

# OSTEOPATHIC MANIPULATIVE TREATMENT IN TARSA SOMATIC DYSFUNCTION

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# Why research tarsal somatic dysfunction?

- Fascination with manual medicine
- Opportunity to treat with minimal use of resources
- Acute injury has potential for acute results
- Satisfaction of using high velocity – low amplitude modalities
- Much of the literature is non-osteopathic yet manipulative

# Prior Studies and Research

- **Lower Extremity**
  - Kuchera ML, Anthony G. Chila, ed.
  - Foundations of Osteopathic Medicine. (2011):602-639.
- **Examination and Treatment of Cuboid Syndrome**
  - Chris J. Durall, DPT, ATC, MSPT
  - Sports Health. (2011) 3(6): 514–519.
- **Fatigue of the plantar intrinsic foot muscles increases navicular drop**
  - Donella L. Headlee, Jamie L. Leonard, Joseph M. Hart, Christopher D. Ingersoll, Jay Hertel
  - Journal of Electromyography and Kinesiology. (2008) 18(3): 420-425.
- **Cuboid Syndrome: A Review of the Literature**
  - Stephen M. Patterson
  - Journal of Sports Science and Medicine. (2006) 5: 597-606.
- **Treatment of Cuboid Syndrome Secondary to Lateral Ankle Sprains: A Case Series**
  - Jason Jennings, DPT, SCS, ATC, MTC, CSCS; George J. Davies, PT, DPT, MEd, SCS, ATC, LAT, CSCS, FAPTA
  - Journal of Orthopaedic and Sports Physical Therapy. (2005) 35(7): 409-415.
- **Factors contributing to the development of medial tibial stress syndrome in high school runners**
  - Bennett JE, Reinking MF, Pluemer B, Pentel A, Seaton M, Killian C
  - The Journal of Orthopaedic and Sports Physical Therapy. (2001) 31(9): 504-510.
- **Navicular drop as a composite measure of excessive pronation**
  - MJ Mueller, JV Host and BJ Norton
  - Journal of the American Podiatric Medical Association. (1993) 83(4): 198-202 .

# Prior Studies and Research

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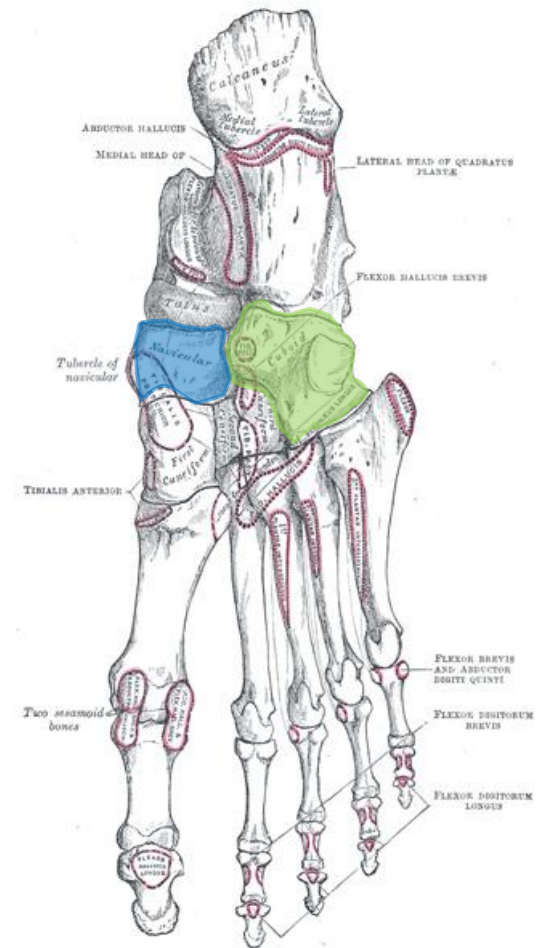
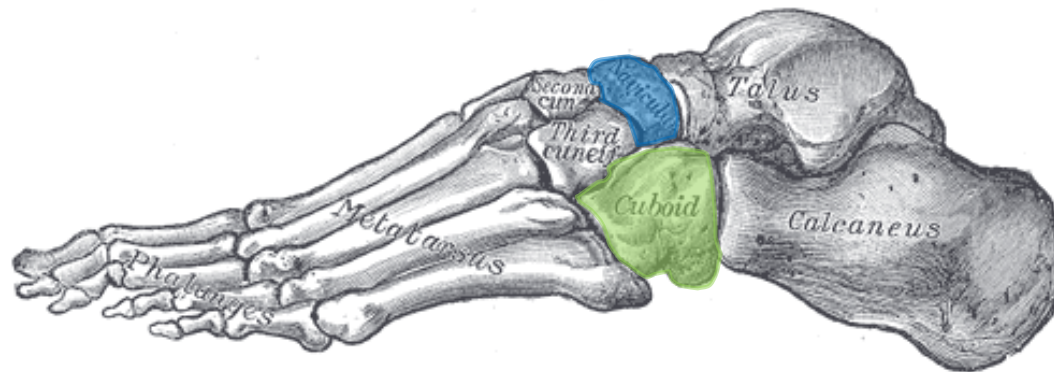
- Most are not osteopathic approaches
- Sporadic and outdated
- Implicate tarsal dysfunction as a contributor or result of other foot/leg pathologies

# Research Methodology

- Anatomy
  - ▣ Structures – bones, ligaments, muscles, fascia
  - ▣ Mechanics
    - Normal
    - Pathologic
- Similar pathologic states
  - ▣ Dropped navicular
  - ▣ Medial Tibial Stress Syndrome (MTSS)

# Research Methodology

- Anatomy
  - ▣ Bones
  - ▣ Arches



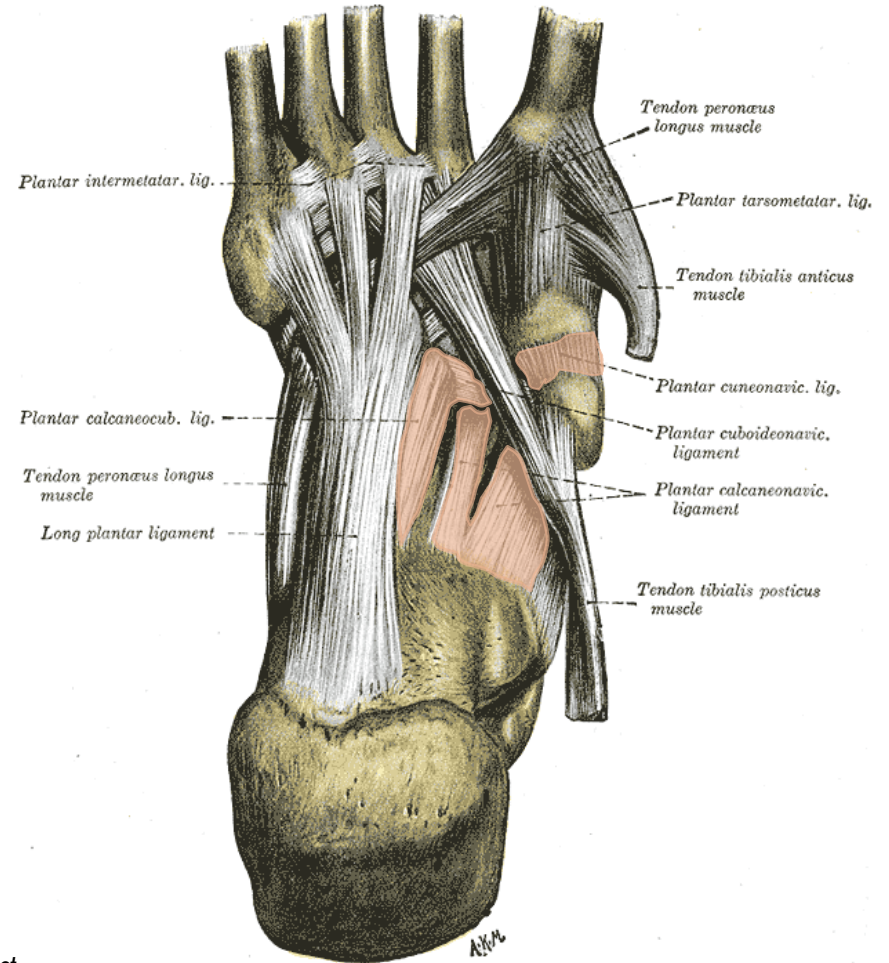
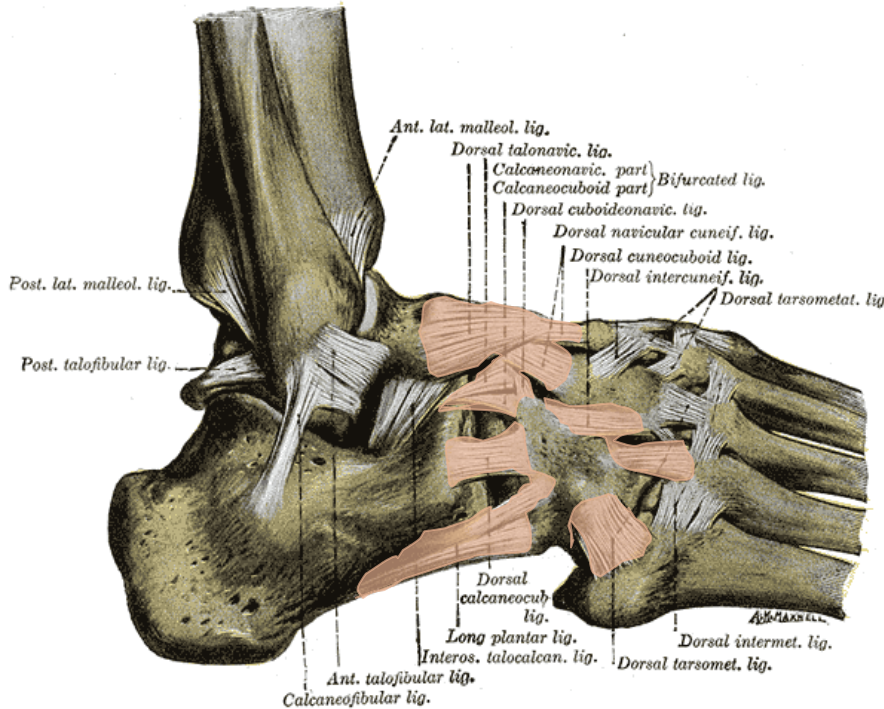
Gray, H. FIG. 291— Skeleton of foot. Lateral aspect.

Gray, H. FIG. 269— Bones of the right foot. Plantar surface.

# Research Methodology

## □ Anatomy

### ▣ Ligaments



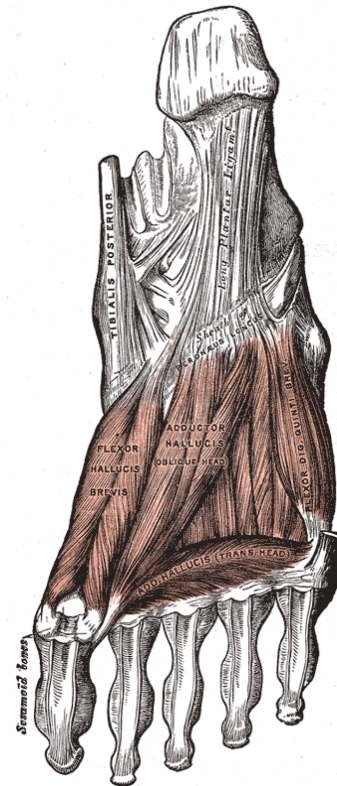
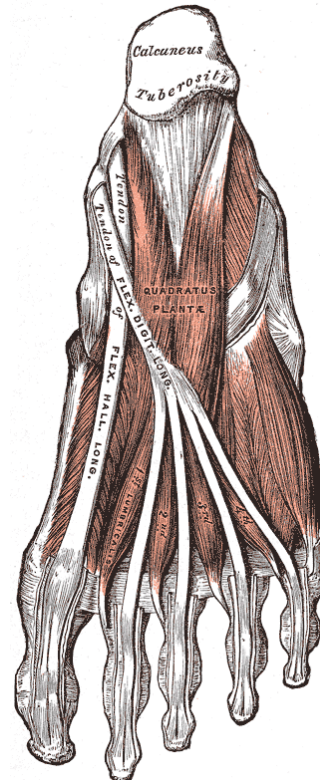
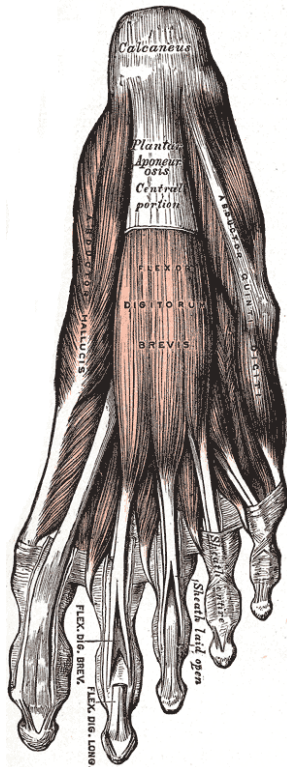
Gray, H. FIG. 355— The ligaments of the foot from the lateral aspect.

Gray, H. FIG. 358— Ligaments of the sole of the foot.

# Research Methodology

## □ Anatomy

### ▣ Muscles



Gray, H. FIG. 443— Muscles of the sole of the foot. First layer.

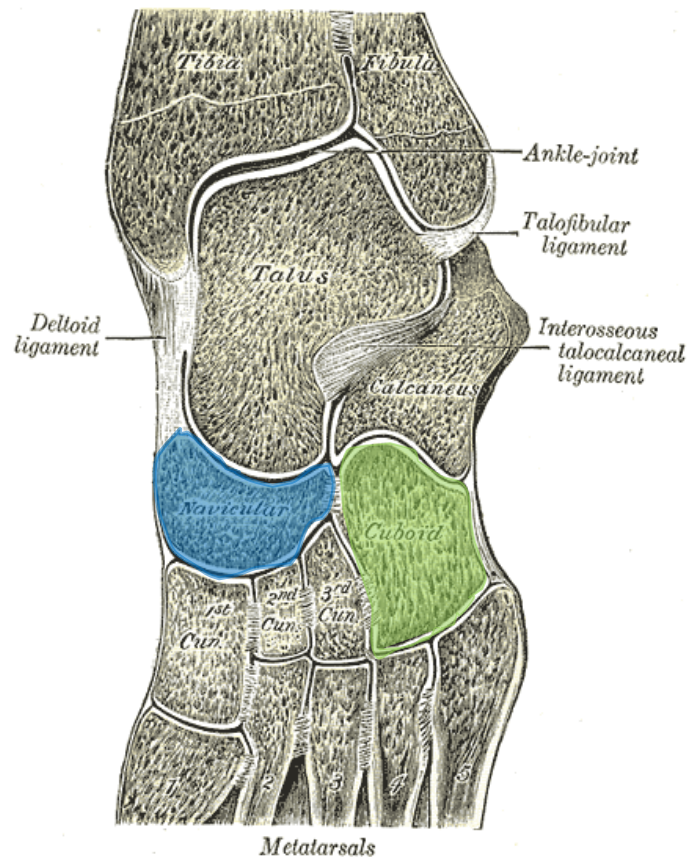
Gray, H. FIG. 444— Muscles of the sole of the foot. Second layer.

Gray, H. FIG. 445— Muscles of the sole of the foot. Third layer.



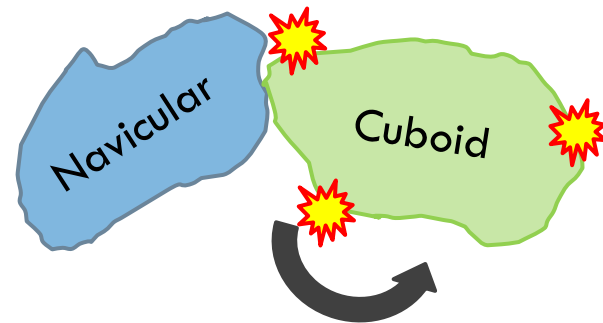
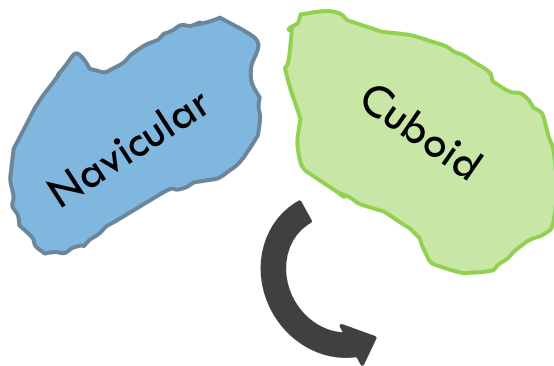
# Research Methodology

## □ Normal Mechanics



# Research Methodology

## □ Pathologic Mechanics



- “Dropped cuboid”
- Internally rotated
- Everted

# Research Methodology

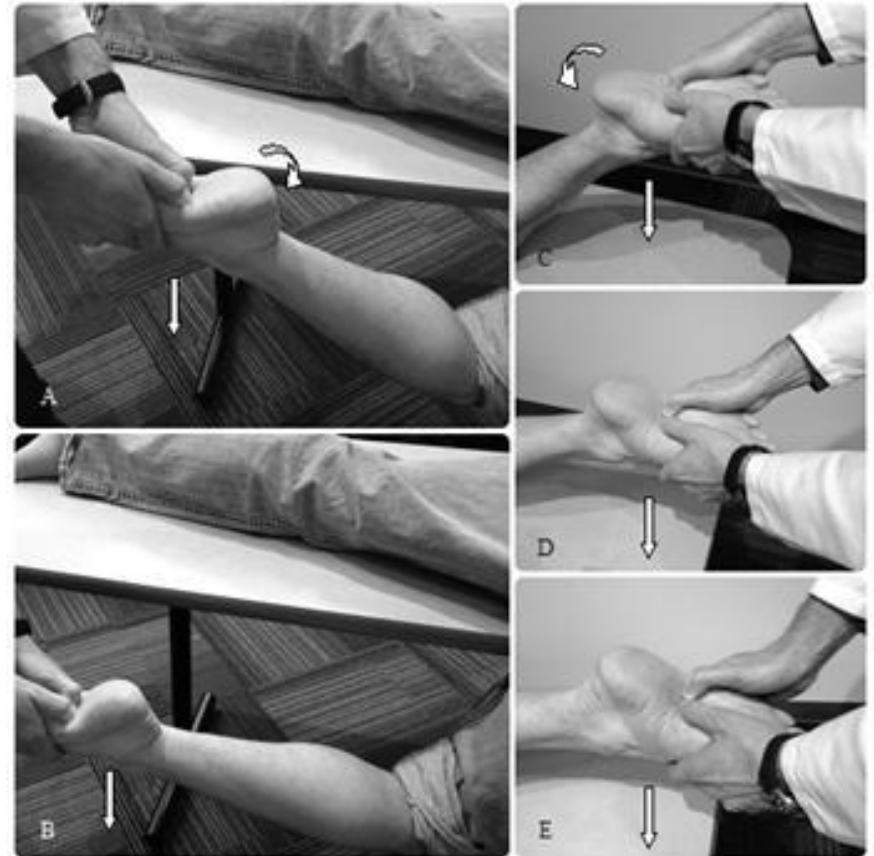
- Similar Pathologic States
  - Dropped Navicular
    - Medial foot pain
    - Result of eversion injury or pes planus
  - Medial Tibial Stress Syndrome (MTSS)
    - “Shin splints”
    - Alters gait/stance patterns – causes tarsal dysfunction
    - Kinetic stress patterns – resulting from tarsal dysfunction
    - Multifactorial
  - Ankle Inversion Injury

# Case Subject

- 24 year old athletic female
- Recent left ankle inversion injury
- No contributing medical history
- Exam
  - ▣ Hemodynamically stable
  - ▣ Non-infectious appearing without open wound
  - ▣ Palpable fullness on plantar midfoot
  - ▣ Mild lateral midfoot tenderness proximal to the 5<sup>th</sup> metatarsal

# Treatment Applied

- High Velocity – Low Amplitude Thrust
  - ▣ Cuboid Squeeze
  - ▣ Modified Hiss Whip
  - ▣ Cuboid Whip
  - ▣ Black Snake Heel Whip
- Soft tissue



The cuboid manipulation in prone position with leg hung over the side of the table (A-B) or knee on the table (C-E) starting with 70-90 degrees of flexion at the knee. In one smooth movement, the knee is passively extended while the ankle is plantar flexed with mild supination of the forefoot (B, D, E) directing the operator's thumbs towards the medial border of the cuboid bone leading to a HVLA thrust at the end-range-of-motion.

# Results

- Overlap between specialties exists suggesting this manipulation is not “owned” by osteopaths
- Cuboid and Navicular somatic dysfunction is a clinical diagnosis
- First-line approach is manipulative reduction
  - ▣ Simple
  - ▣ Safe
- Treating from the ground up can reduce comorbidities

# Research Insights

- Manipulation remains the conservative therapy of choice in tarsal somatic dysfunction
- Other conservative methods
  - Therapeutic exercise
  - Low dye arch taping
  - Padding

# Research Insights

- Exploration of
  - ▣ Normal anatomy
  - ▣ Physiologic mechanics
  - ▣ Pathologic states
  - ▣ Patterned signs and symptoms
  - ▣ Diagnostic approach
  - ▣ Treatment modalities
  - ▣ Follow-up Care
- Robust understanding of medical pathologies



# Conclusions

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- Understanding normal anatomy highlights the abnormal
- History and physical are paramount
- Sometimes the most conservative method is the best method
- A systematic approach to patient pathology guides our understanding of medicine and the treatment we provide

# References

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7. Caselli MA and Pantelaras N. "How to Treat Cuboid Syndrome in the Athlete." *Podiatry Today*. 2004;17(10):76-80.
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