

placement of a similar construct in apposition [control 2]. There was up to a 10-fold stimulation in collagen synthesis in native RTF's when apposed next to constructs containing the IGF-1 gene at both the 48 and 72 hour time point.

Discussion: In this study we demonstrate that tendon fibroblasts can be tissue engineered to deliver therapeutic peptides to the local environment to stimulate a repair response. The goal of this work is to develop a bioactive patch capable of accelerating rotator cuff repair and modulating the quality of the repair tissue. Initial work has focused on IGF-1 and PDGF, however, other growth factors with different actions on tendon cells are being explored.

17B Radiocapitellar Synovitis Secondary to Recalcitrant Lateral Epicondylitis

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Purpose: Certain cases of lateral epicondylitis resist prolonged conservative management and some even defy surgical intervention. In some of these cases, histologic evaluation of the suspected site of pathology fails to provide confirmatory pathologic evidence of the suspected disease entity. In other cases where degenerative extensor tendonitis is confirmed, release or resection with or without repair fails to completely alleviate symptomatology. This paper identifies an intraarticular source of pain in patients with lateral epicondylitis who fail standard therapy.

Method: Twenty-three patients with a diagnosis of lateral epicondylitis who failed conservative management underwent localized extensor tendon release and debridement, partial lateral epicondylectomy and fascial repair, plus limited arthrotomy with resection of a thickened band of synovial tissue consistent with a radiocapitellar synovial "plica". Histologic examination revealed focal inflammatory changes and hypertrophy within this synovial fold with erosive changes in the radial head directly underlying this structure. Two additional patients had undergone a prior surgical procedure for lateral epicondylitis alone and failed to respond. A limited arthrotomy alone was performed in those patients with confirmation of the intraarticular lesion which was then resected.

Results: Twenty-three of these 25 patients have had complete relief of preoperative pain symptoms. One has persistent diffuse pain and is seeking permanent partial disability from Workers' Compensation. Another Workers' Compensation patient has demonstrated complete relief of pain but has a persistent sense of fatigability which has interfered with return to work as a factory piece-worker. The remaining 23 patients have had complete relief of symptoms and have returned to full daily functions including work and athletics, with no recurrence at minimum two-year follow-up.

Conclusions: The presence of synovial boggy, mild joint effusion, a snapping sensation and tenderness at the radiocapitellar articulation with pronation and supination should raise the suspicion of this clinical entity especially if local injection of the lateral epicondylar ridge alone with Xylocaine fails to completely alleviate symptomatology. Resection of the thickened synovial fold, when non-operative treatment fails can be expected to result in a satisfactory outcome in a majority of cases.

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18A TGF β -1 Localization at the Bone Tendon Healing Site in a Rat Rotator Cuff Injury and Repair Model

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Introduction: Transforming growth factor beta-1 (TGF β -1) is an important modulator of musculoskeletal growth and differentiation. This study was performed to localize TGF β -1 at the tendon to bone repair site to determine its activity in the repair process. We hypothesized that TGF β -1 would be present in large amounts in the

periosteum and extracellular matrix of the healing tissue stimulating angiogenesis and fibroblast differentiation.

Methods: Bilateral injury and repair of the supraspinatus tendons was performed in 15 Sprague-Dawley rats. The animals were euthanized at 1,3,7,10 days, and 4 weeks after surgery. Immunohistochemistry was performed to localize TGF β -1 at the repair site specifically in the fibrocartilage zone, adjacent periosteum, tendon proper, and hypercellular healing tissue. Slides were examined and graded by 2 independent observers.

Results: TGF β -1 levels were high in normal, uninjured chondrocytes in the fibrocartilage zone. After surgery, there was no detectable protein in the cells, with levels rising and approaching normal at 4 weeks. Findings were similar in the adjacent periosteum. Levels were initially low in the hypercellular healing zone, rising slightly at 10 days. At 4 weeks, TGF β -1 strongly stained in the extracellular matrix of this area. Cells differentiated from mononuclear cells in the early time period to predominantly fibroblasts at 4 weeks.

Summary: TGF β -1 is localized to the chondrocytes in the fibrocartilage zone and the periosteum in normal specimens. TGF β -1 levels rise significantly in the extracellular matrix of the healing soft tissue area of the bone tendon healing site, coinciding with differentiation of the cell population to fibroblastic cells. These findings suggest it has a significant role in matrix production and cell differentiation at the rotator cuff tendon bone healing site.

18B Extracorporeal Shockwave Therapy for Lateral Epicondylitis

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The use of extracorporeal shockwave therapy was investigated as a treatment modality in patients with lateral epicondylitis.

Thirty patients underwent shockwave therapy to thirty elbows. Patients were prospectively evaluated using visual analogue pain scores and request for subsequent treatment was documented.

Fifty percent of patients underwent subsequent treatment for continuing symptoms of lateral epicondylitis. It was concluded that extracorporeal shockwave therapy was an ineffective treatment modality for lateral epicondylitis.

19A Expression of Growth Factors During the Healing Process of the Supraspinatus Tendon in Rabbits

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Growth factors have been reported to be promotive to tissue healing. Recently, basic fibroblast growth factor (bFGF) has been demonstrated *in vitro* to promote the proliferation of rotator cuff tendon cells. Before applying this finding to an *in vivo* experiment, we need to know what kind of growth factors appear in which stage of the healing process. The purpose of this study was to clarify the expression of growth factors during the supraspinatus tendon healing in rabbits. We made a full thickness defect in the supraspinatus tendon of 27 Japanese White rabbits (2.2-4.0 kg). The shoulders were harvested on Days 1, 3, 5, 7, 9, 11, 14, 21, 28 postoperatively (n=3), and examined histologically and immunohistochemically with each antibody (bFGF, TGF- β , VEGF, PDGF, IGF-1). The defect became indistinct from Day 7 and invisible on Day 21 on gross examination. The histology showed that the defect filled with hematoma was gradually replaced with granulation that contained irregular fibroblast.

Immuno-analysis showed that bFGF, PDGF and IGF-1 were expressed in the fibroblast from Day 5 through Day 9, with a peak expression on Day 7. Other growth factors did not appear strongly.