

**Rha D-W, Park G-Y, et al. Comparison of the therapeutic effects of ultrasound-guided platelet-rich plasma injection and dry needling in rotator cuff disease: a randomized controlled trial. Clin Rehabil 2013;27:113-122.**

Design: Randomized clinical trial

Study question: In the setting of supraspinatus tendinopathy, does the injection of platelet-rich plasma, compared to dry needling, improve shoulder pain and function?

Population/sample size/setting:

- 39 patients (17 men, 22 women, mean age 53) treated for supraspinatus tendinopathy at a university department of physical medicine in Seoul
- Inclusion criteria were at least 6 months of shoulder pain greater than 5 on a scale of 0-10, painful arc and/or an impingement sign, no weakness on resisted testing of the rotator cuff, diagnosis of supraspinatus tendinosis or partial thickness tear less than 1 cm on sonographic examination, and lack of response to conservative therapy for three months
- Exclusion criteria were fracture, rheumatic disease, or other obvious pathology, referred pain from the neck, prior surgery of the neck or shoulder, NSAID use in the past 2 weeks and/or steroid injection in the past 6 weeks, hypersensitivity to lidocaine, or other unstable medical pathology

Main outcome measures:

- All patients underwent venipuncture and 25 ml of blood was withdrawn from the unaffected arm, and in all patients, real-time ultrasound guidance was used to place a needle into the area of the identified lesion
- Randomization was to dry needling (n=19) or to platelet rich plasma (PRP, n=20), with the syringes covered in both groups to ensure blinding of the patients
- The dry needling group underwent passage of a 25 gauge needle 40 to 50 times into the abnormal part of the tendon under ultrasound guidance
- Both groups returned at 4 weeks for a repeat procedure (PRP or dry needling)
- The PRP group had 3 ml of platelet-rich plasma infiltrated into the region of the tendon under ultrasound guidance
  - o The 25 cc blood sample was first centrifuged at 1600 G in order to remove the red cells; then the remaining plasma was again centrifuged at 2000 G to separate the platelet-rich from the platelet-poor plasma
- After the first injection, both groups were instructed to avoid overhead activities and rounded shoulder posture, and to do passive ROM exercise until the pain had significantly subsided and active exercises could be done with minimal discomfort
- Followup was done immediately after the procedure and again at 2 weeks after the first injection, 2 weeks after the second injection, and again at 3 months and 6 months (not clear if this is after the first or second injection)

- The main outcome was the improvement in the score on the Shoulder Pain and Disability Index (SPADI), but range of motion was also assessed and repeat sonogram was done at the last visit to evaluate tendon healing
  - o Among the 39 patients in the study, there were 15 with partial thickness tears and 24 with tendinosis only
- There was significant loss to followup during the study; 7 patients (4 PRP and 3 dry needling) were lost at the 3 month evaluation, and at 6 months, 2 more patients from the dry needling group were lost, leaving 16 patients in the PRP and 14 in the dry needling group for analysis
- There was improvement in the SPADI scores and in ROM in both groups during followup, with a greater improvement in the PRP group
  - o The baseline SPADI score in the PRP group was 62.3; the scores at 2 weeks were 3 and 6 months were 21.1 and 17.7
  - o The baseline SPADI in the dry needling group was 62.8; the scores at 3 and 6 months were 34.6 and 29.5
- At the final followup, 6 partial thickness tears in the PRP group were again observed with a sonogram, and two had improved to tendinosis; two of the 10 patients with tendinosis had improved to normal tendons
- For the dry needling group, 4 partial tears at baseline were again observed, but none had improved to tendinosis, and 1 of the 10 tendinosis cases had improved to normal tendon

#### Authors' conclusions:

- Both PRP and dry needling had therapeutic benefits from the procedure, but the effect was greater for the PRP group
- However, the benefits observed in the dry needling group could have involved some of the purported benefits of PRP, if the dry needling induced bleeding which could release growth factors which stimulate the healing process
- There was a fairly high attrition rate, which could have been due to the fact that the onset of a therapeutic benefit from PRP or dry needling is slow compared to steroid injection, or due to the unfamiliarity of the patients with the nature of the procedures
- Autologous PRP injections could be safe and useful treatments for tendinosis and partial tears of the rotator cuff, with benefits still present 6 months after treatment

#### Comments:

- Several efforts were made to minimize risk of bias; the syringes were covered to preserve patient blinding and the outcome scores were assessed by a blinded observer, with equal post-procedure interventions in both groups
- The analysis of results is probably adequate, since mixed models are well-suited to longitudinal studies with serial observations of two groups, but the presentation of results appears to be in the form of serial t-tests with Bonferroni corrections for the 5 pairwise comparisons as if the advantages of mixed models had not been fully exploited

- The selection of patients was fairly concise, with sonographic examination to ensure that all patients either had tendinosis only or minimal partial thickness tears
- Both groups had venipuncture to preserve blinding, but it is not clear whether the dry needling group had the same injection technique as the PRP group; a 25 gauge needle was used for the dry needling group and it is not clear that a similar size needle used as part of the PRP kit for the PRP injection
- The attrition was approximately equal between groups, and any biases are not likely to favor the PRP group by a significant amount

Assessment: Adequate for some evidence that in the setting of supraspinatus tendinosis or partial thickness tears less than 1 cm in size, both dry needling and an injection of 3 ml of platelet-rich plasma have clinical benefits lasting up to 6 months, and that the benefits of PRP appear to be greater than those for dry needling