

TEACHING MULTIMODAL OSTEOARTHRITIS MANAGEMENT: BRIDGING CLINICAL EVIDENCE AND MEDICAL EDUCATION FOR FUTURE HEALTHCARE PROFESSIONALS

Katerina Tosheva

Medical University – Sofia, Bulgaria, katerina.tosheva@gmail.com

Abstract: Osteoarthritis is one of the most prevalent chronic musculoskeletal disorders worldwide and a leading cause of pain, disability, and reduced quality of life, particularly among aging populations. The increasing prevalence of osteoarthritis is associated with demographic changes, including population aging and rising levels of physical inactivity and obesity, which further contribute to its global burden. In addition to its clinical impact, osteoarthritis represents a significant socioeconomic burden due to increased healthcare costs, reduced work capacity, and long-term disability. Its multifactorial pathophysiology, involving cartilage degeneration, subchondral bone remodeling, inflammation, and biomechanical factors, presents significant challenges for both clinical management and medical education. In addition, the complexity of osteoarthritis management requires integration of knowledge from different medical disciplines, which is often insufficiently addressed in traditional medical curricula, highlighting the need for innovative educational approaches. The aim of the present study is to propose a structured educational framework for teaching multimodal osteoarthritis management, based on current clinical evidence and contemporary educational principles. The methodology includes a comprehensive literature review and analysis of international clinical guidelines, as well as recent scientific publications addressing pharmacological and non-pharmacological approaches to osteoarthritis treatment. Special attention is given to pain mechanisms, patient-reported outcomes, and quality of life assessment, as essential components of modern patient-centered care. The results demonstrate the necessity of integrating theoretical knowledge with clinical competencies through a structured educational model, consisting of disease understanding, pain assessment, multimodal therapy, quality of life evaluation, and clinical decision-making with risk-benefit analysis. This model supports the development of clinical reasoning, critical thinking, and individualized patient management skills. Furthermore, the integration of digital health technologies enhances learning processes and reflects current trends in medical education. The proposed framework is adaptable and can be implemented in different educational settings, including undergraduate and postgraduate medical training. In conclusion, the proposed framework provides a practical and adaptable approach to teaching osteoarthritis management and contributes to the preparation of future healthcare professionals capable of delivering effective, evidence-based, and patient-centered care. The findings support the implementation of structured educational models in medical curricula to improve the quality of osteoarthritis management and enhance patient outcomes, while also contributing to more efficient use of healthcare resources.

Keywords: osteoarthritis, medical education, multimodal therapy, pain assessment, patient-centered care

1. INTRODUCTION

Osteoarthritis (OA) is a leading cause of disability worldwide and a major public health concern (Hunter et al., 2020; Zhang et al., 2023).

In some European medical literature, the term “osteoarthrosis” is used as a synonym for osteoarthritis, emphasizing the degenerative character of the disease (Konstantinov & Momekov, 2019; Loeser, 2012). However, in contemporary international scientific publications, the term “osteoarthritis” is more widely adopted (Hunter, 2019; Hunter & Bierma-Zeinstra, 2022).

The disease is characterized by complex pathophysiological mechanisms involving cartilage degeneration, inflammation, and structural joint changes (Loeser, 2012; Yao & Zhang, 2023). Pain is the primary symptom and a key determinant of reduced quality of life (Hunter, 2019). The discrepancy between radiographic findings and pain perception supports the biopsychosocial model of osteoarthritis pain (Helminen et al., 2016; Koleva, 2019).

Effective management requires a multimodal and individualized approach combining pharmacological therapy, physical therapy, and patient education (Zhang et al., 2019; Bennell et al., 2021). Given these complexities, medical education must evolve to prepare future healthcare professionals with the necessary competencies (Bailey et al., 2020).

2. MATERIALS AND METHODS

The study is based on a literature review and analysis of current scientific evidence related to osteoarthritis (Hunter et al., 2020; Zhang et al., 2023). Sources include clinical guidelines and recent publications addressing multimodal management strategies (Zhang et al., 2019; Bennell et al., 2021). The analysis focuses on pain mechanisms, quality

of life assessment, and therapeutic approaches (Hunter, 2019; Johnston & Stoffman, 2021). The collected evidence is synthesized into an educational framework (Koleva, 2019).

3. RESULTS

The findings indicate that osteoarthritis management requires integration of clinical knowledge, patient-centered care, and multimodal therapy (Hunter et al., 2020; Bennell et al., 2021). Based on the analyzed evidence, a structured educational framework is proposed, consisting of five interrelated components.

The first component, disease understanding, focuses on osteoarthritis as a complex joint disease involving multiple tissues and mechanisms (Loeser, 2012; Yao & Zhang, 2023). This provides the theoretical basis for clinical reasoning and understanding disease progression.

The second component, pain assessment, emphasizes the multidimensional biopsychosocial nature of pain (Hunter, 2019; Koleva, 2019). This approach allows future healthcare professionals to evaluate patients comprehensively beyond structural findings.

The third component, multimodal therapy, integrates pharmacological and non-pharmacological treatment strategies (Zhang et al., 2019; Bennell et al., 2021). This reflects current evidence-based recommendations for osteoarthritis management.

The fourth component, quality of life evaluation, includes validated tools such as VAS, WOMAC, and SF-36 (Johnston & Stoffman, 2021). These tools allow assessment of treatment outcomes and patient well-being.

The fifth component, clinical decision-making and risk-benefit evaluation, supports individualized patient management and therapeutic selection based on clinical evidence (Welsch et al., 2019).

The proposed educational framework can be visualized as a structured and sequential model integrating key components of osteoarthritis management (Figure 1).

Figure 1. Educational framework for teaching multimodal osteoarthritis management.



Source: Author's own elaboration based on data and concepts presented in Loeser (2012), Hunter (2019), Zhang et al. (2019), Bennell et al. (2021), and Hunter & Bierma-Zeinstra (2022).

4. DISCUSSIONS

The results emphasize the need for competency-based medical education that integrates theoretical knowledge with practical clinical skills (Hunter et al., 2020). Osteoarthritis represents a suitable model for such an approach due to its complex pathophysiology and the need for individualized patient management.

The proposed educational framework reflects the multifactorial nature of osteoarthritis and supports the development of clinical reasoning and decision-making skills (Hunter & Bierma-Zeinstra, 2022). By incorporating key elements such as pain assessment and quality of life evaluation, the model aligns with modern patient-centered care principles.

Furthermore, the integration of multimodal therapy highlights the importance of interdisciplinary approaches and individualized treatment strategies (Zhang et al., 2019). This is particularly relevant for chronic conditions requiring long-term management.

The inclusion of digital health technologies enhances medical education by supporting interactive learning and improving clinical decision-making processes (Bailey et al., 2020).

Overall, the proposed framework provides a practical and adaptable model that can be applied in different educational settings and contributes to improving both medical training and patient care outcomes.

5. CONCLUSIONS

Osteoarthritis is a complex and multifactorial condition that requires a comprehensive and individualized approach to management (Zhang et al., 2023).

The proposed educational framework provides a structured model for teaching multimodal osteoarthritis management, integrating essential components such as disease understanding, pain assessment, therapeutic strategies, and outcome evaluation (Bennell et al., 2021).

This approach supports the development of key competencies, including clinical reasoning, patient-centered care, and evidence-based decision-making, which are crucial for future healthcare professionals.

The integration of digital health technologies further enhances the effectiveness of medical education and aligns with contemporary trends in healthcare.

In conclusion, the implementation of such educational models can improve both the quality of medical training and clinical outcomes in osteoarthritis management.

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