Platelet-Rich Plasma (PRP) To Treat Chronic Proximal Patellar Tendinopathy: Exploring The Effect Of A Second Closely-Timed Infiltration


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Introduction

- **PRP** = new treatment for *chronic* tendinopathies

- **Degranulation ➔** various cytokines and *growth factors* ➔ promote angiogenesis, tissue remodeling and tendon healing

- In vitro and animal experiments ➔ *improve* tendon healing process

- Clinical series = *controversy*

- Studies are difficult to compare, using *different* PRP preparation methods yielding *varying qualities*, various injection methods, and different post-infiltration protocols

Most studies have evaluated the effects of *successive infiltrations*.

However, the multiplication of infiltrations can reasonably be expected to *increase the risks of complications*, and moreover, this treatment can be *expensive*.

For these reasons it seems relevant to **evaluate the relative efficacy of 2 infiltrations of PRP to that of a single treatment**.
Methods

All experimental procedures and protocols used in this investigation were reviewed and approved by the Ethics Committee of the University Hospital of Liège (Belgium).


20 patients (men) with jumper’s knee.

Rebel to conservative treatment (eccentric, ESWT...).

Symptoms for at least 3 months.

Randomized into 2 groups (1 or 2 infiltrations of PRP).
The assessments were made using (before the infiltration of PRP, and at 6 weeks and 3 months after the injection): 

- VAS
- Pressure Algometer
- IKDC and VISA-P
- Isokinetic and Optojump assessments
- US + Doppler

After 1 year, subjects were contacted to define their functional evolution.
PRP obtained using an apheresis machine (COM.TEC).

Platelet concentration: around $9 \times 10^5$ platelets/µL.

300µL of CaCl$_2$ were added to the PRP to activate the platelets.

6mL of PRP were injected into the patellar tendon after disinfection and US tracking, without local anesthetic.

Local cryotherapy immediately following the infiltration.

NSAIDs drugs avoided.
A second infiltration of 6mL of PRP to subjects of Group 2.

After 5 to 7 days ➔ standardized progressive sub-maximal eccentric program (3 times a week).

The angulation and the number of sessions progressively increased (from 60° to 90° and from 5 to 7 sessions of 15 to 20 repetitions respectively).

Electro-stimulation, stretching of the quadriceps, cryotherapy.

Ten minutes of cycloergometer exercise, using low resistance (2 weeks after the second treatment), and proprioception exercises (after 1 month).
Evolution over time for both groups was studied using generalized linear mixed models (GLMM).

Results were considered significant at the level of uncertainty of 5% (p<0.05).

Statistical analyses were conducted using Statistical Analysis System version 9.3 software (SAS Institute).
Results

- Patient age (± 30 y.o.) and duration of symptoms (± 17 months) = similar for both groups (p=0.68).

- Concentration PRP (± 9 x 10^5/µL), with virtually no red (<0.001 x 10^6/µL) nor white cells (<0.001 x 10^3/µL).
No improvements in isokinetic physical performance.

Pain during E30 significantly decreased over the 3-month follow-up period (p=0.027).

No improvements in jumping performances.

No improvements in US findings.
Discussion

- Chronic jumper’s knee (>3 months) unresponsive to conservative management.
  - Including long term eccentric rehabilitation (> 20 sessions) and ESWT.

- Treatments stopped at least 1 month prior to inclusion to avoid bias due to these management strategies.

- Both groups were comparable: subject ages were similar and groups were homogenous for the different parameters studied.
No side effects were reported.

We observed a very **similar significant** improvement in **algofunctional status** (VAS, algometer, IKDC and VISA-P) in both groups as little as **6 weeks** after the infiltration of PRP. This improvement continued up to **1 year** following the procedure.

These results confirm the effectiveness of the algofunctional status after infiltrations of PRP in cases of patellar tendinopathy **whatever the number of infiltrations** (Volpi 2007; Kon 2009; Brown 2010; Filardo 2010 & 2013; Kaux in press).
Following the infiltration of PRP, it is necessary to apply a sub-maximal eccentric load to guide the tendon healing process (Virchenko 2006; Kaux 2013).

Isokinetic and Optojump performances not significantly modified (probably due to the great SD between patients).

Pain during eccentric activity of the quadriceps (the most demanding exercise applied on the patellar tendon) significantly decreased over time in the both groups.
Contrary to other studies (Volpi 2007; Kon 2009; Filardo 2010 & 2013), imaging findings in our study did not show any decrease of the pathological lesion.

As demonstrated, a trend for increased vascularity up to 6 months following PRP infiltration could be observed (Chaudhury 2013). Besides, it is well established that there is a clear delay between clinical observation and imagery findings (Khan 2003).

As the healing process of tendon has not concluded after 3 months, we encouraged patients to continue with the rehabilitation program at home for minimum 12 weeks.
Our study presents some minor limitations:

We compared 2 groups with infiltrations of PRP, but we did not have a real control group. However, the aim was to evaluate outcomes of 1 and 2 infiltrations of PRP, not to compare the effect of PRP against a control group.

As we compared 1 infiltration of PRP to 2 infiltrations 15 days apart, evaluations of Group 2 took place 2 weeks after those of Group 1. However, the evaluation delay after the last infiltration was identical for both groups (6 and 12 weeks).
Conclusion

- A local infiltration of PRP associated with a sub-maximal eccentric protocol is an efficient treatment to improve symptoms of chronic jumper’s knee unresponsive to other conservative treatments.

- However, the application of 1 or 2 infiltrations of PRP did not reveal any difference between the 2 groups after a follow-up period of 3 months and up to 1 year.

- A second closely-timed infiltration of PRP to treat upper patellar tendinopathies does not seem relevant in improving the efficacy of this treatment in the short term.

- A second infiltration should perhaps be envisaged later, but this remains to be demonstrated.
Thank you for your attention!

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