

Outcomes of Deltoid Ligament Repair in Open Ankle Fractures: A Retrospective Case Series

Miss B. Gorgun, Mr P. Manjunath, Mr J. Muscat, Mr P. Singh

Trauma & Orthopaedics Department, Addenbrooke's Hospital, Cambridge

BACKGROUND

- Deltoid ligament is critical for ankle stability.
- Benefit of deltoid ligament repair (DLR) is well studied in closed fractures:
 - *Better clinical outcomes in high-grade unstable fractures of the ankle with syndesmotic instability (1,2).*
 - *Better clinical and functional outcomes in concomitant syndesmotic fixation (1,3)*
- Lack of evidence in open fractures → clinical dilemma.**

Methodology

We conducted a retrospective case series on patients presenting with open ankle fractures and concomitant deltoid ligament disruption at level 1 trauma centre between 2017 and 2024. Clinical records and imaging were reviewed to assess complications, stability, infection, and radiographic outcomes.

Results

- 8 patients (mean age 55 years) were included.

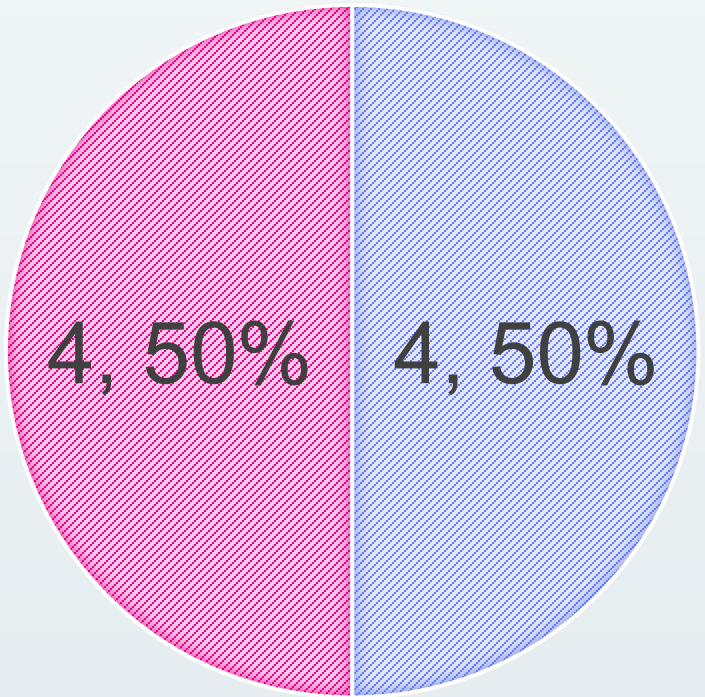
Gustilo–Anderson Grade	Number of Patients
Grade II	1
Grade IIIa	3
Grade IIIb	2
Grade IIIc	2

- The median follow-up was 12 months (range 2–46 months).
- Post-operative infection occurred in 4 patients (50%), of whom 4 required further surgery and 2 underwent metalwork removal.

- Diverse organisms were cultured from these infections including *Candida auris*, *Morganella morganii*, and *Citrobacter* species.

RATE OF POST-OPERATIVE INFECTION

■ Infection ■ No Infection



- 6 patients needed soft tissue flap coverage, with one instance of flap failure.
- Postoperatively, satisfactory medial clear space was achieved radiographically in 7 out of 8 patients.
- Radiographic evidence of post-traumatic osteoarthritis was observed in 3 patients, 2 of whom subsequently underwent ankle fusion.

Conclusions

- Fracture related infection rates in open ankle fractures have been reported as **15%**.
- Our findings suggest a **higher infection rate** when DLR is performed.
- While deltoid repair facilitated anatomic reduction in most cases, the high infection rate underscores the vulnerability of open fractures to complex microbiological challenges.
- Larger multi-centre studies are warranted to validate these observations and define clear surgical indications.

References

- Woo SH, Bae SY, Chung HJ. Short-Term Results of a Ruptured Deltoid Ligament Repair During an Acute Ankle Fracture Fixation. *Foot Ankle Int*. 2018 Jan;39(1):35–45. doi: 10.1177/1071100717732383.
- Zhao HM, Lu J, Zhang F, Wen XD, Li Y, Hao DJ, Liang XJ. Surgical treatment of ankle fracture with or without deltoid ligament repair: a comparative study. *BMC Musculoskelet Disord*. 2017 Dec 21;18(1):543. doi:10.1186/s12891-017-1907-4. PMID: 29268724; PMCID: PMC5740931.
- Wang, J., Stride, D., Horner, N. S., Petrisor, B., Johal, H., Khan, M., & Alolabi, B. (2021). The role of deltoid ligament repair in ankle fractures with syndesmotic instability: a systematic review. *The Journal of Foot and Ankle Surgery*, 60(1), 132–139.
- Cooke, M. E., Tornetta III, P., Firoozabadi, R., Vallier, H., Weinberg, D. S., Alton, T. B., ... & Teague, D. (2022). Open ankle fractures: what predicts infection? A multicenter study. *Journal of orthopaedic trauma*, 36(1), 43–48.

