

## Literature Abstracts

**Simonpieri A, Choukroun J, Del Corso M, Sammartino G, Dohan Ehrenfest DM. Simultaneous sinus-lift and implantation using microthreaded implants and leukocyte- and platelet-rich fibrin as sole grafting material: a six-year experience. *Implant Dent.* 2011 Feb;20(1):2-12. [Medline: [21278521](#)]**

Previous studies showed that a sinus grafting material built with allograft and platelet rich Fibrin (PRF) in equal volume was suitable for implantation after only 4 months and potentially even more mature than a sole allograft after 8 months. Furthermore, PRF membranes were easy to use during Summers osteotomy and offered a good compromise as filling material, shock absorber during sinus floor elevation, and healing support for the damaged Schneiderian membrane. The paper aims to describe the use of PRF clots and membranes as sole filling material during lateral sinus-lift with immediate implantation, the evolution of the technical procedure during a 6-year period, and the clinical success rate of this procedure in a significant case series.

PRF clots and membranes were prepared as described by Choukroun et al. During surgery, 72 mL whole blood was drawn in 8 glass-coated plastic tubes, without anticoagulant, and was immediately centrifuged at about 400 g during 12 minutes, using a table centrifuge specifically designed for this application (PC02; Process). Platelets were immediately activated, thus triggering a coagulation cascade. The result was a fibrin clot located in the middle of each tube. Each clot was removed from the tube and separated from the red blood cell base with pliers, then stored in metal cups before subsinus filling. Some clots were gently pressed in between 2 sterile compresses to obtain an autologous fibrin membrane. Five clots and 3 membranes were generally produced in this way for the treatment of each sinus. This clinical experience is based on a case series of 23 sinus elevations performed on 20 patients between January 2003 and January 2008 with Choukroun's PRF as sole filling biomaterial. Patients were 12 women (60%) and 8 men (40%) with a mean age of  $59.8 \pm 11.1$  years, from 37 to 80 years. Both the implant systems used in this study show similar profile, with a typical tapered and microthreaded collar. It was the more adequate implant shape and design for this specific application where implants have to be placed in a very limited residual bone height. In this case series, a total of 52 implants were placed. Seven patients were treated with 19 Astra implants (AstraTech), and 13

patients with 33 Intra-Lock implants (Ossean; Intra-Lock, Boca Raton, FL). Astra implants were 13 mm long and 4.5 mm in diameter; Intra-Lock implants were 11.5 or 13 mm long and 4.3 mm in diameter. Implants were inserted in 23 first molar, 19 second molar, and 10 premolar sites, under clean but not sterile conditions. In 3 patients, clear sinus membrane perforations were noticed during the sinus-lift and patched easily with PRF membranes. After surgery, healing was uneventful for all patients. Six months after surgery, all implants were clinically stable during abutment tightening. The maximum follow-up was 6 years, and all patients were followed-up for a minimum of 2 years. Clinical follow-up was associated with retroalveolar and panoramic X-rays just after implant placement, after 6 months, after 1 year, and finally after each following year. In some cases, low-dose volumetric computed radiography or CT scan examinations were performed 6 months after sinus-lift surgery, and even sometimes after 1 year or more, to evaluate accurately the sinus bone gain around each implant. The main results in this case series were that no implant was lost during this 6-year experience and that the vertical bone gain (assessed by X-ray follow-up) was always substantial and stable. All implants were inserted in a residual bone height between 1 and 3 mm ( $1.8 \pm 0.5$ ). Thus, the final bone gain was always very significant with these quite long implants, between 8.5 and 12 mm bone gain ( $10.4 \pm 1.2$ ). The final level of the new sinus floor was sometimes difficult to assess precisely with only X-rays as investigation tools, but it seemed that the position of the final sinus floor was always in the continuation of the implant end. The periimplant crestal bone height was always very stable. This result could be associated with the typical microthreaded profiles and the similar platform-switching prosthetic system of both implant systems. It proved that this kind of screw implants placed in residual bone height can maintain a strong periimplant bone tissue as long as they are blocked in stable position. No statistical comparison between the different implant systems was performed to define which implant system was the more efficient for bone gain around implants. Indeed, in this technique, implants were used as tent pegs to delineate the bone regeneration chamber, and the implant shape or surface did not seem to influence the position of the new sinus floor. Therefore, authors concluded that the use of PRF as sole grafting material during simultaneous sinus-lift and implantation is a secure and reliable option. This autologous and inexpensive material can be considered as an optimized blood clot, and this L-PRF matrix seems a relevant biomaterial for natural bone regeneration. However, in this technique, the experience of the surgeon and the choice of the implant profile are also

significant parameters, because implant stability in the residual alveolar ridge is the key condition to the firm support of the implants as tent pegs on the Schneiderian membrane. Finally, by extension, the systematic use of PRF during sinus-lift, with or without bone grafting material, may be beneficial, particularly for the protection of the Schneiderian membrane, and should be analyzed in further studies.

**Del Fabbro M, Ceresoli V, Lolato A, Taschieri S. Effect of platelet concentrate on quality of life after periradicular surgery: a randomized clinical study. J Endod. 2012 Jun;38(6):733-9. Epub 2012 Apr 13. [Medline: [22595104](#)]**

Control of postoperative discomfort might enhance the patient's quality of life and treatment acceptance. Plasma rich in growth factors (PRGF) in combination with anorganic bovine bone has been recently used in endodontic surgery for the treatment of large through-and-through periapical lesions and obtained encouraging results. Present paper aims randomized to evaluate whether the use of PRGF might have a favourable impact on patient's quality of life after endodontic surgery.

Eighteen patients with periapical lesion were treated with modern endodontic surgical procedure (control group). In another 18 patients, in adjunct to surgical procedure, platelet concentrate was applied on the root end in liquid form, within the bone defect in clot form, and over the suture in liquid form (test group). All patients completed a questionnaire for evaluation of main symptoms and daily activities during the first week after surgery. The outcomes of the questionnaires of the 2 groups were statistically compared. The test group showed significantly less pain and swelling, fewer analgesics taken and improved functional activities as compared with the control group. Authors concluded that the results of the present study suggest that the use of PRGF during endodontic surgical procedure is related to lower levels of pain, swelling, and other symptoms as well as improved daily activities in the early postsurgical period. This might positively affect the patients' quality of life and treatment acceptance. A longer follow-up will allow evaluating whether PRGF might also have a beneficial role in the healing of periapical lesion.

**Del Corso M, Vervelle A, Simonpieri A, Jimbo R, Inchingolo F, Sammartino G, Dohan Ehrenfest DM. Current knowledge and perspectives for the use of platelet-rich plasma (PRP) and platelet-**

**rich fibrin (PRF) in oral and maxillofacial surgery part 1: Periodontal and dentoalveolar surgery. Curr Pharm Biotechnol. 2012 Jun;13(7):1207-30. [Medline: [21740371](#)]**

Platelet concentrates for surgical use are innovative tools of regenerative medicine, and were widely tested in oral and maxillofacial surgery. Unfortunately, the literature on the topic is contradictory and the published data are difficult to sort and interpret. In periodontology and dentoalveolar surgery, the literature is particularly dense about the use of the various forms of Platelet-Rich Plasma (PRP) - Pure Platelet-Rich Plasma (P-PRP) or Leukocyte- and Platelet-Rich Plasma (L-PRP) - but still limited about Platelet-Rich Fibrin (PRF) subfamilies. In this first article, authors describe and discuss the current published knowledge about the use of PRP and PRF during tooth avulsion or extraction, mucogingival surgery, Guided Tissue Regeneration (GTR) or bone filling of periodontal intrabony defects, and regeneration of alveolar ridges using Guided Bone Regeneration (GBR), in a comprehensive way and in order to avoid the traps of a confusing literature and to highlight the underlying universal mechanisms of these products. Finally, authors particularly insist on the perspectives in this field, through the description and illustration of the systematic use of L-PRF (Leukocyte- and Platelet- Rich Fibrin) clots and membranes during tooth avulsion, cyst exeresis or the treatment of gingival recessions by root coverage. The use of L-PRF also allowed defining new therapeutic principles: NTR (Natural Tissue Regeneration) for the treatment of periodontal intrabony lesions and Natural Bone Regeneration (NBR) for the reconstruction of the alveolar ridges. In periodontology, this field of research will soon find his golden age by the development of user-friendly platelet concentrate procedures, and the definition of new efficient concepts and clinical protocols.

**Simonpieri A, Del Corso M, Vervelle A, Jimbo R, Inchingolo F, Sammartino G, Dohan Ehrenfest DM. Current knowledge and perspectives for the use of platelet-rich plasma (PRP) and platelet-rich fibrin (PRF) in oral and maxillofacial surgery part 2: Bone graft, implant and reconstructive surgery. Curr Pharm Biotechnol. 2012 Jun;13(7):1231-56. [Medline: [21740370](#)]**

Platelet concentrates for surgical use are innovative tools of regenerative medicine, and were widely tested in oral and maxillofacial surgery. Unfortunately, the literature on the topic is contradictory and the published data are difficult to sort and interpret. In bone graft, implant

and reconstructive surgery, the literature is particularly dense about the use of the various forms of Platelet-Rich Plasma (PRP) - Pure Platelet-Rich Plasma (P-PRP) or Leukocyte- and Platelet-Rich Plasma (L-PRP) - but still limited about Platelet-Rich Fibrin (PRF) subfamilies. In present article, authors describe and discuss the current published knowledge about the use of PRP and PRF during implant placement (particularly as surface treatment for the stimulation of osseointegration), the treatment of peri-implant bone defects (after peri-implantitis, during implantation in an insufficient bone volume or during immediate post-extraction or post-avulsion implantation), the sinuslift procedures and various complex implant-supported treatments. Other potential applications of the platelet concentrates are also highlighted in maxillofacial reconstructive surgery, for the treatment of patients using bisphosphonates, anticoagulants or with post-tumoral irradiated maxilla. Finally, authors particularly insist on the perspectives in this field, through the description and illustration of the use of L-PRF (Leukocyte- and Platelet-Rich Fibrin) clots and membranes during the regeneration of peri-implant bone defects, during the sinus-lift procedure and during complex implant-supported rehabilitations. The use of L-PRF allowed to define a new therapeutic concept called the Natural Bone Regeneration (NBR) for the reconstruction of the alveolar ridges at the gingival and bone levels. As it is illustrated in this article, the NBR principles allow to push away some technical limits of global implant-supported rehabilitations, particularly when combined with other powerful biotechnological tools: metronidazole solution, adequate bone substitutes and improved implant designs and surfaces (for example here Astra Tech Osseospeed or Intra-Lock Ossean implants). As a general conclusion, authors are currently living a transition period in the use of PRP and PRF in oral and maxillofacial surgery. PRPs failed to prove strong strategic advantages that could justify their use in daily practice, and the use of most PRP techniques will probably be limited to some very specific applications where satisfactory results have been reached. Only a few simple, inexpensive and efficient techniques such as the L-PRF will continue to develop in oral and maxillofacial surgery in the next years. This natural evolution illustrates that clinical sciences need concrete and practical solutions, and not hypothetical benefits. The history of platelet concentrates in oral and maxillofacial surgery finally demonstrates also how the techniques evolve and sometimes promote the definition of new therapeutical concepts and clinical protocols in the today's era of regenerative medicine.

**Saito E, Saito A, Kuboki Y, Kimura M, Honma Y, Takahashi T, Kawanami M. Periodontal repair following implantation of beta-tricalcium phosphate with different pore structures in class III furcation defects in dogs. Dent Mater J. 2012;31(4):681-8. [Medline: [22864225](#)]**

Present paper aims to investigate the effect of the pore characteristics of  $\beta$ -tricalcium phosphate ( $\beta$ -TCP) on periodontal healing in class III furcation defects in dogs. Two types of  $\beta$ -TCP were prepared for grafting; 1) a tunnel pipe structure with an inner diameter of 300  $\mu$ m, and 2) continuous pore structure with interconnected macropores. The furcations of thirty mandibular premolar teeth were implanted with each type of  $\beta$ -TCP or were left untreated as control. The dogs were sacrificed 8 weeks post-surgery, and healing was evaluated histologically. Downgrowth of junctional epithelium in the tunnel structure group was significantly less than that in the other two groups ( $P < 0.01$ ). There was significantly more new bone formation and new cementum formation in the tunnel structure group than that in the other two groups ( $P < 0.01$ ). Authors concluded that the present findings demonstrate that the tunnel structure of  $\beta$ -TCP induced an increase in cells and blood vessels derived from the residual bone, which enhanced periodontal regeneration in class III furcation defects.

**Koivisto T, Bowles WR, Rohrer M. Frequency and distribution of radiolucent jaw lesions: a retrospective analysis of 9,723 cases. J Endod. 2012 Jun;38(6):729-32. Epub 2012 Apr 13. [Medline: [22595103](#)]**

Practitioners should be aware of the occurrence rate and usual location of radiolucent jaw lesions. The aims of this study were to examine the frequency and location of radiolucent jaw lesions, including apical granulomas, apical cysts, keratocystic odontogenic tumours (KOTs), central giant cell lesions (CGCLs), ameloblastomas, and metastatic lesions, that were submitted for biopsy along with associated demographics. Biopsy diagnoses from 9,723 lesions (submitted between 1992 and 2006) were included in this study. Data on lesion location as well as patient demographics were evaluated. Authors classified thirty types of radiolucent jaw lesions. Nonhealing apical granulomas (40.4%) and cysts (33.1%) occurred at similar rates and together totaled 73% of all biopsied lesions. The majority of reported granulomas and cysts occurred in the anterior maxilla (> 36% in each category). The frequency of KOTs (8.8%), CGCLs (1.3%), ameloblastomas (1.2%),

and metastatic lesions (< 1%) are to be noted along with their location, which was predominately in the posterior mandible. The occurrence of apical cysts, ameloblastomas, KOTs, and metastatic lesions were seen slightly more in men, at 56%, 54%, 55%, and 68%, respectively. The occurrence of CGCLs was seen slightly more in women at 56%, whereas apical granulomas were equally present in men and women. Authors concluded that most of the nonhealing radiolucent lesions submitted for biopsy were either apical granulomas (40.4%) or apical cysts (33.1%), and they were often from the maxillary anterior jaw. Over 20% of the reported nonhealing radiolucent lesions submitted had a more severe pathologic implication, such as KOTs (8.8%), CGCLs (1.3%), ameloblastomas (1.2%), and even the small but important number of

metastatic lesions (0.26%), with most of these lesions being located in the posterior mandible. Age should not be a detriment for biopsy, and lesions were submitted from patients as young as 5 years old to 100 years old. Differential diagnoses must be considered to allow proper treatment of patients. Dentists should be aware of abnormal radiolucent or radiopaque areas in the jaws. Radiopaque lesions are rarely cause for immediate alarm, whereas many benign and malignant processes appear as radiolucent lesions in the jaws. These can range from a simple bone marrow defect to a primary malignancy or metastatic tumour in the jaw. There are numerous examples of serious pathologic conditions or malignancies masquerading as a nonhealing apical lesion.

Accepted for publication: 14 September 2012.

Literature Abstracts.

J Oral Maxillofac Res 2012;3(3):a1

URL: <http://www.ejomr.org/JOMR/archives/2012/3/a1/v3n3a1ht.pdf>

doi: [10.5037/jomr.2012.33a1](https://doi.org/10.5037/jomr.2012.33a1)

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