

## Stress Injuries in Soft Tissue

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## Agenda

- Changing views of soft tissue injury
- Role of muscle imbalances
- Limitations of current treatments
- New treatments



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## Tendonitis

- Historically considered inflammatory process
- "tendinosis" conotes degenerative process
- Studies reveal change microfibrillar injury, change in ground substance



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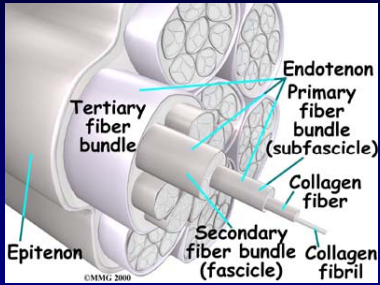
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### Structure of Tendon



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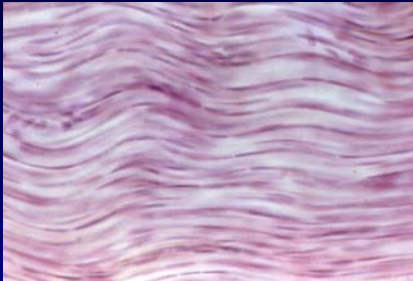
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### Microanatomy of Tendon



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### Tendon Injury

- Damage to microfibrils causes an increase in degradative enzymes (collagenase, metalloproteinases)
- Results in weakening of collagen fibrils & decreased load transmission tendon
- Death of matrix cells also occurs



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### Weakened Tendon

- New collagen is immature
  - Irregular orientation of collagen
  - Fibre disruption
  - Change in fibre diameter
  - Decrease in overall density of cartilage
- Further load causes failure of other fibrils at strains that would not damage healthy tendon



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### Initial Event

- Experiments have shown that a single abnormal loading cycle could sufficiently damage fibrils to induce the degredative cascade
- Abnormal loading cycle could be from
  - Muscle fatigue
  - Abnormal mechanics



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### Heel Valgus



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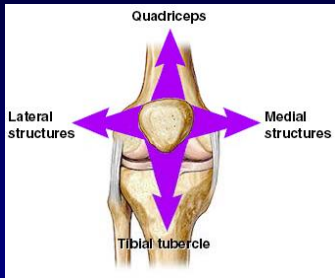
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## Patellar Forces



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## NSAIDs & Tendonitis

- Many clinical studies
- Modest benefit for long standing injuries
- Major pathology is degeneration, not inflammation



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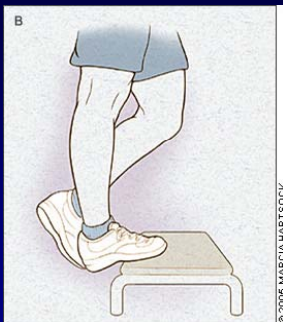
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## Eccentric Training



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## Iontophoresis

- Some benefit for tenosynovitis
- Probably does not penetrate deep into the tendon
- Anti-inflammatory drugs do not alter the basic pathology



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## Radiofrequency Microtenotomy

- Electrical charge applied to exposed tendon, results in exaggerated inflammatory response
- Results in increased vascularity of tendon and more rapid return to normal microarchitecture



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## Shockwave Therapy

- High energy ultrasound
- Several treatments required
- Painful
- Disrupts collagen, induces repair response



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