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Research Article

World's First Human Case of Significant Dupuytren's Contracture Resolution Two Years Post Single Platelet-Rich Plasma Injection

Hassan Mubark[1*]

[1]Rheumatologist, Auckland Regenerative Clinic, Ormiston Specialist Centre, 125 Ormiston Road, Flat Bush, Auckland 2019, New Zealand

***Correspondence author:** Hassan Mubark, Rheumatologist, Auckland Regenerative Clinic, Ormiston Specialist Centre, 125 Ormiston Road, Flat Bush, Auckland 2019, New Zealand; Email: drhassnmubark@gmail.com

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Abstract

Dupuytren's contracture is a progressive fibroproliferative condition affecting the palmar fascia, often leading to hand dysfunction. Management ranges from conservative observation to corticosteroid or collagenase injections and ultimately surgery for advanced stages. This case presents the world's first documented human report of a middle-aged woman with early-stage Dupuytren's contracture who demonstrated significant and sustained resolution two years after a single ultrasound-guided injection of autologous Platelet-Rich Plasma (PRP). The patient had previously undergone surgical fasciectomy on the contralateral hand with residual numbness. PRP was injected directly into the pathological cords under local anaesthesia. At nine months post-injection, near-complete functional recovery was noted and at the two-year mark, the patient remained symptom-free without recurrence. This case introduces PRP as a novel, non-surgical, regenerative option for early Dupuytren's disease, warranting further investigation in controlled clinical studies.

Keywords: Dupuytren's Contracture; Platelet-Rich Plasma; PRP; Regenerative Medicine; Ultrasound-Guided Injection; Fibromatosis

Introduction

Dupuytren's Contracture (DC) is a chronic fibroproliferative disorder of the palmar fascia, characterized by progressive thickening and shortening of fibrous tissue that leads to flexion deformities of the fingers, particularly the ring and little fingers. The disease predominantly affects men between ages 40 and 80, but women may also be affected. Known risk factors include genetic predisposition, diabetes mellitus, alcohol use, smoking, epilepsy treatment and repetitive manual labour [1,2].

Current treatment strategies vary with disease severity. Early disease is often monitored or treated conservatively with splinting and physiotherapy. More established cases may be managed with corticosteroid injections, Collagenase Clostridium Histolyticum (CCH) enzymatic fasciotomy, needle aponeurotomy or surgical fasciectomy [3-5]. Each approach has its limitations-ranging from high recurrence rates to complications such as digital nerve damage, tendon rupture and prolonged rehabilitation. Recently, interest has grown in regenerative therapies such as Platelet-Rich Plasma (PRP), due to its ability to modulate inflammation and fibrosis. PRP contains a concentrated mix of autologous growth factors that may influence fibroblast activity and matrix remodelling, potentially altering disease progression [6-8].

Case Report

A right-handed woman in her late 50s presented with clinically evident grade 1 Dupuytren's Contracture (DC) affecting the left ring and little fingers, associated with palpable cords and minor functional impairment, confirmed by office-based ultrasound. Concurrently, she demonstrated signs of right thumb flexor tenosynovitis. She had previously undergone surgical fasciectomy for DC in her right hand five years earlier, which resulted in residual digital numbness and a slow recovery. Eager to avoid further surgery, she sought a less invasive option.

After providing informed consent, the patient elected to receive Platelet-Rich Plasma (PRP) therapy as a novel regenerative treatment. A total of 30 mL of peripheral blood was drawn and anticoagulated with ACD-A. The sample was processed using an 8-minute centrifugation protocol, for the Dupuytren's contracture we used total of 4.5 mL of leukocyte-poor PRP Under sterile conditions and ultrasound guidance, 2 mL was injected into the nodule of the left little finger and 2.5 mL into the left ring finger nodule, as shown in Fig. 1. PRP was precisely injected into the palpable nodular cords of the left palm and involved fingers, as demonstrated in the live procedure (Video 1). Correct placement within the cords was confirmed via ultrasound (Video 2). Simultaneously, 2 mL of PRP was injected into the symptomatic flexor tendon sheath of the right thumb under ultrasound guidance using a sterile technique. At one-month post-injection, she reported initial improvement in hand function. Over the following months, she experienced ongoing gradual improvement, culminating by nine months in nearly complete resolution of the contracture, full finger extension, normalization of palm contour and disappearance of nodules. Although the site of the Dupuytren's contracture remained faintly thick on palpation, they were no longer visible or functionally restrictive. At her two-year follow-up, she remained symptom-free, with continued improvement and no signs of recurrence or adverse effects (Fig. 2).

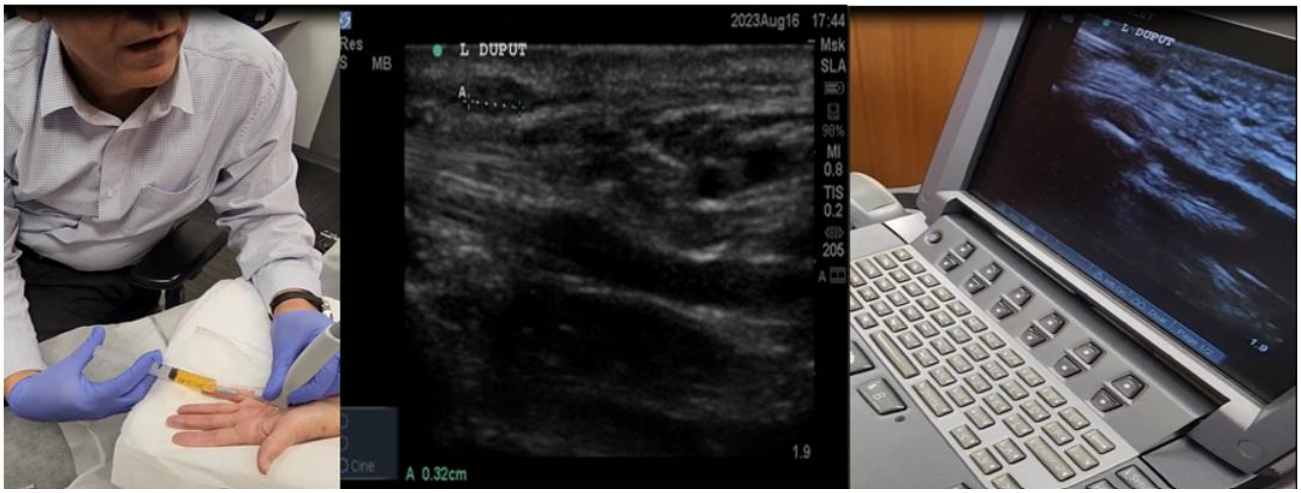

Figure 1: Shows PRP is injected into the Dupuytren's cords under ultrasound guidance.

Figure 2: Demonstrate marked improvement in Dupuytren's contracture following Platelet-Rich Plasma (PRP) therapy, as seen in the comparison of pre- and post-treatment images.

Discussion

This is the first published *in-vivo* human case showing long-term resolution of early-stage Dupuytren's contracture after a single PRP injection, with complete clinical remission sustained for two years. The lasting improvement observed highlights the potential disease-modifying effects of PRP.

Pre-clinical *in-vitro* and animal studies on Dupuytren's disease tissue cells, called myofibroblasts, in laboratory dishes to better understand how the disease works. These cells are responsible for making the hand tissue stiff and causing the fingers to bend. In these studies, researchers test different treatments such as PRP, stem cells or medicines to see if they can stop the cells from making the tissue tight. Some treatments can even help turn the myofibroblasts into softer, fat-like cells that do not cause stiffness [10].

The biological mechanism may be linked to PRP's anti-fibrotic effects. TGF-β1, a central cytokine in myofibroblast activation and collagen deposition, is downregulated in PRP-treated tissues [6,9]. Additionally, PRP contains BMP-4 and BMP-7, which have been shown in preclinical models to facilitate the reversion of myofibroblasts into less fibrotic phenotypes or adipocyte-like cells-a process potentially beneficial in reversing palmar fibromatosis [11,12].

Beyond PRP, Mesenchymal Stem Cell (MSC) therapy, particularly Adipose-Derived Stem Cells (ADSCs), has emerged as a promising adjunct or standalone regenerative approach in fibrotic conditions, including Dupuytren's disease. ADSCs possess potent anti-fibrotic, anti-inflammatory and immunomodulatory effects and have been shown to reduce myofibroblast activity and modulate extracellular matrix remodelling [13-15]. When combined with PRP, the regenerative synergy between stem cells and growth factors may enhance tissue remodelling and accelerate functional recovery.

Stem cell therapy combined with PRP could theoretically offer superior outcomes compared to PRP alone, especially in recurrent or more established nodular disease. However, the major limitation remains cost and access-expanded autologous stem cell therapies are significantly more expensive and are not widely available in many clinical settings due to regulatory and logistical barriers.

In this case, PRP alone resulted in sustained resolution, suggesting that for early-stage disease, PRP may suffice as a cost-effective, low-risk first-line regenerative option. Nonetheless, stem cell enhanced therapy may be more suitable for complex or refractory presentations and further comparative studies are needed to define the role of each modality. Surgical management, while effective for severe deformities, carries considerable risks, cost and a substantial recurrence rate (up to 50% in some reports) [5]. Collagenase injection offers a less invasive approach but has been suspended in several markets and may not be universally available or affordable. Compared to these options, PRP represents a low-risk, autologous, point-of-care therapy that could intervene early in the disease course, potentially preventing the need for surgery altogether.

Though limited to a single case, these findings offer a compelling rationale for larger prospective trials to evaluate PRP's efficacy and long-term benefits in Dupuytren's contracture. Standardization of PRP protocols (e.g., cellular composition, dosing and delivery technique) and better identification of candidates (e.g., early nodular stage) will be essential for future clinical translation.

Conclusion

This pioneering case highlights platelet-rich plasma as a safe, effective regenerative treatment for early Dupuytren's contracture, demonstrating complete and sustained resolution two years after a single injection. These results support the need for further studies to validate PRP as a potential disease-modifying therapy in early-stage fibromatosis.

Conflict of Interests

The author declares no conflict of interest.

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