ANALYSIS OF PHYSIOTHERAPY INTERVENTION IN ANTERIOR CRUCIATE LIGAMENT INJURY: AN INTEGRATIVE REVIEW

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ABSTRACT

Anterior cruciate ligament (ACL) injury is one of the most common and disabling injuries in sports, significantly affecting knee stability and function. Physical therapy plays a crucial role in the recovery process, as well as preventing post-injury complications and recurrence. This study aims to conduct an integrative review of interventions that are potentially effective in the treatment of ACL injuries. This is an integrative review covering articles published between 2018 and 2024 in the Virtual Health Library (BVS) and Scientific Electronic Library Online (SciELO) databases. The results indicate that rehabilitation programs that combine muscle strengthening exercises, proprioceptive training, and joint mobilization techniques have better functional outcomes. Early and progressive interventions have been shown to be effective in reducing pain, improving joint stability, and accelerating return to activities. In addition, the inclusion of neuromuscular training and individualized protocols contributed to lower rates of re-injury. It is concluded that physical therapy is important in the postoperative care of ACL cases, contributing to the recovery and, consequently, the improvement of these patients' quality of life. After all, rehabilitation work aims to restore joint stability, increase range of motion and muscle potential, and with these aspects combined, it is likely that the patient will return to their daily activities.

Keywords: Anterior Cruciate Ligament; Rehabilitation; Intervention; Physical Therapy.

INTRODUCTION

The knee is a joint that is essential for locomotion and body support. It is composed of bones, cartilage, and ligaments that provide stability and protection. Among the critical structures are the menisci, which are responsible for absorbing impacts and preventing overload on the joint. To ensure the functional stability of the knee, four main ligaments are necessary: the anterior cruciate ligament (ACL),

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posterior cruciate ligament (PCL), medial collateral ligament (MCL), and lateral collateral ligament (LCL), in addition to the muscles and joint capsule (Oliveira, Chiapeta, 2018).

Among the most common sports injuries, the anterior cruciate ligament (ACL) injury of the knee stands out as the main focus of this study, which causes significant damage to the knee joint and severely affects its stability, potentially resulting in meniscus and articular cartilage injury, accelerating joint degeneration, and increasing the risk of osteoarthritis (Shu *et al.*, 2022; Chen *et al.*, 2021). Sports such as soccer account for 64% of knee injuries and activities involving rotations and changes in direction (Yu *et al.*, 2021; Nitta *et al.*, 2021).

According to Arliani *et al* (2019), regarding the procedure adopted to treat ACL injuries, the overall recommendation of specialists is to perform surgical reconstruction of the injured structure, since the ligament, after the injury, does not have an adequate healing process, as indicated by 98% of surgeons, especially for athletes. On the other hand, Arraes *et al* (2023) emphasize that physical therapy is essential in the postoperative process, assisting in recovery and promoting a better quality of life.

Given the above, this article aimed to conduct an integrative review of interventions that are possibly effective in the treatment of ACL injuries.

METHOD

This is an integrative review, a unique method in the field of health, synthesizing a subject to provide greater understanding and comprehension of relevant publications, allowing new knowledge to be obtained. The research was based on the search, collection, and analysis of data in articles published in the last 6 years, between 2018 and 2024. Studies available in the following databases were included: Virtual Health Library (BVS) and Scientific Electronic Library Online (SciELO). The search was carried out using the following descriptors: Anterior Cruciate Ligament, Rehabilitation, Intervention, Physical Therapy. Data collection consisted of reviewing the literature of all selected and studied material resulting from the search for articles published between June and August 2024. Data analysis was performed through a critical reading of the content, identifying the authors' contributions, the methods used, and the main conclusions presented.

RESULTS

ACL injury is one of the most common sports injuries, with an increasing incidence, especially among active young people. Arthroscopic ACL reconstruction has become the gold standard for treatment (Wei; Huang, 2022). Paterno *et al* (2019) highlight that ACL injuries are recurrent in different age groups, reinforcing the need for preventive measures and specific training.

With regard to diagnosis, Yen *et al* (2020) showed that advanced imaging methods, such as radiography, magnetic resonance imaging (MRI), and arthroscopy, are of paramount importance for early detection and effective treatment of injuries and more accurate recovery of knee stability.

According to Shu *et al* (2022), effective postoperative rehabilitation training can consolidate the surgical effect and promote knee function recovery, highlighting that inappropriate exercises can compromise the success of reconstruction. Chen *et al* (2021) mention that physical training increases muscle strength through neural regulation, which promotes nerve activity and motor unit recruitment, and biochemical regulation, which improves muscle function by increasing glycogen and mitochondrial enzymes.

Shu *et al* (2022) describe that water sports, such as underwater exercises and resistance training for knee flexion, are practical in ACL rehabilitation. Wei and Huang (2022) demonstrated that sports rehabilitation training is more effective in increasing muscle strength, range of motion, and joint stability. In Brazil, according to Arliani *et al* (2019), orthopedists who treat professional soccer players reveal that isokinetic strength testing was considered the main indicator for assessing return to sport after ACL surgery, with 60% to 90% of athletes recovering or exceeding their previous level.

Brito *et al* (2024) emphasize the importance of integrating functional training and return to sports activities, adapting them to the specific requirements of the sport. Arliani *et al* (2019) highlight hydrotherapy as a recommended technique in pre-restoration intervention for ACL, reducing pain, inflammation, and movement limitations. Silva *et al* (2022) add that kinesiotherapy, or movement therapy, is an effective strategy.

Also according to Silva *et al* (2022), physical therapy is important in the prevention and rehabilitation of ACL injuries among soccer players. Therapy to improve muscle function and reduce pain was effective in returning to sports activities.

CONCLUSION

Based on scientific evidence, it is clear that ACL rupture is a common injury among individuals with complex knee injuries, especially young and physically active people such as athletes. As future physical therapists, it is important to understand that rehabilitation should not be based solely on physical recovery, but also on ensuring a safe return to sports. In this regard, the importance of a holistic rehabilitation program that addresses individual needs and specific sports requirements is highlighted. Such a plan should include not only measures to restore joint function, but also measures aimed at injury prevention and optimization of sports performance, thus emphasizing an integrated approach to the health and well-being of athletes.

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