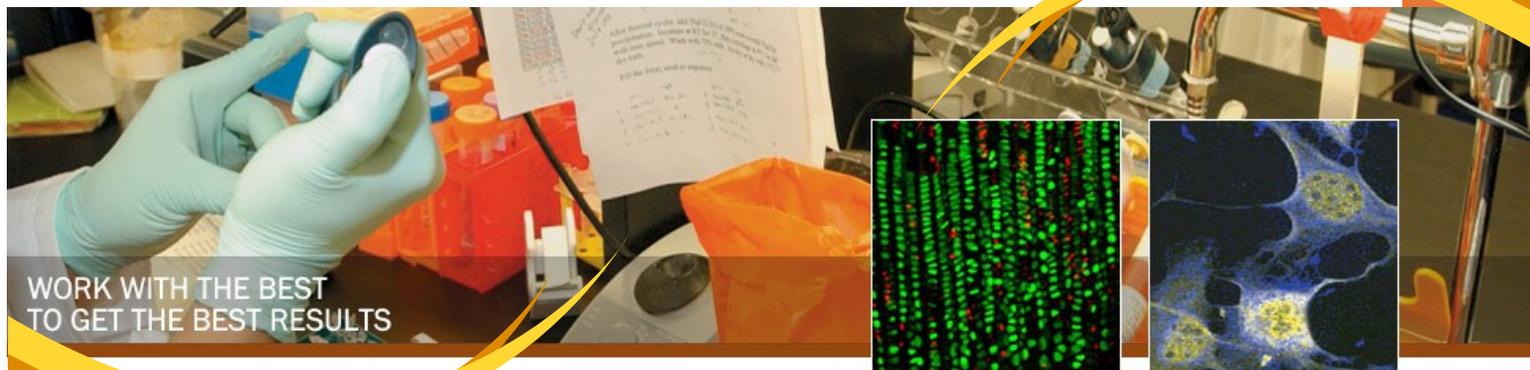




MUSCULOSKELETAL
RESEARCH CENTER
at Washington University

Musculoskeletal Research Center

Vol 6 | Issue 1 | Jan 2014



WORK WITH THE BEST
TO GET THE BEST RESULTS

in this issue

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Musculoskeletal Winter Symposium

February 12, 2014

1:00 - 5:30 pm

Eric P. Newman Educational Center

- Oral presentations selected from abstracts
- Two poster session times & awards
- Reception



Dr. Farshid Guilak
Laszlo Ormandy Professor of Orthopaedic Surgery
Director, Orthopaedic Bioengineering Laboratory
Duke University Medical Center
will speak at 4:30 pm
“Engineering New Therapies for Osteoarthritis”

For more information, please visit our website:

<http://www.musculoskeletalcore.wustl.edu/content/Calendar/2998/Winter-Symposium.aspx>

Or contact Kamilla McGhee (mcgheek@wudosis.wustl.edu)

Avioli Musculoskeletal Seminar Series

*BJCIH Bldg. | 11th floor
A/B Conference Room
Fridays @ 9am*

- 1/10 Jeffrey Arbeit, MD
Urologic Surgery
- 1/17 Leila Revollo
Bone & Mineral Diseases
- 1/24 Tim Peterson, PhD
Harvard University
- 1/31 Corinne Decker
Faccio Lab
- 2/7 Deborah Novack, MD, PhD
Bone & Mineral Diseases
- 2/14 No Seminar
- 2/21 Kannan Karuppaiah, PhD
Ornitz Lab
- 2/28 Keith Hruska, MD
Pediatric Nephrology

For more information about the MRC and the Cores, please click here:

<http://musculoskeletalcore.wustl.edu>

Please remember to include reference to support from the Musculoskeletal Research Center in your abstracts and publications.

Cite Grant # P30AR057235 from the National Institute Of Arthritis And Musculoskeletal And Skin Diseases.

Rotator Cuff Tendon Healing- A Clinical and Basic Science Perspective

Leesa M. Galatz, MD & Stavros Thomopoulos, PhD

Rotator cuff disease is a common cause of shoulder pain, the incidence of which increases with age. Rotator cuff tears are common in the elderly population, and are found in approximately 30% of asymptomatic people over the age of 65 years. Many tears are not responsive to nonoperative treatment and are indicated for operative repair. Repair of the torn tendon presents a challenge however, as adult tendon to bone healing is characterized by a reparative, rather than a regenerative response. Structural failure of repair is common. Healed tendon tissue never attains the same mechanical properties as normal tendon.

Our research has focused on tendon healing utilizing a rodent model of injury and repair. More recently, we have focused on chronic injury and repair, as chronic tears typify the clinical scenario.

Degenerative Changes and Fat Accumulation Correlate with Tear Size and Nerve Injury

Chronic degenerative changes, muscle atrophy and fatty accumulation, are negative prognostic factors after rotator cuff repair. In this study, mice underwent single and dual tendon injuries, and a group also had neural injury to involved muscles. Fatty degeneration was worse in larger tears and most severe in muscles with nerve injury (fig.1). Interestingly, supraspinatus and infraspinatus muscles responded differently, with more intracellular fat in supraspinatus as opposed to extracellular fat in the infraspinatus.

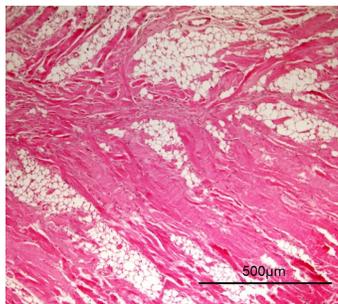


Figure 1

The effects of chronic unloading and gap formation on tendon repair

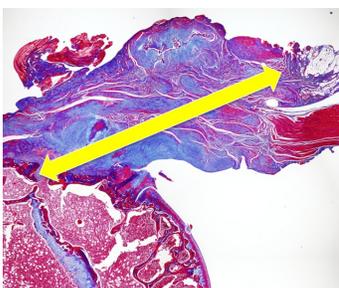


Figure 2

This study was the first to evaluate the effect of chronicity on multi tendon injury and repair in an animal model. Gap formation occurred in 35% of acute repairs and 44% of chronic repairs (fig. 2), and this gap had detrimental effects on mechanical and structural characteristics of the healing tissue. This correlates to what is seen clinically, as repair failure is higher in larger tears- gap formation, healing in continuity, and production of poor quality tissue in the interface may be responsible.

Chronic Degeneration negatively impact rotator cuff repair

Botulinum toxin A injections were used to magnify chronic changes such as muscle atrophy and collagen accumulation before repairs. The chronic repairs demonstrated disorganized healing tissue with decreased mechanical properties compared to acute repairs.

Current studies focus on repair augmentation of repairs using absorbable nanofiber scaffolds with and without stem cells. Future directions will focus on the etiology of degenerative changes and pharmaceutical augmentation of repair.

Collaborators: Megan Killian and Justin Lipner



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