The Arterial Anatomy of the Deltoid Ligament: A Cadaveric Study

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Disclosures

- We have no pertinent disclosures
Injuries to the deltoid ligament account for 10-15% of ankle sprains

Chronic deltoid insufficiency can lead to instability

- Can necessitate operative treatment

Multiple studies have investigated the structural anatomy of deltoid ligament

- Focused on characterizing different “bands”

The vascular supply to the deltoid has not been well characterized

- Possible implications on chronic insufficiency
- Important knowledge when considering operative intervention
Purpose

- Describe the vascular supply to the deltoid ligament utilizing a method of chemical debridement with cadaveric specimens
Methods

- Twenty-seven pairs of adult cadaveric legs (54 total specimens) utilized
  - Specimens excluded for signs of prior trauma/surgical treatment
  - Specimens prepared by amputating 8cm distal to tibial plateau articular surface

- The anterior tibial, posterior tibial and peroneal arteries were injected with India Ink followed by Ward’s Blue Latex

- Specimens chemically debrided utilizing 6.0% sodium hypochlorite (bleach)
  - Leaves latex casts of vessels, ligaments and bones

- Vascular supply to the deltoid ligament was documented and photographed
Results

- Vascular supply visualized in 50 (92.6%) of specimens
- Deltoid ligament supplied by medial tarsal arteries in 100% of specimens
  - Branch of the dorsalis pedis artery
- 32 (64%) of specimens had additional supply from anterior tibial artery (proximal to tibiotalar joint)
Deltoid ligament complex (D) with arterial supply from A. anterior tibial and dorsalis pedis arteries (arrows) and B. dorsalis pedis artery only (arrow)
Thirty-nine specimens (78%) had additional vascular supply from the posterior tibial artery.

Posterior tibial artery was dominant supply in 13 (30%) of specimens.

This figure shows the deltoid ligament, labeled D, receiving vascular supply from the posterior tibial artery (arrows).
All specimens had anterior arterial supply

- Medial tarsal arteries +/- anterior tibial supply

Anterior supply was dominant in 70% of specimens

- Based on vessel caliber

The majority of specimens received additional contributions from the posterior tibial artery
Limitations

- No data available on medical comorbidities of specimens
- Identification of vessels dependent on quality of injection/filling of vessels with ink and latex
- Review of photos to determine vascular supply – mitigated by having multiple authors review and reach consensus
Conclusions

- Knowledge of the vascular anatomy of the deltoid ligament is useful when planning medial-sided surgery
- May have implications in the progression of medial ankle sprains to chronic deltoid insufficiency/instability
- Direction of future studies may be in-vivo utilizing angiogram technology
References


