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SYMPOSIUM: MOLECULAR AND CLINICAL DEVELOPMENTS IN TENDINOPATHY

The Basic Science of Tendinopathy

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Abstract Tendinopathy is a common clinical problem with athletes and in many occupational settings. Tendinopathy can occur in any tendon, often near its insertion or enthesis where there is an area of stress concentration, and is directly related to the volume of repetitive load to which the tendon is exposed. Recent studies indicate tendinopathy is more likely to occur in situations that increase the "dose" of load to the tendon enthesis – including increased activity, weight, advancing age, and genetic factors. The cells in tendinopathic tendon are rounder, more numerous, and show evidence of oxidative damage and more apoptosis. These cells also produce a matrix that is thicker and weaker with more water, more immature and cartilage-like matrix proteins, and less organization. There is now evidence of a population of regenerating stem cells within tendon. These studies suggest prevention of tendinopathy should be directed at reducing the volume of repetitive loads to below that which induces oxidative-induced apoptosis and cartilage-like genes. The management strategies might involve agents or cells that induce tendon stem cell proliferation, repair and restoration of matrix integrity.

Introduction

Tendons are specialized tissues that connect muscle to bone and transmit the forces generated by muscle to bone, resulting in joint movement. Tendon injuries are common and affect a substantial portion of recreational and professional athletes and those in many occupations involving repetitive work [16, 37, 60, 79, 102]. Tendinopathy (often called tendinitis or tendinosis) is the most common tendon disorder [86, 99]. It is characterized by activity-related pain, focal tendon tenderness, and decreased strength and movement in the affected area. The histological features of tendinopathy are further described in the current study. Tendinopathy can occur in almost any tendon. Common examples include plantar fasciitis, Achilles tendinitis, patellar tendinitis, tennis elbow, golfer's elbow, and supraspinatus tendinitis. Tendinopathy is poorly understood and has many described remedies with very little evidence to support their efficacy. One of the reasons there are very few, if any, good treatments for tendinopathy is lack of knowledge regarding its pathogenesis.

We summarize recent cellular and molecular findings in tendinopathy to identify potential preventative and treatment strategies and specific areas needing further investigation.

Search Strategies and Criteria

We performed a systematic review of peer-reviewed, original English language papers published on the etiology, histopathology and molecular biology/pathology of tendinopathy using Ovid MEDLINE and PubMed database from 1950 to November 2007. Keywords used in the search were: tendinopathy; pathogenesis; tendon cells;

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