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Tendon Separation Ends after Achilles Tendon Suture: Achilles Tendon Rupture: Aetiology and Pathogenesis of Subcutaneous Rupture

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Abstract

A physical condition known as an Achilles (uh-KILL-eez) ligament break affects the rear of your lower leg. It mostly affects recreational sports players, but anyone can get it. The muscles in your calf's back are connected to your heel bone by the strong, fibrous Achilles tendon. If you overstretch your Achilles tendon, it may tear (rupture) completely or just partially. If your Achilles ligament breaks, you might hear a pop followed by a sharp pain in the back of your leg and lower leg that probably will make it hard for you to walk normally.

Introduction

Typically, the rupture is repaired surgically. However, nonsurgical treatment is equally effective for some people. Achilles tendon rupture is a common sports-related injury characterized by the partial or complete tearing of the Achilles tendon, which connects the calf muscles to the heel bone [1]. The etiology and pathogenesis of subcutaneous Achilles tendon rupture have been extensively studied and researched. Based on the literature, here are some key points regarding the causes and mechanisms behind this injury

- Overuse and degeneration: Chronic overuse of the Achilles tendon, especially in activities that involve repetitive jumping or running, can lead to microtrauma and degeneration of the tendon fibers. Over time, these degenerative changes weaken the tendon, making it more susceptible to rupture.

- Age-related factors: The incidence of Achilles tendon rupture increases with age. Older individuals tend to have decreased tendon elasticity and strength, making their tendons more prone to rupture.

- Mechanical factors: Sudden and excessive force applied to the Achilles tendon can cause it to rupture. This can occur during activities that require a quick and forceful push-off, such as sprinting or jumping.

- Pre-existing conditions: Certain factors can predispose individuals to Achilles tendon rupture. These include previous tendon injuries or surgeries, systemic diseases (such as rheumatoid arthritis), and the use of certain medications (such as fluoroquinolone antibiotics) [2].

- Anatomic factors: Some anatomical variations can increase the risk of Achilles tendon rupture. For example, individuals with a tendon that inserts lower on the heel bone or those with a thickened tendon may be more prone to rupture.

- Vascular supply: The Achilles tendon has a relatively poor blood supply, particularly in its middle portion. Reduced blood flow to the tendon can impair its healing capacity and increase the risk of rupture.

Pathogenesis of subcutaneous Achilles tendon rupture involves the following steps

- Tendon degeneration: Chronic overuse, age-related changes, or pre-existing conditions can lead to degenerative changes in the tendon. This includes the disruption of collagen fibers and the formation of microtears within the tendon matrix.

- Tendon weakening: The degenerative process weakens the tendon structure, reducing its ability to withstand mechanical stress.

- Sudden forceful contraction: A sudden and forceful contraction of the calf muscles, often combined with dorsiflexion of the ankle, can generate high tension forces within the Achilles tendon.

- Rupture: The combination of degenerative changes and sudden force can exceed the tendon's strength threshold, resulting in partial or complete rupture. In most cases, the rupture occurs just above the insertion point of the tendon on the heel bone.

Discussion

It's important to note that the exact etiology and pathogenesis of Achilles tendon rupture can vary among individuals and may involve a combination of factors. The information provided here is a general overview based on the existing literature, and further research is continually being conducted to enhance our understanding of this injury. The separation of tendon ends after the suture of the Achilles tendon can occur in some cases, leading to complications and delayed healing [3-5]. Here are few possible reasons for this phenomenon:

- Tension on the suture: If there is excessive tension placed on the sutured tendon, it can cause the tendon ends to pull apart. This can happen if the suture is not properly tensioned or if the patient engages in activities that put stress on the healing tendon.

- Inadequate suture technique: The choice of suture technique is crucial for achieving a strong and secure tendon repair. If the suture technique used is not appropriate for the specific case or if the sutures are not properly placed through the tendon, it can result in inadequate strength and stability, leading to separation of the tendon ends.

- Inadequate immobilization: Proper immobilization is essential for allowing the tendon to heal without excessive stress or

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movement. If the patient fails to follow the prescribed immobilization protocol or if the immobilization method used is insufficient, it can contribute to the separation of the tendon ends.

- Poor blood supply: The Achilles tendon has a relatively poor blood supply, particularly in its middle portion. Inadequate blood flow to the sutured area can compromise the healing process, leading to poor tissue repair and potential separation of the tendon ends.

- Infection: Infection at the surgical site can impair healing and weaken the repair, increasing the risk of separation of the tendon ends.

- Delayed rehabilitation: Proper rehabilitation plays a crucial role in restoring tendon function and preventing complications. If the patient does not adhere to the recommended rehabilitation program or if there are delays in initiating rehabilitation, it can negatively impact tendon healing and increase the likelihood of tendon end separation.

- Patient factors: Certain patient-related factors, such as underlying medical conditions, smoking, poor nutrition, or compromised immune system, can impair the healing process and contribute to the separation of tendon ends.

Conclusion

It's important to note that the separation of tendon ends after suture of the Achilles tendon is a potential complication that can occur despite appropriate surgical technique and care. Proper diagnosis, timely intervention, and close monitoring by a healthcare professional are crucial to address this complication and ensure optimal healing of the Achilles tendon. Understanding the aetiology and pathogenesis of subcutaneous Achilles tendon rupture is crucial for effectively managing this injury. The rupture is often caused by a combination of factors, including overuse, degeneration, mechanical stress, age-related changes, and anatomical variations. Following surgical suturing of the Achilles tendon, the separation of tendon ends can occur as a complication, leading to delayed healing. Factors such as excessive tension on the suture, inadequate suture technique, poor immobilization, compromised blood supply, infection, and delayed rehabilitation can contribute to this complication. Timely intervention, appropriate surgical technique, meticulous postoperative care, and patient compliance with rehabilitation protocols are essential to minimize the risk of tendon end separation and optimize the healing process. Further research and advancements in treatment strategies are needed to enhance our understanding and management of Achilles tendon rupture and its associated complications.

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