

# SYNDESMOSIS INJURIES

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**NO FINANCIAL DISCLOSURES**

# OBJECTIVES

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- 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?!

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## 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<sup>2,3,4</sup>

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- 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



# PREVALENCE<sup>2,3,4</sup>

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- 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<sup>2,4</sup>

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- Patient history
  - Mechanism of injury
  - Location of injury
  - Type of sport
  - Position of limb
  - Ability to bear weight

# HOW IT IS DIAGNOSED<sup>2,4</sup>

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- 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.)<sup>2,4</sup>

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- 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<sup>2</sup>

## WEBER CLASSIFICATION OF FIBULA FX

- Weber B
  - Fx at the level of the distal syndesmosis, caused by external rotation (ER) mechanism
  - Often do not have a disruption of Interosseus membrane (IOM)
- Weber C
  - Disruption of deltoid lig, caused by ER
  - Fx above the level of the distal syndesmosis
- Maissonneuve Fx
  - Proximal fibula fx

## GRADED ANKLE SPRAIN

- 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<sup>3</sup>

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- 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.)<sup>3,4</sup>

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- 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

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Stable

- Treat conservatively and refer to therapy

Unstable

- Immobilize, protect WB while healing
  - or
- Surgery

# TREATMENT - PHASE I<sup>2,3,4</sup>

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- Edema and pain management
  - Cryotherapy
  - Compression
  - Elevation
  - Active motion
- Controlled Motion
  - Must protect eversion and DF
  - Superior to immobilization



# TREATMENT - PHASE I<sup>2,3,4</sup>

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- Early WB with support
  - CAM boot or Aircast
  - NWB or PWB
  - Crutches or walker



# CRITERIA TO PROGRESS TO PHASE II<sup>4</sup>

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- Pain and swelling subside
- PWVB with an assistive device



# TREATMENT – PHASE II<sup>2,3,4</sup>

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- Gait training
  - Footwear modifications
    - Using a heel lift
  - Aquatics
    - Unweighting
    - Slowing down movement
  - Unloaded
    - Crutches, walker
    - TM with unloader

## TREATMENT – PHASE II<sup>2,3,4</sup>

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- Low level balance training
  - Bilateral standing
  - Standing on foam
- Low level strengthening
  - Light Theraband resistance
- Gentle stretching

# CRITERIA TO PROGRESS TO PHASE III<sup>4</sup>

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- Pain-free ambulation
- Full WB
- (May still need heel lift or ankle brace for protection)

# TREATMENT – PHASE III<sup>2,3,4</sup>

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- Balance training
  - Stable → unstable surfaces
  - Expected → random perturbations
  - Unilateral balance training
  - Toe walking

## TREATMENT – PHASE III<sup>2,3,4</sup>

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

# PROPRIOCEPTIVE EXERCISES

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



# PROPRIOCEPTIVE EXERCISES

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- ½ Foam roll squats
- Lateral lunge on BOSU
- Anterior lunge on BOSU
- Dynadisk SLS with/without ball toss



# CRITERIA TO PROGRESS TO PHASE IV<sup>4</sup>

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- Able to perform single leg heel raise



## TREATMENT –PHASE IV<sup>2</sup>

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- Normal functional ankle strength
- Pain-free running, jumping, cutting
- PRE with full-speed functional movements
- Plyometric training

# PLYOMETRIC TRAINING (JUMPING)

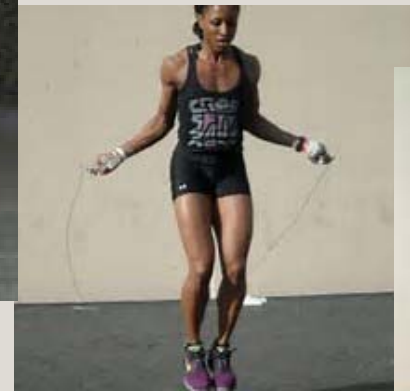
- Total Gym plyo jumps
- Box jumps
- Multidirectional jumps
- 90 deg turns
- Jumps for distance
- Cross over jumps



# PLYOMETRIC TRAINING (HOPPING)

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



# OUTCOMES

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- Foot and Ankle Ability Measure
  - 21 question self-report
- Lower Extremity Functional Scale
  - 20 question self-report
- Recovery period of 2-6 months

# CONCLUSION

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- 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

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