Novel Techniques in Arthritis & Bone Research
ISSN: 2575-8888

Juniper Publishers
key to the Researchers

Opinion
Volume 2 Issue 1 – September 2017
DOI: 10.19080/NTAB.2017.02.555577

Nov Tech Arthritis Bone Res

The Effects of Platelet-Rich Plasma Injections on Bone Injuries

Jayenth Mayur, Maximilian Muñoz, Anthony Lin and Sheldon Lin*

Rutgers New Jersey Medical School, Newark, USA

Submission: September 12, 2017; **Published:** September 18, 2017

***Corresponding author:** Sheldon Lin, Rutgers New Jersey Medical School, Newark, USA, Email: linss@njms.rutgers.edu

Opinion

Musculoskeletal injuries treated via surgery have the risk of developing complications and infection. As a result, minimally invasive platelet-rich plasma (PRP) injections are garnering increased attention in the treatment of bone pathologies. PRP is a potent, autologous growth factor therapy with a platelet concentration greater than that of whole blood [1]. An increased platelet concentration at the site of injury is advantageous in bone healing because platelets secrete growth factors and cytokines that induce mitosis, angiogenesis, and tissue formation [2].

Preparation of PRP occurs by centrifugation and separation techniques [3]. While the preparation method is similar amongst PRP samples, the exact components of PRP vary due to its autologous nature and the frequent addition of calcium chloride or thrombin for accelerated platelet activation [3]. Innate differences in PRP composition make it difficult to generalize about PRP in literature. Nevertheless, for this review, select meta-analyses were chosen which demonstrate PRP's effectiveness in treating knee osteoarthritis and tendinopathies.

Dai et al. [4] is a meta-analysis consisting of 10 level 1 studies evaluating the efficacy and safety of PRP injections on knee osteoarthritis. A common outcome parameter amongst the studies was chosen for comparison: Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) for pain and function. At 12 months post-injection, PRP had significantly better pain relief and function than hyaluronic acid (HA) injections ($p = 0.01$). At 6 and 12 months post-injection, PRP had significantly improved pain relief and function than saline injections ($p < 0.00001$ at both time points). PRP injections did not increase the risk of adverse events compared to either HA or saline injections.

Andia et al. [5] included 13 prospective, controlled studies to determine the efficacy of PRP injections on tendinopathies. Pain was the common parameter amongst the studies evaluated using the Visual Analogue Scale (VAS). 12 of the 13 studies used leukocyte-rich PRP (LR-PRP). PRP showed a significant pain reduction at 3 months [Weighted Mean Difference (WMD) 95% CI, −0.61 (−0.97, −0.25)] and 1 year [WMD 95% CI, −1.56 (−2.27, −0.83)] post-injection compared to controls. Additionally, no adverse effects due to PRP injections were reported.

Fitzpatrick et al. [6], a meta-analysis of 18 studies, evaluated the effectiveness of specific PRP compositions on tendinopathies based on their abilities to alleviate pain. Tendinopathies included in the meta-analysis were Achilles, tennis elbow, patellar, and rotator cuff. PRP compositions included LR-PRP, leukocyte-poor PRP (LP-PRP), and leukocyte-poor platelet-poor plasma (ACP). LR-PRP showed the strongest effects in reducing pain compared to the other PRPs. Furthermore, a single PRP injection using ultrasound guidance was determined to be most effective compared to multiple PRP injections.

Though a single PRP preparation has not been conclusively determined as optimal, many different PRP preparations can be used clinically due to the FDA's exemption of autologously derived products from regulation [7]. Additionally, several preparation kits with different platelet recovery capacities continue to enter the market via the FDA's 510(k) application [7]. The evidence for platelet-rich plasma as a therapeutic agent in bone pathologies is growing, but more level I studies and meta-analyses are needed to compare the efficacies of different PRP formulations [1].

References

1. Navani A, Li G, Chrystal J (2017) Platelet Rich Plasma in Musculoskeletal Pathology: A Necessary Rescue or a Lost Cause? Pain Physician 20(3): e345-e356.
2. Xie X, Zhang C, Tuan RS (2014) Biology of platelet-rich plasma and its clinical application in cartilage repair. Arthritis Research & Therapy 16(1): 204-218.
3. Dhurat R, Sukesh M (2014) Principles and methods of preparation of platelet-rich plasma: A review and author's perspective. J Cutan Aesthet Surg 7(4): 189-197.

4. Dai W-L, Zhou A-G, Zhang H, Zhang J (2017) Efficacy of Platelet-Rich Plasma in the Treatment of Knee Osteoarthritis: A Meta-analysis of Randomized Controlled Trials. Arthroscopy 33(3): 659-670.

5. Andia I, Latorre PM, Gomez MC, Burgos-Alonso N, Abate M, et al. (2014) Platelet-rich plasma in the conservative treatment of painful tendinopathy: a systematic review and meta-analysis of controlled studies. British Medical Bulletin 110(1): 99-115.

6. Fitzpatrick J, Bulsara M, Zheng MH (2016) The Effectiveness of Platelet-Rich Plasma in the Treatment of Tendinopathy: A Meta-analysis of Randomized Controlled Clinical Trials. Am J Sports Med 45(1): 226-233.

7. Beitzel K, Allen D, Apostolakos J, Russell RP, McCarthy MB, et al. (2015) US Definitions, Current Use, and FDA Stance on Use of Platelet-Rich Plasma in Sports Medicine. J Knee Surg 28(1): 29-34.

DOI: 10.19080/NTAB.2017.02.555577

How to cite this article: Jayenth M, Maximilian M, Anthony L, Sheldon L. The Effects of Platelet-Rich Plasma Injections on Bone Injuries. Nov Tech Arthritis Bone Res. 2017; 2(1) : 555577. DOI: 10.19080/NTAB.2017.02.555577