Lower leg, Foot & Ankle

Common Joint & bone injuries
- Lateral Ligament
- Joint capsule
- Medial ligament
- Tarsal fracture

Risk Factors?
- Common Muscle injuries:
  - Calf strain achilles tendon sprain

Complexity Continuum

Think in terms of:
- Motor Complexity
- Applied Loads/Exercise intensity
- Frequency of exercise or programme
- Repetition of exercises
- Within realms of healing stage
- Direction of movement
- Isolation/integration
- Eccentric/concentric/isometric
- Stable base needed?

UPPER LIMB INJURIES AND MANAGEMENT

Common Upper Limb Injuries

Impact
- Dislocation - GH/AC/SC
- Fracture – Clavicle/Acromion/Humerus
- RC tear
- Biceps rupture
- SLAP lesion
- Bankart
- Hill Sachs
- Reverse Hill Sachs

Non – Impact
- Subacromial impingement
- Long head of biceps
- RC tear
- RC tendinopathy
- Adhesive Capsulitis
- Elbow tendinopathy
Functional Training some guidelines
- Use bodyweight before adding external resistance
- Stress “core” before extremity
- Initial load should be eccentric to teach the athlete force reduction before force production
- Ability to reduce and absorb external forces is essential to both performance and injury prevention

Functional Training
Must build from slow to fast:
- Involve as many faster activities as possible. Takes advantage of eccentric load to help produce a stronger, more powerful and efficient movement
- Training with unstable surfaces - Most important sporting feats take place in unstable/unpredictable environments

The combination of ‘balance’ with ‘stabilisation’
Balance & Stability training guidelines
- Safe, but challenging
- Stress multiple planes of motion
- Incorporate a multi-sensory approach
- Eyes open/eyes closed (if appropriate!)
- Increase proprioceptive demand
- Static/bilateral/stable surfaces progressed to dynamic/unilateral/unstable surfaces
- Progress to sport specific performance drills

Train in multiple ‘environments’
- By training and practicing movements in various environments and under various conditions the athlete becomes more versatile in handling the forces and stresses involved in sport
- Variety is key! - The body responds well to differing stimuli
- SAID principles
- functional conditioning activities must involve all 3 planes, and all joints at the same time

Progression
- Always consider how you would progress to, and from, each activity and…. 
- Where that activity fits into the big scheme of things Remember! Every activity is a test Every test is an activity
- Stress correct execution of skills and movement patterns
- Motor learning first
- Movement speed comes later

3 P’s and 3 M’s (Vern Gambetta)

Is it Practical? = Can it be done given the development of the athlete and the facilities available?
Is it Personal? = Does it meet the needs of the individual athlete?
Is it Proactive? = Does it anticipate possible roadblock to progress and provide possible methods to overcome these?

Is it measurable? = See and quantify the results
Is it manageable? = Accomplished in the context of the personnel
Is it motivational? = Both parties look forward to doing
Acceleration training
- Involves
  - 50/90’s repeated acceleration, jogs between
  - Get up and reaction drills
  - Sports loading
  - E.g parachute sprints, weighted vest, harness running

Technique training
- Involves
  - Sprint drills (heel flicks, high knees)
  - Frankenstein run (straight leg run)
  - Mini hurdle steps

Lateral speed
- Essential for
  - Changing direction
  - Side stepping
  - E.g side to side hop drills, W sprints, Lateral shuffle with hurdles

SAQ Theory
- Ability to decelerate and accelerate via rapid force acceptance/generation — increased eccentric RFD and concentric RFD
- Neuromuscular efficiency through the 3 CNS levels of control
- Efficient motor execution patterning/feedforward mechanisms
- Neuromuscular overload for short, high intensity durations

SAQ — foot quickness
- Essential for
  - First 5-7m of sprint
  - Changing direction whilst on run
  - Side stepping
  - E.g. line hops, ladder runs/shuffles

Explosive power training
- High intensity - Quickness of execution with maximal effort is essential. Rate of pre-stretch is far more important than magnitude of pre-stretch
- Adequate rest - Essential for intensity and quality. Min 1-2 mins between sets, 3-10 sets, 2-4 days
- Maximal force/minimise time and Progressive and Highly specific

Over speed training
- Sensation of moving faster than normally capable
  - Trains nervous system to cope with faster speeds
  - Increases stride frequency (possibly length also)
  - Increases relaxation at top speeds
  - Helps maintenance of these speeds
  - Must be performed early in workout, when fresh
  - Allow full recovery

Plyometrics
- Specialised training to increase explosive power
- Used alongside other power training modalities, not a stand alone technique
- Must be highly specific to the sport
- Requires excellent technique to avoid injury/re-injury
- Improves
  - NM reactions
  - Explosiveness
  - Quickness
  - Rapid force generation
  - E.g. throws, skips, jumps, bounds

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Rehabilitation?
- Little research to support Rx and rehab from overtraining
- Combination of psychological and physiological intervention
- Rest, change of training patterns, nutrition, reduce stress
- Resumption of training should be individualised and carefully monitored
- Implications beyond sporting life

**HOME EXERCISE PROGRAMMES**

**Non clinical skills**
- Clarity
- Goal set
- Motivate – a patient in clinic may have different motivations for adhering to your programme than a professional athlete
- Accountability

**Aims**
- Continue the effects of treatments
- Establish tissue strength with exercises
- Correct flexibility
- Re-learn Motor control patterns/correct poor habits
- Self manage and develop self awareness
- Educate and understand how the basics of the body work in relation to their injury
- Advise fitness

**Adhering to Programmes**
Reasons for not adhering:
- Time
- Schedule
- Equipment
- Forgetting
- Motivation
- Intermittent performance of HEP

**How to address:**
- Explain, educate, gain trust and good rapport
- Inter-personal skills
- Convenience
- Efficiency
- Accessible

**Performance indicators:**
- morning HR
- training HR
- time trials
- blood tests

**Psychological indicators:**
- perceived level of fatigue

**Periodisation:**
- adequate rest and recovery

**Education, athletes, family, coaches**

**Regular medical check ups**

**Prevention**

**Keep stresses to a minimum**

**Proper nutrition/hydration**
### Exercise prescription

<table>
<thead>
<tr>
<th>Considerations</th>
<th>Initial assessment</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capability of individual</td>
<td>Screening tools/methods are paramount</td>
<td>Equipment available is much more limited than in professional sports</td>
</tr>
<tr>
<td>Complexity</td>
<td>Understanding of posture and ability to classify are important</td>
<td>Any equipment used needs to be carefully considered</td>
</tr>
<tr>
<td>Replicate exercises/movements encountered in everyday life</td>
<td>Vital that these are objective as measurement of speed, power and strength are not necessarily needed</td>
<td>When applying resistance utilise other medical props</td>
</tr>
<tr>
<td>Reps/sets – need to be absolutely clear!</td>
<td></td>
<td>E.g. Theraband</td>
</tr>
<tr>
<td>Progression</td>
<td></td>
<td>May have to consider households objects</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E.g. 1kg=bag of sugar/can of Baked Beans or broom handle</td>
</tr>
</tbody>
</table>

### Progression

- Will be much more gradual than with elite athletes. For 2 reasons: (i) The contact time with your patient is vastly reduced (once every 2 weeks) (ii) The end goals/criteria for return to “fitness” are much lower
- Exercises are still functional
- Still require increase in strength, mobility and function
- Early rehabilitation is key!
- This may actually make up the entire rehabilitation process
- May not require components such as:
  - Plyometrics
  - Advanced neuromuscular control
  - Sprint, SAQ, foot quickness training

### Goal setting

- The end/outcome goals will be totally different to professional athletes
- Much more varied so have to be adaptable
- Consequently your “end stage” rehabilitation principles will change
- Consider the patient’s goals
- E.g. for an office worker is the ability to perform a single leg drop and depth jump essential to their outcome?

### Stretching and their effects

**Stretching**

- Essential component in a comprehensive rehabilitation programme
- Should always look to increase mobility prior to working on strength aspects
- Useful to incorporate into all aspects of rehabilitation depending upon the aim of the exercises

**Therapeutic stretching**

Typically, four types of stretching are used:

<table>
<thead>
<tr>
<th>Static</th>
<th>Dynamic</th>
<th>Ballistic</th>
<th>Proprioceptive Neuromuscular Facilitation</th>
</tr>
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</table>