SYNDESMOSIS INJURIES

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NO FINANCIAL DISCLOSURES
OBJECTIVES

• Define what an ankle syndesmosis is and common mechanisms of injury
• Identify how it is diagnosed
• Describe the evaluation process
• Understand phases of rehabilitation
• Describe outcomes following ankle syndesmotic treatment
WHAT IS A SYNDESMOSIS?¹

Definition
- Fibrous joint between two bones linked by ligaments and a strong membrane

Function
- Provide stabilization and dynamic support to the ankle mortise
- Maintain the integrity between the distal tibia and fibula
- Resist forces that attempt to separate the two bones
WHAT IS A SYNDESMOTIC INJURY\textsuperscript{2,3,4}

- Disruption of the distal tibia and fibula
  - Sprain or tear of the ligaments
  - Fracture of distal tibia

- Mechanism of injury
  - Forced IR of leg on a planted ER foot
  - Forced ER of foot
  - Forced DF/eversion
PREVALENCEx2,3,4

• Incidence of total ankle sprain
  • Highest in 15-19 year-olds
  • 49.3% occurred during athletics
  • Up to 18% involve injury to the syndesmosis
  • Within the athletic population 12%-32%
HOW IT IS DIAGNOSED\textsuperscript{2,4}

- Patient history
  - Mechanism of injury
  - Location of injury
  - Type of sport
  - Position of limb
  - Ability to bear weight
HOW IT IS DIAGNOSED\textsuperscript{2,4}

- Symptoms
  - Pain above the ankle
  - Calf pain
  - Inability to bear weight on leg
- Ligamentous testing
  - External Rotation Stress Test
  - Squeeze Test
HOW IT IS DIAGNOSED (CONT.)

- Palpation
  - Anterior and posterior inferior tibiofibular ligaments, deltoid ligament
  - Medial malleolus
  - Along the entire fibula
- Edema and ecchymosis
  - Where edema and/or ecchymosis is located
- X-rays should be obtained if a syndesmotic injury is suspected
## CLASSIFICATION

### WEBER CLASSIFICATION OF FIBULA FX

<table>
<thead>
<tr>
<th>Weber B</th>
<th>Weber C</th>
<th>Maisonneuve Fx</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fx at the level of the distal syndesmosis, caused by external rotation (ER) mechanism</td>
<td>Disruption of deltoid lig, caused by ER</td>
<td>Proximal fibula fx</td>
</tr>
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<td>Often do not have a disruption of Interosseus membrane (IOM)</td>
<td>Fx above the level of the distal syndesmosis</td>
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### GRADED ANKLE SPRAIN

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<th>Grade III</th>
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<td>Tears of anterior and deep deltoid lig and AITFL, partial tear of IOL</td>
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<td>No diastasis</td>
<td>Painful ambulation</td>
<td>Obvious instability</td>
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Grade I:
- Partial tears of AITFL, anterior deltoid lig, and distal interosseous ligament (IOL)
- No diastasis

Grade II:
- Tears of anterior and deep deltoid lig and AITFL, partial tear of IOL
- Painful ambulation

Grade III:
- Complete disruption of syndesmosis
- Obvious instability
CLINICAL EVALUATION

- Ankle Motion
  - Dorsiflexion, plantarflexion, inversion, eversion
  - Gross ROM for hip and knee
- Manual Muscle Testing
  - Local (ankle strength)
  - Regional (hip and knee strength)
- Edema
  - Circumferential girth at reference point
CLINICAL EVALUATION (CONT.)

- Gait
  - Antalgic
  - Failure to advance tibia
  - Lack of active push-off

- Single Limb Balance
  - Uninvolved vs involved
  - Anterior Reach Test

- Functional Abilities
  - Ascend/descend stairs, jog/run
  - Self-reported function (via outcome measures)
TREATMENT

- Stable
  - Treat conservatively and refer to therapy

- Unstable
  - Immobilize, protect WB while healing
    - or
  - Surgery
TREATMENT - PHASE I\textsuperscript{2,3,4}

- Edema and pain management
  - Cryotherapy
  - Compression
  - Elevation
  - Active motion
- Controlled Motion
  - Must protect eversion and DF
  - Superior to immobilization
TREATMENT - PHASE $^{1,2,3,4}$

- Early WB with support
  - CAM boot or Aircast
  - NWB or PWB
  - Crutches or walker
CRITERIA TO PROGRESS TO PHASE II

- Pain and swelling subside
- PWB with an assistive device
TREATMENT – PHASE II$^{2,3,4}$

- Gait training
  - Footwear modifications
    - Using a heel lift
  - Aquatics
    - Unweighting
    - Slowing down movement
  - Unloaded
    - Crutches, walker
    - TM with unloader
TREATMENT – PHASE II$^{2,3,4}$

- Low level balance training
  - Bilateral standing
  - Standing on foam
- Low level strengthening
  - Light Theraband resistance
- Gentle stretching
CRITERIA TO PROGRESS TO PHASE III

- Pain-free ambulation
- Full WB
- (May still need heel lift or ankle brace for protection)
TREATMENT – PHASE III\textsuperscript{2,3,4}

- Balance training
  - Stable $\rightarrow$ unstable surfaces
  - Expected $\rightarrow$ random perturbations
  - Unilateral balance training
  - Toe walking
TREATMENT – PHASE II\textsuperscript{2,3,4}

- Unilateral heel raises
- Progress hip and knee strengthening
- Walking drills
- Treadmill progression
- Proprioceptive exercises
PROPRIOCEPTIVE EXERCISES

- STAR balance
- SLS drill with soccer ball
- Rapid kicks with SLS
- BOSU squats
- Ball toss to SLS on BOSU
PROPRIOCEPTIVE EXERCISES

- ½ Foam roll squats
- Lateral lunge on BOSU
- Anterior lunge on BOSU
- Dynadisk SLS with/without ball toss
CRITERIA TO PROGRESS TO PHASE IV

- Able to perform single leg heel raise
TREATMENT – PHASE IV²

• Normal functional ankle strength
• Pain-free running, jumping, cutting
• PRE with full-speed functional movements
• Plyometric training
PLYOMETRIC TRAINING (JUMPING)

- Total Gym plyo jumps
- Box jumps
- Multidirectional jumps
- 90 deg turns
- Jumps for distance
- Cross over jumps
PLYOMETRIC TRAINING (HOPPING)

• Multi-directional hops
• Jump rope
• Lateral hops
• Wide hops
• Crossover hops
OUTCOMES

• Foot and Ankle Ability Measure
  • 21 question self-report

• Lower Extremity Functional Scale
  • 20 question self-report

• Recovery period of 2-6 months
CONCLUSION

• Important to correctly diagnosis and identify the presence of a syndesmotic injury
• Achieve anatomical stabilization of the ankle
• Structured progressive rehab program that is individualized to the patient and activity demands
• Continue with high quality communication between interdisciplinary team
REFERENCES


