



# Exploring the effect of a second closely-timed infiltration of PRP to treat proximal patellar tendinopathy

Kaux JF, Croisier JL, Forthomme B, Le Goff C, Buhler F, Savanier B, Delcour S, Gothot A, Crielaard JM

Physical Medicine and Sports Traumatology Department  
University and University Hospital of Liège, Belgium

Université  
de Liège



# 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





- **Efficacy** of PRP in the treatment of jumper's knee (Volpi 2007; Kon 2009; Brown 2010; Filardo 2010 & 2013; Andia et al 2014; Kaux et al 2015).
- 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).



● Kaux JF, Forthomme B, Namurois MH et al.

**Description of a standardized rehabilitation program based on sub-maximal eccentric following a platelet-rich plasma infiltration for jumper's knee.**

*Muscles Ligaments Tendons J.* 2014 May 8;4(1):85-9.



● Kaux JF, Croisier JL, Bruyère O et al.

**One injection of platelet-rich plasma associated to a submaximal eccentric protocol to treat chronic jumpers knee.**

*J Sports Med Phys Fitness.* 2014 Jun 19. [Epub ahead of print].

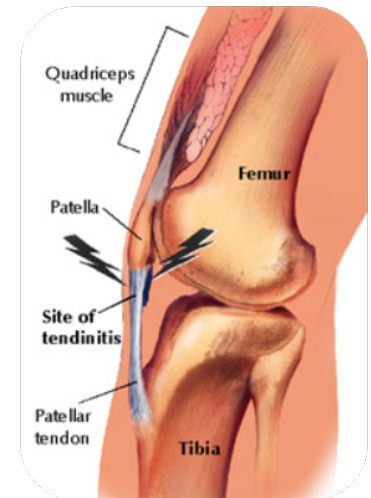
● Kaux JF, Bruyère O, Croisier JL et al.

**One-year follow-up of platelet-rich plasma infiltration to treat chronic upper patellar tendinopathies.**

*Acta Orthop Belg.* 2015 Jun;81(2):251-6.



- **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  **$9 \cdot 10^5$**  platelets/ $\mu\text{L}$ .
- 300 $\mu\text{L}$  of  **$\text{CaCl}_2$**  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).

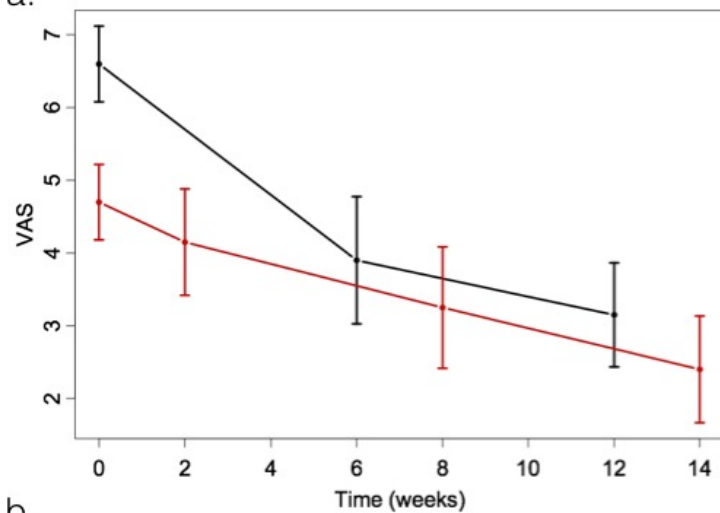


# Results

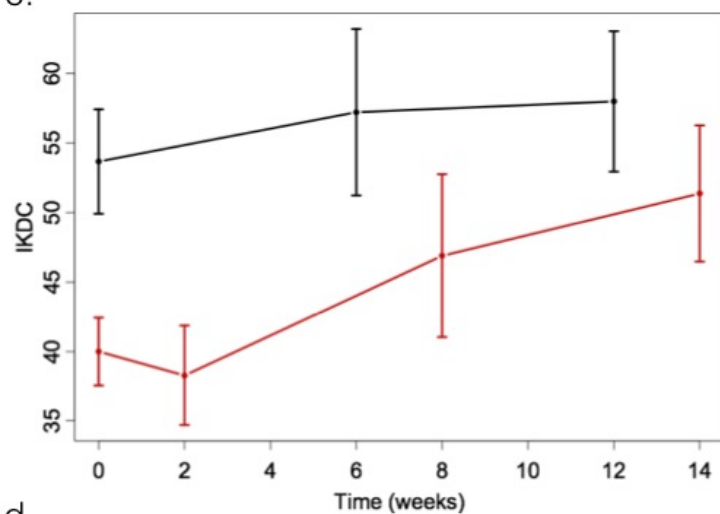
- Patient age ( $\pm 30$  y.o.) and duration of symptoms ( $\pm 17$  months) = **similar** for both groups ( $p=0.68$ ).
- Concentration **PRP** ( $\pm 9 \times 10^5/\mu\text{L}$ ), with virtually **no red** ( $<0.001 \times 10^6/\mu\text{L}$ ) **nor white cells** ( $<0.001 \times 10^3/\mu\text{L}$ ).



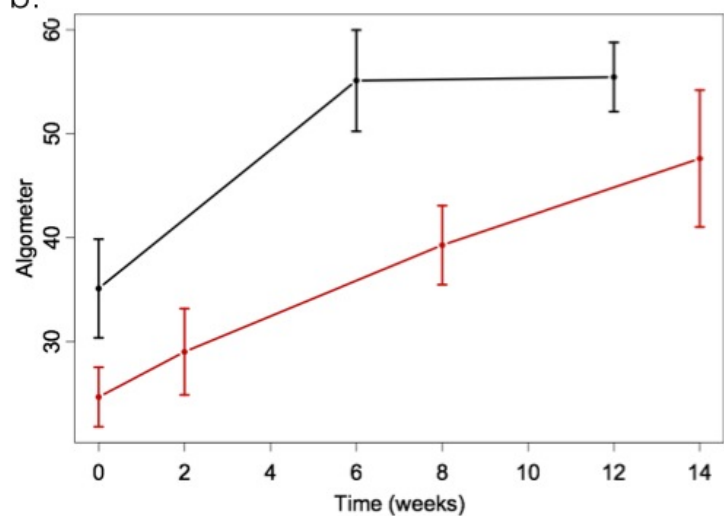
a.



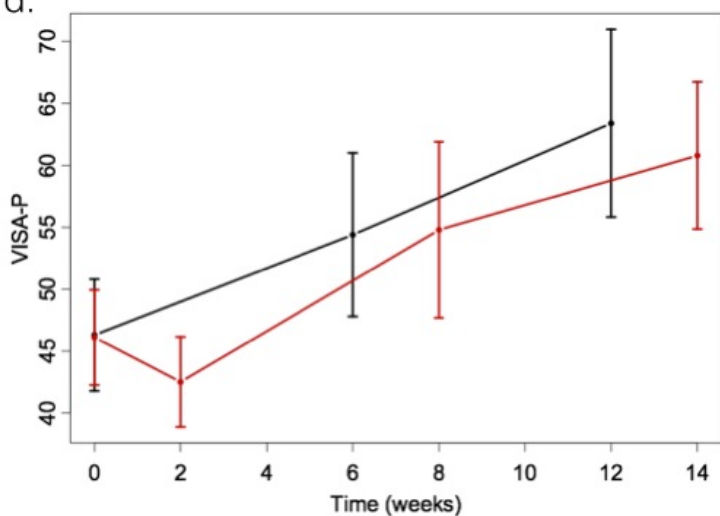
c.

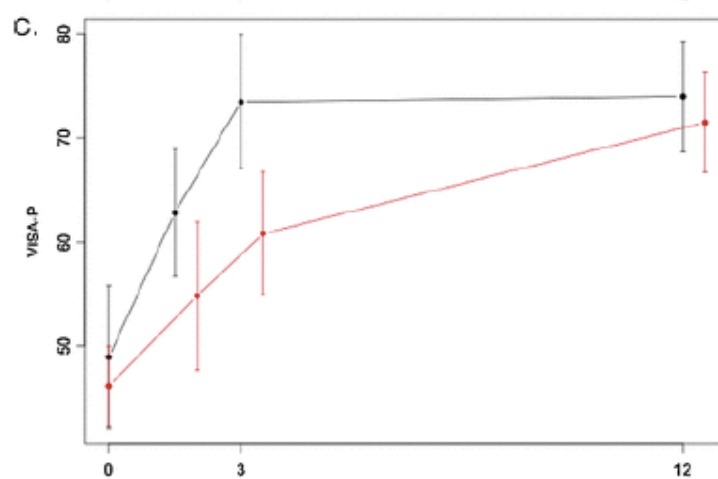
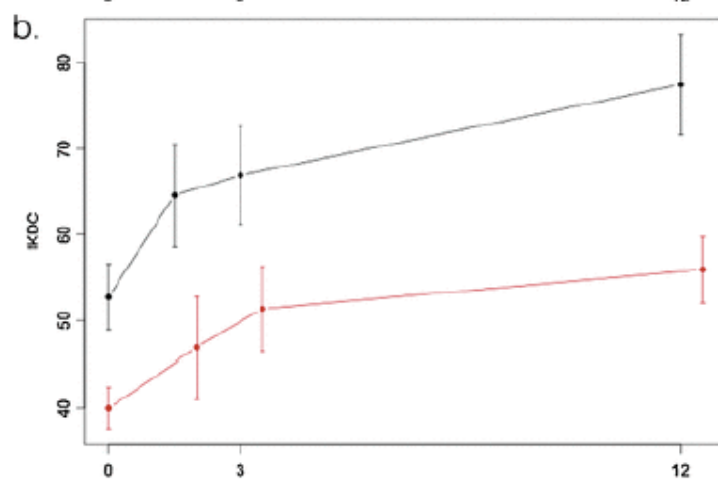
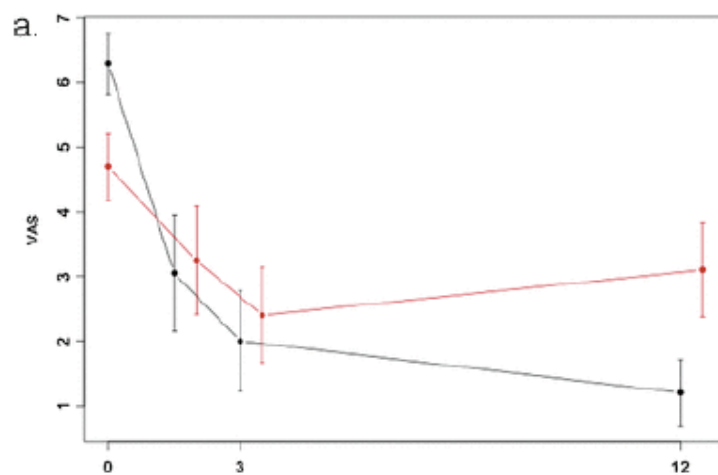


b.



d.







- 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

- 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 weeks, 3 months and 1 year).

# 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 !



<http://hdl.handle.net/2268/185835>

Kaux JF, Croisier JL, Forthomme B et al.

**Using platelet-rich plasma to treat jumpers knees: exploring the effect of a second closely-timed infiltration.**

*J Sci Med Sport.* 2015 Mar 21. [Epub ahead of print]

Université  
de Liège