Development of the Clinical Hypothesis

Injury threshold
- Dosage
- Mechanics
- Structure

Case Study 1

History
- Structure
- Mechanics
- Experience
- Clinical hypothesis

Case Study

History
- 25 yr old national field hockey player
- Right PFJ pain 2: overtraining
- Unable to run at all without pain

LQ Exam

<table>
<thead>
<tr>
<th></th>
<th>Left</th>
<th>Right</th>
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</thead>
<tbody>
<tr>
<td>STJ inc/neu/ev</td>
<td>30/0/7</td>
<td>20/6/10</td>
</tr>
<tr>
<td>Patella</td>
<td>alta, lat tilt</td>
<td>alta, hypermob</td>
</tr>
<tr>
<td>ITB</td>
<td>tight</td>
<td>tight</td>
</tr>
<tr>
<td>Hip IR/ER</td>
<td>45/45</td>
<td>45/45</td>
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<tr>
<td>Hip Abd Strength</td>
<td>5/5</td>
<td>5/5</td>
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<tr>
<td>Hip ER Strength</td>
<td>5/5</td>
<td>4/5</td>
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</tbody>
</table>
Relaxed Stance  True Relaxed Stance  Stance from Rear

Running Mechanics
R Hip ADD  R Hip IR  R midft EV

Field Hockey Stance
Right
Hip Add + IR
Knee Abd (valgum) + IR
Mid/Rearft Pronation
Hallux Valgus

Hypothesis
Tight ITB tensions lat retinaculum = lat tilt and displacement
Inc. Fem IR = Inc. pressure on lateral patellar facet
Pt. stands in supination to inc. ER of femur
Able to maintain this in stance and walking, but not running

Evidence of abnormal FEMORAL tracking !!

Treatment
Address Hip/Core strength
Address Mechanics
Address ITB
Address Feet

Courtesy of USC
Case Study 2

**History**

21 yr old field hockey player

January - off season - began jogging program and developed diffuse pain in both lower legs - worsened - d/c jogging

March - spring season - practiced in the field - ran on inside track - lower leg pain (7/10) - stopped running again

April - tried running - legs painful and tight

**Differential Diagnosis**

- Tibial/fibular stress fx
- Tenosynovitis
- Periostitis
- Deep Venous Thrombosis
- Exertional Compartment syndrome
- Tibial stress syndrome
- Claudication
- Nerve entrapment

**Chronic Exertional Compartment Syndrome**

Increased pressure in one of the compartment thought to be associated with either muscular hypertrophy (overtraining) or increased blood volume (acute trauma)

**Symptoms**

- Pain
- Tightness
- Numbess
- Tingling/Burning
- Weakness/Cramping

**Wick Catheter Test of Compartment Pressures**

<table>
<thead>
<tr>
<th></th>
<th>Pre-exercise</th>
<th>1 min post</th>
<th>5 min post</th>
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<tbody>
<tr>
<td>R ant</td>
<td>22</td>
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<tr>
<td>L ant</td>
<td>17</td>
<td>24</td>
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</tr>
<tr>
<td>R lat</td>
<td>12</td>
<td>19</td>
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</tr>
<tr>
<td>L lat</td>
<td>19</td>
<td>17</td>
<td>16</td>
</tr>
<tr>
<td>R post-D</td>
<td>32</td>
<td>41</td>
<td>48 **</td>
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<tr>
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<tr>
<td>Norms</td>
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**Diagnosis**

Bilateral Deep Posterior Compartment Syndrome

Recommendation: Bilateral Fasciotomy
Treatment
Initially seen in outpatient PT Clinic

Gait
Excessive RF strike pattern

Clinical Hypotheses
Compartment Syndrome
Abn loading of lower leg secondary to excessive rearfoot strike pattern

Gait Retraining

Case Study 2
History
16 yr old x-country runner
End of freshman XC season – onset of L hip pain
Winter track did not run
Outdoor track – re-aggravated her L hip
Imaging: X-Rays, MRI were negative
Treatment: Multiple Cortisone injections into piriformis
Multiple courses of PT
Unable to walk more than 1.5 miles or run more than 10 min without pain
Pain with multiple flights of stairs

MSK Assessment
Posture: HIP IR (L>R), ant pelvic tilt
Single leg squat: Hip drop, anterior pelvic tilt, femoral adduction
ROM: Tight Hip flexors, hams, Hip IR Bias L sided antetorsion
Strength: Weak Hip Ext, ABD, ER (L>R)
Weak abdominals and calves,
Left piriformis and deep external rotators were tender to palpation

Gait Analysis
Left
Hip Drop
Femoral ADD and IR
Rearfoot Eversion
Hip Pain 1-2/10 – did not change with glut squeeze – did not activate gluts well
Right
Hip Drop <L,
Femoral ADD and IR <L,
BIL Long Stride with dec. Knee Flex at FS:
Anterior Pelvic Tilt
BF FFS L Hip pain 0/10

*Loadrates (bw/s)
Shod
BF
Left
61
38
Right
74
25

Assessment
Pt presents with L Hip pain: piriformis a and deep Hip ER tender to palpation
Weak Hip ABD and ER, with Hip IR bias
Leads to Hip Drop and Hip ADD and IR which can lead to increase loads to hip
Unable to activate glutes well, so no reduction in pain. Transitioning to FFS did reduce hip pain, due to increasing cadence and decreasing loadrates – requires strengthening the calves.

Recommendations
Strengthen feet, calves, hips
Gait training to reduce femoral adduction, internal rotation and hip drop
Transition to a forefoot strike and minimal footwear to facilitate this

Clinical hypothesis