

TECHNOLOGY OVERVIEW

Artelon is a Dynamic Matrix™ for tendon and ligament reconstruction. It mimics the body's natural healing matrices to create repairs that are both strong and highly elastic.¹ These features have been proven^{2,3,4} to:

- **Restore** kinematics
- **Resist** failure from necrosis
- **Regenerate** native tissue through load sharing

Artelon is extremely inert, and less reactive than common biomaterials such as titanium, polystyrene and suture.⁵ It integrates into the repair site and scaffolds new tissue growth. Its high compliance permits load sharing, which stimulates rapid tissue remodeling through mechanotransduction.⁶ Artelon maintains its properties for five years, then dissolves in water and is eliminated from the body.

The current case involves a patient with a deltoid ligament tear causing ankle pain and medial ankle instability.

CLINICAL HISTORY

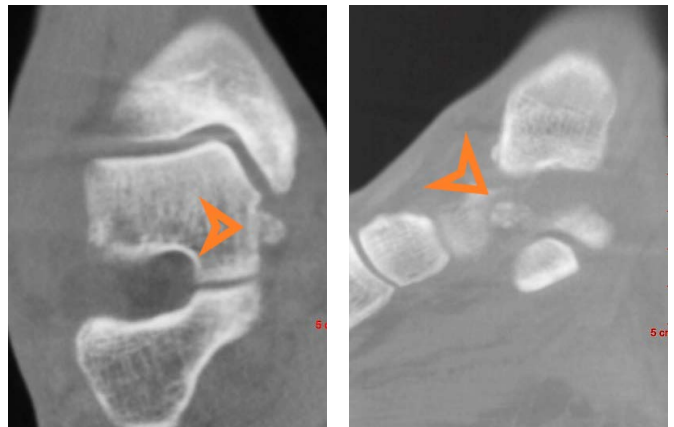
A 30-year-old healthy male presented after twisting his ankle in a basketball game. Clinically he presented with pain and swelling along the medial sides of his ankle. 3 months after failing conservative treatment radiographs showed a small avulsion of the deltoid insertion (Figures 1&2). CT scan confirmed the diagnosis (Figures 3&4).

INTRAOPERATIVE FINDINGS:

The deltoid ligament was found to be thin and incompetent and the ankle unstable. A loose fragment was discovered at the talar insertion point signifying a chronic avulsion fracture non-union. The large defect and degenerated deltoid ligament made primary repair impossible. (Figure 5) Reconstruction & augmentation was necessary and an Artelon FlexBand matrix was determined to be strong enough to sustain the kinematic forces experienced by the deltoid ligament.



Figures 1&2. Radiographs of the ankle show an avulsion fracture off the talus at the site of the deltoid ligament.



Figures 3&4. CT reconstructions confirm the un-united talar avulsion fracture.



Figure 5. Intraoperative photograph showing torn deltoid ligament and loose avulsion fracture.

References

1. Gisselbalt et al, *Biomacromolecules* 2002, 3, 951-958.
2. Lijsten et al, *J. Biomater. Sci: Materials in Medicine* 13 (2002) 351-359
3. Peterson et al, *Knee Surg Sports Traumatol Arthrosc* (2014) 22:2109-2120.
4. Peterson et al., *The Anterior Cruciate Ligament: Reconstruction and Basic Science*. 2nd ed., Elsevier 2018.
5. Gretzer et al, *J. Biomater. Sci. Polymer Edn*, Vol. 17, No. 6, pp. 669-687 (2006)
6. Gersoff et al, *J Knee Surg*. 2018 Apr 27.

SURGICAL INTERVENTION

An incision was made along the medial ankle. The medial joint was inspected revealing a torn deltoid ligament. The talar insertion point of the deltoid ligament was isolated and an un-united avulsion fracture removed. An anchor was then placed into the talus (figure 6). The medial malleolus deltoid insertion site was debrided and a second anchor was placed (figure 7). One end of the Artelon FlexBand was secured to the talus. The unattached end of the FlexBand was pulled into 10-20% tension and secured directly to the tibial deltoid insertion point with the second anchor (figure 8-9). The remaining native deltoid ligament was wrapped around the FlexBand (Figure 10), the layers were closed, and a splint was applied (figure 11).



Figure 6. Inserting anchors into the deltoid insertions: talus and medial malleolus



Figure 7. Anchor placements confirmed with fluoroscopy.



Figure 8. Securing the FlexBand to the talus/deltoid origin



Figure 9. Repair remaining deltoid ligament around the FlexBand matrix then tension and secure to the medial malleolus.



Figure 10. Final repair; deltoid reinforced with FlexBand matrix



Figure 11. Final closure

FOLLOW UP

Immediately post-op, the patient had a short leg splint placed. At his 1-week follow-up, he was placed in a short leg cast, remained non-weight bearing and physical therapy started at 6 weeks. He continued to rehab well and at 12 weeks returned to playing basketball. Deltoid ligament reconstruction maintained the stability of the ankle.

CONCLUSION

This 30 year-old active man sustained a tear to his deltoid ligament after twisting his ankle playing basketball. He underwent a successful reconstruction utilizing Artelon FlexBand augmentation. Through the procedure, we achieved a strong and reliable repair, which allowed him an early return to full activities.

Deltoid reconstruction utilizing Artelon's FlexBand technology is safe, effective, and has the capability of supporting an early return to activities.