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ABSTRACT

Phenomenological classification of pain: a mechanism-based approach

Clasificación fenomenológica del dolor: un enfoque basado en mecanismos

Classificação fenomenológica da dor: uma abordagem baseada em mecanismos

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Introduction: Pain is an unpleasant sensory and emotional experience associated with actual or potential tissue damage, according to the seminal definition of the International Association for the Study of Pain (IASP)[1]. More than just a symptom, pain represents a major challenge for public health, with estimates indicating that its chronic condition affects approximately 20% of the world's adult population, resulting in high socioeconomic costs and a significant burden of disability[2]. Its presence goes beyond mere symptoms, constituting a complex and multifaceted clinical entity with profound implications for quality of life, individual psychosocial functioning, and the burden on healthcare systems. The pathophysiology of pain involves an intricate network of peripheral and central mechanisms, including peripheral and central sensitization processes, descending modulation, and psychoneuroimmunological influences, which vary according to the type and chronicity of the condition[3]. In this context, the correct characterization and classification of pain are therefore a scientific and clinical imperative, fundamental to guiding accurate and personalized diagnostic and therapeutic strategies. The objective of this research is the systematic investigation of the different types of pain, as documented in the indexed scientific literature. The central problem identifies the existence of multiple classification systems, such as those based on duration, pathophysiology, or location, which are not always applied consistently in clinical practice and research, which can negatively impact clinical conduct, language standardization, and the development of new therapies. This heterogeneity can lead to underdiagnosis, inappropriate treatments, and unsatisfactory patient outcomes. This study hypothesizes that an integrative literature review will allow the synthesis of a robust and updated phenomenological classification model, based primarily on pathophysiological mechanisms, which will aid in standardizing nomenclature, improving diagnostic accuracy, and guiding future research.

Objective: Systematize and analyze the scientific evidence available in PubMed on the main types of pain, focusing on their classification based on pathophysiological mechanisms, duration, and clinical characteristics.

Methodology: An integrative literature review was conducted following the proposed five-stage protocol[5]: 1) problem identification; 2) literature search; 3) data evaluation; 4) data analysis; and 5) presentation. The search was conducted in the PubMed (National Library of Medicine) database in July 2024. The following descriptors in English were used combined by Boolean operators: ("Pain"[Mesh] OR "Pain Management"[Mesh] OR "Chronic Pain"[Mesh]) AND ("Classification"[Mesh] OR "Types" OR "Phenomenology" OR "Mechanisms") NOT ("Animal" OR "Veterinary"). Original articles, systematic reviews, meta-analyses, and clinical guidelines published in the last 10 years (2014-2024), in English, Portuguese, or Spanish, with full text available, were included. Studies involving animals, editorials, letters, and isolated case reports were excluded. Two independent researchers screened titles and abstracts, followed by full-text readings of the selected articles, applying the inclusion and exclusion criteria. Disagreements were resolved by consensus or by a third researcher. The extracted data (author, year, country, study type, sample, objective, and main results on pain classification) were synthesized into a matrix for thematic analysis, categorizing the types of pain according to the most prevalent consensus in the literature.

Results and Discussion: The initial search returned 2,348 articles. After removing duplicates and applying the criteria, 78 studies were eligible for full-text reading and analysis, resulting in a final sample of 13 studies. The analysis revealed that pain classification is predominantly structured along three main axes: Duration, Pathophysiological Mechanisms, Location, and Etiology. Based on duration: The fundamental distinction is between acute and chronic pain. The former, of short duration (<3 months), functions as a biological warning signal for tissue damage (postoperative, trauma)[2]. The second, persistent beyond the normal healing time (≥3 months), loses its adaptive function and is recognized as a disease, with distinct sensory, emotional, and cognitive components[5]. Based on pathophysiological mechanisms, being the most relevant classification for therapeutic choice, it includes: nociceptive pain that results from the activation of nociceptors by thermal, mechanical or chemical stimuli (arthritis, burns, fractures); neuropathic pain that is caused by an injury or disease of the somatosensory system (diabetic neuropathy, postherpetic neuralgia)[6] - the IASP recently refined this definition, requiring diagnostic evidence of neural injury -; and nociplastic pain that emerges as a third category, in which pain is generated by an alteration in nociception, without clear evidence of tissue or neural injury (fibromyalgia, irritable bowel syndrome), given concept explains centralized pain syndromes and sensitization[7]. In this context, the conceptual understanding of the different categories of pain represents a central element in clinical healthcare practice. The ability to differentiate between acute, chronic, nociceptive, neuropathic, and nociplastic pain directly influences both diagnostic accuracy and the definition of therapeutic strategies. Failure to distinguish between these categories can lead to ineffective approaches, promote chronic pain, increase the use of healthcare resources, and significantly compromise the patient's quality of life. Thus, accurately identifying the type of pain goes beyond the theoretical realm and becomes an essential skill for professional practice. In-depth knowledge in this field enables the provision of effective, humanized care, supported by scientific evidence, tailored to the specific needs of each individual. In addition to improving clinical outcomes, this skill expands professional autonomy, contributes to the rational use of drugs and technologies, and strengthens a more efficient, ethical, and patient-centered care model[1,5,6].

Conclusion: Pain classification is a constantly evolving field and plays a central role in the advancement of pain medicine. This review highlights the consolidation of a consensus around a multidimensional taxonomy that integrates pathophysiological mechanisms - nociceptive, neuropathic, and nociplastic - with the temporal dimension (acute and chronic). Adopting this phenomenological perspective, based on evidence available in the most relevant scientific database, PubMed, proves essential to overcoming merely symptomatic models, favoring the development of more precise and effective therapeutic strategies. In this context, the need for future research aimed at improving diagnostic criteria, especially regarding mixed and nociplastic pain, as well as the effective incorporation of this knowledge into daily clinical practice, is highlighted.

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