Pain Measurement in Humans

I. Know that pain is a subjective, multidimensional experience unique to the individual (Clark et al. 2002; Kumar et al. 2002).
   A. Understand the distinction between pain and nociception.
      1. Appreciate that pain is a conscious, aversive aspect of somatic awareness, the product of complex, central, nociception-induced processing, and not a primitive sensation.
      2. Appreciate that nociception is never conscious and engages sensory, emotional, and cognitive processing areas of the brain.
   B. Understand that pain is multidimensional.
      1. Appreciate that the pain experience may have sensory, emotional, and cognitive aspects.
      2. Appreciate the potential impact of pain on function, affective status, and quality of life.

II. Know the basic concepts of introspection and measurement of subjective experience (Nakamura and Chapman 2002).
   A. Understand pain measurement as the product of selective introspection, self-scaling by number or descriptor assignment, and reporting.
      1. Appreciate the importance of training or carefully instructing patients/subjects.
         a. Comprehend the difficulty patients/subjects face in separating pain from concomitant somatic sensations and emotions (paresthesias, dysesthesias, and anxiety).
         b. Comprehend the difficulty patients/subjects have in assigning numbers to a dynamic, complex experience.
         c. Comprehend that pain measurement often requires patients to draw upon memory for assessment or comparison.
         d. Comprehend that patients reporting pain need to distinguish pain at rest from pain with activity or pain during stress.
      2. Appreciate that not everyone can or will generate a meaningful pain score upon demand.
         a. Comprehend that some reluctant patients, if pressed to report pain, may produce a number without properly scaling their subjective experience.
   B. Understand a pain score as a number that can never measure pain perfectly.
      1. Appreciate that the goal of measurement is to capture true pain with as little measurement error as possible.
      2. Appreciate that the pain score reflects both measurement error and systematic individual differences.
   C. Understand validity and reliability and their importance for pain measurement.
      1. Appreciate that reliability is precision or consistency of measurement and validity is the accuracy of measurement.
         a. Comprehend that reliability and validity are continua rather than dichotomies, with coefficients ranging from 0 to 1.0.
2. Appreciate that reliability is the upper limit for validity.
3. Appreciate that useful assessment of individuals requires high reliabilities (>0.90).

III. Know the challenges and limitations of measuring pain in special populations (Herr and Mobily 1991; McGrath and Brigham 2001).

A. Understand the challenges of developmentally sensitive instruments in children.
   1. Appreciate that nociception produces an aversive, unpleasant experience in young neonates and infants.
      a. Comprehend the challenges and problems of measuring pain in neonates and infants.
      b. Comprehend the importance of simple observational and self-report scoring methods and category scales.
      c. Comprehend the place of surrogate ratings of pain for neonates and infants.
   2. Appreciate that pain expression differs across developmental stages.
   3. Appreciate that pain behavior can be a function of many influences in addition to pain.

B. Understand that temporary or permanent inability to communicate does not mean that pain is absent.

C. Understand the problems of measuring pain in cognitively compromised patients, including those with dementia, poststroke syndromes, and mental illness.
   1. Appreciate that pain expression may vary from normal when the central nervous system is damaged.
   2. Appreciate that in some circumstances, conventional approaches based on introspection may not yield valid or reliable scores in cognitively compromised patients.
      a. Comprehend the value of observational pain assessment tools for cognitively compromised patients.


A. Understand the use of simple unidimensional pain scales.
   1. Appreciate and be able to administer numerical rating scales, visual analogue scales, and category rating scales.
      a. Comprehend the advantages of these tools in efficiency and minimization of responder burden.
      b. Comprehend the limitations of these tools, including ambiguous upper anchors and reliabilities that may be too low for useful individual assessment.

B. Understand the use of complex unidimensional pain scales.
   1. Appreciate the nature, advantages and limitations of magnitude estimation, cross-modality matching, and verbal descriptor scaling.

C. Understand the use of complex instruments for multidimensional scaling of pain.
   1. Appreciate that some instruments such as the McGill Pain Questionnaire may permit the scaling of multiple dimensions of subjective experience.
   2. Appreciate that some instruments such as the Brief Pain Inventory assess both pain and the subjective impact of pain on activity and functional capability.

V. Know the options available for measuring pain indirectly by observation (Craig et al. 2001; Keefe and Williams 2001).

A. Understand that methods exist for observing and scoring facial pain expression in children and others who cannot perform introspection and produce verbal reports.
B. Understand the concept of pain behavior (Hadjistavropoulos and Craig 2002).
1. Appreciate the use of simple pain behavior ratings in specific situations.
2. Appreciate the availability of complex formal inventories that relate activities to pain report.
   a. Comprehend the concept of scoring and interpreting complex behavior patterns.
3. Appreciate the availability of wearable electronic motion loggers that can chart 24-hour activity levels in persons living with pain.
4. Appreciate the advantages and limitations of pain behavior assessment versus subjective report measures.

VI. Know the basic issues surrounding pain measures as outcomes in clinical studies (Stone and Shiffman 1994; Kane 1997).
A. Understand the advantages and limitations of simple unidimensional scales for outcome evaluation.
1. Appreciate the advantages of rapid, simple assessment.
2. Appreciate that chronic pain requires greater complexity of assessment.
3. Appreciate that simple unidimensional scales have limited breadth for the assessment of functioning.
4. Appreciate the advantages of assessing pain at variable times and in varied settings (ecological momentary assessment).
B. Understand the value of multiple measures and correlational techniques for improving the capture of true pain.
C. Understand the value of repeated measurement for outcomes research.
1. Appreciate that average outcomes may not apply to all individuals under study.

VII. Know the importance of including strong outcome measures in studies of the impact of pain (Dworkin and Whitney 2001).
A. Understand the importance of measures such as activity level, functional capability, quality of life, costs of care, and disability.
B. Understand the value of including such measures with pain measures in studies of pain interventions.

REFERENCES


