SPORTS….LOWER EXTREMITY INJURY…and OMT

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THE ANKLE OF THE ATHLETE??!!

♦ Adjusts to the musculoskeletal demands
♦ Gravitational challenges
♦ Demands of sport: biomechanical strength, flexibility
THE ANKLE OF THE ATHLETE??!!

*Adjusts to the musculoskeletal demands
*Adjusts to the gravitational challenges
*Adjusts to the demands of the sport:
  biomechanical strength
  flexibilty
ANKLE SPRAIN

- Mechanism of injury
- Physical exam
- Knowledge of functional anatomy
- Radiological exam??
- Immediate therapy
THE ANKLE JOINT

Mechanical and sensory organ

Processes proprioceptive and nocioceptive information

Processing of altered information may alter motor patterns and produce a dysfunction
ANKLE SPRAIN
DISTURBED MOTOR FUNCTION

♦ Most important symptom is PAIN

Lower Extremity OMT in Sports,
Brolinson, VTech Athletics
First: Must learn to identify and treat the somatic dysfunction
ANKLE ANATOMY

- Three major bones:
  - tibia
  - fibula
  - talus
ANKLE ANATOMY: medial

- deltoid ligament
ANKLE ANATOMY: lateral

- anterior talofibular
- calcaneofibular
- posterior talofibular
ANKLE ANATOMY: superior

♦ Superior Ligament:
  tibiofibular
ANKLE ANATOMY: the foot

- Hind foot: talus, calcaneus
- Mid foot: 3 cuneiform, navicular, cuboid
- Fore foot: 5 metatarsal, 14 phalange
ANKLE ANATOMY: 3 ARCHES

ARCHES OF FOOT

Spreading the weight

Transverse arch of the foot

- Runs from side to side
- Formed by cuboid, cuneiforms & bases of metatarsals

Arch of the foot
TRANSVERSE ARCH DYSFUNCTION

Comprehensive Review in Osteopathic Medicine, Savarese, 2nd ed
ANKLE ANATOMY: MUSCLES

♦ Invertors of the foot
  Tibialis anterior
  Tibialis posterior

♦ Evertors of the foot
  Peroneus tertius
  Peroneus longus
  Peroneus brevis
INVERSION ANKLE SPRAIN

♦ It is important to recognize that any injury is a manifestation of a dysfunction in the kinetic chain and that the entire chain must be screened to rule out dysfunction.
THE CASE

- PMH: A fib, Osteoporosis, CHF, Asthma
  Semi colectomy
- Meds: Coumadin, digoxin, cartia, eplerenone
torsemide, mirtazepine, potassium
- SOC: non smoker, non drinker, legally blind
- All: NKDA

- Neuro: A & O x iii
- Psych: judgement & insight intact
- Inspection: lateral ankle and foot edema
  no deformity, no lesions
- Palpation: TTP lateral malleoli at ATF
  non tender medial malleoli, talus,
  5th metatarsal
  Fibular head is posterior
  Tender & ecchymotic lat R thigh
THE CASE

- Ambulation: can wt bear but uncomfortable
- Vascular: DP in tact
- Sensation: in tact specifically L4 L5 S1
- ROM: ankle: restricted in all directions
  - knee: FROM
- Reflexes: = b/l
INVERSION ANKLE SPRAIN STABILITY

EXAM: Anterior Drawer Test

anterior talofibular ligament
INVERSION ANKLE SPRAIN STABILITY
EXAM: Talar Tilt Inversion Stress Test

Calcaneofibular ligament
INVERSION ANKLE SPRAIN STABILITY EXAM: Talar Tilt Eversion Stress Test

Deltoid ligament
INVERSION ANKLE SPRAIN
STABILITY EXAM: Squeeze Test

The squeeze test: A provocative test for syndesmotic injury. The examiner compresses the tibia and fibula above the ankle. Pain in the region of the distal syndesmotic ligaments of pain indicated by the tip of the arrow confirms distal syndesmotic injury. Courtesy of Karen Ragland, MD.
INVERSION ANKLE SPRAIN: Fibular Head Motion Test
FIBULAR DYSFUNCTION

- Pronation/dorsiflexion at the ankle will cause the fibular head to glide anteriorly.
- Supination/plantar flexion at the ankle will cause the fibular head to glide posteriorly.
INVERSION ANKLE SPRAIN
STABILITY EXAM: Kleiger Test
INVERSION ANKLE SPRAIN
WHEN TO X-RAY?

OTTOWA ANKLE RULE:

- Pain in malleolar region
- Bone tenderness at A
- Bone tenderness at B
- Unable to bear weight immediately in exam room & subsequent exam
INVERSION ANKLE SPRAIN MANIPULATIVE THERAPY

Helps provide some immediate relief

- Physical, physiological and psychological linkages
- Reintroduces motion as soon as possible
INVERSION ANKLE SPRAIN
MANIPULATIVE THERAPY

♦ Osteopathic Manipulative Treatment in the Emergency Department for Patients with Acute Ankle Injuries

♦ Eisenhart, DO; Gaeta, DO; Yens, PhD
♦ JAOA, Vol 109, No 9, Sept 2003
ANKLE INVERSION SPRAIN
OUR CASE: MRS. C

- Immediate edema
- Lateral foot tenderness
- + TTP at ATF on lateral malleoli
- Lateral LE tenderness
- + Anterior drawer test
- Posterior displacement of fibular head
- - Squeeze test
POPLITEAL LYMPHATIC RELEASE
EFFLEURAGE
PERONEAL (FIBULARIS) MUSCLE
MYOFASCIAL RELEASE
Ankle Inversion One week later

♦ Balance improved
♦ Still with discomfort on ambulation
♦ No swelling
♦ Unable to go to exercise/dance class
POSTERIOR FIBULAR HEAD DYSFUNCTION: MUSCLE ENERGY
COUNTERSTRAIN OF LATERAL ANKLE TENDERPOINT
POSTERIOR FIBULAR HEAD DYSFUNCTION: LVLA
POSTERIOR FIBULAR HEAD DYSFUNCTION: LVLA
INVERSION ANKLE: 2-3 WEEKS

♦ Time for a dynamic exam
CUBOID DYSFUNCTION LVLA
CUBOID DYSFUNCTION: LVLA
CUBOID DYSFUNCTION: HVLA WHIP
CUBOID DYSFUNCTION
HVLA WHIP
CUBOID DYSFUNCTION: HVLA
INVERSION ANKLE INJURY: RESOLVED 3-4 weeks
ANTERIOR LATERAL MALLEOLUS DYSFUNCTION: HVLA
NAVICULAR DYSFUNCTION: HVLA
NAVICULAR DYSFUNCTION: HVLA
NAVICULAR DYSFUNCTION: HVLA
TALUS DYSFUNCTION: TALAR TUG
TALUS DYSFUNCTION: TALAR TUG
TALUS DYSFUNCTION: TALAR TUG
ANTERIOR FIBULAR HEAD MUSCLE ENERGY

*Grasp the affected extremity with the examiner’s hand at the calcaneous
*Invert and plantar flex the foot
*Grasp the fibular head with the other hand b/n the thumb and index finger. While applying posterior medial force ask the patient to lift her foot to the ceiling.
*Relax
*Engage the new barrier and repeat
*Recheck
ANTERIOR FIBULAR HEAD DYSFUNCTION: HVLA

- Patient is supine
- Grasp the tib/fib at the ankle and internally rotate the affected leg. May also supinate the foot
- Place the thenar eminence of the other hand on the fibular head.
- Using a stiff arm, lean into the fibular head and give a quick thrust posteriorly
POSTERIOR LATERAL MALLEOLUS DYSFUNCTION: HVLA
ANKLE INVERSION SPRAIN

WHAT

WHY

Mechanism of Supination (Inversion)
Strain or Sprain

Supination (inversion)
of the ankle

Cuboid: plantar glide and plantar surface rotates laterally

Navicular: plantar glide and plantar surface rotates medially

Sacrum rotated right on a right oblique axis

Lumbar

Femur rotated internally

Anteromedial glide of the tibia

External rotation of the tibia
THANK YOU
REFERENCES

♦ Physical Exam of the Spine and Extremities, Hoppenfeld, Stanley, Appleton-century-Crofts, norwalk, Conn 1976
♦ Osteopathic Evaluation and Treatment of Ankle Injuries, Dawn Dillinger, DO and Kyle Bodley, DO ABOFP
♦ Principles of Prolotherapy, Ravin, DO, Cantiere, DO, Pasquello, DO, Academy of Musculoskeletal Medicine, 2008.
♦ Osteopathic Clinical Joint Exam, A Stockard, DO American Osteopathic Academy of Sports Medicine, 2010
REFERENCES

QUESTIONS

♦ With an inversion ankle sprain, the correct kinetic chain dysfunction is
   a. The distal fibula will glide posterior
   b. The fibular head will glide posterior
   c. The ipsilateral scapula will pull anterior and upward
   d. The talocalcaneal joint will glide anteriomedially

♦ If the patient is not improving as expected with therapy to an inverted ankle injury, it may be due to the dysfunction of the transverse arch allowing
   a. The medial edge of the navicular to glide toward the plantar surface
   b. The second cuneiform to glide toward the dorsal surface
   c. The medial edge of the cuboid to glide toward the plantar surface
   d. The lateral edge of the cuboid to glide toward the dorsal surface
MANIPULATIVE TREATMENT

♦ Direct: practitioner moves the body tissues or joint closer to the restrictive barrier

♦ Indirect: practitioner moves the body tissues or joint away from the restrictive barrier
EFFLEURAGE
POPLITEAL RELEASE
LYMPHATIC DRAINAGE
POPLITEAL LYMPHATIC RELEASE
PERONEAL MUSCLE
MYOFASCIAL RELEASE
POSTERIOR FIBULAR HEAD DYSFUNCTION : LVLA
RESTRICTIONS aka BARRIERS

Physiological: a point where one can actively move any given joint

Anatomical: a point at which an examiner can passively move any given joint

Restrictive: prevents full range of motion of a joint prior physiological barrier
SOMATIC DYSFUNCTION

♦ Impaired and altered function of related components of the somatic (body framework) system: skeletal, arthrodial, myofascial structures, and related vascular, lymphatic, and neural elements.

♦ Diagnosed by using specific criteria:
  Tenderness
  Asymmetry
  Restriction of motion
  Tissue texture changes
ANKLE INVERSION SPRAIN

♦ Dynamic examination is essential to get an idea of how the entire chain is functioning. Static exam of the foot alone often reveals the diagnosis (the “what”), but does little to identify the underlying cause (the “why”). Only identifying and correcting the “why” can allow treatment of the problem and not just the symptoms. Failure to correct the “why” will result in recurrent injuries.