The assessment of musculoskeletal pain

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ABSTRACT

Musculoskeletal (MSK) pain has a major impact on people's quality of life. Chronic MSK pain causes sleep interruption, fatigue, depressed mood, activity limitations and participation restrictions. The impact of MSK pain is influenced by contextual factors, including comorbidity, arthritis coping efficacy and access to MSK care. Thus, MSK pain assessment warrants a bio-psychosocial perspective that includes pain, its downstream effects and contextual factors. Such an approach should incorporate elicitation of symptoms using patient-report questionnaires and physical examination to help localize the pain and assess for signs of inflammation, tenderness on palpation, pain on motion, joint instability and malalignment. Using such an approach to the assess chronic pain in MSK conditions has potential to improve our ability to target the right treatment to the right patient, resulting in improved outcomes.

Introduction

Musculoskeletal (MSK) pain has a major impact on people's quality of life. It is this pain that drives people with MSK conditions to seek medical care (1), to use non-steroidal anti-inflammatory drugs (2) and to undergo joint replacement surgery (3). The most common MSK conditions include osteoarthritis (OA), autoimmune inflammatory arthritis, such as rheumatoid arthritis (RA), crystal-induced inflammatory arthritis, including gout, and fibromyalgia. Irrespective of the diagnosis, chronic pain is the predominant complaint of people living with these MSK conditions. While there have been relatively few comparisons of the pain experience across MSK conditions, what evidence does exist suggests more similarities than differences.

As in other chronic pain conditions, a number of key contextual factors influence the downstream impact of pain in MSK conditions. These include the presence of comorbid health problems (4, 5), social support (6, 7), sex/gender (8), education and health literacy, income, personality, *e.g.*, pain catastrophising (8, 9), perceived efficacy of arthritis coping (10, 11), and access to and use of health care for the MSK condition. This explains why people with similar radiographic arthritis severity may experience very different levels of pain or other symptoms (12).

The pain cascade

From longitudinal study of people with hip and knee OA, chronic MSK pain can lead to depressed mood through its effect on fatigue and disability (13). Depressed mood is highly prevalent in people with chronic painful MSK conditions. Not only does comorbid depressed mood contribute to the pain experience, but it can also impact adherence to self-management and pharmacologic interventions and the effectiveness of these strategies when used (14). The effect of MSK pain on fatigue is, at least in part, due to its impact on sleep (15-18). Among people with chronic painful MSK conditions, self-reported poor sleep quality is common. Chronic pain can cause disruption of sleep architecture and sleep deprivation, reducing pain threshold and increasing perceived discomfort (19). These effects can lead to worsening pain and disability over time, with increased risk for sensitisation of the central pain pathways (central sensitisation) (13, 20-23) (Fig. 1).

The concept of flares in MSK conditions

Furthermore, MSK pain often fluctuates. In some patients with inflammatory autoimmune arthritis (IA), symptom 'flares' are associated with elevations in measures of systemic inflammation, *e.g.,* C-reactive protein, and thus these measures may be used to guide management (24). However, laboratory biomarkers of 'flare' in MSK conditions

are generally unreliable for use in clinical practice. Thus, valid and reliable measures of flare that incorporate patient-reported symptoms and signs on physical examination have been developed. Flares have also been described in people with OA. Focus groups conducted in people with hip and knee OA from the UK, US, Canada and Australia elucidated two distinct types of pain: an intermittent, predictable sharp or other pain, usually brought on by a trigger (activity, repetition, sport); and a dull/aching pain that became more constant as the disease progressed (25). Work is ongoing to elucidate how best to define and measure OA flares as an outcome in OA clinical trials.

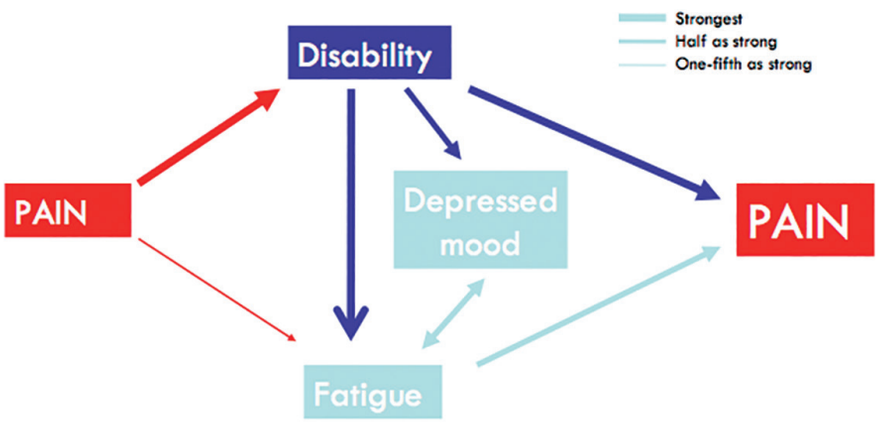

Fig. 1. Pain Cascade - The relative strengths of the longitudinal relationships after controlling for contextual factors (13) based on regression coefficients (Reprinted from Hawker GA, Gignac MA, Badley E *et al*. A longitudinal study to explain the pain-depression link in older adults with osteoarthritis, *Arthritis Care Res* (Hoboken), 63 (10): 1382-1390, copyright 2011 (with permission from John Wiley & Sons).

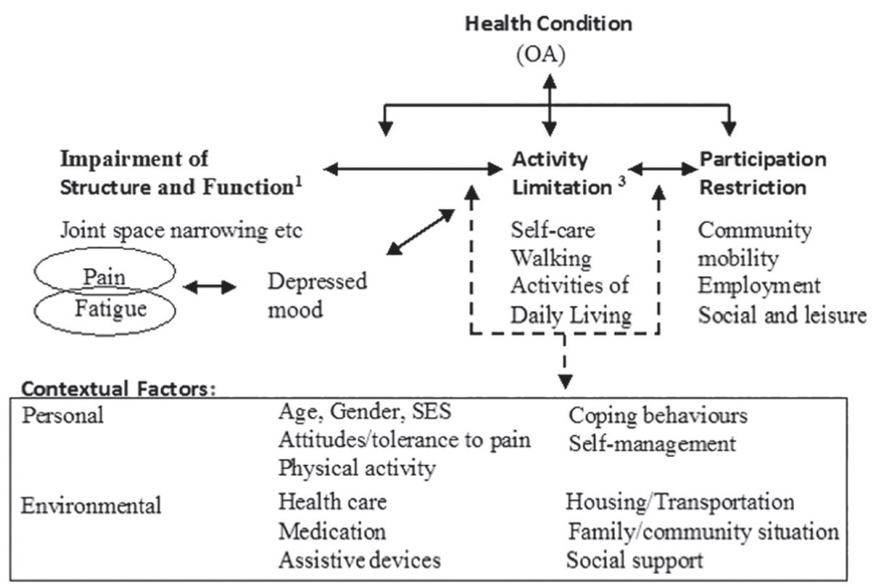

Fig. 2. World Health Organization's International Classification of Functioning, Disability and Health (ICF) model (30).

Using a biopsychosocial perspective to assess MSK pain

Thorough assessment of the patient's pain experience is an important first step in ensuring optimal clinical management of MSK conditions. Such an approach can inform patient-physician decision-making regarding the most appropriate treatment approach. For example, a patient with chronic MSK pain who has sleep apnea may experience an improvement in their pain through treatment of the comorbid sleep disorder. Similarly, management of comorbid depressed mood or poor pain coping (*e.g.*, referral to a chronic disease self-management program) may augment the response to MSK pain therapies. Finally, patients' descriptions of their pain, *e.g.*, aching versus burning and radiating, may be helpful in identifying individuals with pain sensitisation.

Comprehensive MSK pain assessment warrants a *bio-psychosocial perspective* (26), which includes pain and its downstream effects as well as key contextual (social, cultural and personal) factors (27, 28). Elicitation of symptoms through administration of standardized reliable and valid patient-report outcome measures (PROs) is recommended. PROs are widely available for the assessment MSK pain characteristics, *e.g.*, intensity, predictability, frequency, quality (aching, burning, knife like, etc.), sleep quality, mood (depression and anxiety), fatigue, activity limitations (activities one has to do, *e.g.*, bathing), participation restrictions (activities one wants to do, *e.g.*, work or travel) (13, 29) as well as key contextual factors. Use of a conceptual framework that illustrates the inter-relationships among these factors may be helpful in reminding clinicians and researchers about the many factors that may influence patients' pain experiences and, thus, that should be assessed formally or informally. A framework often used in the MSK field is the World Health Organization's International Classification of Functioning, Disability and Health, known as the ICF model (30) (Fig. 2).

Factors to consider in measure selection

Considerations include the following:

- Time and ease of use to administer the questionnaire(s) in the target population. Standardised questionnaires may be completed by the patient or administered by an interviewer. The former are less labour intensive and may also be more reliable than the latter and, thus, more appropriate for use in clinical practice. The availability of electronic data capture, touch-screen technology and laptop computers has further facilitated the process of questionnaire completion and data entry, improving data

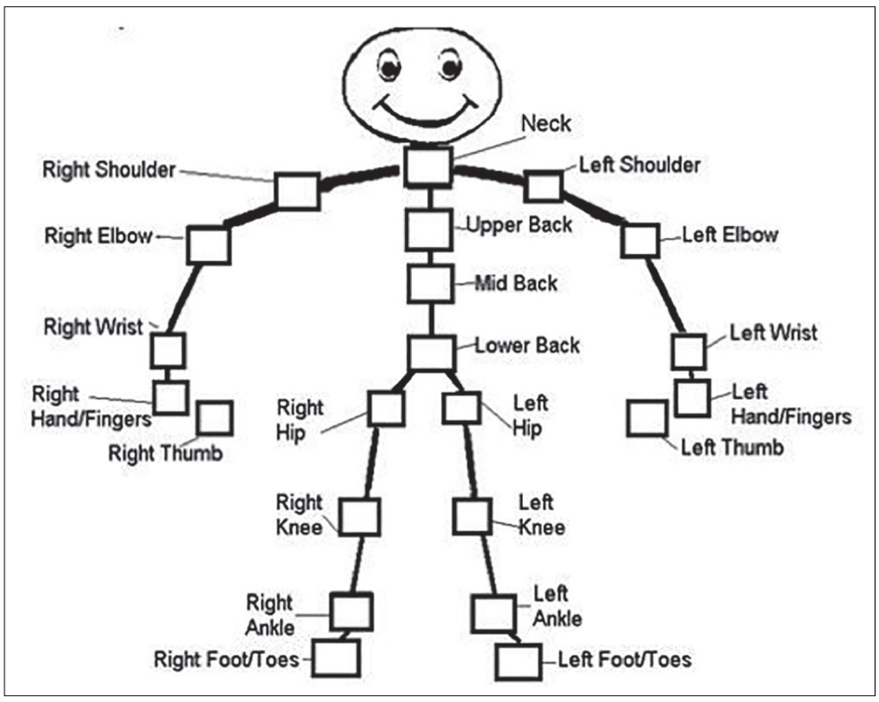

Fig. 3. Joint Homunculus (31) for assessment of troublesome (aching, painful, swollen, stiff) joints*. *A time frame for response should be indicated, *e.g.*, the respondent would be asked to indicate the joints that have been troublesome on most days of the past month.

quality in both clinical practice and research (31). Although still highly variable across practices, some physicians and practices are utilising mobile applications to enable their patients to complete questionnaires prior to their clinic visit. In some cases, the data is directly entered into the electronic health record;

- Generic *versus* disease-specific questionnaire. Generic (general) questionnaires provide an excellent appreciation of an individual's overall health status, but lack the necessary specificity to assess the status of the patient's specific MSK condition (31). This is especially difficult when assessing pain in people with more than one health condition, *e.g.*, knee OA in a patient with diabetes and related neuropathy. Thus, generic health status questionnaires should be used together with disease-specific questionnaires (32);
- Unidimensional *versus* multi-dimensional questionnaire. Measurement of a single aspect of the pain experience may be achieved using a unidimensional questionnaire, *e.g.*, pain intensity using a 0–10 numeric rating scale, whereas more comprehensive assessment of the pain experience requires a multi-dimensional questionnaire.
- Individual joint (*e.g.*, left knee) versus anatomical region (*e.g.*, lower extremity or hands), the disease in its entirety (*e.g.*, overall) or the person as a whole (*e.g.*, health status or health-related quality of life); and,
- The psychometric properties of the questionnaire – specifically, reliability, validity and sensitivity to detect change. A valid questionnaire is one that measures what it is intended to measure, while one that is reliable is able to measure something in a reproducible way. Sensitivity to change – also called responsiveness – quantifies the magnitude of change over time and in response to interventions.

Assessment of change in MSK pain conditions

Questionnaires that have been demonstrated to detect change that is *meaningful* to patients should be used. For a number of questionnaires, the *minimal clinically important difference* or MCID has been determined, and may differ for improvement versus worsening. The MCID represents the minimum amount of improvement or worsening that patients perceive as beneficial or harmful, respectively (33, 34). Distribution-based and anchor-based methods have been used to establish the MCID for questionnaires. The "distribution-based method," used the effect size (ES) to define MCID (35), whereas anchor-based methods determine the relationship of the amount of change with an external indicator, *e.g.*, the patient's rating of change from "slightly" to "a great deal" better/worse (33, 36). In this case, the MCID is often defined as the difference in the mean change score for patients who rate themselves as "slightly better" and those who rate themselves as "equal" to their prior level. A reduction in patient-reported MSK pain over time may indicate symptom improvement as a result of effective non-pharmacologic or pharmacologic management. However, societal beliefs about MSK conditions as simply wear and tear due to aging and fear of use of 'addictive' pain medications means that people often manage their MSK pain by avoiding exacerbating activities (37), *e.g.*, walking in the setting of knee OA. Thus, improvement in a MSK patient's pain over time must be interpreted cautiously (38) and take into consideration the patient's level of physical activity (39).

For a summary of available generic and MSK disease-specific questionnaires to assess the pain cascade see the OARSI Primer (31). At a minimum, clinicians should assess patient's pain (*e.g.*, a 11-point numeric rating scale for pain intensity) (40), physical function (ideally using a disease-specific brief measure, such as the Knee injury and Osteoarthritis Outcome Score, KOOS, 7-item Physical Function short form measure for knee OA) (41), and mental health status using a brief screening questionnaire such as the Patient Health Questionnaire (PHQ) depression screener. The PHQ-9 is a 9-item self-administered measure designed to screen for common mental disorders (42).

The role of clinical examination in MSK pain assessment

Physical examination is complimentary to assessment of symptoms using pa-

tient-report questionnaires. The examination is useful to localise the patient's pain (joint, muscle, etc.) and assess for the presence of signs of inflammation (erythema, joint effusion or soft tissue swelling), tenderness on palpation, pain on motion, joint instability and malalignment. The distribution of MSK pain may be recorded on a pain diagram or joint homunculus; in the setting of arthritis, separate homunculi may be used to indicate tender and/or painful joints versus those that are stiff and/or swollen (Fig. 3). This simple descriptive exercise provides a basis for tracking the disorder's evolution, for example in monitoring progression and/or response to treatment. In individuals with pain descriptors characteristic of neuropathic pain, *e.g.*, burning, radiating, knife-like, additional assessment for somatosensory abnormalities, *e.g.*, quantitative sensory testing for allodynia or hyperalgesia, may be useful to identify individuals with central sensitisation (43).

Conclusions

In summary, a comprehensive biopsychosocial perspective is warranted in the assessment of MSK pain. Taking a broader approach to the assessment of pain in MSK conditions – one that incorporates pain, associated downstream effects, and key contextual factors – has potential to enhance our understanding of the spectrum of effects of an intervention (*e.g.* relief of pain and/or improvements in sleep quality) and improve our ability to target the right treatment to the right patient, resulting in improved outcomes (26, 44).

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