Effects of platelet-rich plasma in supraspinatus tendinopathy

Supraspinus tendinopathy is a common and perplexing problem in current clinical practice. It is one of the most common reason that patients seek medical attention accounts for patient visits to a medical practitioner.[1] The most common reason for the supraspinatus tendinopathy is overuse injuries in sports as well as in jobs that require repetitive activity.[2-5] Shoulder impingement is one of the most common causes of shoulder tendinopathy[6-8] and refers to the compression of the subacromial structures against the coracoacromial ligament during the elevation of the arm.[9] Excessive mechanical loading is considered the major causation factor. However, tendon problems are very frequent, and no clinical guidelines available to manage such problems. Apoptosis,[10] vascular changes[11,12] tears[13] and calcifications[14] of the supraspinatus tendon have been described in subjects who were treated with subacromial decompression.

Although originally considered an inflammatory problem, histopathologic analysis of tendinopathy has revealed evidence that this process is predominantly degenerative and is characterized by hypercellularity, vascular hyperplasia, and collagen disorganization. Since tendinopathy is primarily a degenerative condition, several new treatments have been developed in an attempt to stimulate tissue regeneration. One of these treatments is an injection of platelet-rich plasma (PRP). The use of autologous growth factors in the form of PRP may be just the beginning of a new medical frontier known as "orthobiologics." PRP is a new technology focused on enhancing the healing response after injury of different tissue types.[15,16]

In tendinopathy, changes in the composition of the tendinous matrix are in part mediated by inflammatory mediators and metalloproteinase enzymes and are consistent with changes in cell-mediated matrix remodeling, which precedes the onset of clinical symptoms. These biochemical changes around tendon may represent patients whom PRP may be beneficial. However, corticosteroids could mediate their own effect thorough alterations in the release of these harmful chemicals agents, the behavior of their receptors, or both.[17] Essentially, corticosteroid aims to achieve a reduction in inflammation, but a negative effect on neo-vascularization by a general inhibition of protein synthesis.[18] However, the patient who receives PRP may respond better due to the fact that human tenocytes with degenerative lesions showed neo-vascularization and new tenocytes formation.[19,20]

It can also be hypothesized that the PRP can be a good treatment option for the patients with supraspinatous tendinopathy who had involvement of substance of tendon and needed regeneration of the tendon.

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References

1. Järvinen M. Epidemiology of tendon injuries in sports. Clin Sports Med 1992;11:493-504.
2. Camargo PR, Haik MN, Ludewig PM, Filho RB, Mattiello-Rosa SM, Salvini TF. Effects of strengthening and stretching exercises applied during working hours on pain and physical impairment in workers with subacromial impingement syndrome. Physiother Theory Pract 2009;25:463-75.
3. Cools AM, Declercq G, Cagnie B, Cambier D, Witvrouw E. Internal impingement in the tennis player: Rehabilitation guidelines. Br J Sports Med 2008;42:165-71.
4. Martins LV, Marziale MH. Assessment of proprioceptive exercises in the treatment of rotator cuff disorders in nursing professionals: A randomized controlled clinical trial. Rev Bras Fisioter 2012;16:502-9.
5. Marcondes FB, de Jesus JF, Bryk FF, de Vasconcelos RA, Fukuda TY. Posterior shoulder tightness and rotator cuff strength assessments in painful shoulders of amateur tennis players. Braz J Phys Ther 2013;17:185-94.
6. Burke WS, Vangsness CT, Powers CM. Strengthening the supraspinatus: A clinical and biomechanical review. Clin Orthop Relat Res 2002;402:292-8.
7. Littlewood C. Contractile dysfunction of the shoulder (rotator cuff tendinopathy): An overview. J Man Manip Ther 2012;20:209-13.
8. Lewis JS. Rotator cuff tendinopathy/subacromial impingement syndrome: Is it time for a new method of assessment? Br J Sports Med 2009;43:259-64.
9. Neer CS 2nd. Anterior acromioplasty for the chronic impingement syndrome in the shoulder: A preliminary report. J Bone Joint Surg Am 1972;54:41-50.
10. Tuoheti Y, Itoi E, Pradhan RL, Wakabayashi I, Takahashi S, Minagawa H, *et al.* Apoptosis in the supraspinatus tendon with stage II subacromial impingement. J Shoulder Elbow Surg 2005;14:535-41.
11. Carr A, Harvie P. Rotator cuff tendinopathy. In: Maffulli N, Renström P, Leadbetter WB, editors. Tendon Injuries: Basic Science and Clinical Medicine. London: Springer; 2005. p. 101-18.
12. Biberthaler P, Wiedemann E, Nerlich A, Kettler M, Mussack T, Deckelmann S, *et al.* Microcirculation associated with degenerative rotator cuff lesions. *In vivo* assessment with orthogonal polarization spectral imaging during arthroscopy of the shoulder. J Bone Joint Surg Am 2003;85-A:475-80.
13. Bunker T. Rotator cuff disease. Curr Orthop 2002;16:223-33.
14. Hughes PJ, Bolton-Maggs B. Calcifying tendonitis. Curr Orthop 2002;16:389-94.

15. Kraushaar BS, Nirschl RP. Tendinosis of the elbow (tennis elbow). Clinical features and findings of histological, immunohistochemical, and electron microscopy studies. J Bone Joint Surg Am 1999;81:259-78.
16. Eppley BL, Woodell JE, Higgins J. Platelet quantification and growth factor analysis from platelet-rich plasma: Implications for wound healing. Plast Reconstr Surg 2004;114:1502-8.
17. Fredberg U, Stengaard-Pedersen K. Chronic tendinopathy tissue pathology, pain mechanisms, and etiology with a special focus on inflammation. Scand J Med Sci Sports 2008;18:3-15.
18. Fredberg U, Bolvig L, Pfeiffer-Jensen M, Clemmensen D, Jakobsen BW, Stengaard-Pedersen K. Ultrasonography as a tool for diagnosis, guidance of local steroid injection and together with pressure algometry monitoring of the treatment of athletes with chronic jumper's knee and achilles tendinitis: A randomised, double-blind, placebo-controlled study. Scand J Rheumatol 2004;33:94-101.
19. Hoppe S, Alini M, Benneker LM, Milz S, Boileau P, Zumstein MA. Tenocytes of chronic rotator cuff tendon tears can be stimulated by platelet-released growth factors. J Shoulder Elbow Surg 2013;22:340-9.
20. Jo CH, Kim JE, Yoon KS, Shin S. Platelet-rich plasma stimulates cell proliferation and enhances matrix gene expression and synthesis in tenocytes from human rotator cuff tendons with degenerative tears. Am J Sports Med 2012;40:1035-45.

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