CHRONIC PAIN: MEDICAL AND FUNCTIONAL ANALYSIS

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Abstract: This article provides a comprehensive scientific analysis of the concept of chronic pain, including its etiology, pathogenesis, clinical manifestations, diagnostics, differential diagnosis, modern treatment approaches, and prevention. The main objective of the study is to examine the complex impact of chronic pain on the human body, identify its differences from acute pain, analyze its pathophysiological mechanisms in depth, and develop effective treatment strategies. The results of the study indicate that chronic pain develops based on the biopsychosocial model and significantly affects the patient's quality of life.

Keywords: chronic pain, nociception, neuropathic pain, central sensitization, pain syndrome, therapy, analgesics, biopsychosocial model.

Introduction: Chronic pain is one of the most significant challenges in modern medicine. In recent years, this issue has become widespread globally, placing a substantial burden on healthcare systems. According to statistical data, up to 20–30% of the population in both developed and developing countries suffer from various forms of chronic pain. Chronic pain is generally defined as pain that persists for more than three months or continues even after the initial cause has resolved. Unlike acute pain, chronic pain loses its protective function and becomes an independent pathological condition. Therefore, it requires consideration as a separate disease entity. Relevance of the Study: Chronic pain is associated with

complex neurophysiological and biochemical processes in the human body, with significant involvement of both peripheral and central nervous system alterations. This condition leads not only to physical suffering but also to psychological issues (such as depression, anxiety, and insomnia) and social problems (including reduced work capacity and social isolation). For this reason, studying chronic pain and developing effective management strategies is one of the priority areas in modern medicine. Research Methodology: This scientific work was conducted using the following methods: systematic analysis of scientific literature, generalization of clinical observation results, comparative-descriptive methods, as well as pathophysiological and functional analysis approaches. Modern scientific sources in the fields of neurology, internal medicine, psychiatry, and algology were used as the foundation of the study. Main Part: The etiology of chronic pain is multifactorial, involving biological, psychological, and social factors. Biological factors include various somatic diseases (such as arthritis, osteochondrosis, tumors), neurological disorders (neuropathies, nerve compression), and inflammatory processes. Psychological factors include stress, depression, and prolonged emotional strain. Social factors are determined by the patient's living conditions, working environment, and level of social support. The main types of chronic pain include nociceptive, neuropathic, and psychogenic pain. Nociceptive pain arises from tissue damage, while neuropathic pain is associated with injury to the nervous system. Psychogenic pain is primarily influenced by psychological factors. Recent studies also highlight the prevalence of mixed-type pain. From a pathogenesis perspective, both peripheral sensitization (increased sensitivity of nociceptors) and central sensitization (amplification of pain signals in the spinal cord and brain) play crucial roles. Additionally, increased activity of neurotransmitters such as glutamate and substance P, along with weakened endogenous pain inhibitory systems, contributes to the persistence and intensification of pain signals. Clinically, chronic pain presents in various forms. Patients often complain of persistent pain, sleep

disturbances, fatigue, reduced concentration, emotional instability, and depressive states. The pain syndrome is frequently diffuse and poorly localized.: Chronic pain syndromes include low back pain, migraine, fibromy algia, neuralgia, postoperative pain, oncological pain, and phantom pain. Each syndrome has distinct clinical and pathogenetic characteristics. Diagnostics: The diagnostic process involves a thorough assessment of the patient's medical history, as well as the duration, intensity, and nature of pain. Tools such as the Visual Analog Scale (VAS) and Numeric Rating Scale (NRS) are used to evaluate pain severity. Instrumental methods such as MRI, CT scans, and electromyography are also important. Psychological assessments help evaluate the patient's mental state. Differential Diagnosis: Differentiating chronic pain from other conditions is essential. It should be distinguished from acute pain, somatoform disorders, psychiatric illnesses, and neurological pathologies. This ensures the selection of an appropriate treatment strategy. Results: The analysis demonstrates that chronic pain is a multifactorial and complex condition, with biological, psychological, and social factors playing significant roles in its development. The effectiveness of treatment depends on an individualized approach and should not be limited to a single method. Discussion (Treatment): The management of chronic pain requires a comprehensive and multidisciplinary approach. Pharmacological treatment includes nonsteroidal anti-inflammatory drugs (NSAIDs), opioid analgesics, antidepressants, and anticonvulsants. Non-pharmacological methods such as physiotherapy, massage, acupuncture, and therapeutic exercise are widely used. Psychotherapy, particularly cognitive-behavioral therapy, plays a crucial role in improving the patient's mental health. In severe cases, invasive methods such as nerve blocks and neurostimulation may be applied.

Prevention: Prevention of chronic pain includes maintaining a healthy lifestyle, regular physical activity, stress management, timely treatment of acute pain, and adherence to proper work-rest balance. Discussion: In modern medicine, chronic

pain is increasingly recognized as a separate disease entity. This approach enables the development of new diagnostic and treatment methods, promotes the use of multidisciplinary strategies, and improves patients' quality of life. Conclusion: Chronic pain is a complex, multifaceted, and highly relevant problem that requires a comprehensive management approach. Early diagnosis, individualized treatment strategies, and consideration of biopsychosocial factors significantly improve patient outcomes. Further in-depth scientific research in this field is of great importance.

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