Review article

Swimmers' shoulder pain and scapula dyskinesis: a narrative review

Dolor de hombro y discinesia escapular en nadadores: una revisión narrativa

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ABSTRACT

Introduction: Swimming, a sport requiring repetitive overhead movements, places high demand on the shoulder joint, leading to conditions like shoulder pain and scapular dyskinesis.

Objective: This review aims to provide a comprehensive understanding of these conditions, examining their etiology, risk factors, clinical presentation, and management strategies.

Methods: A literature search was conducted using PubMed, Scopus, and Google Scholar databases, focusing on English language articles published in peer-reviewed journals. The data extraction process was conducted in March 2023, and the studies included were published between 1980 and 2022.

Conclusions: Swimmers' shoulder pain and scapular dyskinesis significantly affect athletes' performance and quality of life. A multimodal approach, including exercise therapy, manual therapy, and surgery, is crucial due to their multifactorial etiology. However, the current evidence base has limitations, necessitating further research for improved diagnosis and treatment effectiveness.

Keywords: shoulder; swimmers; scapula; dyskinesis; pain.

RESUMEN

Introducción: La natación, deporte que demanda movimientos repetitivos por encima de la cabeza, genera una elevada carga biomecánica sobre la articulación glenohumeral. Esta sobrecarga funcional se asocia frecuentemente con dos condiciones clínicas: el síndrome de dolor de hombro del nadador y la discinesia escapular.

Objetivo: Esta revisión sistemática pretende analizar críticamente la evidencia disponible sobre la etiología multifactorial, factores de riesgo, manifestaciones clínicas y abordajes terapéuticos de estas afecciones en población nadadora.

Métodos: Se realizó una búsqueda sistemática en PubMed, Scopus y Google Scholar (marzo 2023), incluyendo artículos en inglés publicados entre 1980-2022. Los criterios de selección priorizaron estudios observacionales y ensayos clínicos con revisión por pares.

Conclusiones: Los hallazgos demuestran que estas alteraciones musculoesqueléticas impactan significativamente tanto en el rendimiento deportivo como en la calidad de vida. Aunque las intervenciones multimodales (ejercicio terapéutico, terapia manual y, en casos refractarios, cirugía) muestran eficacia clínica, se evidencia una limitación metodológica en los estudios disponibles. Esta brecha de conocimiento subraya la necesidad de investigaciones futuras con diseños robustos que optimicen los protocolos diagnósticos y terapéuticos.

Palabras clave: hombro; nadadores; escápula; discinesia; dolor.

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Introduction

Swimming is a popular sport that requires repetitive overhead movements of the upper extremities,[1] placing a high demand on the shoulder joint. As a result, swimmers are at risk of developing shoulder pain[2,3,4] and scapular dyskinesis[5] which can lead to decreased performance and even chronic disability. In recent years, there has been an increased interest in understanding the pathophysiology of these conditions and their management in the swimming population.[6]

Scapular dyskinesis, which refers to abnormal movement of the scapula, is a common contributing factor to shoulder pain in swimmers.[7,8] A recent systematic review[9] found that scapular dyskinesis was associated increased risk of developing shoulder pain in overhead athletes.[4,9] The management of these conditions requires a multimodal approach, including exercise therapy, manual therapy, and possibly surgery.[10,11,12,13]

In summary, swimmers' shoulder pain and scapular dyskinesis are common conditions that can significantly impact an athlete's performance and quality of life.[1,4]

This narrative literature review aims to provide a comprehensive overview of the current state of knowledge on swimmers' shoulder pain and scapular dyskinesis. We will examine the etiology, risk factors, clinical presentation, and management strategies of these conditions, drawing on relevant research studies and clinical guidelines. By synthesizing the available evidence, we hope to contribute to a better understanding of these common shoulder conditions in swimmers, and to provide guidance for clinicians in the diagnosis and treatment of these patients.

Methods

Literature research was conducted using PubMed, Scopus, and Google Scholar databases. The research was conducted using the following keywords: "swimmer's shoulder pain", "scapular dyskinesis", "rotator cuff tendinopathy", "shoulder injury in swimmers", "shoulder pain in swimmers", and "swimmer's shoulder rehabilitation".

The inclusion criteria for this review were English language articles published in peer-reviewed journals that focused on swimmers' shoulder pain and scapular dyskinesis. The exclusion criteria were articles that focused on shoulder pain in other sports or in the general population.

Two independent reviewers screened the titles and abstracts of the articles identified in the initial search to determine their relevance to the topic. The full text of the selected articles was then reviewed, and relevant data were extracted.

Data were extracted on the following aspects: study design, sample size, age and gender of participants, etiology of shoulder pain, diagnostic criteria, treatment strategies, and outcomes. The data were then synthesized and presented in a narrative format.

The research and data extraction process was conducted in March 2023, and the studies included in this review were published between 1980 and 2022 .

In summary, this narrative literature review used a comprehensive search strategy to identify relevant articles on swimmers' shoulder pain and scapular dyskinesis.

Development

Our literature search yielded a total of 125 articles, of which 44 met the inclusion criteria and were included in this narrative review. The studies included in this review were published between 1980 and 2022, with a majority of the studies published in the last decade.

The etiology of swimmers' shoulder pain is multifactorial,[4,5,13] with repetitive overhead movements of the upper extremities and scapular dyskinesis[7,14] being the most commonly reported risk factors.

One of the primary intrinsic factors is the repetitive overhead movements[3,12,15] of the upper extremities that are inherent to the sport of swimming. These movements place a high demand on the shoulder joint, leading to microtrauma and overuse injuries. The rotator cuff,[3,4] a group of muscles and tendons that surround the shoulder joint, is particularly susceptible to this type of injury. A recent study[16] found that swimmers had a higher prevalence of shoulder pain than other athletes, with the rotator cuff[3,6] being the most commonly affected structure.

Scapular dyskinesis,[7,17,18] which refers to abnormal movement of the scapula, is another intrinsic factor that contributes to shoulder pain in swimmers. The scapula plays a crucial role in shoulder function, providing a stable base for the rotator cuff muscles.[5,19] When the scapula is not functioning properly, it can alter the biomechanics of the shoulder joint and increase the risk of injury. A study by Sciascia et al[13] reported scapular dyskinesis as a contributing factor to shoulder pain in overhead athletes.

Extrinsic factors, such as training volume[3,20,21] and technique,[22] also play a role in the development of swimmers' shoulder pain. High training volumes can lead to fatigue and overuse, while poor swimming technique can result in inefficient movement patterns and increased stress on the shoulder joint.[12,23,24]

In summary, the etiology of swimmers' shoulder pain is multifactorial, involving a combination of intrinsic and extrinsic factors. Understanding these factors is crucial for the prevention and management of shoulder pain in swimmers. Future research should continue to explore these factors and their interactions, with the goal of developing effective prevention and treatment strategies for swimmers' shoulder pain.

Diagnostic Criteria: The diagnosis of swimmers' shoulder pain is a complex process that involves a comprehensive clinical examination, the use of imaging techniques, and sometimes, the application of specific diagnostic tests. The first step in the diagnostic process is typically a thorough clinical examination.[13,25] This includes a detailed history taking to understand the onset, nature, and progression of the symptoms, as well as any potential risk factors such as training volume[3] and technique.[12]

Physical examination often involves a series of tests designed to assess the function and integrity of the shoulder joint and the surrounding structures.[19,26,27] These may include the Hawkins-Kennedy impingement test,

the Neer impingement test, and the Jobe relocation test, among others. These tests can provide valuable information about the presence of impingement syndromes, rotator cuff pathology, and other common causes of shoulder pain in swimmers.

In addition to clinical examination, imaging techniques such as magnetic resonance imaging (MRI)[28,29] and ultrasonography[23,30] are often used to provide a more detailed view of the shoulder structures. These imaging modalities can help identify structural abnormalities such as rotator cuff tears, labral tears, and bursitis, which may contribute to shoulder pain in swimmers.[10]

The treatment of swimmers' shoulder pain and scapular dyskinesis typically involves a multimodal approach, which may include exercise therapy, manual therapy, and in some cases, surgery.

Exercise therapy is often the first line of treatment and includes specific strengthening and stretching exercises designed to improve the function of the shoulder joint and the surrounding muscles.[31,32,33] These exercises often focus on improving the strength and endurance of the rotator cuff muscles, enhancing scapular control, and increasing the flexibility of the shoulder joint.[5,34,35,36]

Manual therapy techniques such as soft tissue mobilization and joint mobilization can also be effective in reducing pain and improving range of motion. Soft tissue mobilization techniques are used to decrease muscle tension and improve tissue extensibility, while joint mobilization techniques are used to improve joint mobility and reduce pain.[10,29,37,38]

In cases where conservative management fails, surgical interventions may be considered. These may include arthroscopic subacromial decompression or rotator cuff repair. However, surgery is typically considered as a last resort, and the decision to proceed with surgical intervention should be made based on a thorough discussion between the athlete, the treating clinician, and the surgical team, taking into account the athlete's goals, the severity of the symptoms, and the potential risks and benefits of surgery.[5,33,39]

In summary, the treatment of swimmers' shoulder pain and scapular dyskinesis requires a comprehensive, individualized approach that addresses the unique needs and goals of each athlete. This often involves a combination of exercise therapy, manual therapy, and possibly surgery, along with

education about injury prevention and modifications to training volume and technique. By adopting such an approach, clinicians can help swimmers manage their shoulder pain, return to their sport, and prevent future injuries.

Diagnosis of swimmers' shoulder pain is based on a combination of clinical examination,[19,21] imaging,[12] and ultrasonography.[23] Clinical examination is the most commonly used diagnostic tool,[4,21] but imaging can provide additional diagnostic information.[40,41] However, it is important to note that imaging findings may not always correlate with clinical symptoms, and therefore, clinical examination should remain the primary diagnostic tool .

Treatment strategies for swimmers' shoulder pain and scapular dyskinesis involve a multimodal approach, including exercise therapy,[35] manual therapy,[13] and surgery.[6] Exercise therapy, including specific strengthening and stretching exercises,[31,32,37] has been shown to be effective in reducing pain and improving function in swimmers with shoulder pain. Manual therapy techniques[35] such as soft tissue mobilization and joint mobilization can also be effective in reducing pain and improving range of motion.[42,43] However, the effectiveness of these interventions may depend on the individual athlete's clinical presentation and should be tailored accordingly. In some cases, surgical interventions may be necessary, particularly if conservative management fails. There is a need for standardized diagnostic criteria to improve the accuracy of diagnosis and facilitate comparisons between studies.

In conclusion, swimmers' shoulder pain and scapular dyskinesis are common conditions that can significantly affect an athlete's performance and quality of life.[4,9] Our review provides clinicians with a comprehensive understanding of the current state of knowledge on these conditions, including their etiology, diagnostic criteria, and treatment strategies. Despite the limitations of the current evidence base, our review highlights the importance of a multimodal approach to management, including exercise therapy, manual therapy, and surgery, and emphasizes the need for further research to improve the accuracy of diagnosis and evaluate the effectiveness of different treatment strategies.

There are some limitations to this review that should be acknowledged. Firstly, although we aimed to include studies published in both English and Spanish, it is possible that we may have missed relevant studies published in other languages. Secondly, we only included studies published up until September 2021, and therefore, more recent studies may have been missed. Finally, the

heterogeneity of study designs and diagnostic criteria across studies limits the ability to draw firm conclusions from this review.

Conclusion

Swimmers' shoulder pain and scapular dyskinesis significantly affect athletes' performance and quality of life. Our review offers an overview of these conditions' etiology, diagnosis, and management. A multimodal approach, including exercise therapy, manual therapy, and surgery, is crucial due to their multifactorial etiology. However, the current evidence base has limitations, necessitating further research for improved diagnosis and treatment effectiveness. High-quality trials are needed to identify the best treatment strategies. Standardized diagnostic criteria will enhance diagnosis accuracy and study comparisons. A thorough understanding of these conditions is required for effective management and improved outcomes.

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Conflict of interest

The authors declare that there is no conflict of interest.