Table 5** and **Figure 4**); this is vital to screen for melanoma, a life-threatening skin cancer in which early detection is essential (Rigel et al., 2005). Most

moles are benign, but they can become malignant: people with more than 50 moles, light-coloured skin, regular sun exposure without sunscreen, and/or a family history of melanoma are at increased risk for melanoma.

- Normally, nevi are smaller than 6 mm in diameter, round, smooth surfaced, with distinct/round edges. They can be elevated or not, pink, tan, brown, or dark brown. Generally, persons with darker skin tones have darker moles and persons with lighter skin tone have lighter moles. See **Figure 5** for examples of what is considered normal nevi.
- Abnormal moles are often larger than 6 mm with variation in colours and asymmetrical with irregular borders. Note any atypical moles including the location and description.



**Figure 4:** Abnormal nevi/moles. (**Credit:** Courtesy of Skin Cancer Foundation/National Cancer Institute **License:** Public domain. **Source:** Left to right: <http://visualsonline.cancer.gov/details.cfm?imageid=2362>; <http://visualsonline.cancer.gov/details.cfm?imageid=2363>; <http://visualsonline.cancer.gov/details.cfm?imageid=2364>; <http://visualsonline.cancer.gov/details.cfm?imageid=2184>).



**Figure 5:** Examples of normal nevi/moles.

**Table 5:** ABCDE mole screening. (Adapted from Rigel et al., 2005.

See the American Academy of Dermatology Association about the history of the mnemonic: <https://www.aad.org/public/diseases/skin-cancer/find/at-risk/abccdes>)

Screening Characteristic	Warning Sign
A – Asymmetry	Moles that are asymmetrical/irregular in shape (one side does not match the other).
B – Border irregularity	Mole borders that are irregular or jagged in appearance.
C – Colour	Moles that have more than one colour within the mole (mixture of colours like tan, brown, black, red/pink) or changes colour (white, red, or blue) or a dark mole that does not match other moles on the client's body (dark black).
D – Diameter greater than 6 mm	Moles that are larger than 6 mm (pea-size) or moles that start small and grow larger than 6 mm.
E – Evolving	Moles that have changed/evolved in terms of bleeding, pain, size, colour, shape, texture (crusting), elevation, or itching.



## Clinical Tip

ABCDE is a useful mnemonic for screening moles and is easily teachable to most clients. Teach-back is an effective technique: this involves presenting the ABCDE mnemonic to the client and then having them “teach” it back to you. This method helps with memory retention; fill in any gaps you may have overlooked as you taught them. Ask them to screen one of their moles based on the mnemonic; it may be appropriate to take a picture for comparison purposes.

3. **Inspect for skin integrity** including whether the skin is intact. Look for the presence of **ulcerations, erosions, contusions**, or other damage that can disrupt the normal pattern of the skin. You will learn to recognize the signs of skin breakdown and who is at risk for impaired skin integrity. An important tool to assess skin integrity is the Braden Scale, which is commonly used in many healthcare settings and is especially useful for hospitalized clients and those with restricted mobility.
  - Skin is normally intact with no lesions, ulcerations, erosions, and contusions.
  - If you observe any areas where the skin is not intact, note the location and describe the area. Pressure injuries are classified into stages, as shown in **Table 6**. **Figure 6** presents an example of staging.

## Braden Scale

The **Braden Scale** is an established tool used to screen and assess for risk of developing pressure sores (Bergstrom et al., 1987; Braden, 2012). Clients at risk are screened weekly. Many factors can increase the risk of developing pressure injuries, including altered sensory perception, increased moisture, decreased activity, impaired mobility, inadequate nutrition, and issues with friction and shear (Open Resources for Nursing, n.d.). As Bergstrom and colleagues note, the Braden Scale is used to screen clients in six areas:

- Sensory perception.
- Skin moisture.
- Activity.
- Mobility.
- Friction and shear.
- Nutritional status.

Friction and shear is rated on a scale from 1–3; all other areas are rated on a scale of 1–4 (Open Resources for Nursing, n.d.). The scores for all six areas are totalled to indicate the client's risk for developing a pressure injury based on the following ranges:

Mild risk: 15–18

Moderate risk: 13–14

High risk: 10–12

Severe risk: less than 9

(Bergstrom et al., 1998; Open Resources for Nursing, n.d.).

Check out the Braden Scale at this link and assess your own risk, and then try using it with a client in your clinical setting:

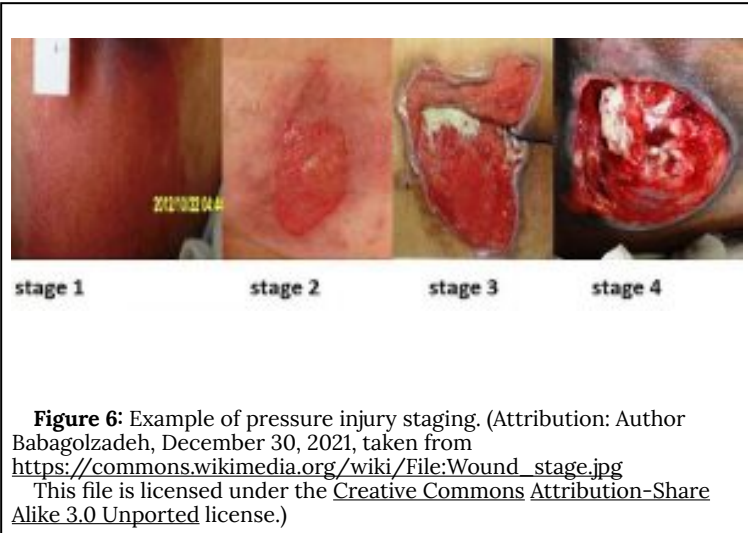
<https://www.clwk.ca/modules/Braden/Slide-1-14.html>

## Pressure Injury Staging

Classify a pressure injury according to Stages 1–4 or note it is unstageable as per the descriptions below and the example provided in **Figure 6**.

**Table 6:** Pressure injury staging. (Attribution: Adapted and modified from <https://wtcs.pressbooks.pub/nursingfundamentals/>)

Stage	Description
<b>Stage 1</b> pressure injury.	Intact skin with localized area of nonblanchable erythema where prolonged pressure has occurred. Nonblanchable erythema is a medical term used to describe a reddened skin area that does not turn white when pressed.
<b>Stage 2</b> pressure injury.	Partial-thickness loss of skin with exposed dermis. The wound bed is viable and may appear as an intact or ruptured blister.
<b>Stage 3</b> pressure injury.	<p>Full-thickness tissue loss in which subcutaneous tissue is visible, but cartilage, tendon, ligament, muscle, and bone are not. Depth of tissue damage varies by anatomical location. Undermining and tunneling may occur in Stage 3 and 4 pressure injuries. Undermining occurs when the tissue under the wound edge becomes eroded, resulting in a pocket beneath the skin. Tunneling refers to passageways underneath the skin surface that extend from a wound and can involve twists and turns.</p> <p>Slough and eschar may also be present in Stage 3 and 4 pressure injuries. Slough is an inflammatory exudate that is usually light yellow, soft, and moist. Eschar is dark brown/black, dry, thick, and leathery dead tissue. If slough or eschar obscures the wound so that tissue loss cannot be assessed, the pressure injury is referred to as unstageable. In most wounds, slough and eschar must be removed by debridement for healing to occur.</p>
<b>Stage 4</b> pressure injury.	Full-thickness tissue loss with visible cartilage, tendon, ligament, muscle, or bone. Osteomyelitis (bone infection) may also be present.
<b>Unstageable (Stage X)</b> pressure injury.	Full-thickness tissue loss in which the presence of slough or eschar are making it difficult to evaluate the extent of damage. If slough or eschar were to be removed, a Stage 3 or Stage 4 pressure injury would likely be revealed.

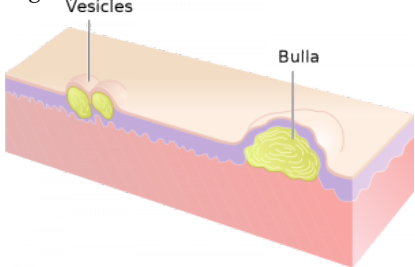
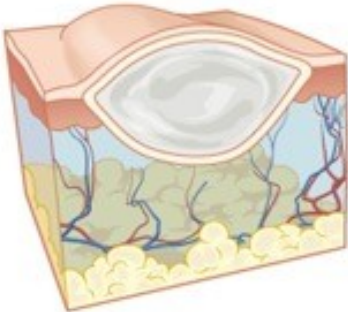


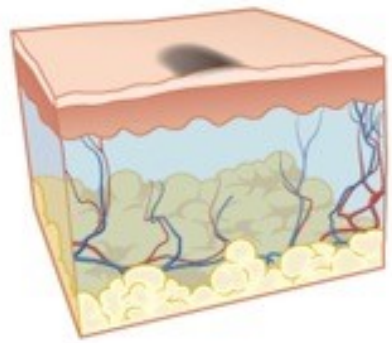
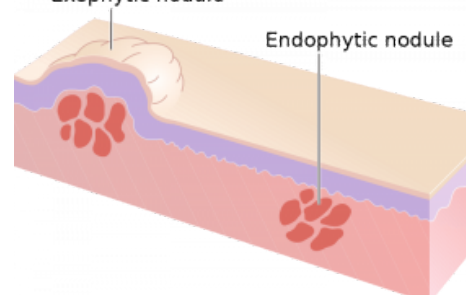
4. **Inspect skin for other lesions** such as cysts, blisters, macules, and wheals. Typically, lesions are associated with pain because they generally involve the epidermis and/or dermis which are both innervated (supplied by nerves). However, nerve damage may limit sensation and therefore pain to the region. Clients with nerve damage are at increased risk for secondary infections and lesions because they are not restricted by pain at the site. Lesions are usually categorized as primary (develop as a result of a pathological process and not modified by scratching or infection) or secondary (evolve from a primary lesion as a natural development or as a result of scratching or infection). **Tables 7** and **8** provide more additional information about primary and secondary lesions.

- Normally, there are no lesions.
- If lesions are present, describe the location and characteristics in detail, including size, colour, movability, borders, elevation, drainage, and pain levels.

**Table 7:** Primary lesions. (Attribution: unless otherwise noted, lesion

images adapted from [https://commons.wikimedia.org/wiki/File:OSC\\_Microbio\\_21\\_01\\_LesionLine.jpg](https://commons.wikimedia.org/wiki/File:OSC_Microbio_21_01_LesionLine.jpg) This file is licensed under the [Creative Commons Attribution 4.0 International](https://creativecommons.org/licenses/by/4.0/) license).

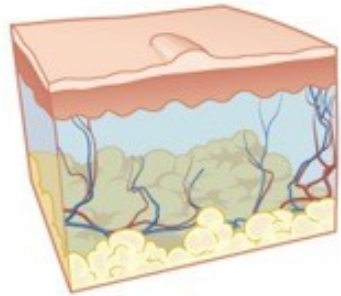
Type	Example
Abscess: Localized lump filled with pus.	Tooth abscess, peritonsillar abscess.
Bulla: Fluid-filled blister.	<p>Shingles, burns.</p>  <p>(Attribution: Adapted photo by Madhero88 – work, CC BY-SA 3.0, <a href="https://commons.wikimedia.org/index.php?curid=14546567">https://commons.wikimedia.org/index.php?curid=14546567</a>)</p>
Cyst: Encapsulated sac filled with fluid, semi-solid matter (such as dead skin cells), or gas; typically located in the upper layer of skin.	<p>Dermoid, cutaneous, ganglion, sebaceous cysts</p>  <p><b>cyst</b></p>

<p>Macule: Flat (non-palpable) spot typically discoloured (hyperpigmented or erythematous).</p>	<p>Freckle, café au lait spot.</p>  <p><b>macule</b></p>
<p>Nodule: Solid, elevated, palpable growth.</p>	<p><b>Xanthoma</b>, some nevi. Exophytic nodule</p>  <p>Endophytic nodule</p> <p>(Attribution: Photo by Madhero88 – Own work BY-SA 3.0, <a href="https://commons.wikimedia.org/wiki/File:Macule.jpg?curid=14546471">https://commons.wikimedia.org/wiki/File:Macule.jpg?curid=14546471</a>)</p>



Papule: Elevated, solid, palpable, circumscribed (with limits/bounded).

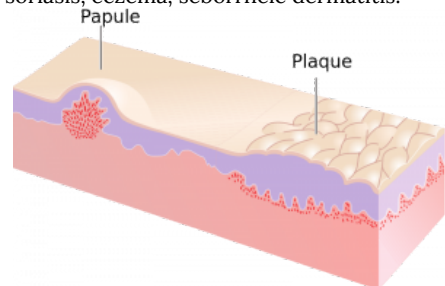
Elevated mole, mosquito bite.



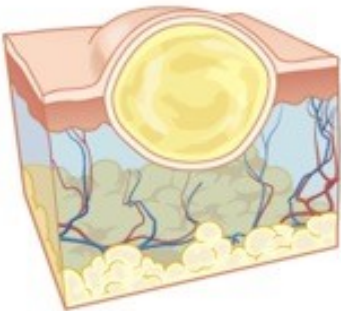
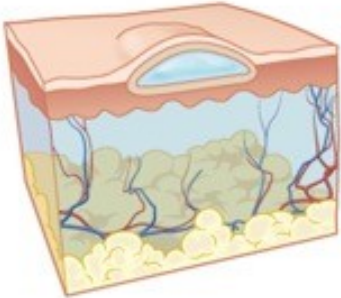
**papule**

Plaque: Circumscribed, elevated, solid deposit.

Psoriasis, eczema, seborrheic dermatitis.

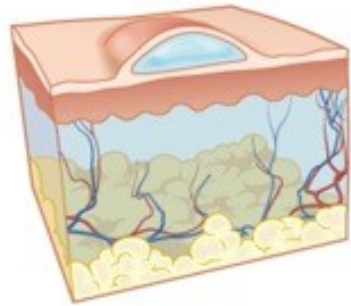


(Attribution: Adapted photo by Madhero88  
– Own work, CC BY-SA 3.0,  
<https://commons.wikimedia.org/w/index.php?curid=14546485>)

<p>Pustule: Pus-filled, circumscribed, elevated.</p>	<p>Pimple.</p>  <p><b>pustule</b></p>
<p>Tumour: Abnormal growth, palpable.</p>	<p>Lipoma, skin cancer.</p>
<p>Vesicle: Small, fluid-filled sacs, thin-walled.</p>	<p>Herpes simplex blister.</p>  <p><b>vesicle</b></p>

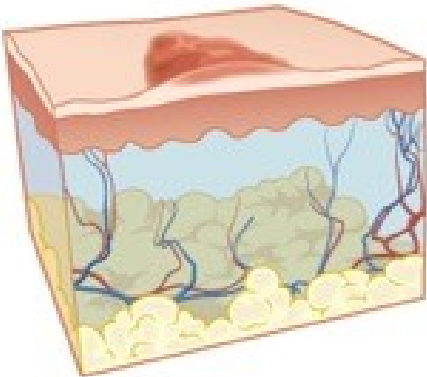
Wheal: Swollen, inflamed skin patch that itches or burns.

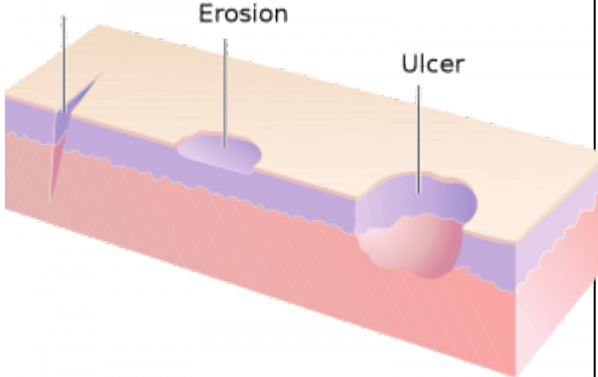

Hives.

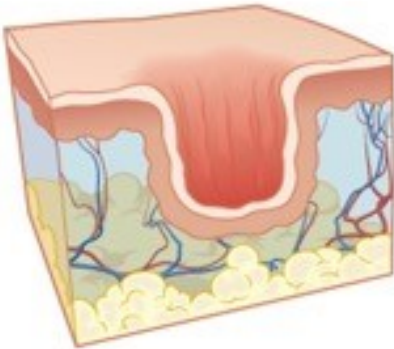


wheal

**Table 8:** Secondary lesions. (Attribution: unless otherwise noted, lesion images adapted from [https://commons.wikimedia.org/wiki/File:OSC\\_Microbio\\_21\\_01\\_LesionLine.jpg](https://commons.wikimedia.org/wiki/File:OSC_Microbio_21_01_LesionLine.jpg) This file is licensed under the [Creative Commons Attribution 4.0 International](https://creativecommons.org/licenses/by/4.0/) license).

Type	Description
Atrophy	Thinning of the skin (sometimes shiny appearance), translucent, increased fragility.
Crust	<p>Accumulation of dried exudate and skin cells on the outer layer of the affected area (scab).</p>  <p><b>crust</b></p>

<p>Erosion</p>	<p>Loss of parts of the epidermis.</p>  <p>(Attribution: Photo by Madhero88 – Own work, CC BY-SA 3.0, <a href="https://commons.wikimedia.org/w/index.php?curid=14546561">https://commons.wikimedia.org/w/index.php?curid=14546561</a>)</p>
<p>Excoriation</p>	<p>Skin breakdown caused by repetitive scratching.</p>
<p>Fissure</p>	<p>Crack or split of the outer layer of the skin.</p>
<p>Keloid</p>	<p>Thick, raised patch of skin (scar tissue).</p>  <p>(Attribution: Photo by Htirgan – Own work, CC BY-SA 3.0, <a href="https://commons.wikimedia.org/w/index.php?curid=32782658">https://commons.wikimedia.org/w/index.php?curid=32782658</a>)</p>

Lichenification	Hyperpigmentation and thickening of the skin.
Scar	Fibrous, thick tissue, shiny appearance once lesion has healed.
Ulcer	<p>Loss of parts of the tissue (crater-like), exposed with some healing formation.</p>  <p><b>ulcer</b></p>

5. Note the **findings**.

- Normal findings might be documented as: “Skin integrity intact. Skin colour consistent throughout with no variations. No lesions or rashes noted. Nevus on back examined. Located 2 inches distal to the scapula, left side. Symmetrical with even borders, tan coloured, 3 mm in size and no changes noted by the client. No pain or sensation reported. Image taken and included in the chart.”
- Abnormal findings might be documented as: “Stage 1 pressure injury on thoracic spine 4 inches in length and 2 inches wide”

## Priorities of Care

All abnormal findings should be documented and reported, but some findings are more urgent than others. For example, signs of cyanosis and pallor suggest possible issues with oxygenation, so you should conduct a primary survey, assess vital signs, and conduct a focused assessment on related systems including respiratory, cardiovascular, and peripheral vascular. A similar approach should be used when you observe mottled skin. This is a blotching and netlike discolouration that can appear as bluish, red, purple blotches, sometimes referred to as marbled. It is often associated with conditions that involved reduced blood flow and can be associated with peripheral vascular diseases, shock, and end-of-life, and sometimes cold environments. Always report signs of clinical deterioration immediately. For clients with a Stage 1 pressure injury, it is important to ensure good skin care and repositioning so that the client is not lying on a particular area for long periods of time. Medical intervention may be required for ulcers classified as Stage 2 and higher. Report any moles with warning signs to the physician or nurse practitioner, as the client may need a referral to a dermatologist and/or oncologist.

## Knowledge Bite

Burns are caused when the skin is damaged by intense heat, radiation, electricity, friction, or chemicals. This damage results in the death of skin cells. Loss of the skin's protective layers can lead to massive loss of fluid, and makes burned skin extremely susceptible to infection.

Burns are classified by the **degree of their severity**.

**First-degree burn:**

- Superficial burn affecting the epidermis.
- Mild sunburn is one example.

**Second-degree burn** (see **Figure 7**):

- Partial-thickness burn affecting the epidermis and a portion of the dermis.
- Results in swelling and a painful blistering of the skin.

**Third-degree burn:**

- Full-thickness burn extends fully into the epidermis and dermis, destroying the tissue and affecting the nerve endings and sensory function.

**Fourth-degree burn:**

- Deep full-thickness burn affecting the skin and



underlying muscle, tendon, and bone.

**Third- and fourth-degree burns** require immediate intervention. They are usually not as painful as second-degree burns because the nerve endings are damaged. Full-thickness burns require debridement (removal of dead skin) followed by grafting of the skin from an unaffected part of the body or from skin grown in tissue culture.



**Figure 7:** Second-degree burn.

(Attribution: Photo by Kronoman at English Wikipedia, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=26501619>)

## Activity: Check Your Understanding



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=1039#h5p-55>

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Bergstrom, N., Braden, B., Kemp, M., Champagne, M., & Ruby, E. (1998). Predicting pressure ulcer risk: A multisite study of the predictive validity of the Braden Scale. *Nursing Research*, 47(5), 261-269.

Bergstrom, N., Braden, B., Laguzza, A., & Holman, V. (1987). The Braden Scale for predicting pressure sore risk. *Nursing Research*, 36(4), 205-210.

Braden, B. (2012). The Braden Scale for predicting pressure sore risk: Reflections after 25 years. *Advances in Skin & Wound Care*, 25(2), 61.

Open Resources for Nursing (n.d.). Chippewa Valley Technical College. <https://wtcs.pressbooks.pub/nursingfundamentals/>

Rigel, D., Friedman, R., Kopf, A., & Polsky, D. (2005). ABCDE—an evolving concept in the early detection of melanoma. *Arch Dermatol*, 141(8), 1032-1034.

# Skin: Palpation

Palpation of the skin can be performed with the client sitting upright on the exam table or lying in a supine position. You may need to ask or assist the client to reposition as needed. Palpate the arms from **shoulder to fingertips** and the leg from the **upper legs to toes**.

Steps for palpating the skin include:

1. **Palpate the skin temperature** using the dorsa of your hands: start at the upper arms and move down to the fingertips. Repeat on the legs from upper legs to the tips of the toes (see **Video 1** for an example).
  - Normally, the temperature is warm to touch and equal bilaterally. The hands and feet are sometimes slightly cooler than the upper arms and legs, but they should be equal bilaterally.
  - Note any asymmetry in skin temperature or extreme skin temperatures. Inflammation is typically accompanied by warmth. Describe the characteristics (e.g., warm, cool) and location of asymmetry in skin temperature or extreme skin temperatures.



One or more interactive elements has been excluded from this version of the text. You can view them online

here: <https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=1041#oembed-1>

**Video 1:** Palpating for temperature [0:17]

2. **Palpate for skin texture, thickness, and moisture** using your fingertips: start at the upper arms and move down to the fingertips. Repeat on the legs from upper legs to the tips of the toes.
  - Normally, the skin is smooth and dry with uniform thickness.
  - If the skin feels excessively sweaty and clammy, this is referred to as diaphoresis. The skin should feel smooth, free from cracks, peeling, or flaking. Describe the quality and location of dry (xerosis) and flaky skin if present. Darker skin tones may have an ashy appearance, which is a result of dry skin and can appear as white/grey and can range from mild to severe. Describe and note the location of thickened areas of the skin or areas of the skin that are thin. Thickened areas of the skin may be the result of calluses. There are several factors that cause thin skin (e.g., aging, medications).
3. **Palpate the skin for turgor** to assess for skin elasticity (see **Video 2** for an example). Use your fingertips and thumb to grasp a fold of skin in the midclavicular region under the clavicle (collarbone) or on the forearm or hand. Pull upward gently and then release. The skin's ability to recoil or return to normal may be affected by the client's hydration status.
  - Skin that returns immediately to its normal position is considered normal/resilient and described as good skin turgor (associated with adequate hydration).
  - Skin that remains tented or takes time to return to its normal position is considered abnormal and is described as lacking skin turgor (associated with dehydration).



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=1041#oembed-2>

### **Video 2:** Assess for skin turgor on forearm [0:19]



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=1041#oembed-3>

### **Video 3:** Assess for skin turgor below clavicle [0:17]

4. **Palpate lesions and masses if present.** Wear gloves for open lesions. Use your index finger and thumb to size the lesion and get a sense of the depth. Note innervation by asking the client if they can feel you palpating it. Press down on the lesion to see if it blanches. This provides contrast to get a better visual of the lesion, providing information about the skin variation. Petechiae generally does not blanch, while other skin lesions will momentarily blanch. Assess consistency (soft or hard) and shape (e.g., round, irregular).

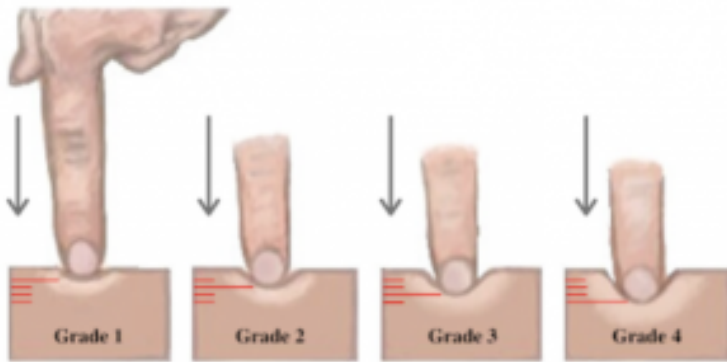
- Normally, no lesions or masses are present.
- If you observe lesions or masses, describe the location and characteristics: what they look like, whether they are intact or open, consistency, and shape.

5. **Palpate for size and edema.** Compare limb circumference of one arm to the other arm and from one leg to the other leg. Generally, you will visually observe the upper and lower part of each limb.
- Normally, limb circumference is equal bilaterally at each site.
  - If you suspect a size difference, use a tape measure to accurately assess the size on both limbs on the lower and upper limb. If you observe edema, assess for pitting edema: an indentation that remains after applying pressure over the location (see **Figure 8**). Apply pressure with the pad of your finger on a distal location (feet and medial malleolus) for about 3-5 seconds and then release. If you observe an indentation (a “pit”), note the location and how long the indentation remains. If you observe it in a distal location, assess a proximal location such as over the tibia. Check with the unit you work on about the scale used to evaluate pitting edema. It is usually classified using a scale from Grade 1-4 based on pit depth and rebound time (time for the indentation to disappear), with 1 indicating mild, 2 moderate, 3 severe, and 4 very severe (see **Figure 9** for scale).



**Figure 8:** Pitting edema.

Grade 1	0–2 mm indentation; rebounds immediately.
Grade 2	3–4 mm indentation; rebounds in < 15 seconds.
Grade 3	5–6 mm indentation; up to 30 seconds to rebound.
Grade 4	8 mm indentation; > 20 seconds to rebound.



**Figure 9:** Pitting edema scale. (Attribution, taken from <https://wtcs.pressbooks.pub/nursingskills/> CC-BY 4.0)

6. Note the **findings**:

- Normal findings might be documented as: “Skin temperature is warm and equal bilaterally on arms and legs. Skin is smooth with no perspiration and no lesions. Good skin turgor. Limb circumference is equal bilaterally with no edema.
- Abnormal findings might be documented as: “Right foot is cold in comparison to left foot. Poor skin turgor and dry



skin.”

## Priorities of Care

All abnormal findings should be investigated further and reported to the physician or nurse practitioner. For example, poor skin turgor suggests possible dehydration and the client may have other signs such as dry mouth/ mucous membranes, cracked lips, decreased urine output/ dark urine, and light-headedness. With severe dehydration, client's can experience tachypnea, tachycardia, and hypotension. Dehydration can also be associated with clients who have a fever, nausea, vomiting, diarrhea or reduced fluid intake. Ask whether they have experienced recent vomiting, diarrhea, or reduced fluid intake. If the client is an infant, ask the caregiver/parent if they have observed a decrease in the number of wet diapers. If the dehydration is mild, encourage the client to increase their fluid intake. More severe dehydration may require fluid replacement with intravenous to replace fluid loss.

## Contextualizing Inclusivity

Use a trauma-informed approach to touch by creating a trusting, safe environment. Clients might have experienced trauma resulted to experiencing or observing physical, sexual and/or emotional abuse, childhood neglect, a family member with mental illness or substance use disorder, violence, and poverty and systemic discrimination (Menschner & Maul, 2016). This can affect how they perceive touch (including palpation). Discuss with the client what they can expect from the objective assessment in terms of touch and explain what you are doing and why.

## References

Menschner, C., & Maul, A. (2016). Key ingredients for successful trauma-informed care implementation. Centre for Health Care Strategies Inc, Robert Wood Johnson Foundation. [https://www.samhsa.gov/sites/default/files/programs\\_campaigns/childrens\\_mental\\_health/atc-whitepaper-040616.pdf](https://www.samhsa.gov/sites/default/files/programs_campaigns/childrens_mental_health/atc-whitepaper-040616.pdf)

# Nails: Inspection and Palpation

Inspection and palpation of nails can be accomplished with the client in a sitting upright position or lying supine. Nail polish or artificial nails must be removed to fully assess the nails. You will need to decide if a full nail assessment is warranted depending on the nature of the visit, the reason for seeking care and the client's status. If appropriate, remind the client to arrive without nail polish or artificial nails before their appointment.

Steps for nail inspection and palpation include:

1. **Inspect the nail condition** and **nail colour** by asking the client to hold their hands out in front of them (**Figure 10**).



**Figure 10:** Inspection of nails.

(Licensed under a Creative Commons Attribution-Non-commercial 4.0 License. Arthur Labatt Family School of Nursing,

“Nail Colour Assessment” (2021). Respiratory Exams.

[https://ir.lib.uwo.ca/clinicalskills\\_respexam/15](https://ir.lib.uwo.ca/clinicalskills_respexam/15)

- Normally, the ends of the nails are smooth and nails are clean. A client’s job may influence nail cleanliness. Nails are translucent in colour and have a slight pinkish tone.
- Abnormal findings may include ridges, pitting, brittleness, indentations, and discolourations. If you note any abnormal nail condition or discolouration, describe the appearance and location, e.g., white markings at the base of the nail on the left index finger. **Table 9** lists some nail variations that you may observe. Yellowing or darkening of the nails is a common discolouration associated with nail fungus (see **Figure 11**)

## Clinical Tip

Landmark digits (fingers and toes) appropriately. Many institutions have a body diagram to landmark anatomy. Check with your institution for specific nomenclature, which can vary in terms of how digits are referenced. Sometimes the thumb is referred to as Digit 1, index finger as Digit 2, middle finger as Digit 3, ring finger as Digit 4, and little finger as Digit 5. If you are uncertain about how to reference a specific digit, landmark as descriptively as possible (e.g., middle finger left hand, 2nd medial toe right foot).

**Table 9:** Nail colour changes.

Colour Variation	Description
White	Loss of pigmentation (pinkness) and whitening of the nail bed can be the result of lack of perfusion related to illnesses like diabetes and liver disease.
Blue	Blue hue of the nail bed can be an indication of hypoxia.
Yellow	Yellowing of the nails can be a sign of chronic lung disease or lymphedema: over time, the nails thicken and become yellow due to lack of drainage of lymph fluid under the nail bed. Yellowing can also be a sign of rheumatoid arthritis or fungal infection. Smoking can also discolour the nail and leave yellow nicotine stains.
Red/brown half-moons	Red half-moons may be a sign of auto-immune disorder.
Blue half-moon	A blue-half moon is a sign of poisoning (e.g., silver).
Black stripe	A black stripe that runs down the nail bed can be a sign of melanoma, but also can be benign.
Greenish black	Bacterial infection under the nail can cause a greenish black appearance (see <b>Figure 11</b> ).



**Figure 11:** Nail fungus.

2. **Assess for the presence of clubbing** (see **Figure 12** and **Video 4**

and 5). Clubbing is related to conditions that lead to chronic hypoxia (e.g., chronic lung diseases, cystic fibrosis, congenital heart disease). Chronic hypoxia can cause the nail angle to flatten to 180 degrees or more, the nail bed to soften and become spongy, and the fingertips distal to the distal interphalangeal joint to become enlarged. Clubbing typically first develops in the thumb and then the forefingers. It is often assessed on the index finger, but in cases of early clubbing it may not have advanced to that digit, so it is best to assess the thumb first. To assess for the presence of clubbing, ask the client to point their thumb out so that it is parallel to the ground and view it at your eye level (this is considered the profile sign). Inspect the nail angle at the intersection of where the nail base meets the skin.

- Normally, the nail angle base is about 160 degrees with normal-sized fingertips and nail beds that are firm to touch.
- Clubbing is evident when the angle of the nail base is greater than 180 degrees (flattening of the nail base); fingertips are usually enlarged and bulb-like, and the nail base is spongy/soft upon palpation.



**Figure 12:** Clubbing.

(Photo by Sidsandyy, CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=40100295>)



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**Video 4:** Inspection for clubbing on the index finger [0:19]



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**Video 5:** Inspection for clubbing on the thumb [0:18]

3. **Palpate the nails for texture and consistency** using a grasping motion: place the pad of your index finger on the client's nail and your thumb on the underside of the client's finger. Palpate the whole nail including the nail bed.
  - Normally, nails are smooth and firm.
  - Describe the appearance and location of thick nails and spongy/soft nails.
4. **Palpate the nails for capillary refill** on two or three fingernails of each hand, at heart level (see **Video 6**). Start by applying pressure with your own finger to the client's nail; this causes the nail to blanch (become paler in colour). Apply the pressure for 5 seconds and then release and observe the return in colour.
  - A normal finding when assessing capillary refill is colour return within 3 seconds or less.
  - Colour return taking longer than 3 seconds is considered sluggish return for capillary refill (or slow capillary refill time), and this finding suggests possible issues with **oxygenated blood perfusion** (this may be related to peripheral vascular and/or cardiac and/or respiratory issues). Note that capillary refill time can be slower if the client's hands are cold from being outside or from washing in cold water; ask them to warm their hands to ensure an

accurate reading.



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#### **Video 6:** Capillary refill [0:45]

5. Note the **findings**:

- Normal findings might be documented as: “Nails are smooth, firm, clean with translucent colour, and no presence of clubbing. Capillary refill within 2 seconds.”
- Abnormal findings might be documented as: “Nail angle on thumbs is slightly greater than 180 degrees, capillary refill time is 5 seconds.”

### Priorities of Care

Nail concerns do not usually require immediate intervention. However, a client with sluggish capillary refill combined with other cues suggesting severely reduced blood flow to the limbs requires additional interventions to

re-establish blood flow. For example, if associated with absent or diminished pulses, cool limbs, numbness, cyanosis, or pallor, report these findings to the physician or nurse practitioner.

Some other nail concerns also may need to be addressed promptly. For example, nail **laceration**, **avulsion**, and **subungual hematoma** may require treatment. Bleeding under the nail can cause pressure and pain, and drilling a small hole in the nail can alleviate the pain associated with pressure by allowing the blood to escape the nail bed. With some cases of laceration and avulsion, healthcare providers may need to remove or glue the nail or the surrounding skin may need to be stitched in place.

# Hair: Inspection and Palpation

You might begin with a brief inspection of the hair, but this is typically done in combination with palpation. Always ask permission to touch. Move the hair around while observing the scalp and strands of hair; when looking for lice or nits, it is helpful to use a comb.

Steps for inspecting and palpating hair include:

## 1. **Inspect and palpate for hair colour and texture.**

- Keep in mind that hair can vary greatly in terms of colour and texture. Note any variations in hair colour not attributable to hair dye, any colour patches or other inconsistencies, hair texture, and the integrity of the scalp. If you have a concern, it can be helpful to first ask the client what their normal or baseline hair colour and texture is.
- Note any excessive dryness or oiliness of the hair and scalp or any areas of the scalp that are not intact.

## 2. **Inspect and palpate for hair distribution.**

- Hair patterns should be consistent without patches of hair or hair loss. However, keep in mind that as a person ages, it is natural for hair to thin and for some people to experience bald areas on the scalp particularly when it is associated with male-pattern baldness.
- Abnormal findings may include unexplained hair loss on the scalp and the body. Hair loss can be the result of certain conditions and medications. Any hair tufts on the body that are inconsistent with the rest of the hair

distribution, such as patches of hair on the scapula, are considered abnormal findings. Hirsutism refers to excessive hair growth on the body. Alopecia refers to patches of baldness or total absence of hair on the scalp. Hair loss on the legs, particularly the toes, can be affected by peripheral vascular disease (you will learn more about this in another chapter).

3. **Inspect and palpate for lesions and other issues.** Use a systematic approach generally starting from the midline of the hairline on the forehead and making your way one side at a time to the base of the skull. Then return to the midline of the hairline of the forehead and repeat on the other side. Be sure to examine behind the ears for lesions and examine strands of hair.
  - Normally, no lesions are present.
  - Describe any abnormal findings. For example, dandruff (seborrhea) is a common condition involving a dry flaking that can be seen on the scalp or hair. Because it flakes (or falls), it can sometimes be seen on the client's clothing (e.g., on the shoulders). Lice may be found on the scalp at the neckline and behind the ears, while the nits (eggs) stick to strands of hair. Pilar cysts are often observed on the head. These are benign growths stemming from the hair follicle, but they can be painful and even disrupt rest.
4. Note the **findings**:
  - Normal findings might be documented as: "Hair colour and distribution consistent with no dryness or oiliness and no lesions present."
  - Abnormal findings might be documented as: "Several nits located on hair strands on the posterior and left side of the head with lice behind the left ear and at the base of the

neck.”

## Contextualizing Inclusivity

The beauty industry and commercialism has shaped ideals and standards of what constitutes beauty, particularly for women. Facial hair removal is a pervasive cultural practice for many women, but remember that some facial hair growth is normal regardless of gender. Hair growth along the upper lip, cheeks, and chin can be a normal finding for many women.

Consider an inclusive, anti-racist, and trauma-informed approach when assessing the hair on a client’s head. Always ask permission to touch and explain what you are doing and why. Only perform assessments when necessary, and engage the client in the process.

Clients may have alopecia due to a medical diagnosis or treatment that has caused hair loss; hair loss can be distressing and make them feel vulnerable. There is also a cultural component to hair and headwear, which can be connected to identity, culture, and body image (e.g., Jewish men may wear a kippa, married Jewish women may wear a wig or headscarf, Sikh men and women may wear a turban, transgender individuals may wear wigs or extensions). It is important to be aware of the structural racism that continues to pervade ideals of beauty, for example affecting Black women in particular (Johnson & Bankhead, 2014). Black women may wear their hair

naturally, in locs, braids, wigs, or extensions such as clip-ins and weaves, and some may use coconut oil or other oil-based products in their hair. Black women continue to be affected by structural and interpersonal racism with accompanying discrimination, judgement, and marginalization (Brown, 2018). Additionally, some Indigenous people have a spiritual connection with their hair and for that reason, along with the effects of forced cutting of hair in residential schools, and intergenerational trauma more broadly, some may consider it offensive to have their hair touched.

## References

Brown, S. (2018). "Don't touch my hair": Problematizing representations of Black women in Canada. *Africology: The Journal of Pan African Studies*, 12(8), 64-85.

Johnson, T., & Bankhead, T. (2014). Hair it is: Examining the experiences of Black women with natural hair. *Open Journal of Social Sciences*, 2, 86-100. <https://doi.org/10.4236/jss.2014.21010>

# Health Promotion and Disease Prevention: Considerations and Interventions

Health promotion is an important component of any visit with clients. An assessment of the integumentary system is an opportunity to determine appropriate interventions, if required. Carefully consider all of the collected data, both subjective and objective. During your subjective data collection, you will have asked about risk factors, social determinants, and other considerations. Based on your critical reflection of all data, you might formulate additional questions. Together, your findings will inform your clinical judgment and help you determine the health promotion needed for a specific client.

## Healthy Eating

A well-balanced diet is an important part of maintaining healthy skin, hair, and nails. Persons with substance use disorder, mental illness, and other conditions that affect nutrient absorption are at particular risk for developing vitamin deficiencies, which can lead to integumentary manifestations (see **Table 10**). Always use a non-judgemental approach when assessing healthy eating with all clients, including those with these conditions.

Probing questions related to diet may include:

- Tell me about your usual diet?



- How much fluids do you typically drink in a day? What fluids do you drink (e.g., water, caffeinated beverages, alcohol)?
- Have you had any recent changes in your life that have affected your diet?
- Do you have any issues accessing healthy food?
- Do you have enough money to buy healthy food?

**Table 10:** Vitamin deficiencies.

Vitamin deficiency	Integumentary manifestation
Vitamin A	“Toad skin” appearance (phrynoderma), generalized dry skin, lesions on the face, skull, and extremities.
Vitamin B2	Facial dermatitis (nasolabial folds, forehead, cheeks, and <b>postauricular skin</b> ).
Vitamin B3 (niacin)	Dermatitis, photosensitivity with eruptions, perineal lesions, thickened pigmented skin.
Vitamin B6	Dermatitis, intertriginous rash, skin ulcerations.
Vitamin B12	Hyperpigmentation on face, palmar creases and flexures, sores in mouth, and red, swollen tongue.
Vitamin C	Follicular hyperkeratosis with fragmented corkscrew hair, perifollicular hemorrhages, diffuse <b>petechia</b> in pressure sites (e.g., buttocks), edema, red swollen gums.

## Skin, Nail, and Hair Care

Tools used on the skin, hair, and nails should be cleaned regularly to prevent the spread of microorganisms. Families that share nail clippers and hair brushes should replace these tools after an infection or infestation (e.g., lice), and it is never advisable to share razors with others. Inquire about the client's skin, nail, and hair care routine.

Probing questions related to skin, nail, and hair care may include:

- Tell me about your usual skin care routine? Your hair routine? Your nail routine?
- What products do you use?
- Have you recently changed the products you use?

## Environmental Health

Environmental exposures to irritants such as poison ivy, poison oak, poison sumac, stinging nettle, and wood nettle can cause contact dermatitis (inflammation of skin with burning/itching) and other rashes. Other irritants that may cause skin reactions can include soaps/detergents, perfumes, solvents, and disinfectants. Some clients may have occupations involving exposure to potent chemicals, for example those working at dry cleaners or nail salons. Others may have occupational exposure to pesticides, plastics, and other materials/chemicals that can cause skin reactions. Ask about all of these issues during your subjective assessment.

Another important issue is skin cancer, which can be related to environmental conditions, especially sun exposure. Mole mapping and monitoring are important strategies to prevent skin cancer or identify it in early stages. Skin cancers can vary in shape, size, and presentation. A new growth or change in skin is the most common sign: a new growth that does not heal, bleeds, is painful – or a mole

that evolves – are important warning signs that should prompt further assessment. Teach clients about sun protection to prevent skin cancers, including daily application of sunscreen and use of protective clothing.

Probing questions related to environmental health might include:

- Do you have any allergies?
- Do you spend time outside in the sun?
- How do you protect yourself from the sun? (e.g., sunscreen with SPF 30 or above, limiting time in sun, wearing a hat, wearing long sleeves/pants). What is the SPF?
- Do you have a history of abnormal moles? If so, do you monitor your moles? How?
- Do you spend time outside in long grass or treed areas? Have you noticed any ticks? How do you protect yourself from ticks? (e.g., long, cuffed pants, closed shoes).
- Are you exposed to chemicals at your workplace? If so, what precautions do you take?

## Knowledge Bites

Eruptive skin rashes caused by viruses can occur year-round in children and adults, but winter months tend to be correlated with higher rates of spread because more time is spent indoors.

<b>Virus</b>	<b>Integumentary manifestation</b>	<b>Associated symptoms</b>
Hand-foot-and-mouth disease	Painful blister-like lesions on the tongue, gums, and inside the cheeks. Rash on palms of hands, soles of feet, and occasionally on the buttocks.	Fever, loss of appetite, sore throat, general malaise.
Roseola infantum	Pink rash with flat or raised lesions, begins on trunk and spreads to face and extremities	High fever (3–4 days), irritability, swelling of the eyelids.
Measles	Deep red, flat rash on face and spreads down toward the trunk and extremities. Typically starts as a small, distinct lesion (red with white centre) and then coalesces into a larger lesion. After several days, the rash turns to discolouration and peeling.	Cough, redness and irritation of the eyes, fever.
Rubella	Pink/light red rash that starts on the face and spreads to the neck, trunk and extremities with spots 2–3 mm in size. May or may not be itchy. Rash lasts about 5 days.	Low-grade fever, sore throat, runny nose, malaise, tender/swollen glands.

Erythema infectiosum (fifth disease)	Bright red rash that starts on cheeks (slapped cheeks appearance), spreads to the trunk and extremities, and lasts for 2–4 days. Rash may return when exposed to sunlight, heat or cold, or injury to the skin.	Low-grade fever, headache, runny nose, sore throat, itching, nausea, vomiting, diarrhea.
Varicella (chickenpox)	Itchy rash on trunk, face, armpits, extremities, inside mouth.	Typically accompanied by a fever, runny nose, cough, fatigue, joint pain.

# Clinical Judgment: Case Study

A 64-year-old client attends a primary healthcare clinic reporting a burning and tingling sensation with pain and rash under their breast on the left side of the trunk. The client indicates difficulty sleeping due to pain and irritation and rates the pain as 6/10. The client reports that the burning and tingling pain started 8 days ago and the rash started 5 days ago and has progressively worsened and spread slightly. Upon assessment, you note a linear red rash with vesicles spanning from the midline of the trunk to the posterior scapula on the left side (following dermatome). Several vesicles appear to have erupted and are crusted over. Client's vital signs are: blood pressure: 135/89 mm Hg, pulse 89 beats per minute, respirations 18 breaths per minute, O2 saturation: 98%, temperature: 38.6°C tympanic. Client has not received immunizations in 20 years.



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<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=1049#h5p-51>

# Key Takeaways

- Common symptoms to assess related to the integumentary system include skin lesions, skin breakdown, hair loss and nail discoloration.
- The objective assessment of the integumentary system involves inspecting and palpating the skin, hair and nails.
- Health promotion interventions should be developed with the client to address what is important to them. Considerations include dietary adjustments to prevent vitamin deficiencies and preventing the spread of infection.





# MUSCULOSKELETAL SYSTEM

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# Learning Outcomes

1. Apply subjective assessment skills.
2. Apply objective assessment skills.
3. Use clinical judgement.
4. Integrate health promotion interventions into actions.
5. Integrate an inclusive approach to musculoskeletal assessment.

# Introduction to the Musculoskeletal System

The musculoskeletal system (MSK) is important to assess as it is considered the body's framework and supportive structure. It has additional roles such as **hemopoiesis**, and mineral and fat storage. See **Figures 1 and 2** for an anatomical overview of the MSK system.

Your assessment provides information about the functioning of this system and potential cues that require your action.

## Musculoskeletal System Components

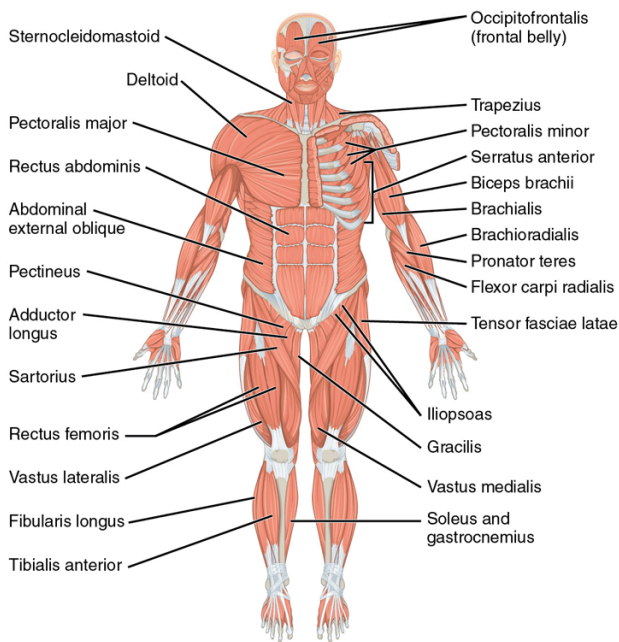
The main components of the MSK system include the skeleton:

- Skull, including the cranial and facial bones.
- Vertebral column with intervertebral discs.
- Thoracic cage with sternum and ribs.
- Clavicle and scapula.
- Upper and lower limb bones.
- Hip/pelvis bones.

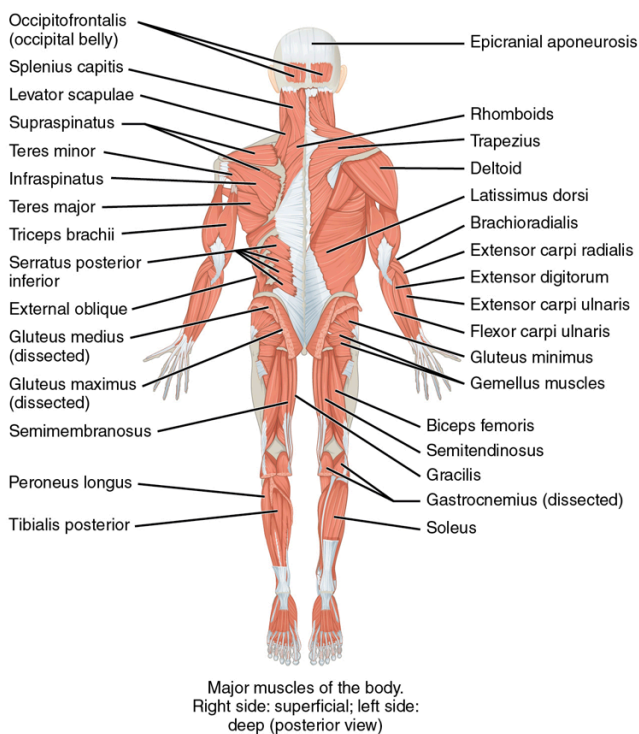
The skeleton also includes cartilage in particular areas of the body such as the nose, ears, **costal cartilage**, and **articular cartilage** in joints (e.g., shoulder, hips, knees, elbows, wrists/hands, and ankles/feet). See **Figure 3** for an anatomical overview of the articular cartilage and synovial joint.

The skeleton is supported by muscles. Skeletal muscles specifically attach to the bones of the skeleton and provide support. The MSK system is connected and supported by joints. These joints include articular cartilage, ligaments, and tendons to connect the MSK system together. Many joints have a cavity with synovial fluid

between the articulating joints that permits mobility, including the shoulders, elbows, wrists/fingers, hips, knees, and ankles/toes. Other joints do not have a cavity with synovial fluid including cranial sutures (which are not moveable) and the vertebral column (which is slightly moveable). Bones are connected by ligaments, and tendons connect muscle to bone.

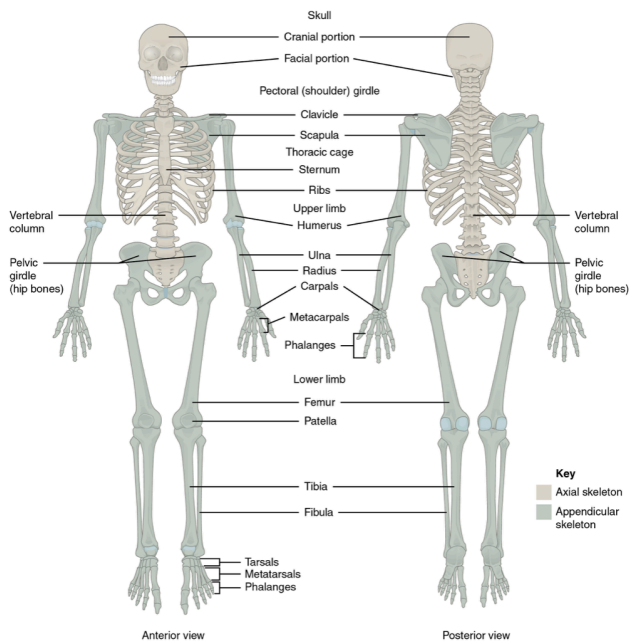


Major muscles of the body.  
Right side: superficial; left side:  
deep (anterior view)

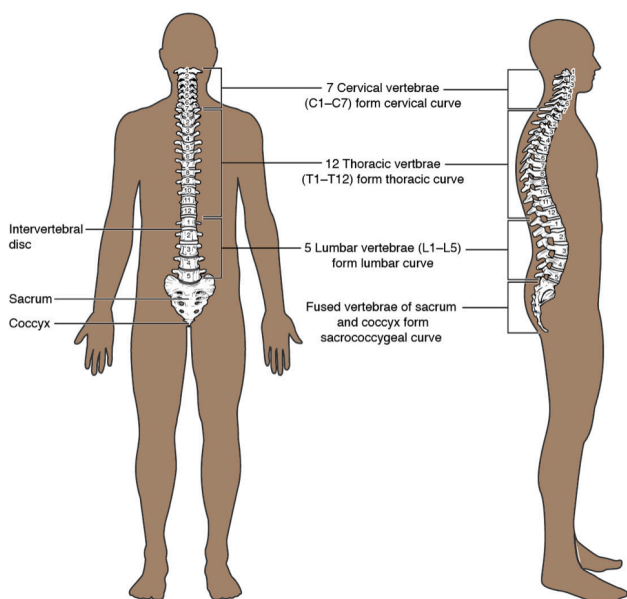


**Figure 1:** Muscular system (anterior view on top image, posterior view on bottom image)

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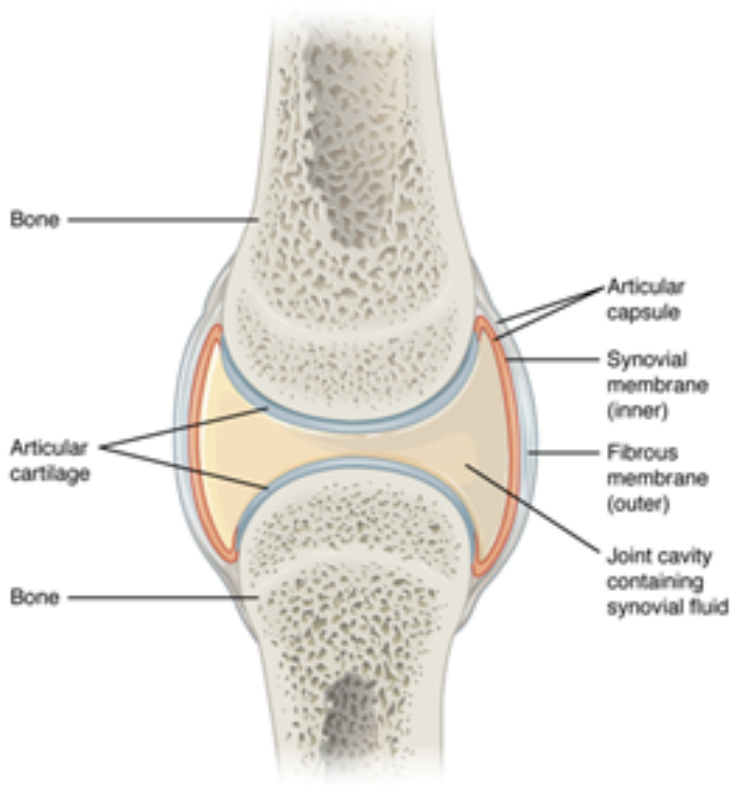






**Figure 2:** Skeletal system

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**Figure 3:** Articular cartilage and synovial joint.

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You have already learned about the anatomy and physiology of the MSK system, but check out these helpful videos on the [muscular](#)

[system](#) explained in six minutes and the [skeletal system](#) explained in seven minutes.

## Clinical Tip

Your MSK assessment will begin when you first meet the client. Remember to incorporate the concept of functional health by assessing the client's physical capacity to participate in daily activities. For example, a functional assessment includes assessing day-to-day activities such as walking into the room, moving from standing to sitting, signing a consent form, or changing into a hospital gown. Always compare bilaterally during the assessment. Ask clients if they have noticed any changes in their movement and if they have any questions or concerns. Your findings will help to guide your assessment throughout the examination, as well as provide opportunities to incorporate health promotion and prevention education.

## Knowledge Bites

The MSK system is influenced by the neurological system. For example, muscle functioning (e.g., movement and strength) is innervated by the cranial nerves (12 pairs of nerves that send electrical signals from the brain to the body) and the spinal nerves.

### Activity: Check Your Understanding



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# Subjective Assessment

**Subjective assessment** of the **MSK system** involves asking questions about the health of the client and symptoms that may occur because of pathologies that affect the muscles, bones, and joints. A full exploration of these pathologies is beyond the scope of this chapter, but common problems associated with the MSK system include back pain, repetitive strain injury (RSI) such as carpal tunnel syndrome or tendinitis, osteoarthritis, rheumatoid arthritis, sprains, and bone fractures.

**Common symptoms** that can be related to the MSK system include pain, headache, stiffness, muscle tightness, numbness, weakness, muscle twitches, fatigue, mobility, redness, swelling, local temperature change, deformities, and psychological distress. See **Table 1** for guidance on subjective health assessment. Many of the questions in this table align with the PQRSTU mnemonic; for a reminder, check out this resource: [PQRSTU](#). Probing of these symptoms should occur in the order of relevance, as opposed to being sequentially aligned with the PQRSTU mnemonic.

You should also ask about any medications (prescribed, over the counter, and herbal and natural products) the client is taking: the name, dose, frequency, reason it was prescribed or rationale for taking over-the-counter medications, how long they have been taking it, and the effectiveness.

The subjective assessment is performed prior to the objective assessment so that it can inform the objective assessment. Remember to always ask questions related to health promotion. Depending on the context of the assessment, you may ask these questions and engage in a discussion during a subjective assessment or after an objective assessment. A section on “Health Promotion Considerations and Interventions” is included later in this chapter after the discussion of objective assessment.

## Knowledge Bites: Pathophysiology

Many MSK-related pathophysiology disorders are related to physical work (e.g., working at a computer, lifting boxes) and workplace injuries, which can be prevented or decreased by implementing health promotion strategies. MSK injuries can occur in the muscles, nerves, tendons, joints, cartilage, and bones. Certain work environments can increase the risk or worsen an MSK injury. For example, work that involves routine lifting, performing repetitive tasks, or work that challenges the ergonomics of your body (e.g., working at a computer for lengthy periods of time). Common workplace musculoskeletal disorders include sprains, back pain, tendonitis, and carpal tunnel syndrome. Proper body alignment and ergonomics can help decrease the risk of a MSK workplace injury.

**Table 1:** Common symptoms, questions, and clinical tips.

<b>Symptoms</b>	<b>Questions</b>	<b>Clinical tips</b>
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<p><b>Pain</b> associated with the MSK system can be described in many ways such as aching, sharp, cramping, stiffness, or burning sensation. Myalgia is a term that refers to muscle aches and pains.</p> <p>Clients may tell you about pain in their muscles, joints and bone. Sometimes they might not be able to specify, but instead just show the location. Thus, your assessment is important to figuring out the issue.</p>	<p>You might start by asking: Do you currently or have you recently had any pain or other sensations in your joints, muscles, or bones?</p> <p>If the client's response is affirmative, ask: Do you have the pain now?</p> <p>Additional <b>probes</b> may include:</p> <p>Region: Where do you feel the pain/sensation?</p> <p>Radiation: Does the pain radiate to another part of your body</p> <p>Quality/quantity: Tell me about it. What does it feel like? How bad is it?</p> <p>Severity: Can you rate your pain on a scale of 0 to 10 with 0 being no pain and 10 being the most pain you have ever had?</p> <p>Timing: When did it begin? What were you doing when it began? Is it constant or intermittent? Do you wake up with the pain and if so, how long does it last?</p> <p>Provocative/palliative: Is there anything that makes it worse? (If you suspect a fracture, it may be appropriate to ask if movement increases the pain because fractures can cause sharp, intense pain with movement). Is there</p>	<p>If the client has had an injury or a fall, you may suspect a fracture if they describe a sharp and intense pain on movement or when they attempt to bear weight. If you suspect a fracture, assess for potential deformities, swelling, and decreased circulation distal to the location. Immediate help may be required to decrease the risk of further injury to the MSK, peripheral vascular, and nervous systems, as well as respiratory system (e.g., a fractured rib).</p> <p>When caring for clients with impaired cognition or with clients who are preverbal or non-verbal, refer to the pain assessment chapter, particularly pain tools related to children, cognitive impairment, and critical care.</p> <p>When possible, clients should monitor their pain level and treatment strategies with chronic pain. You might ask them to</p>
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	<p>anything that makes it better?</p> <p>Treatment: Have you treated it with anything? Do you take any medications for it? Does it work? Have you sought treatment regarding this pain? If the pain is in the lower extremities, does walking relieve or aggravate it?</p> <p>Understanding: Do you know what is causing it or what it is related to? Did you have a recent injury?</p> <p>Other questions: How does the pain affect your life? Does it affect your activities of daily living? What type of work do you do? Does it involve physical activity or heavy lifting? Does it involve sitting/standing for long periods of time?</p>	<p>document their pain in a journal and discuss further strategies for pain management.</p> <p>Types of pain management strategies for some MSK conditions may include non-opioid medications, e.g., acetaminophen or ibuprofen. Non-medicinal pain strategies could include deep breathing exercises, massage, physiotherapy, stretching, ice and heat, and some rest (but you should tell the client it is important to maintain light activity).</p>
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<p><b>Headache</b> is a specific type of pain that can be felt in one certain location or all over the head. It can be described in many ways including sharp, achy, throbbing, full, or squeezing with a viselike quality.</p> <p>You should inquire about the presence of severe and frequent headaches.</p> <p>Headaches can be related to the MSK (e.g., tension or cervicogenic headaches) or neurological system (e.g., <b>migraine</b>). Assessment will help you start thinking about which system could be causing the headache. A headache can be the primary cause (e.g., migraine, tension headache) or secondary cause (e.g., cervicogenic or sinus headaches). For example, migraines are primarily related to the neurological system, but head/neck pain and stiffness can occur due to tension that can affect the MSK system; this would be considered a secondary cause.</p>	<p>Do you currently have a headache? Have you recently experienced any headaches that you are concerned about? Do you have frequent, severe, and/or reoccurring headaches that disrupt your day-to-day functioning?</p> <p>Remember to incorporate the language that the client uses into your probing questions.</p> <p>Additional <b>probes</b> if the client's responses are affirmative may include:</p> <p>Quality/quantity: What does your headache feel like? How bad is your headache?</p> <p>Severity: Can you rate your headache on a scale of 0 to 10 with 0 being no pain and 10 being the most pain you have ever had?</p> <p>Region/radiation: Where do you feel your headache? Does it radiate anywhere?</p> <p>Provocative/palliative: Is there anything that makes your headache worse? Is there anything that makes your headache better?</p> <p>Timing/treatment: When did the headache begin? Was it sudden or gradual? What were you doing when it began? Is it</p>	<p>Almost everyone has had a headache. Common causes include stress, dehydration, changes in sleep, poor posture/body alignment, and certain foods (e.g., <b>nitrates</b>).</p> <p>Frequent and severe headaches are more concerning.</p> <p>It is important to determine if the headache is primary (e.g., migraine, tension) or secondary and related to another medical condition (e.g., head injury, trauma, tumor, stroke). A sudden onset of a severe headache may require immediate intervention. You should call for emergency help if it is accompanied by confusion, trouble seeing, speaking, or walking, fainting, or numbness/weakness. This kind of headache could be related to a stroke, brain aneurysm, or other serious medical condition.</p>
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	<p>constant or intermittent? Have you taken anything to treat your headache? Have you taken any medications</p> <p>Understanding: Do you know what is causing the headache? Do other members in your family experience similar headaches?</p> <p>Other: How does it affect your daily life?</p>	
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<p><b>Joint stiffness</b> refers to when joint movement is limited or difficult (medical term is ankylosis). The joint may feel achy or sore.</p> <p>Joint stiffness can be caused by degeneration of cartilage and/or decreased synovial fluid being produced with age. It can also be caused by other MSK conditions such as arthritis, gout, or bursitis.</p>	<p>Do you currently have any stiffness in your joints? Have you had any recent stiffness in your joints?</p> <p>Additional <b>probes</b> if the client's responses are affirmative may include:</p> <p>Quality/quantity: What does it feel like? How bad is it?</p> <p>Region: Which joints feel stiff?</p> <p>Timing: When did it begin? Is there a time of day when the stiffness is worst? Is it constant or intermittent? If intermittent, how long does it last for?</p> <p>Provocative/palliative: Is there anything that makes it better (e.g., position)? Is there anything that makes it worse (e.g., exercise or sitting for long periods of time)? Is it aggravated or associated with any specific movements?</p> <p>Treatment: Have you treated it with anything (e.g., ice, heat, exercise)? Do you take any medications or supplements for it? Do you use any mobility aids?</p> <p>Understanding: Do you know what causes your joint stiffness? Do you have any related symptoms (e.g., pain,</p>	<p>Joint stiffness is a common MSK concern.</p> <p>Understanding the pathophysiology of the cause of the stiffness will help you determine effective interventions.</p> <p>You should assess the location of the joint stiffness to help determine the cause and whether and how it is affecting the client's activities of daily living.</p> <p>Preventive strategies that can ease joint stiffness include gentle range of motion movements, exercise (e.g., walking), hot and cold compresses, good body alignment/posture, managing weight, and balancing rest and activity.</p>
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	<p>swollen glands or lymph nodes, increased saliva production)?</p> <p>Other: How does it affect your ability to move around? How does it affect your sleep?</p>	
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<p><b>Muscle spasms</b> are involuntary muscle contractions.</p> <p>The cause of muscle spasms is often unknown, but they can be related to inactivity, fatigue, stress, lack of stretching, dehydration, overuse of the muscle, or pain. Muscle spasms can feel like a twitch or cramping and can create pain.</p>	<p>Do you experience muscle spasms?</p> <p>If the client's response is affirmative, additional <b>probes</b> might include:</p> <p>Quality/quantity: Tell me about the muscle spasm. What does it feel like? How bad is it?</p> <p>Region: Which muscle(s) has the spasm?</p> <p>Timing: How often do you have them? When did it begin? When do you feel the muscle spasm (e.g., at night, after exercise)? Is it constant or intermittent?</p> <p>Provocative/palliative: Is there anything that makes it better? Is there anything that makes it worse? Is it aggravated or associated with any other symptoms?</p> <p>Treatment: Have you treated it with anything (e.g., stretching, hot or cold compresses)? Do you take any medications or supplements for it?</p> <p>Understanding: Do you know what caused the muscle spasm or what it is related to?</p>	<p>Assess the cause of the muscle spasm and associated signs and symptoms. If it is related to a neurological system concern, symptoms will vary (e.g., numbness, paralysis, tremor) and other interventions will be required.</p> <p>Adequate water intake, especially during exercise or warm weather, will assist with dehydration-related muscle spasms.</p> <p>Some clients will describe intense muscle spasms in the night, particularly in the calf muscle. Stretching and massaging the spasm can relieve the symptoms.</p> <p>Stretching before and after activities, as well as after being stationary for long periods, will help decrease the risk of muscle spasms.</p>
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<p><b>Mobility, lack of balance, and weakness.</b></p> <p>A person's mobility can be affected and limited by their joints, muscles, or bones, as can lack of balance and weakness.</p>	<p>Tell me about your mobility? Tell me about your daily activities and exercise?</p> <p>Do you have any limitations when walking, standing, sitting, or any other body movements?</p> <p>Do you have mobility limitations? For example, do you have any concerns with your balance or any weakness while moving?</p> <p>Do you use any mobility aids (e.g., walker, cane, crutch, bar handles, wheelchair, prosthetics)?</p> <p>If the client's response is affirmative, additional <b>probes</b> might include:</p> <p>Quality/quantity: Tell me about your mobility concerns. What does it feel like? How bad is it?</p> <p>Region/radiation: Which part of your body experiences limitations or weakness related to your mobility/movement? Does the limitation/weakness remain in the one location or does it move to another location (e.g., hip to knee)? Does this happen when you walk for longer periods of time?</p> <p>Timing: When do you feel a lack of balance or weakness</p>	<p>Mobility will depend on the client's developmental age, current health, and morbidity status. It can also be affected by certain medications that can affect balance or cause fatigue.</p> <p>Help the client take precautions against falling. Think about the SAFE mnemonic:</p> <ul style="list-style-type: none"> <li>• Safe environment (e.g., well-lit environment, tripping hazards removed).</li> <li>• Assist with mobility (e.g., if relevant, ensure mobility aids and glasses are in reach, document and assist with mobility).</li> <li>• Fall risk reduction (e.g., non-slip footwear, bed in lowered position, call bell in reach).</li> <li>• Engage the client and family (e.g., having conversations about risk factors and prevention).</li> </ul> <p>(Canadian Institute</p>
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	<p>when you are mobile? When did the mobility concerns begin? How long have you been experiencing the limitation or weakness? Is it constant or intermittent?</p> <p>Provocative/palliative: Is there anything that makes it better? Is there anything that makes it worse? Does a certain movement or activity aggravate it or make it feel better? Is it associated with any other symptoms (e.g., pain or numbness)?</p> <p>Treatment: Have you treated it with anything (e.g., stretching, hot or cold compresses, mobility aids)? Do you take any medications or supplements for it (e.g., ibuprofen, fish oil)? Do you regularly use any mobility aids?</p> <p>Understanding: Do you know what caused the mobility issue or what it is related to? How does it affect your daily life?</p>	<p>of Patient Safety, 2015).</p> <p>You should identify any risk for falls: fall-related injuries are the number one cause of death in seniors (Canadian Fall Prevention Curriculum, 2017).</p> <p>A careful assessment is needed for any client at risk of falling. Various assessment tools are available to systematically assess risk factors related to falls, which include history of falls/near falls, acute condition, ability to move around, mobility aids, or hearing, vision, or cognitive impairment.</p> <p>If the client has already been assessed, you should follow recommendations, as well as all institutional policies to prevent falls.</p> <p>If the client has mobility limitations, assess how this affects their overall daily life (e.g., physically, psychosocially, financially).</p>
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<p><b>Redness, swelling, temperature changes, and deformities</b> may be related to the joints, muscles, or bones.</p>	<p>Always ask one question at a time. Questions might include:</p> <p>Have you experienced any redness (or swelling or temperature changes or deformities) in any joints (or muscles or bones)?</p> <p>Use variations of the <a href="#">PQRSTU</a> mnemonic to assess these symptoms further if the client's response is affirmative.</p>	<p>These symptoms can be related to the MSK system or another body system. You should assess each symptom individually to determine the systematic cause.</p>
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<p><b>Injury</b> and <b>trauma</b> can cause a range of musculoskeletal symptoms and/or exacerbate existing issues. It is important to explore the <b>mechanism of injury</b>.</p>	<p>Have you had any recent injuries/trauma?          If the client's response is affirmative, additional <b>probes</b> might include:          Quality/quantity: Tell me about the injury/trauma? What does it feel like? How bad is it?          Region/radiation: Which part of your body experienced the injury/trauma? Have the effects of the injury/trauma remained in one location or is another location affected?          Timing: When did the injury/trauma occur? How long have you been experiencing it?          Provocative/palliative: Is there anything that makes it better? Is there anything that makes it worse?          Treatment: Have you treated it with anything?</p>	<p>Understanding the mechanism of injury and how the injury occurred will inform your objective assessment and interventions.</p>
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<p><b>Other MSK symptoms</b> can include fatigue, numbness, dizziness, or flu-like symptoms.</p>	<p>Always ask one question at a time. Questions might include:</p> <p>Have you experienced any body fatigue? (or numbness or dizziness or flu-like symptoms?)</p> <p>Use variations of the PQRSTU mnemonic to assess these symptoms further if the client's response is affirmative.</p>	<p>These symptoms can be related to other body systems and non-MSK issues. To determine whether they are MSK related, you will need to explore these symptoms along with any other associated symptoms.</p>
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<p><b>Personal and family history of MSK</b> conditions and diseases.</p> <p>Some of the common issues associated with the MSK system, including back pain, repetitive strain injury (RSI) such as carpal tunnel syndrome or tendinitis, osteoarthritis (OA), rheumatoid arthritis (RA), systemic lupus erythematosus (SLE), gout, and fibromyalgia, can have a familial connection.</p>	<p>Do you have any chronic conditions or diseases that affect your muscles, bones, and joints? Do you have a familial history of conditions or diseases that affect the muscles, bones, and joints (e.g., arthritis, lupus, gout, and fibromyalgia)?</p> <p>If the client's response is affirmative, begin with an open-ended probe: Tell me about the condition/disorder/disease?</p> <p>If the client has a personal history, <b>probing questions</b> might include:</p> <p>Timing: When did you begin experiencing symptoms related to this condition? When were you diagnosed? Are the symptoms constant or intermittent?</p> <p>Quality/quantity: How does it affect you? What symptoms do you have? How bad are the symptoms?</p> <p>Treatment: How is it treated? Have you had any surgeries? Do you take medication?</p> <p>Provocative/palliative: Is there anything that makes it worse? Is there anything that makes it better?</p>	<p>The biological and non-biological nature of family may be important to consider when asking questions: risk factors may be influenced by genetics and/or culture and/or environmental factors.</p> <p>Some musculoskeletal disorders are related to genetics (e.g., (e.g., <b>achondroplasia, Duchenne muscular dystrophy, osteogenesis imperfecta</b>), but it is more common that a combination of environment and cultural factors play a larger role (e.g., <b>osteoarthritis, degenerative disc disease</b>).</p>
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## Priorities of Care

All abnormal findings require a focused assessment on the MSK system and possibly other systems. However, certain MSK symptoms are cues that require immediate action.

A sudden very severe headache that is worse than the client has ever experienced before requires urgent assessment. It could be a sign of a life-threatening condition such as an aneurysm or a ruptured aneurysm. Other associated symptoms include reduced consciousness, disorientation, eye pain, light sensitivity, blurred vision. If your client has this sort of headache, you should immediately report it to the physician or nurse practitioner, monitor the client's vital signs, and conduct focused assessments (on the MSK, neurological system, and the eye).

Additionally, if you suspect a potential fracture, you should perform a focused assessment. A bone fracture is highly probable if the client experiences a sharp and intense pain upon movement particularly when they have experienced some sort of trauma (e.g., a fall). Take immediate action to decrease the risk of further internal trauma to the peripheral vascular systems (e.g., circulation), nervous system, or other organ damage (e.g., punctured lung or perforated bowels). For example, with a clavicle fracture, the sharp edge of a broken bone could damage the

underlying vessels (e.g., internal jugular vein), nerves (e.g., brachial plexus) or puncture the apex region of the lung (e.g., pneumothorax). When a fracture is suspected:

- Assess pain level.
- Immobilize the area and do not attempt to realign the bones.
- Monitor vital signs frequently (particularly respiration, pulse, and blood pressure) and perform a primary survey.
- Assess circulation and sensation distal to the injury including skin temperature, sensations, and pulses: cool temperature, numbness/tingling, and decreased or absent pulses.
- Report findings to the physician or nurse practitioner.

## Contextualizing Inclusivity

Recognize that some clients may have extensive MSK histories, particularly older clients, and ensure you allow sufficient time for assessment. Children may experience what is often called growing pains; this type of pain is an achy muscle pain typically in the legs.

Also, you may have certain values surrounding activity and exercise and/or concerns about your own body

image. Try to reflect on your own unconscious biases: this will help you support each client's agency and their own mobility goals while connecting them with supportive resources within their communities.

Some clients with MSK limitations may feel hesitant to participate in sports or activities. For example, they may feel uncomfortable because of self-concept or body image issues associated with their limitations, mobility aids, or physical deformities. It is important that you create an inclusive environment, and be aware of the client's potential discomfort. For example, you may begin the assessment with a non-judgemental question such as: "What type of activities (or sports) do you enjoy?" This can open a discussion about participating in sports or group activities, which can provide many benefits to the client's concept of self. Interacting and socializing with others in a shared activity can create a sense of inclusion, as well as have positive health benefits, both physical and emotional.

Listen to Justin Gallegos' story about being part of his high school cross-country and track team: No Such Thing As A Disability: The story of a runner with cerebral palsy [insert link: <https://youtu.be/Hv3liaDDtSY>]

## Activity: Check Your Understanding

A 28-year-old client is admitted to the emergency department after being involved in a motor vehicle accident (MVA). Their vital

signs are RR 28 bpm and shallow, HR 110, BP 100/60, T 36.4°C, and client-rated pain 6 out of 10. The client has a fractured left clavicle, dislocated shoulder with numbness along the distal arm, and a fractured right pelvis. Bruising noted anteriorly across the upper chest wall/thoracic cage area and medial-lateral from the hip to upper thigh. Right peripheral IV with normal saline infusing at 50 ml/hr. Client states their head is throbbing, feels stiff and sore all over their body, tired, and scared.



*An interactive H5P element has been excluded from this version of the text. You can view it online here:*

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=80#h5p-18>

## References

Canadian Patient Safety Institute (2015). Reducing falls and injuries from falls. <https://www.patientsafetyinstitute.ca/en/toolsResources/Pages/Falls-resources-Getting-Started-Kit.aspx>



# Brief Scan: MSK System

A brief scan provides a **quick overview** of the MSK system. It can be performed when the client enters the room. Your observations provide insight into how the client may need to be supported during the assessment, ways you may need to modify the assessment, and cues that require further investigation.

**Steps involved in the brief scan** are:

1. Assess the type of **footwear** and the presence of **prosthetics** and **mobility aids** such as canes, walkers, braces, splints, or wheelchairs.
  - If aids are present, you should ask further questions. You need to understand the need for the aid and should assess whether it is being used properly.
2. Assess the client's **posture** and **balance** when they enter the room and their ability to sit or stand upright and maintain this position.
  - Normal findings may include an upright posture and no issues with balance.
  - Abnormal findings may include hunched over, unequal weight bearing, and lateral lean.
3. Assess for the presence of **tremors or obvious deformities**.
  - Normal findings include no tremors or deformities.
  - Abnormal findings may include deformities, which could include fractures, or unilateral or bilateral tremors in head/neck region, upper or lower limbs.
4. Assess the client's **symmetry of limbs** in terms of length and

**gait.** This can be done informally when the client walks in the room from the waiting room. Otherwise, you can ask them to walk about 10 feet. This may not be required if a client is in a wheelchair, particularly if they are unable to stand up.

- Normally, limbs are symmetrical, and gait is balanced.
- Abnormal findings include asymmetrical limbs and difficulties with balance. Cues of asymmetry and a gait that is not balanced should be probed further.

5. Note the **findings**.

- Normal findings might be documented as: “Client’s body is symmetrical, no deformities, posture straight, steady gait and balance. No mobility aids used.”
- Abnormal findings might be documented as: “Client has a slow and unsteady gait. Left arm hangs lower than the right arm.”

## Contextualizing Inclusivity

Use a **person-centred** and **systematic approach** to assessment. The initial MSK brief scan will help guide your questioning and facilitate a **non-discriminatory, anti-ableist** assessment. For example, if a client uses a mobility aid, always ask for permission/consent to touch or handle the equipment.

## Priorities of Care

During the brief scan, any **fractures** or **suspected fractures** should take priority. The fracture may have caused internal damage that is not visible upon inspection, such as a punctured lung, severed cranial nerve, perforated organ, bone fragments, or vascular or peripheral nerve damage.

A **primary survey** approach should be performed before beginning a focused MSK assessment. If there are no life-threatening injuries, you can begin the MSK assessment. **Safety** should be prioritized, including prevention of falls when assessing a client's movement, balance, strength, and gait.

# Objective Assessment

An objective MSK assessment is generally completed after the subjective assessment. If the client shows signs of clinical deterioration, such as respiratory distress, you should focus the interview portion on pertinent questions and proceed directly to the objective assessment and associated interventions. For example, a fractured rib or vertebral fracture or a fracture that has severed circulation requires urgent intervention.

Be aware of the environmental temperature in the room and the temperature of your hands. Room temperatures are not easily modified, so try to limit exposing the client's body parts and keep them covered with their clothes or sheet/blanket until you need to assess that body part. This also follows a **trauma-informed approach** and maintains the client's dignity and limits exposing them unnecessarily. If a stethoscope is needed, warm your hands and stethoscope before placing them on the client's body.

The objective assessment of the MSK system involves a brief scan and a focus on **inspection, palpation, range of motion (ROM), and manual muscle testing (MMT)**, and sometimes **auscultation**, depending on the affected area (see **Table 2**). Compare the body bilaterally throughout the assessment. Assess the unaffected side first for comparison with the affected side, and when a joint is affected, at the minimum, assess above and below the joint. However, it is important to note that some causes of joint pain can go beyond the joint above and joint below.

The **sequential order of the objective assessment** is typically based on minimizing position changes and using a cephalocaudal (head to toe) or proximal to distal approach. Although certain positions are suggested, you may need to adapt the position if a client is not able to stand or sit up. **Do not conduct ROM or muscle testing** if the subjective assessment and/or inspection and palpation suggest **trauma to the neck or back, or a bone fracture**.

**Table 2:** Brief overview of a MSK assessment.

MSK Assessment	Clinical Tips
<p><b>Inspection</b> involves systematic observation with a focus on muscles, bones, and joints. Depending on the areas inspected, this may include colour, swelling, masses, deformities, and asymmetry. Observed deformities may include subluxation (when a bone is partially dislocated within a joint) or a complete dislocation in which the articular surface of two bones are no longer aligned or connected. You also need to assess the surrounding skin condition and presence of bleeding with <b>open fractures</b> and whether you observe any involuntary muscle contractions (e.g., twitching, spasms).</p>	<p>Remember to <b>compare findings bilaterally</b> and further assess discrepancies, asking additional subjective questions when required.</p> <p>Any <b>abnormal findings</b> noted upon inspection should be further assessed with palpation.</p> <p>You should assess for the presence of muscle atrophy/wasting (loss of muscle mass and tone) in clients who have suspected musculoskeletal conditions and mobility issues. It is best evaluated by comparing the client's muscle mass and tone to their baseline (i.e., their normal composition).</p>
<p><b>Palpation</b> involves applying your hands to assess temperature, pain, masses, swelling, deformities, palpable fluid, and size and contour of muscles. You can palpate the affected area if the client notes or you observe any involuntary muscle contractions (e.g., twitching, spasms).</p>	<p>Assess the <b>unaffected side first</b> to compare it to the affected side.</p> <p>Use the <b>dorsal aspect</b> of your hands to assess for temperature, because it is most sensitive to temperature changes.</p> <p>For palpation, use your <b>finger pads</b> as they are densely innervated. Your thumb will often be used along with your fingertips when assessing joints.</p> <p>A synovial joint does not normally have palpable fluid.</p> <p>To learn more details about palpation techniques, review the <a href="#">Physical Examination Techniques: A Nurse's Guide</a> open educational resource.</p>

**Range of motion (ROM)** refers to a joint's mobility: can it stretch to its fullest extent? You should become familiar with the normal ROM of each joint. A client's baseline also is important so that you can evaluate their progress over time.

When assessing, make note of:

- **Range of motion** of the joint (full ROM or limited ROM with the specific range, and the presence of any **contractures**).
- **Quality of the movement** (movements of joints should be smooth and symmetrical with no obvious misalignments).
- Presence of **pain** (ask the client if they have any pain).
- Presence of **crepitus** (crepitus is an abnormal grating or crunching sound or sensation felt and heard over joints at the location where bones meet. It occurs when the articular surface of bones grind together. It is different from the sounds that are made when a person cracks their fingers or joints, which are caused by the slipping of tendons/ligaments over bony surfaces. Ask the client to move their joints through a range of motion and listen. If the client has pain or a limited range of motion, you may cup your hand over the joint or grasp the joint with your fingers and thumb.).

When performing ROM exercises, encourage the client to try to perform **active ROM** first, meaning that they move without assistance. If they are unable, help the client perform assisted active ROM, and then move to passive ROM as needed.

- Assisted active ROM is when you are providing some

It is helpful to **demonstrate the movement** so that the client can mirror the motions you make. Before beginning, ensure the client's **body is aligned**. As the client moves through the motions, ensure stability of the body part proximal to the joints.

Ideally, the client would perform ROM bilaterally at the same time in order to make comparisons. However, this is not possible with all joints such as the hips. Additionally, it may not be possible with clients who have mobility limitations and pain.

The guidelines for ROM angles vary across the literature. We recommend using the ROM guidelines set out by the American Academy of Orthopaedic Surgeons (1965) and Luttgens and Hamilton (1997), as they are most commonly used in practice.

Typically, you will visually observe the angle of the joint. Note that this will be an estimate, which is an appropriate approach when doing a **functional assessment of ROM**. If a more accurate joint angle is needed (e.g., fitting for a wheelchair), you may require a goniometer, which is a tool that measures the angle of a joint.

ROM can be affected by several factors including the person's typical use of the joint and their age. New onset of limited ROM is a concern and is a cue that requires further investigation.

<p>assistance to help the client with ROM.</p> <ul style="list-style-type: none"><li>• Passive ROM is when a healthcare provider or equipment/machine moves the client's joints through ROM positions for a specific joint.</li></ul> <p>With all ROM, ensure the <b>joint is still</b> and <b>stabilized</b>. When performing assisted active or passive ROM, always support the client's joint and maintain proper body alignment throughout the movement. It is appropriate to provide light pressure to fully test the full ROM of the joint, but you should <b>never force a joint beyond its capacity</b>, as this could cause damage.</p>	
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**Manual muscle testing (MMT)** evaluates the body's capacity to **innervate muscle strength**. This can reveal neurologic deficits and help you evaluate their response to treatment of neuromuscular conditions. Essentially, you are evaluating the muscle strength resistance against the force of the assessor (i.e., the nurse).

The Medical Research Council (MRC) Manual Muscle Testing scale (1943) is a common tool used and accepted by healthcare providers (James, 2007). It uses a **grading scale of 0–5** to measure upper and lower extremities resistance against applied pressure by the healthcare provider in various ROM exercise movements (see **Table 3**).

An alternative method to test muscle strength is to use a dynamometry, which is a kind of mechanical equipment. The tool can record a more precise measurement of the muscle strength. However, not all healthcare facilities have access to this equipment.

Another method to assess a client's muscle strength is a functional test. This kind of test assesses performance during activities of daily living; examples include the [30 Seconds Sit to Stand](#) test or the [Timed Up, Go \(TUG\)](#) test.

MMT can be evaluated in several ways. Check with the unit policy to see if there is a preferred approach.

The MRC tool is somewhat controversial in terms of grade breakdown, as the subjective nature of skill when performing MMT (Naqvi, 2019). You can minimize subjectivity by being consistent in how you perform these techniques.

Keep these tips in mind when performing MMT:

- Before beginning, assess the environment. Are there any situational factors that might affect the client's MMT performance (e.g., pain, fatigue from medications, lack of sleep, stress)?
- Ensure the joint is stabilized/still.
- Maintain proper body alignment of you and the client (i.e., the muscle being tested) to ensure stability and that only the selected muscles are being tested.
- When making comparisons bilaterally, ensure your hand is positioned on the client at the same location.
- Test one joint at a time. This will ensure consistency and stability of the specific muscle and joint being tested.
- Use both hands when performing MMT.
- When applying force, be aware of your own strength and your dominant side so that you apply the same force on each side. Be aware that clients have varying muscle strength and use force accordingly. When uncertain, apply force gradually to ensure safety

	<p>and minimize potential injury.</p> <ul style="list-style-type: none"><li>• Compare bilaterally and report findings. For example, normal findings are full resistance equal bilaterally. Alternatively, note any asymmetry in strength and decrease in resistance.</li><li>• Note whether the client has pain. MMT puts the tissue under a higher threshold of stress and may elicit pain.</li></ul>
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**Table 3:** MMT Scale (based on Medical Research Council (MRC) Manual Muscle Testing scale, 1943).

Grade	Muscle State	Description
0	No contraction.	There is no contraction or movement of the body part being tested. Thus, MMT cannot be performed.
1	Flicker or trace of contraction.	There is a trace of contraction or flicker of movement of the body part being tested with no gravity and no applied force. No gravity means that the body part is supported by a bed or table.
2	Active movement, with gravity eliminated.	The body part being tested is able to actively move through a ROM when supported on a flat surface (i.e., supported by the table or bed) with gravity eliminated and no applied force.
3	Active movement, against gravity.	The body part being tested is able to actively move through a ROM against gravity without support and no applied force. Note: If client is able to perform full active ROM, then you can assume the client is already at $\frac{3}{5}$ on the MMT as a baseline.
4	Active movement, against gravity and resistance	The body part being tested is able to actively move through a ROM against gravity while you apply force and they try to resist your force, and they demonstrate partial resistance.

5	Normal power	The body part being tested is able to actively move through a ROM against gravity while you apply force and they try to resist your force, and they demonstrate full resistance.
<p>Note: For each MMT movement, document the movement and whether the movement is equal bilaterally in strength (except spine flexion and extension, where bilateral comparison is not possible) as well as if the client experiences pain. For example, a normal finding may be reported as “<b>full resistance equal bilaterally on all upper limb ROM with no pain.</b>”</p>		

## Contextualizing Inclusivity

When assessing the MSK, you will need to assist the client into various body positions. Try to reduce the number of changes in body position, particularly for older clients and clients with physical disabilities who may have difficulty and possibly reduced strength to change positions. If you are assessing a newborn or young child, you can ask someone (e.g., care partner, healthcare provider, parent) to help hold and reposition the client on the exam table or in their lap while you conduct the assessment.

## Knowledge Bites

**Synovial joints** have a small amount of fluid in the cavity between the articulating joints, but this fluid should not be palpable. Palpable fluid is a joint effusion, which refers to an accumulation of excess fluid. When palpating, it feels soft and moveable, and is sometimes associated with warmth, redness, and pain. The cause of effusions varies, but can be associated with infection, inflammation, and injury. Effusions are considered in the context of other cues, the severity, and potential causes. Treatment may be as simple as rest, ice or heat, and non-steroidal anti-inflammatory medications. Depending on the cause and severity, other treatments may include antibiotics, **arthrocentesis**, and surgery.

## Activity: Check your Understanding



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=82#h5p-26>

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# Face, Neck, and Cranium

Assessment of the face, neck, and cranium involves inspection, palpation, ROM, and MMT. This assessment is best performed with the client sitting upright on the exam table. However, depending on the client's situation, it can be performed when they are sitting in a chair/wheelchair or lying in bed.

## Inspection

Steps for **inspecting** the **face**, **neck** and **cranium** include:

1. **Inspect** the **face for colour, symmetry, swelling, masses, and deformities** with a focus on the muscles, bones, and joints.
  - Normally, the face has no discolourations such as erythema and is symmetrical with no swelling, masses, or deformities. Describe the appearance and location of any discolouration, swelling, masses, and deformities.
2. **Inspect** the **anterior, lateral, and posterior sides** of the neck and cranium (as well as the superior side of the cranium). Depending on the reason for assessment, it may be appropriate to request permission to move the client's hair so that you can directly observe the cranium.
  - Normally, the head is upright and centred and the cranium and the neck are symmetrical with no masses, swelling, deformities, or discolourations. Describe the appearance and location of any asymmetry, masses, swelling, deformities, and discolourations (these will be further assessed with palpation).

### 3. Note the **findings**.

- Normal findings might be documented as: “Client’s head is upright and centred. No masses, swelling, deformities or discolouration on the head, face and neck.”
- Abnormal findings might be documented as: “Client’s face has swelling over the right zygomatic (cheekbone) area with bluish-purple discolouration.”

## Contextualizing Inclusivity

Consider an inclusive, anti-racist, and trauma-informed approach when assessing the cranium, which may involve touching the hair. Clients may have alopecia due to a medical diagnosis or treatment that has caused hair loss; hair loss can be distressing and make them feel vulnerable. There is also a cultural component to hair and headwear, which can be connected to identity, culture, and body image – this can apply to many people. Be aware that structural racism continues to pervade ideals of beauty and affects Black women in particular (Johnson & Bankhead, 2014). Black women may wear their hair naturally, in locs, braids, wigs, or extensions such as clip-ins and weaves. Black women continue to be affected by structural and interpersonal racism with accompanying discrimination, judgement, and marginalization (Brown, 2018). Additionally, some Indigenous people have a spiritual connection with their hair and for that reason, along with the effects of forced



cutting of hair in residential schools, and intergenerational trauma more broadly, some may consider it offensive to have their hair touched. As a healthcare provider, you should be aware of these issues and use an anti-racist and trauma-informed approach. Always ask permission to touch and explain what you are doing and why. Only perform assessments when necessary and engage the client in the process.

## Palpation

Steps for **palpating** the **cranium**, **face**, and **neck** include:

1. Palpate the **temporomandibular joint** (where the maxilla and mandible meet anterior to the tragus). Do both sides at the same time and place two to three finger pads on each side and move in a circular motion in two to three areas. Then, use dorsa of hands and palpate the **posterior side of neck** for **temperature**. The rest of the facial structures are normally not palpated unless the client has indicated a concern or has experienced a physical injury.
  - Normally, the temperature is equal bilaterally, muscles are firm to touch, and no pain is felt on palpation.
2. Palpate down the **cervical spine** and the **paravertebral muscles** on the posterior side of the neck from inferior to the occipital bone (C1) down to C7 (see **Video 1**). Then, palpate down the **trapezius muscles** followed by the **sternomastoid muscles**. Ask the client if they have any pain/tenderness.

- Normally, the cervical spine and muscles are symmetrical with no pain, masses, swelling, deformities, or paravertebral muscle spasms. The description and location of abnormal findings should be noted. Description of masses and swelling may include size and consistency (soft or hard).

### 3. Note the **findings**:

- Normal findings might be documented as: “Temperature warm to touch and equal bilaterally with no pain on temporomandibular joint. Cervical spine and muscles are symmetrical with no pain, masses, swelling, or deformities noted on palpation.”
- Abnormal findings might be documented as: “Client noted pain as a 6/10 upon palpation of the cervical spine. Swelling palpable from C6–7.”



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**Video 1:** Palpation of spinous processes and paravertebral muscles from C1 to C7 [0:43]

## Range of Motion (ROM)

ROM related to the face is focused on the temporomandibular joint

and includes vertical and lateral motions and protraction and retraction. ROM of the neck involves flexion, extension, lateral bending, and rotation (see **Table 4** for normal ranges). For cervical spine ROM, you will assess the gross ROM, which is the cumulative ROM of all of the spinal segments together.

While performing the assessment, observe the ROM, quality of the movement, listen for crepitus, and ask the client about the presence of pain.

While demonstrating the movements yourself, the steps in assessing ROM of the temporomandibular joint and the neck are:

1. Ask the client to open and close their mouth (**vertical motion**). Then, place your index and middle fingers on the temporomandibular joints on both sides of the face and ask them to repeat the movement
  - Normally, there should be no pain and the temporomandibular joint should open and close smoothly. Sometimes, you may hear and/or feel a click (clunk) of the jaw. This is usually not of concern unless associated with pain and affecting the ability to chew food.
2. Ask the client to perform **neck flexion** by attempting to touch their chin to their chest and bring it back to neutral position.
3. Ask the client to perform **neck extension** by gently tilting their head back and bring it back to neutral position.
4. Ask the client to perform **neck lateral bending** by tilting their head to the right, back to neutral position, and then to the left (e.g., “attempting to touch their ear to their shoulder”).
5. Ask the client to perform **neck rotation** by turning their head to the right, back to neutral position, and then to the left.
6. Note the **findings**:
  - Normal findings might be documented as: “Client’s temporomandibular joint and neck has full ROM,

movements of joints are smooth and symmetrical with no obvious misalignments, no crepitus or pain noted.”

- Abnormal findings might be documented as: “Client’s neck has limited ROM in flexion with no crepitus. Pain noted as a 3/10 while flexing.”

NOTE: See **Video 2** for ROM of the neck.

**Table 4:** Normal ROM of temporomandibular joint and neck (adapted from Luttgens & Hamilton, 1997).

Joint	Range of motion
Temporomandibular joint	ROM for the temporomandibular joint is not commonly performed unless there is pain or dysfunction regarding pain or functionality.
Neck: Flexion	60 degrees
Neck: Extension	75 degrees
Neck: Lateral flexion	45 degrees
Neck: Rotation	80 degrees



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## Video 2: ROM of neck [0:58]

# Manual Muscle Testing (MMT)

Assess MMT after ROM. Explain the procedure before applying force. Perform MMT on each joint bilaterally. Grade the resistance according to the institution's grading scale (e.g., MRC) or just describe it and note whether it is equal bilaterally. Keep in mind that MMT of the neck also provides information about the functioning of cranial nerve XI (spinal accessory nerve) and whether it is innervating the muscles.

MMT of the face, neck, and cranium is focused only on the neck and is typically performed with the client in sitting position. The steps involve:

1. Begin with the client's head in a neutral position looking straight ahead. To perform **cervical/neck flexion**, stand slightly lateral to the client, place one hand on the thoracic spine for stability and the other on the client's forehead, ask them to bend their neck bringing their chin to their chest while you apply force with your hand on their forehead. Ask them to resist your force. Release the force and ask them to return their head to neutral. Note if the client tries to move

their shoulders or thoracic body during the procedure.

2. Next, place one hand on the posterior occipital bone and the other on the client's shoulder for stability. To perform **neck extension**, ask the client to look up to the ceiling to extend the cervical spine, while applying force with the hand on the occipital bone. Ask them to resist your force. Release the force and ask them to return their head to neutral. Note if the client tries to use their back during the procedure.
3. Move in front of the client. For stability, place one hand on their right shoulder and the other on the client's head above the left ear over the temporal bone structures. To perform **lateral bending**, ask the client to touch their left ear to their left shoulder, while you apply force to the movement. Ask them to resist your force. Release the force and ask them to return their head to neutral. Repeat the procedure on the opposite side. Note if the client tries to flex the lateral thoracic spine during the procedure.
4. To perform **rotation**, place one hand on the right shoulder for stability and the other on the lateral side of the client's face with fingers pointing toward the temporal bone structures. Ask the client to look left to rotate the cervical spine while you apply force. Ask them to resist your force. Release the force and ask them to return their head to neutral. Repeat the procedure on the opposite side. Note if the client tries to rotate the thoracic spine during the procedure.
5. Note the findings:
  - Normal findings might be documented as: “full resistance equal bilaterally on all neck ROM with no pain.”
  - Abnormal findings might be documented as: “partial resistance equal bilaterally on all neck ROM with mild pain.”

NOTE: See **Video 3** for MMT of the neck.



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### **Video 3:** MMT of the neck [1:34]

## Priorities of Care

If a fracture or internal trauma is suspected when inspecting the head, face, or neck, call for immediate assistance and stabilize the head and neck. Your initial suspicions will usually be based on the client's reason for seeking care. Monitor vital signs for any internal damages caused by bone fragments, such as changes in respiration due to damage of the larynx or nasal bone/cartilage. Monitor for reduced consciousness, disorientation, or dilated pupils due to swelling in the brain. Monitor for loss of sensation or paralysis due to a severed cranial nerve. Do not perform palpation, ROM and MMT as this manipulation can increase the risk of permanent damage or life-threatening conditions. You will also do a neurological assessment, which will be introduced in another chapter; neurological involvement may be suspected if the client has limited ability to blink their eyes, stick out their tongue,



raise their eyebrows, or smile.

## Activity: Check your Understanding



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<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=86#h5p-36>

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# Arms, Hands, and Related Joints

Assessment of the arms and hands progresses from the shoulders to the fingertips. Related joints include the shoulders, elbows, wrists, and fingers. This assessment involves inspection, palpation, range of motion, and manual muscle testing, and is generally completed with the client sitting upright on the exam table. ROM and muscle testing of the shoulders requires the client to stand, so it is usually reserved until the end of the MSK assessment to minimize position changes. You may also need to modify the approach if a client is unable to stand.

## Inspection

Steps for inspecting the arms and hands include:

1. **Inspect for colour, symmetry, swelling, masses, deformities, and length of limbs** with a focus on the muscles, bones, and joints on the whole arm and hand. This involves asking the client to stretch arms and hands out in front of them (pronation) and then turn them over (supination) so that you can inspect the anterior and posterior sides. You may need to ask the client to spread their fingers apart while they are moving their outstretched arms from pronation to supination. Next, ask the client to rest their hands on their lap while you inspect the shoulders and elbows as these cannot be fully visualized when pronating and supinating.
  - Normally, there is no discolouration, swelling, masses, and deformities, and the arms and hands and joints are

symmetrical.

- Describe the appearance and location of any discolouration, swelling, masses, and deformities.

2. Note the **findings**:

- Normal findings might be documented as: “Client’s shoulders, arms, wrists and hands are symmetrical with no redness, swelling, masses, or deformities.”
- Abnormal findings might be documented as: “Client’s right wrist is red and swollen on the dorsal side of wrist, 5 cm x 3 cm area.”

NOTE: See **Video 4** for inspection of arms and hands.



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**Video 4:** Inspection of arms and hands [0:50]

## Palpation

Steps for palpating the arms and hands:

1. **Palpate for temperature** from shoulders to fingertips bilaterally. Palpate over the shoulder, elbow, wrist, and finger joints as you move down the client’s arm.

- Temperature is normally warm to touch and equal bilaterally. Temperature may get slightly cooler toward the fingertips.
- Abnormal findings include increased temperature over a joint and sometimes a muscle.

2. **Palpate for pain, masses, swelling, deformities, palpable fluid, and muscle twitching** from shoulders to fingertips. Palpate the whole arm and hand including the full joint. If the client reports pain prior to assessment, assess that area last.

- Normally, there is no pain, masses, swelling, deformities or palpable fluid.
- If pain is present, note the location and ask client to rate the severity and describe the quality. Describe the location and characteristics of any masses, swell, deformities, or palpable fluid.


3. Note the **findings**:

- Normal findings might be documented as: “Client’s shoulders, arms, wrists and hands are warm to touch to fingertips, equal bilaterally. No pain, swelling, masses, deformities, or palpable fluid noted.”
- Abnormal findings might be documented as: “Client’s right elbow is warmer to touch in comparison to left elbow. Swelling over the olecranon area. Client reported pain as a 6/10 upon palpation.”

NOTE: See **Video 5** for palpation of arms and hands.



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## Video 5: Palpation of arms and hands [2:03]

## Range of Motion

ROM of the arms and hands is focused on the shoulders, elbows, wrists, and finger joints (see **Table 5** for normal ranges). Much of this assessment can be performed in sitting position except the shoulder ROM, which is best performed in standing position (it can be performed toward the end of the MSK assessment when the client is positioned into standing). In saying this, ROM of shoulders, elbows, wrists and finger joints can all be performed in standing position if the client has no issues with mobility and balance or a supine and lying lateral position if the client is unable to stand. Begin with the unaffected arm first, then move to the affected arm for comparison.

While performing the assessment, observe the ROM, quality of the movement, listen for crepitus, and ask the client about the presence of pain. You can demonstrate the movements yourself.

Steps for assessing ROM of the arms and hands:

1. To perform **shoulder flexion**, ask the client to stand with their arms hanging straight at their sides (neutral position/extension), then lift their arms in front of them above their head (keeping their arms straight) until their fingertips point toward the ceiling, and finally bring them back to a neutral position.

2. To perform **shoulder extension**, start with the client in a neutral position and ask them to move their arms/hands back as far as possible (keeping their arms straight with an upright posture and not leaning forward), and then return to a neutral position.
3. To perform **shoulder abduction**, start with the client in a neutral position and ask them to move their arms out from their body (laterally) and up over their head until the hands meet, and then back to a neutral position. Assess movement anteriorly and posteriorly.
4. To perform **shoulder adduction**, start with the client in a neutral position and ask them to move their arm across the midline of their body to the opposite side, keeping the arm straight, and then repeat with the other arm.
5. To perform **shoulder external rotation** (also called lateral rotation), ask the client to bend their arm at the elbow to a 90-degree angle keeping their elbow tightly close to their side, then ask them to move their hands out to the side while keeping their elbows tight to the side of their body until their palms face forward (this externally rotates the shoulder).
6. To perform **shoulder internal rotation** (also called medial rotation), ask the client to have their arms hanging straight down at side with thumbs pointing inward/medial to the body, and then move their thumbs/arms up their back as high as they can, and then back to a neutral position.
7. To perform **elbow flexion**, start with the client in a neutral position, and then ask them to lift their forearm/hand arms up by bending at the elbow, moving their hands toward their shoulders while keeping the elbow joint still, and finally return to a neutral position (which is **elbow extension**).
8. To perform elbow **supination** and **pronation**, start with the client in a neutral position, and ask them to bend their elbow at a 90-degree angle with thumbs facing up. Next, rotate the thumbs/forearms internally for pronation (palms of the hands should be facing down to the floor), and then externally for

supination (palms of the hands should be facing up to the ceiling).

9. To perform **wrist flexion** and **extension**, ask the client to rest their forearms and hands on a table.
  - For **wrist flexion**, the client's forearms should be resting on the table in supination position (palms of the hands facing up). Ask the client to bend at the wrist joint with fingers pointing to the ceiling while keeping the forearms/wrists on the table.
  - For **wrist extension**, the client's forearm should be resting on the table in a prone position (palms of the hands facing down). Ask the client to bend their wrist joint back with fingers pointing to the ceiling by keeping the forearm and wrists on the table.
10. To perform **wrist radial** and **ulnar deviation** ask the client to rest their forearm on the table in a prone position (palms of the hands facing down).
  - For **radial deviation**, ask the client to flex their wrists inward/medially keeping the forearm/hands/fingers on the table as the fingers deviate midline and point toward each other, and then return to a neutral position.
  - For **ulnar deviation**, ask the client to flex wrists outward/laterally keeping the forearms/hands/fingers on the table as the fingers deviate away from midline and point away from each other, and then return to a neutral position.
11. To perform **finger flexion and extension/abduction**, first ask the client to make a fist (flexion) by bending the fingers and then stretch and spread their fingers out straight (extension). This is also considered abduction as the fingers are spread out from one another. Ask the client to put their forearm/hands/fingers flat in a prone position on a table and lift their fingers

off the table in extension, while keeping their palms flat.

12. To perform **thumb flexion, extension, abduction, and opposition**, ask the client to rest their forearms on the table in a prone position (palms of the hands facing down), then ask the client to externally rotate their forearms so the palms are facing each other.
  - For thumb **flexion and extension**, ask the client to bend their thumbs into the base of the palm, and then up, pointing the tip toward the ceiling for extension.
  - For thumb **abduction and adduction**, ask the client to abduct their thumbs internally pointing toward each other, and then adduction moving back beside the first digit.
  - For thumb **opposition**, ask the client to touch their thumb tips to the tip of the 5th digit.
13. Note the **findings**:
  - Normal findings might be documented as: “Full ROM of shoulders, elbows, wrists and hands, movements of joints are smooth and symmetrical with no obvious misalignments, crepitation, or pain bilaterally.”
  - Abnormal findings might be documented as: “Client shoulder abduction 100 degrees, no crepitation, reported tenderness 3/10.”

NOTE: See **Video 6** for ROM of shoulders, see **Video 7** for ROM of elbows, see **Video 8** for ROM of wrists, and **Video 9** for ROM of fingers.



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#### **Video 6:** ROM of shoulders [2:23]



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#### **Video 7:** ROM of elbows [1:05]



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#### **Video 8:** ROM of wrists [1:20]



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**Video 9:** ROM of fingers [1:19]

**Table 5:** Normal ROM of shoulders, elbows, wrists, and fingers (adapted from American Academy of Orthopaedic Surgeons, 1965; Luttgens & Hamilton, 1997).

Joint	Range of motion
Shoulders: Flexion and extension	Flexion: 180 degrees Extension: 50–60 degrees
Shoulders: Abduction and adduction	Abduction: 180 degrees Adduction: 50 degrees
Shoulders: External/lateral and internal/medial rotation	External/lateral rotation: 90 degrees Internal/medial rotation: 70–90 degrees
Elbows: Flexion and extension	Flexion: 140–150 degrees Extension: 0 degrees
Elbows: Pronation and supination	Pronation: 80 degrees Supination: 80 degrees

Wrists: Flexion and extension	Flexion/palmar flexion: 60–80 degrees Extension/dorsiflexion: 60–70 degrees
Wrists: Ulnar and radial deviation	Ulnar deviation: 30 degrees Radial deviation: 20 degrees
Fingers: Flexion, extension, abduction, and adduction	Flexion: 90 degrees Extension: 10 degrees Abduction/adduction: Varies in degrees; ask the client to spread their fingers apart, then back together in adduction.
Thumbs: Flexion, extension, abduction, and opposition	Flexion: 15–80 degrees Extension: 20 degrees Abduction: 70 degrees Opposition: Varies in degrees; ask the client to touch the tip of their thumb to the tip of their 5th digit or the base of their palm

## Manual Muscle Testing (MMT)

Perform MMT after you assess ROM. Explain the procedure before applying force and perform MMT on each joint, one at a time. Grade the resistance according to the institution's grading scale (e.g., MRC) or just describe it and note whether it is equal bilaterally.

Steps for MMT of shoulders, elbows, wrists, and fingers:

1. To perform MMT for **shoulder flexion** and then **extension**, ask the client to stand with their arms hanging straight down at the side (neutral position). With their shoulder joints still and arms straight, place your hands on the client's forearm and apply force while you ask the client to raise their arm straight up in front of them and resist your force. Release the force and ask them to return their arm to a neutral position. Repeat on the other arm. Then, have the client raise one arm straight out in front of them and above their head. Place your hands on their elbow/forearm, apply pressure and ask them to resist your force while pushing their arm down back to a neutral position. Release the force and ask them to return their arm to a neutral position. Repeat on the other arm.
2. To perform MMT for **shoulder abduction** and then **adduction**, ask the client to stand in a neutral position. Place your hands over the elbow/top of the forearm. Ask the client to try to raise their straight arm out to the sides while you apply force and they try to resist it. Release the force and ask them to return their arm to a neutral position. Repeat on the other arm. For adduction, assess one arm at a time: place your hand on their inner forearm and ask them to move their straight arm across the midline while you apply force and they resist it. Release the force and ask them to return their arm to a neutral position. Repeat on the other arm.
3. To perform MMT for **elbow flexion** and then **extension**, ask the client to stand in a neutral position. Place your hands in the

middle of one forearm and ask the client to flex/bend their arm (at the elbow) in front of them while you apply force and they resist it. Release the force. Repeat on the other arm. Next, ask the client to bend their arm about 100 degrees (at the elbow) in front of them; place your hands on the middle area of the forearm and ask them to attempt to straighten their arm while you apply force and they resist it. Repeat on the other arm.

4. To perform MMT for **wrist flexion** and then **extension**, ask the client to rest their forearms/hands on a table in a supination position. Place one of your hands on their forearm and the other touching the palm of their hand. Ask the client to bend their wrists by pushing their palm up into your palm while you apply force and they resist it. Repeat on the opposite side. Next, ask the client to rest their forearm/hands on the table in a pronation position. Place one hand on their forearm to stabilize the arm; place the other on the dorsal side of their hand. Apply force to the dorsal side of the hand and ask the client to bend their wrist back by pushing their hand up into yours while resisting your force. Repeat the procedure on the opposite side.
5. To perform MMT for **finger flexion**, ask the client to grasp your two fingers with their hands (or with a handshake) to assess their strength bilaterally.
6. Note the **findings**:
  - Normal findings might be documented as: “full resistance equal bilaterally on all upper limb ROM with no pain.”
  - Abnormal findings might be documented as: “partial resistance on left wrist ROM with mild pain.”

NOTE: See **Video 10** for MMT of shoulders, see **Video 11** for MMT of elbows, and see **Video 12** for MMT of wrists.



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#### **Video 10** for MMT of shoulders [1:19]



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#### **Video 11** for MMT of elbows [0:51]



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#### **Video 12:** MMT of fingers [0:58]

## Priorities of Care

A priority of care related to the upper limbs is a functional assessment, which helps determine whether the client can complete activities of daily living such as personal hygiene, getting dressed, picking up a fork or cup, and opening doors. Clients with a limited ROM caused by pain, inflammation, or contractures can experience difficulties completing these activities, and an interprofessional team approach can help promote autonomy, independence, and comfort among these clients. For example, a nurse can identify these healthcare issues when performing assessments and help relieve or reduce the client's pain level using pharmaceutical or non-pharmaceutical strategies. Nurses can also advocate for additional referrals, such as interprofessional assessments and treatments: for example, an occupational therapist can provide clients with therapeutic devices such as large-handled utensils, or safety hand bars or shower chairs for their bathrooms; a physiotherapist can help adapt an appropriate exercise program; and a psychologist can help clients cope with their new health status. An interprofessional healthcare team can help clients to maintain their independence, overcome any potential barriers, and help them find supportive resources to address their specific needs.



## Activity: Check your Understanding



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# Thoracic Cage and Spine

Ask the client to reposition into a sitting position on the exam table with their legs and feet hanging off the side. Parts of the assessment can be performed in a sitting position and then reposition into standing. If the client cannot sit or stand, you will need to modify the assessment approach.

As always, use a trauma-informed approach. You will need to expose the thoracic cage and back, so you should explain what you are doing and why and provide a drape as needed. The thoracic cage is part of both MSK and respiratory systems, so these assessments are often combined.

## Inspection and Palpation

Steps for inspection and palpation include:

1. **Inspect** the **thoracic cage** for deformities that may be related to injury/trauma or congenital anomalies.
  - The thoracic cage is normally symmetrical.
  - Abnormal findings may be related to fractured ribs that can appear as a deformity or a sunken chest such as with **pectus excavatum**. If you note these abnormal findings, auscultate the lungs because both conditions can affect breathing. For example, a broken rib can be associated with a risk of **pneumothorax**.
2. Use your four finger pads to **palpate** the **thoracic cage** for masses, swelling, and deformities. You may also palpate for **subcutaneous emphysema**, which can result from a rib fracture. Ask the client if they have pain.

- Normally, no pain, masses, swelling, and deformities are present.
  - Describe the characteristics and location of any pain, masses, swelling and deformities.
3. To **palpate for temperature**, use the dorsa of your hands to palpate down the spine from T1 to the lower back (about L4 at the superior iliac crest).
- Temperature is normally warm to touch.
  - Be attentive to areas that are excessively warm and possibly associated with redness, swelling, and deformities.
4. Using two or three finger pads, including the index and middle finger, **palpate down spinous processes to feel for deformities and pain** from T1 to L4. A moderate pressure with a circular motion is best. Use the same technique, with both hands, to palpate down the paravertebral muscles on either side of the vertebra for pain and spasms.
- Normally, there are no deformities or pain along the spinous process and no pain and spasms on the paravertebral muscles.
  - Describe the location and characteristics of pain, deformities, or spasms.

For the next steps, ask the client to stand.

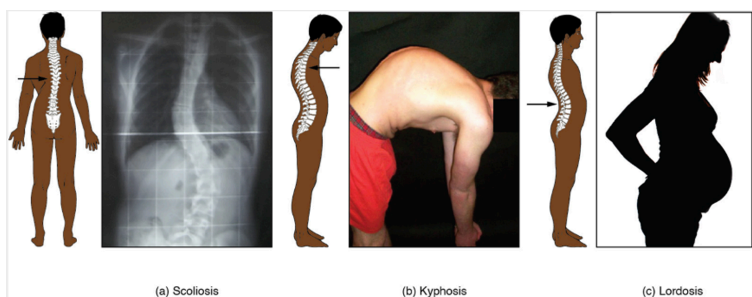
5. From a posterior view, **inspect the spinal alignment** from C1 to L4. At this point, you have already inspected the neck, but it can be helpful to look at the whole spine to assess alignment as well as head position. Also inspect the back for **symmetry**: compare the level of the shoulders, scapula, iliac crest, gluteal folds, and arm hang bilaterally. Ask the client to keep their legs straight and bend down toward their toes; this can accentuate

any asymmetry if present.

- Normally, the spine is straight with no curvature from a posterior view and the back is symmetrical and arms hang at an equal length.
- Any curvature and asymmetry should be described including the location. One type of curvature is a spinal condition called **scoliosis (Figure 4)**. It appears as an S or a C curve affecting either or both thoracic and lumbar sections of the spine. This curvature also affects the head position and asymmetry of the arm hang.

6. From a lateral view, **inspect the spinal curvature**.

- Note the normal thoracic convex (outward) curve and the cervical and lumbar concave (inward) curve.
- Note any variations in curvature such as kyphosis and lordosis (**Figure 4**). **Kyphosis** is increased curvature of the thoracic section of the spine (the upper back). A person can be born with it (congenital) or it can develop as a result of poor posture (postural kyphosis) or MSK-related conditions such as **osteoporosis**. **Lordosis** is an inward curve of the lumbar section of the spine. It can occur for pathological reasons in various age groups, but especially during pregnancy as a way to realign the centre of gravity as the fetus grows.



**Figure 4:** Scoliosis, kyphosis, and lordosis.

Attribution: Gordon Betts, J., Young, K.A., Wise, J.A., Johnson, E., Poe, B., Kruse, D.H., Korol, O., Johnson, J.E., Womble, M., & DeSaix, P. (2013). The Autonomic Nervous System. In *Anatomy and Physiology*. OpenStax. Creative Commons Attribution License v4.0. Book URL: <https://openstax.org/books/anatomy-and-physiology/pages/1-introduction>. Section URL: <https://openstax.org/books/anatomy-and-physiology/pages/7-3-the-vertebral-column>

7. Note the **findings**:

- Normal findings might be documented as: “Client’s thoracic cage is symmetrical with no reported pain, and no swelling, masses, or deformities, temperature warm to touch and equal bilaterally. Spinal column is straight with no abnormal curvatures. No deformities and pain along the spinous process and no pain and spasms on the paravertebral muscles.”
- Abnormal findings might be documented as: “Swelling at L4-5, tender to touch, with tingling and radiating pain to the right buttock and upper thigh area. Client reported tenderness as 4/10 upon palpation.”

NOTE: See **Video 13** for inspection and palpation of thoracic cage and spine.



One or more interactive elements has been excluded from this version of the text. You can view them online here: <https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=92#oembed-1>

**Video 13:** Inspection and palpation of thoracic cage and spine (note, you can also inspect the spinal curvature from the lateral view)  
[3:17]

## Contextualizing Inclusivity

An inclusive approach to health assessment is vital because clients need to feel accepted for who they are. For example, some non-binary and transmasculine clients may wear a chest binder because they feel uncomfortable or distressed about having breast tissue. Binders are garments designed to flatten the appearance of the chest wall. They come in different forms and can extend from the chest down to the diaphragm or to the hips: they may look like a sports bra or tank top, and some clients may use compression bandages.

The binder needs to be removed to adequately assess inspect and palpate the spine. First, decide whether the assessment is necessary. Also, you may or may not be aware of whether the client you are assessing wears a chest binder, so you can apply an inclusive approach by acknowledging the vulnerability that clients may feel. Provide step-by-step instructions so that they are prepared, and ask non-judgmental questions like “Assessing your spine requires me to assess on the bare skin of your back. Is there anything that would impede

me from doing so?” You can also ask if they have any questions before beginning.

You should also assess the binder for proper fit: a good fit allows for normal movement and chest expansion.

For a client with breast tissue, you may need to have them reposition their breast so that you can palpate the thoracic cage. It may feel awkward for the client to perform this action, so some nurses demonstrate on themselves over their own uniform to show the client what they would like them to do. If the client is unable to do so, you may ask permission to reposition their breast. In this case, do so with the ulnar aspect of your hand. Avoid grasping or cupping the breast with your hand as this can be misinterpreted as a sexual motion. Always ask permission and inform the client what you will be doing in order to apply a trauma-informed approach and support the therapeutic nurse-client relationship.

## Range of Motion (ROM)

When possible, ROM of the spine is best performed in a standing position to ensure full movement. Start with the client standing straight, looking forward with the face and body, and arms/hands hanging at the side (neutral position). When assessing cervical spine ROM, you will assess the gross ROM, which is the cumulative

ROM of all of the spinal segments together. See **Table 6** for normal ROM for each movement.

Steps for assessing ROM:

1. To perform **lumbar spine flexion** and **extension**, ask the client to bend forward at the waist, keeping their legs straight and bending down toward their toes, and then return to a neutral position. Next, ask the client to bend back at the waist, keeping their pelvis and hips still, and then return to a neutral position.
2. To perform **lumbar spine lateral flexion**, ask the client to bend to the right side with arms/hands reaching toward their toes while looking forward and keeping pelvis/hips still and facing forward. Return to a neutral position and then repeat on the opposite side.
3. To perform **lumbar spinal rotation**, ask the client to twist to the right while keeping arms/hands at the side and legs/pelvis/hips facing forward. Return to a neutral position and then repeat on the opposite side.
4. Note the **findings**:
  - Normal findings might be documented as: “Full ROM of lumbar spine with symmetrical and smooth movements, no crepitation and pain noted.”
  - Abnormal findings might be documented as: “Client has limited ROM of lumbar spine flexion of 30 degree, no crepitation. Rates pain 3/10 during movement.”

Note: See **Video 14** for ROM of the spine.

**Table 6:** ROM of spine (adapted from Luttgens & Hamilton, 1997).



Joint	Range of motion
Lumbar spine: Flexion	65–90 degrees (see Figure X showing where to measure, angles are based on Savlovskis & Raitis, 2021; Washington State, 2014)
Lumbar spine: Extension	25 degrees
Lumbar spine: Lateral flexion	25 degrees
Lumbar spine: Rotation	30 degrees

NOTE: There are many variations of what is described as “normal” spine flexion; we have based these numbers on “lumbar” spine flexion specifically. Always ensure that the client does not engage/move the hips when assessing spine flexion.



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**Video 14:** ROM of spine [1:07]

## Manual Muscle Testing (MMT)

You should assess MMT after completing your assessment of ROM. Demonstrate the procedure before applying resistance, and then perform MMT on each joint bilaterally. Ask the client if they experience any pain and where. Grade the resistance according to the institution's grading scale (e.g., MRC or Oxford testing scale).

MMT of the spine begins with the client in a standing position with feet placed under hips (slightly apart) for stability and arms hanging down at the side (neutral position).

Steps for MMT of the spine:

1. To perform MMT of **spinal flexion**, stand in front of the client with each hand on the anterior aspect of the shoulder applying force, and ask the client to flex the spine by bending (at the waist) forward toward their toes while resisting your force. Apply resistance once the client begins to bend (about 10

degrees). This technique can also be performed in a supine position if needed. Note any engagement of surrounding muscles to compensate for the movement.

2. To perform MMT of **spinal extension**, stand behind the client with each hand on the posterior aspect of the shoulders and scapula applying force, and ask the client to extend the spine by bending back at the waist while resisting your force. Apply resistance once the client begins to extend (about 10 degrees). This technique can also be performed in a prone position if needed. Note any engagement of surrounding muscles to compensate for the movement.
3. Note the **findings**:
  - Normal findings might be documented as: “full resistance on spine ROM with no pain.”
  - Abnormal findings might be documented as: “partial resistance equal bilaterally on spine ROM with mild pain.”

## Priorities of Care

The thoracic cage is part of the MSK and respiratory systems. When performing a MSK assessment of the thoracic cage and spine, remember to assess the client's respiration efforts. If skeletal trauma or injury has occurred, it could puncture the lungs and cause subcutaneous emphysema. In this case, assessment and support of the airway, breathing, and circulation always take priority (Edgecombe et al., 2022). A primary survey should be conducted to assess for signs of clinical deterioration.

External trauma is not always evident, so you should use subjective questioning and objective assessment to identify any potential internal trauma. Cues that are life-threatening require immediate action: these may include an airway that is not patent, increased work during breathing, tachypnea, bradypnea, and decreasing oxygen saturation levels.

## Activity: Check Your Understanding



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# Legs, Feet, and Related Joints

Assessment of the legs and feet progresses from the upper leg to the toes; related joints include the hips, knees, ankles, and toes. This assessment involves inspection, palpation, range of motion, and muscle testing. Most of it is completed with the client in a supine position with their head on the pillow and their arms relaxed at their side.

Use a trauma-informed approach: tell the client you need to inspect their legs, including their hips, and provide them with a drape. Only expose the areas that you are assessing, particularly the hips, because clients may feel a sense of discomfort exposing this area.

## Inspection

Steps for inspecting the legs and feet:

1. **Inspect** for **colour, swelling, masses, and deformities** with a focus on the muscles, bones, and joints. This involves inspecting from the hips/upper leg to the toes on the anterior, lateral, and posterior sides of the legs. To inspect the posterior side, you can either ask the client to lift their leg into the air or to reposition on their lateral side. Then, you should expose the full area of the hip ensuring the client is draped. Inspect all of the joints (hip, knee, ankles, and toes).
  - Normally, there will be no discolouration, swelling, masses, or deformities.
  - Describe the appearance and location of any discolouration, swelling, masses, and deformities.

2. **Inspect for symmetry in terms of leg size and length.** This can be done by just looking at the legs: compare the thigh size and the calf size from one limb to the other and from the hips to the feet. You can evaluate with a tape measure for accuracy if upon inspection you notice a potential discrepancy, or the client has indicated a concern. For circumference, measure at the largest point around the thigh and the calf. For leg length, place the tape measure at the anterior-superior point of the iliac crest to the inferior point of the bony prominence of the medial malleolus and repeat again. Some begin at the umbilicus as opposed to the iliac crest. Because many factors can affect accuracy, it is best to measure twice and take an average of the two measurements (Applebaum et al., 2021).
  - The legs are usually of equal length and circumference.
  - Describe any asymmetry that is greater than 10 mm (1 cm).
3. Note the **findings**:
  - Normal findings might be documented as: “Thigh and calf circumference and leg length are equal bilaterally. No discolouration, swelling, masses, and deformities noted on hips, legs, knees, ankles, or toes.”
  - Abnormal findings might be documented as: “Swelling and purple-blue discolouration over lateral side of left knee. No deformities noted. Client reported they were ‘side tackled’ during rugby.”

## Palpation

Steps for palpating the legs and feet:

1. **Palpate for temperature** from the hips/upper legs to the toes bilaterally. Palpate around each of the joints as you move down

the client's legs.

- Temperature is normally warm to touch and equal bilaterally. Temperature may get slightly cooler toward the feet.
- Abnormal findings include increased temperature over a joint and sometimes a muscle. Describe the characteristics and the location.

2. **Palpate for pain, masses, swelling, deformities, and palpable fluid** from hips to toes. Palpate the whole leg and foot including the full joint. If the client reports pain prior to assessment, assess that area last.

- Normally, there will be no pain, masses, swelling deformities or palpable fluid.
- If present, describe the characteristics and the location.

3. Note the **findings**:

- Normal findings might be documented as: “Client’s hips, legs, knees, ankles, and toes are warm to touch and cooler at toes, equal bilaterally with no swelling, masses, deformities, pain, or palpable fluid noted.”
- Abnormal findings might be documented as: “Client’s left ankle to toes are cool to touch in comparison to right ankle. Swelling around the base of the ankle. Client reported discomfort as a 4/10 upon palpation. Client reported ‘twisting ankle’ stepping off a ladder.”

## Range of Motion

ROM of the legs and feet is focused on the hips, knees, ankles, and toes (see **Table 7** for normal ranges). While performing this



assessment, observe the ROM and also listen for crepitus and ask the client about the presence of pain. Start with the unaffected leg first, and then move to the affected leg for comparisons.

The assessment begins with the client in a supine position with the legs straight – this is considered: neutral position. All assessments are completed in supine position except hip extension.

Steps for assessing ROM of the legs and feet:

1. To perform **hip flexion with straight leg** and **hip flexion with knee flexion**, ask the client to lie with their hips/pelvis still. Ask the client to lift one leg up (with leg straight) while bending it at the hip and moving it as close to the upper body as they can, then return to a neutral position (this is hip flexion with straight leg). Next, ask the client to lift the leg up as high as they can while bending it at the hip and the knee (hip flexion with knee flexion). Perform on the other leg.
2. To perform **hip extension**, ask the client to stand and move one straight leg back while keeping their body facing forward and upright. This is normally done at the end of the exam when the client stands up for you to assess their spine. If the client cannot stand, you may assess in the prone position. NOTE: this ROM can be performed toward the end of the assessment when asking the client to stand to assess the spine.
3. To perform **hip abduction** and **adduction**, ask the client to lie in a neutral position. For hip abduction, ask the client to move their leg out (keeping leg straight) toward the side (moving off the bed) and back to neutral. Repeat on the opposite leg. Next, for hip adduction, place one hand proximal to the ankle and one proximal to the knee on the underside of the leg and lift the client's legs up enough so that the client can slide their other leg underneath. Next, ask the client to slide the opposite leg underneath the leg that you are holding up. Return to a neutral position and repeat on the opposite leg.
4. To perform **hip internal rotation** (also called medial rotation) and **external rotation** (also called lateral rotation), first ensure

the client does not engage the spine with any sort of spinal rotation. For hip internal rotation, ask the client to bend one leg up at the knee, keeping their foot flat on the table with the knee pointing to the ceiling, then tip their knee inward (medially) and keeping their heel fixed to the table and their hips still (flat on table). Then, return the leg so that the knee is pointing to the ceiling. For external rotation, ask the client to tip their knee outward (laterally) while keeping the heel fixed to the surface and keeping their hips still (flat on table). Then, return to the leg to a neutral position with both legs straight. Repeat on the opposite leg. Note, both of these ROM can also be done in sitting position, which is commonly seen in practice.

5. To perform **knee flexion** and **extension**, ask the client to bend their leg at the knee by sliding their foot/heel toward their buttocks (knee flexion), and then back to a neutral position (extension). Repeat on the opposite leg.
6. To perform **dorsiflexion** and **plantar flexion**, ask the client to point and move their toes on both feet toward their shin or head (dorsiflexion), and then back to a neutral position. Next, ask the client to point and move their toes away from the body with the soles of the feet facing down (plantar flexion), and then return to a neutral position.
7. To perform **ankle inversion** and **eversion**, place one hand on the client's lower leg to stabilize their tibia and ask the client to tilt/move the sole/bottom of the feet inward (medially) facing each other (inversion), and then back to a neutral position. Next, for ankle eversion, ask the client to move the sole/bottom of the feet outward (away from each other), and then return to a neutral position.
8. To perform **toe flexion** and **extension**, ask the client to curl their toes toward the bottom of the foot, and then ask the client to uncurl their toes and point the tips of their toes up as much as possible, and then back to a neutral position.
9. Note the **findings**:

- Normal findings might be documented as: “Full range of motion, no crepitation, and pain of hip, knees, ankles, and toes bilaterally, smooth and symmetrical movements of joints with no obvious misalignments.”
- Abnormal findings might be documented as: “Right knee flexion is 110 degrees and extension 10 degrees, no crepitation. Reported muscle tightness on movement.”

NOTE: See **Video 15** for ROM of hips, **Video 16** for ROM of the knees, **Video 17** for ROM of the ankles, and **Video 18** for ROM of the toes.



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**Video 16:** ROM of the hips [1:59]



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**Video 17:** ROM of the knees [0:29]



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#### **Video 18:** ROM of the ankles [0:37]



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#### **Video 19:** ROM of toes [0:21]

**Table 7:** Normal ROM of hips, knees, ankles, and toes (adapted from American Academy of Orthopaedic Surgeons, 1965; Luttgens & Hamilton, 1997)

Joint	Range of motion
Hips: Flexion with straight leg and bent leg	100 and 120 degrees
Hips: Extension	30 degrees
Hips: Abduction and adduction	Abduction: 40-45 degrees Adduction: 20-30 degrees
Hips: External/lateral and internal/medial rotation	External/lateral rotation: 45-50 degrees Internal/medial rotation: 40-45 degrees
Knee: Flexion	150 degrees

Ankle: Dorsiflexion and plantarflexion	Dorsiflexion: 20–30 degrees Plantarflexion: 20–50 degrees
Ankle: Inversion and eversion	Inversion: 35 degrees Eversion: 15 degrees

# Manual Muscle Testing (MMT)

Perform MMT after you assess ROM. Explain the procedure before applying force. Perform MMT on each joint bilaterally. Grade the resistance according to the institution's grading scale (e.g., MRC) or just describe it and note whether it is equal bilaterally.

This testing generally begins with the client in a supine position with the legs straight (neutral position).

Steps for MMT:

1. To perform **hip flexion with straight leg**, place one hand proximal to the ankle and the other proximal to the knee. Ask the client to bend/flex their leg at the hip as if they were going to lift their leg up (keeping leg straight) while you apply force and they resist it. Return to a neutral position and then repeat the procedure on the opposite side.
2. To perform **hip extension**, ask the client to raise their straight leg up (hip flexion with leg straight), place one hand proximal to the ankle and the other proximal to the knee (both on the underside of the leg), and then ask the client to move their leg back down to the table while you apply force and they resist it. Return to a neutral position and repeat on the opposite leg.
3. To perform **hip abduction and adduction**, place one hand proximal to the knee and the other proximal to the ankle on the lateral side of the leg. Ask the client to move their leg out toward the side (moving off the bed) while you apply force and they resist it. Return to a neutral position and repeat on the opposite leg. Next, ask the client to move their leg out/abduct toward the edge of the bed (about 15 degrees). Place one hand proximal to the knee and the other proximal to the ankle on the medial side of leg. Ask the client to move their leg in toward the centre (moving their leg toward the other leg) while you apply force and they resist it.
4. To perform **knee extension and flexion**, ask the client to bend

their leg/knee keeping their foot flat on the table (about 90 degrees) with the other leg remaining straight in neutral position. Place one hand proximal to the knee for support and the other proximal to the ankle so that you can apply force. Ask the client to extend their leg by moving their foot off the bed (like a kicking action) while you apply force and they resist it. Return to the 90-degree position with the foot flat on the table. Next, for flexion, place one hand proximal to the knee for support and the other proximal to the ankle to apply force on the posterior side of the leg. Ask the client to move their foot off the table so that their lower leg is parallel to the table and knee at about 90 degrees, and then bend their knee and bring the heel of their foot back down to the table while you apply force and they resist it. Repeat on the opposite leg.

5. To perform **ankle dorsiflexion and plantarflexion**, place your hand on the top (dorsal) side of one foot. Ask the client to point and move their toes toward their shin or head while you apply force and they resist it. Repeat on the other foot. For plantar flexion, place your hand on the bottom (plantar) side of the foot. Ask the client to point and move their toes away from the body, with the sole of the foot facing down, while you apply force and they resist it. Repeat on the other foot.
6. Note the findings:
  - Normal findings might be documented as: “full resistance equal bilaterally on all lower limb ROM with no pain.”
  - Abnormal findings might be documented as: “partial resistance with left hip ROM with mild pain.”

NOTE: see **Video 20** for MMT of hips, **Video 21** for MMT of knees, **Video 22** for MMT of ankles.





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### **Video 20:** MMT of hips [3:08]



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### **Video 21:** MMT of knees [1:47]



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### **Video 22:** MMT of ankles [1:11]

## Contextualizing Inclusivity

Clients may require a leg or arm amputation and may choose to wear a prosthetic to replace the amputated limb. Prosthetics can be expensive and require replacing from use or damage; the cost and resources available vary by province or territory. Aesthetics and functionality of prosthetics have evolved over time (Franzino, 2020) from uncomfortable wooden limbs to functional life-like or artistic structures. Clients often choose a prosthetic that is closest to their skin tone (Hussain, 2011) or may choose an alternative style for sports or fashion (Burton, & Melkumova-Reynolds, 2019). As a nurse, you should advocate for clients' needs and preferences as they may encounter unconscious bias and barriers during the process. Another issue is that while the prosthetic assists with mobility and function, it also becomes a part of their body, or an extension of their body, and part of their self-identity. Always ask permission to touch when assessing the client's prosthetic. A trauma-informed approach will help foster a safe environment for the client to share their thoughts and feelings about the amputation and their prosthetic limb. Focusing on the client's needs fosters collaboration and a client-centred decision-making process.

## Activity: Check Your Understanding



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# Health Promotion and Disease Prevention: Considerations and Interventions

Health promotion and disease prevention strategies for a healthy musculoskeletal system need to be appropriate for each specific individual, so you should carefully consider all collected data, both objective and subjective. Subjective data collection involves asking the client about risk factors, social determinants, and other considerations. This kind of inquiry should be integrated throughout the entire assessment. You will ask many probing questions during the subjective assessment, but you should also formulate questions based on critical reflection of the data you have collected during the subjective and objective assessment. Together, the findings will inform your clinical judgement for each specific patient and the health promotion needed.

## Activity/Exercise

A **sedentary lifestyle** with limited activity/exercise is a risk factor that contributes to MSK conditions. Many clients will sit for long periods at work, and then sit at home to relax. Oftentimes, **activity** is described as one's general activity in the day (such as the activity they do around the house or at work). **Exercise** is a form of activity, but is considered intentional and planned physical activity often referred to as "working out."

Listen to Murat Dalkilın TED-Ed on Why sitting is bad for you [4:50].



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Exercise, including aerobic and strength-training exercise, strengthens the muscles, bones, and joints of the MSK system. Guidelines vary based on age and health, but in general individuals should engage in about **30–60 minutes of aerobic activity**, 5–7 times a week. **Stretching** is also an important element of activity in the workplace or during exercising. Watch the video by [Physiopedia](#) called [Musculoskeletal Disorders \(MSD\) & Work Place](#) to learn more about MSD and how stretching can help decrease the risk. **Strength training** is also important throughout life, and can include weight lifting, resistance bands, and using one's own body weight for resistance, e.g., squats and push-ups.

Exercise is an important part of life for many clients, and can be part of their self-concept. However, individuals with MSK conditions may not be able to perform activities as they once did. You should assess what an active lifestyle means to the client, learn about their past experiences, and collaboratively design a new exercise program that fits their specific needs and interests.

**Probing questions** related to activity may include:

- Do you have any concerns about your level of activity or exercise?
- Tell me about your daily pattern of activity? What activities are you involved in?
- What exercise do you engage in? How long do you engage in

this type of exercise? How many days of the week do you participate in exercise? (If the client plays sports, ask about their use of protective equipment.)

- What does an active lifestyle mean to you?

**Collaborate with the client** to create an activity/exercise care plan/program that is specific to their needs and personal goals. For example, low-impact activities such as walking, cycling, and water exercises involve less stress on the joints and muscles, and yoga and tai chi can help release endorphins, control breathing, strengthen balance and posture, and increase flexibility while strengthening muscles. Start at a **realistic and attainable level**, depending on the client's physical capabilities and energy level, and slowly start to increase the time and duration of the physical activity. Clients should keep active but maintain pain-free activities and avoid over-strenuous activities when joints and muscles become inflamed or tired. For example, a client with an injury to the back muscles could engage in light activity (such as walking and stretching), but should avoid heavy lifting. Strength training can be resumed when the acuity of the injury subsides.

Many interventions are available to support clients to achieve their activity goals: community walking groups, fitness apps, and joining a local gym or group activity. The participACTION website is a helpful resource related to activity guidelines:

<https://www.participaction.com/en-ca>. Consider activity interventions from a structural health promotion approach, considering the financial costs associated with many of these resources.

## Ergonomics and Back Health

**Ergonomics** is essential to **back health** and the overall health of the

MSK system. Many injuries and chronic health issues are related to inattention to ergonomics science.

Broadly speaking, ergonomics refers to **designing a space for the body to move** and **function** based on the needs of the human body. For example, consider body positioning when sitting at a desk, during repetitive actions, or picking up and moving heavy objects. Teach the client about how to maintain proper body alignment by using large muscle groups, keeping the objects close to their centre of gravity, avoiding twisting motions, and instead using pivoting motions or asking for assistance. For example, when picking an object up from the ground, a client should stand directly in front of the object, place their feet hip distance apart to create a supportive centre of gravity, bend down using the knees to engage the large quadricep muscles, keep the object close to the body's centre of gravity during lifting and standing, engaging their quadriceps and glutes. Maintaining proper body alignment by stabilizing the centre of gravity and core can decrease the risk of injuries. The ultimate aim is to increase comfort and decrease injuries and pain. The workspace is often a focus when considering ergonomics, but it is also important to also consider common spaces in the home.

Listen to Murat Dalkilic TED-Ed on The benefits of good posture [4:11].



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here: <https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=94#oembed-2>

**Probing questions** related to ergonomics and health may include:

- Tell me about any concerns you have related to ergonomics and your back health at work or at home?

- What physical position are you typically in at work (e.g., sitting, standing)?
- Are you engaged in any repetitive motions at home or at work (e.g., typing at a computer, lifting heavy objects, or other activities such as dishes/sewing)?
- Additional probing questions may be required based on the client's answers:
  - Tell me more?
  - How does it affect your back or body?
  - Do you experience any pain?

When considering interventions for a client, think about activities the client is concerned about, for example those that cause pain or other issues. Always consider health promotion from a preventative perspective, based on cues that are suggestive of potential issues.

Use relational and structural health promotion perspectives to further assess a client's ergonomics and back health. Health is affected by relationships with others in the workplace and at home, and broader structural influences may require discussions and advocacy, especially with regard to the work space.

## Diet

A **healthy diet** is important for musculoskeletal health because nutrients and hydration are important for the bones, joints, and muscles to grow and function. A healthy diet is also essential to help maintain an ideal body weight: when a person is overweight, the MSK system has to work harder to move the body because of the excess weight on the joints.

A well-balanced diet includes protein, calcium, vitamins D and K, magnesium, and zinc, which help with muscle and bone growth, repair, and maintenance, and adequate water intake helps with hydration and joint fluid. Inadequate nutrition can increase the risk



of injury and negatively affects muscle, bone, and joint repair. Clients should avoid foods that cause inflammation such as refined carbohydrates (e.g., white bread), fried foods, processed meats, sugar, and trans and saturated fats.

**Probing questions** related to diet may include:

- Tell me about your usual diet?
- What have you eaten in the last 24 hours? Is that your usual diet?
- How much fluids do you typically drink in a day? What fluids do you drink (e.g., water, caffeinated beverages, alcohol)?
- Have you had any recent changes in your life that have affected your diet?
- With rising food costs, purchasing food can be difficult. Do you have enough money to buy healthy food?

Assess the client's familiarity with **Health Canada's Food Guide** (Government of Canada 2021) and discuss how they might use it to guide their food choices: <https://food-guide.canada.ca/en/>. Be aware that this new guide still has a Eurocentric element to it, so you should collaborate with the client about its relevance in the context of their cultural food practices. A snapshot of the guide is now available in dozens of languages: <https://www.canada.ca/en/health-canada/services/canada-food-guide/resources/snapshot/languages.html>. Many resources have also been developed related to healthy eating and food safety for Indigenous individuals: <https://www.sac-isc.gc.ca/eng/1581522106156/1581522147811>

Based on the food guide, some key elements to consider are:

- **Water** should be the drink of choice: hydration can help keep muscles and joints lubricated.
- A meal/dinner plate should have **half vegetables/fruit**, **one-quarter protein**, and **one-quarter whole grains**.
- **Cook whenever possible**, as opposed to eating processed

meals and purchasing fast foods.

Assess each client's situational environment to understand how it affects their diet. For example, people with arthritis may have difficulty opening certain food items; you can help the client find adaptive tools that help with their grip. Nurses can collaborate with occupational therapists and physiotherapists to help clients create an accessible living environment that meets their specific needs.

From a structural health promotion approach, consider a client's geographical access and financial ability to purchase healthy food. These are elements of food security, and the rising cost of food globally has made it difficult to ensure everyone is food secure. This is especially true in many remote regions of Canada's North, where access to nutritious food is limited in terms of availability, and even when available, the costs are excessive. There may be times when you should refer the client to a dietitian with certain and more severe musculoskeletal conditions.

## Stress

**Stress is a risk factor** for MSK-related conditions as it can have physical, social, mental and emotional effects. Talking about stress factors can be triggering, so always use a trauma-informed approach to support the client during this type of conversation.

Stress can:

- Change and disrupt sleep patterns.
- Cause tooth-grinding, which can affect the temporomandibular joint.
- Lead to feelings of self-consciousness and subsequent self-isolation.
- Increase muscular tension in the trapezius muscles, causing neck or lower back pain.

- Affect breathing, thereby decreasing oxygen to muscles.
- Release hormones that increase inflammation in the body.
- Lead to injury due to distractions caused by a trigger.

Stress is usually a combination of multiple stressors. You should pay attention to how clients perceive or talk about themselves, their life, and their current situation, as these can indicate potential concerns and areas that need further assessment.

**Probing questions** related to stress may include:

- Tell me about stressors in your life?
- Have you experienced stress recently? Physically? Socially? Emotionally?
- Have you had any recent changes in your life? Tell me more?
- How does stress affect you?
- How often do you experience stress?
- How do you handle this stress?
- Tell me about the coping strategies you use?

When considering interventions for a client, consider their daily patterns of living and potential stressors that may be disrupting these patterns.

**Stress management** and **coping strategies** may include:

- Engaging in regular physical activity.
- Spending time with family and friends.
- Practicing relaxation techniques such as yoga, deep breathing exercises, and tai chi.
- Taking time for oneself and personal interests.
- Getting adequate sleep (usually 7–9 hours). (Wang et al., 2022).

Use a relational and structural health promotion approach to further assess the client's situation in relation to stress and potential strategies/resources. Once you understand how the client experiences, perceives, and manages stress in relation to themselves

and their relationships, you can start to create a collaborative plan of action.

All clients experience stress at some point in their lives, but structural factors influence whether they are more at risk for stress or are better able to manage stress. For example, ableism is a determinant that can lead to highly stressful experiences, such as not being able to access community services due to lack of wheelchair/walker accessibility. In this case, use a trauma-informed approach to stress and stress management to understand how the client is being influenced by ableism and how best to support them. Socioeconomic status can also influence a person's access to resources to cope with stress; when collaborating with clients to develop stress management techniques, you must be aware of these structural influences.

## Contextualizing Inclusivity

Arthritis is a common condition affecting many older people. However, about 25,000 Canadians under the age of 18 live with arthritis (Arthritis Society, 2022); a pediatric client can be diagnosed with arthritis as early as 12 months. A client-centred approach is essential for these cases, as the disease affects each individual differently. Arthritis affects the joints in fingers, hands, hips, knees, ankles and toes, which affect daily activities such as writing school assignments, participating in school activities, playing sports, and eating lunch with friends. Inflamed joints can cause pain, stiffness, and limitations in mobility, which can affect the physical,

emotional, and social health of a young person, who may feel embarrassed or self-conscious or isolated because of their limitations. You can help the client adapt by using open supportive dialogue for them to share their feelings (verbally and nonverbally), and discuss strategies on how to adapt to specific situations so they can still participate. Use an interprofessional team approach, which can include nurses, doctors, occupational therapists, pharmacists, physiotherapist, school counsellors, teachers, care partners, and sometimes peers. A strong community network can help the client build meaningful relationships and decrease their risk of isolation.

Gillian Taylor, a Clinical Nurse Specialist in Rheumatology, from Montreal Children's Hospital, highlights experiences of individuals living with juvenile arthritis in the video *Juvenile Arthritis – Kids Get it Too* What Educators Need to Know About Juvenile Arthritis [9:01].



*One or more interactive elements has been excluded from this version of the text. You can view them online here:*

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=94#oembed-3>

To learn more about arthritis go to [www.arthritis.ca](http://www.arthritis.ca)

## Priorities of Care

Falls are a common cause of injury at any age, but they are the leading cause of injury among older adults in Canada, affecting 30% of the population each year (Public Health Agency of Canada, 2014). Falls can result in hospitalization due to head injuries or hip fractures, and can have a psychological impact on an individual's self-concept. Completing a fall assessment and implementing prevention strategies can help decrease the risk.

One preventative strategy is wearing proper footwear. Shoes that do not properly fit or support the foot during an activity (e.g., walking or running) can lead to knee, hip, and lower back pain, as well as skin integrity and foot issues (e.g., nail damage). Outdoor and indoor shoes should have an intact non-slip sole, laces or Velcro to increase ankle support and maintain a snug fit around the foot, and an appropriate length with no extra space for the foot to slide. Walking in socks or bare feet can increase the risk of falling.

Other strategies to help prevent falls include regular medical checkups (e.g., eye and hearing exams), creating a safe home environment (e.g., grab bars, lighting, non-slip carpets, mobility aids), eating nutritious meals (e.g., protein, calcium, water), exercising (e.g., walking, yoga, swimming), monitoring alcohol intake, and managing medications (e.g., side effects). Clients begin to lose muscle mass after about

age 30, so it is important to engage in exercise as a preventative strategy.

## Activity: Check Your Understanding



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<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=94#h5p-11>

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Public Health Agency of Canada. (2014). Senior's falls in Canada: Second report. <https://www.canada.ca/en/public-health/services/health-promotion/aging-seniors/publications/publications-general-public/seniors-falls-canada-second-report.html>

Wang, C., Colley, R.C., Roberts, K.C., Chaput, J-P., & Thompson, W. (2022). Sleep behaviours among Canadian adults: Findings from the 2020 Canadian Community Health Survey healthy living rapid response module. *Statistic Canada Health Reports*, 33(3), 3-14. <https://www.doi.org/10.25318/82-003-x202200300001-eng>

# Clinical Judgement: Case Study

A 48-year-old client comes to the clinic with back pain. They report feeling pain in their back after moving some boxes. Yesterday their back spasmed as they tried to get out of bed, and now they're unable to bend over to tie their shoes without feeling pain. The client has a history of back pain for the past 10 years. They play rugby and go to cross-fit exercises 2x/week. Due to the spasms, they are unable to do anything or go out and are feeling useless. Vital signs: blood pressure 124/78 mm Hg, pulse 98 beats per minute, respirations 20 breaths per minute and shallow, oxygen saturation 98%, oral temperature 36.9 degrees Celsius, BMI: 26. Upon a brief inspection, the client's trapezius muscles are elevated and tense, and their posture is leaning slightly forward to the left while walking slowly. Client slowly sat down in the chair with their face grimacing and using pursed lip breathing.



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<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=96#h5p-8>

The client has been diagnosed with strained lower back muscles and inflammation along the L4-5. The client is being discharged and requires health teaching. Identify which health teaching strategies are required by dragging and dropping each strategy in the Indicated or Not Indicated columns.





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<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=96#h5p-39>

# Key Takeaways

- Common symptoms related to the MSK system can include headache, pain, stiffness, muscle tightness, numbness, weakness, muscle twitches, fatigue, mobility, redness, swelling, temperature change, deformities, and psychological distress.
- The objective assessment of the MSK system involves a brief scan, as well as inspection, palpation, range of motion, manual muscle testing, and sometimes auscultation, depending on the affected area.
- The objective assessment is performed in sequential order to minimize position changes.
- Health promotion interventions should be developed with the client to address what is important to them.

# PERIPHERAL VASCULAR SYSTEM

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# Learning Outcomes

1. Apply subjective assessment skills.
2. Apply objective assessment skills.
3. Use clinical judgement.
4. Integrate health promotion interventions into actions.
5. Integrate an inclusive approach to peripheral vascular assessment.

# Introduction to the Peripheral Vascular System

The peripheral vascular system (PVS) is a continuous network of blood vessels that carry oxygenated blood away from the heart to the periphery and carry deoxygenated blood back to the heart and to the lungs for reoxygenation. This system is important in the perfusion and oxygenation of tissues in the periphery. If this system is not functioning properly, perfusion issues can arise including **hypoxia** and tissue damage.

Assessment of the PVS provides information about the functioning of this system and cues that may require action.

## Peripheral Vascular System Components

The main components of the PVS (see **Table 1** and **Figures 1** and **2**) include:

- **Arteries:** vessels that carry blood away from the heart to the periphery. Blood in the arteries is referred to as arterial blood. The multiple layers of the arteries are strong and elastic and can dilate (expand in circumference) and recoil (decrease or return to normal size) in relation with cardiac **systole** and **diastole**. These high-pressure vessels dilate when the heart contracts and pumps blood out into them and then recoil to push blood through the arteries, creating a wave of blood through the vessels (felt as a pulse).
- **Veins:** vessels that carry blood back to the heart from the periphery. Blood in the veins is referred to as venous blood. The walls of these vessels are thin in comparison to arteries but have good stretching capacity, so they can acclimate to

larger volumes of fluid (blood) when needed. Veins are low-pressure vessels because they are further away from the heart than arteries. Cardiac systole (contraction of the heart) does not assist with the forward movement of venous blood the way it does with arterial blood. Rather, forward movement of venous blood is mainly achieved through contraction of the skeletal muscles surrounding these veins and **intraluminal valves** in the veins that maintain unidirectional blood flow and prevent backward flow of blood.

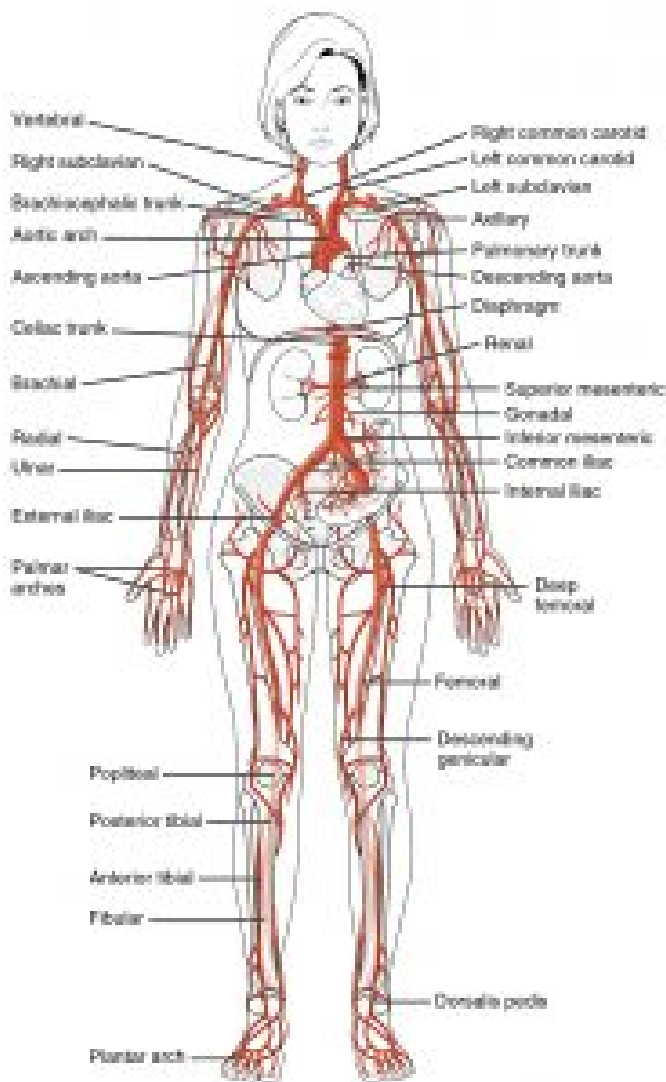
- **Capillaries:** small blood vessels that connect the arteries to the veins. Their main function is to facilitate the exchange of materials between blood and body tissues (e.g., muscles, kidneys, liver). They deliver blood and its components (nutrients and oxygen) to tissues throughout the body and transport waste products.

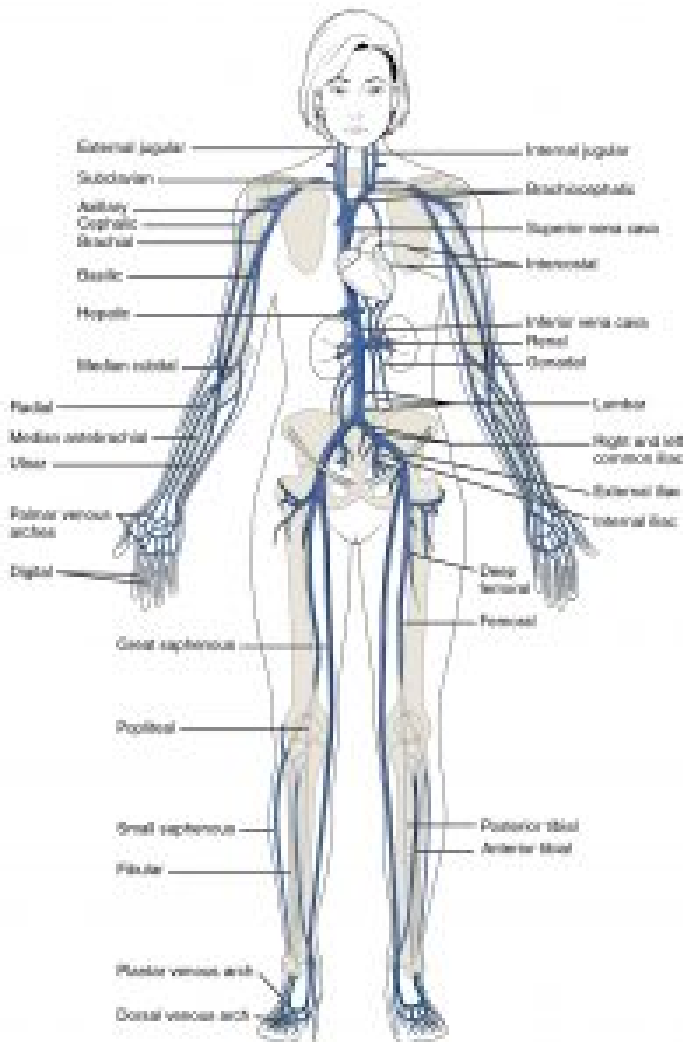
You have already learned about the anatomy and physiology of the PVS assessment: see this video for a quick overview: <https://youtu.be/v43ej5lCeBo>

**Table 1:** Comparison of arteries and veins. (Image from [Anatomy and Physiology](#) [on [OpenStax](#)] by Betts et al., used under a [CC BY 4.0 international license](#). Download and access this book for free at <https://openstax.org/books/anatomy-and-physiology/pages/1-introduction>)

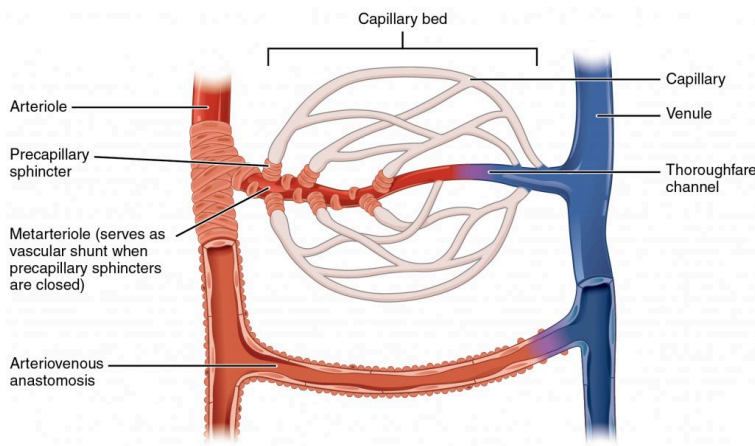
CHARACTERISTIC	ARTERIES	VEINS
<b>Direction of blood flow</b>	Conducts blood away from the heart	Conducts blood toward the heart
<b>General appearance</b>	Rounded	Irregular, often collapsed
<b>Pressure</b>	High	Low
<b>Wall thickness</b>	Thick	Thin
<b>Relative oxygen concentration</b>	Higher in systemic arteries	Lower in systemic veins
	Lower in pulmonary arteries	Higher in pulmonary veins
<b>Valves</b>	Not present	Present most commonly in limbs and in veins inferior to the heart







**Figure 1:** Peripheral vascular system anatomy. (Image from [Anatomy and Physiology](https://openstax.org/books/anatomy-and-physiology/pages/1-introduction) [on [OpenStax](https://openstax.org)] by Betts et al., used under a [CC BY 4.0 international license](https://creativecommons.org/licenses/by/4.0/). Download and access this book for free at <https://openstax.org/books/anatomy-and-physiology/pages/1-introduction>)

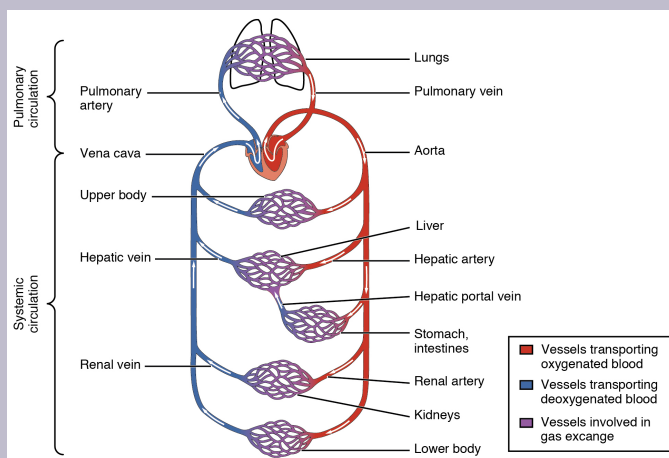


**Figure 2:** Capillaries. (Image from [Anatomy and Physiology](#) [on [OpenStax](#)] by Betts et al., used under a [CC BY 4.0 international license](#). Download and access this book for free at <https://openstax.org/books/anatomy-and-physiology/pages/1-introduction>)

## Clinical Tip

The PVS is interconnected with many other body systems, so it is rarely assessed in isolation. When attempting to make sense of cues, nurses commonly assess other body systems including cardiovascular,

integumentary, lymphatic, and musculoskeletal. See **Figure 3** for related systems. For example, the PVS might be assessed along with a cardiovascular assessment to assess perfusion and also with the musculoskeletal system to assess potential blood flow interruptions. The PVS is also closely related to the lymphatic system and connected via the capillaries. In addition, many PVS conditions affect the skin, thus the integumentary system is often assessed.



**Figure 3:** Pulmonary and systemic circulation.

(Image from [Anatomy and Physiology](#) [on [OpenStax](#)] by Betts et al., used under a [CC BY 4.0 international license](#). Download and access this book for free at <https://openstax.org/books/anatomy-and-physiology/pages/1-introduction>)

## Activity: Check your Understanding



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# Subjective Assessment

Subjective assessment of the peripheral vascular system (PVS) involves asking questions about the health of the client and symptoms that occur because of pathologies that affect the vasculature of the body. A full exploration of these pathologies is beyond the scope of this chapter, but common problems associated with this system include **peripheral vascular disease** (PVD), **atherosclerosis**, **arteriosclerosis**, **venous stasis**, **varicose veins**, and **ulcers**.

## Knowledge Bites

Many peripheral vascular symptoms are related and are caused by the same issue. See **Table 2** for the signs and symptoms of arterial and venous issues and watch **Video 1**:



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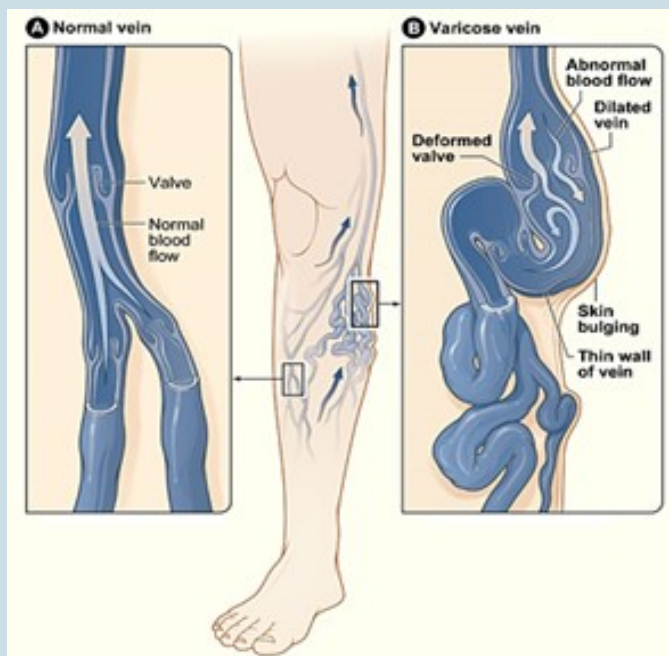
<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=570#oembed-1>

**Video 1:** Arterial and venous issues [5:00]

**Peripheral arterial issues** occur when there is a problem with perfusion (blood flow is restricted or blocked) in the arteries due to a blockage. This can be caused by **atherosclerosis** (narrowing of the arteries caused by plaque build up on the arterial walls) and **arteriosclerosis** (hardening, stiffening and loss of elasticity of the arterial walls); these are both forms of peripheral arterial disease. When blood flow is restricted, oxygen and nutrients are not efficiently delivered to body tissues. When tissues in the periphery do not get sufficient oxygen-rich blood, hypoxia can develop, leading to pain, numbness, ulcers, fatigue, and other symptoms and signs. However, it's important to note that many clients with arterial disease don't have symptoms, so your assessment of risk factors is important.

**Peripheral venous issues** are related to venous insufficiency: veins in the periphery (typically the legs) restrict the return of blood to the heart, causing **venous stasis** (collection or pooling of blood) in the peripheral limbs (typically the feet and lower legs). This is often caused when the one-way venous valves are not working properly and allow backflow of blood, as opposed to the forward movement of blood. It can also be caused by blood clots. **Venous hypertension** and varicose veins can arise secondary to venous insufficiency and venous stasis (Anwar et al., 2021). **Varicose veins** (see **Figure 4**) are dilated, bulging, and twisted veins that can be superficial (observed on the skin's surface) or deep within the leg and not visible upon inspection. You may hear the term tortuous veins, which refers to twisted veins. Varicose veins can have a genetic component and can also have primary causes that are relatively unknown (Anwar et al., 2021). Some varicose

veins are painful and depending on the associated cause may result in blood clots. Another venous issue is **spider veins (Figure 5)**, which appear as small flat dark red, blue, or purple venous patterns close to the surface. Spider veins can cause body image issues, but they are not painful and are not related to serious problems such as blood clots.



**Figure 4:** Comparison of a normal and varicose vein.

(Attribution: Photo by National Heart Lung and Blood Institute. – Varicose veins., Public Domain,

<https://commons.wikimedia.org/w/index.php?curid=6885995>)





**Figure 5:** Spider veins.

**Table 2:** Venous and arterial issues signs and symptoms.

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**Venous issues**

**Arterial issues**

- Dull achy pain, tiredness, and a heavy and full feeling in the legs (typically worse toward end of day and when standing).
  - **Edematous** feet and legs including **pitting edema**.
  - Warm skin
  - temperatures in feet and legs.
  - Coarse and thickened texture with flaky skin.
  - Erythema, hyperpigmentation, and brownish/yellowish skin discolouration. The discolouration is sometimes referred to as brawny (brown-reddish discolouration). Red blood cells accumulate in the interstitial space and cause hemosiderin staining from the blood leaking out of capillaries.
  - Pulses present, but may need to use a Doppler ultrasound device due to the quantity of edema.
  - Irregularly shaped ulcers. Although they are often found anywhere on the lower limbs, they are typically on the medial (inside) **malleoli** and medial side of the leg with an exudative base and a shallow depth (London & Donnelly, 2000; Vivas et al., 2016). See **Figure 6**.
  - Sharp leg pain that often increases with activity and is relieved with rest, and leg pain that can get worse when lying down.
  - Numbness, tingling, burning, or inability to move or feel the toes and feet.
  - Muscle **atrophy**.
  - Hair loss in the periphery (legs) particularly related to toes.
  - Smooth and shiny skin.
  - Cool skin
  - temperatures in feet and legs.
  - Pallor and/or cyanosis of skin and nail beds, and **gangrene**.
  - Absent pulses or decreased force (weak and thready) of distal pulses in the periphery.
  - Ulcers with well-demarcated borders (smooth and round) and typically located on the toes, dorsal side of foot, and shin in which the ulcer is deep and dry (London & Donnelly, 2000; Vivas et al., 2016). See **Figure 7**.
- NOTE: Another type of ulcer is a **diabetic ulcer** typically found on the plantar side of the foot. Although they resemble arterial ulcers, their underlying pathophysiology is related to the effects of diabetes (damage to nerve

endings and vasculature and decreased sensation in feet).

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**Figure 6:** Chronic venous insufficiency and venous ulcer.

(Attribution: Photo by Ashashyou – Own work, CC BY-SA 4.0, <https://commons.wikimedia.org/w/index.php?curid=122884459>)



**Figure 7:** Arterial ulcer PVD.

(Attribution: Photo by Jonathan Moore – Creating the Ideal Microcosm for Rapid Incorporation of Bioengineered Alternative Tissues Using An Advanced Hydrogel Impregnated Gauze Dressing: A Case Series. *The Foot and Ankle Online Journal* 1 (9): 2., CC BY 3.0, <https://commons.wikimedia.org/w/index.php?curid=6886430>)

Common symptoms that can be related to the PVS include pain-related sensations, numbness, **skin discolouration** changes, skin temperature changes, edema, and ulcers. See **Table 3** for guidance on the subjective health assessment. Many of the questions in the table align with the [PQRSTU](#) mnemonic, but you should probe symptoms in the order of relevance, as opposed to sequentially with the PQRSTU mnemonic.

Ask about any medications the client is taking: name, dose, frequency, reason it was prescribed, and how long they have been taking it.

Also ask questions focused on health promotion. Depending on the context, you may ask these questions and engage in a discussion during a subjective assessment or after an objective assessment. A section on “Health Promotion Considerations and Interventions”

is included later in this chapter after the discussion of objective assessment.

**Table 3:** Guidance on subjective assessment.

<b>Symptoms</b>	<b>Questions</b>	<b>Clinical tips</b>
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<p><b>Pain-related sensations</b> such as sharp pain, sensitivity, cramping, achiness, and numbness in the legs/feet and/or arms/hands.</p> <p>These types of sensations are common with perfusion issues and more often affect the lower limbs. These sensations worsen as circulation is reduced.</p> <p><b>Arterial perfusion</b> issues usually lead to sharp pain and cramping in the lower legs and feet, as well as numbness and sensitivity in the feet and toes. Pain-related sensations with <b>venous issues</b> often include achiness and a heavy feeling.</p>	<p>Do you currently have or have you recently had any pain, discomfort, tenderness, numbness, sensitivity, and cramping in your feet or legs?</p> <p>Additional <b>probes</b> if the response is affirmative:</p> <p>Region/radiation: Where is the pain located? Does it move around, or do you feel it anywhere else</p> <p>Quality/quantity: Can you describe what it feels like? How bad is it?</p> <p>Severity: Can you rate it on a scale of 0 to 10, with 0 being no pain and 10 being the worst pain you have had</p> <p>Provocative/palliative: What makes it better? What makes it worse? Is it brought on by activities such as walking? If so, how long can you walk before the pain begins? Have you noticed a reduction in the amount of activity that you can do before the pain begins?</p> <p>Timing/treatment: When did the pain begin? Does it begin suddenly or gradually? Is it constant or intermittent? If intermittent, how long does it last for? Does it occur at night when you are in bed?</p>	<p>Use the client's words when probing. For example, they may refer to sensations as "tenderness" or "pain."</p> <p><b>Claudication</b> is a type of pain that happens with activity and is caused by lack of oxygen to the tissues. It is typically related to arterial insufficiency and can be felt in the feet, buttocks, calves, and thighs. This type of pain is often relieved with rest. For example, it may be an intermittent pain that subsides within ten minutes when the client rests. It is important to assess how much activity it takes to produce the pain and whether the amount of activity that exacerbates the pain has changed recently.</p> <p>Pain-related sensations may have a peripheral vascular or musculoskeletal or neurological cause. If you suspect peripheral vascular issues, you should assess impact on circulation: skin temperature and distal pulses (more information is provided later in the objective assessment section). Numbness and tingling sensations can be neurological-related as a result of damage</p>
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	<p>Have you tried treating it with anything?</p> <p>Understanding: Do you know what is causing it? What do you think is causing it?</p>	<p>to or pressure on the peripheral nerves.</p>
<p><b>Skin discolouration and skin temperature changes</b> in the distal portions of the limbs.</p> <p>PVD can cause changes in skin colour (cyanosis, erythema, pallor) and skin temperature (coolness, warmth).</p>	<p>Have you noticed any changes in skin colour or skin temperature in your legs or arms?</p> <p>If the answer is affirmative, ask the client to describe the change. Additional <b>probes</b> if the response is affirmative:</p> <p>Region/radiation: Where is it located? Is it anywhere else?</p> <p>Quality/quantity: Can you describe what it looks like or feels like? How bad is it?</p> <p>Provocative/palliative: What makes it better? What makes it worse?</p> <p>Timing/treatment: When did you notice it? Is it constant or intermittent? If intermittent, how long does it last for? Have you tried treating it with anything? Have you sought treatment for it? Is it affected by position change (e.g., standing all day or elevating your feet? Is it worse at the end of the day?</p> <p>Understanding: Do you know what is causing it?</p>	<p>The type of change in skin colour and temperature change can help you determine whether this is an arterial or venous issue. As a reminder, see <b>Table 3</b> above for skin changes associated with arterial and venous issues.</p> <p><b>Gangrene</b> is the death of tissue. It can occur when tissue does not receive oxygen supply as a result of occlusion in the arterial vasculature. It can happen in any part of the body but when associated with peripheral arterial disease, it is usually first observed in the toes, feet and lower limbs. The skin becomes darker in colour and can have shades of dark green and black. Gangrene requires immediate treatment to prevent further tissue damage. Sometimes amputation is required with advanced gangrene.</p>

<p><b>Edema</b> is swelling that occurs from excess fluid in the interstitial space. It is sometimes described as a heavy feeling by clients.</p> <p>It is most easily noticed in peripheral locations such as the feet and legs because gravity pulls the fluid downward into these dependent positions, but it may also be observed in the sacrum, abdomen, hands, and arms.</p> <p><b>Dependent edema</b> is a type of edema that is worse while standing or when the legs/feet are below the heart level and improves when legs/feet are elevated (i.e., when lying down with legs/feet above the heart level).</p> <p>A common cause of peripheral edema in the older population is venous insufficiency, which is associated with dependent edema.</p>	<p>Have you noticed any swelling or puffiness in your feet or ankles (or any other areas)? Have you noticed that your shoes fit more tightly?</p> <p>Additional <b>probes</b> if the response is affirmative:</p> <p>Region/radiation: Where is the swelling? Have you noticed it anywhere else?</p> <p>Timing: When did the swelling begin? Is it worse at a particular time of day?</p> <p>Provocative/palliative: Does anything make the swelling worse? Does anything make it better? Is it affected by position change (e.g., when standing or when legs are elevated)? Is it worse when you have been standing for a long period?</p> <p>Other: Have you noticed any associated colour changes to the skin? Do you have difficulty walking? Have you noticed any skin ulcers on your feet or legs? Have you noticed any recent and rapid weight gain (e.g., in the last week)?</p>	<p>Assess the timing of the edema: is it acute or chronic and is it unilateral or bilateral? This will help you focus your questioning. If it is acute and unilateral, it may be a localized issue such as <b>deep vein thrombosis</b> (DVT) or an injury. If it is chronic, it is more likely to be a systematic issue. Bilateral edema can also be associated with venous insufficiency.</p> <p><b>Diabetes</b> that is not well controlled can also cause bilateral edema due to vascular damage caused by high blood glucose levels, resulting in reduced blood circulation.</p> <p>Edema and <b>rapid weight gain</b> are sometimes related. Rapid weight gain can be suggestive of increased fluid retention (leading to edema) and is often associated with heart failure. A 2–3 lb (0.9–1.3 kg) weight increase in 24 hours is a cue that requires immediate action.</p> <p>Compression stockings are often prescribed for leg edema. These are fitted elastic stockings that apply a certain amount of pressure to the leg. When leg edema is associated with</p>
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		venous insufficiency, it is often recommended to elevate legs and feet. These therapeutic treatments help improve blood flow and prevent pooling of blood in the legs.
<p><b>Ulcers</b> are open sores on the skin.</p> <p>Initially, these sores are often caused by an injury to the skin, even a minor injury. They are slow to heal. Because ulcers are open to the air, they can act as an entry point for bacteria and can become infected and increase in size.</p>	<p>Have you noticed any sores on your legs or feet that are slow to heal?</p> <p>Additional <b>probes</b> if the response is affirmative:</p> <p>Region/radiation: Where are they located? Have you noticed them anywhere else?</p> <p>Quality: What do they look like? Is the sore open? Are the sores wet or dry? Do you notice a discharge? If so, what colour is it?</p> <p>Timing: When did the sore begin? Do you know how it developed?</p> <p>Treatment: Have you treated it with anything?</p> <p>Understanding: Do you know what is causing it?</p>	<p>When a client reports a leg ulcer, it is important to perform a focused peripheral vascular assessment including an objective assessment.</p> <p>Leg ulcers that are slow to heal are often related to peripheral venous disease. Other causes include peripheral arterial disease and diabetes.</p> <p>Your assessment will help you determine the type of ulcer and assess the risk for infection.</p>

<p><b>Other peripheral vascular related symptoms</b> can include fatigue, weakness, hair loss on legs, shiny skin, and erectile dysfunction.</p>	<p>Have you experienced fatigue? (Ask about weakness, hair loss on the legs, shiny skin, erectile dysfunction). Use variations of the PQRSTU mnemonic to assess these symptoms further if the client's response is affirmative.</p>	<p>These symptoms can be related to other body systems and non-peripheral vascular issues. If you suspect a PVD, it is important to do a focused assessment.</p>
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<p><b>Personal and family health history</b> of PVD, <b>coronary artery disease</b>, high blood pressure, hypercholesterolemia, and diabetes.</p> <p>Each of the above conditions are risk factors for PVD. Coronary artery disease and PVD occur as a result of atherosclerosis.</p>	<p>Do you have any chronic conditions or diseases (e.g., personal and/or family health history of PVD, coronary artery disease, high blood pressure, hypercholesterolemia, or diabetes)? Is there a familial history of any of these conditions or diseases?</p> <p>If the client's response is affirmative, begin with an open-ended probe: Tell me about the condition/disease?</p> <p>Other questions might include:</p> <p>Timing: When did you begin experiencing symptoms related to this condition? When were you diagnosed? Are the symptoms constant or intermittent?</p> <p>Quality/quantity: How does it affect you? What symptoms do you have? How bad are the symptoms?</p> <p>Treatment: How is it treated? Has this treatment helped? Have you had any surgeries? Do you take medication? If so, is the medication effective or do you experience any side effects?</p> <p>Provocative/palliative: Is there anything that makes it worse? Is there</p>	<p>The biological and non-biological nature of family may be important to explicate when asking questions, considering that the risk factors may be influenced by genetics and/or culture. These assessment questions will allow you to gain a better understanding of the client and relevant nursing interventions and education.</p> <p>Although there is a genetic role to some PVDs, it is also important to consider culture in terms of family traditions and practices which can have a large role to play (e.g., eating habits, activity/exercise, smoking).</p> <p>Some cases of high cholesterol may involve a genetic component. Familial hypercholesterolemia is an inherited condition (the gene is present at birth) that leads to hypercholesterolemia (high levels of cholesterol in the blood) and increases the risk of atherosclerotic plaque buildup.</p>
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	anything that makes it better? Other: Tell me about living with this condition?	
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## Contextualizing Inclusivity

The risk of PVD increases with age, particularly for those over the age of 50. Risk factors include sedentary lifestyle, physical inactivity, obesity, high blood pressure, high cholesterol, diabetes, smoking, and diets high in saturated and trans fat, red meat, sodium, and sugar.

While assessing and responding to these risk factors, always use an inclusive approach in conducting your subjective health assessment. Inclusive health assessments should be grounded in social justice: uphold the humanity of all clients in all aspects of care, regardless of their race, ethnicity, gender, sexuality, age, ability, health decisions, and any other factors that makes them who they are. Treat everyone with dignity and recognize that each client is a human being with unique health experiences. Be aware of your biases and use a non-judgemental approach to interviewing.

## Priorities of Care

All abnormal symptoms need to be explored and followed up by an objective assessment.

New onset or worsening pain-related symptoms, changes in skin colour and skin temperature, edema, and ulcers need to be fully assessed and reported to the physician or nurse practitioner. Prompt intervention is required with rapid weight gain in a short period of time (e.g., 2–3 lb or 0.9–1.3 kg in 24 hours). These issues should be reported to the physician or nurse practitioner.

With regard to **arterial issues**, you should be attentive to signs and symptoms that may indicate acute ischemia to the limbs: this is a decrease in peripheral perfusion that could threaten the **viability of the affected limb**. These signs and symptoms should be monitored and reported to the physician or nurse practitioner; they are often referred to as **the 5 Ps** (Obara et al., 2022):

- Pain (this could be acute pain in the affected limb and extremity that gets progressively worse).
- Pallor (extremities that become paler than the client's normal skin colour in the affected limb).
- Pulselessness (absent pulses in the affected limb).
- Paresthesia (decreased sensation in the affected limb or a tingling or a numbness sensation).
- Paralysis (inability to move the affected limb).

Additionally, reports of gangrenous tissue (**Figure 8**) require prompt intervention and should be reported to the physician or nurse practitioner.



**Figure 8:** Gangrene: By Dr. Andreas Settje – This Picture was copied under GFDL from the german PflegeWiki., CC BY-SA 3.0, <https://commons.wikimedia.org/w/index.php?curid=168739>



## Activity: Check your Understanding



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<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=570#h5p-42>

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# Objective Assessment

An objective assessment is usually completed after the subjective assessment, unless symptoms require urgent interventions.

An objective assessment of the peripheral vascular system (PVS) includes:

- Inspection and palpation of hands and arms.
- Inspection and auscultation of abdominal vasculature areas.
- Inspection and palpation of feet and legs.

All assessments should be performed on bare skin. You will need a penlight and a stethoscope.

Be aware of the environmental temperature in the room and the temperature of your hands. Room temperatures are not easily modified, so you should only expose the body part(s) you are assessing. Try to warm your hands before placing them on the client's body. Don gloves if you observe skin that is not intact.

Ensure the client is positioned in the best way to assess the arms, abdomen, and legs. You will usually begin with the client seated on the side of the exam table with legs or feet dangling or in the high-Fowler's position. If you are assessing a young child or newborn, you could ask someone (e.g., care partner, healthcare provider, parent) to hold them on their lap or on the exam table.

When assessing the PVS, you will usually assess arterial and venous sufficiency. Your findings from the objective assessment, along with those from the subjective assessment, will provide cues about whether any issues are arterial or venous related. Recall **Table 3** from the Subjective Assessment section.

## Clinical Tips

**Trauma-informed approach:** Always use a **trauma-informed approach**. This is particularly important considering that areas of the abdomen and legs will be exposed. Don't assume who may have experienced trauma: it can happen to anyone, regardless of gender, age, or socioeconomic/educational level. Trauma is also subjective and personal to each individual; trauma for one person might not be trauma for another.

You could start by asking the client if they would like a family member or friend or another healthcare provider present. Always maintain privacy by closing the door and/or curtains and using draping. Ask permission to touch and explain what you are going to do so the client knows what to expect. If relevant, ask permission to touch any mobility aids and prosthetics; the client may view these as an extension of their body and part of their self-identity.

**What if pulses are not palpable?** If a pulse is not palpable in the distal most aspect of the limb, you should assess the next proximal pulse (or medial). For example, if you can't feel a radial pulse, you might assess the brachial or ulnar pulses. It can also be helpful to use a **Doppler ultrasound device** (often just referred to a doppler) when you are struggling to feel a pulse and are concerned about perfusion into the limbs. This is a handheld device that allows you to hear the whooshing sound of the pulsatile

blood flow. See **Figure 8** and **Video 2** for use of a Doppler device.



**Figure 8:** Doppler ultrasound device. (Photo by [Juan Manuel Montejano Lopez](#) on [Pexel](#).)



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**Video 2:** Use of a Doppler ultrasound device [1:51]

## Contextualizing Inclusivity

Objective assessment involves assessing skin discolouration. Two common kinds of skin discolouration related to peripheral vascular assessment are cyanosis and pallor.

- **Cyanosis** involves an increase in **deoxygenated hemoglobin** in the blood (**hypoxemia**). Reduced oxygen makes blood a darker red colour. When this blood is circulated to the limbs, the tissues receive inadequate oxygen (**hypoxia**) and as result the skin becomes dull in colour and the skin and nail beds change in colour. The skin can become a variation of blue/purple and grey/green shades. In people with dark skin, cyanosis appears as a dark purple and sometimes a grey colour, but it is difficult to see with early cyanosis. People with yellowish tones to their skin can have a greyish/green shade (Lewis, 2020; Sommers, 2011), and people with lighter skin tones tend to develop a dusky bluish/purple shade (Lewis, 2020). Acrocyanosis is cyanosis that happens in the extremities (feet and hands). Newborns can be born with acrocyanosis, but it should disappear after a couple of hours and should be monitored.
- **Pallor** occurs when there is **decreased perfusion to the limbs**. In clients with darker skin, it is best assessed on the palms of the hands and

the nail bed, as these areas are already paler in colour; with pallor, these areas become paler than the client's normal skin colour (Lewis, 2020). This is also true for clients with lighter skin colour, but with these clients you will also observe paler toes and feet. In people with lighter brown skin, you might observe pallor as a yellowish shade (Lewis, 2020).

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# Inspection and Palpation of Hands and Arms

Peripheral vascular issues usually affect the lower limbs (feet and legs) more than the upper limbs, but you should begin a complete peripheral vascular assessment with the hands and arms because most clients feel comfortable exposing these areas. However, you might focus on a particular area such as the legs if the assessment is related to a physical trauma and you are concerned about perfusion to that limb. Assessment of the hands and arms can be done while the client is sitting on the side of the exam table or in a high Fowler's or supine position.

Steps for **inspecting and palpating hands and arms** include:

1. **Inspect the skin** of the hands and arms for colour (including nails), edema, limb circumference discrepancy, lesions, presence of ulcers, and venous patterns. Ask the client to place their hands and arms in front of them with their palms facing downwards, and then turn their palms upwards. Next, **palpate skin temperature** using the dorsa of your hands from the shoulders down the arms to the fingertips (see **Video 3**).
  - Normally, the skin colour is consistent and skin temperature is warm to touch and equal bilaterally from shoulders to fingertips, although the fingertips can be slightly cool to touch. Normally, there are no signs of cyanosis or pallor in the nails or fingertips. Nails are translucent in colour with a slight pinkish tone underneath. Remember that the palms of hands are a lighter skin colour, particularly among people with darker skin tones. Normally, there is no edema, no ulcers, no lesions and circumference is equal bilaterally.
  - Describe the location, size, and quality of any abnormal

findings such as skin discolouration, signs of cyanosis, pallor, venous pattern, and presence of ulcers or lesions. With regard to quality, for example, you should note what the discolouration and the ulcers look like. Describe the location and quality of abnormal skin temperatures, particularly if asymmetrical. If you notice any discrepancy in terms of unequal limb circumference, measure with a flexible tape measure at the same location on both limbs to ensure accuracy. Note the location of any edema.



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### **Video 3:** Palpation of skin temperature [0:17]

2. **Test capillary refill** on two or three fingernails of each hand at heart level (see **Video 4**). Start by applying pressure with your own finger to the client's nail; this causes the nail to blanch (become paler in colour). Apply the pressure for 5 seconds and then release and observe the return in colour.
  - A normal finding when assessing capillary refill is colour return that is equal to or less than 3 seconds when assessing capillary refill.
  - Colour return that is greater than 3 seconds is described as sluggish return for capillary refill (or slow capillary refill time), and this finding suggests that there may be issues with oxygenated blood perfusion (this may be related to peripheral vascular and/or cardiac and/or respiratory



issues). Capillary refill time can be slower if the client's hands are cold; if the client's hands are cold from being outside or from washing in cold water, ask them to warm their hands to ensure an accurate reading.



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#### **Video 4:** Testing capillary refill [0:45]

3. **Palpate the radial pulses** bilaterally and simultaneously, and then palpate the **brachial pulses** (see **Figure 9**). Assessing the pulses simultaneously allows you to compare the strength of pulsation; recall the [4-point scale for force](#). Assessing pulses for the presence, force, and symmetry of force provides information about perfusion (flow of blood) to the limbs. If these pulses are not palpable, you can use a Doppler ultrasound device to assess pulsatile blood flow.
  - Normally, pulses are present, 2+ force and equal bilaterally.
  - Decreased pulse force or absent pulses can be associated with arterial insufficiency. A decreased pulse force (1+) can be described as “thready,” which refers to a weak pulse that is difficult to feel.



**Figure 9:** Palpation of radial and brachial pulses.

4. Note the **findings**:

- Normal findings might be documented as: “From shoulders to fingertips: equal limb circumference with no edema or ulcers, and skin colour consistent. Good capillary refill. Radial and brachial pulses 2+ force and equal bilaterally. Skin temperature warm to touch and equal bilaterally from shoulders to fingertips.”
- Abnormal findings might be documented as: “Pallor in fingernails, cool to touch in fingers bilaterally, sluggish capillary refill 4–5 seconds, 1+ radial pulses equal

bilaterally.”

## Activity: Check your Understanding



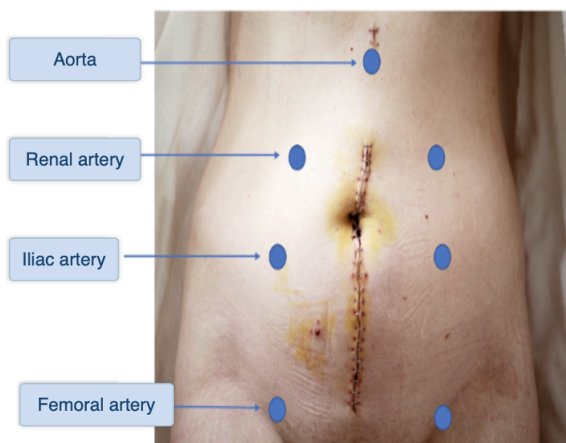
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# Inspection and Auscultation of Abdominal Vasculature

Inspection and auscultation of abdominal vasculature is best performed with the client in a supine position with their head on a pillow. You will be assessing the area over the abdominal aorta, renal arteries, iliac arteries, and femoral arteries (**Figure 10**). Draping is important because you will need to expose the abdomen and groin area.



**Figure 10:** Abdominal vasculature. (Attribution: Adapted photo by [Alexander Grey](#) on [Unsplash](#), CC BY-NC 4.0)

Steps for assessing the **abdominal vasculature** include:

1. **Observe for pulsations** over the areas of the abdominal vasculature. Use **tangential lighting** with a penlight; this will help highlight any small imperfections/shadows, which accentuate visible pulsations.

- Normally, no pulsations are present. Pulsations may be present with a client who has a thin abdominal wall, but these are never considered normal in a client who has increased adipose tissue.
  - Note the location of any pulsations.
2. **Auscultate** over the abdominal vasculature (see **Figure 10** and **Video 4**) using the bell of a cleansed stethoscope. Use slightly firmer pressure than when you use the diaphragm over the lungs or intestines. Listen for vascular sounds related to the flow of the blood through the arteries. Placing your stethoscope in each location for about 2-3 seconds is usually sufficient.
- Normally, you won't hear any vascular sounds because unobstructed blood flow through an artery is silent.
  - Note the location of any vascular sounds. Partial obstruction of an artery creates turbulent blood flow, leading to vascular sounds such as a bruit: blowing/swooshing noises. Atherosclerosis can cause stenosis (narrowing of the vessel), leading to a bruit. If you hear a bruit, notify the physician or nurse practitioner while you keep the client still and continue to monitor them. Do not palpate the abdomen if a bruit is present, as this finding suggests that blood flow is already compromised.
3. Note the **findings**:
- Normal findings might be documented as: "No pulsations observed or bruits heard over the abdominal aortic artery and the renal, iliac, and femoral arteries."
  - Abnormal findings might be documented as: "Pulsation observed over aortic artery with a bruit noted."



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#### **Video 4:** Auscultation of the abdominal vasculature [1:27]

### Priorities of Care

If you hear a bruit, do not palpate the area. Ask if the client has experienced any recent pain in their chest, back, abdomen, or groin, and if they have ever been diagnosed with an **aneurysm**. You should also complete a primary survey and measure blood pressure in both arms. Notify the physician and nurse practitioner of the findings. Until an aneurysm is ruled out or assessed, it is best to keep the client in bed, at rest, and under continuous monitoring.

### Activity: Check Your Understanding



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# Inspection and Palpation of Feet and Legs

This assessment can be done while the client is supine with their head on a pillow. The client will need to remove their shoes and socks and uncover the legs from the upper legs down to the feet. You should inspect the anterior as well as the posterior side of the legs; ask the client to roll on their side to do so.

Steps of **inspection and palpation of legs and feet** include (see **Video 5** for technique):



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here: <https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=578#oembed-1>

**Video 5:** Inspection and palpation of feet and legs (showing technique) [1:44]

1. **Inspect the legs and feet for colour and hair distribution.**

Remember that clients will have different skin tones: assess abnormal findings related to skin discolouration in comparison to the rest of the skin. In addition to inspecting the legs, it is important to assess the toes for hair distribution, because hair loss associated with **peripheral arterial disease (PAD)** often begins at the toes and moves upward.

- Normally, the skin colour is consistent and hair distribution is equal. Remember that the plantar side of the feet are lighter in colour, particularly among clients



with darker skin tones.

- Describe any abnormal findings such as skin discolouration (e.g., colour and location) and any uneven hair distribution, particularly if asymmetrical. Some clients remove leg hair with hair laser removal, waxing, or shaving; this is not considered an abnormal finding related to hair distribution.

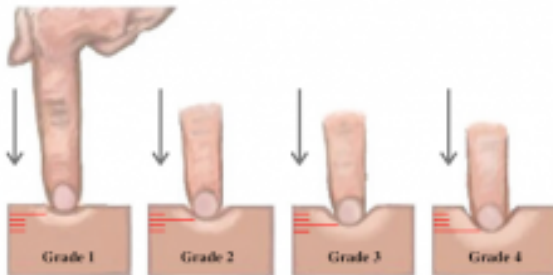
## 2. **Inspect (and palpate) the legs and feet for size and edema.**

- Normally, the upper and lower leg circumference and ankle circumference are equal bilaterally at each site.
- If you suspect a size difference of the ankle, calf or upper leg circumference, use a tape measure to accurately note the size on both limbs.
- If you observe edema, assess for pitting edema: an indentation that remains after applying pressure over the location. See **Figure 11** for a picture of pitting edema. Apply pressure with the pad of your finger on a distal location (feet and medial malleolus) for about 3-5 seconds and then release. If you observe an indentation (a “pit”), note the location and how long the indentation remains. If you observe it in a distal location, assess proximal such as over the tibia. Always check with the unit you work on about the scale used to evaluate pitting edema; scales are usually 1 to 4 (see **Figure 12**). Assess the pit depth and the rebound time (the time for the indentation to disappear). Pitting edema is often rated as 1 mild, 2 moderate, 3 severe, and 4 very severe.



**Figure 11:** Pitting edema.

Grade 1	0–2 mm indentation; rebounds immediately.
Grade 2	3–4 mm indentation; rebounds in < 15 seconds.
Grade 3	5–6 mm indentation; up to 30 seconds to rebound.
Grade 4	8 mm indentation; > 20 seconds to rebound.



**Figure 12:** Pitting edema scale. (Attribution, taken from <https://wtcs.pressbooks.pub/nursingskills/> CC-BY 4.0.)

3. **Inspect the feet and legs for lesions and ulcers.** Ensure you inspect between the toes and on the plantar side of the feet.
  - Normally, no lesions or ulcers are present.
  - Describe the location and quality of any lesions and ulcers.
4. **Palpate skin temperature** using the dorsa of your hands from the anterior side of the upper legs down to the toes. Use your fingertips to assess skin texture.
  - Normally, the temperature is warm to touch and equal bilaterally. The feet are sometimes slightly cooler than the upper legs, but they should be equal bilaterally. The skin texture is normally smooth.
  - Describe any asymmetry in skin temperature, extreme temperatures, and skin textures such as dry, flaky skin.

5. **Inspect the nails for colour** and **test capillary refill** on two or three toenails of each foot. Start by applying pressure with your own finger to the client's nail; this causes the nail to blanch (become pale in colour). Apply the pressure for 5 seconds and then release and observe the return in colour.
- Normally, the nails are translucent in colour with a slight pinkish tone underneath. Colour should return within 3 seconds or less when assessing capillary refill.
  - Describe any pallor or cyanosis of the nails. A sluggish return for capillary refill suggests that there may be issues with oxygenated blood perfusion, which might be related to peripheral vascular issues (and/or cardiac and/or respiratory issues).
6. **Gently palpate the dorsalis pedis pulses** bilaterally and simultaneously, and then **palpate the posterior tibial pulses** (see **Figure 13** and **Video 6**). Simultaneous assessment helps you compare the force (strength of pulsation); recall the 4-point scale for pulse force. Assessment of pulses for presence, force, and symmetry of force provides information about perfusion (flow of blood) to the limbs. If you are concerned about blood flow into the extremities (e.g., neither the dorsalis pedis or posterior tibial pulses are palpable on one foot), use a Doppler device to assess blood flow.
- Normally, pulses are present, 2+ force and equal bilaterally.
  - Decreased pulse force or absent pulses can be associated with arterial insufficiency. A decreased pulse force (1+) can be described as “thready,” which is a weak pulse that is difficult to feel.



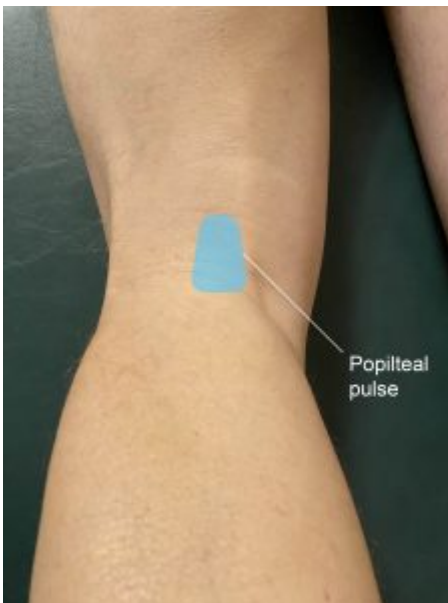
**Figure 13:** Location of dorsalis pedis and posterior tibial pulses.



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**Video 6:** Palpating dorsalis pedis and posterior tibial pulses [0:30]

7. Palpate the **popliteal (Figure 14)** and **femoral pulses**. For the popliteal pulse, slide your fingers behind the knee just medial to the the middle of the popliteal fossa (typically located slightly lateral to the medial tendon). While palpating, push up with pressure, because this pulse is high up in the fossa and can be difficult to palpate. For the femoral pulse, palpate inferior to the inguinal ligament less than halfway from the pubis bone to the anterior superior iliac spine. While palpating, press firmly up into the bone. If you do not feel a pulse right away, reduce the pressure slightly.
- Normal and abnormal findings are the same as item 6 above: if you can find a femoral and dorsalis pedis pulse, a non-palpable popliteal pulse is usually not of concern.



**Figure 14:** Popliteal pulse.

8. If the findings from the above assessments make you suspect arterial insufficiency, **assess for elevational pallor** and

**dependent rubor** (Wennberg, 2013). Elevational pallor is when the extremities become pale when they are raised above the heart level. Dependent rubor is an erythematous discolouration, particularly of the dorsal sides of the toes, when the feet/legs are below the level of the heart (Bahrani & Sladden). **Step 1:** While the client is in a supine position, hold their legs at 45 degrees for about 30 seconds; this action helps push the venous blood back to the heart, and the skin colour is reflective of the sufficiency of arterial blood flow. **Step 2:** Return the client's legs to the table and assist the client into a sitting position with their legs dangling over the edge or into a standing position.

- During Step 1, the skin colour normally becomes just slightly paler in comparison to the client's normal skin colour (best seen on the sole of the foot), demonstrating good arterial blood flow. During Step 2, the colour of the client's foot normally returns within 10 seconds.
  - Abnormal findings associated with Step 1 include significant pallor in comparison to the client's normal skin colour (best seen on the sole of the foot). Abnormal findings associated with Step 2 are the normal colour of the client's feet taking more than 10–15 seconds to return, as well as dependent rubor. Dependent rubor in combination with other cues (such as claudication) may be associated with PAD.
9. Ask the client to stand so that you can **inspect the legs and feet for vascularity**. If the client is unable to stand, you can complete the inspection while they are in a supine position.
- Normally, you will observe no vascularity or a fine and flat venous pattern. Athletes may have superficial veins.
  - Describe any vascular patterns you observe on the legs and feet, such as varicose veins.

10. Note the **findings**:

- Normal findings might be documented as: “Skin colour consistent from upper legs to toes, equal limb circumference with no edema or ulcers. No presence of cyanosis or pallor on nails. Good capillary refill. Dorsalis pedis and posterior tibial pulses 2+ force and equal bilaterally. Skin temperature warm to touch and equal bilaterally from upper legs to toes.”
- Abnormal findings might be documented as: “Pallor in nails, cool to touch in feet and toes bilaterally, sluggish capillary refill 4-5 seconds, 1+ dorsalis pedis pulses equal bilaterally.”

## Contextualizing Inclusivity

A large majority of pregnant people have edema in their feet and legs due to increased blood volume and pressure on veins from the growing fetus (Smyth et al., 2015). In addition to edema, the increased volume and pressure on veins can lead to venous insufficiency and varicose veins, in which the blood pools in the feet and legs, particularly when in dependent positions (Smyth et al., 2015). Although edema is a normal part of pregnancy, a pregnant person should be referred to their physician or nurse practitioner if they experience a sudden onset of edema associated with other symptoms such as headache, high blood pressure, and vision changes; these symptoms can be associated with **preeclampsia**.



## Knowledge Bites

The **ankle-brachial index (ABI) test** is one test used to assess the presence of peripheral arterial disease. The test is sometimes performed by nurses, but it is usually associated with an advanced practice nursing role.

The ABI can be performed in various ways, so you should receive advanced training in the procedure and always be consistent with your practice.

Begin with the client in supine position at rest (US Preventive Services Task Force, 2018). Measure BP using a Doppler ultrasonic device (Fowkes, 2008). Follow this sequence:

1. Measure BP:
  - a. right arm (brachial)
  - b. right posterior tibial
  - c. right dorsalis pedis
  - d. left posterior tibial
  - e. left dorsalis pedis
  - f. left arm
  - g. repeat right arm measurement (average both right arm measurements).
2. Next, calculate an ABI for the right side and an ABI for the left side using the following equation:

highest systolic pressure of the posterior tibial or dorsalis pedis is the numerator (some may average the two)

---

Highest systolic arm pressure is the denominator (some may average the two)

(Aboyans et al., 2012)

Divide the numerator by the denominator to obtain a ratio, which is the ABI. A ratio of less than 0.9 indicates the presence of PAD (Fowkes, 2008; US Preventive Services Task Force, 2018).

For example, if the ankle pressure is 122 and the brachial systolic is 148, the ABI is 0.82, which is suggestive of peripheral arterial disease.

## Priorities of Care

An urgent priority of care is signs suggesting **absent or severely reduced arterial blood flow** such as absent or diminished pulses, which are usually accompanied by sluggish capillary refill, cool limbs, pain, numbness, decreased sensation, and pallor or cyanosis. Assess these if

you have not already. If you cannot detect dorsalis pedis and/or posterior tibial pulses, use a Doppler device. Report these findings immediately to the physician or nurse practitioner so that additional intervention can be taken to re-establish blood flow.

Any signs related to **deep vein thrombosis (DVT)** should also be reported to the physician or nurse practitioner. A combination of unilateral leg pain, swelling, warmth, and erythema can be an urgent situation: a DVT may be blocking blood flow. A DVT can loosen from the vessel wall and travel to the lungs, causing a pulmonary embolism that blocks blood flow. Risk factors for blood clots and DVT include advancing age, smoking, oral contraceptives, sedentary lifestyle, obesity, and pregnancy. Other conditions related to DVT include prolonged sitting, immobilization of limbs, fractures, damage to veins, varicose veins, and **sickle cell disease**.

## Activity: Check Your Understanding



An interactive H5P element has been excluded from this version of the text. You can view it online here:

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# Health Promotion and Disease Prevention: Considerations and Interventions

When developing health promotion and disease prevention strategies for a healthy peripheral vascular system (PVS), always select an appropriate intervention based on careful consideration of all collected data, both subjective and objective. Subjective data collection should include asking about risk factors, social determinants, and other considerations.

This kind of inquiry should be integrated throughout the assessment. You will ask many probing questions during the subjective assessment phase, but you will also come up with some questions based on your critical reflection of all data collected during the subjective and objective assessments. All of these data will inform your clinical judgement and appropriate health promotion strategies for a specific patient.

## Activity

Any activity, including **general daily activity**, **aerobic exercise**, and **strength training**, improves blood flow within the body, lowers blood pressure, and supports the transportation of oxygen throughout the PVS. An active lifestyle and regular exercise lower the risk of vascular diseases. Exercise and participating in social activities can also help reduce stress, which in turn can help lower blood pressure and decrease the risk of peripheral vascular disease

(PVD); a sedentary lifestyle with limited activity increases the risk factors that contribute to PVD. **Standing and sitting for sustained periods of time** can increase venous stasis and risk of deep vein thrombosis (DVT). For example, DVT can be an issue for some people with lengthy air travel due to the sustained period of sitting and lack of activity.

Guidelines for activity vary based on age and health status. Most people should engage in **about 30–60 minutes of aerobic activity**, five to seven times per week.

**Probing questions** related to activity might include:

- Tell me about your daily exercise? What activities are you involved in? (Probe about the type and amount each day.)
- Do you have any concerns about your level of activity or exercise? Do you have any limitations to your mobility that affect your activity?
- Do you experience leg pain or cramps when walking? Do you experience a lack of sensation to heat or cold in the extremities?

**Collaborate with the client** to create an activity/exercise plan that is specific to their needs and goals. Be aware of **your own biases** related to activity/exercise with certain populations such as older clients or clients who may currently live sedentary lifestyles or have mobility issues. Also, recognize that some clients may have concerns about starting an exercise plan: these might include exacerbating pain, fear of falling, mobility issues, and/or a history of previous falls. Try to connect with the client and get to know them and their needs and fears. Start at a **realistic and attainable level**, depending on the client's physical capabilities and energy level, and then begin to increase the time and duration of the physical activity. Many interventions are available to help clients achieve their activity goals: community walking groups, fitness apps, or joining a local gym or group activity. When appropriate, encourage clients to ask family and friends to get active with them: a strong

support system can help clients stay active and achieve their health goals. The participACTION website is a helpful resource for activity guidelines: <https://www.participaction.com/en-ca>. Also, consider activity interventions from a structural health promotion approach: for example, consider the financial costs associated with many resources and the client's financial ability to pay for them.

## Diet

A **healthy diet** helps maintain healthy blood vessels of the PVS and decreases the risk of plaque buildup in the blood vessels. A heart-healthy diet of leafy greens, vegetable, fruits, whole grains, nuts, fish, lean meats, low-fat dairy, and monounsaturated fats (e.g., olive oil) helps the body function, controls blood pressure, lowers cholesterol and blood glucose levels, and helps maintain an ideal body weight. In contrast, an **unhealthy diet** of refined sugars, carbohydrates, saturated and trans fats, and high levels of cholesterol and salt can lead to buildup of plaque in the arteries, high blood pressure, obesity, and an increased risk of PVD.

Canada's guidelines now suggest that there are health risks associated with any level of alcohol consumption, although negligible with two drinks or less weekly (Paradis et al., 2022). The current literature indicates that drinking alcohol of any kind does not decrease risks of heart disease, and high levels of consumption increase risk for coronary artery disease, myocardial infarction, heart failure, hypertension, and stroke (Paradis et al., 2022).

**Probing questions** related to diet might include:

- Tell me about your typical diet? What sorts of food do you eat each day?
- What have you eaten in the last 24 hours? Is that your usual diet?
- Do you have enough money to buy healthy food? Do you pack a

lunch or purchase your food when out?

- Tell me about your cultural practices related to diet?

Explore the client's familiarity with **Health Canada's Food Guide** (Government of Canada, 2021) and explain that it can help them guide their food choices: <https://food-guide.canada.ca/en/>. However, this guide still includes **Eurocentric elements**, so you should collaborate with the client about its relevance in the context of their cultural food practices. A snapshot of the food guide is now offered in dozens of languages: <https://www.canada.ca/en/health-canada/services/canada-food-guide/resources/snapshot/languages.html> and many resources have been developed for Indigenous populations: <https://www.sac-isc.gc.ca/eng/1581522106156/1581522147811>.

Assess the client's lifestyle to understand how it affects their diet and how you can help them adapt to include healthier food choices when possible. Use a **relational health promotion approach** to learn what a healthy diet means to the client and how their environment and the people within it can influence their choices. For example, some clients may choose fast food vendors for lunch due to accessibility (e.g., school or work cafeteria options). Try to help the client find accessible food services or learn how to pack healthy lunches. Issues related to **food security**, and the increasing costs of food globally, has made it difficult to ensure everyone can have a healthy diet. As a nurse, you can **advocate** to ensure the particular needs of each client are being met using the available socioeconomic and environmental resources. Advocacy might include identifying and securing access to resources for clients, as well as political advocacy efforts related to food costs and geographical access to food. By working in partnership with clients, you can create effective interventions that help them achieve a healthy diet.



# Smoking

**Smoking tobacco** has negative effects on the PVS because it can damage blood vessels and increase the risk of atherosclerosis and PVD. Smoking can cause the blood vessels to narrow, which reduces blood flow and the transportation of oxygen to the peripheral areas (e.g., limbs). There has been some recent interest in the health effects of **cannabis use**, but the literature remains inconclusive in terms of peripheral vascular and cardiovascular diseases (Page et al., 2020). Some have suggested that smoking cannabis may lead to arteritis and should be considered in adults younger than 50 years of age who are presenting with signs and symptoms associated with PVD (Cottencin et al., 2010 as cited in Page et al., 2020).

Always use a **culturally inclusive** and **non-judgemental approach** when you are asking about consuming tobacco and cannabis or providing health education. For example, be aware that tobacco plays an important part in traditional and spiritual practices in many communities, such as some Indigenous communities, where individuals may use it for ceremonial and medicinal purposes (CAN-ADAPTT, 2011).

**Probing questions** related to smoking tobacco and cannabis might include:

- Do you smoke cigarettes or use any tobacco- or cannabis-related products? If affirmative, ask probing questions such as: How much per day? What type of product do you use (e.g., smoking, vaping, chewing)? For how long? Can you tell me the reasons you began smoking? Have you ever considered quitting smoking?
- If you do not currently smoke, have you ever? If affirmative, ask similar probing questions, including the reason that the client quit.
- Are you exposed to second- or third-hand smoke? If affirmative, ask similar probing questions, including whether

the client is still exposed and possible interventions to reduce the risk.

Health education should focus on the client's lifestyle, living situation, and reasons for using tobacco. Interventions related to using safely or quitting should be tailored to each client and could include counselling, cognitive-behavioural therapy, and support groups. You should also consider a relational approach. For example, a client's smoking or second- and third-hand exposure can be influenced by their surrounding environment (e.g., family, friends, workplace).

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# Clinical Judgement: Case Study

A 74-year-old white client was admitted to the hospital. The client has a history of heart failure, hypertension, peripheral vascular disease (PVD), and arthritis. The client stated they have a “heavy, dull, achy feeling” in their legs. Skin on the lower legs has a brownish yellow discolouration. No visible veins. Client has +2 pitting edema bilaterally in the lower legs and feet, pulses difficult to palpate due to edema. Legs warm to touch down to toes. Open sore on the lateral malleoli is irregular in shape and shallow, no discharge or smell. Client smokes 3–5 cigarettes a day. Client has been smoking for 40 years and stated they have slowly been decreasing the amount each day for the past year. Client moved to a new community 6 months ago and has not been going out as much because they do not know anyone and has been more sedentary than usual. Client stated their legs usually feel worse at the end of the day and when making dinner if standing too long. Vital signs: R20, P90, BP 140/90, O2 saturation 97%, T 36.1, BMI 34.5.



*An interactive H5P element has been excluded from this version of the text. You can view it online here:*

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=582#h5p-40>

# Key Takeaways

- The peripheral vascular system (PVS) is a continuous network of vessels that carry oxygenated blood away from the heart to the periphery (arteries) and deoxygenated blood back to the heart and to the lungs for reoxygenation (veins).
- Common symptoms that can be related to the PVS include pain-related sensations, skin discolouration changes, skin temperature changes, edema, and ulcers.
- An objective assessment of the PVS includes inspection and palpation of hands and arms; inspection and auscultation of abdominal vasculature areas; and inspection and palpation of feet and legs.
- Health promotion interventions should be developed in collaboration with the client and focus on what is important to them.



# LYMPHATIC SYSTEM

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# Learning Outcomes

1. Apply subjective assessment skills.
2. Apply objective assessment skills.
3. Use clinical judgment.
4. Integrate an inclusive approach to lymphatic system assessment.
5. Integrate health promotion interventions into actions.

# Introduction to Lymphatic System

The lymphatic system (see **Figure 1, 2, and 3** for an anatomical overview) includes lymphatic capillaries, lymphatic vessels, lymph nodes, and other lymphoid tissues. This system plays a valuable role in **fluid balance** and **filtering pathogens** and **waste** such as cellular debris. Assessment of the lymphatic system provides important information about the functioning of this system and potential cues that require further action.

The lymphatic system involves the following processes:

- Fluids and proteins leak from the vascular system into the **interstitial space**. As previously discussed in the peripheral vascular chapter, much of this fluid is reabsorbed back into the venous system.
- Some of the fluid and proteins (including waste and pathogens) in the interstitial space are absorbed by the lymphatic capillaries into the lymphatic system, which becomes lymph (i.e., lymphatic fluid that is rich in proteins).
- The lymph travels along the **lymphatic vessels** so that fluid and proteins can be returned from the lymphatic system into the bloodstream to ensure sufficient blood volume in the cardiovascular system. The lymph is returned to the bloodstream through the right lymphatic duct and the thoracic duct into the subclavian veins. Attached to the lymphatic vessels are hundreds of lymph nodes throughout the body, which filter the lymph and cleanse it.
- Lymph nodes can be found all over the body and are often assessed in the head/neck, axilla, anterior chest, upper arm, and groin areas.

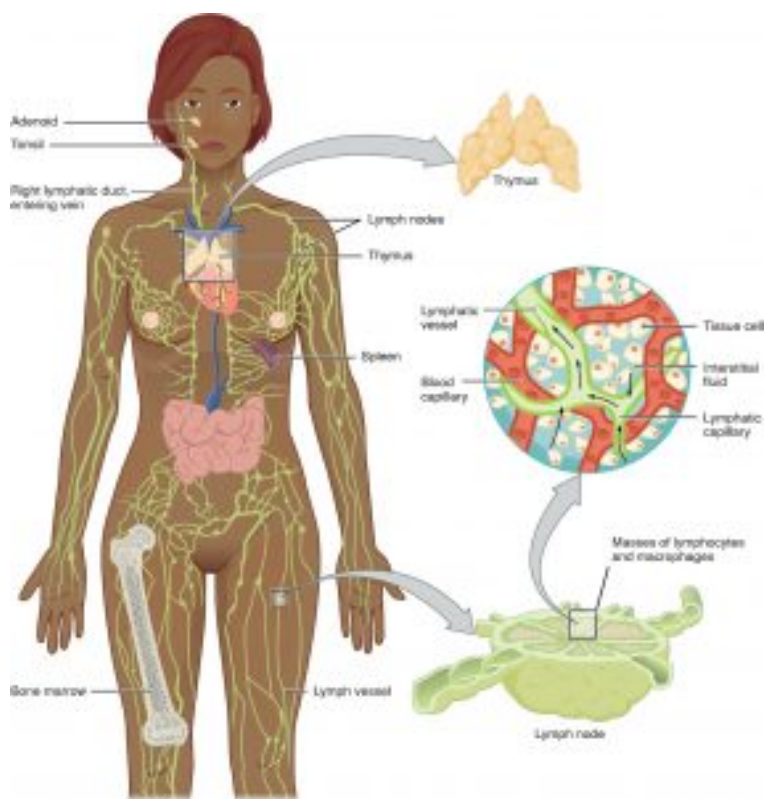
You have already learned about the anatomy and physiology of the

lymphatic system, here is a quick overview of how it works:  
<https://www.youtube.com/watch?v=QD9AdNXSQe4>

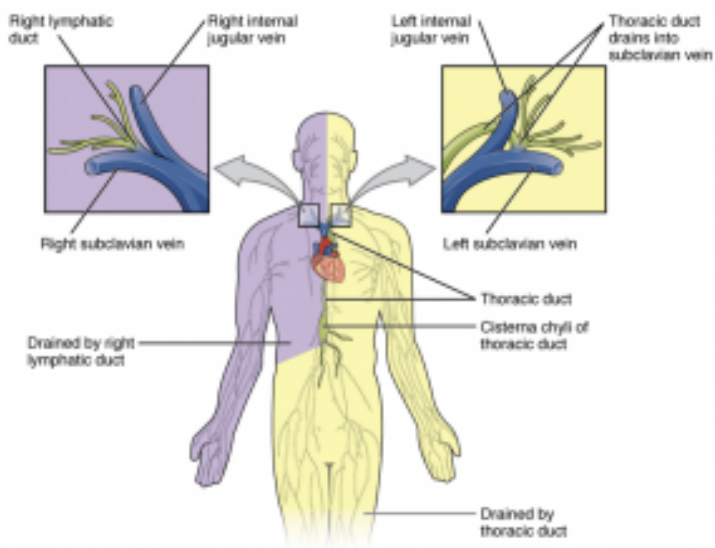
An additional resource is this video: [https://www.youtube.com/watch?v=I7orwMgTQ5I&list=PL8dPuualjXtOAKed\\_MxxWBNaPno5h3Zs8&index=46](https://www.youtube.com/watch?v=I7orwMgTQ5I&list=PL8dPuualjXtOAKed_MxxWBNaPno5h3Zs8&index=46)

### Clinical Tip

The lymphatic system is rarely assessed in isolation because it is closely linked to many other systems including the cardiovascular system, peripheral vascular system, respiratory system, immune system, gastrointestinal system, and musculoskeletal system.

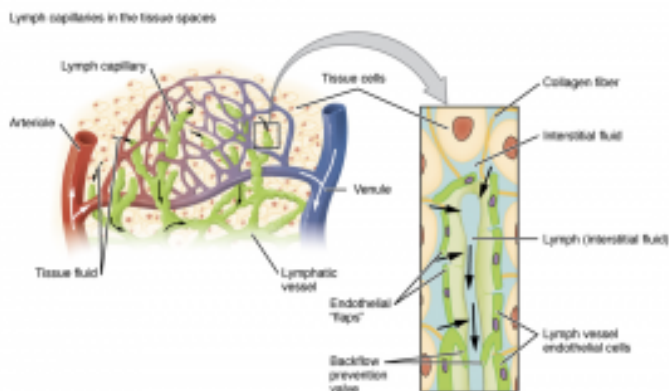


**Figure 1:** Overview of lymphatic system.



**Figure 21.4 Major Trunks and Ducts of the Lymphatic System** The thoracic duct drains a much larger portion of the body than does the right lymphatic duct.

**Figure 2:** Lymphatic ducts.



**Figure 21.3 Lymphatic Capillaries** Lymphatic capillaries are interlaced with the arterioles and venules of the cardiovascular system. Collagen fibers anchor a lymphatic capillary in the tissue (inset). Interstitial fluid slips through spaces between the overlapping endothelial cells that compose the lymphatic capillary.

### Figure 3: Lymphatic capillaries.

(Attribution for all three images: Gordon Betts, J., Young, K.A., Wise, J.A., Johnson, E., Poe, B., Kruse, D.H., Korol, O., Johnson, J.E., Womble, M., & DeSaix, P. (2013). The Lymphatic and Immune System. In *Anatomy and Physiology*. OpenStax. Creative Commons Attribution License v4.0. Book URL: <https://openstax.org/books/anatomy-and-physiology/pages/1-introduction>

Section URL: <https://openstax.org/books/anatomy-and-physiology/pages/21-1-anatomy-of-the-lymphatic-and-immune-systems>)

## Activity: Check Your Understanding



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# Subjective Assessment

**Subjective assessment** of the **lymphatic system** involves asking questions about the health of the client and symptoms that occur because of pathologies affecting this system. Subjective assessment related to the lymphatic system is typically conducted as part of assessments related to peripheral vascular, gastrointestinal, respiratory, genital, and musculoskeletal systems.

A full exploration of pathologies is beyond the scope of this chapter, but common problems associated with the lymphatic system include **lymphadenopathy**, **lymphedema**, and cancers of the lymphatic system such as **lymphomas**.

**Common symptoms** that can be related to the lymphatic system include noticeable lymph nodes, skin changes (swelling, tight, hard skin, leaking fluid), headache, general fatigue, and fever. See **Table 1** for guidance on subjective health assessment. Many of the questions in the table align with the PQRSTU mnemonic; you should probe symptoms in the order of relevance, rather than sequentially according to the mnemonic. For a reminder, check out this resource: [PQRSTU](#).

You should also ask about any medications (prescribed or over the counter) the client is taking: name, dose, frequency, reason it was prescribed, how long they have been taking it, and effectiveness. Always ask about herbal and natural products.

Also ask questions related to health promotion. Depending on the context of the assessment, you may ask these questions and engage in a discussion during a subjective assessment or after an objective assessment. A section on “Health Promotion Considerations and Interventions” is included later in this chapter, after the discussion of objective assessment.



## Knowledge Bites

Many lymphatic system pathologies result in swelling. For example, clients may report or you may observe **lymph node swelling** (a raised lump under the skin). Lymph node swelling is often the body's way of filtering pathogens possibly related to an upper respiratory infection, flu, or cold; swelling is typically localized (in one area) and usually resolves within 1–2 weeks after the condition resolves. In these cases, lymph nodes are often tender, enlarged, and warm to touch with some localized redness. Abnormal characteristics are discussed below under priorities of care.

**Table 1:** Common symptoms, questions, and clinical tips.

Symptoms	Questions	Clinical tips
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<p><b>Noticeable lymph nodes</b> associated with the lymphatic system can be described as lumps, swollen, palpable, and/or painful.</p>	<p>Have you noticed any lymph nodes (or lumps) on your head, neck, under your arms, or in your groin area?</p> <p>If the client's response is affirmative, <b>additional probes</b> may include:</p> <p>Region: Where do you feel the nodes?</p> <p>Quality/quantity: Tell me about it. What does it feel like (e.g., hard, soft)? Is there pain associated with it? (You might need to use the word "tender"). If so, how bad is the pain/tenderness?</p> <p>Severity: If there is pain, can you rate your pain on a scale of 0–10 with 0 being no pain and 10 being the worst pain you have ever had?</p> <p>Timing: When did you notice the lymph nodes (or pain/tenderness)? Were you sick when you noticed them? Are the nodes constantly swollen?</p> <p>Provocative/palliative: Does anything make it worse? Does anything make it better?</p>	<p>Many clients refer to <b>lumps</b> without being aware that they are lymph nodes. Therefore, you may need to use this terminology in your assessment.</p> <p>Use a <b>calm demeanor</b> with clients and help them understand that most lymph node issues are not concerning or malignant. Swollen lymph nodes are often a sign that one's lymphatic system is working effectively and indicating that the body is filtering pathogens when a person is sick.</p> <p>In addition to asking the client about the nodes, inquire about any <b>associated symptoms</b> (e.g., pain, fatigue, unexplained weight loss, persistent fever, fainting, breathing issues) and palpate the nodes. Depending on the location of the nodes, you may also ask about symptoms related to respiratory infections (e.g., runny nose, sore throat, cough).</p>
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	<p>Treatment: Have you treated it with anything? Do you take any medications for it?</p> <p>Understanding: Do you know what is causing it or what it is related to?</p>	
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<p><b>Skin changes</b> can occur with lymphadenopathy and lymphedema.</p> <p>With <b>lymphadenopathy</b>, skin changes may include swelling, redness, and warmth over the affected lymph nodes.</p> <p>With <b>lymphedema</b>, localized skin changes may include swelling, a feeling of fullness/heaviness, redness, tight and firm skin, dry and thick skin, and leaking fluid and blisters when severe.</p>	<p>Have you noticed any changes in your skin? (You might ask about specific changes like those in the column to the left).</p> <p>If the client's response is affirmative, additional probes may include:</p> <p>Quality/quantity: Tell me about the changes. What does it feel like? What does it look like? How bad is it?</p> <p>Region: Where are these changes? Have you noticed them anywhere else?</p> <p>Timing: When did you notice these changes? Are they constant or intermittent?</p> <p>Provocative/palliative: Does anything make it worse? Does anything make it better?</p> <p>Treatment: Have you treated it with anything? Do you take any medications for it?</p> <p>Understanding: Do you know what is causing it or what it is related to?</p>	<p>Skin changes associated with lymphedema are often associated with <b>chronic conditions</b> and can be significant enough to affect body image.</p> <p>Lymphedema can be caused by various conditions and <b>treatments</b> (e.g., cancer surgery, radiation) that disrupt the flow of lymphatic fluids returning to the blood. It often affects arms and legs, and can also affect the breasts, chest, abdomen, face, and neck depending on the cause.</p> <p>Some of the first symptoms that clients experience is the feeling that their clothing or jewelry (e.g., rings and bracelets) that they are wearing seems to fit tighter.</p>
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<p><b>Other lymphatic system symptoms</b> may include fatigue, unexplained weight loss, weight gain, persistent fever, headache, dizziness, fainting, difficulty moving a limb or area of the body, breathing issues, coughing, and night sweats.</p> <p>An individual may experience a host of other associated symptoms depending on the lymphatic condition.</p>	<p>It is important to ask about other symptoms, particularly if the client answers in the affirmative about noticeable lymph node changes or skin changes, or if you suspect a lymphatic condition.</p> <p>Use variations of the PQRSU mnemonic to assess these associated symptoms further.</p>	<p>Explore these symptoms specifically if the client answers affirmatively, but also recognize that these symptoms can be related to many other body systems.</p> <p>Affirmative answers related to fever, anorexia, chills, and fatigue can help you determine if the cause is systemic.</p>
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<p><b>Personal and family history of lymphatic</b> conditions and diseases.</p> <p>As noted above, common issues associated with the lymphatic system include lymphadenopathy, lymphedema, lymphatic-related cancers, cancer treatments, or physical traumas.</p>	<p>Do you have any chronic conditions or diseases that affect your lymphatic system?</p> <p>Do you have any family members with conditions or diseases that affect the lymphatic system?</p> <p>If the client responds in the affirmative, begin with an open-ended probe: Tell me about the condition/disease?</p> <p>If the client has a personal history, <b>probing questions</b> might include:</p> <p>Timing: When did it occur? When were you diagnosed?</p> <p>Quality/quantity: How does it affect you? What symptoms do you have?</p> <p>Treatment: How is it treated? Is the treatment effective? Have you had any surgeries? (e.g., tonsillectomy or cancer-related surgeries or radiation?) Do you take medication?</p> <p>Provocative/palliative: Does anything</p>	<p>Although some lymphatic-related cancers involve familial clustering, the genetic causes are not clearly understood. Lymphedema is sometimes genetic (Jones &amp; Mansour, 2017). This cause may be considered with childhood lymphedema, particularly when no cancers are present.</p>
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	make it worse? Does anything make it better?	
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## Priorities of Care

In cases of **severe lymphedema**, you should assess for **cellulitis**, which is a bacterial infection resulting in fever and inflammation (heat, erythema, swelling, and pain) over the affected area. With severe infection, you may observe red, purple, or other deeply coloured streaks radiating from the affected site (see **Figure 4** for signs of cellulitis). Keep in mind that these streaks may be less visually obvious in clients with darker skin tones. Severe lymphedema is usually treated with antibiotics and can be life-threatening if untreated. Any signs of cellulitis should be reported to the physician or nurse practitioner. Mark the borders with a skin marker pen and monitor for enlargement. If the client is outpatient, tell them to contact their healthcare provider if it enlarges beyond the original borders.



**Figure 4:** Signs of cellulitis.

(Image CC-BY-SA, By James Heilman, MD,  
[https://commons.wikimedia.org/wiki/  
File:CellulitisJmh649.JPG](https://commons.wikimedia.org/wiki/File:CellulitisJmh649.JPG))

Keep in mind that enlarged lymph nodes often simply indicate that the body is fighting an infection such as a cold. However, they are sometimes associated with serious conditions such as cancer, so you should always conduct a focused subjective and objective assessment when lymph nodes are enlarged. Any **lymph node swelling** with the following **abnormal characteristics** requires further investigation and should be reported to the physician or nurse practitioner:

- Nodes that are larger than 1 cm.
- Nodes that have developed for no apparent reason (i.e., no sign of infection) and remain swollen for more than 3 weeks or continue to enlarge.

- Nodes that are fixed/attached to the skin and not easily moveable.
- Nodes that are hard like a stone upon palpation or rubbery as opposed to soft.
- Nodes that are matted (in a group and attached to each other) as opposed to a discrete node (an individual node not attached to other nodes).
- Nodes associated with sustained symptoms such as fatigue, unexplained weight loss, persistent fever, fainting, and breathing issues.

Note whether nodes are non-painful or painful. Be aware that even a non-painful node may be a cause for concern: some non-painful nodes can meet some of the above characteristics and be associated with certain cancers. Nodes can also grow large enough to press on surrounding nerves. A systemic issue may be the cause of generalized swollen nodes found in multiple locations throughout the body, as opposed to localized. A local infected lymph node can also become systemic, so it is important to ask the client about symptoms such as fever, fatigue, chills, and anorexia.

## Contextualizing Inclusivity

**Children** have **active immune systems** and are

exposed to many viral and bacterial infections (e.g., cold, flu) at daycare and school. As a result, palpable soft, moveable, and small lymph nodes are common in children. These changes are the body's normal response to fighting infection and indicate that the lymphatic system is working properly. Prompt assessment and intervention is required if the lymph nodes continue to enlarge when an infection has resolved or the swelling is associated with symptoms such as difficulty breathing or swallowing or any of the abnormal characteristics described in the box above.

## Activity: Check Your Understanding



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=875#h5p-47>

## References

Jones, G., & Mansour, S. (2017). An approach to familial lymphoedema. *Clinical Medicine*, 17(6), 552-557.  
<https://doi.org/10.7861/clinmedicine.17-6-552>

# Objective Assessment

The objective assessment of the lymphatic system is usually completed after the subjective assessment. Position the client depending on the related area being assessed.

Be aware of the **environmental temperature** in the room and the temperature of your hands. Room temperatures are not easily modified, so try to limit exposing the client and keep them covered, and try to warm your hands before placing them on the client's body.

Objective assessment of the lymphatic system involves the techniques of inspection and palpation. Compare your assessment bilaterally and ask the client if they feel any pain. If you notice leaking fluid or blisters, wear gloves to help prevent and control infection.

## Contextualizing Inclusivity

You will be exposing various areas of the body, so it is important to be attentive to the client's needs during the assessment. Always use a **trauma-informed approach**: ask permission to touch and explain what you are doing before you proceed.

A **cultural humility approach** to assessment is also important because you cannot know and fully understand all cultures. This kind of approach requires a life-long process of reflection and self-critique to

address power imbalances within systems and develop mutually beneficial partnerships and relationships (Tervalon & Murray-Garcia, 1998). Healthcare professionals should engage in continuous, critical reflection on power and privilege, and find ways to interact with clients of different race, sex, gender, age, and ability.

For example, some of your clients may wear head coverings or coverings over their face or body. Some Muslim women wear hijabs that cover their heads or niqabs that cover their faces; some Sikh individuals wear turbans; and some married Jewish women cover their hair with scarves or wear wigs. These are just some examples. For some clients, touch (i.e., physical assessment) from a person of the opposite gender may not be permissible or encouraged. Some Muslim women may prefer or require a female healthcare provider of the same gender, but others may feel that receiving healthcare from a male practitioner can be medically necessary and is therefore permitted.

Another consideration is that many clients are uncomfortable with assessments of the lymph nodes in the groin area. This kind of assessment may be particularly uncomfortable for clients who have experienced trauma and/or clients who experience **gender incongruence**.

Overall, you should first determine whether the assessment is necessary, if the client feels comfortable with you doing the assessment, and if accommodations can be made for the client. You can find some tips for

providing sensitive care to 2SLGBTQ+ clients at  
<https://soginursing.ca/>.

## References

Tervalon, M., & Murray-García, J. (1998). Cultural humility versus cultural competence: A critical distinction in defining physician training outcomes in multicultural education. *Journal of Health Care for the Poor and Underserved*, 9(2), 117–125. <https://doi.org/10.1353/hpu.2010.0233>

# Assessment of Lymphedema

Assessment of the lymphatic system includes inspecting the skin for signs of lymphedema (**Figure 5** shows signs of severe edema). The most common sign is swelling, but other signs may be present when the condition is severe or not well managed.







**Figure 5:** Lymphedema.

(Attribution: Photo of legs by Medical doctors – <https://commons.wikimedia.org/w/index.php?curid=37663127> and photo of arms has been cropped. Photo by DocHealer – <https://commons.wikimedia.org/w/index.php?curid=64120555>, both own work, CC-BY SA 4.0)

Clients with lymphedema will usually report that they are experiencing swelling or that their clothes or jewelry appear to be fitting tighter. This will help you to determine where to begin your assessment. If you are doing a general assessment, it is appropriate to observe the face, neck, arms and legs in a sitting or supine position. Observe the client's bare skin and compare bilaterally.

**Assessment for lymphedema** involves the following steps:

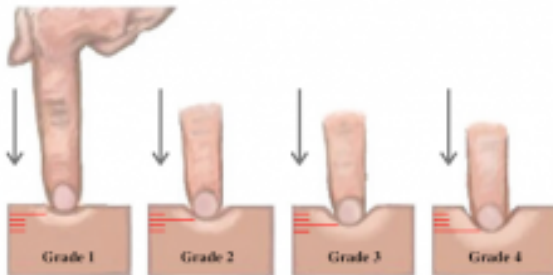
1. Inspect for **swelling** and **symmetry** over the face, neck, arms, and legs.
  - Normally, no swelling is present on the face, neck, arms, and legs, and limb circumference is equal bilaterally.
  - If swelling or asymmetry is present, describe the location. If you observe asymmetrical limbs in terms of circumference, measure with a flat/flexible tape measure around the largest area of swelling on the affected limb and measure at the same location on the other limb.

If you note swelling, **assess for pitting edema**: an indentation that remains after applying pressure over the location (see **Figure 6**). Apply pressure with the pad of your finger on a distal location (feet and medial malleolus) for about 3-5 seconds and then release. If you observe an indentation (a “pit”), note the location and how long the indentation remains. Then, assess a proximal location to assess how high the edema goes (e.g., over the tibia). Always check with the unit you work on about the scale used to evaluate pitting edema. Scales are usually 1-4 as shown in **Figure 7** and are used to record the pit depth and rebound time (the time for the indentation to disappear). Often, 1 is classified as mild, 2 as moderate, 3 as severe, and 4 as very severe.



**Figure 6:** Example of pitting edema

Grade 1	0–2 mm indentation; rebounds immediately.
Grade 2	3–4 mm indentation; rebounds in < 15 seconds.
Grade 3	5–6 mm indentation; up to 30 seconds to rebound.
Grade 4	8 mm indentation; > 20 seconds to rebound.



**Figure 7:** Pitting edema scale. (Attribution: <https://wtcs.pressbooks.pub/nursingskills/> CC-BY 4.0).

2. Inspect for **skin discolouration**, **skin breakdown** (cuts, cracks), and **ulcers** over the face, neck, arms, and legs. Inspect anterior and posterior sides, in between skin folds and toes, and on the bottom of the feet.
  - Normally, skin colour is even throughout the body and skin is intact.
  - If you observe any skin discoloration from the client's baseline, identify the location and colour. If skin is not intact or ulcers are present, note the location and record a description. If applicable, describe the colour, odour, **consistency** and colour and quantity of discharge.
3. **Palpate for temperature** using the dorsa of your hands from the top of the client's limb (e.g., shoulder/upper leg) to their extremities (hand/fingers and feet/toes).

- Normally, the temperature is equal bilaterally. The distal portions of the limbs (hands and feet) may be slightly cooler, but should be equal bilaterally.
  - If you note any asymmetry in temperature or extreme temperatures, identify the location and temperature (i.e., cold or hot).
4. **Palpate skin texture and consistency** with your first two or three fingers and thumb over the limbs or any areas where lymphedema is suspected.
- Normally, the skin texture is smooth and soft with no lumps.
  - Describe the quality and note the location of any dry, moist, dimpled, or firm areas on the skin.
5. If you suspect lymphedema, assess the client's **mobility** of the affected limb and **range of motion**.
- Normally, clients should have no difficulty moving their arms and legs, with full range of motion and no pain.
  - Note any difficulty moving, limited range of motion, or pain.
6. Note the **findings**:
- Normal findings might be documented as: "No swelling or discolouration present on the face, neck, arms, and legs, and limb circumference is equal bilaterally. Temperature is warm to touch and equal bilaterally, and skin texture is smooth with no lumps on arms and legs."
  - Abnormal findings might be documented as: "Redness and swelling noted on left arm, left upper arm circumference 19 inches and forearm circumference 12 inches. Right upper arm circumference 14 inches and forearm circumference 10 in inches. Full range of motion of both

arms. Client describes slowness and difficulty moving arm.”

## Priorities of Care

A main priority of care is to **prevent and/or treat infection**. Clients with lymphedema are at risk for skin breakdown, ulcers, and infection. Skin should be kept clean, dry, and moisturized. Clients should also be careful to prevent any scratches or cuts that could lead to infection. Assess and monitor any areas of the skin that are not intact and/or show potential infection. It is important to observe if any areas of concern worsen (e.g., get bigger). Report to the physician or nurse practitioner if you observe any ulcers or signs of infection.

Clients with lymphedema may be referred to a physiotherapist and encouraged to perform light exercises to assist with **lymphatic fluid transportation**. For similar reasons, compression stockings are often prescribed: these are fitted elastic stockings that apply a certain amount of pressure to the limb. It is also often recommended to elevate limbs with lymphedema.

## Activity: Check Your Understanding



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# Inspection and Palpation of the Lymph Nodes

This assessment is often performed with the client sitting **upright on the exam table** to assess the lymph nodes in the head and neck, the upper arm, and the axillae, and then with the client **repositioned into a supine position** to assess the lymph nodes in the groin.

- NOTE: Lymph nodes are located in many areas of the body, some of which are not physically accessible. Although some of the axilla lymph nodes are associated with the breast, other lymph nodes associated with the breast will be explored in another chapter.

Use the following **techniques** to palpate the lymph nodes:

- Prior to palpation, say to the client “let me know if you have any pain or tenderness when I touch you.”
- Use the **finger pads** of two to three fingers and move them in a circular motion.
- Use a **light touch** with gentle pressure so that you don’t forcefully push the node inwards.
- After you palpate in one spot, **shift your fingers** to a new spot within the same area, because there are strands of lymph nodes in each area. This should be done about two to three times in each area.
- Typically, you palpate bilaterally at the same time and compare the right side to the left side.
- Conclude by asking the client if they had any pain or tenderness.

See **Table 2** for what to note when assessing lymph nodes and abnormal characteristics.

**Table 2:** Lymph node assessment.

- Presence of observable swelling (is the node swollen and observable upon inspection?)
- Skin changes over the node (what is the skin colour and temperature?)
- Presence of pain/tenderness (is the node painful or tender?)
- Node location (where is the node located?)
- Node size (what is the size of the node?)
- Node consistency, e.g., rubbery, hard, soft (what is the consistency of the node?)
- Node movability (can you move it around when you palpate it?)
- Node delimitation (what are the limits or the boundaries of the node in terms of whether it is an individual node or a cluster of nodes matted together?)
- Symmetry (is the node the same on both sides of the person's body?)

## Lymph Nodes of Head and Neck

Steps for assessing **lymph nodes** of the **head and neck** are as follows:

1. **Inspect the lymph node areas** on the head and neck (see **Figure 8**) for swelling, asymmetry, and erythema.
  - Normally, the lymphatic areas are symmetrical between sides with no discolouration, swelling, or visible nodes.
  - Abnormal findings may include asymmetry and visible nodes due to swelling with erythema overlying the skin.

2. **Palpate for lymph nodes** using a systematic approach moving from proximal to distal; thus moving from preauricular to supraclavicular area (see **Figure 8**, **Table 3** and **Video 1**). Consider lymphatic drainage patterns (see **Figure 9**); this approach allows you to reflect on the origins of the cause when there is an abnormality.
  - Recall to palpate nodes bilaterally at the same time: for example, assess the preauricular nodes on the left and right side at same time. However, for the submental lymph nodes, you should use the fingers of your dominant hand to palpate just under the chin behind the bony prominence. When assessing the deep cervical chain on clients with a muscular neck, you may ask the client to tip their head toward the side you are assessing to relax the sternomastoid muscle; thus, you will need to do one side at a time. For the supraclavicular nodes, you can ask the client to gently raise their shoulders.
    - Normally, lymph nodes are not palpable, but remember that normal lymph nodes can sometimes be palpable in young children.
    - If a lymph node is palpable, assess them as per **Table 2** noted above.
3. If lymph nodes are visible or palpable, **palpate the temperature** over the lymph node areas of the head and neck using the dorsa of your hands, comparing bilaterally.
4. Note the **findings**:
  - Normal findings might be documented as: “No lymph nodes palpable in the head and neck, no swelling, no asymmetry, no discolouration or increased temperature over lymph node locations, and no pain.”
  - Abnormal findings might be documented as: “Visible lymph nodes in the neck, hard, matted, and palpable

cervical and supraclavicular lymph nodes on the right side, 3 cm. Client indicates they are tender.”



**Figure 8:** Lymph node areas on head and neck  
**Table 3:** Lymph node locations on the head and neck.

Name	Location
1 Preauricular	Anterior to the tragus of the ear.
2 Posterior auricular	Along the mastoid process.
3 Occipital	Inferior to the occipital bone and on the lateral
4 Submental	Under the chin behind the bony prominence.
5 Submandibular	Halfway between the submental nodes and the
6 Tonsillar	Inferior to the angle of the jaw.
7 Superficial cervical chain	Along the sternomastoid muscle at the top, just
8 Deep cervical chain	Further down the sternomastoid muscle.
9 Posterior cervical chain	Behind the sternomastoid muscle.
10 Supraclavicular	Superior to the clavicles.



**Figure 9:** Lymphatic drainage of head and neck lymph nodes.



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here: <https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=881#oembed-1>

**Video 1:** Palpation of head and neck lymph nodes [1:16]

## Lymph Nodes of Upper Arm and Axillary Area

Steps for assessing **lymph nodes** of the **upper arm and axillary** area:

1. Inspect the area surrounding the upper arm where the epitrochlear lymph nodes are located (see **Figure 10**–the area

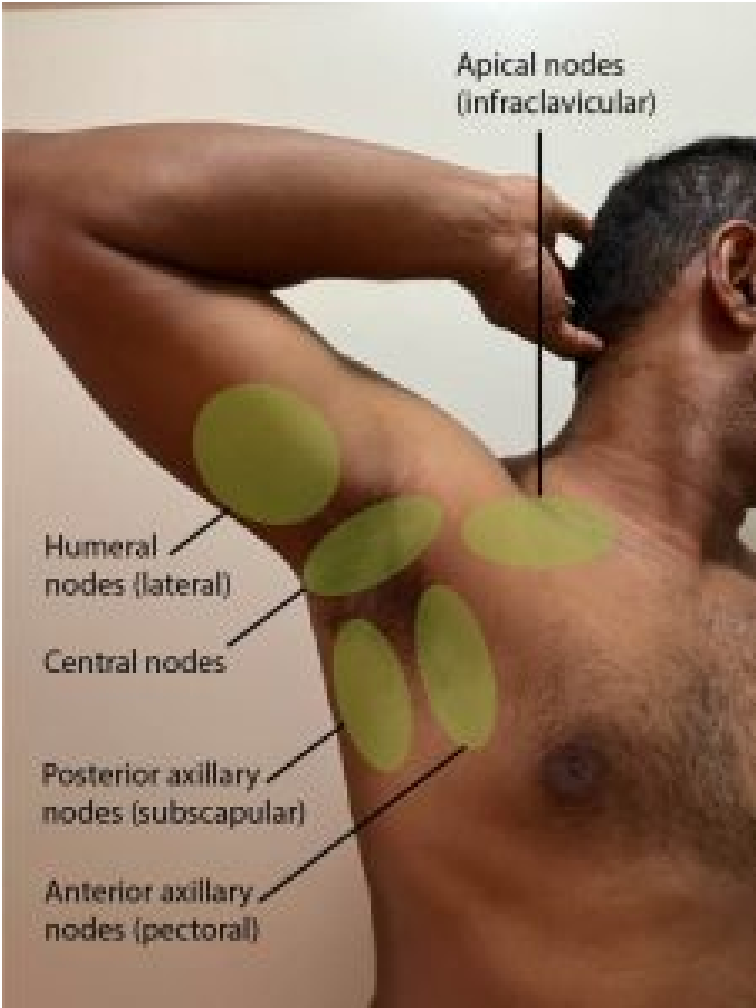
under the finger tips is where you should inspect which is superior and behind the medial epicondyle of the humerus) and inspect the axillae where the axillary lymph nodes are located (see **Figure 11**).

- Normally, the lymphatic areas are symmetrical on each side with no discolouration, swelling, or visible nodes.
- Abnormal findings may include asymmetry and visible nodes due to swelling with erythema overlying the skin. If a lymph node is palpable, assess it for abnormal characteristics (**Table 2**).





**Figure 10:** Epitrochlear lymph node area.



**Figure 11:** Axillary lymph node area.

- 2. **Palpate the epitrochlear (Video 2) and axillary lymph nodes (Video 3).** Prior to palpation, say to the client “let me know if

you have any pain or tenderness when I touch you.” For the **epitrochlear lymph nodes**: Ask the client to place their forearm on the bedside table with the palm facing up and palpate in a gentle circular motion in about two to three locations just superior to and behind the medial epicondyle of the humerus (about 1–2 cm). For the **axillary lymph nodes**: Ask the client to raise their arm and rest their hand on the back of their head. Use a gentle circular motion to palpate. Begin in the axilla: palpate in one row high in the axilla, then palpate in three rows away from the axillae along the upper arm, then three rows away from the axillae down the chest wall, and then in one row medially (see **Figure 12** for pattern). For each row, palpate about three to four locations.

- Normally, there are no palpable lymph nodes.
- If a lymph node is palpable, assess them as per **Table 2** and pay attention to the drainage patterns noted in **Figure 13**. It is important to recognize that a large amount of the lymph from the breast drains into the anterior axillary nodes, lymph from the back drains into the posterior axillary nodes, and lymph from the arm drains into the lateral nodes. Additionally, this lymph drains into the central nodes to the apical nodes to the supraclavicular and then, often returns to the vascular system through the subclavian vein via the **thoracic duct**.



**Figure 12:** Axillary lymph node palpation pattern.



- Normally, there is no increase in temperature.
- Some abnormal lymph nodes will have increased localized skin temperature overlying the node.

4. Note the **findings**:

- Normal findings might be documented as: “No lymph nodes palpable in the upper arm or axillae, no swelling, no asymmetry, no discolouration and no increased temperature over lymph node locations, and no pain reported by the client.”
- Abnormal findings might be documented as: “Hard, matted and palpable lymph nodes on the left axillary side. Tenderness reported by the client.”



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here: <https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=881#oembed-2>

**Video 2:** Palpation of the epitrochlear lymph nodes (showing technique on right arm) [0:25]



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here: <https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=881#oembed-3>

**Video 2:** Palpation of the axillary lymph nodes (showing technique on right side) [1:05]

## Lymph Nodes of the Groin

Steps for assessing **lymph nodes** in the **groin** area:

1. **Inspect and palpate the groin area** for the **inguinal lymph nodes**. Assist the client into supine position and provide a drape. Briefly expose one side to inspect and palpate, and then repeat on the other side. Prior to palpation, say to the client “let me know if you have any pain or tenderness when I touch you.” Palpate about four to five times in the groin area (**Figure 14**). If nodes are palpable, assess for temperature (comparing bilaterally)
  - Normally, the lymphatic areas are symmetrical on each side with no discolouration, swelling, or visible or palpable nodes.
  - Abnormal findings may include asymmetry and visible nodes due to swelling with erythema overlying the skin. If a lymph node is palpable, assess it for abnormal characteristics (**Table 2**).
2. Note the **findings**:
  - Normal findings might be documented as: “No lymph nodes palpable in the groin, no swelling, asymmetry, discolouration or increased temperature over lymph node locations, and no pain reported.”
  - Abnormal findings might be documented as: “Palpable, soft right-sided inguinal lymph node. Tenderness reported by the client.”



**Figure 14:** Inguinal lymph node area.

## Priorities of Care

Lymph nodes with abnormal characteristics require further investigation and should be reported to the physician or nurse practitioner. Depending on the client, you may ask about whether they have been recently unwell or have noted any other concerns in the affected area (pain, itching, rashes). You might also ask whether they shave or

have had a recent cat scratch or bite. Lymph node swelling can be associated with certain infections such as skin and yeast infections, sexually transmitted infections, and eye, ear, and throat infections. In rare situations, it can also be associated with cancer, particularly when accompanied by other symptoms such as fatigue, unexplained weight loss, persistent fever, fainting, breathing issues, and if the lymph nodes have continued to enlarge with no obvious signs of infection.

### **Contextualizing Inclusivity**

The lymphatic system undergoes changes as a person ages; the lymphatic vessels become thinner and the lymph nodes atrophy. As a result, older people may have more difficulty fighting infection and are more prone to lymphedema.

Always use a trauma-informed approach, particularly when assessing the inguinal lymph nodes due to their location. Explain what you are doing and why, ask permission to touch, provide a drape, and ask if the client would like someone present (a friend, family member, or another healthcare provider).



## Activity: Check Your Understanding



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# Health Promotion and Disease Prevention: Considerations and Interventions

Health promotion is an important component of a healthy lymphatic system. To determine appropriate interventions, carefully consider all of the collected data, both subjective and objective. As part of subjective data collection, you should inquire about risk factors, social determinants, and other considerations.

Integrate this kind of inquiry throughout the assessment. You will ask many probing questions during the subjective assessment, but other questions will emerge based on your critical reflection of data collected during the subjective and objective assessment. These findings will inform your clinical judgment and help you develop appropriate health promotion interventions for each specific patient.

## Preventing the Spread of Infection

The spread of infections can be prevented with simple techniques such as hand hygiene, staying home when sick, covering the mouth when coughing, wearing a mask, and receiving an annual influenza vaccine. You may need to **assess the knowledge of the client** and provide education about infection control. Also, with young children, you may need to assess the knowledge of parents/caregivers and educate them about infection control so that they can teach their children. **Children** learn about preventing the

spread of infection by watching their parents/caregivers/siblings and practicing the techniques they use, so it is important to reinforce proper technique and infection prevention behaviours.

**Probing questions** might include:

- When do you perform hand hygiene?
- How do you perform hand hygiene?
- What do you do when you are sick?

## Activity

**Activity** is another important part of assisting with effective **lymph fluid transportation**. For example, the pump action associated with muscle contraction helps aid in lymphatic drainage. Activity and exercise also help maintain a healthy body weight and prevent obesity.

It is often recommended that clients with lymphedema engage in gentle movement of limbs to help transport lymph fluid. Activities can include walking, swimming, and bike riding. Depending on the severity of lymphedema, clients may be assisted with range of motion exercises and referred to a physiotherapist or a registered massage therapist specializing in lymphedema.

**Probing questions** may include:

- Tell me about any activity/exercise you are involved in?
- How many times do you participate in exercise a week?
- How long each time?
- Do you have limitations related to activity/exercise?
- Do you have any concerns related to activity/exercise?

# Healthy Eating

**Healthy eating** promotes healthy cell function, so it is important that clients have an appropriate level of water intake, nutrients, and vitamins. Healthy eating can also help maintain a healthy body weight; extra body weight can interfere with the lymphatic system's ability to transport lymph fluid.

**Probing questions** may include:

- Tell me about your normal diet?
- What do you eat and drink each day?
- Do you have sufficient access to healthy food?
- Do you have sufficient funds to access healthy food?

# Alcohol and Drug Use

Alcohol and drug use can affect the lymphatic system in many ways. For example, these activities can be associated with certain cancers, cause inflammation, and increase the risk for injury and infections. The most recent Canadian guidelines now suggest that there are health risks associated with any level of alcohol consumption, although negligible with two drinks or less weekly (Paradis et al., 2022). Alcohol is considered a carcinogen and linked to several types of cancers and can affect the arteries (Paradis et al., 2022).

Reflect on your own **biases** about alcohol and drugs. Use of these substances can be stigmatized, so self-reflection is crucial to help facilitate a non-judgmental approach to care.

**Probing questions** may include:

- Tell me about how much alcohol you consume in a day? If the client does not consume alcohol daily, you can assess consumption based on weekly, monthly, or none. If the client's

answer is affirmative, ask probing questions such as: How much (e.g., ounces a day)? What type of alcohol (e.g., red wine, beer)? For how long? Can you tell me the reasons?

- If you do not currently consume alcohol, have you ever? If affirmative, ask similar probing questions, including why the client quit.

Ask similar questions related to drug use.

### **Contextualizing Inclusivity**

Consider a client's socio-economic status during your assessment, particularly as it relates to healthy eating. For example, does the client have geographical access and sufficient funds for healthy foods such as fresh fruits and vegetables? If not, discuss alternatives with the client (e.g., frozen vegetables). Another issue is that discussions about weight can be triggering for some clients, especially those with moderate to severe lymphedema, which can affect body image. Always use a compassionate, open, and non-judgmental approach to assessment.

# Clinical Judgement: Case Study

A 26-year-old client has not been feeling well for 4 days. The client reports starting a new job at a drop-in centre for adolescents in the community. Enlarged tonsillar lymph nodes, 2 cm bilaterally, tender to touch, and accompanied with a sore throat, cough, ear ache, and fatigue. The client reports feeling excited and stressed with the new job, and has not been eating very much due to an unsettled stomach. Client's vital signs are: blood pressure 100/68 mm Hg, pulse 64 bpm, respiration 12 bpm, O2sat 97%, temperature 38.2°C tympanic.



An interactive H5P element has been excluded from this version of the text. You can view it online here:

<https://pressbooks.library.torontomu.ca/assessmentnursing2/?p=886#h5p-50>

# Key Takeaways

- Common symptoms to assess related to the lymphatic system include noticeable lymph nodes and pain, skin changes (swelling, tight, hard skin, leaking fluid), headache, general fatigue, and fever.
- Objective assessment of the lymphatic system includes assessment for lymphedema and inspection and palpation of the lymph nodes in the head and neck, axilla, groin, and related area of the body.
- Health promotion interventions should be developed with the client to address what is important to them. Considerations include preventing infection spread, activity, healthy eating, and alcohol and drug use.





This is where you can add appendices or other back matter.