Rotator Cuff Tendinopathy

Normal Anatomy
- The rotator cuff are 4 muscles that surround the glenohumeral joint anterior, superiorly and posteriorly
- As the rotator cuff merge with the glenohumeral capsule and their close attachment to the humeral head they are considered important for glenohumeral dynamic stability
- The rotator cuff tendons are primarily composed of water, Type I collagen, glycosamioglycans and tenocytes
- Normal tendons undergo continual remodelling (degradation and rebuilding)

Pathology
- Pathology in and pain arising from a tendon
- Tendinopathy can progress into partial and full thickness tears

Mechanism of Injury
- Rotator cuff tears can be traumatic or due to degenerative Tendinopathy
- The majority of acute tears are usually large or massive full thickness tears on top of a degenerative tendon
- More information on Acute Rotator Cuff Tears can be found in a separate hand out

Intrinsic
- Changes within the tendon
- Usually due to overuse or overload altering the balance between (degradation and rebuilding)
- The physiological limit of the tendon unit is surpassed resulting in pain, weakness and structural failure

Age Related Changes
- Reduced elasticity
- Decreased tensile strength
- Increased amount of Type III collagen content

Vascularity
- Neovascularisation healing response occurs in areas of degeneration due to repeated micro trauma
- Tendon progression to complete tears results in avascularity

Tendon Matrix
- Acutely overloaded tendons present as swollen due to an increased uptake of large proteins into the ground substance to create stiffness
- Progression from Type I Collagen to Type III Collagen
- Type III Collagen are thinner, weaker and more irregularly arranged
Extrinsic

- Irritation of the tendons by surrounding structures

Anatomical

- Irritation from anterioinferior aspect of the acromion (External impingement)
- Irritation from thickened Coracoacromial ligament (External impingement)
- Irritation from posteriorsuperior aspect of the glenoid (Internal Impingement)

Scapular Kinematics

- Scapular kinematics affect the relative position of the rotator cuff to the acromion and glenoid
- Scapular dyskinesis may narrow the Subacromial or Coracoacromial space (External Impingement)
- Scapular dyskinesis may increase contact of the rotator cuff with the posteriorsuperior aspect of the glenoid (External Impingement)

Humeral Head Kinematics

- Humeral head migration affects the relative position of the rotator cuff to the acromion and glenoid
- Increased superior head migration can increase contact with acromion (External Impingement)
- Increased anterior translation can increase the contact of the posterior rotator cuff with the posteriorsuperior aspect of the glenoid (Internal Impingement)

Intrinsic v Extrinsic

- The literature suggests there is a combination of both factors leading to tendinopathy

Pathophysiology and Stages

- Most accepted model of Tendinopathy at present is the ‘Pathology Continuum’

Reactive

- Acutely overloaded tendon
- Global increased levels of substance P and cytokine
- Global swelling within the tendon with possible bursal effusion
- Start of neovascularisation
- Increase humeral head migration due to poor dynamic stability

Disrepair

- Similar to reactive Tendinopathy but with greater matrix breakdown
- Increased amount of myofibroblasts
- Laying down of Type III collagen
- Neovascularisation increases
- Swelling and matrix changes are more focal

Degenerative

- Little chance of pathology reversal
• Large amount of Type III Collagen matrix
• Fatty infiltrates
• High chance of developing Partial and Full Thickness Tears

**Associated Pathologies**
- Internal Impingement
- External Impingement

**Examination**

**Subjective**

**Reactive**
- Acute overload caused by a change in load, environment or equipment
- Chronically unloaded and weakened tendon
- Increased pain with activity
- Persistent pain
- Night pain
- Non-specific pain

**Disrepair**
- Continued overloading with incomplete rest for healing
- Increased pain with activity
- Persistent pain
- Night Pain
- Non-specific pain

**Degenerated**
- 50 +
- Continued overloading
- Symptoms indicative of a partial or full thickness tear
- Night pain
- Can be pain free

**Objective**

**Reactive**
- Global restriction in range of movement
- Swollen or globally thickened tendon
- Global pain throughout tendon
**Disrepair**
- Difficult to differentiate with reactive

**Degenerated**
- Pain end of range movement
- Passive range of movement greater than active range of movement
- Pain and weakness on resisted testing if a tear is present
- Focal tenderness on palpation
- May be completely pain free

**Further Investigation**
- Ultrasound
- MRI

**Management**

**Conservative**
- Dependent on the stage of the Tendinopathy

**Reactive**
1. Relative rest to unload the tendon
2. Decrease biomechanical stress
   - Decrease tone of muscle spasm
     - Soft tissue massage
     - Dry needling
     - MET
   - Decrease postural or joint changes
     - Joint Mobilisations
3. Gradual loading of tendon once symptoms have settled

**Disrepair**
1. Reduce pain
   - Soft tissue massage
   - Dry needling
   - Relative rest
2. Reduce neovascularity
   - Ice/Heat
   - Slow eccentric loading of affected tissue (Painful)
3. Restore normal mobility
   - Decrease tone of muscle spasm
     - Soft tissue massage
- Dry needling
- MET
  - Decrease postural or joint changes
    - Joint Mobilisations

4. Dynamic Stability
5. Return to Sport/Activity Criteria

**Degenerative**

1. Reduce pain
   - Soft tissue massage
   - Dry needling
   - Relative rest
2. Rehabilitation of unaffected tissue if large to massive rotator cuff tear present
3. Reduce neovascularity
   - Ice/Heat
   - Slow eccentric loading of affected tissue (Painful) (Dependent on presence of potential tear)
4. Restore normal mobility
   - Decrease tone of muscle spasm
     - Soft tissue massage
     - Dry needling
     - MET
   - Decrease postural or joint changes
     - Joint Mobilisations
5. Dynamic Stability
6. Return to Sport/Activity Criteria

**Plan B**

**Injection**
- Corticosteroid injection
- Platelet rich plasma injections

**Surgery**
- Arthroscopic Repair
- Mini Open Repair
- Open Repair
- Subacromial Decompression
References

(Cook & Purdam, 2009; Lewis, 2009a; b; 2010; Littlewood et al., 2012; Littlewood et al., 2013a; Littlewood et al., 2013b; McCreeh & Lewis, 2013; Seitz et al., 2011)