

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 chronic foot drop secondary to a torn anterior tibial tendon rupture.

CLINICAL HISTORY

A 54-year-old healthy male presented with long standing foot weakness and limp after sustaining a slip and fall on ice. Clinically he demonstrated insufficiency of his right anterior tibial tendon (ATT) and a unilateral right foot drop. Radiographs showed no pathology while physical exam and ultrasound (*Figure 1*) confirmed a torn anterior tibial tendon. MRI confirmed an anterior tibial tendon tear with retraction of the remnants (*Figure 2*). Conservative treatment including AFO bracing, taping, and boot immobilization had failed; therefore, he elected to undergo surgical treatment.

INTRAOPERATIVE FINDINGS:

The ATT was torn with proximal retraction, degeneration and an intact distal stump (*Figure 3*). The large defect in the tendon made primary repair impossible. Reconstruction & augmentation was necessary and an Artelon FlexBand™ device was chosen to sustain the kinematic forces across the tendon and function as a scaffold for biologic ingrowth and replacement by host tendinous tissue.

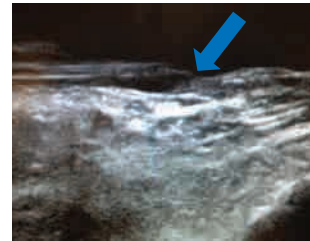


FIGURE 1: Ultrasound of the foot demonstrating the torn anterior tibial tendon (blue arrow)

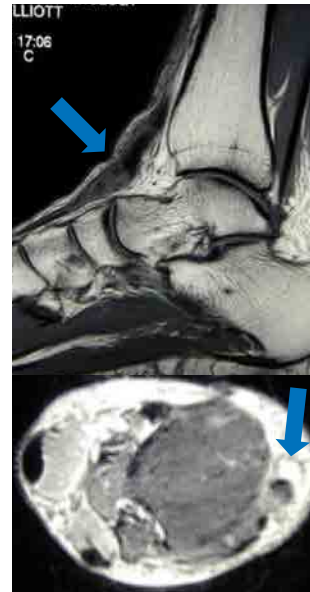


FIGURE 2: MRI of the right foot/ankle showing rupture and retraction of the anterior tibial tendon



FIGURE 3: Intraoperative photograph showing rupture and retraction of the anterior tibial tendon.

Note the intact distal stump.

References

1. Gisseffalt et al, *Biomacromolecules* 2002, 3, 951-958.
2. Lijjsten 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 anterior medial ankle and foot. The ATT sheath was opened revealing an intact distal stump only. The remaining ATT was torn, degenerated and irreparable. An anchor was used to secure a 0.7x16cm Artelon FlexBand to the medial cuneiform attachment of the ATT (*Figure 4*). The unattached end of the Artelon FlexBand was pulled into 10-20% tension and secured directly to the proximal stump. Additionally, any remaining native tendon and sheath was wrapped around the Artelon FlexBand (*Figure 5*). The reconstructed ATT was relocated and the proximal retinaculum closed (*Figure 6*). Following final closure, the foot was splinted in dorsiflexion.



FIGURE 4:
Sutured Artelon FlexBand to the medial cuneiform insertion site



FIGURE 5:
Tensioned Artelon FlexBand and wrapped native tissue around the Artelon FlexBand



FIGURE 6:
Closure of sheath and retinaculum over the Artelon FlexBand and ATT

FOLLOW UP

Immediately post-op, the patient had a short leg splint placed. 1-week post-op, he was placed in a short leg cast. At 6-weeks the patient was allowed to weight bear and begin physical therapy. He continued to rehab well and at 12 weeks returned to light exercise with active pain-free dorsiflexion without a limp. Patient continued to wear a night splint for 6 months to ensure maintenance of the tensioned graft and repair.

CONCLUSION

This 54 year-old active man with a chronic foot drop secondary to a ruptured ATT 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 pain-free exercises and no limp. Tendon reconstruction including Artelon's dynamic matrix technology is safe and effective, with the capability of supporting an early return to activities.