Pain Types & Patterns- A Differential Diagnosis

Course Description:
This course is derived from the textbook Differential Diagnosis for Physical Therapists by Catherine Goodman, MBA, PT, CBP and Teresa Snyder, MN, RN, OCN, CS. Following the standards for competency established by the American Physical Therapy Association (APTA) related to conducting a screening examination, Differential Diagnosis for Physical Therapists, 5th Edition gives you a consistent way to screen for systemic diseases and medical conditions that can mimic neuromuscular and musculoskeletal problems. This comprehensive text centers on a 5-step screening model that covers past medical history, risk factor assessment, clinical presentation, associated signs and symptoms, and review of symptoms for each client.

This course covers chapter 3: Pain Types and Viscerogenic Pain Patterns.

Methods of Instruction:
Online course available via internet

Target Audience:
Physical Therapists, Physical Therapy Assistants, Occupational Therapists, Occupational Therapy Assistants and Athletic Trainers.

Educational Level:
Intermediate

Prerequisites:
None

Course Goals and Objectives:
At the completion of this course, participants should be able to:
1. Identify the three types of referred pain mechanisms of the viscera
2. Recognize common pain patterns
3. Differentiate between systemic versus musculoskeletal pain
4. Differentiate between the five sources of most physiologic pain
5. Identify the systemic causes and clinical presentations of common joint pain
6. Identify common patterns of referred pain
7. Describe the clinical scenario between bone pain and aspirin
8. Recognize the screening tools for emotional and psychologic overlay
9. List the system effects of depression
10. Recognize the screening tools for systemic versus psychogenic symptoms
11. List the clinical signs and symptoms of conversion
Criteria for Obtaining Continuing Education Credits:
A score of 70% or greater on the written post-test
DIRECTIONS FOR COMPLETING

THE COURSE:

1. This course is offered in conjunction with and with written permission of Elsevier Science Publishing.
2. Review the goals and objectives for the module.
3. Review the course material.
4. We strongly suggest printing out a hard copy of the test. Mark your answers as you go along and then transfer them to the actual test. A printable test can be found when clicking on “View/Take Test” in your “My Account”.
5. After reading the course material, when you are ready to take the test, go back to your “My Account” and click on “View/Take Test”.
6. A grade of 70% or higher on the test is considered passing. If you have not scored 70% or higher, this indicates that the material was not fully comprehended. To obtain your completion certificate, please re-read the material and take the test again.
7. After passing the test, you will be required to fill out a short survey. After the survey, your certificate of completion will immediately appear. We suggest that you save a copy of your certificate to your computer and print a hard copy for your records.
8. You have up to one year to complete this course from the date of purchase.
9. If you have a question about the material, please email it to: info@advantageceus.com and we will forward it on to the author. For all other questions, or if we can help in any way, please don’t hesitate to contact us at info@advantageceus.com or 405-974-0164.
Pain is often the primary symptom in many physical therapy practices. Pain assessment is a key feature in the physical therapy interview. Pain is now recognized as the “fifth vital sign,” along with blood pressure, temperature, pulse, and respiration.

Recognizing pain patterns that are characteristic of systemic disease is a necessary step in the screening process. Understanding how and when diseased organs can refer pain to the neuromusculoskeletal (NMS) system helps the therapist identify suspicious pain patterns.

This chapter includes a detailed overview of pain patterns that can be used as a foundation for all the organ systems presented. Information will include a discussion of pain types in general and viscerogenic pain patterns specifically. Additional resources for understanding the mechanisms of pain are available.

Each section discusses specific pain patterns characteristic of disease entities that can mimic pain from musculoskeletal or neuromuscular disorders. In the clinical decision-making process the therapist will evaluate information regarding the location, referral pattern, description, frequency, intensity, and duration of systemic pain in combination with knowledge of associated symptoms and relieving and aggravating factors.

This information is then compared with presenting features of primary musculoskeletal disorders that have similar patterns of presentation. Pain patterns of the chest, back, shoulder, scapula, pelvis, hip, groin, and sacroiliac (SI) joint are the most common sites of referred pain from a systemic disease process. These patterns are discussed in greater detail later in this text (see Chapters 14 to 18).

A large component in the screening process is being able to recognize the client demonstrating a significant emotional overlay. Pain patterns from cancer can be very similar to what we have traditionally identified as psychogenic or emotional sources of pain. It is important to know how to differentiate between these two sources of painful symptoms. To help identify psychogenic sources of pain, discussions of conversion symptoms, symptom magnification, and illness behavior are also included in this chapter.

**MECHANISMS OF REFERRED VISCERAL PAIN**

The neurology of visceral pain is not well understood at this time. Proposed models are based on what is known about the somatic (nonvisceral) sensory system. Scientists have not found actual nerve fibers and specific nociceptors in organs. Peripheral mechanisms are suspected. We do know the afferent supply to internal organs is in close proximity to blood vessels along a path similar to the sympathetic nervous system.

Research is ongoing to identify the sites and mechanisms of visceral nociception. During inflammation, increased nociceptive input from an inflamed organ can sensitize neurons that receive convergent input from an unaffected organ, but the site of visceral cross-sensitivity is unknown.

Viscerosensory fibers ascend the anterolateral system to the thalamus with fibers projecting to several regions of the brain. These regions encode the site of origin of visceral pain, although they do it poorly because of low receptor density, large overlapping receptive fields, and extensive convergence in the ascending pathway. Thus the cortex cannot distinguish where the pain messages originate from.

Studies show there may be multiple mechanisms operating at different sites to produce the sensation we refer to as “pain.” The same symptom can be produced by different mechanisms and a single mechanism may cause different symptoms.

In the case of referred pain patterns of viscera, there are three separate phenomena to consider from a traditional Western medicine approach. These are:

- Embryologic development
- Multisegmental innervation
- Direct pressure and shared pathways

**Embryologic Development**

Each system has a bit of its own uniqueness in how pain is referred. For example, the viscera in the abdomen comprise a large percentage of all the organs we have to consider. When a person gives a history of abdominal pain, the location
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axis of the mesenchyme) and are formed at the same time (Fig. 3-2).

When a child is born with any anomaly of the ear(s) or even a missing ear, the medical staff knows to look for possible similar changes or absence of the kidney on the same side.

of the pain may not be directly over the involved organ (Fig. 3-1).

Functional magnetic resonance imaging (fMRI) and other neuroimaging methods have shown activation of the inferolateral postcentral gyrus by visceral pain so the brain has a role in visceral pain patterns. However, it is likely that embryologic development has the primary role in referred pain patterns for the viscera.

Pain is referred to a site where the organ was located in fetal development. Although the organ migrates during fetal development, its nerves persist in referring sensations from the former location.

Organs, such as the kidneys, liver, and intestines, begin forming by 3 weeks when the fetus is still less than the size of a raisin. By day 19, the notochord forming the spinal column has closed and by day 21, the heart begins to beat.

Embryologically, the chest is part of the gut. In other words, they are formed from the same tissue in utero. This explains symptoms of intrathoracic organ pathology frequently being referred to the abdomen as a viscero-viscero reflex. For example, it is not unusual for disorders of thoracic viscera, such as pneumonia or pleuritis, to refer pain that is perceived in the abdomen instead of the chest.

Although the heart muscle starts out embryologically as a cranial structure, the pericardium around the heart is formed from gut tissue. This explains why myocardial infarction or pericarditis can also refer pain to the abdomen.

Another example of how embryologic development impacts the viscera and the soma, consider the ear and the kidney. These two structures have the same shape since they come from the same embryologic tissue (otorenal axis of the mesenchyme) and are formed at the same time (Fig. 3-2).

When a child is born with any anomaly of the ear(s) or even a missing ear, the medical staff knows to look for possible similar changes or absence of the kidney on the same side.
**Multisegmental Innervation**

Multisegmental innervation is the second mechanism used to explain pain patterns of a viscerogenic source (Fig. 3-3). The autonomic nervous system (ANS) is part of the peripheral nervous system. As shown in this diagram, the viscera have multisegmental innervations. The multiple levels of innervation of the heart, bronchi, stomach, kidneys, intestines, and bladder are demonstrated clearly.

There is new evidence to support referred visceral pain to somatic tissues based on overlapping or same segmental projections of spinal afferent neurons to the spinal dorsal horn. This concept is referred to as **visceral-organ cross-sensitization**. The mechanism is likely to be sensitization of viscera-somatic convergent neurons.12

For the first time ever, scientists showed that individuals diagnosed with multiple visceral problems obtained relief...
from pain in all organ systems with overlapping segmental projections when only one visceral area was treated. In other words, nontreated visceral disease significantly decreased when one viscera of the overlapping segments was addressed. For groups of people with no overlapping segments, spontaneous relief of referred pain was not obtained until and unless all involved visceral systems were treated.\(^\text{12}\)

Pain of a visceral origin can be referred to the corresponding somatic areas. The example of cardiac pain is a good one. Cardiac pain is not felt in the heart, but is referred to areas supplied by the corresponding spinal nerves.

Instead of actual physical heart pain, cardiac pain can occur in any structure innervated by C3 to T4 such as the jaw, neck, upper trapezius, shoulder, and arm. Pain of cardiac and diaphragmatic origin is often experienced in the shoulder, in particular, because the C5 spinal segment supplies the heart, respiratory diaphragm, and shoulder.

**Direct Pressure and Shared Pathways**

A third and final mechanism by which the viscera refer pain to the soma is the concept of direct pressure and shared pathways (Fig. 3-4). As shown in this illustration, many of the viscera are near the respiratory diaphragm. Any pathologic process that can inflame, infect, or obstruct the organs can bring them in contact with the respiratory diaphragm.

Anything that impinges the central diaphragm can refer pain to the shoulder and anything that impinges the peripheral diaphragm can refer pain to the ipsilateral costal margins and/or lumbar region (Fig. 3-5).

This mechanism of referred pain through shared pathways occurs as a result of ganglions from each neural system gathering and sharing information through the cord to the plexuses. The visceral organs are innervated through the ANS.
Direct pressure from any inflamed, infected, or obstructed organ in contact with the respiratory diaphragm can refer pain to the ipsilateral shoulder. Note the location of each of the viscera. The spleen is tucked up under the diaphragm on the left side so any impairment of the spleen can cause left shoulder pain. The tail of the pancreas can come in contact with the diaphragm on the left side potentially causing referred pain to the left shoulder. The head of the pancreas can impinge the right side of the diaphragm causing referred pain to the right side. The gallbladder (not shown) is located up under the liver on the right side with corresponding right referred shoulder pain possible. Other organs that can come in contact with the diaphragm in this way include the heart and the kidneys.

The ganglions bring in information from around the body. The nerve plexuses decide how to respond to this information (what to do) and give the body finely-tuned, local control over responses.

Plexuses originate in the neck, thorax, diaphragm, and abdomen, terminating in the pelvis. The brachial plexus supplies the upper neck and shoulder while the phrenic nerve innervates the respiratory diaphragm. More distally, the celiac plexus supplies the stomach and intestines. The neurologic supply of the plexuses is from parasympathetic fibers from the vagus and pelvic splanchnic nerves.\(^4\)

The plexuses work independently of each other but not independently of the ganglia. The ganglia collect information derived from both the parasympathetic and the sympathetic fibers. The ganglia deliver this information to the plexuses; it is the plexuses that provide fine, local control in each of the organ systems.\(^4\)

For example, the lower portion of the heart is in contact with the center of the diaphragm. The spleen on the left side of the body is tucked up under the dome of the diaphragm. The kidneys (on either side) and the pancreas in the center are in easy reach of some portion of the diaphragm.

The body of the pancreas is in the center of the human body. The tail rests on the left side of the body. If an infection, inflammation, or tumor or other obstruction distends the pancreas, it can put pressure on the central part of the diaphragm.

Since the phrenic nerve (C3-5) innervates the central zone of the diaphragm, as well as part of the pericardium, the gallbladder, and the pancreas, the client with impairment of these viscera can present with signs and symptoms in any of the somatic areas supplied by C3-5 (e.g., shoulder).

In other words, the person can experience symptoms in the areas innervated by the same nerve pathways. So a problem affecting the pancreas can look like a heart problem, a gallbladder problem, or a mid-back/scapular or shoulder problem.

Most often, clients with pancreatic disease present with the primary pain pattern associated with the pancreas (i.e., left epigastric pain or pain just below the xiphoid process). The somatic presentation of referred pancreatic pain to the shoulder or back is uncommon, but it is the unexpected, referred pain patterns that we see in a physical or occupational therapy practice.

Another example of this same phenomenon occurs with peritonitis or gallbladder inflammation. These conditions can irritate the phrenic endings in the central part of the diaphragmatic peritoneum. The client can experience referred shoulder pain due to the root origin shared in common by the phrenic and supraclavicular nerves.

Not only is it true that any structure that touches the diaphragm can refer pain to the shoulder, but even structures adjacent to or in contact with the diaphragm in utero can do the same. Keep in mind there has to be some impairment of that structure (e.g., obstruction, distention, inflammation) for this to occur (Case Example 3-1).

**ASSESSMENT OF PAIN AND SYMPTOMS**

The interviewing techniques and specific questions for pain assessment are outlined in this section. The information
gathered during the interview and examination provides a description of the client that is clear, accurate, and comprehensive. The therapist should keep in mind cultural rules and differences in pain perception, intensity, and responses to pain found among various ethnic groups.  

Measuring pain and assessing pain are two separate issues. A measurement assigns a number or value to give dimension to pain intensity.  

A comprehensive pain assessment includes a detailed health history, physical exam, medication history (including nonprescription drug use and complementary and alternative therapies), assessment of functional status, and consideration of psychosocial-spiritual factors.  

The portion of the core interview regarding a client’s perception of pain is a critical factor in the evaluation of signs and symptoms. Questions about pain must be understood by the client and should be presented in a nonjudgmental manner. A record form may be helpful to standardize pain assessment with each client (Fig. 3–6).  

To elicit a complete description of symptoms from the client, the physical therapist may wish to use a term other than pain. For example, referring to the client’s symptoms or using descriptors such as hurt or sore may be more helpful with some individuals. Burning, tightness, heaviness, discomfort, and aching are just a few examples of other possible word choices. The use of alternative words to describe a client’s symptoms may also aid in refocusing attention away from pain and toward improvement of functional abilities.  

If the client has completed the McGill Pain Questionnaire (see discussion of McGill Pain Questionnaire in this chapter), the physical therapist may choose the most appropriate alternative word selected by the client from the list to refer to the symptoms (Table 3–1).  

**Pain Assessment in the Older Adult**  

Pain is an accepted part of the aging process, but we must be careful to take the reports of pain from older persons as serious and very real and not discount the symptoms as part of aging. Well over half of the older adults in the United States report chronic joint symptoms. We are likely to see pain more often as a key feature among older adults as our population continues to age.  

The American Geriatrics Society (AGS) reports the use of over-the-counter (OTC) analgesic medications for pain, aching, and discomfort is common in older adults along with routine use of prescription drugs. Many older adults have taken these medications for 6 months or more.  

**CASE EXAMPLE 3–1**  

**Mechanism of Referred Pain**  

A 72-year-old woman has come to physical therapy for rehabilitation after cutting her hand and having a flexor tendon repair. She uses a walker to ambulate, reports being short of breath “her whole life,” and takes the following prescription and over-the-counter (OTC) medications:  

- Feldene  
- Vioxx  
- Ativan  
- Glucosamine  
- Ibuprofen “on bad days”  
- Furosemide  
- And one other big pill once a week on Sunday “for my bones”  

During the course of evaluating and treating her hand, she reports constant, aching pain in her right shoulder and a sharp, tingling, burning sensation behind her armpit (also on the right side). She does not have any associated bowel or bladder signs and symptoms, but reports excessive fatigue “since the day I was born.”  

You suspect the combination of Feldene and Ibuprofen along with long-term use of Vioxx may be a problem.  

**What Is the Most Likely Mechanism of Pain: Embryologic Development, Multisegmental Innervation of the Stomach and Duodenum, or Direct Pressure on the Diaphragm?**  

Even though Vioxx is a cyclooxygenase-2 (COX-2) inhibitor and less likely to cause problems, gastritis and gastrointestinal (GI) bleeding are still possible, especially with chronic long-term use of multiple nonsteroidal antiinflammatory drugs (NSAIDs).  

Retroperitoneal bleeding from peptic ulcer can cause referred pain to the back at the level of the lesion (T6–10) or right shoulder and/or upper trapezius pain. Shoulder pain may be accompanied by sudomotor changes such as burning, gnawing, or cramping pain along the lateral border of the scapula. The scapular pain can occur alone as the only symptom.  

Side effects of NSAIDs can also include fatigue, anxiety, depression, paresthesia, fluid retention, tinnitus, nausea, vomiting, dry mouth, and bleeding from the nose, mouth, or under the skin. If peritoneal bleeding is the cause of her symptoms, the mechanism of pain is blood in the posterior abdominal cavity irritating the diaphragm through direct pressure.  

Be sure to take the client’s vital signs and observe for significant changes in blood pressure and pulse. Poor wound healing and edema (sacral, pedal, hands) may be present. Ask if the same doctor prescribed each medication and if her physician (or physicians) knows which medications she is taking. It is possible that her medications have not been checked or coordinated from before her hospitalization to the present time.  

*Removed from the market in 2004 by Merck & Co., Inc., due to reports of increased risk of cardiovascular events.*
**Pain Assessment Record Form**

<table>
<thead>
<tr>
<th>Client’s name:</th>
<th>Date:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Physician’s diagnosis:</strong></td>
<td><strong>Physical therapist’s diagnosis:</strong></td>
</tr>
<tr>
<td>Medications:</td>
<td></td>
</tr>
</tbody>
</table>

**Onset of pain** (circle one): Was there an:
- Accident
- Injury
- Trauma (violence)
- Specific activity

If yes, describe:

**Characteristics of pain/symptoms:**

**Location** (Show me exactly where your pain/symptom is located):

Do you have any pain or symptoms anywhere else? **Yes** **No**

**Description** (If yes, what does it feel like):

Circle any other words that describe the client’s symptoms:

- Knifelike
- Dull
- Aching
- Other (describe):

- Boring
- Burning
- Throbbing
- Severe pain
- Moderate pain
- Other (describe):

**Frequency** (circle one):
- Constant
- Intermittent (comes and goes)

If constant: Do you have this pain right now? **Yes** **No**

If intermittent: How often is the pain present (circle all that apply):
- Hourly
- Once/daily
- Twice/daily
- Unpredictable
- Other (please describe): ________________

**Intensity:** *Numeric Rating Scale* and the *Faces Pain Scale*

**Instructions:** On a scale from 0 to 10 with zero meaning ‘No pain’ and 10 for ‘Unbearable pain,’ how would you rate your pain right now?

**Intensity:** *Visual Analog Scale*

**Instructions:** On the line below, put a mark (or point to) the place on the line between ‘Pain free’ and ‘Worst possible pain’ that best describes/shows how much pain you are having right now.

**Fig. 3-6** Pain Assessment Record Form. Use this form to complete the pain history and obtain a description of the pain pattern. The form is printed in the Appendix for your use. This form may be copied and used without permission. (From Carlsson AM: Assessment of chronic pain. I. Aspects of the reliability and validity of the visual analogue scale, Pain 16(1):87–101, 1983. Used with permission.)
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**Duration:**
How long does your pain (name the symptom) last?

<table>
<thead>
<tr>
<th>Aggravating factors (What makes it worse?)</th>
<th>Relieving factors (What makes it better?)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Duration:</strong></td>
<td><strong>Relieving factors (What makes it better?)</strong></td>
</tr>
<tr>
<td>How long does your pain (name the symptom) last?</td>
<td></td>
</tr>
<tr>
<td>____________________________________________________________________________________</td>
<td></td>
</tr>
</tbody>
</table>

**Pattern**
Has the pain changed since it first began?  Yes  No
If yes, please explain:

What is your pain/symptom like from morning (am) to evening (pm)?

<table>
<thead>
<tr>
<th>Circle one:</th>
<th>Worse in the morning</th>
<th>Worse midday/afternoon</th>
<th>Worse at night</th>
</tr>
</thead>
<tbody>
<tr>
<td>Circle one:</td>
<td>Gradually getting better</td>
<td>Gradually getting worse</td>
<td>Staying the same</td>
</tr>
<tr>
<td>Circle all that apply:</td>
<td>Present upon waking up</td>
<td>Keeps me from falling asleep</td>
<td>Wakes me up at night</td>
</tr>
</tbody>
</table>

**Therapist:** Record any details or description about night pain. See also Appendix for Screening Questions for Night Pain when appropriate:

**Associated symptoms** (What other symptoms have you had with this problem?)

Circle any words the client uses to describe his/her symptoms. If the client says there are no other symptoms ask about the presence of any of the following:

<table>
<thead>
<tr>
<th>Burning</th>
<th>Difficulty breathing</th>
<th>Shortness of breath</th>
<th>Cough</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin rash (or other lesions)</td>
<td>Change in bowel/bladder</td>
<td>Difficulty swallowing</td>
<td>Painful swallowing</td>
</tr>
<tr>
<td>Dizziness</td>
<td>Heart palpitations</td>
<td>Hoarseness</td>
<td>Nausea/vomiting</td>
</tr>
<tr>
<td>Diarrhea</td>
<td>Constipation</td>
<td>Bleeding of any kind</td>
<td>Sweats</td>
</tr>
<tr>
<td>Numbness</td>
<td>Problems with vision</td>
<td>Tingling</td>
<td>Weakness</td>
</tr>
<tr>
<td>Joint pain</td>
<td>Weight loss/gain</td>
<td>Other:__________________________</td>
<td></td>
</tr>
</tbody>
</table>

**Final question:** Are there any other pain or symptoms of any kind anywhere else in your body that we have not talked about yet?

**For the therapist:**
**Follow up questions can include:**
Are there any positions that make it feel better? Worse?
How does rest affect the pain/symptoms?
How does activity affect the pain/symptoms?
How has this problem affected your daily life at work or at home?
Has this problem affected your ability to care for yourself without assistance (e.g. dress, bathe, cook, drive)?
Has this problem affected your sexual function or activity?

**Therapist’s evaluation:**
Can you reproduce the pain by squeezing or palpating the symptomatic area?
Does resisted motion reproduce the pain/symptoms?
Is the client taking NSAIDs? Experiencing increased symptoms after taking NSAIDs?
If taking NSAIDs, is the client at risk for peptic ulcer? Check all that apply:
- Age > 65 years
- History of peptic ulcer disease or GI disease
- Smoking, alcohol use
- Oral corticosteroid use
- Anticoagulation or use of other anticoagulants (even when used for heart patients at a lower dose, e.g., 81 to 325 mg aspirin/day)
- Renal complications in clients with hypertension or congestive heart failure (CHF) or who use diuretics or ACE inhibitors
- NSAIDs combined with selective serotonin reuptake inhibitors (SSRIs; antidepressants such as Prozac, Zoloft, Celexa, Paxil)
- Use of acid suppressants (e.g., H2-receptor antagonists, antacids)

**Other areas to consider:**
- Sleep quality
- Bowel/bladder habits
- Correlation of symptoms with peak effect of medications (dosage, time of day)
- Depression or anxiety screening score
- For women: correlation of symptoms with menstrual cycle

**Fig. 3-6, cont’d**
Older adults may avoid giving an accurate assessment of their pain. Some may expect pain with aging or fear that talking about pain will lead to expensive tests or medications with unwanted side effects. Fear of losing one’s independence may lead others to underreport pain symptoms. Sensory and cognitive impairment in older, frail adults makes communication and pain assessment more difficult. The client may still be able to report pain levels reliably using visual analogue scales in the early stages of dementia. Improving an older adult’s ability to report pain may be as simple as making sure the client has his or her glasses and/or hearing aid.

The Verbal Descriptor Scale (VDS) (Box 3-1) may be the most sensitive and reliable among older adults, including those with mild-to-moderate cognitive impairment. But these and other pain scales rely on the client’s ability to understand the scale and communicate a response. As dementia progresses, these abilities are lost as well.

A client with Alzheimer’s-type dementia loses short-term memory and cannot always identify the source of recent painful stimuli. The Alzheimer’s Discomfort Rating Scale may be more helpful for older adults who are unable to communicate their pain. The therapist records the frequency, intensity, and duration of the client’s discomfort based on the presence of noisy breathing, facial expressions, and overall body language.

Another tool under investigation is the Pain Assessment in Advanced Dementia (PAINAD) scale. The PAINAD scale is a simple, valid, and reliable instrument for measurement of pain in noncommunicative clients developed by the same author as the Alzheimer’s Discomfort Rating Scale. A disadvantage of this pain scale is that the pain is inferred by the examiner or caregiver rather than self-reported directly by the individual experiencing the pain.

Facial grimacing; nonverbal vocalization such as moans, sighs, or gasps; and verbal comments (e.g., ouch, stop) are the most frequent behaviors among cognitively impaired older adults during painful movement (Box 3-2). Bracing, holding onto furniture, or clutching the painful area are other behavioral indicators of pain. Alternately, the client may resist care by others or stay very still to guard against pain caused by movement.

Untreated pain in an older adult with advanced dementia can lead to secondary problems such as sleep disturbances, weight loss, dehydration, and depression. Pain may be manifested as agitation and increased confusion.

Older adults are more likely than younger adults to have what is referred to as atypical acute pain. For example, silent acute myocardial infarction (MI) occurs more often in the older adult than in the middle-aged to early senior adult. Likewise, the older adult is more likely to experience appendicitis without any abdominal or pelvic pain.

**Pain Assessment in the Young Child**

Many infants and children are unable to report pain. Even so the therapist should not underestimate or prematurely conclude that a young client is unable to answer any questions about pain. Even some clients (both children and adults) with substantial cognitive impairment may be able to use pain-rating scales when explained carefully.

The Faces Pain Scale (FACES or FPS) for children (see Fig. 3-6) was first presented in the 1980s. It has since been revised (FPS-R) and presented concurrently by other researchers with similar assessment measures.

Most of the pilot work for the FPS was done informally with children from preschool through young school age. Researchers have used the FPS scale with adults, especially the elderly, and have had successful results. Advantages of the...
Characteristics of Pain

It is very important to identify how the client’s description of pain as a symptom relates to sources and types of pain discussed in this chapter. Many characteristics of pain can be elicited from the client during the Core Interview to help define the source or type of pain in question. These characteristics include:

- Location
- Description of sensation
- Intensity
- Duration
- Frequency and duration
- Pattern

Other additional components are related to factors that aggravate the pain, factors that relieve the pain, and other symptoms that may occur in association with the pain. Specific questions are included in this section for each descriptive component. Keep in mind that an increase in frequency, intensity, or duration of symptoms over time can indicate systemic disease.

Location of Pain

Questions related to the location of pain focus the client’s description as precisely as possible. An opening statement might be as follows:

- Show me exactly where your pain is located.
- Do you have any other pain or symptoms anywhere else?
- If yes, what causes the pain or symptoms to occur in this other area?

If the client points to a small, localized area and the pain does not spread, the cause is likely to be a superficial lesion and is probably not severe. If the client points to a small, localized area but the pain does spread, this is more likely to be diffuse, segmental, referred pain that may originate in the viscera or deep somatic structure.

The character and location of pain can change and the client may have several pains at once, so repeated pain assessment may be needed.

Description of Pain

To assist the physical therapist in obtaining a clear description of pain sensation, pose the question:

- What does it feel like?

After giving the client time to reply, offer some additional choices in potential descriptors. You may want to ask: Is your pain/Are your symptoms:
• Knifelike
• Boring
• Throbbing
• Deep aching

Follow-up questions may include:
• Has the pain changed in quality since it first began?
• Changed in intensity?
• Changed in duration (how long it lasts)?

When a client describes the pain as knifelike, boring, colicky, coming in waves, or a deep aching feeling, this description should be a signal to the physical therapist to consider the possibility of a systemic origin of symptoms. Dull, somatic pain of an aching nature can be differentiated from the aching pain of a muscular lesion by squeezing or by pressing the muscle overlying the area of pain. Resisting motion of the limb may also reproduce aching of muscular origin that has no connection to deep somatic aching.

Intensity of Pain

The level or intensity of the pain is an extremely important but difficult component to assess in the overall pain profile. Psychologic factors may play a role in the different ratings of pain intensity measured between African Americans and Caucasians. African Americans tend to rate pain as more unpleasant and more intense than whites, possibly indicating a stronger link between emotions and pain behavior for African Americans compared with Caucasians. A

The same difference is observed between women and men. Likewise, pain intensity is reported as less when the affected individual has some means of social or emotional support.

Assist the client with this evaluation by providing a rating scale. You may use one or more of these scales, depending on the clinical presentation of each client (see Fig. 3-6). Show the pain scale to your client. Ask the client to choose a number and/or a face that best describes his or her current pain level. You can use this scale to quantify symptoms other than pain such as stiffness, pressure, soreness, discomfort, cramping, aching, numbness, tingling, and so on. Always use the same scale for each follow-up assessment.

The Visual Analog Scale (VAS) allows the client to choose a point along a 10-cm (100 mm) horizontal line (see Fig. 3-6). The left end represents “No pain” and the right end represents “Pain as bad as it could possibly be” or “Worst Possible Pain.” This same scale can be presented in a vertical orientation for the client who must remain supine and cannot sit up for the assessment. “No pain” is placed at the bottom, and “Worst pain” is put at the top.

The VAS scale is easily combined with the numeric rating scale with possible values ranging from 0 (no pain) to 10 (worst imaginable pain). It can be used to assess current pain, worst pain in the preceding 24 hours, least pain in the past 24 hours, or any combination the clinician finds useful.

The Numeric Rating Scale (NRS; see Fig. 3-6) allows the client to rate the pain intensity on a scale from 0 (no pain) to 10 (the worst pain imaginable). This is probably the most commonly used pain rating scale in both the inpatient and outpatient settings. It is a simple and valid method of measuring pain.

Although the scale was tested and standardized using 0 to 10, the plus is used for clients who indicate the pain is “off the scale” or “higher than a 10.” Some health care professionals prefer to describe 10 as “worst pain experienced with this condition” to avoid needing a higher number than 10.

This scale is especially helpful for children or cognitively impaired clients. In general, even adults without cognitive impairments may prefer to use this scale.

An alternative method provides a scale of 1 to 5 with word descriptions for each number and asks:

FOLLOW-UP QUESTIONS

• How strong is your pain?
  1 = Mild
  2 = Discomforting
  3 = Distressing
  4 = Horrible
  5 = Excruciating

This scale for measuring the intensity of pain can be used to establish a baseline measure of pain for future reference. A client who describes the pain as “excruciating” (or a 5 on the scale) during the initial interview may question the value of therapy when several weeks later there is no subjective report of improvement.

A quick check of intensity by using this scale often reveals a decrease in the number assigned to pain levels. This can be compared with the initial rating, thus providing the client with assurance and encouragement in the rehabilitation process. A quick assessment using this method can be made by asking:

FOLLOW-UP QUESTIONS

• How strong is your pain?
  1 = Mild
  2 = Moderate
  3 = Severe

The description of intensity is highly subjective. What might be described as “mild” for one person could be “horrible” for another person. Careful assessment of the person’s nonverbal behavior (e.g., ease of movement, facial grimacing, guarding movements) and correlation of the person’s personality with his or her perception of the pain may help to clarify the description of the intensity of the pain. Pain of an intense, unrelenting (constant) nature is often associated with systemic disease.
The pattern of pain associated with systemic disease is often a progressive pattern with a cyclical onset (i.e., the client describes symptoms as being alternately worse, better, and worse over a period of months). When there is back pain, this pattern differs from the sudden sequestration of a discogenic lesion that appears with a pattern of increasingly worse symptoms followed by a sudden cessation of all symptoms. Such involvement of the disk occurs without the cyclical return of symptoms weeks or months later, which is more typical of a systemic disorder.

If the client appears to be unsure of the pattern of symptoms or has “avoided paying any attention” to this component of pain description, it may be useful to keep a record at home assisting the client to take note of the symptoms for 24 hours. A chart such as the McGill Home Recording Card¹⁶ (Fig. 3-7) may help the client outline the existing pattern of the pain and can be used later in the episode of care to assist the therapist in detecting any change in symptoms or function.

There is also a Short-Form McGill Pain Questionnaire that has been validated for use to assess treatment response. It is designed to measure all kinds of pain—both neuropathic and nonneuropathic—using a numeric rating scale to assess 22 pain descriptors from zero (none) to 10 (worst possible).⁴⁷

Medications can alter the pain pattern or characteristics of painful symptoms. Find out how well the client’s current medications reduce, control, or relieve pain. Ask how often medications are needed for breakthrough pain.

When using any of the pain rating scales, record the use of any medications that can alter or reduce pain or symptoms such as antiinflammatories or analgesics. At the same time remember to look for side effects or adverse reactions to any drugs or drug combinations.

Watch for clients taking nonsteroidal antiinflammatory drugs (NSAIDs) who experience an increase in shoulder, neck, or back pain several hours after taking the medication. Normally, one would expect symptom relief from NSAIDs so any increase in symptoms is a red flag for possible peptic ulcer.
SECTION I  Introduction to the Screening Process

Aggravating and Relieving Factors

A series of questions addressing aggravating and relieving factors must be included such as:

°FOLLOW-UP QUESTIONS

- What brings your pain (symptoms) on?
- What kinds of things make your pain (symptoms) worse (e.g., eating, exercise, rest, specific positions, excitement, stress)?

To assess relieving factors, ask:
- What makes the pain better?

Follow-up questions include:
- How does rest affect the pain/symptoms?
- Are your symptoms aggravated or relieved by any activities?
- If yes, what?
- How has this problem affected your daily life at work or at home?
- How has this problem affected your ability to care for yourself without assistance (e.g., dress, bathe, cook, drive)?

The McGill Pain Questionnaire also provides a chart (Fig. 3-8) that may be useful in determining the presence of relieving or aggravating factors.
CHAPTER 3  Pain Types and Viscerogenic Pain Patterns

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any associated symptoms, such as those mentioned here, would require contact with the physician to confirm the physician’s knowledge of these symptoms.

In summary, careful, sensitive, and thorough questioning regarding the multifaceted experience of pain can elicit essential information necessary when making a decision regarding treatment or referral. The use of pain assessment tools such as Fig. 3-6 and Table 3-2 may facilitate clear and accurate descriptions of this critical symptom.

SOURCES OF PAIN

Between the twentieth and twenty-first centuries, the science of clinical pain assessment and management made a significant paradigm shift from an empiric approach to one that is based on identifying and understanding the actual mechanisms involved in the pathogenesis of pain.

The implications of this are immense as we move from classifying pain on the basis of disease, duration, and body part or anatomy to a mechanism-based classification. In this approach the major goal of assessment is to identify the pathophysiologic mechanism of the pain and use this information to plan appropriate intervention.9,48

Physical therapists frequently see clients whose primary complaint is pain, which often leads to a loss of function. However, focusing on sources of pain does not always help us to identify the causes of tissue irritation.

The most effective physical therapy diagnosis will define the syndrome and address the causes of pain rather than just identifying the sources of pain.49 Usually, a careful assessment of pain behavior is invaluable in determining the nature and extent of the underlying pathology.

Systemic pain tends to be relieved minimally, relieved only temporarily, or unrelieved by change in position or by rest. However, musculoskeletal pain is often relieved both by a change of position and by rest.

Associated Symptoms

These symptoms may occur alone or in conjunction with the pain of systemic disease. The client may or may not associate these additional symptoms with the chief complaint. The physical therapist may ask:

FOLLOW-UP QUESTIONS

- What other symptoms have you had that you can associate with this problem?

If the client denies any additional symptoms, follow-up this question with a series of possibilities such as:

<table>
<thead>
<tr>
<th>Burning</th>
<th>Difficulty in breathing</th>
<th>Difficulty in swallowing</th>
<th>Dizziness</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart palpitations</td>
<td>Hoarseness</td>
<td>Nausea</td>
<td>Night sweets</td>
</tr>
<tr>
<td>Numbness/Tingling</td>
<td>Problems with vision</td>
<td>Vomiting</td>
<td>Weakness</td>
</tr>
</tbody>
</table>

Whenever the client says “yes” to such associated symptoms, check for the presence of these symptoms bilaterally. Additionally, bilateral weakness, either proximally or distally, should serve as a red flag possibly indicative of more than a musculoskeletal lesion.

Blurred vision, double vision, scotomas (black spots before the eyes), or temporary blindness may indicate early symptoms of multiple sclerosis or may possibly be warning signs of an impending cerebrovascular accident. The presence of any associated symptoms, such as those mentioned here, would require contact with the physician to confirm the physician’s knowledge of these symptoms.

In summary, careful, sensitive, and thorough questioning regarding the multifaceted experience of pain can elicit essential information necessary when making a decision regarding treatment or referral. The use of pain assessment tools such as Fig. 3-6 and Table 3-2 may facilitate clear and accurate descriptions of this critical symptom.
The clinical evaluation of pain usually involves identification of the primary disease/etiological factor(s) considered responsible for producing or initiating the pain. The client is placed within a broad pain category usually labeled as nociceptive, inflammatory, or neuropathic pain (see Table 3-4). Pain and sensory disturbances associated with central changes (sensitization) may be present with chronic pain. It can be difficult in clinical practice to specify which of these, alone or in combination, may be present.

We further classify the pain by identifying the anatomic distribution, quality, and intensity of the pain. Such an approach allows for physical therapy interventions for each identified mechanism involved.

From a screening perspective, we look at the possible sources of pain and types of pain. When listening to the client’s description of pain, consider these possible sources of pain (Table 3-3):

- Cutaneous
- Somatic
- Visceral
- Neuropathic
- Referred

### TABLE 3-2 Comparison of Systemic Versus Musculoskeletal Pain Patterns

<table>
<thead>
<tr>
<th>Systemic Pain</th>
<th>Musculoskeletal Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Onset</td>
<td>May be sudden or gradual, depending on the history</td>
</tr>
<tr>
<td>Description</td>
<td>• Recent, sudden</td>
</tr>
<tr>
<td></td>
<td>• Does not present as observed for years without progression of symptoms</td>
</tr>
<tr>
<td></td>
<td>• Knifelike quality of stabbing from the inside out, boring, deep aching</td>
</tr>
<tr>
<td></td>
<td>• Cutting, gnawing</td>
</tr>
<tr>
<td></td>
<td>• Throbbing</td>
</tr>
<tr>
<td></td>
<td>• Bone pain</td>
</tr>
<tr>
<td></td>
<td>• Unilateral or bilateral</td>
</tr>
<tr>
<td>Intensity</td>
<td>• Usually unilateral</td>
</tr>
<tr>
<td></td>
<td>• May be stiff after prolonged rest, but pain level decreases</td>
</tr>
<tr>
<td></td>
<td>• Achy, cramping pain</td>
</tr>
<tr>
<td></td>
<td>• Local tenderness to pressure is present</td>
</tr>
<tr>
<td>Duration</td>
<td>• May be mild to severe</td>
</tr>
<tr>
<td></td>
<td>• May depend on the person’s anxiety level—the level of pain may increase in a client fearful of a “serious” condition</td>
</tr>
<tr>
<td></td>
<td>• Duration can be modified by rest or change in position</td>
</tr>
<tr>
<td></td>
<td>• May be constant but is more likely to be intermittent, depending on the activity or the position</td>
</tr>
<tr>
<td>Pattern</td>
<td>• Restriction of active/passive/accessory movement(s) observed</td>
</tr>
<tr>
<td></td>
<td>• One or more particular movements “catch” the client and aggravate the pain</td>
</tr>
<tr>
<td></td>
<td>• Although constant, may come in waves</td>
</tr>
<tr>
<td></td>
<td>• Gradually progressive, cyclical</td>
</tr>
<tr>
<td></td>
<td>• Night pain</td>
</tr>
<tr>
<td></td>
<td>• Location: chest/shoulder</td>
</tr>
<tr>
<td></td>
<td>• Accompanied by shortness of breath, wheezing</td>
</tr>
<tr>
<td></td>
<td>• Eating alters symptoms</td>
</tr>
<tr>
<td></td>
<td>• Sitting up relieves symptoms (decreases venous return to the heart; possible pulmonary or cardiovascular etiology)</td>
</tr>
<tr>
<td></td>
<td>• Symptoms unrelieved by rest or change in position</td>
</tr>
<tr>
<td></td>
<td>• Migratory arthralgias: Pain/symptoms last for 1 week in one joint, then resolve and appear in another joint</td>
</tr>
<tr>
<td>Aggravating Factors</td>
<td>• Altered by movement; pain may become worse with movement or some myalgia decreases with movement</td>
</tr>
<tr>
<td></td>
<td>• Cannot alter, provoke, alleviate, eliminate, aggravate the symptoms</td>
</tr>
<tr>
<td></td>
<td>• Organ dependent (examples):</td>
</tr>
<tr>
<td></td>
<td>• Esophagus—eating or swallowing affects symptoms</td>
</tr>
<tr>
<td></td>
<td>• Heart—cold, exertion, stress, heavy meal (especially when combined) bring on symptoms</td>
</tr>
<tr>
<td></td>
<td>• Gastrointestinal (GI)—peristalsis (eating) affects symptoms</td>
</tr>
<tr>
<td>Releasing Factors</td>
<td>• Symptoms reduced or relieved by rest or change in position</td>
</tr>
<tr>
<td></td>
<td>• Muscle pain is relieved by short periods of rest without resulting stiffness, except in the case of fibromyalgia; stiffness may be present in older adults</td>
</tr>
<tr>
<td></td>
<td>• Stretching</td>
</tr>
<tr>
<td></td>
<td>• Heat, cold</td>
</tr>
</tbody>
</table>
### Table 3-2: Comparison of Systemic Versus Musculoskeletal Pain Patterns—cont’d

<table>
<thead>
<tr>
<th>Systemic Pain</th>
<th>Musculoskeletal Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Associated Signs and Symptoms</strong></td>
<td><strong>Usually none, although stimulation of trigger points (TrPs) may cause sweating, nausea, blanching</strong></td>
</tr>
<tr>
<td>• Fever, chills</td>
<td></td>
</tr>
<tr>
<td>• Sweats (at any time day or night)</td>
<td></td>
</tr>
<tr>
<td>• Unusual vital signs</td>
<td></td>
</tr>
<tr>
<td>• Warning signs of cancer (see Chapter 13)</td>
<td></td>
</tr>
<tr>
<td>• GI symptoms: Nausea, vomiting, anorexia, unexplained weight loss, diarrhea, constipation</td>
<td></td>
</tr>
<tr>
<td>• Early satiety (feeling full after eating)</td>
<td></td>
</tr>
<tr>
<td>• Bilateral symptoms (e.g., paresthesias, weakness, edema, nailbed changes, skin rash)</td>
<td></td>
</tr>
<tr>
<td>• Painless weakness of muscles: more often proximal but may occur distally</td>
<td></td>
</tr>
<tr>
<td>• Dyspnea (breathlessness at rest or after mild exertion)</td>
<td></td>
</tr>
<tr>
<td>• Diaphoresis (excessive perspiration)</td>
<td></td>
</tr>
<tr>
<td>• Headaches, dizziness, fainting</td>
<td></td>
</tr>
<tr>
<td>• Visual disturbances</td>
<td></td>
</tr>
<tr>
<td>• Skin lesions, rashes, or itching that the client may not associate with the musculoskeletal symptoms</td>
<td></td>
</tr>
<tr>
<td>• Bowel/bladder symptoms</td>
<td></td>
</tr>
<tr>
<td>• Hematuria (blood in the urine)</td>
<td></td>
</tr>
<tr>
<td>• Nocturia</td>
<td></td>
</tr>
<tr>
<td>• Urgency (sudden need to urinate)</td>
<td></td>
</tr>
<tr>
<td>• Frequency</td>
<td></td>
</tr>
<tr>
<td>• Melena (blood in feces)</td>
<td></td>
</tr>
<tr>
<td>• Fecal or urinary incontinence</td>
<td></td>
</tr>
<tr>
<td>• Bowel smears</td>
<td></td>
</tr>
</tbody>
</table>

### Table 3-3: Sources of Pain, Pain Types, and Pain Patterns

<table>
<thead>
<tr>
<th>Sources</th>
<th>Types</th>
<th>Characteristics/Patterns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cutaneous</td>
<td>Tension</td>
<td>Client describes:</td>
</tr>
<tr>
<td>Deep somatic</td>
<td>Inflammatory</td>
<td>• Location/onset</td>
</tr>
<tr>
<td>Visceral</td>
<td>Ischemic</td>
<td>• Description</td>
</tr>
<tr>
<td>Neuropathic</td>
<td>Myofascial pain</td>
<td>• Frequency</td>
</tr>
<tr>
<td>Referred</td>
<td>• Muscle tension</td>
<td>• Duration</td>
</tr>
<tr>
<td></td>
<td>• Muscle spasm</td>
<td>• Intensity</td>
</tr>
<tr>
<td></td>
<td>• Trigger points (TrPs)</td>
<td>Therapist recognizes the pattern:</td>
</tr>
<tr>
<td></td>
<td>• Muscle deficiency (weakness and stiffness)</td>
<td>• Vascular</td>
</tr>
<tr>
<td></td>
<td>• Muscle trauma</td>
<td>• Neurogenic</td>
</tr>
<tr>
<td></td>
<td>Joint pain</td>
<td>• Musculoskeletal/spondylotic</td>
</tr>
<tr>
<td></td>
<td>• Drug-induced</td>
<td>• Visceral</td>
</tr>
<tr>
<td></td>
<td>• Chemical exposure</td>
<td>• Emotional</td>
</tr>
<tr>
<td></td>
<td>• Inflammatory bowel disease</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Septic arthritis</td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Reactive arthritis</td>
<td></td>
</tr>
<tr>
<td>Radicular pain</td>
<td>Arterial, pleural, tracheal</td>
<td></td>
</tr>
<tr>
<td>Gastrointestinal pain</td>
<td>Pain at rest</td>
<td></td>
</tr>
<tr>
<td>Night pain</td>
<td>Pain with activity</td>
<td></td>
</tr>
<tr>
<td>Diffuse pain</td>
<td>Chronic pain</td>
<td></td>
</tr>
</tbody>
</table>

### Cutaneous Sources of Pain

Cutaneous pain (related to the skin) includes superficial somatic structures located in the skin and subcutaneous tissue. The pain is well localized as the client can point directly to the area that “hurts.” Pain from a cutaneous source can usually be localized with one finger. Skin pain or tenderness can be associated with referred pain from the viscera or referred from deep somatic structures.

Impairment of any organ can result in sudomotor changes that present as trophic changes such as itching, dysesthesia, skin temperature changes, or dry skin. The difficulty is that...
Somatic Sources of Pain

Somatic pain can be superficial or deep. Somatic pain is labeled according to its source as deep somatic, somatovisceral, somatoemotional (also referred to as psychosomatic), or viscerosomatic.

Most of what the therapist treats is part of the somatic system whether we call that the neuromuscular system, the musculoskeletal system, or the NMS system. When psychologic disorders present as somatic dysfunction, we refer to these conditions as psychophysologic disorders.

Psychophysologic disorders, including somatiform disorders, are discussed in detail elsewhere. Superficial somatic structures involve the skin, superficial fasciae, tendon sheaths, and periosteum. Deep somatic pain comes from pathologic conditions of the periosteum and cancellous (spongy) bone, nerves, muscles, tendons, ligaments, and blood vessels. Deep somatic structures also include deep fasciae and joint capsules. Somatic referred pain does not involve stimulation of nerve roots. It is produced by stimulation of nerve endings within the superficial and deep somatic structures just mentioned.

Somatic referred pain is usually reported as dull, aching, or gnawing or described as an expanding pressure too diffuse to localize. There are no neurologic signs associated with somatic referred pain since this type of pain is considered nociceptive and is not caused by compression of spinal nerves or nerve root. It is possible to have combinations of pain and neurologic findings when more than one pathway is involved.

Deep somatic pain is poorly localized and may be referred to the body surface, becoming cutaneous pain. It can be associated with an autonomic phenomenon, such as sweating, pallor, or changes in pulse and blood pressure, and is commonly accompanied by a subjective feeling of nausea and faintness.

Pain associated with deep somatic lesions follows patterns that relate to the embryologic development of the musculoskeletal system. This explains why such pain may not be perceived directly over the involved organ (see Fig. 3-1).

Parietal pain (related to the wall of the chest or abdominal cavity) is also considered deep somatic. The visceral pleura (the membrane enveloping the organs) is insensitive to pain, but the parietal pleura is well supplied with pain nerve endings. For this reason, it is possible for a client to have extensive visceral disease (e.g., heart, lungs) without pain until the disease progresses enough to involve the parietal pleura.

When we talk about the “psycho-somatic” response, we refer to the mind-body connection.

Somatoemotional or psychosomatic sources of pain occur when emotional or psychologic distress produces physical symptoms either for a relatively brief period or with recurrent and multiple physical manifestations spanning many months or years. The person affected by the latter may be referred to as a somatizer, and the condition is called a somatization disorder.

Two different approaches to somatization have been proposed. One method treats somatization as a phenomenon that is secondary to psychologic distress. This is called presenting somatization. The second defines somatization as a primary event characterized by the presence of medically unexplained symptoms. This model is called functional somatization.

Alternately, there are viscerosomatic sources of pain when visceral structures affect the somatic musculature, such as the reflex spasm and rigidity of the abdominal muscles in response to the inflammation of acute appendicitis or the pectoral trigger point associated with an acute myocardial infarction. These visible and palpable changes in the tension of skin and subcutaneous and other connective tissues that are segmentally related to visceral pathologic processes are referred to as connective tissue zones or reflex zones.

Somatovisceral pain occurs when a myalgic condition causes functional disturbance of the underlying viscera, such as the trigger points (TrPs) of the abdominal muscles, causing diarrhea, vomiting, or excessive burping (Case Example 3-2).

Visceral Sources of Pain

Visceral sources of pain include the internal organs and the heart muscle. This source of pain includes all body organs located in the trunk or abdomen, such as those of the respiratory, digestive, urogenital, and endocrine systems, as well as the spleen, the heart, and the great vessels.

Visceral pain is not well localized for two reasons:
1. Innervation of the viscera is multisegmental.
2. There are few nerve receptors in these structures (see Fig. 3-3).

The pain tends to be poorly localized and diffuse.

Visceral pain is well known for its ability to produce referred pain (i.e., pain perceived in an area other than the site of the stimuli). Referred pain occurs because visceral fibers synapse at the level of the spinal cord close to fibers supplying specific somatic structures. In other words, visceral pain corresponds to dermatomes from which the organ receives its innervations, which may be the same innervations for somatic structures.

For example, the heart is innervated by the C3-T4 spinal nerves. Pain of a cardiac source can affect any part of the soma (body) also innervated by these levels. This is one
reason why someone having a heart attack can experience jaw, neck, shoulder, mid-back, arm, or chest pain and accounts for the many and varied clinical pictures of MI (see Fig. 6–9).

More specifically, the pericardium (sac around the entire heart) is adjacent to the diaphragm. Pain of cardiac and diaphragmatic origin is often experienced in the shoulder because the C5-6 spinal segment (innervation for the shoulder) also supplies the heart and the diaphragm.

Other examples of organ innervations and their corresponding sensory overlap are as follows:

- Sensory fibers to the heart and lungs enter the spinal cord from T1–4 (this may extend to T6).
- Sensory fibers to the gallbladder, bile ducts, and stomach enter the spinal cord at the level of the T7-8 dorsal roots (i.e., the greater splanchnic nerve).
- The peritoneal covering of the gallbladder and/or the central zone of the diaphragm are innervated by the phrenic nerve originating from the C3-5 (phrenic nerve) levels of the spinal cord.
- The phrenic nerve (C3-5) also innervates portions of the pericardium.
- Sensory fibers to the duodenum enter the cord at the T9-10 levels.
- Sensory fibers to the appendix enter the cord at the T10 level (i.e., the lesser splanchnic nerve).
- Sensory fibers to the renal/ureter system enter the cord at the L1-2 level (i.e., the splanchnic nerve).

As mentioned earlier, diseases of internal organs can be accompanied by cutaneous hypersensitivity to touch, pressure, and temperature. This viscerocutaneous reflex occurs during the acute phase of the disease and disappears with its recovery.

The skin areas affected are innervated by the same cord segments as for the involved viscera; they are referred to as Head’s zones. Anytime a client presents with somatic symptoms also innervated by any of these levels, we must consider the possibility of a visceral origin.

Keep in mind that when it comes to visceral pain, the viscera have few nerve endings. The visceral pleura are insensitive to pain. It is not until the organ capsule (deep somatic structure) is stretched (e.g., by a tumor or inflammation) that pain is perceived and possibly localized. This is why changes can occur within the organs without painful symptoms to warn the person. It is not until the organ is inflamed or distended enough from infection or obstruction to impinge nearby structures or the lining of the chest or abdominal cavity that pain is felt.

The neurology of visceral pain is not well understood. There is not a known central processing system unique to visceral pain. Primary afferent fibers innervating the viscera consist entirely of Aδ and C fibers. Nociceptors of the organs are polymodal, responding to heat, chemical stimuli, and mechanical stimuli (e.g., compression, distention). It is known that the afferent supply to internal organs follows a path similar to that of the sympathetic nervous system, often in close proximity to blood vessels. The origins of embryology explain far more of the visceral pain patterns than anything else (see discussion in this chapter).

In the early stage of visceral disease, sympathetic reflexes arising from afferent impulses of the internal viscera may be expressed first as sensory, motor, and/or trophic changes in the skin, subcutaneous tissues, and/or muscles. As mentioned earlier, this can present as itching, dysesthesia, skin temperature changes, or dry skin. The viscera do not perceive pain, but the sensory side is trying to get the message out that something is wrong by creating sympathetic sudomotor changes.

It appears that there is not one specific group of spinal neurons that respond only to visceral inputs. Since messages from the soma and viscera come into the cord at the same level (and sometimes visceral afferents converge over several segments of the spinal cord), the nervous system has trouble deciding: Is it somatic or visceral? It sends efferent information back out to the plexus for change or reaction, but the input results in an unclear impulse at the cord level.
The body may get skin or somatic responses such as muscle pain or aching peristome or it may tell a viscous innervated at the same level to do something it can do (e.g., the stomach increases its acid content). This also explains how sympathetic signals from the liver to the spinal cord can result in itching or other sudomotor responses in the area embryologically related to the liver. 

This somatization of visceral pain is why we must know the visceral pain patterns and the spinal versus visceral inner-
vations. We examine one (somatic) while screening for the other (viscera).

Because the somatic and visceral afferent messages enter at the same level, it is possible to get somatic-somatic reflex responses (e.g., a bruise on the leg causes knee pain), somato-
visceral reflex responses (e.g., a biomechanical dysfunction of the tenth rib can cause gallbladder changes), or viscero-
somatic reflex responses (e.g., gallbladder impairment can result in a sore 10th rib; pelvic floor dysfunction can lead to incontinence; heart attack causes arm or jaw pain). These are actually all referred pain patterns originating in the soma or the viscera.

A more in-depth discussion of the visceral-somatic response is available. A visceral-somatic response can occur when biochemical changes associated with visceral disease affect somatic structures innervated by the same spinal nerves.

Prior to her death, Dr. Janet Travell was researching how people with anginal pain are really experiencing residual pectoralis major TrPs caused by previous episodes of angina or MI. This is another example of the viscero-somatic response mentioned.

A viscero-viscero reflex (also referred to as cross-organ sensitization) occurs when pain or dysfunction in one organ causes symptoms in another organ. For example, the client presents with chest pain and has an extensive cardiac workup with normal findings. The client may be told “it’s not in your heart, so don’t worry about it.”

The problem may really be the gallbladder. Because the gallbladder originates from the same tissue embryologically as the heart, gallbladder impairment can cause cardiac changes in addition to shoulder pain from its contact with the diaphragm. This presentation is then confused with cardiac pathology.

On the other hand, the doctor may do a gallbladder workup and find nothing. The chest pain could be coming from arthritic changes in the cervical spine. This occurs because the cervical spine and heart share common sensory pathways from C3 to the spinal cord.

Information from the cardiac plexus and brachial plexus enter the cord at the same level. The nervous system is not able to identify who sent the message, just what level it came from. It responds as best it can, based on the information present, sometimes resulting in the wrong symptoms for the problem at hand.

Pain and symptoms of a visceral source are usually accompanied by an ANS response such as a change in vital signs, unexplained perspiration (diaphoresis), and/or skin pallor. Signs and symptoms associated with the involved organ system may also be present. We call these associated signs and symptoms. They are red flags in the screening process.

**Neuropathic Pain**

Neuropathic or neurogenic pain results from damage to or pathophysiologic changes of the peripheral or central nervous system (CNS). Neuropathic pain can occur as a result of injury or destruction to the peripheral nerves, pathways in the spinal cord, or neurons located in the brain. Neuropathic pain can be acute or chronic depending on the timeframe.

This type of pain is not elicited by the stimulation of nociceptors or kinesthetic pathways as a result of tissue damage but rather by malfunction of the nervous system itself. Disruptions in the transmission of afferent and efferent impulses in the periphery, spinal cord, and brain can give rise to alterations in sensory modalities (e.g., touch, pressure, temperature), and sometimes motor dysfunction.

It can be drug-induced, metabolic-based, or brought on by trauma to the sensory neurons or pathways in either the peripheral nervous system or CNS. It appears to be idiosyncratic: not all individuals with the same lesion will have pain. Some examples are listed in Table 3-4.
It is usually described as sharp, shooting, burning, tingling, or producing an electric shock sensation. The pain is steady or evoked by some stimulus that is not normally considered noxious (e.g., light touch, cold). Some affected individuals report aching pain. There is no muscle spasm in neurogenic pain. Acute nerve root irritation tends to be severe, described as burning, shooting, and constant. Chronic nerve root pain is more often described as annoying or nagging.

Neuropathic pain is not alleviated by opiates or narcotics, although local anesthesia can provide temporary relief. Medications used to treat neuropathic pain include antidepressants, anticonvulsants, antispasmodics, adrenergics, and anesthetics. Many clients have a combination of neuropathic and somatic pain, making it more difficult to identify the underlying pathology.

**Referred Pain**

By definition, referred pain is felt in an area far from the site of the lesion but supplied by the same or adjacent neural segments. Referred pain occurs by way of shared central pathways for afferent neurons and can originate from any somatic or visceral source (primary cutaneous pain is not usually referred to other parts of the body).

Referred pain can occur alone or with accompanying deep somatic or visceral pain. When caused by an underlying visceral or systemic disease, visceral pain usually precedes the development of referred musculoskeletal pain. However, the client may not remember or mention this previous pain pattern … and the therapist has not asked about the presence of any other symptoms.

Referred pain is usually well localized (i.e., the person can point directly to the area that hurts), but it does not have sharply defined borders. It can spread or radiate from its point of origin. Local tenderness is present in the tissue of the referred pain area, but there is no objective sensory deficit. Referred pain is often accompanied by muscle hypertonus over the referred area of pain.

Visceral disorders can refer pain to somatic tissue (see Table 3-8). On the other hand, as mentioned in the last topic on visceral sources of pain, some somatic impairments can refer pain to visceral locations or mimic known visceral pain patterns. Finding the original source of referred pain can be quite a challenge (Case Example 3-3).

Always ask one or both of these two questions in your pain interview as part of the screening process:

**FOLLOW-UP QUESTIONS**

- Are you having any pain anywhere else in your body?
- Are you having symptoms of any other kind that may or may not be related to your main problem?

---

**CASE EXAMPLE 3-3**

**Type of Pain and Possible Cause**

<table>
<thead>
<tr>
<th>Type of Pain and Possible Cause</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Would you classify this as cutaneous, somatic, visceral, neuopathic, or referred pain?</td>
</tr>
<tr>
<td>B. What are some possible causes and how can you differentiate neuromusculoskeletal from systemic?</td>
</tr>
</tbody>
</table>

- **A. The client has not mentioned the skin hurting or pointed to a specific area to suggest a cutaneous source of pain. It could be referred pain, but we do not know yet if it is referred from the neuromusculoskeletal system (neck, ribs, shoulder) or from the viscera (given the description, most likely cardiac). Without further information, we can say it is somatic or referred visceral pain. We can describe it as radiating since it starts in the neck and affects a wide area above and below that. No defined dermatomes have been identified to suggest a neuropathic cause, so this must be evaluated more carefully.**

- **B. This could be a pain pattern associated with thoracic outlet syndrome (TOS) because the lower cervical plexus can innervate as far down as the nipple line. This can be differentiated when performing tests and measures for TOS. Since TOS can impact the neuro- (brachial plexus) or vascular bundle, it is important to measure blood pressure in both arms and compare them for a possible vascular component. Onset of anginal pain occurs in some people with the use of arms overhead. To discern if this may be a cardiac problem, have the client use the lower extremities to exercise without using the arms (e.g., stairs, stationary bike). Onset of symptoms from a cardiac origin usually has a lag effect. In other words, symptoms do not start until 5 to 10 minutes after the activity has started. It is not immediate as it might be when using impaired muscles. If the symptoms are reproduced 2 to 5 or 10 minutes after the lower extremity activity, consider a cardiac cause. Look for signs and symptoms associated with cardiac impairment. Ask about a personal/family history of heart disease. At age 44, she may be perimenopausal (unless she has had a hysterectomy, which brings on surgical menopause) and still on the young side for cardiac cause of upper quadrant symptoms. Still, it is possible and would have to be ruled out by a physician if you are unable to find a NMS cause of symptoms.**

Chest pain can have a wide range of causes, including trigger points, anabolic steroid or cocaine use, breast disease, premenstrual symptoms, assault or trauma, lactation problems, scar tissue from breast augmentation or reduction, and so on. See further discussion, Chapter 17.
Differentiating Sources of Pain

How do we differentiate somatic sources of pain from visceral sources? It can be very difficult to make this distinction. That is one reason why clients end up in physical therapy even though there is a viscerogenic source of the pain and/or symptomatic presentation.

The superficial and deep somatic structures are innervated unilaterally via the spinal nerves, whereas the viscera are innervated bilaterally through the ANS via visceral afferents. The quality of superficial somatic pain tends to be sharp and more localized. It is mediated by large myelinated fibers, which have a low threshold for stimulation and a fast conduction time. This is designed to protect the structures by signaling a problem right away.

Deep somatic pain is more likely to be a dull or deep aching that responds to rest or a non-weight-bearing position. Deep somatic pain is often poorly localized (transmission via small unmyelinated fibers) and can be referred from some other site.

Pain of a deep somatic nature increases after movement. Sometimes the client can find a comfortable spot, but after moving the extremity or joint, cannot find that comfortable spot again. This is in contrast to visceral pain, which usually is not reproduced with movement, but rather, tends to hurt all the time or with all movements.

Pain from a visceral source can also be dull and aching, but usually does not feel better after rest or recumbency. Keep in mind pathologic processes occurring within somatic structures (e.g., metastasis, primary tumor, infection) may produce localized pain that can be mechanically irritated. This is why movement in general (rather than specific motions) can make it worse. Back pain from metastasis to the spine can become quite severe before any radiologic changes are seen.

Visceral diseases of the abdomen and pelvis are more likely to refer pain to the back, whereas intrathoracic disease refers pain to the shoulder(s). Visceral pain rarely occurs without associated signs and symptoms, although the client may not recognize the correlation. Careful questioning will usually elicit a systemic pattern of symptoms.

Back or shoulder range of motion (ROM) is usually full and painless in the presence of visceral pain, especially in the early stages of disease. When the painful stimulus increases or persists over time, pain-modifying behaviors, such as muscle splinting and guarding, can result in subsequent changes in biomechanical patterns and pain-related disability and may make it more difficult to recognize the systemic origin of musculoskeletal dysfunction.

TYPES OF PAIN

Although there are five sources of most physiologic pain (from a medical screening perspective), many types of pain exist within these categories (see Table 3-3).

When orienting to pain from these main sources, it may be helpful to consider some specific types of pain patterns.

Not all pain types can be discussed here, but some of the most commonly encountered are included.

Tension Pain

Organ distention, such as occurs with bowel obstruction, constipation, or the passing of a kidney stone, can cause tension pain. Tension pain can also be caused by blood pooling from trauma and pus or fluid accumulation from infection or other underlying causes. In the bowel, tension pain may be described as “colicky” with waves of pain and tension occurring intermittently as peristaltic contractile force moves irritating substances through the gastrointestinal (GI) system. Tension pain makes it difficult to find a comfortable position.

Inflammatory Pain

Inflammation of the viscera or parietal peritoneum (e.g., acute appendicitis) may cause pain that is described as deep or boring. If the visceral peritoneum is involved, then the pain is usually poorly localized. If the parietal peritoneum is the primary area affected, the pain pattern may become more localized (i.e., the affected individual can point to it with one or two fingers). Pain arising from inflammation causes people to seek positions of quiet with little movement.

Ischemic Pain

Ischemia denotes a loss of blood supply. Any area without adequate perfusion will quickly die. Ischemic pain of the viscera is sudden, intense, constant, and progressive in severity or intensity. It is not typically relieved by analgesics, and no position is comfortable. The person usually avoids movement or change in positions.

Myofascial Pain

Myalgia, or muscle pain, can be a symptom of an underlying systemic disorder. Cancer, renal failure, hepatic disease, and endocrine disorders are only a few possible systemic sources of muscle involvement.

For example, muscle weakness, atrophy, myalgia, and fatigue that persist despite rest may be early manifestations of thyroid or parathyroid disease, acromegaly, diabetes, Cushing’s syndrome, or osteomalacia.

Myalgia can be present in anxiety and depressive disorders. Muscle weakness and myalgia can occur as a side effect of drugs. Prolonged use of systemic corticosteroids and immunosuppressive drugs has known adverse effects on the musculoskeletal system, including degenerative myopathy with muscle wasting and tendon rupture.

Infective endocarditis caused by acute bacterial infection can present with myalgias and no other manifestation of endocarditis. The early onset of joint pain and myalgia as the first sign of endocarditis is more likely if the person is older and has had a previously diagnosed heart murmur. Joint pain...
CHAPTER 3  Pain Types and Viscerogenic Pain Patterns

Muscle Tension

Muscle tension, or sustained muscle tone, occurs when prolonged muscular contraction or co-contraction results in local ischemia, increased cellular metabolites, and subsequent pain. Ischemia as a factor in muscle pain remains controversial. Interruption of blood flow in a resting extremity does not cause pain unless the muscle contracts during the ischemic condition.

Muscle tension also can occur with physical stress and fatigue. Muscle tension and the subsequent ischemia may occur as a result of faulty ergonomics, prolonged work positions (e.g., as with computer or telephone operators), or repetitive motion.

Take for example the person sitting at a keyboard for hours each day. Constant typing with muscle co-contraction does not allow for the normal contract-relax sequence. Muscle ischemia results in greater release of substance P, a pain neurotransmitter (neuropeptide).

Increased substance P levels increase pain sensitivity. Increased pain perception results in more muscle spasm as a splinting or protective guarding mechanism, and thus the pain-spasm cycle is perpetuated. This is a somatic-somatic response.

Muscle tension from a visceral-somatic response can occur when pain from a visceral source results in increased muscle tension and even muscle spasm. For example, the pain from any inflammatory or infectious process affecting the abdomen (e.g., appendicitis, diverticulitis, pelvic inflammatory disease) can cause increased tension in the abdominal muscles.

Given enough time and combined with overuse and repetitive use or infectious or inflammatory disease, muscle tension can turn into muscle spasm. When opposing muscles such as the flexors and extensors contract together for long periods of time (called co-contraction), muscle tension and then muscle spasm can occur.

Muscle Spasm

Muscle spasm is a sudden involuntary contraction of a muscle or group of muscles, usually occurring as a result of overuse or injury of the adjoining NMS or musculotendinous attachments. A person with a painful musculoskeletal problem may also have a varying degree of reflex muscle spasm to protect the joint(s) involved (a somatic-somatic response). A client with painful visceral disease can have muscle spasm of the overlying musculature (a viscero-somatic response).

Spasm pain cannot be attributed to transient increased muscle tension because the intramuscular pressure is insufficiently elevated. Pain with muscle spasm may occur from prolonged contraction under an ischemic situation. An increase in the partial pressure of oxygen has been documented inside the muscle in spasm under these circumstances.

Muscle Trauma

Muscle trauma can occur with acute trauma, burns, crush injuries, or unaccustomed intensity or duration of muscle contraction, especially eccentric contractions. Muscle pain occurs as broken fibers leak potassium into the interstitial fluid. Blood extravasation results from damaged blood vessels, setting off a cascade of chemical reactions within the muscle.

When disintegration of muscle tissue occurs with release of their contents (e.g., oxygen-transporting pigment myoglobin) into the bloodstream, a potentially fatal muscle toxicity called rhabdomyolysis can occur. Risk factors and clinical signs and symptoms are listed in Table 3-5. Immediate medical attention is required (Case Example 3-4).

Muscle Deficiency

Muscle deficiency (weakness and stiffness) is a common problem as we age and even among younger adults who are deconditioned. Connective tissue changes may occur as small amounts of fibrinogen (produced in the liver and normally converted to fibrin to serve as a clotting factor) leak from the vasculature into the intracellular spaces, adhering to cellular structures.

The resulting microfibrinous adhesions among the cells of muscle and fascia cause increased muscular stiffness. Activity and movement normally break these adhesions; however, with the aging process, production of fewer and less efficient macrophages combined with immobility for any reason result in reduced lysis of these adhesions.

Other possible causes of aggravated stiffness include increased collagen fibers from reduced collagen turnover, increased cross-links of aged collagen fibers, changes in the mechanical properties of connective tissues, and structural and functional changes in the collagen protein. Tendons and ligaments also have less water content, resulting in increased stiffness.

When muscular stiffness occurs as a result of aging, increased physical activity and movement can reduce
### TABLE 3-5  Risk Factors for Rhabdomyolysis

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>Examples</th>
<th>Signs and Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trauma</td>
<td>Crush injury</td>
<td>Profound muscle weakness</td>
</tr>
<tr>
<td></td>
<td>Electric shock</td>
<td>Pain</td>
</tr>
<tr>
<td></td>
<td>Severe burns</td>
<td>Swelling</td>
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<tr>
<td></td>
<td>Extended mobility</td>
<td>Stiffness and cramping</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Associated signs and symptoms</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Reddish-brown urine (myoglobin)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Decreased urine output</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Malaise</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Fever</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Sinus tachycardia</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Nausea, vomiting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Agitation, confusion</td>
</tr>
<tr>
<td>Extreme Muscular</td>
<td>Strenuous exercise</td>
<td></td>
</tr>
<tr>
<td>Activity</td>
<td>Status epilepticus</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Severe dystonia</td>
<td></td>
</tr>
<tr>
<td>Toxic Effects</td>
<td>Ethanol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Ethylene glycol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Isopropanol</td>
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</tr>
<tr>
<td></td>
<td>Methanol</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Heroin</td>
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<tr>
<td></td>
<td>Barbiturates</td>
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<td></td>
<td>Methadone</td>
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<tr>
<td></td>
<td>Cocaine</td>
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<tr>
<td></td>
<td>Tetanus</td>
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<tr>
<td></td>
<td>Ecstasy (street drug)</td>
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<tr>
<td></td>
<td>Carbon monoxide</td>
<td></td>
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<tr>
<td></td>
<td>Snake venom</td>
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</tr>
<tr>
<td></td>
<td>Amphetamines</td>
<td></td>
</tr>
<tr>
<td>Metabolic Abnormalities</td>
<td>Hypothyroidism</td>
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<tr>
<td></td>
<td>Hyperthyroidism</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diabetic ketoacidosis</td>
<td></td>
</tr>
<tr>
<td>Medication-Induced</td>
<td>Inadvertent intravenous (IV) infiltration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(e.g., amphotericin B, azathioprine, cyclosporine)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cholesterol-lowering statins (e.g., Zocor, Lipitor, Crestor)</td>
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</tr>
</tbody>
</table>


associated muscular pain. As part of the diagnostic evaluation, consider a general conditioning program for the older adult reporting generalized muscle pain. Even 10 minutes a day on a stationary bike, on a treadmill, or in an aquatic program can bring dramatic and fast relief of painful symptoms when caused by muscle deficiency.

Proximal muscle weakness accompanied by change in one or more deep tendon reflexes is a red flag sign of cancer or neurologic impairment. In the presence of a past medical history of cancer, further screening is advised with possible medical referral required, depending on the outcome of the examination/evaluation.

**Trigger Points**

TrPs, sometimes referred to as myofascial TrPs (MTrPs), are hyperirritable spots within a taut band of skeletal muscle or in the fascia. Taut bands are ropelike indurations palpated in the muscle fiber. These areas are very tender to palpation and are referred to as local tenderness. There is often a history of immobility (e.g., cast immobilization after fracture or injury), prolonged or vigorous activity such as bending or lifting, or forceful abdominal breathing such as occurs with marathon running.

TrPs are reproduced with palpation or resisted motions. When pressing on the TrP, you may elicit a “jump sign.” Some people say the jump sign is a local twitch response of muscle fibers to trigger point stimulation, but this is an erroneous use of the term.

The **jump sign** is a general pain response as the client physically withdraws from the pressure on the point and may even cry out or wince in pain. The **local twitch response** is the visible contraction of tense muscle fibers in response to stimulation.

When TrPs are compressed, local tenderness with possible referred pain results. In other words, pain that arises from the trigger point is felt at a distance, often remote from its source.

The referred pain pattern is characteristic and specific for every muscle. Knowing the TrP locations and their referred pain patterns is helpful. By knowing the pain patterns, you can go to the site of origin and confirm (or rule out) the presence of the TrP. The distribution of referred TrP pain...
Muscles with active TrPs fatigue faster and recover more slowly. They show more abnormal neural circuit dysfunction. The pain and spasm of TrPs may not be relieved until the aberrant circuits are corrected.71

Any compromise of muscle energy metabolism, such as occurs with endocrine or cancer-related disorders, can aggravate and perpetuate TrPs making successful intervention a more challenging and lengthy process.

Remember, too, that visceral disease can create tender points. For those who understand the Jones’ Strain/Counterstrain concept, some of the Jones’ points might happen to fall in the same area as viscerogenic tender point, but the two are not the same points. A careful evaluation is required to differentiate between Jones’ points and viscerogenic tender points.

Travell’s TrPs can also produce visceral symptoms without actual organ impairment or disease. This is an example of a somato-visceral response. For example, the client may have an abdominal muscle TrP, but the history is one of upset stomach or chest (cardiac) pain. It is possible to have both tender points and TrPs when the underlying cause is visceral disease.

Pain and dysfunction of myofascial tissues is the subject of several texts to which the reader is referred for more information.60,72,73

Joint Pain

Noninflammatory joint pain (no redness, no warmth, no swelling) of unknown etiology can be caused by a wide range of pathologic conditions (Box 3-4). Fibromyalgia, leukemia, sexually transmitted infections, artificial sweeteners,74-76 Crohn’s disease (also known as regional enteritis), postmenopausal status or low estrogen levels, and infectious arthritis are all possible causes of joint pain.

Joint pain in the presence of fatigue may be a red flag for anxiety, depression, or cancer. The client history and screening interview may help the therapist find the true cause of joint pain. Look for risk factors for any of the listed conditions and review the client’s recent activities.

When comparing joint pain associated with systemic versus musculoskeletal causes, one of the major differences is in the area of associated signs and symptoms (Table 3–6). Joint pain of a systemic or visceral origin usually has additional signs or symptoms present. The client may not realize there is a connection, or the condition may not have progressed enough for associated signs and symptoms to develop.

The therapist also evaluates joint pain over a 24-hour period. Joint pain from a systemic cause is more likely to be constant and present with all movements. Rest may help at first but over time even this relieving factor will not alter the symptoms. This is in comparison to the client with osteoarthritis (OA), who often feels better after rest (though stiffness may remain). Morning joint pain associated with OA is less than joint pain at the end of the day after using the joint(s) all day.

CASE EXAMPLE 3-4

Military Rhabdomyolysis

A 20-year-old soldier reported to the military physical therapy clinic with bilateral shoulder pain and weakness. He was unable to perform his regular duties due to these symptoms. He attributed this to doing many push-ups during physical training 2 days ago.

When asked if there were any other symptoms of any kind to report, the client said that he noticed his urine was a dark color yesterday (the day after the push-up exercises). The soldier had shoulder active range of motion (ROM) to 90 degrees accompanied by an abnormal scapulohumeral rhythm with excessive scapular elevation on both sides. Passive shoulder ROM was full but painful. Elbow active and passive ROM were also restricted to 90 degrees of flexion secondary to pain in the triceps muscles.

The client was unable to handle manual muscle testing with pain on palpation to the pectoral, triceps, and infraspinatus muscles, bilaterally. The rotator cuff tendon appeared to be intact.

What Are the Red Flags in This Case?

• Bilateral symptoms (pain and weakness)
• Age (for cancer, too young [under 25 years old] or too old [over 50] is a red flag sign)
• Change in urine color

Result: The soldier had actually done hundreds of different types of push-ups, including regular, wide-arm, and diamond push-ups. Although the soldier was not in any apparent distress, laboratory studies were ordered. Serum CK level was measured as 9600 U/L (normal range: 55-170 U/L).

The results were consistent with acute exertional rhabdomyolysis (AER), and the soldier was hospitalized. Early recognition of a potentially serious problem may have prevented serious complications possible with this condition.

Physical therapy intervention for muscle soreness without adequate hydration could have led to acute renal failure. He attributed this to doing many push-ups during physical training 2 days ago.

When asked if there were any other symptoms of any kind to report, the client said that he noticed his urine was a dark color yesterday (the day after the push-up exercises). The results were consistent with acute exertional rhabdomyolysis (AER), and the soldier was hospitalized. Early recognition of a potentially serious problem may have prevented serious complications possible with this condition.

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Physical therapy intervention for muscle soreness without adequate hydration could have led to acute renal failure. He attributed this to doing many push-ups during physical training 2 days ago.
or aging can be screened using a few important questions that do not fit the expected pattern for injury, overuse, with an unusual presentation or history. Joint pain and symptoms across a 24-hour span as part of the “Pattern.” The Pain Assessment Record Form (see Fig. 3-6) includes an assessment of these differences. The therapist can use the specific screening questions for joint pain to assess any joint pain of unknown cause or for symptoms of unknown cause. These can include but are not limited to:

- Allergic reactions (e.g., medications such as antibiotics)
- Side effect of other medications such as statins, prolonged use of corticosteroids, aromatase inhibitors
- Delayed reaction to chemicals or environmental factors
- Sexually transmitted infections (STIs) (e.g., human immunodeficiency virus [HIV], syphilis, chlamydia, gonorrhea)
- Infectious arthritis
- Infective endocarditis
- Recent dental surgery
- Lyme disease
- Rheumatoid arthritis
- Other autoimmune disorders (e.g., systemic lupus erythematosus, mixed connective tissue disease, scleroderma, polymyositis)
- Leukemia
- Tuberculosis
- Acute rheumatic fever
- Chronic liver disease (hepatic osteodystrophy affecting wrists and ankles; hepatitis causing arthralgias)
- Inflammatory bowel disease (Crohn’s disease or regional enteritis)
- Anxiety or depression (major depressive disorder)
- Fibromyalgia
- Artificial sweeteners

On the other hand, muscle pain may be worse in the morning and gradually improves as the client stretches and moves about during the day. The Pain Assessment Record Form (see Fig. 3-6) includes an assessment of these differences across a 24-hour span as part of the “Pattern.”

The therapist can use the specific screening questions for joint pain to assess any joint pain of unknown cause or with an unusual presentation or history. Joint pain and symptoms that do not fit the expected pattern for injury, overuse, or aging can be screened using a few important questions (Box 3-5).

Drug-Induced

Joint pain as an allergic response, sometimes referred to as “serum sickness” can occur up to 6 weeks after taking a prescription drug (especially antibiotics). Joint pain is also a potential side effect of statins (e.g., Lipitor, Zocor). These are cholesterol-lowering agents.

Musculoskeletal symptoms (e.g., morning stiffness, bone pain, arthralgia, arthritis) are a well-known side effect of chemotherapy and aromatase inhibitors used in the treatment of breast cancer. Low estrogen concentrations and postmenopausal status are linked with these symptoms. Risk factors for developing joint symptoms may include previous hormone replacement therapy, hormone-receptor positivity, previous chemotherapy, obesity, and treatment with anastrozole (Arimidex—aromatase inhibitor). Noninflammatory joint pain is typical of a delayed allergic reaction. The client may report fever, skin rash, and fatigue that go away when the drug is stopped.

Chemical Exposure

Likewise, delayed reactions can occur as a result of occupational or environmental chemical exposure. A work and/or military history may be required for anyone presenting with joint or muscle pain or symptoms of unknown cause. These clients can be mislabeled with a diagnosis of autoimmune disease or fibromyalgia. The alert therapist may recognize and report clues to help the client obtain a more accurate diagnosis.

Infectious Bowel Disease

Ulcerative colitis (UC) and regional enteritis (Crohn’s disease [CD]) are accompanied by an arthritic component and skin rash in about 25% of all people affected by this inflammatory bowel condition.

The person may have a known diagnosis of inflammatory bowel disease (IBD) but may not know that new onset of joint symptoms can be part of this condition. The client interview should have brought out the personal history of either UC or CD. See the discussion of IBD in Chapter 8.

Peripheral joint disease associated with IBD involves the large joints, most often a single hip or knee. Joint symptoms often occur simultaneously with UC but less often at the same time as CD. Ankylosing spondylitis (AS) is also possible with either form of IBD.

As with typical AS, symptoms affect the low back, sacrum, or SI joint first. The most common symptoms are intermittent low back pain with decreased low back motion. The course of AS associated with IBD is the same as without the bowel component.

Joint problems usually respond to medical treatment of the underlying bowel disease but in some cases require separate management. Interventions for the musculoskeletal involvement follow the usual protocols for each area affected.

Arthritis

Joint pain (either inflammatory or noninflammatory) can be associated with a wide range of systemic causes, including bacterial or viral infection, trauma, and sexually transmitted diseases. There is usually a positive history or other associated signs and symptoms to help the therapist identify the need for medical referral.

Infectious Arthritis. Joint pain can be a local response to an infection. This is called infectious, septic, or bacterial arthritis. Invading microorganisms cause inflammation of the synovial membrane with release of cytokines (e.g., tumor necrosis factor [TNF], interleukin-1 [IL-1]) and proteases.

**BOX 3-4 SYSTEMIC CAUSES OF JOINT PAIN**

Infectious and noninfectious systemic causes of joint pain can include but are not limited to:

- Allergic reactions (e.g., medications such as antibiotics)
- Side effect of other medications such as statins, prolonged use of corticosteroids, aromatase inhibitors
- Delayed reaction to chemicals or environmental factors
- Sexually transmitted infections (STIs) (e.g., human immunodeficiency virus [HIV], syphilis, chlamydia, gonorrhea)
- Infectious arthritis
- Infective endocarditis
- Recent dental surgery
- Lyme disease
- Rheumatoid arthritis
- Other autoimmune disorders (e.g., systemic lupus erythematosus, mixed connective tissue disease, scleroderma, polymyositis)
- Leukemia
- Tuberculosis
- Acute rheumatic fever
- Chronic liver disease (hepatic osteodystrophy affecting wrists and ankles; hepatitis causing arthralgias)
- Inflammatory bowel disease (e.g., Crohn’s disease or regional enteritis)
- Anxiety or depression (major depressive disorder)
- Fibromyalgia
- Artificial sweeteners
### TABLE 3-6  Joint Pain: Systemic or Musculoskeletal?

<table>
<thead>
<tr>
<th>Clinical Presentation</th>
<th>Musculoskeletal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awakens at night</td>
<td>Decreases with rest</td>
</tr>
<tr>
<td>Deep aching, throbbing</td>
<td>Sharp</td>
</tr>
<tr>
<td>Reduced by pressure*</td>
<td>Reduced by change in position</td>
</tr>
<tr>
<td>Constant or waves/spasm</td>
<td>Reduced or eliminated when stressful action is stopped</td>
</tr>
<tr>
<td>Cyclical, progressive symptoms</td>
<td>Restriction of A/PROM</td>
</tr>
<tr>
<td>Decreases with rest</td>
<td>Restriction of accessory motions</td>
</tr>
<tr>
<td>Sharp</td>
<td>1 or more movements “catch,” reproducing or aggravating pain/symptoms</td>
</tr>
<tr>
<td>Reduced by change in position</td>
<td>Repetitive motion</td>
</tr>
<tr>
<td>Reduced or eliminated when stressful action is stopped</td>
<td>Arthritis</td>
</tr>
<tr>
<td>Restriction of A/PROM</td>
<td>Static postures (prolonged)</td>
</tr>
<tr>
<td>Restriction of accessory motions</td>
<td>Trauma (including domestic violence)</td>
</tr>
<tr>
<td>1 or more movements “catch,” reproducing or aggravating</td>
<td></td>
</tr>
<tr>
<td>pain/symptoms</td>
<td></td>
</tr>
<tr>
<td>Past Medical History</td>
<td></td>
</tr>
<tr>
<td>Recent history of infection:</td>
<td></td>
</tr>
<tr>
<td>Hepatitis, bacterial infection from staphylococcus or</td>
<td></td>
</tr>
<tr>
<td>streptococcus (e.g., cellulitis), mononucleosis, measles,</td>
<td></td>
</tr>
<tr>
<td>URI, UTI, gonorrhea, osteomyelitis, cellulitis</td>
<td></td>
</tr>
<tr>
<td>History of bone fracture, joint replacement or arthroscopy</td>
<td></td>
</tr>
<tr>
<td>History of human bite</td>
<td></td>
</tr>
<tr>
<td>Sore throat, headache with fever in the last 3 weeks or</td>
<td></td>
</tr>
<tr>
<td>family/household member with recently diagnosed strep</td>
<td></td>
</tr>
<tr>
<td>throat</td>
<td></td>
</tr>
<tr>
<td>Skin rash (infection, medications)</td>
<td></td>
</tr>
<tr>
<td>Recent medications (last 6 weeks); any drug but especially</td>
<td></td>
</tr>
<tr>
<td>statins (cholesterol lowering), antibiotics, aromatase</td>
<td></td>
</tr>
<tr>
<td>inhibitors, chemotherapy</td>
<td></td>
</tr>
<tr>
<td>Hormone associated (postmenopausal status, low estrogen</td>
<td></td>
</tr>
<tr>
<td>levels)</td>
<td></td>
</tr>
<tr>
<td>History of injection drug use/abuse</td>
<td></td>
</tr>
<tr>
<td>History of allergic reactions</td>
<td></td>
</tr>
<tr>
<td>History of GI symptoms</td>
<td></td>
</tr>
<tr>
<td>Recent history of enteric or venereal infection or new</td>
<td></td>
</tr>
<tr>
<td>sexual contact (e.g., Reiter’s)</td>
<td></td>
</tr>
<tr>
<td>Presence of extensor surface nodules</td>
<td></td>
</tr>
<tr>
<td>Associated Signs and Symptoms</td>
<td>Usually none</td>
</tr>
<tr>
<td>Jaundice</td>
<td>Check for trigger points</td>
</tr>
<tr>
<td>Migratory arthralgias</td>
<td>TrPs may be accompanied by some minimal ANS</td>
</tr>
<tr>
<td>Skin rash/lesions</td>
<td>phenomenon (e.g., nausea, sweating)</td>
</tr>
<tr>
<td>Nodules (extensor surfaces)</td>
<td></td>
</tr>
<tr>
<td>Fatigue</td>
<td></td>
</tr>
<tr>
<td>Weight loss</td>
<td></td>
</tr>
<tr>
<td>Low grade fever</td>
<td></td>
</tr>
<tr>
<td>Suspicious or aberrant lymph nodes</td>
<td></td>
</tr>
<tr>
<td>Presence of GI symptoms</td>
<td></td>
</tr>
<tr>
<td>Cyclical, progressive symptoms</td>
<td></td>
</tr>
<tr>
<td>Proximal muscle weakness</td>
<td></td>
</tr>
</tbody>
</table>

A/PROM, Active/passive range of motion; URI, upper respiratory infection; UTI, urinary tract infection; GI, gastrointestinal; TrPs, trigger points; ANS, autonomic nervous system.

*This is actually a cutaneous or somatic response because the pressure provides a counterirritant; it does not really affect the viscera directly.

The end result can be cartilage destruction even after eradicating the offending organism.78

Bacteria can find its way to the joint via the bloodstream (most common) by:
- Direct inoculation (e.g., surgery, arthroscopy, intraarticular corticosteroid injection, central line placement, total joint replacement)
- Penetrating wound (e.g., human bite or fracture)
- Direct extension (e.g., osteomyelitis, cellulitis, diverticulitis, abscess)

*Staphylococcus aureus*, streptococci, and gonococci are the most common infectious causes. A connection between infection and arthritis has been established in Lyme disease.

Arthritis can be the first sign of infective endocarditis.79 Viruses, mycobacteria, fungal agents, and Lyme disease are other causes.78

Viral infections such as hepatitis B, rubella (after vaccination), and Fifth’s (viral) disease can be accompanied by arthralgias and arthritis sometimes called viral arthritis. Joint symptoms appear during the prodromal state of hepatitis (prior to the clinical onset of jaundice).

Sexually transmitted (infectious) diseases (STIs/STDs) are often accompanied by joint pain and symptoms called gonococcal arthritis. Joint pain accompanied by skin lesions at the joint or elsewhere may be a sign of sexually transmitted infections.
**BOX 3-5 SCREENING QUESTIONS FOR JOINT PAIN**

- Please describe the pattern of pain/symptoms from when you wake up in the morning to when you go to sleep at night.
- Do you have any symptoms of any kind anywhere else in your body? (You may have to explain these symptoms don’t have to relate to the joint pain; if the client has no other symptoms, offer a short list including constitutional symptoms, heart palpitations, unusual fatigue, nail or skin changes, sores or lesions anywhere but especially in the mouth or on the genitals, and so forth.)
- Have you ever had:
  - Cancer of any kind
  - Leukemia
  - Crohn’s disease (regional enteritis)
  - Sexually transmitted infection (you may have to prompt with specific diseases such as chlamydia, genital herpes, genital warts, gonorrhea or “the clap,” syphilis, Reiter’s syndrome, human immunodeficiency virus [HIV])
  - Fibromyalgia
  - Joint replacement or arthroscopic surgery of any kind
- Have you recently (last 6 weeks) had any:
  - Fractures
  - Bites (human, animal)
  - Antibiotics or other medications
  - Infections [you may have to prompt with specific infections such as strep throat, mononucleosis, urinary tract, upper respiratory (cold or flu), gastrointestinal, hepatitis]
- Skin rashes or other skin changes
- Do you drink diet soda/pop or use aspartame, Equal, or NutraSweet? (If the client uses these products in any amount, suggest eliminating them on a trial basis for 30 days; artificial sweetener–induced symptoms may disappear in some people; neurotoxic effects from use of newer products (e.g., Stevia, Splenda) have not been fully investigated.)

**To the therapist:** You may have to conduct an environmental or work history (occupation, military, exposure to chemicals) to identify a delayed reaction.

**Quick Survey**

- What kind of work do you do?
- Do you think your health problems are related to your work?
- Are your symptoms better or worse when you’re at home or at work?
- Follow-up if worse at work: Do others at work have similar problems?
- Have you been exposed to dusts, fumes, chemicals, radiation, or loud noise?
- Follow-up: It may be necessary to ask additional questions based on past history, symptoms, and risk factors present.
- Do you live near a hazardous waste site or any industrial facilities that give off chemical odors or fumes?
- Do you live in a home built more than 40 years ago? Have you done renovations or remodeling?
- Do you use pesticides in your home, on your garden, or on your pets?
- What is your source of drinking water?
- Chronology of jobs (type of industry, type of job, years worked)
- How new is the building you are working in?
- Exposure survey (protective equipment used, exposure to dust, radiation, chemicals, biologic hazards, physical hazards)

In the case of STI/STDs with joint involvement, skin lesions over or near a joint have a typical appearance with a central black eschar or scab-like appearance surrounded by an area of erythema (Fig. 3-9). Alternately, the skin lesion may have a hemorrhagic base with a pustule in the center. Fever and arthritic-like symptoms are usually present (Fig. 3-10).

Anyone with human immunodeficiency virus (HIV) may develop unusual rheumatologic disorders. Diffuse body aches and pain without joint arthritis are common among clients with HIV. (See further discussion on HIV in Chapter 12.)

Other forms of arthritis, such as systemic lupus erythematosus (SLE), scleroderma, polymyositis, and mixed connective tissue disease, may have an infectious-based link, but the connection has never been proven definitively.

Infectious (septic) arthritis should be suspected in an individual with persistent joint pain and inflammation occurring in the course of an illness of unclear origin or in the course of a well-documented infection such as pneumococcal pneumonia, staphylococcal sepsis, or urosepsis.

Major risk factors include age (older than 80 years), diabetes mellitus, intravenous drug use, indwelling catheters, immunocompromised condition, rheumatoid arthritis, or osteoarthritis. Look for a history of preexisting joint damage due to bone trauma (e.g., fracture) or degenerative joint disease.

Other predisposing factors are listed in Box 3-6. Infectious arthritis is a rare complication of anterior cruciate ligament (ACL) reconstruction using contaminated bone-tendon-bone allografts. Infections in prosthetic joints can occur years after the implant is inserted. Indwelling catheters and urinary tract infections are major risk factors for seeding to prosthetic joints.

Watch for joint symptoms in the presence of skin rash, low-grade fever, and lymphadenopathy. The rash may appear
and disappear before the joint symptoms. Joints may be mildly to severely involved. Fingers, knees, shoulders, and ankles are affected most often (bilaterally). Inflammation is nonerosive, suggestive of rheumatoid arthritis.

Often one joint is involved (knee or hip), but sometimes two or more are also symptomatic, depending on the underlying pathologic mechanism. Symptoms can range from mild to severe. Joint destruction can be rapid so immediate medical referral is required. Once treated (antibiotics, joint aspiration), the postinfectious inflammation may last for weeks.62

With infectious arthritis, the client may be unable to bear weight on the joint. Usually, there is an acute arthritic presentation and the client has a fever (often low grade in older adults or in anyone who is immunosuppressed).

Medical referral is important for the client with joint pain with no known cause and a recent history of infection of any kind. Ask about recent (last 6 weeks) skin lesions or rashes of any kind anywhere on the body, urinary tract infection, or respiratory infection.

Take the client’s temperature and ask about recent episodes of fever, sweats, or other constitutional symptoms. Palpate for residual lymphadenopathy. Early diagnosis and intervention are essential to limit joint destruction and preserve function. Diagnosis can be difficult. The physician must differentiate infectious/septic arthritis from reactive arthritis (Case Example 3-5).

**BOX 3-6 RISK FACTORS FOR INFECTIOUS ARTHRITIS**

- History of:
  - Previous surgery, especially arthroscopy for joint repair or replacement
  - Human bite, tick bite (Lyme disease), fracture, central line placement
  - Direct, penetrating trauma
  - Infection of any kind (e.g., osteomyelitis, cellulitis, diverticulitis, abscess (located anywhere), hepatitis A or B, *Staphylococcus aureus*, *Streptococcus pneumoniae*, *gonococci*, or urinary tract or respiratory tract infection)
  - Rheumatoid arthritis, systemic lupus erythematosus, scleroderma, or mixed connective tissue disease
  - Diabetes mellitus
  - Sarcoidosis (inflammatory pulmonary condition can affect knees, proximal interphalangeal [PIP] joints, wrists, elbows)
  - Sexually active, young adult
  - Injection drug user
  - Chronic joint damage (e.g., rheumatoid arthritis, gout)
  - Previous infection of joint prosthesis
  - Recent immunization
  - Increasing age
  - Indwelling catheter (especially in the client with a prosthetic joint)
  - Malnutrition, skin breakdown
  - Immunosuppression or immunocompromise (e.g., renal failure, steroid treatment, organ transplantation, chemotherapy)
CASE EXAMPLE 3-5

Septic Arthritis

A 62-year-old man presented in physical therapy with left wrist pain. There was no redness, warmth, or swelling. Active motion was mildly limited by pain. Passive motion could not be tested because of pain.

All other clinical tests were negative. Neuro screen was negative. Past medical history includes hypertension and non-insulin-dependent diabetes mellitus controlled by diet and exercise.

The client denied any history of fever, skin rashes, or other lesions. He reported a recent trip to Haiti (his native country) 3 weeks ago.

How Do You Screen This Client for Systemic-Induced Joint Pain?

- Review Box 3-6 (Risk Factors for Infectious Arthritis). Besides diabetes, what other risk factors are present? Ask the client about any that apply. Compile a list to review during the Review of Systems.
- Ask the client: Are there any other symptoms of any kind anywhere else in your body?
- Use the client’s answer while reviewing clinical signs and symptoms of infectious arthritis for any signs and symptoms of infectious arthritis.
- Review Box 3-5 (Screening Questions for Joint Pain). Are there any further questions from this list appropriate for the screening process?
- Assess the joints above and below (e.g., elbow, shoulder, neck). Assess for trigger points.

Using the information obtained from these steps, look at past medical history, clinical presentation, and associated signs and symptoms. What are the red flags? Review the Clues to Screening for Viscerogenic Sources of Pain and Guidelines for Physician Referral Required in this chapter.

Based on your findings, decide whether to treat and reevaluate or make a medical referral now.

Result: In this case the therapist did not find enough red flags or suspicious findings to warrant immediate referral. Treatment intervention was initiated. The client missed three appointments because of the “flu.” When he returned, his wrist pain was completely gone, but he was reporting left knee pain. There was mild effusion and warmth on both sides of the knee joint.

The client stated that he still had some occasional diarrhea from his bout with the flu.

The therapist recognized some additional red flags, including ongoing gastrointestinal (GI) symptoms attributed by the client to the flu and new onset of inflammatory joint pain. The therapist decided to take the client’s vital signs and found he was febrile (100°F).

Given his recent travel history, migratory noninflammatory and inflammatory arthralgias, and ongoing constitutional symptoms, the client was referred to his medical doctor. Lab tests resulted in a physician’s diagnosis of joint sepsis with hematogenous seeding to the wrist and knee; possible osteomyelitis. Probable cause: Exposure to pathogens in contaminated water or soil during his stay in Haiti.

CLINICAL SIGNS AND SYMPTOMS

Infectious Arthritis

- Fever (low-grade or high), chills, malaise
- Recurrent sore throat
- Lymphadenopathy
- Persistent joint pain
- Single painful swollen joint (knee, hip, ankle, elbow, shoulder)*
- Multiple joint involvement (often migratory)*
- Pain on weight bearing
- Back pain (infective endocarditis)
- Skin lesions (characteristic of the specific underlying infection)
- Conjunctivitis, uveitis
- Other musculoskeletal symptoms depending on the specific underlying infection
- Myalgias
- Tenosynovitis (especially wrist and ankle extensor tendon sheaths)
- Elevated C-reactive protein and sedimentation rate

*The particular joint or joints involved and associated signs and symptoms will vary from client to client and are dependent upon the underlying infectious cause. For example, joint involvement with Lyme disease presents differently from Reiter’s syndrome or Hepatitis B.

Reactive Arthritis. Reactive arthritis is sometimes used synonymously with Reiter’s syndrome, a triad of nongonococcal urethritis, conjunctivitis, and multiple joint involvement of inflammatory arthritis (oligoarthropathy). However, joint symptoms can occur 1 to 4 weeks after infection (e.g., GI or genitourinary (GU) infection) or virus (e.g., Fifth’s disease in adults).

The most common GI infections associated with reactive arthritis include Salmonella, Shigella, and Campylobacter, which occur in men and women equally. Reactive arthritis from sexually acquired urethritis is caused by Chlamydia or Ureaplasma and affects only men.

The joint is not septic (infected) but rather aseptic (without infection). Affected joints are often at a site remote from the primary infection. Often, only one joint is involved (knee, ankle, foot, distal interphalangeal joint), but two or more can be affected.

Reactive arthritis often causes inflammation along tendons or where tendons attach to the bone resulting in persistent pain from plantar fasciitis and sacroiliitis. Nail bed changes can include onycholysis (fingers or toes).

Anyone with joint pain of unknown cause who presents with a skin rash, lesions on the genitals, or recent history of infection (especially GI or GU, usually within the last 1 to 3 weeks) must be referred to a health care clinic or medical doctor for further evaluation.

Radicular Pain

Radicular pain results from direct irritation of axons of a spinal nerve or neurons in the dorsal root ganglion and is experienced in the musculoskeletal system in a dermatome, sclerotome, or myotome.
Radicular, radiating, and referred pain are not the same, although a client can have radicular pain that radiates. Radiating means the pain spreads or fans out from the originating point of pain.

Whereas radicular pain is caused by nerve root compression, referred pain results from activation of nociceptive free nerve endings (nociceptors) of the nervous system in somatic or visceral tissue. The physiologic basis for referred pain is convergence of afferent neurons onto common neurons within the CNS.

The term sciatica is outdated and reflects our previous (limited) understanding of referred pain. Regional pain anywhere near, around, or along the pathway of the sciatic nerve was automatically attributed to irritation of the sciatic nerve and labeled “sciatica.” The International Association for the Study of Pain recommends replacing the term sciatica with radicular pain.\(^{34}\)

Radiculopathy is another symptom that is separate from radicular pain. Radiculopathy describes a neurologic state in which conduction along a spinal nerve or its roots is blocked. Instead of pain, numbness is the primary symptom (when sensory fibers are blocked) or weakness (when there is a motor block). The numbness will be in a dermatomal pattern, whereas the weakness will present in a myotomal distribution. Radiculopathy is determined by these objective neurologic signs and symptoms rather than by pain. It is possible to have radiculopathy and radicular symptoms at the same time. Radiculopathy can occur alone (no pain) and radicular pain can occur without radiculopathy.\(^{34}\)

Differentiating between radicular (pain from the peripheral nervous system) and referred pain from the ANS can be difficult. Both can start at one point and radiate outwards. Both can cause pain distal to the site of pathology.

As mentioned previously, the CNS may not be able to distinguish which part of the body is responsible for the input into these common neurons so, for example, ischemia of the heart results in shoulder pain, one of several somatic areas innervated by the same neural segments as the heart.\(^{83}\)

Referred pain occurs most often far away from the site of pathologic origin of symptoms, whereas radicular pain does not skip myotomes, dermatomes, or sclerotomes associated with the affected peripheral nerves.

For example, cardiac pain may be described as beginning retrosternally (behind the sternum) and radiating to the left shoulder and down the inner side of the left arm. This radiating referred pain is generated via the pathways of the ANS but follows the somatic pattern of ulnar nerve distribution. It is not radicular pain from direct irritation of a spinal nerve of the peripheral nervous system but rather referred pain from shared pathways in the spinal cord.

Ischemic cardiac pain does not cause arm pain, hand pain, or pain in somatic areas other than those innervated at the C3 to T4 spinal levels of the ANS. Similarly, gallbladder pain may be felt to originate in the right upper abdomen and to radiate to the angle of the scapula. These are the somatic areas innervated by the same level of the ANS as the involved viscera mentioned.

Physical disease can localize pain in dermatomal or myotomal patterns. More often the therapist sees a client who describes pain that does not match a dermatomal or myotomal pattern. This is neither referred visceral pain from ANS involvement nor irritation of a spinal nerve. For example, the client who describes whole leg pain or whole leg numbness may be experiencing inappropriate illness behavior.

Inappropriate illness behavior is recognized clinically as illness behavior that is out of proportion to the underlying physical disease and is related more to associated psychologic disturbances than to actual physical disease.\(^{34}\) This behavioral component to pain is discussed in the section on Screening for Systemic Versus Psychogenic Symptoms.

### Arterial, Pleural, and Tracheal Pain

Pain arising from arteries, as with arteritis (inflammation of an artery), migraine, and vascular headaches, increases with systolic impulse so that any process associated with increased systolic pressure, such as exercise, fever, alcohol consumption, or bending over, may intensify the already throbbing pain.

Pain from the pleura, as well as from the trachea, correlates with respiratory movements. Look for associated signs and symptoms of the cardiac or pulmonary systems. Listen for a description of pain that is “throbbing” (vascular) or sharp and increased with respiratory movements such as breathing, laughing, or coughing.

Palpation and resisted movements will not reproduce the symptoms, which may get worse with recumbency, especially at night or while sleeping.

### Gastrointestinal Pain

Pain arising from the GI tract tends to increase with peristaltic activity, particularly if there is any obstruction to forward progress of the food bolus. The pain increases with ingestion and may lessen with fasting or after emptying the involved segment (vomiting or bowel movement).

On the other hand, pain may occur secondary to the effect of gastric acid on the esophagus, stomach, or duodenum. This pain is relieved by the presence of food or by other neutralizing material in the stomach, and the pain is intensified when the stomach is empty and secreting acid. In these cases it is important to ask the client about the effect of eating on musculoskeletal pain. Does the pain increase, decrease, or stay the same immediately after eating and 1 to 3 hours later?

When hollow viscera, such as the liver, kidneys, spleen, and pancreas, are distended, body positions or movements that increase intraabdominal pressure may intensify the pain, whereas positions that reduce pressure or support the structure may ease the pain.

For example, the client with an acutely distended gallbladder may slightly flex the trunk. With pain arising from a tense, swollen kidney (or distended renal pelvis), the client flexes the trunk and tilts toward the involved side; with pancreatic pain, the client may sit up and lean forward or lie down with the knees drawn up to the chest.
Pain at Rest

Pain at rest may arise from ischemia in a wide variety of tissue (e.g., vascular disease or tumor growth). The acute onset of severe unilateral extremity involvement accompanied by the “five Ps”—pain, pallor, pulselessness, paresthesia, and paralysis—signifies acute arterial occlusion (peripheral vascular disease [PVD]). Pain in this situation is usually described by the client as burning or shooting and may be accompanied by paresthesia.

Pain related to ischemia of the skin and subcutaneous tissues is characterized by the client as burning and boring. All these occlusive causes of pain are usually worse at night and are relieved to some degree by dangling the affected leg over the side of the bed and by frequent massaging of the extremity.

Pain at rest secondary to neoplasm occurs usually at night. Although neoplasms are highly vascularized (a process called angiogenesis), the host organ’s vascular supply and nutrients may be compromised simultaneously, causing ischemia of the local tissue. The pain awakens the client from sleep and prevents the person from going back to sleep, despite all efforts to do so. See the next section on Night Pain.

The client may describe pain noted on weight-bearing or bone pain that may be mild and intermittent in the initial stages, becoming progressively more severe and more constant. A series of questions to identify the underlying cause of night pain is presented later in this chapter.

Night Pain

Whenever you take a pain history, an evaluation of night pain is important (Box 3-7). As therapists, we are always gauging pain responses to identify where the client might be on the continuum from acute to subacute to chronic. This information helps guide our treatment plan and intervention.

For example, the client who cannot even lie on the involved side is probably fairly acute. Pain modulation is the first order of business. Modalities and cryotherapy may be most effective here. On the other hand, the client who can roll onto the involved side and stay there for 30 minutes to an hour may be more in the subacute phase. A combination of modalities, hands-on treatment, and exercise may be warranted.

The client who can lie on the involved side for up to 2 hours is more likely in the chronic phase of the musculoskeletal condition. Tissue ischemia brings on painful symptoms after prolonged static positioning. A more aggressive approach can usually be taken in these cases. These comments all apply to pain of an NMS origin.

Night Pain and Cancer

Pain at night is a classic red flag symptom of cancer, but it does not mean that all pain at night is caused by cancer or that all people with cancer will have night pain. For example, the person who lies down at night and has not even fallen asleep who reports increased pain may just be experiencing the first moment in the day without distractions. Suddenly, his or her focus is on nothing but the pain, so the client may report the pain is much worse at night.

Bone pain at night is the most highly suspicious symptom, especially in the presence of a previous history of cancer. Neoplasms are highly vascularized at the expense of the host. This produces local ischemia and pain.

In the case of bone pain (deep pain; pain on weight bearing), perform a heel strike test. This is done by applying a percussive vertical force with the heel of your hand through the heel of the client’s foot in a non–weight-bearing (supine) position. Reproduction of painful symptoms is positive and highly suspicious of a bone fracture or stress reaction.65

Keep in mind for the older adult that pain on weight bearing may be a symptom of a hip fracture. It is not uncommon for an older adult to fall and have hip pain and the x-rays are initially negative. If the pain persists, new x-rays or additional imaging may be needed. MRIs are extremely sensitive for a femoral neck fracture very early after the fracture. MRI may miss a pubic ramus fracture, requiring single-photon

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**BOX 3-7 SCREENING QUESTIONS FOR NIGHT PAIN**

When screening someone with night pain for the possibility of a systemic or cancerous condition, some possible questions are:

- Tell me about the pattern of your symptoms at night (open-ended question).
- Can you lie on that side? For how long?
- (Alternate question): Does it wake you up when you roll onto that side?
- How are you feeling in general when you wake up?
- Follow-up question: Do you have any other symptoms when the pain wakes you up? Give the client time to answer before prompting with choices such as coughing, wheezing, shortness of breath, nausea, need to go to the bathroom, night sweats.
- Always ask the client reporting night pain of any kind (not just bone pain) the following screening questions:
  - What makes it better/worse?
  - What happens to your pain when you sit up? (Upright posture reduces venous return to the heart; decreased pain when sitting up may indicate a cardiopulmonary cause.)
  - How does taking aspirin affect your pain/symptoms? (Disproportionate pain relief can occur using aspirin in the presence of bone cancer.)
  - How does eating or drinking affect your pain/symptoms (for shoulder, neck, back, hip, pelvic pain/symptoms; gastrointestinal [GI] system)?
  - Does taking an antacid such as Tums change your pain/symptoms? (Some women with pain of a cardiac nature experience pain relief much like men do with nitroglycerin; remember, this would be a woman who is postmenopausal, possibly with a personal and/or family history of heart disease—check vital signs!)
emission computed tomography (SPECT) bone scan to rule out an occult fracture in a client who has fallen and is still having hip pain.

In a physically capable client, clear the hip, knee, and ankle by asking the client to assume a full squat position. You may also ask him or her to hop on the involved side. These tests are used to screen for pubic ramus or hip stress fractures (reactions). Stress reactions or stress fractures are discussed in Chapter 16.

Pain with Activity

Pain with activity is common with NMS pathology. Mechanical and postural factors are common. Pain with activity from a systemic or disease process is most often caused by vascular compromise. In this context, activity pain of the upper quadrant is known as angina when the heart muscle is compromised and intermittent vascular claudication in the case of peripheral vascular compromise (lower quadrant).

Pain from an ischemic muscle (including heart muscle) builds up with the use of the muscle and subsides with rest. Thus there is a direct relationship between the degree of circulatory insufficiency and muscle work.

In other words, the interval between the beginning of muscle contraction and the onset of pain depends on how long it takes for hypoxic products of muscle metabolism to accumulate and exceed the threshold of receptor response. This means with vascular-induced pain there is usually a delay or lag time between the beginning of activity and the onset of symptoms.

The client complains that a certain distance walked, a certain level of increased physical activity, or a fixed amount of usage of the extremity brings on the pain. When a vascular pathologic condition causes ischemic muscular pain, the location of the pain depends on the location of the vascular pathologic source. This is discussed in greater detail later in this text (see the section on Arterial Disease in Chapter 6).

The timing of symptom onset offers the therapist valuable screening clues when determining when symptoms are caused by musculoskeletal impairment or by vascular compromise.

Look for immediate pain or symptoms (especially when these can be reproduced with palpation, resistance to movement, and/or a change in position) versus symptoms 5 to 10 minutes after activity begins. Further investigate for the presence of other signs and symptoms associated with cardiac impairment, appropriate risk factors, and positive personal and/or family history.

Diffuse Pain

Diffuse pain that characterizes some diseases of the nervous system and viscera may be difficult to distinguish from the equally diffuse pain so often caused by lesions of the moving parts.

Most clients in this category are those with obscure pain in the trunk, especially when the symptoms are felt only anteriorly. The distinction between visceral pain and pain caused by lesions of the vertebral column may be difficult to make and will require a medical diagnosis.

Chronic Pain

Chronic pain persists past the expected physiologic time of healing. This may be less than 1 month or more often, longer than 6 months. An underlying pathology is no longer identifiable and may never have been present. The International Association for the Study of Pain has fixed 3 months as the most convenient point of division between acute and chronic pain.

There are some who suggest 6 weeks is a better cut-off point in terms of clinical progress. Any longer than that and the client is at increased risk for chronic pain and behavioral consequences of that pain. Repeated pain stimuli changes how the body processes pain. Pain signals become faster and more intense, depleting the body's own pain blocking substances (e.g., norepinephrine, serotonin).

Chronic pain syndrome is characterized by a constellation of life changes that produce altered behavior in the individual and persist even after the cause of the pain has been eradicated. This syndrome is a complex multidimensional phenomenon that requires a focus toward maximizing functional abilities rather than treatment of pain.

With chronic pain, the approach is to assess how the pain has affected the person. Physical therapy intervention can be directed toward decreasing the client's emotional response to pain or developing skills to cope with stress and other changes that impair quality of life.

In acute pain, the pain is proportional and appropriate to the problem and is treated as a symptom. In the chronic pain syndrome, uncontrolled and prolonged pain alters both the peripheral nervous system and CNS through processes of neural plasticity and central sensitization and thus pain becomes a disease itself.

Each person may have a unique response to pain called a neuromatrix or neurosignature. The neuromatrix is initially determined through genetics and early sensory development. Later, life experiences related to pain and coping shape the neural patterns. Each person develops individual perceptual and behavioral responses to pain that are unique to that person.

The person's description of chronic pain often is not well defined and is poorly localized; objective findings are not identified. The person's verbal description of the pain may contain words associated with emotional overlay (see Table 3-1). This is in contrast to the predominance of sensory descriptors associated with acute pain. It may be helpful to ask the client or caregiver to maintain a pain log (see Figs. 3-7 and 3-8).

This should include entries for pain intensity and its relationship to activities or intervention. Clients can be reevaluated regularly for improvement, deterioration, or complications, using the same scales that were used for the initial evaluation.
Always keep in mind that painful symptoms out of proportion to the injury or that are not consistent with the objective findings may be a red flag indicating systemic disease. Pain can be triggered by bodily malfunction or severe illness.

In some cases of chronic pain, a diagnosis is finally made (e.g., spinal stenosis or thyroiditis) and the intervention is specific, not merely pain management. More often, identifying the cause of chronic pain is unsuccessful.

**Risk Factors**

Research evidence has implicated biologic, psychologic, and social variables as key risk factors in chronic pain. These factors do not operate in isolation but often interact with each other.\(^{94}\) Cognitive processes, such as thoughts, beliefs, and expectations, are important in understanding chronic pain, adaptation to chronic pain, response to intervention, and disability.\(^{95}\)

Catastrophizing and/or inflammatory reactivity, which are linked to the tendency to express negative thoughts and emotions, exaggerate the impact of painful experiences, and view the situation as hopeless (and the person in the situation as helpless) are additional risk factors for the development of chronic pain.\(^{96,97}\)

Risk factors for persistent postsurgical pain include pain in other areas of the body before the operation, high levels of psychosocial distress (e.g., anxiety, depression, panic disorder), tobacco use, sleep disturbance (e.g., insomnia, sleep disruption), and chronic use of opioids. It may be necessary to screen for risk of opioid misuse.

Some of the risk factors for the misuse of opioid analgesics include personal/family history of substance abuse, history of criminal activity and/or legal problems (including driving under the influence [DUI]), heavy tobacco use, history of severe depression or anxiety, and history of rehabilitation for alcohol or other drugs.\(^{98}\) Special screening tools are available including the 5-item Opioid Risk Tool, Screener and Opioid Assessment for Patients in Pain (SOAPP tool) or the Current Opioid Misuse Measure (COMM). These tools have been validated and provide predictive measures of drug-related behaviors (see articles, discussions, and questionnaires at www.painedu.org).

The therapist should be aware that chronic pain can be associated with physical and/or sexual abuse in both men and women (see discussion of Assault in Chapter 2). The abuse may be part of the childhood history and/or a continuing part of the adult experience.

**Fear-Avoidance Behavior**

Fear-avoidance behavior can also be a part of disability from chronic pain. The Fear-Avoidance Model of Exaggerated Pain Perception (FAMEPP) or Fear Avoidance Model (FAM) was first introduced in the early 1980s.\(^{99,100}\) The concept is based on studies that show a person’s fear of pain (not physical impairments) is the most important factor in how he or she responds to musculoskeletal pain.

Anxiety, fear of pain, and pain catastrophizing can lead to avoiding physical or social activities. Screening for fear-avoidance behavior to determine whether an individual will resume normal activities (low psychologic distress) or will avoid normal activities due to anticipation of increased pain and/or reinjury (high psychologic distress) can be done using the Fear-Avoidance Beliefs Questionnaire (Table 3-7).\(^{101,102}\) The therapist should not rely on his or her own perception of patient/client’s fear-avoidance behaviors. In addition to the Fear-Avoidance Beliefs Questionnaire (FABQ), the Tampa Scale of Kinesiophobia (TSK-11)\(^{103}\) and Pain Catastrophizing Scale (PSC)\(^{104}\) are available to identify psychologic beliefs linked with pain.\(^{105}\)

Elevated fear-avoidance beliefs are not indicative of a red flag for serious medical pathology. They are indicative of someone who has a poorer prognosis for rehabilitation (e.g., poor clinical outcomes, elevated pain symptoms, development of depressive symptoms, greater physical impairments, continued disability).\(^{106}\) They are more accurately labeled a “yellow flag” indicating psychosocial involvement and provide insight into the prognosis. Such a yellow flag signals the need to modify intervention and consider the need for referral to a psychologist or behavioral counselor.

When the client shows signs of fear-avoidance beliefs, then the therapist’s management approach should include education that addresses the client’s fear and avoidance behavior and should consider a graded approach to therapeutic exercise.\(^{107}\)

The therapist can teach clients about the difference between pain and tissue injury. Chronic ongoing pain does not mean continued tissue injury is taking place. This common misconception can result in movement avoidance behaviors.

There are no known “cut-off” scores for referral to a specialist.\(^{107,108}\) Some researchers categorize FABQ scores into “high” and “low” based on the physical activity scale (score range 0 to 24). Less than 15 is a “low” score (low risk for elevated fear-avoidance beliefs) and more than 15 is “high.”

Higher numbers indicate increased levels of fear-avoidance beliefs. The distinction between these two categories is minor and arbitrary. It may be best to consider the scores as a continuum rather than dividing them into low or high.\(^{107,108}\) A cut-off score for the work scale indicative of having a decreased chance of returning to work has been proposed. The work subscale of the FABQ is the strongest predictor of work status. There is a greater likelihood of return-to-work for scores less than 30 and less likelihood of return-to-work or increased risk of prolonged work restrictions for scores greater than 34.\(^{109}\)

Examination of fear-avoidance beliefs may serve as a useful screening tool for identifying clients who are at risk for prolonged work restrictions. Caution is advised when interpreting and applying the results of the FABQ work subscale to individual clients. This screening tool may be a better predictor of low risk for prolonged work restrictions. The work subscale may be less effective in identifying clients at high risk for prolonged work restrictions.\(^{109}\)

Efforts are underway to develop a single-item screening tool that could be used to identify people with elevated levels...
CHAPTER 3 Pain Types and Viscerogenic Pain Patterns

TABLE 3-7 Fear-Avoidance Beliefs Questionnaire (FABQ)

Here are some of the things other patients have told us about their pain. For each statement, please circle any number from 0 to 6 to say how much physical activities, such as bending, walking, or driving, affect or would affect your back pain.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Completely Disagree</th>
<th>Unsure</th>
<th>Completely Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. My pain was caused by physical activity</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>2. Physical activity makes my pain worse</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>3. Physical activity might harm my back</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>4. I should not do physical activities which (might) make my pain worse</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>5. I cannot do physical activities which (might) make my pain worse</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

The following statements are about how your normal work affects or would affect your back pain.

<table>
<thead>
<tr>
<th>Statement</th>
<th>Completely Disagree</th>
<th>Unsure</th>
<th>Completely Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. My pain was caused by my work or by an accident at work</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>7. My work aggravated my pain</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>8. I have a claim for compensation for my pain</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>9. My work is too heavy for me</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>10. My work makes or would make my pain worse</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>11. My work might harm my back</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>12. I should not do my normal work with my present pain</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>13. I cannot do my normal work with my present pain</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>14. I cannot do my normal work until my pain is treated</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>15. I do not think I will be back to my normal work</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>16. I do not think that I will ever be able to go back to that work</td>
<td>0</td>
<td>1</td>
<td>2</td>
</tr>
</tbody>
</table>

The FABQ is used to quantify the level of fear of pain and beliefs clients with low back pain have about the need to avoid movements or activities that might cause pain. The FABQ has 16 items, each scored from 0 to 6, with higher numbers indicating increased levels of fear-avoidance beliefs. There are 2 subscales: a 7-item work subscale (Sum of items 6, 7, 9, 10, 11, 12, and 15; score range = 0-42) and a 4-item physical activity subscale (Sum of items 2, 3, 4, and 5; score range = 0-24). The FABQ work subscale is associated with current and future disability and work loss in patients with acute and chronic low back pain.


of fear across a wide variety of impairments such as hip, knee, cervical, shoulder, and neck (not just for back pain). 110

Differentiating Chronic Pain from Systemic Disease

Sometimes a chronic pain syndrome can be differentiated from a systemic disease by the nature and description of the pain. Chronic pain is usually dull and persistent. The chronic pain syndrome is characterized by multiple complaints, excessive preoccupation with pain, and, frequently, excessive drug use. With chronic pain, there is usually a history of some precipitating injury or event.

Systemic disease is more acute with a recent onset. It is often described as sharp, colicky, knifelike, and/or deep. Look for concomitant constitutional symptoms, any red flags in the personal or family history, and/or any known risk factors. Ask about the presence of associated signs and symptoms characteristic of a particular organ or body system (e.g., GI, GU, respiratory, gynecologic).

Because pain has an affective component, chronic pain can cause anxiety, depression, and anger. The amount of pain behaviors and the intensity of pain perceived can change with alterations in environmental reinforcers (e.g., increasing as the time to return to work draws near, decreasing when no one is watching). For more information and assessment tools, see the discussions related to anxiety and depression in this chapter.

Secondary gain may be a factor in perpetuating the problem. This may be primarily financial, but social and family benefits, such as increased attention or avoidance of unpleasant activities or work situations, may be factors (see later discussion of behavior responses to injury/illness).

Aging and Chronic Pain

Chronic pain in older adults is very common. One in five older Americans is taking analgesic medications regularly. Many take prescription pain medications for more than 6 months. 111
Older adults are more likely to suffer from arthritis, bone and joint disorders, back problems, and other chronic conditions. Pain is the single most common problem for which aging adults seek medical care.

At the same time, older adults have been observed to present with unusually painless manifestations of common illnesses such as MI, acute abdomen, and infections. To address the special needs of older adults, the AGS has developed specific recommendations for assessment and management of chronic pain (Box 3-8).

**COMPARISON OF SYSTEMIC VERSUS MUSCULOSKELETAL PAIN PATTERNS**

Table 3-2 provides a comparison of the clinical signs and symptoms of systemic pain versus musculoskeletal pain using the typical categories described earlier. The therapist must be very familiar with the information contained within this table. Even with these guidelines to follow, the therapist’s job is a challenging one.

In the orthopedic setting, physical therapists are very aware that pain can be referred above and below a joint. So, for example, when examining a shoulder problem, the therapist always considers the neck and elbow as potential NMS sources of shoulder pain and dysfunction.

Table 3-8 reflects what is known about referred pain patterns for the musculoskeletal system. Sites for referred pain from a visceral pain mechanism are listed. Lower cervical and upper thoracic impairment can refer pain to the interscapular and posterior shoulder areas.

Likewise, shoulder impairment can refer pain to the neck and upper back, while any condition affecting the upper lumbar spine can refer pain and symptoms to the SI joint and hip. When examining the hip region, the therapist always considers the possibility of an underlying SI or knee joint impairment and so on.

If the client presents with the typical or primary referred pain pattern, he or she will likely end up in a physician’s office. A secondary or referred pain pattern can be very deceiving. The therapist may not be able to identify the underlying pathology (in fact, it is not required), but it is imperative to recognize when the clinical presentation does not fit the expected pattern for NMS impairment.

A few additional comments about systemic versus musculoskeletal pain patterns are important. First, it is unlikely that the client with back, hip, SI, or shoulder pain that has been present for the last 5 to 10 years is demonstrating a visceral-genic cause of symptoms. In such a case, systemic origins are suspected only if there is a sudden or recent change in the clinical presentation and/or the client develops constitutional symptoms or signs and symptoms commonly associated with an organ system.

Secondly, note the word descriptors used with pain of a systemic nature: knifelike, boring, deep, throbbing. Pay attention any time someone uses these particular words to describe the symptoms.

**BOX 3-8 AGS RECOMMENDATIONS FOR CHRONIC PAIN ASSESSMENT IN THE GERIATRIC POPULATION**

- All older clients should be assessed for signs of chronic pain.
- Use alternate words for pain when screening older clients (e.g., burning, discomfort, aching, sore, heavy, tight)
- Contact caregiver for pain assessment in adults with cognitive or language impairments
- Clients with cognitive or language impairments should be observed for nonverbal pain behaviors, recent changes in function, and vocalizations to suggest pain (e.g., irritability, agitation, withdrawal, gait changes, tone changes, nonverbal but vocal utterances such as groaning, crying, or moaning)
- Follow AGS guidelines for comprehensive pain assessment including
  - Medical history
  - Medication history, including current and previously used prescription and over-the-counter (OTC) drugs, as well as any nutraceuticals (natural products, “remedies”)
  - Physical examination
  - Review pertinent laboratory results and diagnostic tests (look for clues to the sequence of events leading to present pain complaint)
  - Assess characteristics of pain (frequency, intensity, duration, pattern, description, aggravating and relieving factors); use a standard pain scale such as the visual analogue scale (see Fig. 3-6)
- Observe neuromusculoskeletal (NMS) system for:
  - Neurologic impairments
  - Weakness
  - Hyperalgesia; hyperpathia (exaggerated response to pain stimulus)
  - Allodynia (skin pain to nonnoxious stimulus)
  - Numbness, paresthesia
  - Tenderness, trigger points
  - Inflammation
  - Deformity
  - Pain that affects function or quality of life should be included in the medical problem list


Third, observe the client’s reaction to the information you provide. Often, someone with a NMS problem gains immediate and intense pain relief just from the examination provided and evaluation offered. The reason? A reduction in the anxiety level.

Many people have a need for high control. Pain throws us in a state of fear and anxiety and a perceived loss of control.
CHAPTER 3  Pain Types and Viscerogenic Pain Patterns

TABLE 3-8  Common Patterns of Pain Referral

<table>
<thead>
<tr>
<th>Pain Mechanism</th>
<th>Lesion Site</th>
<th>Referral Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Somatic</td>
<td>C7, T1-5 vertebrae</td>
<td>Interscapular area, posterior</td>
</tr>
<tr>
<td></td>
<td>Shoulder</td>
<td>Neck, upper back</td>
</tr>
<tr>
<td></td>
<td>L1, L2 vertebrae</td>
<td>Sacroiliac (SI) joint and hip</td>
</tr>
<tr>
<td></td>
<td>Hip joint</td>
<td>SI and knee</td>
</tr>
<tr>
<td></td>
<td>Pharynx</td>
<td>Ipsilateral ear</td>
</tr>
<tr>
<td></td>
<td>Temporomandibular joint (TMJ)</td>
<td>Head, neck, heart</td>
</tr>
<tr>
<td>Visceral</td>
<td>Diaphragmatic irritation</td>
<td>Shoulder, lumbar spine</td>
</tr>
<tr>
<td></td>
<td>Heart</td>
<td>Shoulder, neck, upper back, TMJ</td>
</tr>
<tr>
<td></td>
<td>Urothelial tract</td>
<td>Back, inguinal region, anterior thigh, and genitalia</td>
</tr>
<tr>
<td></td>
<td>Pancreas, liver, spleen, gallbladder</td>
<td>Shoulder, midthoracic or low back</td>
</tr>
<tr>
<td></td>
<td>Peritoneal or abdominal cavity</td>
<td>Hip pain from abscess of psoas or obturator muscle</td>
</tr>
<tr>
<td>Neuropathic</td>
<td>Nerve or plexus</td>
<td>Anywhere in distribution of a peripheral nerve</td>
</tr>
<tr>
<td></td>
<td>Nerve root</td>
<td>Anywhere in corresponding dermatome</td>
</tr>
<tr>
<td></td>
<td>Central nervous system</td>
<td>Anywhere in region of body innervated by damaged structure</td>
</tr>
</tbody>
</table>

Knowing what the problem is and having a plan of action can reduce the amplification of symptoms for someone with soft tissue involvement when there is an underlying psychologic component such as anxiety.

On the other hand, someone with cancer pain, viscerogenic origin of symptoms, or systemic illness of some kind will not obtain relief from or reduction of pain with reassurance. Signs and symptoms of anxiety are presented later in this chapter.

Fourth, aggravating and relieving factors associated with NMS impairment often have to do with change in position or a change (increased or decreased) in activity levels. There is usually some way the therapist can alter, provoke, alleviate, eliminate, or aggravate symptoms of a NMS origin.

Pain with activity is immediate when there is involvement of the NMS system. There may be a delayed increase in symptoms after the initiation of activity with a systemic (vascular) cause.

For the orthopedic or manual therapist, be aware that an upslip of the innominate that does not reduce may be a viscerosomatic reflex. It could be a visceral ligamentous problem. If the problem can be corrected with muscle energy techniques or other manual therapy intervention, but by the end of the treatment session or by the next day, the correction is gone and the upslip is back, then look for a possible visceral source as the cause.

If you can reduce the upslip, but it does not hold during the treatment session, then look for the source of the problem at a lower level. It can even be a crossover pattern from the pelvis on the other side.

Aggravating and relieving factors associated with systemic pain are organ dependent and based on visceral function. For example, chest pain, neck pain, or upper back pain from a problem with the esophagus will likely get worse when the client is swallowing or eating.

Back, shoulder, pelvic, or sacral pain that is made better or worse by eating, passing gas, or having a bowel movement is a red flag. Painful symptoms that start 3 to 5 minutes after initiating an activity and go away when the client stops the activity suggest pain of a vascular nature. This is especially true when the client uses the word “throbbing,” which is a descriptor of a vascular origin.

Clients presenting with vascular-induced musculoskeletal complaints are not likely to come to the therapist with a report of cardiac-related chest pain. Rather, the therapist must be alert for the man over age 50 or postmenopausal woman with a significant family history of heart disease, who is borderline hypertensive. New onset or reproduction of back, neck, temporomandibular joint (TMJ), shoulder, or arm pain brought on by exertion with arms raised overhead or by starting a new exercise program is a red flag.

Leaning forward or assuming a hands and knees position sometimes lessens gallbladder pain. This position moves the distended or inflamed gallbladder out away from its position under the liver. Leaning or side bending toward the painful side sometimes ameliorates kidney pain. Again, for some people, this may move the kidney enough to take the pressure off during early onset of an infectious or inflammatory process.

Finally, notice the long list of potential signs and symptoms associated with systemic conditions (see Table 3-2). At the same time, note the lack of associated signs and symptoms listed on the musculoskeletal side of the table. Except for the possibility of some ANS responses with the stimulation of trigger points, there are no comparable constitutional or systemic signs and symptoms associated with the NMS system.

CHARACTERISTICS OF VISCEROGENIC PAIN

There are some characteristics of viscerogenic pain that can occur regardless of which organ system is involved. Any of these by itself is cause for suspicion and careful listening and watching. They often occur together in clusters of two or three. Watch for any of the following components of the pain pattern.
Gradual, Progressive, and Cyclical Pain Patterns

Gradual, progressive, and cyclical pain patterns are characteristic of viscerogenic disease. The one time this pain pattern occurs in an orthopedic situation is with the client who has low back pain of a discogenic origin. The client is given the appropriate intervention and begins to do his/her exercise program. The symptoms improve, and the client completes a full weekend of gardening, 18 holes of golf, or other excessive activity.

The activity aggravates the condition, and the symptoms return worse than before. The client returns to the clinic, gets firm reminders by the therapist regarding guidelines for physical activity, and is sent out once again with the appropriate exercise program. The “cooperate—get better—then overdo” cycle may recur until the client completes the rehabilitation process and obtains relief from symptoms and return of function.

This pattern can mimic the gradual, progressive, and cyclical pain pattern normally associated with underlying organic pathology. The difference between a NMS pattern of pain and symptoms and a visceral pattern is the NMS problem gradually improves over time, whereas the systemic condition gets worse.

Of course, beware of the client with discogenic back and leg pain who suddenly returns to the clinic completely symptom free. There is always the risk of disc herniation and sequestration when the nucleus detaches and becomes a loose body that may enter the spinal canal. In the case of a “miraculous cure” from disc herniation, be sure to ask about the onset of any new symptoms, especially changes in bowel and bladder function.

Constant Pain

Pain that is constant and intense should raise a red flag. There is a logical and important first question to ask anyone who says the pain is “constant.” Can you think what this question might be?

? FOLLOW-UP QUESTIONS

• Do you have that pain right now?

It is surprising how often the client will answer “No” to this question. While it is true that pain of a NMS origin can be constant, it is also true there is usually some way to modulate it up or down. The client often has one or two positions that make it better (or worse).

Constant, intense pain in a client with a previous personal history of cancer and/or in the presence of other associated signs and symptoms raises a red flag. You may want to use the McGill Home Recording Card to assess the presence of true constant pain (see Fig. 3-7).

It is not necessary to have the client complete an entire week’s pain log to assess constant pain. A 24- to 48-hour time period is sufficient. Use the recording scale on the right indicating pain intensity and medications taken (prescription and OTC).

Under item number 3, include sexual activity. The particulars are not necessary, just some indication that the client was sexually active. The client defines “sexually active” for him or herself, whether this is just touching and holding or complete coitus. This is another useful indicator of pain levels and functional activity.

Remember to offer clients a clear explanation for any questions asked concerning sexual activity, sexual function, or sexual history. There is no way to know when someone will be offended or claim sexual harassment. It is in your own interest to behave in the most professional manner possible.

There should be no hint of sexual innuendo or humor injected into any of your conversations with clients at any time. The line of sexual impropriety lies where the complainant draws it and includes appearances of misbehavior. This perception differs broadly from client to client.

Finally, the number of hours slept is helpful information. Someone who reports sleepless nights may not actually be awake, but rather, may be experiencing a sleep disturbance. Cancer pain wakes the client up from a sound sleep. An actual record of being awake and up for hours at night or awakened repeatedly is significant (Case Example 3-6). See the discussion on Night Pain earlier in this chapter.

Physical Therapy Intervention “Fails”

If a client does not get better with physical therapy intervention, do not immediately doubt yourself. The lack of progression in treatment could very well be a red flag symptom. If the client reports improvement in the early intervention phase but later takes a turn for the worse, it may be a red flag. Take the time to step back, reevaluate the client and your intervention, and screen if you have not already done so (or screen again if you have).

If painful, tender, or sore points (e.g., TrPs, Jones’ points, acupuncture/acupressure points/Shiatsu) are eliminated with intervention then return quickly (by the end of the individual session), suspect visceral pathology. If a tender point comes back later (several days or weeks), you may not be holding it long enough.

Bone Pain and Aspirin

There is one odd clinical situation you should be familiar with, not because you are likely to see it, but because the physicians may use this scenario to test your screening knowledge. Before the advent of nonaspirin pain relievers, a major red flag was always the disproportionate relief of bone pain from cancer with a simple aspirin.

The client who reported such a phenomenon was suspected of having osteoid osteoma and a medical workup would be ordered. The mechanism behind this is explained by the fact that salicylates in the aspirin inhibit the pain-inducing prostaglandins produced by the bone tumor.
CHAPTER 3 Pain Types and Viscerogenic Pain Patterns

CASE EXAMPLE 3-6

**Constant Night Pain**

A 33-year-old man with left shoulder pain reports “constant pain at night.” After asking all the appropriate screening questions related to night pain and constant pain, you see the following pattern:

Shoulder pain that is made worse by lying down whether it is at night or during the day. There are no increased pulmonar y or breathing problems at night when lying down. Pain is described as a “deep aching.” The client cannot find a comfortable position and moves from bed to couch to chair to bed all night long.

He injured his arm 6 months ago in a basketball game when he fell and landed on that shoulder. Symptoms have been gradually getting worse and nothing he does makes it go away. He reports a small amount of relief if he puts a rolled towel under his armpit.

He is not taking any medication; has no significant personal or family history for cancer, kidney, heart, or stomach disease; and has no other symptoms of any kind.

**Do You Need to Screen any Further for Systemic Origin of Symptoms?**

Probably not, even though there are what look like red flags:

- Constant pain
- Deep aching
- Symptoms beyond the expected time for physiologic healing
- No position is comfortable

Once you complete the objective tests and measures, you will have a better idea if further questions are needed. Although his pain is “constant” and occurs at night, it looks like it may be positional.

An injury 6 months ago with continued symptoms falls into the category of “symptoms persist beyond the expected time for physiologic healing.” His description of not being able to find a position of comfort is a possible example of “no position is comfortable.”

Given the mechanism of injury and position of mild improvement (towel roll under the arm), it may be more likely that a soft tissue tear is present and physiologic healing has not been possible.

Referral to a physician (or returning the client to the referring physician) may not be necessary just yet. Some clients do not want surgery and opt for a rehabilitation approach. Make sure you have all the information from the primary care physician if there is one involved. Your rehabilitation protocol will depend on a specific diagnosis (e.g., torn rotator cuff, labral tear, impingement syndrome).

If the client does not respond to physical therapy intervention, reevaluation (possibly including a screening component) is warranted with physician referral considered at that time.

When conversing with a physician, it is not necessary for the therapist to identify the specific underlying pathology as a bone tumor. Such a conclusion is outside the scope of a physical therapist’s practice.

However, recognizing a sign of something that does not fit the expected mechanical or NMS pattern is within the scope of our practice and that is what the therapist can emphasize when communicating with medical doctors. Understanding this concept and being able to explain it in medical terms can enhance communication with the physician.

**Pain Does Not Fit the Expected Pattern**

In a primary care practice or under direct access, the therapist may see a client reporting back, hip, or SI pain of systemic or visceral origin early on in its development. In these cases, during early screening, the client often presents with full and pain-free ROM. Only after pain has been present long enough to cause splinting and guarding, does the client exhibit biomechanical changes (Box 3-9).

**SCREENING FOR EMOTIONAL AND PSYCHOLOGIC OVERLAY**

Pain, emotions, and pain behavior are all integral parts of the pain experience. There is no disease, illness, or state of pain without an accompanying psychologic component. This does not mean the client’s pain is not real or does not exist on a physical level. In fact, clients with behavioral changes may also have significant underlying injury. Physical pain and emotional changes are two sides of the same coin.

Pain is not just a physical sensation that passes up to consciousness and then produces secondary emotional effects. Rather, the neurophysiology of pain and emotions are closely linked throughout the higher levels of the CNS. Sensory and emotional changes occur simultaneously and influence each other.

The sensory discriminative component of pain is primarily physiologic in nature and occurs as a result of nociceptive stimulation in the presence of organic pathology. The motivational-affective dimension of pain is psychologic in nature subject to the underlying principles of emotional behavior.

The therapist’s practice often includes clients with personality disorders, malingering, or other psychophysiologic disorder. Psychophysiologic disorders (also known as somatic disorders) are any conditions in which the physical symptoms may be caused or made worse by psychologic factors.

Recognizing somatic signs of any psychophysiologic disorder is part of the screening process. Behavioral, psychologic, or medical treatment may be indicated. Psychophysiologic disorders are generally characterized by subjective complaints that exceed objective findings, symptom development in the

<table>
<thead>
<tr>
<th>BOX 3-9 RANGE OF MOTION CHANGES WITH SYSTEMIC DISEASE</th>
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<tbody>
<tr>
<td><strong>Early screening:</strong> Full and pain-free range of motion (ROM)</td>
</tr>
<tr>
<td><strong>Late screening:</strong> Biomechanical response to pain results in changes associated with splinting and guarding</td>
</tr>
</tbody>
</table>

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presence of psychosocial stresses, and physical symptoms involving one or more organ systems. It is the last variable that can confuse the therapist when trying to screen for medical disease.

It is impossible to discuss the broad range of psychophysiologic disorders that comprise a large portion of the physical therapy caseload in a screening text of this kind. The therapist is strongly encouraged to become familiar with the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV-TR) to understand the psychologic factors affecting the successful outcome of rehabilitation.

However, recognizing clusters of signs and symptoms characteristic of the psychologic component of illness is very important in the screening process. Likewise, the therapist will want to become familiar with nonorganic signs indicative of psychologic factors. Three key psychologic components have important significance in the pain response of many people:

- Anxiety
- Depression
- Panic Disorder

Anxiety, Depression, and Panic Disorder

Psychologic factors, such as emotional stress and conflicts leading to anxiety, depression, and panic disorder, play an important role in the client’s experience of physical symptoms. In the past, physical symptoms caused or exacerbated by psychologic variables were labeled psychosomatic.

Today the interconnections between the mind, the immune system, the hormonal system, the nervous system, and the physical body have led us to view psychosomatic disorders as psychophysiologic disorders.

There is considerable overlap, shared symptoms, and interaction between these emotions. They are all part of the normal human response to pain and stress and occur often in clients with serious or chronic health conditions. Intervention is not always needed. However, strong emotions experienced over a long period of time can become harmful if excessive.

Depression and anxiety often present with somatic symptoms that may resolve with effective treatment of these disorders. Diagnosis of these conditions is made by the therapist or trained mental health professional. The therapist can describe the symptoms and relay that information to the appropriate agency or individual when making a referral.

Anxiety

Anyone who feels excessive anxiety may have a generalized anxiety disorder with excessive and unrealistic worry about day-to-day issues that can last months and even longer.

Anxiety amplifies physical symptoms. It is like the amplifier (“amp”) on a sound system. It does not change the sound; it just increases the power to make it louder. The tendency to amplify a broad range of bodily sensations may be an important factor in experiencing, reporting, and functioning with an acute and relatively mild medical illness.

Keep in mind the known effect of anxiety on the intensity of pain. The Beck Anxiety Inventory (BAI) quickly assesses the presence and severity of client anxiety in adolescents and adults ages 17 and older. It was designed to reduce the overlap between depression and anxiety scales by measuring anxiety symptoms shared minimally with those of depression.

The BAI consists of 21 items, each scored on a 4-point scale between 0 and 3, for a total score ranging from 0 to 63. Higher scores indicate higher levels of anxiety. The BAI is reported to have good reliability for clients with various psychiatric diagnoses.

The BAI differentiates between anxious and nonanxious groups in a variety of clinical settings and is appropriate for all adult mental health populations.
People with chronic pain have three times the average risk of developing depression or anxiety, and clients who are depressed have three times the average risk of developing chronic pain.  

Almost 500 million people are suffering from mental disorders today. One in four families has at least one member with a mental disorder at any point in time, and these numbers are on the increase. Depressive disorders are the fourth leading cause of disease and disability. Public health prognosticators predict that by 2020, clinical depression will be the leading cause of medical disability on earth. Adolescents are increasingly affected by depression.  

The reasons for the increased incidence are speculative at best. Rapid cultural change around the world, worldwide poverty, and the aging of the world’s population (the incidence of depression and dementia increases with age) have been put forth by researchers as possibilities.  

Others suggest better treatment of the symptoms has resulted in fewer suicides. Researchers think that genes may play a role in a person’s risk of developing depression. In earlier times, adults who had this genetic link may have committed suicide before bearing children and passing the gene on. Today, with better treatment and greater longevity, people with major depressive disorders may unwittingly pass the disease on to their children.  

New insights on depression have led scientists to see clinical depression as a biologic disease possibly originating in the brain with multiple visceral involvements (Table 3-10). One error in medical treatment has been to recognize and treat the client’s esophagitis, palpitations, irritable bowel, heart...
### BOX 3-10 PHYSICAL CONDITIONS COMMONLY ASSOCIATED WITH DEPRESSION

<table>
<thead>
<tr>
<th>Cardiovascular</th>
<th>Pneumonia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atherosclerosis</td>
<td>Influenza</td>
</tr>
<tr>
<td>Hypertension</td>
<td></td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td></td>
</tr>
<tr>
<td>Angioplasty or bypass surgery</td>
<td></td>
</tr>
<tr>
<td><strong>Central Nervous System</strong></td>
<td><strong>Nutritional</strong></td>
</tr>
<tr>
<td>Parkinson’s disease</td>
<td>Folic acid deficiency</td>
</tr>
<tr>
<td>Huntington’s disease</td>
<td>Vitamin B₆ deficiency</td>
</tr>
<tr>
<td>Cerebral arteriosclerosis</td>
<td>Vitamin B₁₂ deficiency</td>
</tr>
<tr>
<td>Stroke</td>
<td></td>
</tr>
<tr>
<td>Alzheimer’s disease</td>
<td><strong>Immune</strong></td>
</tr>
<tr>
<td>Temporal lobe epilepsy</td>
<td>Fibromyalgia</td>
</tr>
<tr>
<td>Postconcussion injury</td>
<td>Chronic fatigue syndrome</td>
</tr>
<tr>
<td>Multiple sclerosis</td>
<td>Systemic lupus erythematosus</td>
</tr>
<tr>
<td>Miscellaneous focal lesions</td>
<td>Sjögren’s syndrome</td>
</tr>
<tr>
<td></td>
<td>Rheumatoid arthritis</td>
</tr>
<tr>
<td><strong>Endocrine, Metabolic</strong></td>
<td>Immunosuppression (e.g., corticosteroid treatment)</td>
</tr>
<tr>
<td>Hyperthyroidism</td>
<td>Cancer</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>Pancreatic</td>
</tr>
<tr>
<td>Addison’s disease</td>
<td>Bronchogenic</td>
</tr>
<tr>
<td>Cushing’s disease</td>
<td>Renal</td>
</tr>
<tr>
<td>Hypoglycemia</td>
<td>Ovarian</td>
</tr>
<tr>
<td>Hyperglycemia</td>
<td></td>
</tr>
<tr>
<td>Hyperparathyroidism</td>
<td><strong>Miscellaneous</strong></td>
</tr>
<tr>
<td>Hyponatremia</td>
<td>Pancreatitis</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>Sarcoïdosis</td>
</tr>
<tr>
<td>Pregnancy (postpartum)</td>
<td>Syphilis</td>
</tr>
<tr>
<td><strong>Viral</strong></td>
<td>Porphyria</td>
</tr>
<tr>
<td>Acquired immunodeficiency syndrome</td>
<td>Corticosteroid treatment</td>
</tr>
<tr>
<td>(AIDS)</td>
<td></td>
</tr>
<tr>
<td>Hepatitis</td>
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</tbody>
</table>


disease, asthma, or chronic low back pain without seeing the real underlying impairment of the CNS (CNS dysregulation: depression) leading to these dysfunctions.¹³⁴,¹³⁹,¹⁴⁰

A medical diagnosis is necessary because several known physical causes of depression are reversible if treated (e.g., thyroid disorders, vitamin B₁₂ deficiency, medications [especially sedatives], some hypertensives, and H₂ blockers for stomach problems). About half of clients with panic disorder will have an episode of clinical depression during their lives.

Depression is not a normal part of the aging process, but it is a normal response to pain or disability and may influence the client’s ability to cope. Whereas anxiety is more apparent in acute pain episodes, depression occurs more often in clients with chronic pain.

The therapist may want to screen for psychosocial factors, such as depression, that influence physical rehabilitation outcomes, especially when a client demonstrates acute pain that persists for more than 6 to 8 weeks. Screening is also important because depression is an indicator of poor prognosis.¹⁴¹

In the primary care setting, the physical therapist has a key role in identifying comorbidities that may have an impact on physical therapy intervention. Depression has been clearly identified as a factor that delays recovery for clients with low back pain. The longer depression is undetected, the greater the likelihood of prolonged physical therapy intervention and increased disability.¹⁴¹,¹⁴²

Tests such as the Beck Depression Inventory (BDI) second edition (BDI-II),¹⁴³-¹⁴⁵ the Zung Depression Scale,¹⁴⁶ or the Geriatric Depression Scale (short form) (Table 3-11) can be administered by a physical therapist to obtain baseline information that may be useful in determining the need for a medical referral. These tests do not require interpretation that is out of the scope of physical therapist practice.

The short form of the BDI, the most widely used instrument for measuring depression, takes five minutes to complete, and is also used to monitor therapeutic progress. The BDI consists of questions that are noninvasive and straightforward in presentation.
CHAPTER 3  Pain Types and Viscerogenic Pain Patterns

For a complete list of drugs that can cause depression, see Wolfe S: List of drugs that cause depression, Public Citizen’s Health Research Group, Washington, DC, 2004 http://www.worstpills.org/  

BOX 3-11 DRUGS COMMONLY ASSOCIATED WITH DEPRESSION

- Antianxiety medications (e.g., Valium, Xanax)
- Illegal drugs (e.g., cocaine, crack)
- Antihypertensive drugs (e.g., beta blockers, antiadrenergics)
- Cardiovascular medications (e.g., digitoxin, digoxin)
- Antineoplastic agents (e.g., vinblastine)
- Opiate analgesics (e.g., morphine, Demerol, Darvon)
- Anticonvulsants (e.g., Dilantin, phenobarbital)
- Corticosteroids (e.g., prednisone, cortisone, dexamethasone)
- Nonsteroidal antiinflammatory drugs (NSAIDs) (e.g., indomethacin)
- Alcohol
- Hormone replacement therapy and oral contraceptives

The BDI-II is a 21-item self-report instrument intended to assess the existence and severity of symptoms of depression in adults and adolescents 13 years of age and older as listed in the American Psychiatric Association’s DSM-IV-TR. When presented with the BDI-II, a client is asked to consider each statement as it relates to the way they have felt for the past 2 weeks, to more accurately correspond to the DSM-IV criteria. The authors warn against the use of this instrument as a sole diagnostic measure because depressive symptoms may be part of other primary diagnostic disorders (see Box 3-10).

In the acute care setting, the therapist may see results of the BDI-II for Medical Patients in the medical record. This seven-item self-report measure of depression in adolescents and adults reflects the cognitive and affective symptoms of depression, while excluding somatic and performance symptoms that might be attributable to other conditions. It is a quick and effective way to assess depression in populations with biological, medical, alcohol, and/or substance abuse problems.

The Beck Scales for anxiety, depression, or suicide can help identify clients from ages 13 to 80 with depressive, anxious,

TABLE 3-10  Systemic Effects of Depression

<table>
<thead>
<tr>
<th>System</th>
<th>Sign or Symptom</th>
</tr>
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</table>
| General (multiple system cross over) | Persistent fatigue  
                        Insomnia, sleep disturbance  
                        See clinical signs and symptoms of depression in the text |
| Cardiovascular       | Chest pain  
                        • Associated with myocardial infarction  
                        • Can be atypical chest pain that is not associated with coronary artery disease |
| Gastrointestinal    | Irritable bowel syndrome (IBS)  
                        Esophageal dysmotility  
                        Nonulcer dyspepsia  
                        Functional abdominal pain (heartburn) |
| Neurologic (often symmetric and nonanatomic) | Paresthesia  
                        Dizziness  
                        Difficulty concentrating and making decisions; problems with memory |
| Musculoskeletal      | Weakness  
                        Fibromyalgia (or other unexplained rheumatic pain)  
                        Myofascial pain syndrome  
                        Chronic back pain |
| Immune               | Multiple allergies  
                        Chemical hypersensitivity  
                        Autoimmune disorders |
| Dysregulation        | Recurrent or resistant infections  
                        Autonomic instability  
                        • Temperature intolerance  
                        • Blood pressure changes |
| Other                | Hormonal dysregulation (e.g., amenorrhea)  
                        Migraine and tension headaches  
                        Shortness of breath associated with asthma or not clearly explained  
                        Anxiety or panic disorder |

Data from Smith NL: The effects of depression and anxiety on medical illness, Sandy, Utah, 2002, Stress Medicine Clinic, School of Medicine, University of Utah.

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or suicidal tendencies even in populations with overlapping physical and/or medical problems.

The Beck Scales have been developed and validated to assist health care professionals in making focused and reliable client evaluations. Test results can be the first step in recognizing and appropriately treating an affective disorder. These are copyrighted materials and can be obtained directly from The Psychological Corporation now under the new name of Harcourt Assessment.

If the resultant scores for any of these assessment tools suggest clinical depression, psychologic referral is not always necessary. Intervention outcome can be monitored closely, and if progress is not made, the therapist may want to review this outcome with the client and discuss the need to communicate this information to the physician. Depression can be treated effectively with a combination of therapies, including exercise, proper nutrition, antidepressants, and psychotherapy.

**Symptoms of Depression.** About one-third of the clinically depressed clients treated do not feel sad or blue. Instead, they report somatic symptoms such as fatigue, joint pain, headaches, or chronic back pain (or any chronic, recurrent pain present in multiple places).

Eighty per cent to 90% of the most common GI disorders (e.g., esophageal motility disorder, nonulcer dyspepsia, irritable bowel syndrome) are associated with depressive or anxiety disorders.

Some scientists think the problem is overresponse of the enteric system to stimuli. The gut senses stimuli too early, receives too much of a signal, and responds with too much of a reaction. Serotonin levels are low and substance P levels are too high when, in fact, these two neurotransmitters are supposed to work together to modulate the GI response.

Other researchers propose that one of the mechanisms underlying chronic disorders associated with depression such as irritable bowel syndrome and fibromyalgia is an increased activation of brain regions concerned with the processing and modulation of visceral and somatic afferent information, particularly in the subregions of the anterior cingulate cortex (ACC).

Another red flag for depression is any condition associated with smooth muscle spasm such as asthma, irritable or overactive bladder, Raynaud’s disease, and hypertension. Neurologic symptoms with no apparent cause such as paresthesias, dizziness, and weakness may actually be symptoms of depression. This is particularly true if the neurologic symptoms are symmetric or not anatomic.

### CLINICAL SIGNS AND SYMPTOMS

#### Depression (See Also Table 3-10)

- Persistent sadness, low mood, or feelings of emptiness
- Frequent or unexplained crying spells
- A sense of hopelessness
- Feelings of guilt or worthlessness
- Problems in sleeping
- Loss of interest or pleasure in ordinary activities or loss of libido
- Fatigue or decreased energy
- Appetite loss (or overeating)
- Difficulty in concentrating, remembering, and making decisions
- Irritability
- Persistent joint pain
- Headache
- Chronic back pain
- Bilateral neurologic symptoms of unknown cause (e.g., numbness, dizziness, weakness)
- Thoughts of death or suicide
- Pacing and fidgeting
- Chest pain and palpitations

#### Drugs, Depression, Dementia, or Delirium?

The older adult often presents with such a mixed clinical presentation, it is difficult to know what is a primary musculoskeletal problem and what could be caused by drugs or depression (Case Example 3-7). Family members confuse signs and
symptoms of depression with dementia and often ask the therapist for a differentiation. The therapist may be able to provide observational clues by noting any of the following:

- Mental function: declines more rapidly with depression
- Disorientation: present only in dementia
- Difficulty concentrating: depression
- Difficulty with short-term memory: dementia
- Writing, speaking, and motor impairments: dementia
- Memory loss: people with depression notice and comment, people with dementia are indifferent to the changes

Risk factors for delirium include older age, prior cognitive impairment, presence of infection, severe illness or multiple comorbidities, dehydration, psychotropic medications, alcohol abuse, vision or hearing impairment, fractures, low albumin, recent metastasis, and recent radiation therapy (see further discussion in Chapter 4; see also Box 4-2). Screening for delirium is discussed further in Chapter 4.

Panic Disorder

Persons with panic disorder have episodes of sudden, unprovoked feelings of terror or impending doom with associated physical symptoms such as racing or pounding heartbeat, breathlessness, nausea, sweating, and dizziness. During an attack, people may fear that they are gravely ill, going to die, or going crazy.

The fear of another attack can itself become debilitating so that these individuals avoid situations and places that they believe will trigger the episodes, thus affecting their work, their relationships, and their ability to take care of everyday tasks.

Initial panic attacks may occur when people are under considerable stress, for example, an overload of work or from loss of a family member or close friend. The attacks may follow surgery, a serious accident, illness, or childbirth. Excessive consumption of caffeine or use of cocaine, other stimulant drugs, or medicines containing caffeine or stimulants used in treating asthma can also trigger panic attacks.

The symptoms of a panic attack can mimic those of other medical conditions, such as respiratory or heart problems.

Anxiety or panic is a leading cause of chest pain mimicking a heart attack. Residual sore muscles are a consistent finding after the panic attack and can also occur in individuals with social phobias. People suffering from these attacks may be afraid or embarrassed to report their symptoms to the physician.

The alert therapist may recognize the need for a medical referral. A combination of antidepressants known as selective serotonin reuptake inhibitors (SSRIs) combined with cognitive behavioral therapy (CBT) has been proven effective in controlling symptoms.

Panic disorder is characterized by periods of sudden, unprovoked, intense anxiety with associated physical symptoms lasting a few minutes up to a few hours. Dizziness, paresthesias, headaches, and palpitations are common.

Pain perception involves a sensory component (pain sensation) and an emotional reaction referred to as the sensory-discriminative and motivational-affective dimensions, respectively.
The identification of biologic carriers of emotions has also led to an understanding of a concept well known to physical therapists but previously unnamed: cellular memories. Many health care professionals have seen the emotional and psychological response of a hands-on approach. Concepts labeled as craniosacral, unwinding, myofascial release, and soft tissue mobilization are based (in part) with this in mind.

These new discoveries help substantiate the idea that cells containing memories are shuttled through the body and brain via chemical messengers. The biologic basis of emotions and memories helps explain how soft tissues respond to emotions; indeed, the soft tissue structures may even contain emotions by way of neuropeptides.

Perhaps this can explain why two people can experience a car accident and whiplash (flexion-extension) or other injury. One recovers without any problems, while the other develops chronic pain that is resistant to any intervention. The focus of research on behavioral approaches combined with our hands-on intervention may bring a better understanding of what works and why.

Other researchers investigating neuropathic pain see a link between memory and pain. Studies looking at the physical similarities between the way a memory is formed and the way pain becomes persistent and chronic support such a link.

Researchers suggest when somatic pain persists beyond the expected time of healing the pain no longer originates in the tissue that was damaged. Pain begins in the CNS instead. The experience changes the nervous system. The memory of pain recurs again and again in the CNS.

The nervous system transmits pain signals efficiently, and small pain signals may be amplified until the sensation of pain is out of proportion to what is expected for the injury. Pain amplification occurs in the spinal cord. Spinal cord cells called glia become activated, releasing a variety of chemical substances that cause pain messages to become amplified.

Other researchers have reported the discovery of a protein that allows nerve cells to communicate and thereby enhance perceptions of chronic pain. The results reinforce the notion that the basic process that leads to memory formation may be the same as the process that causes chronic pain.

Along these same lines, other researchers have shown a communication network between the immune system and the brain. Pain phenomena are actually modulated by immune function. Proinflammatory cytokines (e.g., TNF, IL-1, IL-6) released by activated immune cells signal the brain by both blood-borne and neural routes, leading to alterations in neural activity.

The cytokines in the brain interfere with cognitive function and memory; the cytokines within the spinal cord exaggerate fatigue and pain. By signaling the CNS, these proinflammatory cytokines create exaggerated pain, as well as an entire constellation of physiologic, hormonal, and behavioral changes referred to as the sickness response.

In essence immune processes work well when directed against pathogens or cancer cells. When directed against peripheral nerves, dorsal nerve ganglia, or the dorsal roots in
the spinal cord, the immune system attacks the nerves, resulting in extreme pain.

Such exaggerated pain states occur with infection, inflammation, or trauma of the skin, peripheral nerves, and CNS. The neuroimmune link may help explain the exaggerated pain state associated with conditions such as chronic fatigue syndrome and fibromyalgia.

With this new understanding that all peripheral nerves and neurons are affected by immune and glial activation, intervention to modify pain will likely change in the near future.157,169

**SCREENING FOR SYSTEMIC VERSUS PSYCHOGENIC SYMPTOMS**

Screening for emotional or psychologic overlay has a place in our examination and evaluation process. Recognizing that this emotion-induced somatic pain response has a scientific basis may help us find better ways to alter or eliminate it.

The key in screening for systemic versus psychogenic basis of symptoms is to identify the client with a significant emotional or psychologic component influencing the pain experience. Whether to refer the client for further psychologic evaluation and treatment or just modify the physical therapy plan of care is left up to the therapist's clinical judgment.

In all cases of pain, watch for the client who reports any of the following red flag symptoms:
- Symptoms are out of proportion to the injury.
- Symptoms persist beyond the expected time for physiologic healing.
- No position is comfortable.

These symptoms reflect both the possibility of an emotional or psychologic overlay, as well as the possibility of a more serious underlying systemic disorder (including cancer). In this next section, we will look at ways to screen for emotional content, keeping in mind what has already been said about anxiety, depression, and panic disorder.

**Screening Tools for Emotional Overlay**

Screening tools for emotional overlay can be used quickly and easily to help screen for emotional overlay in painful symptoms (Box 3-12). The client may or may not be aware that he or she is in fact exaggerating pain responses, catastrophizing the pain experience, or otherwise experiencing pain associated with emotional or psychologic overlay.

This discussion does not endorse physical therapists' practicing as psychologists, which is outside the scope of our expertise and experience. It merely recognizes that in treating the whole client not only the physical but also the psychologic, emotional, and spiritual needs of that person will be represented in his or her magnitude of symptoms, length of recovery time, response to pain, and responsibility for recovery.

**Pain Catastrophizing Scale**

Pain catastrophizing refers to a negative view of the pain experience or expecting the worst to happen. Catastrophizing boosts anxiety and worry. These emotions stimulate neural systems that produce increased sensitivity to pain so that pain is exaggerated or blown out of proportion. It can occur in a person who already has pain or in individuals who have not even had any pain yet—that person is just anticipating it might happen.

Pain catastrophizing is increasingly being recognized as an important factor in the experience of pain. There is evidence to suggest that pain catastrophizing is related to various levels of pain, physical disability, and psychological disability in individuals with chronic musculoskeletal pain.170,171 Without intervention, these pain-related fears can lead to chronic pain and disability over time.172

Identifying pain catastrophizing can help in the screening process to make appropriate referral for behavioral therapy and coordinate rehabilitative efforts. The Pain Catastrophizing Scale (PCS)173 can be used to assist in the screening process. It is significantly predictive of perceived disability and more strongly predictive of function than pain intensity.172 The PCS is a 13-item self-report scale with items in three different categories (rumination, magnification, and helplessness) that are rated on a scale from 0 to 4. It has shown strong evidence of validity but remains under investigation.171,174

**McGill Pain Questionnaire**

The McGill Pain Questionnaire (MPQ) from McGill University in Canada is a well-known and commonly used tool in assessing chronic pain. The MPQ is designed to measure the subjective pain experience in a quantitative form. It is considered a good baseline for assessing pain and has both high reliability and validity in younger adults. To our knowledge, it has not been tested specifically with older adults.

The MPQ consists primarily of two major classes of word descriptors, sensory and affective (emotional), and can be used to specify the subjective pain experience. It also contains an intensity scale and other items to determine the properties of pain experience.

There is a shorter version, which some clinicians find more practical for routine use.60,175 It can be used for both assessment and ongoing monitoring for any condition. However, for screening purposes outlined here, the format of the original MPQ may work best (Fig. 3-11).

The original form of the MPQ with all its affective word descriptors to help clients describe their pain gives results that help the therapist identify the source of the pain: vascular (visceral), neurogenic (somatic), musculoskeletal (somatic), or emotional (psychosomatic) (see Table 3-1).
When administering this portion of the questionnaire, the therapist reads the list of words in each box. The client is to choose the one word that best describes his or her pain. If no word in the box matches, the box is left blank. The words in each box are listed in order of ascending (rank order) intensity.

For example, in the first box, the words begin with “flickering” and “quivering” and gradually progress to “beating” and “pounding.” Beating and pounding are considered much more intense than flickering and quivering. Word descriptors included in Group 1 reflect characteristics of pain of a vascular disorder. Knowing this information can be very helpful as the therapist continues the examination and evaluation of the client.

Groups 2 through 8 are words used to describe pain of a neurogenic origin. Group 9 reflects the musculoskeletal system and groups 10 through 20 are all the words a client might use to describe pain in emotional terms (e.g., torturing, killing, vicious, agonizing).

After completing the questionnaire with the client, add up the total number of checks. According to the key, choosing up to eight words to describe the pain is within normal limits.

**DIRECTIONS:** There are many words that describe pain. Some of these words are grouped below. Check ( ) one word in each category that best describes your pain. Any category that does not describe your pain should remain blank.

<table>
<thead>
<tr>
<th>Group</th>
<th>Words</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 Flickering, 11 Tiring</td>
</tr>
<tr>
<td></td>
<td>2 Flickering, 12 Sickening</td>
</tr>
<tr>
<td></td>
<td>3 Flickering, 13 Fearful</td>
</tr>
<tr>
<td></td>
<td>4 Flickering, 14 Punishing</td>
</tr>
<tr>
<td></td>
<td>5 Flickering, 15 Wretched</td>
</tr>
<tr>
<td>2</td>
<td>2 Jumping, 12 Sickening</td>
</tr>
<tr>
<td></td>
<td>3 Jumping, 13 Fearful</td>
</tr>
<tr>
<td></td>
<td>4 Jumping, 14 Punishing</td>
</tr>
<tr>
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<td>5 Jumping, 15 Wretched</td>
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<td>3</td>
<td>3 Pricking, 12 Sickening</td>
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<td></td>
<td>4 Pricking, 13 Fearful</td>
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**ACCOMPANYING SYMPTOMS:** Nausea, Headache, Dizziness, Drowsiness, Constipation, Diarrhea

**SLEEP:** Good, Fitful, Can't sleep

**FOOD INTAKE:** Good, Some, Little, None

**COMMENTS:**

A form of the McGill Pain Questionnaire.

**KEY:**
- Group 1 suggests vascular disorder
- Groups 2–8 suggest neurogenic disorder
- Group 9 suggests musculoskeletal disorder
- Groups 10–20 suggest emotional lability

**SCORING:** Add up total number of checks. Clients who mark:
- 4–8 = Within normal limits (WNL)
- ≥9 = may be getting a “little into pain”
- ≥10 = Psychologic evaluation may be needed.

![McGill-Melzack Pain Questionnaire](image-url)
Illness Behavior Syndrome and Symptom Magnification

Pain in the absence of an identified source of disease or pathologic condition may elicit a behavioral response from the client that is now labeled illness behavior syndrome. Illness behavior is what people say and do to show they are ill or perceive themselves as sick or in pain. It does not mean there is nothing wrong with the person. Illness behavior expresses and communicates the severity of pain and physical impairment.90

This syndrome has been identified most often in people with chronic pain. Its expression depends on what and how the client thinks about his or her symptoms/illness. Components of this syndrome include:

- Dramatization of complaints, leading to overtreatment and overmedication
- Progressive dysfunction, leading to decreased physical activity and often compounding preexisting musculoskeletal or circulatory dysfunction
- Drug misuse
- Progressive dependency on others, including health care professionals, leading to overuse of the health care system
- Income disability, in which the person’s illness behavior is perpetuated by financial gain88

Symptom magnification syndrome (SMS) is another term used to describe the phenomenon of illness behavior; conscious symptom magnification is referred to as malingering, whereas unconscious symptom magnification is labeled illness behavior. Conscious malingering may be described as exaggeration or faking symptoms for external gain. Some experts differentiate symptom amplification from malingering or factitious disorder (i.e., fakery or self-induced symptoms that enable the sick role).176

The term symptom magnification was first coined by Leonard N. Matheson, PhD,* in 1977 to describe clients whose symptoms have reinforced their behavior, that is, the symptoms have become the predominant force in the client’s function rather than the physiologic phenomenon of the injury determining the outcome.

By definition, SMS is a self-destructive, socially reinforced behavioral response pattern consisting of reports or displays of symptoms that function to control the life of the sufferer.177-179 The amplified symptoms rather than the physiologic phenomenon of the injury determine the outcome/function.

The affected person acts as if the future cannot be controlled because of the presence of symptoms. All present limitations are blamed on the symptoms: “My (back) pain won’t let me ….” The client may exaggerate limitations beyond those that seem reasonable in relation to the injury, apply minimal effort on maximal performance tasks, and overreact to physical loading during objective examination.

It is important for physical therapists to recognize that we often contribute to SMS by focusing on the relief of symptoms, especially pain, as the goal of therapy. Reducing pain is an acceptable goal for some types of clients, but for those who experience pain after the injuries have healed, the focus should be restoration, or at least improvement, of function.

In these situations, instead of asking whether the client’s symptoms are “better, the same, or worse,” it may be more appropriate to inquire about functional outcomes, for example, what can the client accomplish at home that she or he was unable to attempt at the beginning of treatment, last week, or even yesterday.

Conscious or unconscious? Can a physical therapist determine when a client is consciously or unconsciously symptom magnifying? Is it within the scope of the physical therapist’s practice to use the label “malingering” without a psychologist or psychiatrist’s diagnosis of such first?

Physical exam techniques available include McBride’s, Mankopf’s, Waddell’s, Hoover’s, Abductor, Arm Drop, and Midline Split. The evidence supporting strength of recommendation (SOR) for these tests to detect malingering is ranked as B (systematic review of low-quality studies) or C (expert opinion, small case studies). For a review of these tests and a summary of the evidence for each one, see Greer et al, 2005.180 The American Psychiatric Association and the American Medical Association agree confirmation of malingering is extremely difficult and depends on direct observation. It is safest to assume a person is not malingering unless direct evidence is available.51,181

Keep in mind the goal is to screen for a psychologic or emotional component to the client’s clinical presentation. The key to achieving this goal is to use objective test measures whenever possible. In this way, the therapist obtains the guidance needed for referral versus modification of the physical therapy intervention.

Compiling a list of nonorganic or behavioral signs and identifying how the client is reacting to pain may be all that is needed. Signs of illness behavior may point the therapist in the direction of more careful “management” of the psychosocial and behavioral aspects of the client’s illness.116

Waddell’s Nonorganic Signs

Waddell et al182 identified five nonorganic signs and seven nonanatomic or behavioral descriptions of symptoms (Table 3-12) to help differentiate between physical and behavioral causes of back pain. Each of the nonorganic signs is determined by using one or two of the tests listed. These tests are used to assess a client’s pain behavior and detect abnormal illness behavior. The literature supports that these signs may be present in 10% of clients with acute low back pain, but are found most often in people with chronic low back pain.

A score of three or more positive signs places the client in the category of nonmovement dysfunction. This person is said to have a clinical pattern of nonmechanical, pain-focused

*Director, ERIC Human Performance Laboratory, Washington University School of Medicine, St. Louis, Missouri.
behavior. This type of score is predictive of poor outcome and associated with delayed return-to-work or not working.

One or two positive signs is a low Waddell’s score and does not classify the client with a nonmovement dysfunction. The value of these nonorganic signs as predictors for return-to-work for clients with low back pain has been investigated.\(^\text{183}\) Less than two is a good prognosticator of return-to-work. The results of how this study might affect practice are available.\(^\text{184}\)

A positive finding for nonorganic signs does not suggest an absence of pain but rather a behavioral response to pain (see discussion of symptom magnification syndrome). It does not confirm malingering or illness behavior. Neither do these signs imply the nonexistence of physical pathology.

Waddell and associates\(^\text{117,182}\) have given us a tool that can help us identify early in the rehabilitation process those who need more than just mechanical or physical treatment intervention. Other evaluation tools are available (e.g., Oswestry Back Pain Disability Questionnaire, Roland-Morris Disability Questionnaire). A psychologic evaluation and possiblybehavioral therapy or psychologic counseling may be needed as an adjunct to physical therapy.\(^\text{185}\)

### Conversion Symptoms

Whereas SMS is a behavioral, learned, inappropriate behavior, conversion is a psychodynamic phenomenon and quite rare in the chronically disabled population.

Conversion is a physical expression of an unconscious psychologic conflict such as an event (e.g., loss of a loved one) or a problem in the person’s work or personal life. The conversion may provide a solution to the conflict or a way to express “forbidden” feelings. It may be a means of enacting the sick role to avoid responsibilities, or it may be a reflection of behaviors learned in childhood.\(^\text{16}\)

Diagnosis of a conversion syndrome is difficult and often requires the diagnostic and evaluative input of the physical therapist. Presentation always includes a motor and/or sensory component that cannot be explained by a known medical or neuromusculoskeletal condition.

The clinical presentation is often mistaken for an organic disorder such as multiple sclerosis, systemic lupus erythematosus, myasthenia gravis, or idiopathic dystonias. At presentation, when a client has an unusual limp or bizarre gait pattern that cannot be explained by functional anatomy, family
members may be interviewed to assess changes in the client’s gait and whether this alteration in movement pattern is present consistently.

The physical therapist can look for a change in the wear pattern of the client’s shoes to decide if this alteration in gait has been long-standing. During manual muscle testing, true weakness results in smooth “giving way” of a muscle group; in hysterical weakness the muscle “breaks” in a series of jerks. Often the results of muscle testing are not consistent with functional abilities observed. For example, the person cannot raise the arm overhead during testing but has no difficulty dressing, or the lower extremity appears flaccid during recumbency but the person can walk on the heels and toes when standing.

The physical therapist should carefully evaluate and document all sensory and motor changes. Conversion symptoms are less likely to follow any dermatome, myotome, or sclerotome patterns.

### CLINICAL SIGNS AND SYMPTOMS

#### Conversion
- Sudden, acute onset
- Lack of concern about the symptoms
- Unexplainable motor or sensory function impairment

#### Motor
- Impaired coordination or balance and/or bizarre gait pattern
- Paralysis or localized weakness
- Loss of voice, difficulty swallowing, or sensation of a lump in the throat
- Urinary retention

#### Sensory
- Altered touch or pain sensation (paresthesia or dysesthesia)
- Visual changes (double vision, blindness, black spots in visual field)
- Hearing loss (mild-to-profound deafness)
- Hallucinations
- Seizures or convulsions
- Absence of significant laboratory findings
- Electrodiagnostic testing within normal limits
- Deep tendon reflexes within normal limits

### Screening Questions for Psychogenic Source of Symptoms

Besides observing for signs and symptoms of psychophysio-logic disorders, the therapist can ask a few screening questions (Box 3-13). The client may be aware of the symptoms but does not know that these problems can be caused by depression, anxiety, or panic disorder.

Medical treatment for physiopsychologic disorders can and should be augmented with exercise. Physical activity and exercise has a known benefit in the management of mild-to-moderate psychologic disorders, especially depression and anxiety. Aerobic exercise or strength training have both been shown effective in moderating the symptoms of these conditions.

Patience is a vital tool for therapists when working with clients who are having difficulty adjusting to the stress of illness and disability or the client who has a psychologic disorder. The therapist must develop personal coping mechanisms when working with clients who have chronic illnesses or psychologic disturbances.

Recognizing clients whose symptoms are the direct result of organic dysfunction helps us in coping with clients who are hostile, ungrateful, noncompliant, negative, or adversarial. Whenever possible, involve a psychiatrist, psychologist, or counselor as part of the management team. This approach will benefit the client as well as the health care staff.

### PHYSICIAN REFERRAL

#### Guidelines for Immediate Physician Referral

- Immediate medical attention is required for anyone with risk factors for and clinical signs and symptoms of rhabdomyolysis (see Table 3-5).
- Clients reporting a disproportionate relief of bone pain with a simple aspirin may have bone cancer. This red flag requires immediate medical referral in the presence of a personal history of cancer of any kind.
- Joint pain with no known cause and a recent history of infection of any kind. Ask about recent (last 6 weeks) skin lesions or rashes of any kind anywhere on the body, urinary tract infection, or respiratory infection. Take the client’s temperature and ask about recent episodes of fever, sweats, or other constitutional symptoms. Palpate for residual lymphadenopathy. Early diagnosis and treatment are essential to limit joint destruction and preserve function.

Guidelines for Physician Referral Required

- Proximal muscle weakness accompanied by change in one or more deep tendon reflexes in the presence of a previous history of cancer.
- The physician should be notified of anyone with joint pain of unknown cause who presents with recent or current skin rash or recent history of infection (hepatitis, mononucleosis, urinary tract infection, upper respiratory infection, STI, streptococcus).
- A team approach to fibromyalgia requires medical evaluation and management as part of the intervention strategy. Therapists should refer clients suspected with fibromyalgia for further medical follow up.
- Diffuse pain that characterizes some diseases of the nervous system and viscera may be difficult to distinguish from the equally diffuse pain so often caused by lesions of the moving parts. The distinction between visceral pain and pain caused by lesions of the vertebral column may be difficult to make and may require a medical diagnosis.
- The therapist may screen for signs and symptoms of anxiety, depression, and panic disorder. These conditions are often present with somatic symptoms that may resolve with effective intervention. The therapist can describe the symptoms and relay that information to the appropriate agency or individual when making a referral. Diagnosis is made by a medical doctor or trained mental health professional.
- Clients with new onset of back, neck, TMJ, shoulder, or arm pain brought on by a new exercise program or by exertion with the arms raised overhead should be screened for signs and symptoms of cardiovascular impairment. This is especially important if the symptoms are described as “throbbing” and start after a brief time of exercise (3 to 5 up to 10 minutes) and diminish or go away quickly with rest. Look for significant risk factors for cardiovascular involvement. Check vital signs. Refer for medical evaluation if indicated.
- Persistent pain on weight bearing or bone pain at night, especially in the older adult with risk factors such as osteoporosis, postural hypotension leading to falls, or previous history of cancer.

Clues to Screening for Viscerogenic Sources of Pain

We know systemic illness and pathologic conditions affecting the viscera can mimic NMS dysfunction. The therapist who knows pain patterns and types of viscerogenic pain can sort through the client’s description of pain and recognize when something does not fit the expected pattern for NMS problems.

We must keep in mind that pain from a disease process or viscerogenic source is often a late symptom rather than a reliable danger signal. For this reason the therapist must remain alert to other signs and symptoms that may be present but unaccounted for.

In this chapter, pain types possible with viscerogenic conditions have been presented along with three mechanisms by which viscera refer pain to the body (soma). Characteristics of systemic pain compared to musculoskeletal pain are presented, including a closer look at joint pain.

Pain with the following features raises a red flag to alert the therapist of the need to take a closer look:

- Pain of unknown cause.
- Pain that persists beyond the expected time for physiologic healing.
- Pain that is out of proportion to the injury.
- Pain that is unrelieved by rest or change in position.
- Pain pattern does not fit the expected clinical presentation for a neuromuscular or musculoskeletal impairment.
- Pain that cannot be altered, aggravated, provoked, reduced, eliminated, or alleviated.
- There are some positions of comfort for various organs (e.g., leaning forward for the gallbladder or side bending for the kidney), but with progression of disease the client will obtain less and less relief of symptoms over time.
- Pain, symptoms, or dysfunction are not improved or altered by physical therapy intervention.
- Pain that is poorly localized.
- Pain accompanied by signs and symptoms associated with a specific viscera (e.g., GI, GU, gynecologic [GYN], cardiac, pulmonary, endocrine).
- Pain that is constant and intense no matter what position is tried and despite rest, eating, or abstaining from food; a previous history of cancer in this client is an even greater red flag necessitating further evaluation.
- Pain (especially intense bone pain) that is disproportionately relieved by aspirin.
- Listen to the client’s choice of words to describe pain. Systemic or viscerogenic pain can be described as deep, sharp, boring, knifelike, stabbing, throbbing, colicky, or intermittent (comes and goes in waves).
- Pain accompanied by full and normal ROM.
- Pain that is made worse 3 to 5 minutes after initiating an activity and relieved by rest (possible symptom of vascular impairment) versus pain that goes away with activity (symptom of musculoskeletal involvement); listen for the word descriptor “throbbing” to describe pain of a vascular nature.
- Pain is a relatively new phenomenon and not a pattern that has been present over several years’ time.
- Constitutional symptoms in the presence of pain.
- Pain that is not consistent with emotional or psychologic overlay.
- When in doubt, conduct a screening exam for emotional overlay. Observe the client for signs and symptoms of anxiety, depression, and/or panic disorder. In the absence of systemic illness or disease and/or in the presence of suspicious psychologic symptoms, psychologic evaluation may be needed.
- Pain in the absence of any positive Waddell’s signs (i.e., Waddell’s test is negative or insignificant).
CHAPTER 3  Pain Types and Viscerogenic Pain Patterns

- Manual therapy to correct an upslip is not successful, and the problem has returned by the end of the session or by the next day; consider a somato-visceral problem or visceral ligamentous problem.
- If painful, tender or sore points (e.g., TrPs, Jones’ points, acupuncture/acupressure points/Shiatsu) are eliminated with intervention then return quickly (by the end of the treatment session), suspect visceral pathology. If a tender point comes back later (several days or weeks), the clinician may not be holding it long enough.\(^4\)
- Back, neck, TMJ, shoulder, or arm pain brought on by exertion with the arms raised overhead may be suggestive of a cardiac problem. This is especially true in the postmenopausal woman or man over age 50 with a significant family history of heart disease and/or in the presence of hypertension.
- Back, shoulder, pelvic, or sacral pain that is made better or worse by eating, passing gas, or having a bowel movement.
- Night pain (especially bone pain) that awakens the client from a sound sleep several hours after falling asleep; this is even more serious if the client is unable to get back to sleep after changing position, taking pain relievers, or eating or drinking something.
- Joint pain preceded or accompanied by skin lesions (e.g., rash or nodules), following antibiotics or statins, or recent infection of any kind (e.g., GI, pulmonary, GU); check for signs and symptoms associated with any of these systems based on recent client history.
- Clients can have more than one problem or pathology present at one time; it is possible for a client to have both a visceral AND a mechanical problem.\(^4\)
- Remember Osler’s Rule of Age*: Under age 60, most clients’ symptoms are related to one problem, but over 60, it is rarely just one problem.\(^4\)
- A careful general history and physical examination is still the most important screening tool; never assume this was done by the referring physician or other staff from the referring agency.\(^4\)
- Visceral problems are unlikely to cause muscle weakness, reflex changes, or objective sensory deficits (exceptions include endocrine disease and paraneoplastic syndromes associated with cancer). If pain is referred from the viscera to the soma, challenging the somatic structure by stretching, contracting, or palpating will not reproduce the symptoms. For example, if a muscle is not sore when squeezed or contracted, the muscle is not the source of the pain.\(^4\)

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*Physicians often rely on ad hoc rules of thumb, or “heuristics,” to guide them. These are often referred to as Osler’s Rules. Sir William Osler, MD (1849-1919) promoted the idea that good medical science follows from gathering evidence by directly observing patients.

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### Key Points to Remember

- Pain of a visceral origin can be referred to the corresponding somatic areas. The mechanisms of referred visceral pain patterns are not fully known. Information in this chapter is based on proposed models from what is known about the somatic sensory system.
- Recognizing pain patterns that are characteristic of systemic disease is a necessary step in the screening process. Understanding how and when diseased organs can refer pain to the NMS system helps the therapist identify suspicious pain patterns.
- At least three mechanisms contribute to referred pain patterns of the viscera (embryologic development, multisegmental innervation, and direct pressure and shared pathways). Being familiar with each one may help the therapist quickly identify pain patterns of a visceral source.
- The therapist should keep in mind cultural rules and differences in pain perception, intensity, and responses to pain found among various ethnic groups.
- Pain patterns of the chest, back, shoulder, scapula, pelvis, hip, groin, and SI joint are the most common sites of referred pain from a systemic disease process.

- Visceral diseases of the abdomen and pelvis are more likely to refer pain to the back, whereas intrathoracic disease refers pain to the shoulder(s). Visceral pain rarely occurs without associated signs and symptoms, although the client may not recognize the correlation. Careful questioning will usually elicit a systemic pattern of symptoms.
- A comprehensive pain assessment includes a detailed health history, physical exam, medication history (including nonprescription drug use and complementary and alternative therapies), assessment of functional status, and consideration of psychosocial-spiritual factors. Assessment tools vary from the very young to the very old.
- Careful, sensitive, and thorough questioning regarding the multifaceted experience of pain can elicit essential information necessary when making a decision regarding treatment or referral. The use of pain assessment tools, such as Fig. 3-6 and Table 3-2, may facilitate clear and accurate descriptions of this critical symptom.
- The client describes the characteristics of pain (location, frequency, intensity, duration, description). It is up

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Continued
Key Points to Remember—cont’d

- to the therapist to recognize sources and types of pain and to know the pain patterns of a viscerogenic origin.
- Choose alternative words to “pain” when discussing the client’s symptoms in order to get a complete understanding of the clinical presentation.
- Specific screening questions for joint pain are used to assess any joint pain of unknown cause, joint pain with an unusual presentation or history, or joint pain which does not fit the expected pattern for injury, overuse, or aging (see Box 3-5).

- It is important to know how to differentiate psychogenic and psychosomatic origins of painful symptoms from systemic origins, including signs and symptoms of cancer.
- Pain described as constant or present at night, awakening the client from sleep must be evaluated thoroughly. When assessing constant and/or night pain, the therapist must know how to differentiate the characteristics of acute versus chronic pain associated with a neuromusculoskeletal problem from a viscerogenic or systemic presentation.

SUBJECTIVE EXAMINATION

Special Questions to Ask

Pain Assessment

Location of Pain

Show me exactly where your pain is located.

Follow up questions may include:

- Do you have any other pain or symptoms anywhere else?
- If yes, what causes the pain or symptoms to occur in this other area?

Description of Pain

What does it feel like?

After giving the client time to reply, offer some additional choices in potential descriptors. You may want to ask: Is your pain

- Knife-like
- Dull
- Boring
- Burning
- Throbbing
- Prickly
- Deep aching
- Sharp

Follow up questions may include:

- Has the pain changed in quality since it first began?
- Changed in intensity?
- Changed in duration (how long it lasts)?

Frequency and Duration of Pain

How long do the symptoms last?

Clients who indicate that the pain is constant should be asked:

- Do you have this pain right now?
- Did you notice these symptoms this morning immediately when you woke up?

Pattern of Pain

Tell me about the pattern of your pain/symptoms.

- Alternate question: When does your back/shoulder (name the involved body part) hurt?
- Alternate question: Describe your pain/symptoms from first waking up in the morning to going to bed at night. (See special sleep-related questions that follow.)

Follow up questions may include:

- Have you ever experienced anything like this before?
- If yes, do these episodes occur more or less often than at first?
- How does your pain/symptom(s) change with time?
- Are your symptoms worse in the morning or evening?

Aggravating and Relieving Factors

- What brings your pain (symptoms) on?
- What kinds of things make your pain (symptoms) worse (e.g., eating, exercise, rest, specific positions, excitement, stress)?

To assess relieving factors, ask:

- What makes the pain better?

Follow up questions include:

- How does rest affect the pain/symptoms?
- Are your symptoms aggravated or relieved by any activities?
- If yes, what?
- How has this problem affected your daily life at work or at home?
- How has this problem affected your ability to care for yourself without assistance (e.g., dress, bathe, cook, drive)?
ASSOCIATED SYMPTOMS

- What other symptoms have you had that you can associate with this problem?
  - If the client denies any additional symptoms, follow up this question with a series of possibilities such as:
    - Burning
    - Difficulty in breathing
    - Difficulty in swallowing
    - Dizziness
    - Heart palpitations
    - Hoarseness
    - Nausea
    - Night sweats
    - Numbness/Tingling
    - Problems with vision
    - Problems with swallowing
    - Protruding
    - Restlessness
    - Rim pressure
    - Roughness
    - Weakness

- Are you having any pain anywhere else in your body?
  - Alternately: Are you having symptoms of any other kind that may or may not be related to your main problem?

ANXIETY/DEPRESSION (See Table 3-11)

- Have you been under a lot of stress lately?
- Are you having some trouble coping with life in general and/or life’s tensions?
- Do you feel exhausted or overwhelmed mentally or physically?
- Does your mind go blank or do you have trouble concentrating?

For the Asian client:

- Do you feel you are having any imbalance of yin and yang?
- Is your Qi (or chi, pronounced “chee”) (internal energy) low?
- Do you believe it is your destiny to have this condition or your destiny not to have this condition (fatalism versus well-being approach to illness)?

JOINT PAIN (See Box 3-5)

NIGHT PAIN (See Box 3-7)

PSYCHOGENIC SOURCE OF SYMPTOMS (See Box 3-13)

CASE STUDY*

REFERRAL

A 44-year-old male was referred to physical therapy with a report of right-sided thoracic pain.

Past Medical History: The client reported a 20-pack year smoking history (one pack per day for 20 years) and denied the use of alcohol or drugs. There was no other significant past medical history reported. He had a sedentary job.

The client’s symptoms began following chiropractic intervention to relieve left-sided lower extremity radiating pain. Within 6 to 8 hours after the chiropractor manipulated the client’s thoracic spine, he reported sharp shooting pain on the right side of the upper thoracic spine at T4. The pain radiated laterally under the right axilla into the anterior chest. He also reported tension and tightness along the same thoracic level and moderate discomfort during inspiration. There was no history of thoracic pain prior to the upper thoracic manipulation by the chiropractor.

The client saw his primary care physician who referred him to physical therapy for treatment. No imaging studies were done prior to physical therapy referral. The client rated the pain as a constant 10/10 on the Numeric Rating Scale (NRS) during sitting activities at work. He also reported pain waking him at night.

The client was unable to complete a full day at work without onset of thoracic discomfort; pain was aggravated by prolonged sitting.

EVALUATION

The client was described as slender in build (ectomorph body type) with forward head and shoulders and kyphotic posturing as observed in the upright and sitting positions. There were no significant signs of inflammation or superficial tissue changes observed or palpated in the thoracic spine region. There was palpable tenderness at approximately the T4 costotransverse joint and along the corresponding rib.

A full orthopedic evaluation was conducted to determine the biomechanical and soft tissue dysfunction that produced the client’s signs and symptoms. Active and passive motion and intersegmental mobility were tested. Findings were consistent with a physical therapy diagnosis of hypomobile costotransverse joint at level T4.

Continued
CASE STUDY—cont’d

This was further evidenced by pain at the posterior costovertebral joint with radiating pain laterally into the chest wall. Pain was increased on inspiration. Patient had a smoker’s cough, but reported no other associated signs or symptoms of any kind. See the Pain Assessment Record Form on the companion website.

RESULT

The client obtained gradual relief from painful symptoms after 8 treatment sessions of stretches and costotransverse joint mobilization (grade 4, nonthrust progressive oscillations at the end of the available range). Pain was reduced from 10/10 to 3/10 and instances of night pain had decreased. The client could sit at work with only mild discomfort, which he could correct with stretching.

The client’s thoracic pain returned on the 10th and 11th treatment sessions. He attributed this to increased stressors at work and long work hours. Night pain and pain with respiratory movements (inhalation) increased again.

Red flags in this case included:
- Age over 40
- History of smoking (20-pack years)
- Symptoms persisting beyond the expected time for physiologic healing
- Pain out of proportion to the injury
- Recurring symptoms (failure to respond to physical therapy intervention)
- Pain is constant and intense; night pain

The client was returned to his primary care physician for further diagnostic studies and later diagnosed with metastatic lung cancer.

SUMMARY

Working with clients several times a week allows the therapist to monitor their symptoms and the effectiveness of interventions. This case study shows the importance of reassessment and awareness of red flags that would lead a practitioner to suspect the symptoms may be pathologic.

*Leanne Lenker, DPT. This case was part of an internship experience at St. Luke’s Outpatient Clinic, Allentown, PA under the supervision of Jeff Bays, MSPT (Clinical Instructor). Dr. Lenker is a graduate of the University of St. Augustine for Health Sciences program in St. Augustine, Florida. Used with permission, 2005.

PRACTICE QUESTIONS

1. What is the best follow-up question for someone who tells you that the pain is constant?
   a. Can you use one finger to point to the pain location?
   b. Do you have that pain right now?
   c. Does the pain wake you up at night after you have fallen asleep?
   d. Is there anything that makes the pain better or worse?

2. A 52-year-old woman with shoulder pain tells you that she has pain at night that awakens her. After asking a series of follow-up questions, you are able to determine that she had trouble falling asleep because her pain increases when she goes to bed. Once she falls asleep, she wakes up as soon as she rolls onto that side. What is the most likely explanation for this pain behavior?
   a. Minimal distractions heighten a person’s awareness of musculoskeletal discomfort.
   b. This is a systemic pattern that is associated with a neoplasm.
   c. It is impossible to tell.
   d. This represents a chronic clinical presentation of a musculoskeletal problem.

3. Referred pain patterns associated with impairment of the spleen can produce musculoskeletal symptoms in:
   a. The left shoulder
   b. The right shoulder
   c. The mid-back or upper back, scapular, and right shoulder areas
   d. The thorax, scapulae, right shoulder, or left shoulder

4. Associated signs and symptoms are a major red flag for pain of a systemic or visceral origin compared to musculoskeletal pain.
   a. True
   b. False

5. Words used to describe neurogenic pain often include:
   a. Throbbing, pounding, beating
   b. Crushing, shooting, prickling
   c. Aching, heavy, sore
   d. Agonizing, piercing, unbearable

6. Pain (especially intense bone pain) that is disproportionately relieved by aspirin can be a symptom of:
   a. Neoplasm
   b. Assault or trauma
   c. Drug dependence
   d. Fracture

7. Joint pain can be a reactive, delayed, or allergic response to:
   a. Medications
   b. Chemicals
   c. Infections
   d. Artificial sweeteners
   e. All of the above

8. Bone pain associated with neoplasm is characterized by:
   a. Increases with weight bearing
   b. Negative heel strike
   c. Relieved by Tums or other antacid in women
   d. Goes away after eating
9. Pain of a viscerogenic nature is not relieved by a change in position.
   a. True
   b. False

10. Referred pain from the viscera can occur alone but is usually preceded by visceral pain when an organ is involved.
   a. True
   b. False

11. A 48-year-old man presented with low back pain of unknown cause. He works as a carpenter and says he is very active, has work-related mishaps (accidents and falls), and engages in repetitive motions of all kinds using his arms, back, and legs. The pain is intense when he has it, but it seems to come and go. He is not sure if eating makes the pain better or worse. He has lost his appetite because of the pain. After conducting an examination including a screening exam, the clinical presentation does not match the expected pattern for a musculoskeletal or neuromuscular problem. You refer him to a physician for medical testing. You find out later he had pancreatitis. What is the most likely explanation for this pain pattern?
   a. Toxic waste products from the pancreas are released into the intestines causing irritation of the retroperitoneal space.
   b. Rupture of the pancreas causes internal bleeding and referred pain called Kehr’s sign.
   c. The pancreas and large bowel structures are formed from the same embryologic tissue in the mesoderm.
   d. Obstruction, irritation, or inflammation of the body of the pancreas distends the pancreas, thus applying pressure on the central respiratory diaphragm.

REFERENCES

8. Saladin KS: Personal communication, Distinguished Professor of Biology, Milledgeville, Georgia, 2004, Georgia College and State University.
134. Smith NL: The effects of depression and anxiety on medical illness, Sandy, Utah, 2002, University of Utah, Stress Medicine Clinic.
181. Cocchiarella L, Anderson G: Guides to the evaluation of permanent impairment, ed 5, Chicago, 2001, AMA.