

Platelet-rich plasma (PRP) to treat chronic patellar tendinopathies: comparison of a single *versus* two closely-timed injections

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Dear Editor,

we have read with attention the article by Zayni et al.¹ comparing the effect of 1 or 2 weekly PRP injection(s) whose conclusions are opposed to the findings of our previously published study². Indeed, they observed that 2 injections lead to better results than only 1, but our data suggested that a single injection is sufficient to obtain the same results. The populations in the 2 studies seem to be not exactly similar at baseline, but perhaps the number of injections should be tailored to severity. However this statement must still to be demonstrated. Beside the number of injections, other differences are observed in the experimental protocol. Zayni et al. used the ACP system which expect to produce a PRP with platelet concentration twice as high as in whole blood and without leukocytes. The PRP in our study was obtained using an apheresis machine capable of extracting a reproducible platelet concentration of 850,000 units/microlitre (+/- 4 times as high as whole blood) and without white or red cells. The number of platelets obtained in the injected PRP is very important. Indeed, platelet secretome is composed of hundreds of molecules, and on the basis of α granule content, PRP platelets contain proteins with opposing activities: coagulation factors and anticoagulants; proteins that encourage and those that discourage angiogenesis; and proteases and their inhibitors. Thus to standardize and to understand

the efficacy of the PRP³, it could be helpful to have exactly the same platelet concentration, as obtained with the aphaeresis machine, but not with the ACP system.

The injection method (under ultrasound guidance) was comparable in both studies but the platelet activation by CaCl_2 , to activate the platelets, leading to their degranulation, was triggered only in ours.

Despite both studies prescribed an eccentric rehabilitation protocol⁴, the starting points differed: Zayni et al. recommended to wait a period of 2 weeks while we started it as soon as the painful period was finished. Finally, the best obtained results were similar in the 2 reports, with a 2 years follow-up in the Zayni et al. series and 1 year in our study.

Zayni et al. protocol was based on the preclinical research by Parafioriti et al.⁵ who observed in the rat model that a single PRP injection in Achilles tendon tear had a limited effectiveness and its effect dissipates after one week. However, our preclinical study on rats showed that PRP injection not only leads to a better early enhancement of the healing process but also to a better tendon structure up to 1 month after injection⁶.

From this comparison, it seems that the key factor to a successful healing is the platelets concentration. Indeed, since our best results are comparable to Zayni's, a platelet concentration 4 times as high as whole blood is needed, either in one or multiple injections. The apheresis machine also enables the reproducibility of the PRP preparation⁷, producing every time the same platelet concentration, whatever the patient whole blood initial concentration. This is not true for the ACP system, for which the platelet concentration varies with respect to its natural concentration in the patients' whole blood, as demonstrated by the analysis of similar PRP preparation techniques^{8,9}. Furthermore, the multiplication of injections increases the risk of complications, the treatment price and the patient discomfort, having to go multiple times to the doctor or hospital¹⁰.

In conclusion, the number of injections of PRP needed to obtain good clinical results can vary depending of the quality of the PRP used or, perhaps, of the severity of the tendinopathy. Further well-standardized studies remain necessary, according to the recommendations of the Journal¹¹.

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