

# A Brief Case Report on Umbilical Cord Connective Tissue Allograft Application for Defect of the Achilles Tendon

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## Background

Enthesopathies of the lower extremities are extremely common in adult populations regardless of athletic background. Achilles tendonitis(osis), one of the most common, primarily affects patients over fifty. Enthesopathy can be caused by a loss of fibrillar structure secondary to edema or mineralization, which leads to calcification and ossification, diffuse inflammatory disease, or altered structure of collagen fibers leading to a thickened enthesis<sup>1</sup>. The patient in this study is a 54-year-old female who presented with chronic enthesopathy at the Achilles tendon insertion with tendinosis immediately proximal and significant retrocalcaneal exostosis. Duration of pain, over three years, despite conservative care from multiple doctors. Previous contralateral surgery for the same conditions at St. Elsewhere was still painful. Her work requires her to be on her feet 75% of the time, further aggravating the disorder and causing sharp burning pain. To avoid surgery and loss of productive time at work, she was offered conservative umbilical cord Wharton's Jelly structural connective tissue to help her body supplement the structural defects combined with modalities.

## Purpose

Standard care practices for Achilles tendonitis vary from over-the-counter anti-inflammatories or corticosteroid injections with functional rehabilitation therapy to surgical intervention in severe cases. Best practices are still widely debated as the Achilles tendon's pain mechanisms are poorly understood<sup>2</sup>. It is common for surgeons to experience patients with significant retrocalcaneal exostosis and no pain as frequently as the reverse circumstance. The subject in this study presented with a retrocalcaneal exostosis of the right leg, severe pain, and declining surgical intervention (figure 5A,B). Previously, the patient underwent two procedures: one successful inferior calcaneal osteotomy and one minimally successful retro calcaneal resection of osteotomy on the contralateral foot (figure 4A,B). Recent literature has demonstrated promising alternative interventions, including extracorporeal pulse wave sound therapy, Class IV Laser therapy, and regenerative tissue allograft supplementation<sup>3,4</sup>. This retrospective case study aims to present novel application techniques and preliminary evidence of the efficacy and safety of these interventions on a patient who has failed standard-of-care practices for over two years.

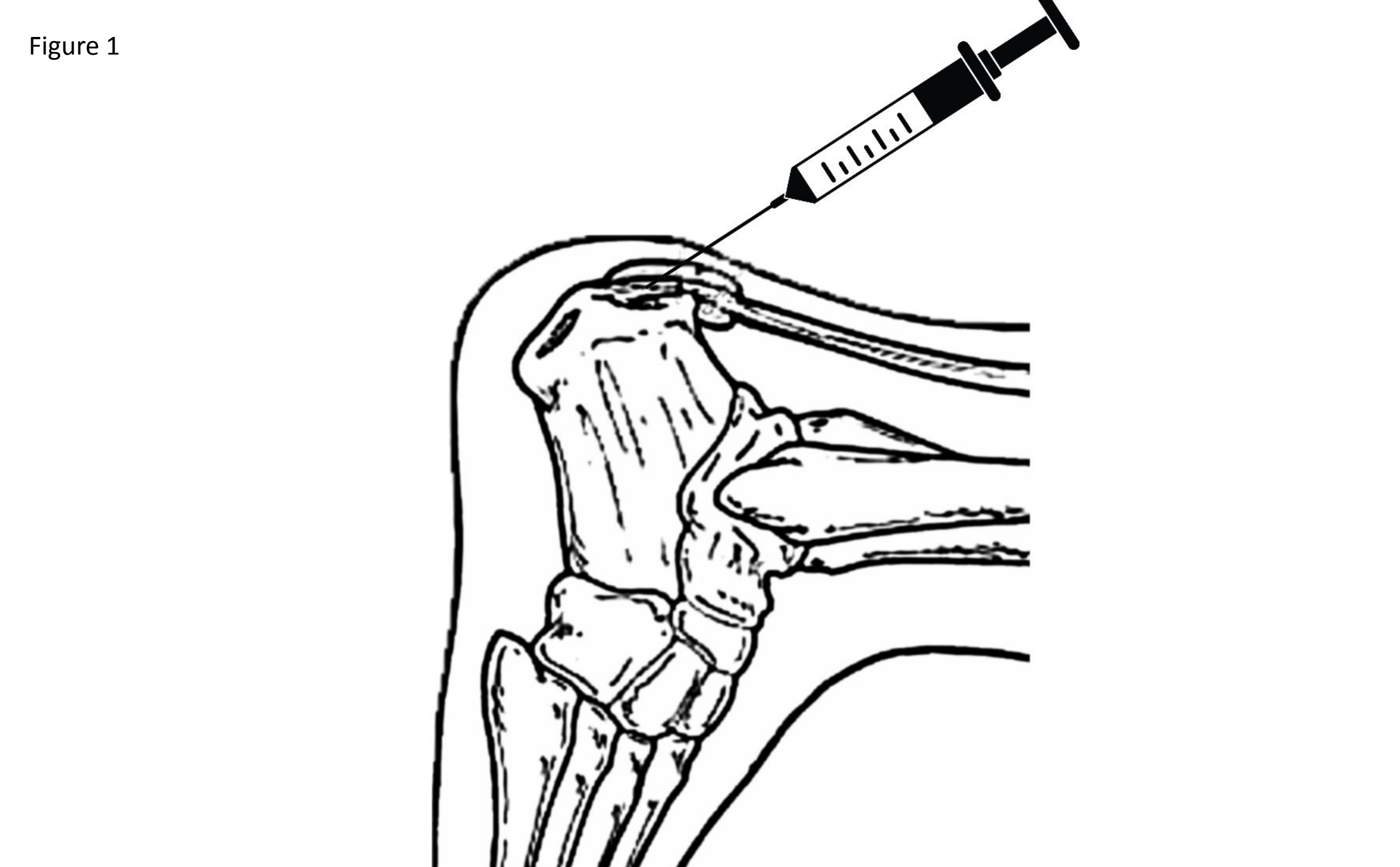
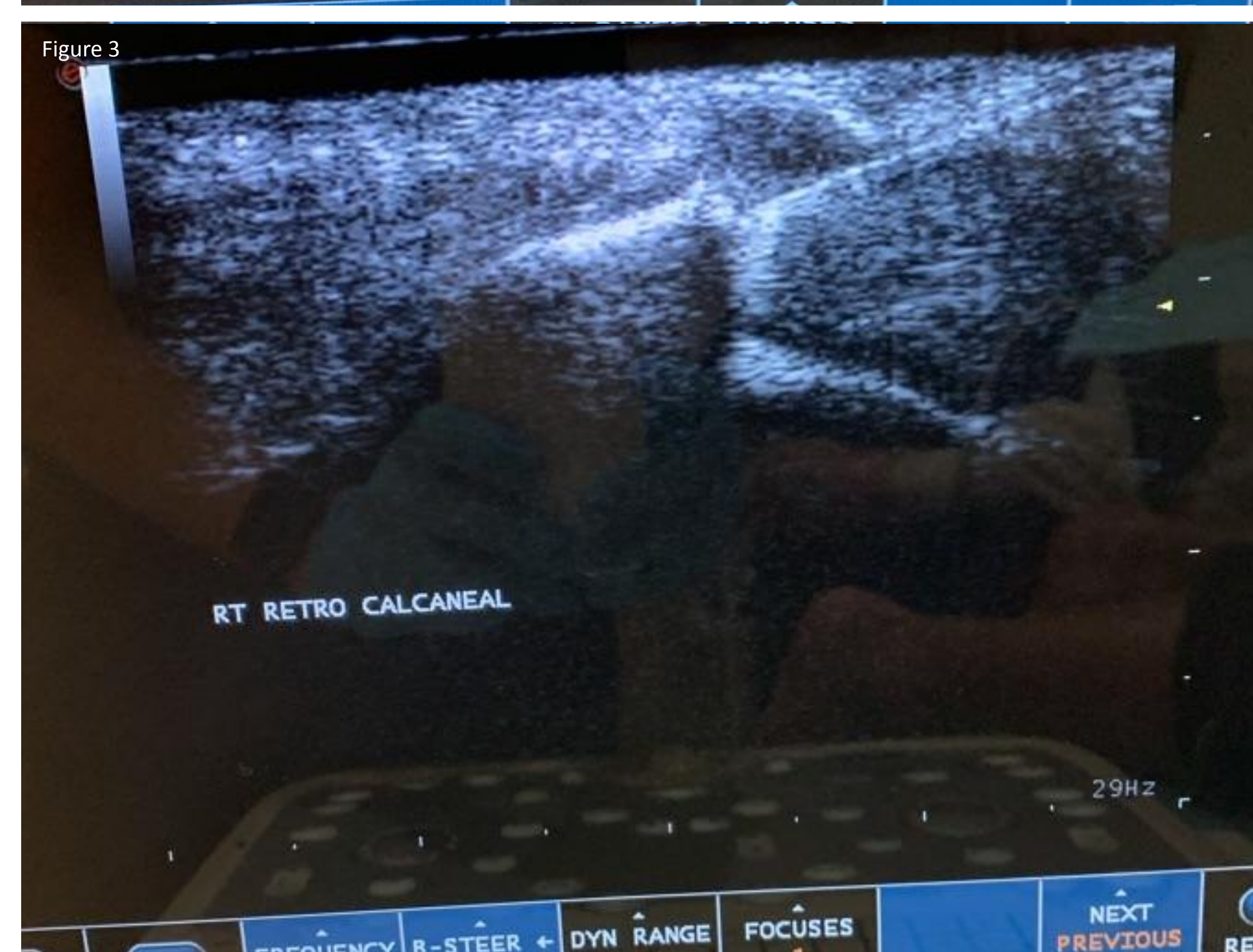
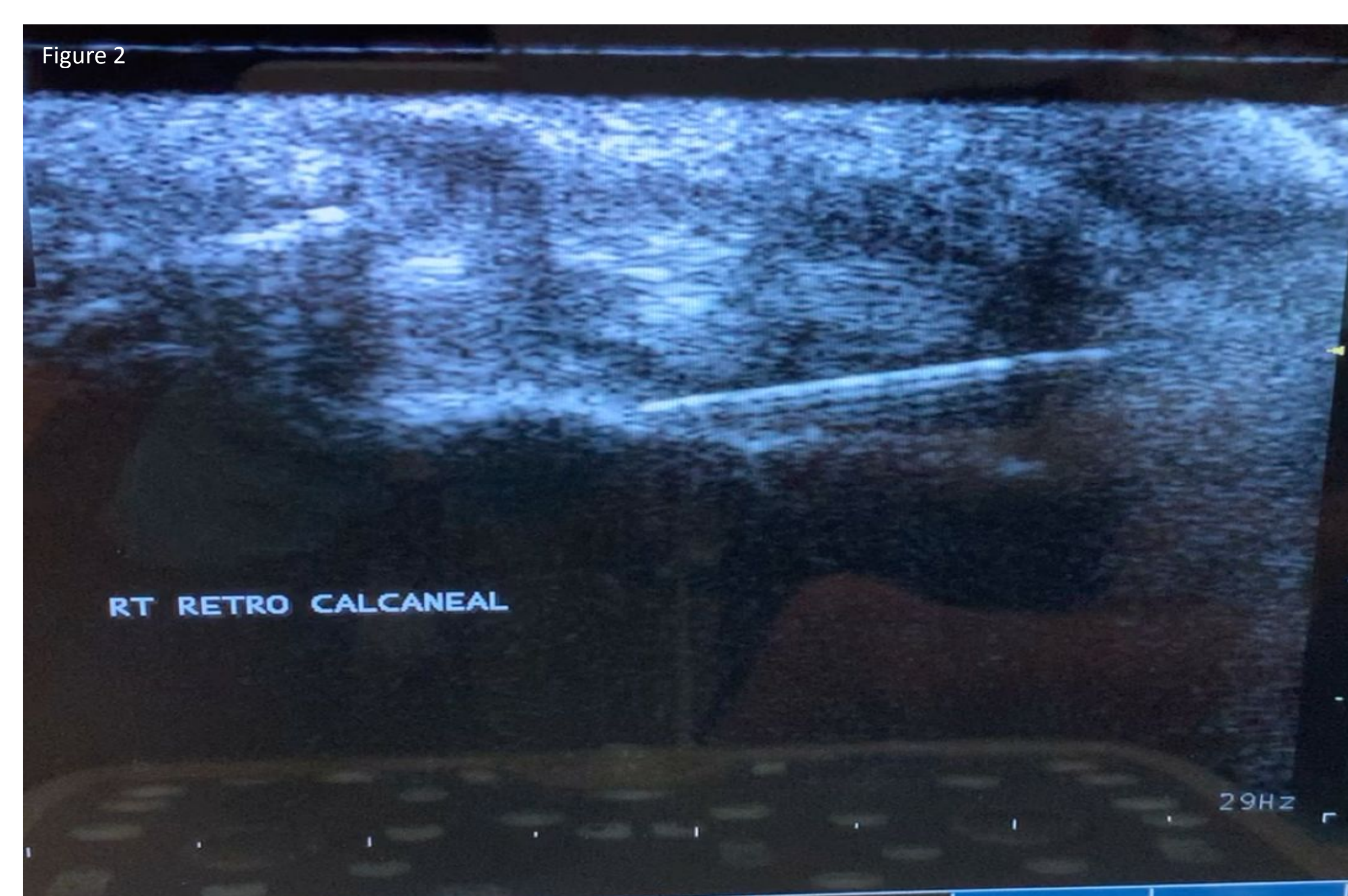


Figure 1: Wharton's Jelly application technique, 2cc, 22 gauge needle



Figures 2, 3: Real Time imaging with 15-18 MHz 4 cm transducer head



Figures 4 A and B: Surgical resection from three years prior

Figures 5 A and B: Current x-ray treated with Structural Allograft Tissue WJ



Figure 6: SEM image of preserved cross-linked collagen structures of WJ tissue product. (Scale bar: 300nm)

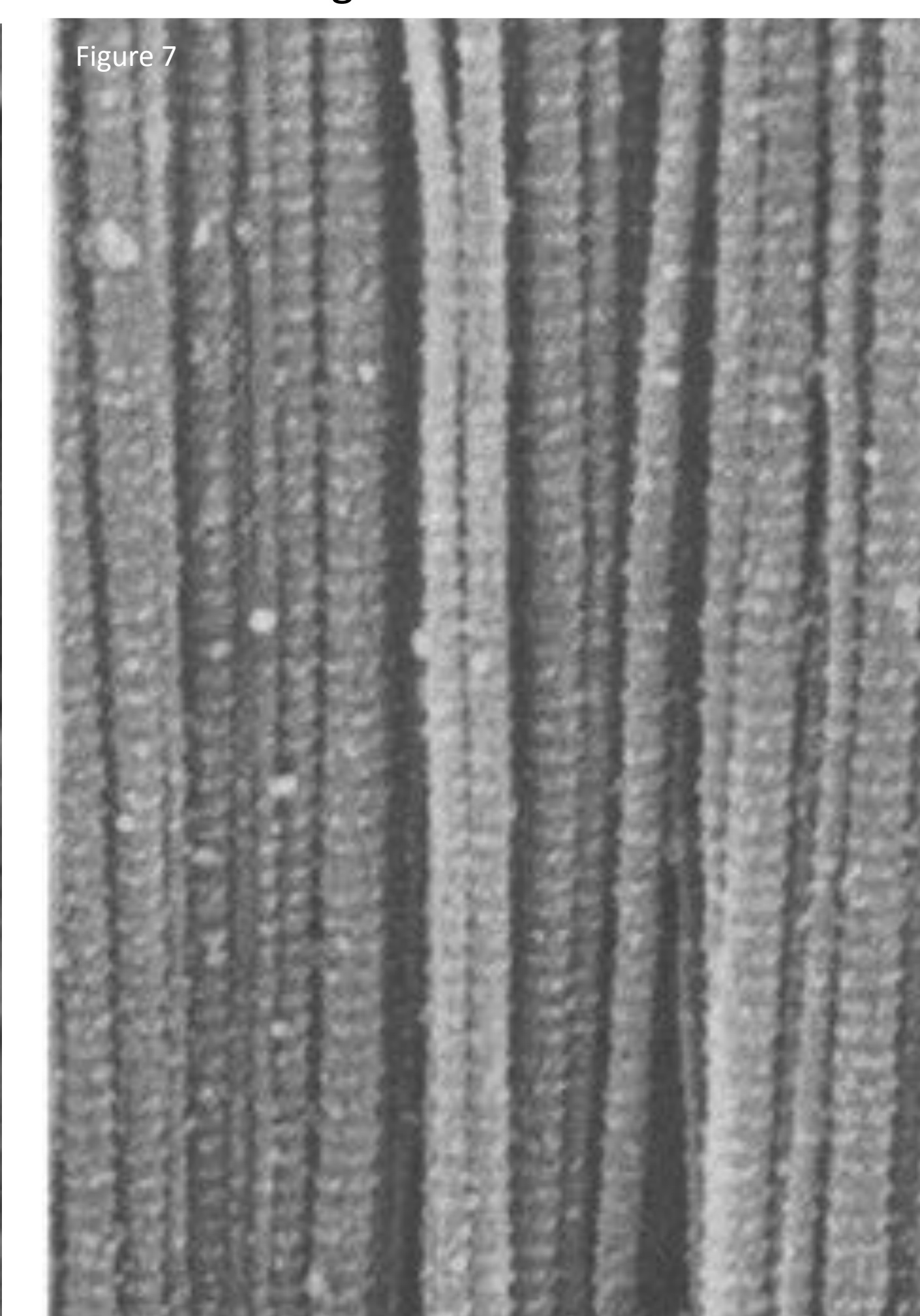


Figure 7: Achilles tendon specimens from 77-to 80-yr-old individuals were incubated with mAb-IH and examined by SEM<sup>5</sup>

## Methods

The procedure included the application of an umbilical cord tissue matrix, also known as Wharton's Jelly, extracorporeal pulse-activated therapy (EPAT), and class IV laser therapy. At the initial visit, 2cc of CryoText, a minimally manipulated umbilical cord tissue allograft, was thawed as per laboratory guidelines in a 35-degree bath and transplanted along the at the Achilles insertion to the calcaneus, right foot, intratendinously and beneath the paratenon using MyLab 15.0 M Hz real-time diagnostic ultrasound guidance with a 4cm transducer head (figures 1, 2, 3). The patient was prepped with a standard sterile technique, careful to block local outside the area of the allograft.. The allograft was strategically placed throughout the inflamed tissues. Before the application, the patient received EPAT at 11Hrtz, 1.4 bars, for 3521 pulses and then scheduled twice weekly for class IV laser treatments times three weeks providing photobiomodulation, (shown to increase microcirculation and ATP production and lower inflammatory markers) The patient was instructed to refrain from high-impact activity and fitted with a prefabricated pneumatic boot<sup>4</sup> to wear for two weeks.

## Results

The patient began treatment on 3/21/2023, reporting VAS pain level of 10/10. Upon follow-up examination on week 5 (4/25/2023), the patient reported a 50% improvement in functionality with VAS pain level of 2/10, noting most residual pain presented in the mornings. At the final exam on week 13 (6/20/2023), the patient reported VAS pain level of 0/10. Her only complaint being that the two weeks wearing the pneumatic boot caused acute hip pain. The patient will be tracked for any recurrence of pain over the next six months.

## Conclusion

These preliminary observations on using umbilical cord structural tissue allografts as a tissue supplementation precisely placed with real time ultrasonography, in combination with EPAT and class IV laser therapy, show promising improvement in patient-reported pain and functionality. The results align with the positive results in other literature regarding each separate element used in the care procedure as stand-alone applications. Future research will further evaluate the efficacy and safety of Wharton's jelly alongside EPAT and class IV laser therapies and assist in defining dosage protocols.

## Resources

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