Assessment of cancer pain

AUTHORS: Russell K Portenoy, MD, Lara K Dhingra, PhD
SECTION EDITOR: Janet Abrahm, MD
DEPUTY EDITOR: Melinda Yushak, MD, MPH

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Literature review current through: **Feb 2024.**
This topic last updated: **Dec 19, 2022.**

INTRODUCTION

Pain due to cancer is a complex symptom that affects most aspects of a person's life, including physical functioning, the performance of activities of daily living, psychological and emotional status, and social interactions.

The prevalence of pain among cancer patients varies widely and is influenced by numerous factors, including the population evaluated, the specific type of cancer and its extent, and treatment status. A 2016 systematic review and meta-analysis of 117 studies found that the prevalence of pain was 39 percent after curative treatment, 55 percent during treatment, and 66 percent among patients with metastatic or advanced disease; in the 52 studies that included pain severity data, 38 percent of cancer patients reported pain that was moderate or severe [1]. The impact of this highly prevalent symptom is compounded by the common underutilization of available and effective drug therapies. A 2022 systematic review of 66 studies observed that 40 percent of patients were at risk of undertreatment [2]. (See "Cancer pain management: General principles and risk management for patients receiving opioids", section on 'The problem of undertreatment'.)

Given the high prevalence, and the potential for undertreatment, cancer-related pain has a profound adverse impact on individuals with cancer. To mitigate this impact, all cancer patients should be routinely screened for pain and those who report pain should undergo a more comprehensive assessment and specific treatment.

This topic review will cover cancer pain assessment. Classification of the different syndromes of pain in cancer patients and treatment of cancer-related pain are addressed elsewhere. (See "Overview of cancer pain syndromes" and "Cancer pain management: General principles and risk management for patients receiving opioids" and "Cancer pain management: Role of adjuvant analgesics (coanalgesics)" and "Cancer pain management with opioids: Optimizing analgesia" and "Interventional therapies for chronic pain".)

GENERAL APPROACH

The population with cancer pain is extremely heterogeneous and pain assessment is a complex undertaking [3]. The evaluation begins with a thorough history of the pain; its consequences for physical, psychosocial and spiritual well-being, and overall quality of life; and both prior and current analgesic treatments. To clarify the relationship between the pain and the underlying malignancy, the history should also elicit details about the current status of the cancer and both ongoing and planned antineoplastic therapies.

Although a pain-focused history is the foundation for effective management, it is well-known that most patients with pain have other distressing symptoms [4]. The history also should elicit information about symptoms other than pain and about medical and psychiatric comorbidities that may influence the experience of pain or contribute to symptom distress.

Objective data can often clarify the etiology or pathophysiology of the pain:

- The painful site should be examined in detail, and these and other physical findings relevant to the patient's medical status (both in terms of the cancer and medical comorbidities) should be noted.
- If indicated, laboratory and radiographic tests should be reviewed or ordered. However, further evaluation may not be warranted if the pain is acute and has a clear proximate cause (eg, postsurgical). (See 'Acute versus chronic pain' below.)

The patient's description of the pain and its characteristics, findings on physical examination, objective data from imaging and other tests, and information about the cancer and its treatment are all utilized to assess the likely etiology and underlying pathophysiology of the pain and, if possible, to identify a specific cancer pain syndrome [3]. (See "Overview of cancer pain syndromes".)

PAIN CHARACTERISTICS

Pain is a subjective and multidimensional experience (table 1). To optimize care, the pain should be characterized in terms of multiple dimensions, beginning with clinically relevant descriptors: intensity, temporal features, location and patterns of radiation, quality, and factors that provoke or relieve the pain. This information may be sufficient to identify a specific pain syndrome (ie, a constellation of clinically meaningful signs and symptoms), which may help to elucidate the etiology, direct the diagnostic evaluation, clarify the prognosis, or suggest appropriate therapeutic interventions. (See "Overview of cancer pain syndromes".)

This information may also allow for inferences regarding the underlying pathophysiology, or it may suggest and guide the need for more information.

Acute versus chronic pain

- **Acute pain** – Acute pain syndromes usually have a well-defined onset and a readily identifiable cause (eg, surgery). Assessment of acute pain is usually straightforward. If the cause is apparent, no further assessment may be needed.

  For most patients, the pain is expected to run its course in a short time frame, and management typically focuses on symptomatic relief until this happens. Acute pain may be accompanied by anxiety, pain behaviors such as grimacing or moaning, or signs of sympathetic activity such as tachycardia.

- **Chronic pain** – By contrast, chronic pain is often characterized by an ill-defined onset and a prolonged, fluctuating course. Overt pain behaviors and sympathetic activity are typically absent, but vegetative signs, including lassitude, sleep disturbance, and anorexia, may be present. Depressed mood may occur. The patient usually does not appear to be in pain, and the only definitive way to determine the presence of pain is to obtain a verbal report from the patient.

  Most patients with chronic cancer pain also experience periodic flares of pain, often referred to as "breakthrough pain" [5-7]. The adverse consequences associated with these transitory pains [7] justify their separate assessment and management as part of the analgesic plan of care. One important subtype of breakthrough pain is "incident pain," which is a pain flare that is precipitated by voluntary activity. The recognition of breakthrough pain as a significant problem in cancer patients led to the concept of so-called "rescue" dosing (ie, doses of a short-acting opioid administered on an as-needed basis to manage pain flares during long-term opioid therapy). Should incident pain be prominent, patients may be taught to use rescue dosing of analgesics preemptively. (See "Cancer pain management with opioids: Optimizing analgesia", section on 'Management of breakthrough pain'.)

Intensity — In the clinical setting, current pain intensity is often measured simply by using a verbal rating scale (eg, "mild," "moderate," or "severe"). However, pain may be more consistently quantified by using numeric rating scale (eg, "How severe is your pain on a scale of 0 to 10, where 0 is no pain and 10 is unbearable pain," or a visual analogue scale, which is a continuous line, usually 10 cm long and anchored on the ends by "no pain" and "worst possible pain" (figure 1)).

Pain intensity ratings also can be described from other perspectives and provide additional information. For example, the patient may be asked to express the severity of pain during the past day or past week. If these longer timeframes are assessed, more information is available by asking patients to describe pain "on average," "at its worst," and "at its least."

Based on the association between numeric pain ratings and the adverse impact of the pain, efforts have been made to translate the numeric score on a 0 to 10 pain intensity scale into a verbal rating scale (ie, "mild," "moderate," and "severe"). The rationale for this work is to attach a linguistically meaningful descriptor to a number that, by itself, may be more difficult to interpret. Although these analyses have yielded slightly different results, they have generally found that the term "moderate" best characterizes a limited midrange of the numeric scale. For example, by associating the numeric pain scores with scores on quality of life measures, one group proposed that pain intensity from bone metastases be considered "mild" if the pain score is 1 to 5, "moderate" if the score is 6, and "severe" if the score is 7 to 10 [8]. Most importantly, these analyses generally support the view that a patient with cancer who describes his or her usual pain as a 7 or greater is likely to be experiencing substantial adverse pain-related consequences and disability. (See "Epidemiology, clinical presentation, and diagnosis of bone metastasis in adults", section on 'Clinical presentation'.)

Instruments for patient-reported outcome measures such as pain have also have been developed and validated to measure pain in multiple dimensions [4]. The first such tool was the McGill Pain Questionnaire (MPQ) [9], which assesses the sensory, affective, and evaluative components of pain. A shortened version is available [10]. (See "Approach to symptom assessment in palliative care", section on 'History'.)

This instrument has largely been supplanted by others, most notably the Brief Pain Inventory (BPI), which was developed to measure both pain intensity and pain interference in various areas of function [11]. A short-form version of the BPI also is available (BPI-SF), which, in at least one systematic review, outperformed the MPQ as a measure of pain in adult cancer patients [12].

Other aspects — Other pain characteristics are also important to assess. As noted previously, patient should be asked about the quality of the pain (eg, aching, sharp, stabbing, burning, etc) because this information may help infer the sustaining mechanisms, most notably by distinguishing between nociceptive and neuropathic pain syndromes. (See 'Nociceptive pain' below and 'Neuropathic pain' below.)

Temporal assessment of the pain may include information about duration, course, and daily fluctuations as well as exacerbating or mitigating factors that may be causing breakthrough pain. (See 'Acute versus chronic pain' above.)

The assessment of pain location should distinguish between local, regional, multifocal, or generalized pain. The identification of a pain that is local or regional may suggest specific therapies, such as the use of topical analgesics or neural blockade.

The evaluation of pain location should be informed by the possibility of referred pain. Referred pain is pain that is experienced at a site remote from the injured body part that is activating nociceptive pathways. Referred pain has complex mechanisms and presentations, but common referral patterns, which may be due to lesions affecting somatic tissues (eg, hip lesions causing knee pain), viscera (eg, biliary lesions causing ipsilateral pain in the scapula region), or nerves (eg, sciatic nerve injury causing foot pain) are well known by clinicians. Less well appreciated are the observations that referred pain may be experienced without any discomfort in the area of injury, and that referral sites may be tender or sensitive to touch. Clinicians may also use this information to target the work-up or treatment for the pain. As an example, treatments that specifically target sites of referred pain (eg, topical therapies) may be helpful in such cases.

The final characteristics worthy of routine assessment are those factors that can provoke or reduce pain. Eliciting this information may help to clarify the etiology of the pain or suggest a treatment approach that includes management of precipitants.

PATIENTS WITH CHRONIC PAIN

Etiology — Chronic pain in a cancer patient usually has an etiology related to the disease itself or its treatment [3,13]. The etiology refers to the specific injury or disease process that drives nociception or induces changes in the nervous system that sustain pain after injury heals. The etiology may be directly related to the neoplasm itself, to antineoplastic therapies of any type, or to conditions that are unrelated to the tumor or its treatment.

Identifying the etiology of chronic pain may require imaging or other testing that can clarify the state of activity of the cancer (ie, is it recurrent?) or its extent, potentially informing the plan of

care or influencing prognostication. Clarifying the etiology also can reveal an opportunity for disease-modifying therapy that may provide some analgesic benefit. Radiation therapy in particular is often performed with pain relief as the primary goal. (See "Overview of cancer pain syndromes".)

When the etiology of the pain is disease-related, it usually involves direct invasion of pain-sensitive structures by the neoplasm [3,13]. Bone is the most common pain-sensitive structure affected by the tumor. Other etiologies include injury to or invasion of a component of the nervous system, obstruction of a hollow viscus, distention of organ capsules, distortion or occlusion of blood vessels, or infiltration of adjacent soft tissues.

Inferred pathophysiology and treatment implications — Based on the initial assessment, clinicians can draw inferences about the types of pathophysiologic process that may be sustaining chronic pain. Although the broad categorization of pain mechanisms oversimplifies typically complex biology and cannot be objectively verified in any case, it is widely employed because of extensive experience demonstrating value for clinical decision making. As such, chronic pain may be characterized as nociceptive, neuropathic, nociplastic, psychogenic, or mixed [14].

Nociceptive pain — Nociceptive pain is related to ongoing tissue injury, which presumably activates the somatosensory systems that alert the organism to noxious events (the nociceptive system) and ultimately lead to the perception of pain. Inflammation is commonly present when tissue injury occurs, and some classifications use the term "inflammatory pain" instead of nociceptive pain; others suggest that inflammatory pain is a subtype of nociceptive pain characterized by activation of the nociceptive system by inflammation of peripheral tissues. Whether or not the inflammatory label is used, nociceptive pains can be divided into those that are sustained by injury to somatic tissues and those that are sustained by injury to visceral tissues:

- Somatic nociceptive pain involves injury to somatic structures, such as bone, joints, or muscles. It is often described by patients as "aching," "stabbing," "throbbing," or "pressure-like" in quality.

- Visceral nociceptive pain involves injury to viscera. It is usually characterized as "gnawing" or "crampy" when arising from the obstruction of a hollow viscus (eg, the bowel lumen), and as "aching" or "stabbing" when arising from other visceral structures, such as organ capsules, myocardium, or pleura.

Regardless, the finding of nociceptive pain may prompt a recommendation concerning a disease-modifying therapy (eg, radiation therapy for painful bone metastases) that may address

the etiology of the pain. Recognition that new pain might indicate a serious new morbidity (eg, back pain related to epidural spinal cord compression) may also suggest the need for urgent treatment.

Neuropathic pain — Pain is labeled neuropathic if the evaluation identifies a neurological lesion, and the presentation suggests that the pain is sustained by abnormal somatosensory processing in the peripheral or the central nervous system [15,16]. Neuropathic mechanisms are involved in approximately 40 percent of cancer pain syndromes, and they can be caused by either the disease or its treatment [13,14,16].

A neuropathic pathophysiology is suggested by descriptors such as "burning," "electrical," or "shock-like." These complaints, collectively termed dysesthesias, may not be present, however, and some patients with nerve injury will describe the pain as "aching" or "throbbing." Abnormal findings on sensory examination of the painful region also suggest a neuropathic mechanism. These abnormalities may include hypesthesia (a numbness or lessening of feeling), paresthesia (abnormal non-painful sensations such as tingling, cold, or itching), hyperalgesia (increased perception of painful stimuli), hyperpathia (exaggerated pain response), or allodynia (pain induced by non-painful stimuli such as a light touch or cool air). Patients may have other concomitant neurologic findings, such as weakness or changes in reflexes, and some patients have autonomic dysfunction within the anatomic distribution of the pain.

The presence of neuropathic pain may suggest opportunities for specific therapeutic strategies. (See "Cancer pain management: Role of adjuvant analgesics (coanalgesics)", section on 'Patients with neuropathic pain'.)

Nociplastic pain — Nociplastic pain is distinguished from neuropathic pain but is also presumed to result from aberrant processes in the nervous system. This type of pain is not explained by neural injury, however, and is instead believed to be the result of either augmented central nervous system sensory transmission or altered central pain modulation, leading to central sensitization or "hypersensitivity" in the nociceptive system [17]. There have been no studies of cancer-related nociplastic pain and the extent to which this category of mechanisms is involved in cancer pain syndromes is unknown. (See "Evaluation of chronic non-cancer pain in adults", section on 'Nociplastic pain'.)

Psychogenic pain — The term "psychogenic pain" is used to describe pain that is believed to be sustained predominantly by psychological factors. It does not refer to the common observation that pain experienced by some patients is amplified or exacerbated by psychological factors, or the finding of high pain-related distress or comorbid psychiatric disease. Rather, psychogenic pain implies that the pain is best understood as resulting from

psychological processes. Syndromes presumed to have this pathophysiology have been codified in the Diagnostic and Statistical Manual of Mental Disorders, 5th Edition (DSM-5) [18].

Psychogenic pain appears to be rare in the cancer population. The label should not be applied unless the assessment reveals evidence of psychopathology that is believed to be specifically related to the experience of the pain. Pain of this type is assumed to be truly experienced; it is not a deception. This distinguishes these pain disorders from factitious disorders, which reflect a serious mental disorder in which pain reports may not indicate a true experience of pain (unless the manifestation of the disorder is self-injury, which may be painful), and malingering. The latter disorders appear to be very rare in the cancer population.

SOCIETY GUIDELINE LINKS

Links to society and government-sponsored guidelines from selected countries and regions around the world are provided separately. (See "Society guideline links: Neuropathic pain" and "Society guideline links: Cancer pain".)

INFORMATION FOR PATIENTS

UpToDate offers two types of patient education materials, "The Basics" and "Beyond the Basics." The Basics patient education pieces are written in plain language, at the 5th to 6th grade reading level, and they answer the four or five key questions a patient might have about a given condition. These articles are best for patients who want a general overview and who prefer short, easy-to-read materials. Beyond the Basics patient education pieces are longer, more sophisticated, and more detailed. These articles are written at the 10th to 12th grade reading level and are best for patients who want in-depth information and are comfortable with some medical jargon.

Here are the patient education articles that are relevant to this topic. We encourage you to print or e-mail these topics to your patients. (You can also locate patient education articles on a variety of subjects by searching on "patient info" and the keyword(s) of interest.)

- Basics topics (see "Patient education: Managing pain when you have cancer (The Basics)")

SUMMARY

- **General approach** – Pain in the patient with a history of cancer is a complex symptom that affects most aspects of a person's life, including physical functioning, the performance of activities of daily living, psychological and emotional status, and social interactions. For all cancer patients with pain, the evaluation begins with a thorough history of the pain, including its consequences for physical, psychosocial and spiritual well-being, and overall quality of life, and both current and prior analgesic treatments.

- **Acute versus chronic pain**

  - **Acute pain** – For patients with straightforward acute pain if the cause is apparent (eg, postsurgical pain), no further assessment may be needed.

  - **Chronic pain** – On the other hand, cancer patients with chronic pain are more challenging because of the heterogeneity in specific cancer diagnoses, disease activity, past and present history of disease-modifying therapies, and existence of relevant medical and psychiatric comorbidities.

- **Assessment for patients with chronic pain** – The complexity of chronic pain calls for a systematic approach to assessment. The major goals are as follows:

  - Clinicians should fully characterize the pain and its impact on function and quality of life. Important characteristics include intensity, duration and location of the pain, exacerbating and mitigating factors, past and current treatments performed specifically for the pain, and their success or failure. (See 'Pain characteristics' above.)

    In the clinical setting, current pain intensity is often measured simply by using a verbal rating scale (eg, "mild," "moderate," or "severe"), but it may be more consistently quantified by using a numeric rating scale or visual analogue scale (figure 1). (See 'Intensity' above.)

  - Objective data from physical examination and available studies may be indicated and can often clarify the etiology (ie, disease related, treatment related, or neither) or pathophysiology of the pain. Clinicians should review prior testing, and clarify the extent of neoplastic disease and identify opportunities for antineoplastic treatment. (See 'Etiology' above.)

    In addition to the cancer itself, specific comorbidities, including other symptoms, medical disorders, and psychiatric/psychosocial problems should be identified.

  - Understanding the etiology and inferred pathophysiology (nociceptive, neuropathic, nociplastic, psychogenic, or mixed), may help to identify a specific pain syndrome. (See

'Inferred pathophysiology and treatment implications' above and "Overview of cancer pain syndromes".)

- In addition to identifying specific pain syndromes, the information obtained from the history, physical examination, and imaging studies can lead to changes in the plan of care, such as the following:
  - Recommendations for additional evaluation to clarify the etiology or pathophysiology of the pain, or the disease extent.
  - Recommendations concerning a disease-modifying therapy (eg, radiation therapy) that may address the etiology of the pain. Recognition that new pain might indicate a serious new morbidity (eg, back pain related to epidural spinal cord compression) may also suggest the need for urgent treatment. (See 'Nociceptive pain' above.)
  - Developing a short-term and longer-term plan for symptomatic analgesic therapy, which may include specific adjuvant co-analgesics, depending on the inferred pathophysiology or pain location. (See 'Neuropathic pain' above and 'Other aspects' above.)
  - Addressing other symptoms or medical or psychiatric/psychosocial comorbidities that may be contributing to suffering, and may be targets for treatment.

REFERENCES

1. van den Beuken-van Everdingen MH, Hochstenbach LM, Joosten EA, et al. Update on Prevalence of Pain in Patients With Cancer: Systematic Review and Meta-Analysis. J Pain Symptom Manage 2016; 51:1070.
2. Roberto A, Greco MT, Uggeri S, et al. Living systematic review to assess the analgesic undertreatment in cancer patients. Pain Pract 2022; 22:487.
3. Caraceni A, Shkodra M. Cancer Pain Assessment and Classification. Cancers (Basel) 2019; 11.
4. Reilly CM, Bruner DW, Mitchell SA, et al. A literature synthesis of symptom prevalence and severity in persons receiving active cancer treatment. Support Care Cancer 2013; 21:1525.

5. Deandrea S, Corli O, Consonni D, et al. Prevalence of breakthrough cancer pain: a systematic review and a pooled analysis of published literature. J Pain Symptom Manage 2014; 47:57.
6. Davies AN. Breakthrough cancer pain. Curr Pain Headache Rep 2014; 18:420.
7. Narayana A, Katz N, Shillington AC, et al. National Breakthrough Pain Study: prevalence, characteristics, and associations with health outcomes. Pain 2015; 156:252.
8. McDonald R, Ding K, Chow E, et al. Classification of painful bone metastases as mild, moderate, or severe using both EORTC QLQ-C15-PAL and EORTC QLQ-BM22. Support Care Cancer 2016; 24:4871.
9. Melzack R. The McGill Pain Questionnaire: major properties and scoring methods. Pain 1975; 1:277.
10. Short-Form McGill Pain Questionnaire -- NeurologyToolKit. Available at: https://www.neurotoolkit.com/sf-mpq/.
11. Daut RL, Cleeland CS, Flanery RC. Development of the Wisconsin Brief Pain Questionnaire to assess pain in cancer and other diseases. Pain 1983; 17:197.
12. Abahussin AA, West RM, Wong DC, Ziegler LE. PROMs for Pain in Adult Cancer Patients: A Systematic Review of Measurement Properties. Pain Pract 2019; 19:93.
13. Caraceni A, Portenoy RK. An international survey of cancer pain characteristics and syndromes. IASP Task Force on Cancer Pain. International Association for the Study of Pain. Pain 1999; 82:263.
14. Bennett MI, Kaasa S, Barke A, et al. The IASP classification of chronic pain for ICD-11: chronic cancer-related pain. Pain 2019; 160:38.
15. Finnerup NB, Haroutounian S, Kamerman P, et al. Neuropathic pain: an updated grading system for research and clinical practice. Pain 2016; 157:1599.
16. Scholz J, Finnerup NB, Attal N, et al. The IASP classification of chronic pain for ICD-11: chronic neuropathic pain. Pain 2019; 160:53.
17. Nijs J, Lahousse A, Kapreli E, et al. Nociplastic Pain Criteria or Recognition of Central Sensitization? Pain Phenotyping in the Past, Present and Future. J Clin Med 2021; 10.
18. American Psychiatric Association. Diagnostic and Statistical Manual of Mental Disorders, Fifth edition (DSM-5), American Psychiatric Association, Arlington VA 2013. p.309.

Topic 2795 Version 29.0

GRAPHICS

Revised definition of pain

Pain
An unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage.

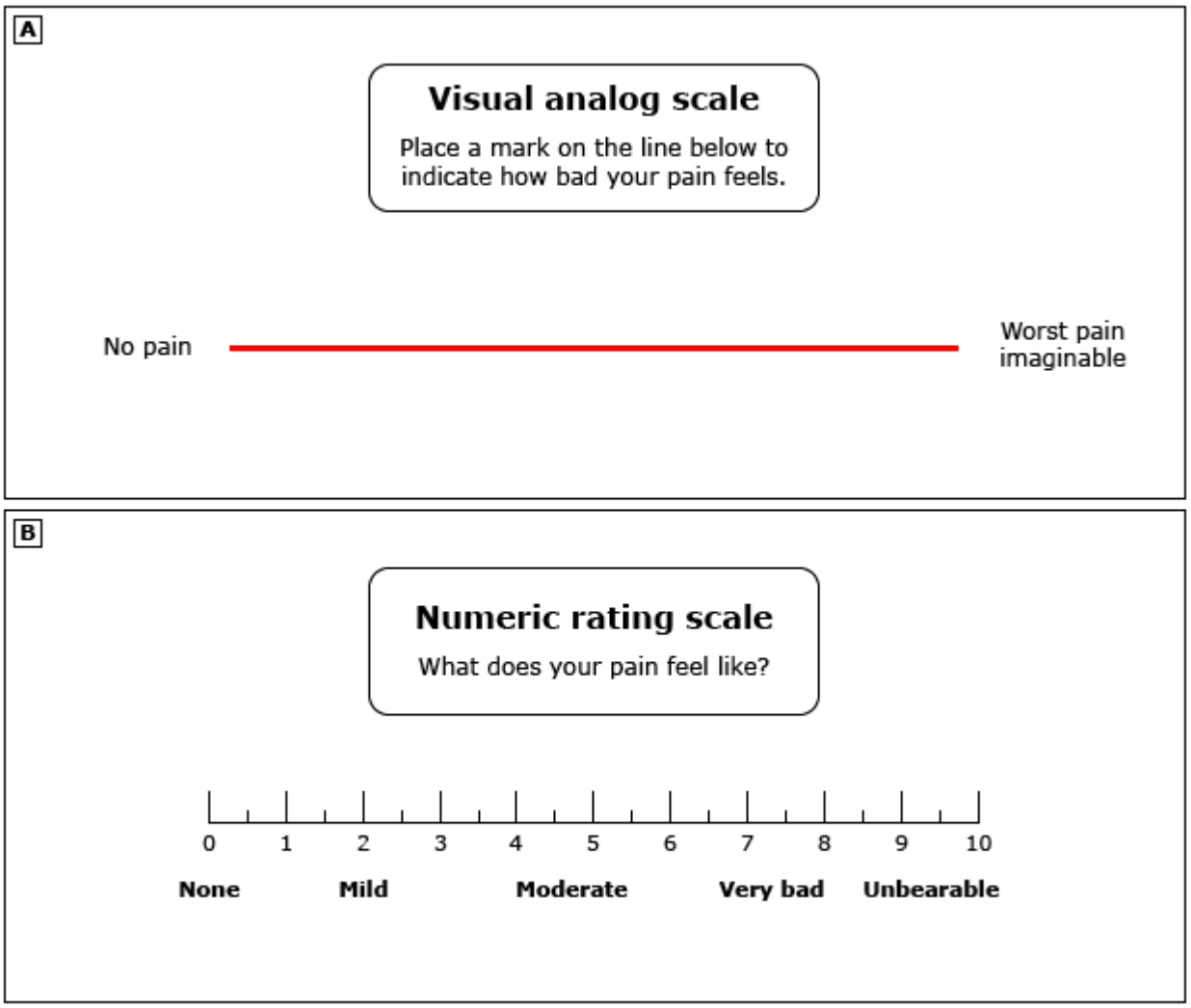
Notes
▪ Pain is always a personal experience that is influenced to varying degrees by biological, psychological, and social factors.
▪ Pain and nociception are different phenomena. Pain cannot be inferred solely from activity in sensory neurons.
▪ Through their life experiences, individuals learn the concept of pain.
▪ A person's report of an experience as pain should be respected.[1]
▪ Although pain usually serves an adaptive role, it may have adverse effects on function and social and psychological well-being.
▪ Verbal description is only one of several behaviors to express pain; inability to communicate does not negate the possibility that a human or a nonhuman animal experiences pain.

Reference:

1. *Declaration of Montréal. International Association for the Study of Pain. Available at: https://www.iasp-pain.org/DeclarationofMontreal (Accessed on October 29, 2020).*

Graphic 129909 Version 2.0

Visual analog and numeric rating pain scales



(A) When using a VAS, the patient is asked to mark a 10 cm line at a point that corresponds to the degree of pain. The VAS score is the distance in millimeters from the left end of the line to the patient's mark.

(B) When using an NRS, the patient indicates the number that corresponds to pain severity, either verbally or by marking the scale.

VAS: visual analog scale; NRS: numeric rating scale.

Graphic 62346 Version 7.0

Contributor Disclosures

Russell K Portenoy, MD No relevant financial relationship(s) with ineligible companies to disclose. **Lara K Dhingra, PhD** No relevant financial relationship(s) with ineligible companies to disclose. **Janet Abrahm, MD** Other Financial Interest: Johns Hopkins University Press [Pain, palliative care, ethics, bone disease in cancer patients]. All of the relevant financial relationships listed have been mitigated. **Melinda Yushak, MD, MPH** No relevant financial relationship(s) with ineligible companies to disclose.

Contributor disclosures are reviewed for conflicts of interest by the editorial group. When found, these are addressed by vetting through a multi-level review process, and through requirements for references to be provided to support the content. Appropriately referenced content is required of all authors and must conform to UpToDate standards of evidence.

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