

## Case study: Tibialis Anterior Tendinosis Repair Artelon® FlexBand®

Presented by: **Steven K. Neufeld, MD** Centers for Advanced Orthopaedics (CAO), Falls Church, VA  
Sponsored by Stryker – Dr. Neufeld is a paid-consultant of Stryker

### Technology overview

Artelon FlexBand® is a degradable synthetic biomaterial that is designed to reinforce soft tissue and serve as a scaffold for connective tissue ingrowth.<sup>1</sup> It is designed to mimic normal tissue elasticity while in the body<sup>2</sup> and is high strength for load sharing.<sup>3</sup> These features are designed to:

- Support motion without constraining it<sup>2</sup>
- Allow for regeneration of natural tissue through load-sharing<sup>1,4</sup>
- Be less inflammatory than titanium and polystyrene<sup>5</sup>

FlexBand shows no evidence of necrotic breakdown.<sup>6</sup> It acts as a scaffold and is capable of integrating with regenerating connective tissue.<sup>1</sup> FlexBand shares the tensile loading to both protect the healing construct and allows mechanical stimulation required for optimal tissue regeneration and remodeling.<sup>7,8</sup> The material gradually degrades through hydrolysis and is fully integrated over 4-6 years.<sup>1,3,9</sup>

### Clinical history

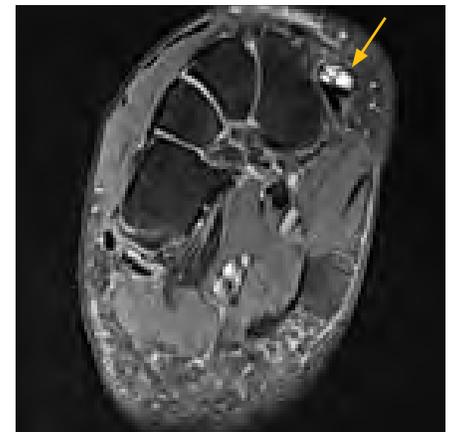
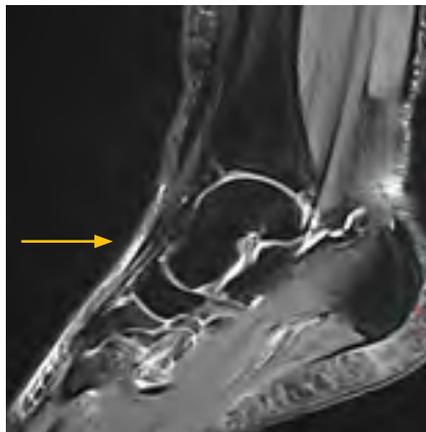
A 62-year-old healthy male presented with long standing foot pain, weakness, and limp after sustaining a slip and fall on ice 5 years earlier. Clinically, he demonstrated insufficiency of his right anterior tibial tendon with weak and painful ankle dorsiflexion. Radiographs showed no pathology while physical exam confirmed a diseased, thickened, and dysfunctional anterior tibial tendon. An MRI confirmed anterior tibial tendinosis.

**(Figures 1,2)** Conservative treatment including AFO bracing, taping, and boot immobilization had failed; therefore, he elected to undergo surgical treatment.

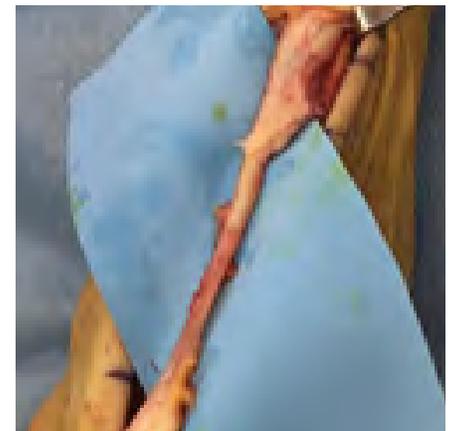
### Intraoperative findings

The anterior tibial tendon was chronically thickened, torn and incompetent.

**(Figures 3,4)** The large degenerated tendon made primary repair ineffective. Reconstruction and augmentation was necessary and an Artelon FlexBand matrix was determined to be an optimal kinematic augment to the tendon repair.



**Figures 1&2:** MRI of the right foot/ankle showing anterior tibial tendinosis.



**Figures 3&4:** Intraoperative photograph showing chronic tendinosis of the anterior tibial tendon.

## Surgical intervention

An incision was made along the anterior medial ankle and foot. The anterior tibial tendon sheath was opened revealing a distally intact stump only. The remaining anterior tibial tendon was torn and degenerated. (**Figures 3,4**) An anchor was used to secure the 0.7×8cm FlexBand matrix to the medial cuneiform attachment of the anterior tibial tendon. (**Figure 5**) The unattached end of the Artelon FlexBand was pulled into 10-20% tension and secured directly to the proximal portion of the anterior tibial tendon. Additionally, the remaining native tendon and sheath were wrapped around the FlexBand to complete the repair and reinforcement of native tissue. (**Figure 6**) The reconstructed anterior tibial tendon was reinforced, followed by closure of the tendon sheath and retinaculum. (**Figures 7,8**) Finally, the incision was closed and the foot was splinted in dorsiflexion.

## 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 and allowed weight bearing with physical therapy beginning at 6 weeks. Patient continued to rehab well and at 8 weeks returned to light exercise demonstrating active pain-free dorsiflexion and no limp. He continued to wear a night splint for 6 months to ensure maintenance of the tensioned graft and repair.

## Conclusion

This 62 year-old active man with chronic foot pain and weakness secondary to tendinosis of the anterior tibial tendon underwent a successful repair utilizing Artelon FlexBand augmentation. Through surgical intervention, we achieved a strong and reliable repair, allowing an early return to pain-free exercises without limp.



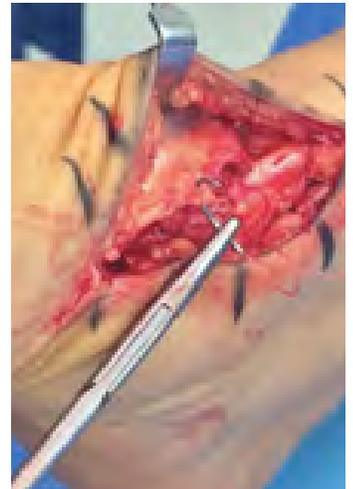
**Figure 5:** Sutured FlexBand to the medial cuneiform insertion site.



**Figure 6:** Tensioned FlexBand wrapped with native tissue reinforcing the degenerated tendon.



**Figure 7:** Final repair showing the FlexBand and anterior tibial tendon repair secured.



**Figure 8:** Closing the sheath and native tissue around the repair.

1. Liljensten, E., Gisselalt, K., Edberg, B., Bertilsson, H., Flodin, P. (2002). *J Mater Sci Mater Med*, 13, 351-359. Claim based on rabbit and minipig ACL studies. It is unknown how the results from the rabbit and minipig models compare with clinical results in humans. 2. Kelly, M. J., Dean, D. M., Hussaini, S. H., Neufeld, S. K., Cuttica, D. J. (2024). *Foot & Ankle Spec*, 17(3), 203-207. 3. Data on file at Stryker. 4. Barber, F.A., and Aziz-Jacobo, J. *J Arthroscopy* (2009) Nov; 25 (11):1233-9 5. Gretzer, C., Emanuelsson, L., Liljensten, E., & Thomsen, P. (2006). *J Biomater Sci, Polymer Ed*, 17(6), 669-687. - Claim based on subcutaneous rat model. It is unknown how results from the rat model compare with clinical results in humans. 6. Woodruff, M.A., and Hutmacher, D.W. (2010). *Progress of Polymer Science*, 35, 1217-1256. - Claim based on review of polycaprolactone polymers as biomaterials. 7. Giza E, Frizzell L, Farac R, Williams J, Kim S. *Foot Ankle Int*. 2011;32(5): S545-S549. 8. Sheng, R., Jiang, Y., Backman, L. J., Zhang, W., Chen, J. (2020). *Stem Cells Intl*, Sept 24, 1-14. 9. Gisselalt, K., Edberg, B., Flodin, P. (2002). *Biomacromolecules*, 3, 951-958

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