Narrative Review

PAIN

# The IASP classification of chronic pain for *ICD-11*: chronic secondary musculoskeletal pain

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**Abstract**

Chronic musculoskeletal pain is defined as chronic pain arising from musculoskeletal structures such as bones or joints. Although comprising the most prevalent set of chronic pain conditions, it was not represented appropriately in the *10th edition of the International Classification of Diseases (ICD-10)*, which was organized mainly according to anatomical sites, was strongly focused on musculoskeletal disease or local damage, and did not consider the underlying mechanisms of pain. The new *ICD-11* classification introduces the concept of chronic primary and secondary musculoskeletal pain, and integrates the biomedical axis with the psychological and social axes that comprise the complex experience of chronic musculoskeletal pain. Chronic primary musculoskeletal pain is a condition in its own right, not better accounted for by a specific classified disease. Chronic secondary musculoskeletal pain is a symptom that arises from an underlying disease classified elsewhere. Such secondary musculoskeletal pain originates in persistent nociception in musculoskeletal structures from local or systemic etiologies, or it may be related to deep somatic lesions. It can be caused by inflammation, by structural changes, or by biomechanical consequences of diseases of the nervous system. It is intended that this new classification will facilitate access to patient-centered multimodal pain management and promote research through more accurate epidemiological analyses.

**Keywords:** Chronic musculoskeletal pain, Rheumatoid arthritis, Osteoarthritis, Spondylosis, *ICD-11*, Classification, Assessment, Diagnosis

## 1. Background on chronic musculoskeletal pain

Pain is not only the most frequent symptom in musculoskeletal disorders but also accounts for most of the associated burden of disease.[7,12] Moreover, chronic musculoskeletal pain represents the most prevalent set of chronic pain conditions.[6] Traditionally, musculoskeletal pain has been regarded as related to known pathological conditions affecting the muscles, bones, or joints, such as osteoarthritis, inflammatory arthritis, and diseases of connective tissue, or to unknown pathology in a particular location such as "back pain" or "periarticular pain."[22] However, it is important to differentiate between pain as a symptom related directly to such diseases and chronic musculoskeletal pain that cannot be so attributed and has to be considered as a condition in its own right. The IASP classification of chronic pain reflects this distinction by identifying the latter as chronic primary musculoskeletal pain,[16] separately from the former, which is identified as chronic secondary musculoskeletal pain. This approach also recognizes that chronic musculoskeletal pain may be related to diseases of the nervous system, for example, pain associated with stiffness in Parkinson disease.

The biopsychosocial framework for chronic pain, including chronic musculoskeletal pain, recognizes that chronic pain is always multifactorial. However, the respective contributions of the various factors may differ among the different syndromes. These distinctions are important for epidemiological, clinical, and economic reasons.

## 2. The need for a classification system

In the current edition of the *International Classification of Diseases, ICD-10* musculoskeletal pain is included in M00-M99 codes, implying that it is always a symptom related to a disease of the musculoskeletal system or connective tissue. However, in fact, the correlation between musculoskeletal structural damage and pain occurrence is weak.[34] The *ICD-10* classification may be relevant for musculoskeletal diseases that are often, but not always, painful but in its current form it is not adapted to chronic musculoskeletal pain as a condition in its own right.

The coding guidelines for the *ICD-10 (ICD-10-CM)* state that if the cause of the pain is known, the main code assigned should be that of the underlying diagnosis, not a pain code. However, if the purpose of the patient's visit is to manage the pain itself rather than

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the underlying condition, then a pain code should be assigned first. Combined codes would be useful but are not part of the coding strategy in *ICD-10*, although they will be in *ICD-11*. A recent "paradigm shift" in the approach to musculoskeletal (and other) diseases has been the recognition that pain should be thought of as a separate issue (the "fifth vital sign in medicine") and chronic pain should be regarded as a condition in its own right (WHO 2014), recognizing its independent impact on functioning. For this purpose, the WHO created the *International Classification of Functioning Disability and Health (ICF)* and included a section on "functioning properties" for each diagnostic entity in the *ICD-11*.[36] In this context, there is a need to classify chronic musculoskeletal pain according not only to site and disease category but also to pain mechanisms.[20] Moreover, this new approach may allow for better pain management, especially with appropriate pharmacological treatments and multimodal treatments.

## 3. The IASP Task Force *ICD* initiative

To address the inadequate representation of chronic pain in *ICD-10*,[24,25] the International Association for the Study of Pain (IASP) established an international Task Force that worked in close cooperation with WHO representatives to generate an improved systematic classification of chronic pain. The classification is dedicated exclusively to chronic pain syndromes and excludes acute pain.[30,31] It was coordinated with the *ICF*, where pain is listed as a bodily function that should be assessed in every patient.[17] Previous versions were field-tested on consecutive cases in pain clinics in 2016[3] and as part of WHO formal testing for consistency in 2017. On June 18, 2018, WHO published a "frozen version" of *ICD-11* for preparation of implementation by member states (WHO 2018).

## 4. The classification of chronic musculoskeletal pain

Chronic pain is defined as persistent or recurrent pain that lasts longer than 3 months.[31] This definition constitutes a clear and unambiguous operationalization that is in line with widely used clinical criteria and includes most relevant chronic pain conditions. Optional specifiers allow for recording the time course and severity of the pain as well as the presence of psychological and social factors.[30] In *ICD-11*, "chronic pain" is the "parent" code for all chronic pain syndromes, and its definition and specifiers are hence inherited by all "children" codes such as chronic musculoskeletal pain.

### *4.1. The general structure of the chronic pain classification: chronic primary and chronic secondary musculoskeletal pain*

Chronic musculoskeletal pain was split into 2 main domains: (1) chronic primary musculoskeletal pain and (2) chronic secondary musculoskeletal pain. A similar distinction was made for chronic headache and orofacial pain, and for chronic visceral pain.[2,4]

Chronic primary musculoskeletal pain is chronic pain experienced in muscles, bones, joints, or tendons that (1) is characterized by significant emotional distress (such as anxiety, anger, frustration, or depressed mood) or functional disability (interference in daily life activities and reduced participation in social roles), and (2) cannot be attributed directly to a known disease or damage process. Chronic primary musculoskeletal pain can be localized in the spine or limbs, or it can be diffuse. The diagnosis is appropriate independently of identified biological or psychological contributors unless another diagnosis would better account for the presenting symptoms. Examples of chronic primary musculoskeletal pain include chronic nonspecific low back pain (in the new classification termed "chronic primary low back pain") and chronic widespread pain. The primary pain conditions are described in detail in a separate companion paper.[16]

Chronic secondary musculoskeletal pain is chronic musculoskeletal pain that arises from an underlying disease classified elsewhere. For a complete list of all chronic musculoskeletal pain conditions as listed in the *ICD-11* foundation layer, please refer to the supplementary Table (available at http://links.lww.com/PAIN/A658).

### *4.2. The classification of chronic secondary musculoskeletal pain*

The chronic secondary musculoskeletal pain categories comprise heterogeneous pain conditions not only related to chronic nociception originating in the vertebral column, joints, bones, muscles, tendons and related soft tissues, from local or systemic etiologies, but also related to deep somatic lesions. If the pain perceived in these locations is considered to be referred from visceral lesions, a diagnosis of chronic secondary visceral pain may be more appropriate (these conditions are described more fully in the respective companion paper).[2] If the chronic pain fulfills the criteria for the descriptor "neuropathic,"[9] it should be coded under chronic neuropathic pain (these conditions are described more fully in the respective companion paper).[27]

Chronic secondary musculoskeletal pain is due mostly to 3 main causes that are reflected in the classification (**Fig. 1**):

(1) persisting local or systemic inflammatory illnesses that may be caused by infection, crystal deposition, or autoimmune and autoinflammatory processes;
(2) local structural musculoskeletal changes; and
(3) diseases of the nervous system that are not musculoskeletal conditions in themselves but which may cause musculoskeletal problems, such as muscular hypertonicity in Parkinson disease.

#### *4.2.1. Chronic secondary musculoskeletal pain from persistent inflammation*

Inflammation is a major mechanism in many musculoskeletal diseases. Likewise, persisting inflammation is an important mechanism of chronic musculoskeletal pain.[8] The pain may be spontaneous or movement-induced. It is characterized by clinical features of inflammation, including increased sensitivity of the affected part to stimuli. Chronic secondary musculoskeletal pain from persistent inflammation may be the main symptom in rheumatological conditions where inflammation is the primary pathophysiological mechanism. It is also one of the most frequent symptoms in autoimmune and autoinflammatory disorders that are driven by systemic or local inflammation.

Inflammation has several etiologies, and chronic pain related to inflammation can be divided along their lines into 3 main subcategories:

(1) diseases characterized by inflammation related to infection;
(2) crystal deposition diseases; and
(3) autoimmune and autoinflammatory disorders.

##### *4.2.1.1. Chronic secondary musculoskeletal pain from persistent inflammation due to infection*

This type of chronic secondary musculoskeletal pain may be due to persistent bacterial, viral, or fungal infection. It is characterized by the clinical features of inflammation. The infection can be active or latent, and chronic pain may persist even after the effective treatment of the infection. As long as the infection is active, both the diagnostic code for the infectious disease and the code for the respective chronic secondary pain condition should be assigned. If the pain persists beyond the successful treatment of the underlying condition, the code for the chronic secondary musculoskeletal pain condition

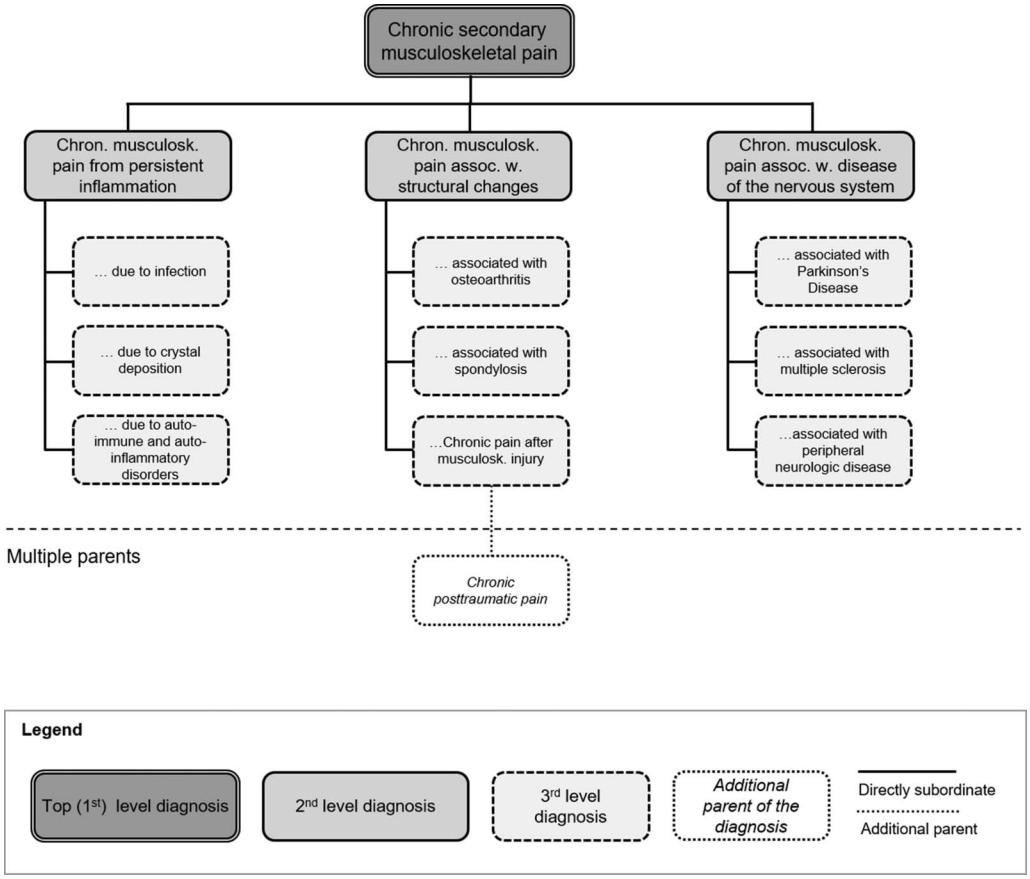


**Figure 1.** Organization of *ICD-11* diagnoses of chronic secondary musculoskeletal pain. Levels 1 and 2 are part of the 2018 frozen version of the *ICD-11*[35]; level 3 was entered into the foundation layer. According to the new concept of multiple parenting in *ICD-11*, an entity may belong to more than one group of diagnoses. [a]Chronic primary musculoskeletal pain is coded under chronic primary pain.[16]

should be retained or assigned on its own. All types of infections may cause chronic musculoskeletal pain, mainly viruses (eg, hepatitis C and B viruses, HIV, herpes viruses, Epstein–Barr virus, HTLV1, parvoviruses, and chikungunya),[14] less frequently, bacteria (eg, *Borrelia burgdorferi* [Lyme],[13] *Rickettsiae*, *Brucella*, Mycobacteria, and infections of prosthetic joints), and rarely, fungi and parasites.

#### *4.2.1.2. Chronic secondary musculoskeletal pain from persistent inflammation due to crystal deposition*

This type of chronic secondary musculoskeletal pain is due to the local deposition of different types of crystals in joints and soft tissues. It is characterized by clinical features of inflammation. The mechanism of the pain is mainly nociceptive. Pain development in crystal deposition disorders is mediated by several inflammatory substances that are formed after cell injury by crystals.[23]

In these conditions, chronic musculoskeletal pain can occur after several episodes of acute inflammation. The intensity of the chronic pain does not correlate necessarily with the degree of crystal deposition because crystal deposition can be painless in some cases. Different types of crystal deposition may be associated with chronic secondary musculoskeletal pain, mainly calcium pyrophosphates, hydroxyapatite, and uric acid (as, eg, in gout); other crystal disorders are less frequent.

#### *4.2.1.3. Chronic secondary musculoskeletal pain from persistent inflammation due to autoimmune and autoinflammatory disorders*

This type of chronic secondary musculoskeletal pain is associated with, but not limited to, systemic autoimmune diseases[15] and autoinflammatory conditions (Case vignette 1). Prominent examples of such systemic autoimmune diseases are rheumatoid arthritis,[21] systemic lupus erythematosus,[11] and Sjögren syndrome.[33] Examples of autoinflammatory conditions include spondyloarthritis[10] and psoriatic arthritis.[18] In all these conditions, chronic musculoskeletal pain is secondary to inflammation but does not necessarily correlate with the clinical or biological activity of the underlying disease. In these conditions, the assessment of the disease activity should include a pain evaluation. Both the diagnostic code for the underlying disease and for the respective chronic musculoskeletal pain should be assigned.

### *4.2.2. Chronic secondary musculoskeletal pain associated with structural changes*

This type of chronic secondary musculoskeletal pain is attributed to anatomical changes in joint(s), bone(s), or tendon(s). The structural change is inferred from clinical examination or demonstrable on imaging. Clinically, features such as swelling, allodynia, and loss of movement are characteristic. Chronic secondary musculoskeletal pain associated with structural changes reflects the older classifications of osteoarthrosis and spondylosis (the latter when referring to spinal structures), and includes persistent pain after bone fracture, especially if there is anatomical deformity, and demonstrable anatomical change in tendons or entheses. This is a classification of chronic pain by anatomical change in the candidate structure(s). The presumption is that the structural change, as observed clinically, whether or not supported by imaging, is the origin of the nociception

*Case vignette 1: chronic musculoskeletal pain associated with inflammation due to an autoimmune disease*

A 45-year-old woman was diagnosed with rheumatoid arthritis 3 years before presentation to the Pain Clinic. Her disease was rheumatoid factor- and ACPA-positive arthritis, and acute-phase reactants were elevated. Initial treatment with a conventional disease-modifying antirheumatic drug (DMARD) (methotrexate) and low-dose corticosteroid was effective for some 6 months after which she experienced new flares with multiple sites of synovitis and elevated acute-phase reactants. Treatment was commenced with a biological agent (TNF-inhibitor) with fair control of synovitis since. However, she presents with persistent pain in many joints despite the absence of joint swelling and allodynia, associated with significant interference with activities of daily living. The CRP is mildly elevated. She is overweight, depressed, and does not exercise.
The diagnoses rheumatoid arthritis and chronic secondary musculoskeletal pain associated with inflammation due to an autoimmune disease were given.
Management included changing to a different biological DMARD to address the underlying disease and, after further assessment of psychosocial factors, initiation of an exercise and weight reduction program including joint protection, advice regarding techniques to enhance activities of daily living, and symptomatic control of joint pain.

*Case vignette 2: chronic musculoskeletal pain associated with spondylosis*

A 44-year-old man presents with an exacerbation of back pain that he has had intermittently for the past 18 months. The current exacerbation was caused by a lifting incident at work. He tried to work despite the pain but was unable to do so. The pain is perceived centrally in the lower back and in both buttocks, occasionally in the left leg, unaccompanied by paraesthesiae or sphincter dysfunction. He has no fever or systemic symptoms, but he is losing sleep. The patient has been otherwise well to date. On examination, flexion of the lumbar spine is limited by pain and allodynia to palpitation is elicited over the lower lumbar segment. There is no abnormality on examination of the lower limb joints. Neurological examination of the lower limbs is normal. Imaging of the lumbosacral spine shows changes of spondylosis, consistent with his age.
The underlying disease diagnosis is lumbar spondylosis; the pain diagnosis is chronic secondary musculoskeletal pain associated with spondylosis.
Management consists of assurance regarding the absence of serious or progressive disease, assessment of factors possibly amplifying pain, attention to biomechanical factors in the workplace, functional restoration, and symptomatic noninvasive treatment of pain.

*Case vignette 3: chronic musculoskeletal pain associated with Parkinson disease*

A 75-year-old man is consulting a pain center for chronic musculoskeletal pain affecting the lower limbs in particular. He has been treated for Parkinson disease for 6 years. He complains of severe constant pain in the muscles and joints of his legs. Clinical examination shows moderate rigidity of muscle tone but no signs of arthropathy or of peripheral neuropathy. His gait is slow and shuffling with occasional freezing. The pain is attributed to biomechanical consequences of the neurological disorder, especially the difficulty with controlling the centre of gravity. In association with optimization of anti-Parkinsonian drug therapy and assessment of psychosocial contributors to distress and disability, attention is given to walking aids and physiotherapy, with symptomatic control of pain with nonopioid analgesics.

ultimately associated with the experience of pain. Importantly, however, there may be a discordance between the nature and intensity of the pain experienced and the degree of structural change observed.

#### *4.2.2.1. Chronic secondary musculoskeletal pain associated with osteoarthritis*

This type of chronic secondary musculoskeletal pain is attributed to the structural changes that characterize osteoarthritis of synovial joints, cartilage, and subchondral bone.[26] The pain may be spontaneous or movement-induced. Allodynia or swelling may be present. The diagnosis of osteoarthritis is based on clinical or radiological examination. The nature and severity of the pain may not be linearly related to the degree of structural osteoarthritis observed. This pain diagnosis should be given regardless of whether the exact mechanism of nociception can be determined, but it should be considered that the structural changes may be relevant to the pain.[19] Otherwise, a diagnosis in the section of chronic primary pain should be considered.[16]

#### *4.2.2.2. Chronic secondary musculoskeletal pain associated with spondylosis*

This type of chronic secondary musculoskeletal pain is attributed to the structural changes that characterize spondylosis. Spondylosis involves vertebral end plates, intervertebral disks, zygapophysial joints, and associated structures in varying combinations (see Case vignette 2). The diagnosis of spondylosis is based on clinical examination or imaging. The pain may be spontaneous or movement-induced. Clinically, restricted movement of the spinal segment(s) or allodynia may be present. The nature and severity of the pain may not be related linearly to the degree of spondylosis observed. This pain diagnosis should be given regardless of whether the exact mechanism of nociception can be determined, but it should be considered that the structural changes may be relevant to the pain. Otherwise, a diagnosis in the section of chronic primary musculoskeletal pain, such as chronic primary low back pain, may be more suitable.[16] It should be noted that this form of chronic musculoskeletal pain is axial in distribution: the presence of associated limb girdle or limb pain may require independent assessment.

#### *4.2.2.3. Chronic pain after musculoskeletal injury*

This type of pain is chronic pain that occurs after an injury to the musculoskeletal system. It includes persistent pain after bone fractures, especially if there is anatomical deformity and demonstrable anatomical change in tendons or entheses. Because of the temporal relationship of the injury and the onset of the chronic pain, chronic posttraumatic pain is the primary parent of this diagnosis.[28]

### *4.2.3. Chronic secondary musculoskeletal pain due to diseases of the nervous system*

This type of chronic secondary musculoskeletal pain is related to peripheral or central neurological disorders classified elsewhere. It includes pain due to altered motor function and altered sensory function. Altered biomechanical function due to the neurological

disease is considered to be responsible for the activation of nociceptors in musculoskeletal tissue. Chronic secondary musculoskeletal pain associated with a disease of the nervous system includes upper and lower motor neuron disease, extrapyramidal disorders, and chronic pain attributable to altered sensory (including proprioceptive) function.

#### *4.2.3.1. Chronic secondary musculoskeletal pain associated with Parkinson disease*

Chronic secondary musculoskeletal pain associated with Parkinson disease is regional or diffuse chronic musculoskeletal pain. It is mainly experienced in joints and muscles and may occur in patients with any type of Parkinson disease, but it is not directly attributable to the pathogenesis of that disease (see Case vignette 3). Pain is one of the most common and troublesome nonmotor symptoms of Parkinson disease; it can appear at any time during the disease, irrespective of the effectiveness of treatment.[1] Secondary musculoskeletal pain coded here is the chronic pain that is attributed to altered biomechanical function. This is pain of nociceptive origin. The recently published King's Parkinson's Disease Pain Scale has identified 7 domains of pain in Parkinson disease, including musculoskeletal pain.[5] Comorbid forms of chronic neuropathic pain should be coded separately.[27] It should be noted that the pain assessment in a patient with Parkinson disease may be challenging if cognitive and depressive symptoms are present. In these cases, the assessment will have to be adapted accordingly.

#### *4.2.3.2. Chronic secondary musculoskeletal pain associated with multiple sclerosis*

Chronic secondary musculoskeletal pain associated with multiple sclerosis is mostly experienced in muscles and joints. Chronic pain in multiple sclerosis should be classified according to mechanism, such as nociceptive pain arising from postural abnormalities secondary to motor disorders.[32] These types of chronic pain may occur in patients with any type of multiple sclerosis. The pain is considered to originate in musculoskeletal structures but is not due to the multiple sclerosis itself.

Chronic secondary musculoskeletal pain associated with multiple sclerosis may coexist with neuropathic pain, especially in inflammatory myelitis. Comorbid forms of chronic neuropathic pain should be coded separately.[27] The identification of various types of pain in multiple sclerosis may allow for appropriate targeted pharmacological treatment and improve clinical practice.[29]

#### *4.2.3.3. Chronic secondary musculoskeletal pain associated with peripheral neurologic disease*

This type of chronic secondary musculoskeletal pain is related to peripheral neurological disorders classified elsewhere. The pain is not directly attributable to the pathogenesis of the neurologic disease itself. Rather, it is due to the altered biomechanical function of those structures consequent upon altered nervous system control. Chronic secondary musculoskeletal pain associated with peripheral neurologic disease includes pain due to altered motor function and altered sensory function, for example, Charcot joint disease related to peripheral neuropathy. By contrast, pain due to nerve entrapment (eg, compression neuropathy in carpal or tarsal tunnels) is classified as chronic neuropathic pain.[27]

### *4.2.4. Other chronic secondary musculoskeletal pain*

At each level, the WHO adds the residual categories of "other specified" and "unspecified" to complete the classification. The category "other specified" is designed for specific diagnoses that fall in the section's category but are not represented individually. On the current level of the classification of chronic secondary musculoskeletal pain, the category "Other specified chronic secondary musculoskeletal pain" would be the catchment term for chronic secondary musculoskeletal pain diagnoses that are due to factors other than inflammation, structural change, or diseases of the nervous system. In this category may be mentioned chronic musculoskeletal pain associated with work-related musculoskeletal disorders.

The category "unspecified" is used to provide a code for cases in which too little information is available to allow for a specific allocation.

## 5. Discussion

The code for chronic secondary musculoskeletal pain is intended to be assigned with the code for the disease that it accompanies, provided that the chronic pain is considered to be attributable to this disease. Musculoskeletal pain can be caused directly by an underlying disease process such as rheumatoid arthritis or by changes in musculoskeletal function that are attributable to another underlying disease such as osteoarthritis or a disorder of the nervous system. The secondary pain codes are reserved for cases in which such a disease is (or was) present and caused the musculoskeletal pain. This does not mean that the intensity of the pain has to correlate with the disease process: in many of the conditions described in this review, this is not the case. Often, the underlying disease may have been treated successfully, but chronic pain remains and becomes the main complaint in its own right. If the original disease is still present, both codes should be given: that for the underlying disease and the chronic pain code from this section (as in Case vignettes 2 and 3). If the original disease was treated successfully and the pain persists (as in Case vignette 1), the chronic secondary musculoskeletal pain code should be assigned on its own. If the chronic musculoskeletal pain was caused by surgery or other trauma, it should be diagnosed with a code from the section dedicated to chronic posttraumatic and chronic postsurgical pain.[28]

If pain perceived in muscles is due to a disease of inner organs (referred pain), codes from the chronic visceral pain section should be used.[2] If pain perceived in muscles is due to a lesion or disease of the somatosensory system, codes from the section on chronic neuropathic pain[27] should be considered. For other musculoskeletal pain, the musculoskeletal pain diagnoses in the section on chronic primary pain[16] should be considered, such as chronic widespread pain or chronic primary low back pain.

## 6. Summary and conclusions

Chronic musculoskeletal pain, primary and secondary, represent newly described pain entities. This classification merges underlying mechanisms of nociception with earlier classifications of musculoskeletal disorders. Integrating both perspectives is a modern approach that may promote more accurate epidemiological analyses of conditions characterized by musculoskeletal pain from electronic health records once *ICD-11* has been implemented in 2022. Including a separate code for chronic pain will allow for patient-centered management of such conditions that is driven not only by the pathophysiology of a disease but also implies the need for multimodal treatment of the chronic pain.

## Conflict of interest statement

A. Barke reports personal fees from IASP, during the conduct of the study. W. Rief reports grants from IASP, during the conduct of the study; personal fees from Heel; and personal fees from Berlin Chemie, outside the submitted work. R.-D. Treede reports grants from Boehringer Ingelheim, Astellas, AbbVie, and Bayer, personal fees from Astellas, Grünenthal, Bauerfeind, Hydra, and Bayer, and grants from EU, DFG, and BMBF, outside the submitted work. S. Perrot, M. Cohen and B. Korwisi have nothing to disclose.

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## Appendix A. Supplemental digital content

Supplemental digital content associated with this article can be found online at http://links.lww.com/PAIN/A658. SDC includes a complete reference list of the diagnoses entered into the foundation with the foundation IDs as well as the extension codes (specifier). Since the complete list is contained, the material is identical for all papers of the series.

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