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Case Study

The Use of Platelet Rich Plasma in a Patient with Severe Osteoarthritis of the Talocrural Joint: A Case Study

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Abstract

Purpose: The purpose of this case study is to demonstrate the efficacy of PRP in a patient with chronic pain and joint degeneration for whom conventional medicines were not helpful. PRP has shown to be a very effective modality for inflammation reduction in many tissue types over the past twenty years.

Methods: Physical Therapy treatment progression demonstrates the need for multiple interventions due to the patient's physical deficits.

Results: The results are divided into four categories: AROM, Pain, Lower Extremity Functional Index score, and radiographic findings with significant improvements in all four categories.

Conclusion: The patient's improvement was remarkable due to the administration of PRP, as this amount of improvement is typically not seen with just conventional Physical Therapy alone.

Keywords: *Platelet Rich Plasma; Talocrural Joint; Osteoarthritis*

Introduction and Case Study

This case study involves a 59-year-old female with a history of ORIF to the left fibula with multiple fractures involving some of the left tarsals 30 years previous. She received 30 Physical Therapy treatments over eight and a half consecutive months with a treatment averaging every 7.8 days. The initial radiograph (Figure 1) was remarkable for talocrural and subtalar articular cartilage degeneration. The patient used collagen powder daily throughout the rehabilitation program. Physical Therapy treatments commenced 55 days (8 sessions) prior to the PRP injection to facilitate improved joint capsule pliability and volume, along with improved AROM (treatment described in Methods). She then received PRP intraarticularly to her left talocrural and calcaneocuboid joints from another provider with this physical therapist performing joint distraction to the aforementioned joints during the intraarticular PRP injections.

Platelet-rich plasma (PRP) is a preparation of autologous human plasma with a high platelet concentration that is produced by centrifuging several milliliters to upwards of ten milliliters of the patient's own blood. Platelets contain a wide variety of growth factors and healing mediators, that become highly concentrated through the centrifugation process. The plasma is then aspirated via hypodermic syringe and injected into the inflamed tissue or joint, which releases copious amounts of these growth factors and healing mediators to the inflamed tissue, thus beginning the natural healing process [1-10].

Gato-Calvo L., *et al*. in their randomized or quasi-randomized clinical trials from five recent meta-analyses and systematic reviews concluded the efficacy of PRP products over other intraarticular treatments (mostly hyaluronic acid), particularly in terms of pain improvement up to one year [12]. More specifically, Guney A., *et al*. research demonstrated that PRP, in combination with arthroscopic microfracture surgery for the treatment of talar osteochondral lesion, resulted in improved functional score status over an average follow up time of 16.2 months [13]. Numerous authors [14-18] have investigated PRP's efficacy when used intraarticularly in the ankle joint compared with hyaluronic acid and corticosteroids.

Methods

The patient underwent a physical therapy evaluation of her left foot and ankle nearly eight weeks (8 sessions) before receiving PRP to her left talocrural and calcaneocuboid joints This time lapse from initial evaluation to PRP injections was to allow for improving joint spacing to facilitate the efficacy of the PRP injections. Significant findings: talocrural and calcaneocuboid joints were moderately hypomobile, AROM of ankle in sagittal plane 21.4 degrees, numeric pain rating scale (NPRS) 4/10, and Lower Extremity Functional Index (LEFI) 35/80, and significant loss of joint space in the left talocrural joint with Kellgren and Lawrence system for classification of osteoarthritis at a grade four.

The patient received thirty (30) physical therapy treatments over a contiguous period of approximately 8.5 months with a treatment averaging every 7.8 days. Physical therapy treatments consisted of:

1. Home exercise program [11]: AROM exercises to help enable return to barrel racing to get her left heel down in the stirrup.

2. Grade 3-4 joint mobilizations:

- Left talocrural joint- Distraction, anterior, and posterior glides,
- Left talocalcaneal joint- Distraction, medial, and lateral glides,
- Left calcaneocuboid joint- Anterior and posterior glides,
- Left talonavicular joint- Anterior and posterior glides.

3. Myofascial release circumferentially to left lower leg.

4. Far infrared to L ankle and foot.

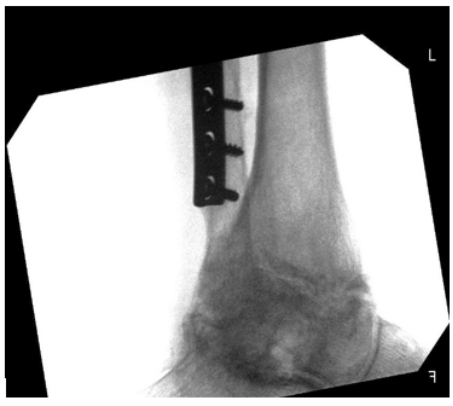

Figure 1

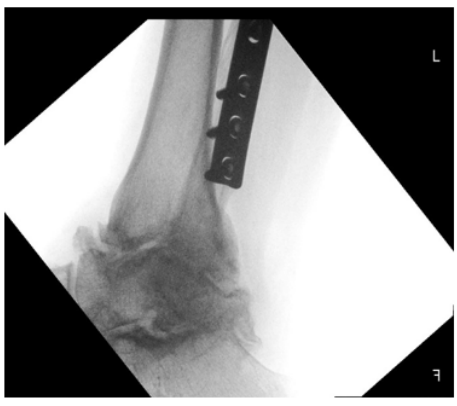

Figure 2

Results

- **Active range of motion (AROM):** Her left ankle AROM in the sagittal plane improved from an initial 21.4 degrees to 43.9 degrees (105% improvement) with measurements taken with a digital goniometer for higher precision measurements.
- **Numeric pain rating scale (NPRS**): Initially 4/10 and 6-months post PRP 2/10, representing a 50% reduction in subjective pain rating.
- **Lower extremity functional index (LEFI):** Initially 35/80 and 6-months post PRP 54/80, a 54% subjective functional improvement (19 scale points) in ADL performance. The minimal clinically important difference is 9 scale points [19] (Author's note- 80/80 score represents subjectively normal functioning).
- **Radiographic findings**: Figure 2 represents significant improvement in chondral surface inflammation 6 months post PRP at the talocrural joint compared to Figure 1 (taken prior to PRP and physical therapy treatments). Also note the improved talocrural joint spacing as a result of joint mobilizations in Figure 2 compared to Figure 1.

Conclusion

In this case study, the use of PRP made a significant difference in the rehabilitation outcome that in this author's experience (nearly 40 years), is not seen in patients with similar symptoms and physical findings. The patient's significant improvement in subjective ratings, AROM gains, and radiographic findings demonstrates that conventional physical therapy alone would not have offered similar results. There is a dearth of research on the use of PRP in talocrural joint arthropathy, thus it is hoped that this paper will bring to a stronger light the efficacy of PRP with arthropathy in this anatomical region.

Further research is recommended on the use of PRP with degenerative joint disease (DJD), to help define precise dosage of plasma and investigate its use in acute injuries to help mitigate symptoms and shorten the rehabilitation phase of musculoskeletal dysfunctions.

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