Int. J. Oral Maxillofac. Surg. 2016; 45: 828–835
http://dx.doi.org/10.1016/j.ijom.2016.01.018, available online at http://www.sciencedirect.com

International Journal of
Oral & Maxillofacial Surgery

Clinical Paper
TMJ Disorders

Does injection of plasma rich in growth factors after temporomandibular joint arthroscopy improve outcomes in patients with Wilkes stage IV internal derangement? A randomized prospective clinical study

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J. Fernández SanrománM. Fernández Ferro, A. Costas López, J. Arenaz Bua, A. López: Does injection of plasma rich in growth factors after temporomandibular joint arthroscopy improve outcomes in patients with Wilkes stage IV internal derangement? A randomized prospective clinical study. Int. J. Oral Maxillofac. Surg. 2016; 45: 828–835.

Abstract. The aim of this study was to evaluate the efficacy of injection of plasma rich in growth factors (PRGF) after temporomandibular joint (TMJ) arthroscopy in patients with Wilkes stage IV internal derangement. Ninety-two patients were randomized to two experimental groups: group A (42 joints) received injections of PRGF, group B (50 joints) received saline injections. Pain intensity on a visual analogue scale (VAS) and maximum mouth opening (MMO, mm) were measured before and after surgery and compared by analysis of variance (ANOVA). The mean age of patients was 35.8 years (range 17–67 years); 86 were female. Significant reductions in pain were noted in both groups after surgery: VAS 7.9 preoperative and 1.4 at 24 months postoperative. Significantly better clinical results were achieved in group A than in group B only at 6 and 12 months postoperative; no significant difference was noted at 18 or 24 months after the surgical intervention. MMO increased after surgery in both groups: 26.2 mm preoperative and 36.8 mm at 24 months postoperative. No significant

0901-5027/070828 + 08

differences in MMO were found when the two groups of patients were compared. In conclusion, the injection of PRGF does not add any significant improvement to clinical outcomes at 2 years after surgery in patients with advanced internal derangement of the TMJ.

Key words: temporomandibular joint disorders; TMJ arthroscopy; TMJ arthrosis; plasma rich in growth factors; PRP.

Accepted for publication 29 January 2016
Available online 26 February 2016

It has been suggested that disc displacement without reduction (DDwoR) might progress to osteoarthrosis (OA).[1,2] In cases of longstanding DDwoR, magnetic resonance imaging (MRI) signs of OA are frequently noted; however, these radiological signs can appear in patients diagnosed with disc displacement with reduction (DDwR) and even in patients with a normal disc position.[3,4] Thus, disc displacement is only one cause of OA, which can result from a multitude of primary joint lesions.

The majority of patients with internal derangement of the temporomandibular joint (TMJ) improve clinically with non-surgical treatments that include analgesics, non-steroidal anti-inflammatory drugs (NSAIDs), occlusal splints, and physiotherapy.[5,6] When these treatment modalities fail to improve the patient's clinical situation, different minimally invasive techniques, such as the injection of diverse substances into the joint, arthrocentesis, and arthroscopy with lysis and lavage, have exhibited good clinical results in relieving pain and improving functional outcomes.[7–11] None of these surgical procedures modify the abnormal position of the articular disc or enter the inferior joint compartment, which might be one of the reasons for the poor clinical outcomes that are observed in some cases in which the internal derangement progresses to disc perforation, OA, and mandibular asymmetry.[12,13]

Most previously published studies have failed to demonstrate any differences in the outcomes of arthroscopy with lysis and lavage compared to operative arthroscopic surgery.[5,10,13] Recently, descriptions of new surgical arthroscopic techniques that use coblation technology, new stabilization sutures, and pins have been reported, and the efficacies of these new techniques require verification over the long term.[14–17]

The use of plasma rich in growth factors (PRGF) is an autologous biological therapy that is based on the use of the patient's own plasma, platelet-derived growth factors, and endogenous fibrin scaffolds for regenerative purposes. Recent data support the application of platelet-rich plasma (PRP) products as an effective and safe method in the treatment of the initial stages of knee OA.[18,19] Furthermore, some randomized clinical studies have concluded that PRGF exhibits superior clinical results compared to hyaluronic acid (HA) in alleviating the symptoms of mild to moderate osteoarthritis of the knee.[20,21]

The aim of this prospective clinical study was to evaluate the efficacy of PRGF injections at the end of arthroscopic surgery in patients with disc displacement and MRI signs of condylar OA of the TMJ.

Materials and methods

Patients with internal derangement of the TMJ (DDwoR) and OA of the mandibular condyle (Wilkes stage IV) who had failed to respond to non-surgical treatments (NSAIDs, physiotherapy, and occlusal splints) for at least 6 months were assessed for this prospective randomized controlled clinical study. The study was approved by the reference ethics committee of the study hospital and all patients provided written informed consent before entering into the study. The recruitment of patients began in January 2008 and finished in December 2011.

Consecutive patients were assessed against defined inclusion and exclusion criteria and only those meeting the necessary criteria were included in the study. All patients completed the 2 years of follow-up. The inclusion criteria were as follows: unilateral joint involvement and MRI signs of anterior DDwoR (ADDwoR) with degenerative alterations of the bony components of the joint (OA). The exclusion criteria were as follows: bilateral joint involvement, prior TMJ surgery (including infiltrations and arthrocentesis), history of mandibular fracture, presence of known connective tissue or autoimmune diseases, concurrent use of steroids, muscle relaxants, or narcotics, major psychiatric disease, contraindications for imaging, and the presence of a medical contraindication to the treatment.

All of the patients were assessed clinically according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) specifications,[22] and the following variables were recorded: joint pain using a visual analogue scale (VAS) (0–10), joint noises (clicking, crepitus, or none), duration of the symptoms, and maximum mouth opening (MMO) measured as the distance between the upper and lower incisors. The different clinical parameters were recorded by the same observer (staff maxillofacial surgeon not blinded to the surgical procedure) before surgery and at 3, 6, 12, 18, and 24 months of follow-up.

MRI images were obtained using a Philips Achieva 1.5T scanner (release 3.2 level 3; Philips Medical Systems, Netherlands) with the following parameters: a pseudodynamic sagittal survey at four consecutive oral apertures and fast field echo (FFE) sequences, with a repeat time (TR) of 1/4 200 ms and echo times (TEs) of 1/4 15 and 1/4 50 ms. MRI images were also obtained in the coronal plane. The morphological characteristics of the articular disc (normal, biconvex, biplanar, folded, amorphous, or other), the position and mobility of the disc (normal, anteriorly displaced with or without reduction, anteromedial or anterolateral disc displacement, pure medial or lateral disc displacement, normal mobility, hypomobility, or fixed), the morphological appearance of the joint (normal, intra-articular effusion, or free bodies), and the bone morphology (normal, or signs of OA including deformity, erosions, osteophytes, cysts, and bone marrow changes (sclerosis, oedema)) were studied before surgery and at 2 years after surgery.

Ninety-two patients fulfilled the inclusion criteria and consented to participate in this study. The patients were randomized to the two experimental groups using specific software (Random Allocation Software). The patients were blinded to which arm they were in. The patients assigned to group A received injections of PRGF in both the superior and inferior joint spaces at the end of the arthroscopic treatment, under direct arthroscopic view. The other group of patients (group B, control group) received an injection of 5 ml of 5% sodium chloride in the inferior joint compartment.

With regard to the arthroscopy, all operations were performed under general anaesthesia as ambulatory procedures by a