

# Intraosseous injection of Platelet Rich Plasma for the treatment of severe knee osteoarthritis: a case-control study

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## PURPOSE

Platelet Rich Plasma (PRP) has emerged as a promising alternative to conventional treatment for knee osteoarthritis (KOA). However, this efficacy is limited in severe degree KOA.<sup>1</sup> After a pilot study that showed the safety and efficacy of this technique,<sup>2</sup> the aim of this study was to confirm the clinical effectiveness of **intraosseous PRP** respect to a control group (intraarticular PRP) in patients with **severe KOA**.

## METHODS

An observational case-control study using **intraarticular (IA group) infiltrations of PRP as a control group** was conducted. Each group included 30 patients with severe KOA, matched according to age, sex, body mass index and radiographic severity (III and IV degree according to Ahlbäck scale). Patients of both groups received three IA infiltration of PRP on a weekly basis. In addition, patients of the **IO group** underwent during the first treatment **two additional intraosseous infiltrations into subchondral bone, one in the medial femoral condyle and one in the tibial plateau**.<sup>3</sup> Clinical outcome was evaluated using the Knee injury and Osteoarthritis Outcome Score (KOOS) questionnaires performed prior to treatment and **6 months** after the treatment.

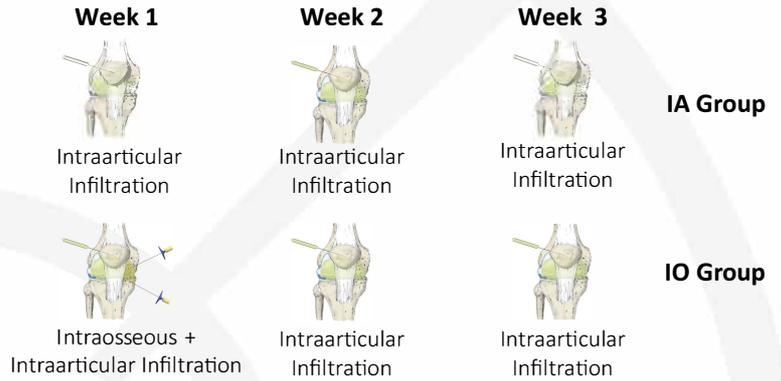


Figure 1. Schematic representation of the different treatment groups.

## RESULTS

Both groups did not differ with respect age, sex, body mass index and radiographic severity (Table 1). The percentage of **patients with significant clinical improvement in KOOS Pain subscale was higher in the IO group** (53.33%) than in the IA group (26.66%) ( $p=0.035$ ). The increase in **Pain score was also significantly higher in IO group patients** (12.44) compared with the IA group (2.48) ( $p=0.021$ ). The combined treatment of intraosseous with intraarticular injections also proved to be significantly better than the intraarticular injections alone in the difference from baseline ( $\delta$ ) in Symptoms and Function in sport and recreation (Sport/Rec). In addition, **patients of the IO group showed significant improvements in all KOOS subscales six months after treatment**, in contrast to patients of the IA group.

Table 1. Baseline characteristic of the studied patients.

	IA Group	IO Group
Age	67.89 ± 7.28	63.38 ± 9.00
Percentage of Male	56	60
BMI (kg/m <sup>2</sup> )	30.86 ± 5.60	30.86 ± 5.60
Ahlbäck grade (n)		
III	29	27
IV	1	3
KOOS		
Pain	53.24 ± 14.77	56.65 ± 15.24
Symptoms	66.31 ± 20.78	62.55 ± 16.05
ADL	51.32 ± 14.45	61.47 ± 17.22
Sport/Rec	22.00 ± 25.55	23.17 ± 20.15
QOL	26.67 ± 18.12	30.42 ± 15.81

IA Group: Intraarticular infiltrations of Platelet Rich Plasma; IO Group: Intraosseous infiltrations of Platelet Rich Plasma; KOOS: Knee injury and Osteoarthritis Outcome Score. ADL: Function in daily living; Sport/Rec: Function in sport and recreation; QOL: knee related Quality of life.

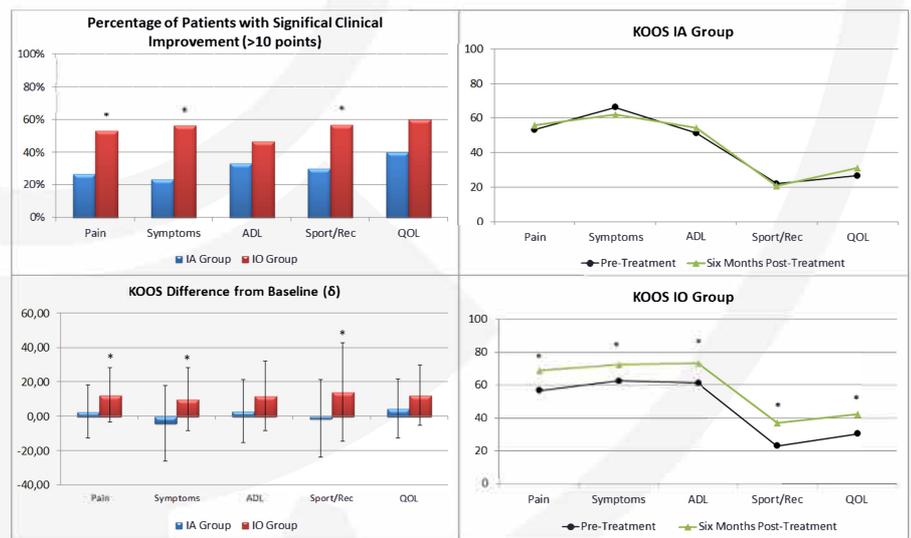


Figure 2. Outcomes at six months after treatment. IA Group: Intraarticular infiltrations of Platelet Rich Plasma; IO Group: Intraosseous infiltrations of Platelet Rich Plasma; KOOS: Knee injury and Osteoarthritis Outcome Score. ADL: Function in daily living; Sport/Rec: Function in sport and recreation; QOL: knee related Quality of life. \* $p < 0.05$ .

## CONCLUSIONS

Although a lot of work still has to be done, these results provide useful information about the **clinical efficacy of intraosseous infiltrations of PRP** in patients with severe KOA, and open new perspectives on additionally targeting **subchondral bone** to treat knee OA<sup>4</sup>.

## REFERENCES

- Chang KV, et al. Comparative effectiveness of platelet-rich plasma injections for treating knee joint cartilage degenerative pathology: a systematic review and meta-analysis. *Rheumatology (Oxford)*. 2015; 54(9):1735-43.
- Sánchez M, et al. Combination of intra-articular and intraosseous injections of Platelet Rich Plasma for Severe Knee Osteoarthritis: a Pilot study. *Biomed Res Int*. 2016. Accepted.
- Sánchez M, et al. Intraosseous Infiltration of Platelet-Rich Plasma for Severe Knee Osteoarthritis. *ArthroscTech*. 2014;3:e713-e717.
- Campbell TM, et al. Mesenchymal stem cell alterations in bone marrow lesions in hip osteoarthritis. *Acta Biomaterialia* 2016. *Arthritis Rheumatol*. 2016. [Epub ahead of print].