CHAPTER 3

TENDON DEGENERATION IN THE ROTATOR CUFF

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Overuse injuries of the rotator cuff are a significant source of pain and morbidity.\(^1\) Despite an aging population and documented associations between rotator cuff tears and increasing age, the pathogenesis of rotator cuff tendinopathy remains poorly understood.\(^1\)-\(^9\) The natural history of rotator cuff tears is unfavorable, as these lesions fail to spontaneously heal and progress in size over time.\(^10,11\) This progression in tear size is accompanied by fatty infiltration and atrophy of the rotator cuff musculature and no evidence of reversal or repair of the degeneration process.\(^12\)-\(^14\) Furthermore, recurrent tears after surgical repair remain a significant issue for large and massive tears, with documented failure rates ranging from 11% to 94%.\(^15\)-\(^19\) While arthroscopic surgical techniques have considerably evolved, including the use of double-row repair to improve time-zero biomechanics, our understanding and ability to improve the biologic milieu for tendon-to-bone healing has lagged behind. This chapter reviews the current understanding of the pathogenesis and biology of rotator cuff tendinopathy and outlines various treatment modalities and future directions for research into biologic augmentation of tendon-to-bone healing after rotator cuff repair.

PATHOGENESIS

Tendinopathy is a term that describes a continuum of specific histopathologic changes that occur to tendons as a result of overuse.\(^20\) Historically, the term tendinitis was used to describe pain from symptomatic tendons; however, this nomenclature implied an inflammatory process despite histologic studies demonstrating minimal or absent inflammatory changes.\(^21\),\(^22\) Overall, tendinitis treatment modalities that target the inflammatory process have shown limited efficacy.\(^6\),\(^14\) Nonetheless, several recent studies have demonstrated altered gene expression related to an inflammatory response as well as an increased infiltration of mast cells and macrophages in early mild to moderate tendinopathy.\(^6\),\(^23\),\(^24\) While not all cases of rotator cuff tendinosis progress to a frank tear, the process of tendon degeneration does not regress over time and is not reversible.\(^23\) Tendinosis is a