Umbilical Cord Connective Tissue Allograft Applications with EPAT and Class IV Lasers for Defects of the Plantar Fascia: A Retrospective Case Series

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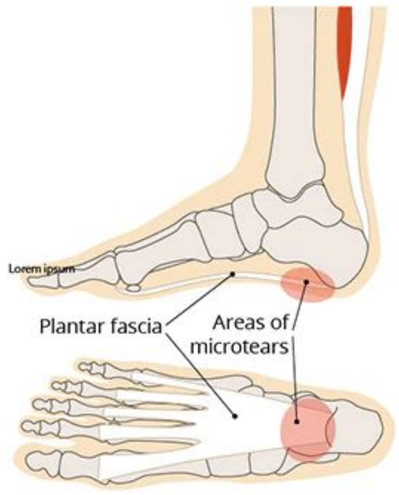
Background

Nearly one in ten people will experience plantar fasciopathy in their lifetime [1]. Several diverse pathologies, including neurologic, arthritic, traumatic, neoplastic, infectious, or vascular, may lead to plantar enthesopathy [2]. Chronic enthesopathy experienced in the plantar aspect of the foot may be Plantar Fasciosis (PF). Risk factors often include excessive running, high arch, obesity, and a sedentary lifestyle [3].

Standard-of-care treatment options for plantar fasciosis include corticosteroid injections, NSAIDs, night splints, taping, stretching, exercise, foot orthosis, and extracorporeal shock wave therapy [5]. While surgical interventions have shown some success, the removal of greater than 40% of the plantar fascia may have detrimental effects on other ligamentous and bony structures in the foot [6]. With the increased risk of detrimental effects after surgery and a potential increase in pain, there is a clear need for additional treatment options.

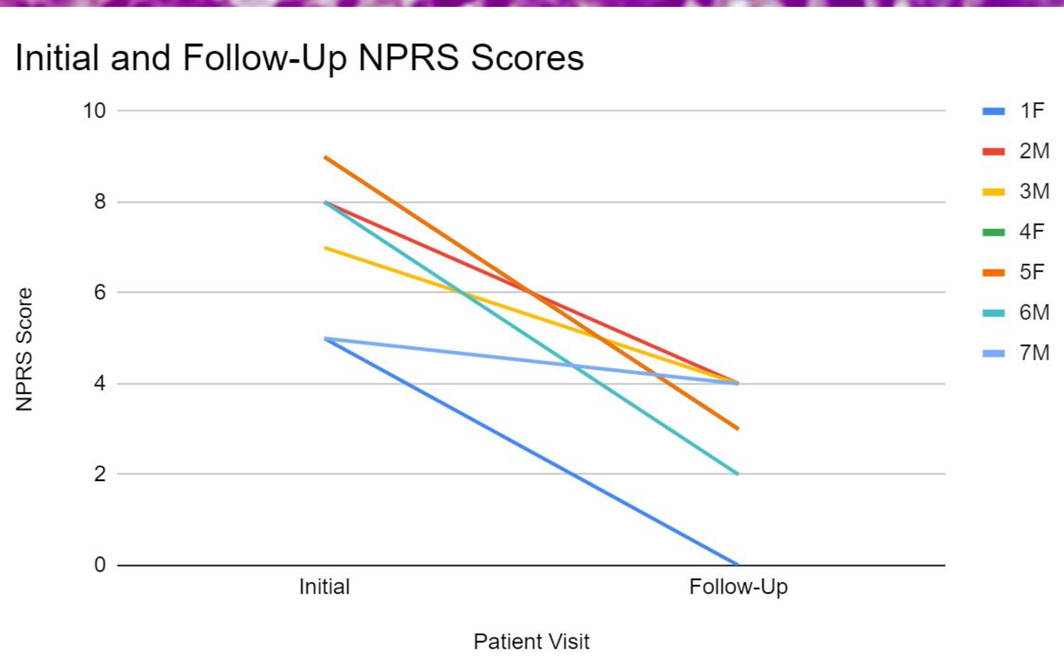
Wharton's Jelly (WJ), a loose connective tissue found in the umbilical cord, has literature to support its use to supplement damaged connective tissue. This retrospective report presents WJ supplementation of the plantar fascia alongside other conservative care practices, shockwave therapy, and class IV lasers to minimize the negative symptoms of plantar fasciosis.



Methods

This study included seven consenting individuals who presented with either left or right plantar fasciosis and had ultrasound evidence of structural tendon damage. All individuals had previously exhausted standard-of-care treatment options. The cohort is 57% males and 43% females aged from 47 to 66- years- old. Each individual received a single application of 1cc CryoPlus, class IV laser therapy, extracorporeal pulse-activated therapy (EPAT), and a boot. After the initial application, all individuals were assessed at a follow-up visit an average of 11 weeks later to evaluate pain improvement and to ensure no adverse side effects. This series aims to present progress in patient-reported pain scales after the application of WJ to the site of tissue defect, including laser therapy, EPAT, and a pneumatic boot.

Before applying the tissue allograft, most patients received EPAT at 11 Hrtz, 3.0 bars, and 3231 to 3432 pulses to the affected tissue. One patient received EPAT at 11 Hrtz, 1.4 bars, and 3532 pulses. The WJ product used in this study was 1cc of CryoPlus, a minimally manipulated tissue allograft containing 75mg of WJ tissue per 1 mL. The allograft was transplanted along the plantar medial origin of plantar fascia throughout the inflamed tissues utilizing MyLab 15.0 MHz real-time diagnostic ultrasound guidance with a 4 cm transducer head. Further “needling” in a pin-cushion technique with a 22 gauge needle was performed to encourage neovascularization. The patients received class IV laser treatments twice a week for two weeks.



Results

The sample's initial average visual analog scale (VAS) score was 6.88. With a 50% improvement, the final average VAS score was 3.44. When comparing gender improvement, females reported a slightly greater improvement with an average initial VAS of 7.66 and a final VAS of 2, which improved 74%. In comparison, males had an average initial VAS of 7 and a final VAS of 3.5, improving 50%. All patented reported a decrease in VAS, equating to a decrease in pain. No patients reported adverse reactions to any applications.

Conclusion

The results show significant improvement in pain relief after utilizing umbilical cord tissue allografts in combination with laser therapy, EPAT, and a boot. The umbilical cord tissue allografts applied in a homologous fashion function as a scaffolding matrix to supply structural support to the damaged fascia tissue. EPAT application functions to agitate the fascia which increases blood flow and stimulates the body's healing processes [8]. High-intensity laser therapy (HILT) decreases erythrocyte deformability and platelet coagulation, resulting in membrane revitalization, viscosity reduction, and erythrocyte stress adaptation [10]. The function of the boot application is to restrict and limit motion, provide stabilization, immobilize, and add compression to the affected area. The success of this preliminary data prompts further randomized control trials to compare this alternative protocol with the current non-surgical standard of care options. Future implications for the use of WJ in conjunction with standard care practices could greatly improve patient outcomes and potentially prevent or postpone invasive surgical procedures in many musculoskeletal defects.

Resources

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