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SHSS5063

Ankle Early and I/M Rehabilitation

Trawsnewid Addysg; Trawsnewid Bywydau
Transforming Education; Transforming Lives



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Learning Outcomes

- Understand some of the biomechanics around the ankle joint and injury
- Gain knowledge of the common conditions around the ankle
- Describe and demonstrate exercises for an early and intermediate stage issue

Initial Rehab Framework

Flexibility and ROM

- Active
 - 15-30sec
 - 4-5 reps
- Passive
 - 15-30sec
 - 4-5 reps
- Prolonged
 - Up to 20mins
 - 3min if FWB

Proprioception

Maintain CV and Other Joints

M. Endurance and Strength

- Isometric
 - 20° Intervals in P+ free range
 - 5-6 sec hold (ease on & off)
 - 10 reps
 - 10 sec rest per rep
- Concentric & Eccentric
 - Strength Endurance
 - Up to 3 sets 25 reps
 - 30sec recovery per set
 - <67% 1RM
 - Strength
 - 2-6 sets
 - 6 reps
 - •85%
 - 1RM •2-5min recovery

Ankle Function

- Mobile adaptor
- Spring-like lever
- Reliant on complex system of bones, joints and muscles
- Balance and Dynamic Function
- Local system must be intact
- Well-tuned, efficient and strong neuromuscular system

Foot and Ankle Structure

- Talocrural Joint
 - Talus and inferior tibia
- Inferior tibiofibular joint
 - Distal tibia and distal fibula
- SubTalar joint
 - Talus and calcaneus
- Proximal Tarsals
 - Navicular and Cuboid
- Distal Tarsals
 - Medial, Intermediate & Lateral cuneiforms
- Metatarsals and Phalanges
- Loose Packed Position
 - Plantarflexion
- Joint congruency essential for stability
- Closed Packed Position
 - Dorsiflexion
 - Associated with high force injuries
- Peroneals and Tibialis groups provide dynamic stability

Biomechanics in Walking

- Three distinct phases (initial contact, mid-stance and toe-off).
- Efficient gait relies on the 3-rocker system:
 - Talocrural mortice
 - Calcaneus
 - 1st Metatarsal Head
- At initial contact, convex surface of calcaneus promotes forward motion of body with the aid of TC mortice, which leads to smooth motion of skin.

Biomechanics in Walking

- The 3rd rocker and subsequent dorsiflexion tightens the plantar fascia. This in turn generates stiffness along the longitudinal and transverse arches of the foot (Windlass Effect)
- 1st MT and TC Dorsiflexion generates passive tension in plantar flexors (+ achilles), thus aiding toe with elastic energy and reducing contractile demands

Biomechanics of Running

- Differences between walking and running:
 - Progressive reduction in foot contact time
 - Progressive $\uparrow$ in vert/horiz GRFs
 - Change in foot contact
 - Heel to mid-foot
 - Front of body to below body

Biomechanics of Running

- Minimising foot contact is important in both accel and max velocity
- MT Unit initially works isometrically to generate a 'stiff F+A complex and brace the limb for impact.
- Tendon then harnesses elastic energy via elongation
 - Maximising spring-like potential of tendon (series and parallel elements)

Multidirectional issues

- Rocker and spring models work with sagittal plane models.
- F+A strength must be sufficient to adapt rapidly to external forces and alterations in surface.
- Increases in foot muscle activation has been found in perturbing environments.

Lateral Ankle Sprain

- Mechanism
 - PF and Inversion
- Watch for Ottawa guidelines
- ATFL weakest of the ligaments
- Grading (1-3)
- Grade 3 – orthopaedic management (surgical v conservative)

Medial Ankle Sprain

- Mechanism
 - Eversion
- Strongest ligament in body.
- Less common than lateral
- Associated with bony issues due to the amount of force required to strain
- Return twice as long as lateral

High Ankle Sprain

- Mechanism
 - Dorsiflexion/Eversion
 - Excessive PlantarFlexion/Inversion
- Grade 1 conservative (boot)
- Grade 2 conservative/ surgical
- Grade 3 surgical

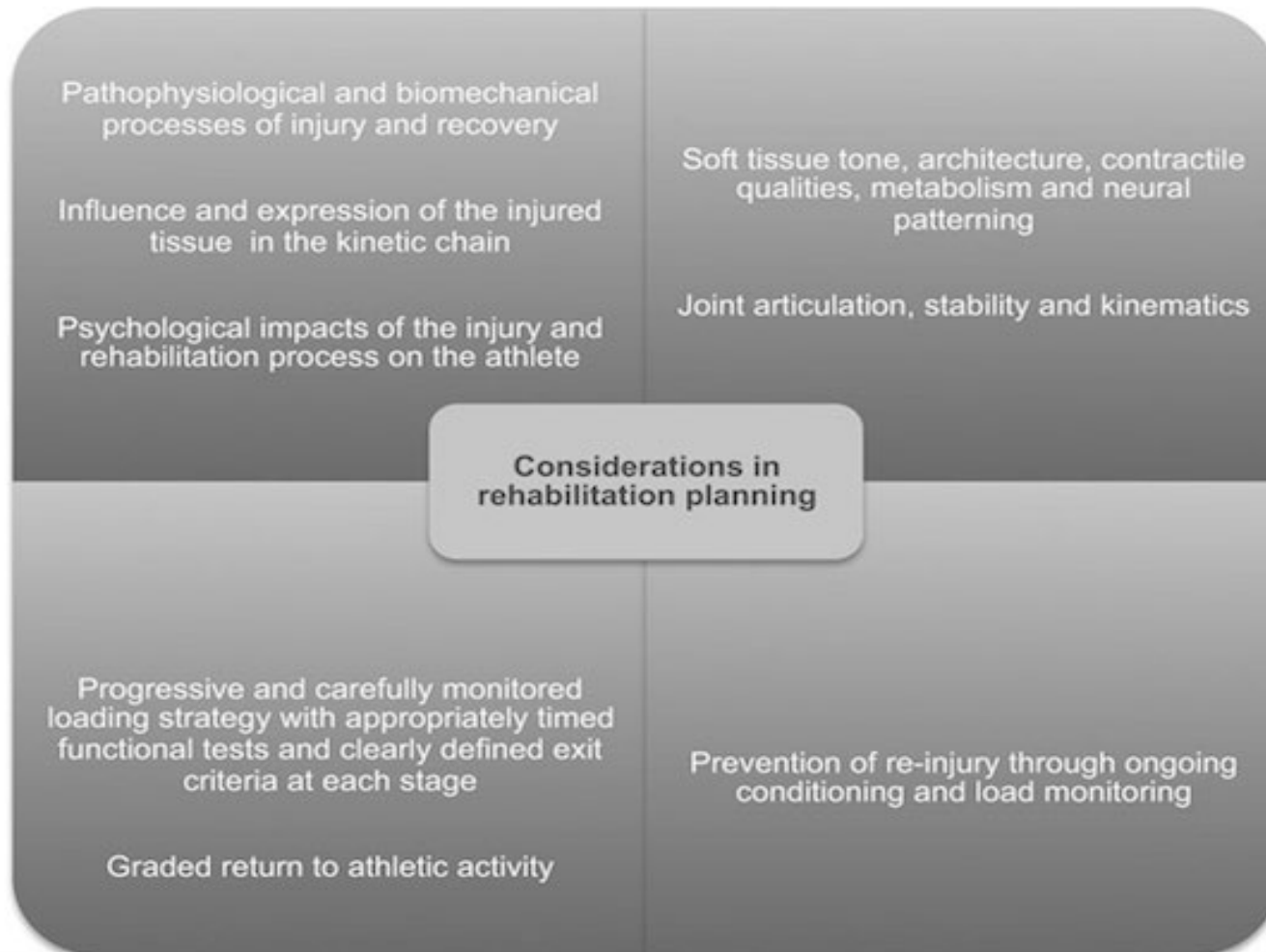
Calf Strain (Tendon/ Musc)

- Protection
- Ankle & Calf Mobility
- Leg muscle activation
- Balance
- Use of Kinetic Chain
- Use of concentric jumps to facilitate SSC

Bony Impingements

- Anterior
- Posterior
- Can play on with them.....
- Ensuring range is maintained or improved is key (is there part of the range that is non bony)?
- X-Ray for DD confirmation
- If unable to play at same level, consider referral.

Rehab Considerations



Rehab considerations

- Early mobilisation is key
 - In safe planes (maintains afferents and painfree mvt)
- Gait re-education
- Balance
- Dynamic crossover neural
- Unaffected limb
 - SL Press, split stance lunges, calf raises, hopping, full UL, core strength,

Moving from Early and I/M Phases

- I/M Criteria
 - No effusion
 - Full ROM (foot and ankle)
 - Normalised gait
 - SL Balance Eyes Open 43 sec and Eyes Closed 9 sec
 - Kinetic Chain improvements?

Case Studies

- 18 yrs old, high ankle sprain, intermediate stage rehab in female volleyball player
- 25 yrs old player with calf strain in female football early stage
- 34 yrs, male, old player with bony impingement in rugby. Currently playing but looking to resolve the issue
- 12 yrs old male, heel pain, in athletics.

TASKS

- For each of the case studies discuss what problems you are likely to see, what aims you would want to achieve and how you are going to achieve those aims (that is, your plan)?
 - Problems (pain, swelling, reduced rom, etc)
 - Aims (to improve DF to L=R in 1/52)
 - Plan (ankle dorsiflexion stretch x3 x20sec)