

A-PRF as sole grafting material in sinus lifts

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Introduction

Reduced residual bone height underneath sinus maxillaris is solved by lifting the Schneiderian membrane from the floor of the sinus using either the osteotome technique or the lateral window approach. By these means, it is possible to place a dental implant to anchor a fixed or removable prosthesis. In these treatments, it is custom to use biomaterials to keep the volume around the dental implant and finally make way for osseointegration of the implant.

The purpose of this case presentation is to describe the author's experience of using A-PRF (Advanced platelet-rich fibrin) as sole grafting material and to show that it is possible to get good bone formation around the dental implant inside the sinus without the use of biomaterials. Two operations were performed under local anaesthesia, venous blood was collected and A-PRF made. Osteotomy was done by means of osteotomes (Summers technique).

There were no perforations to the Schneiderian membrane, A-PRF membranes were placed inside the sinus and the dental implant placed achieving adequate primary stability in both cases. Impressions were taken after twelve weeks. From cone beam computed tomography it is clear that bone formation has taken place inside the sinus underneath the Schneiderian membrane. Both of the two implants were fully osseointegrated and restored successfully.



Figure 1: Three glasses with venous blood placed in the centrifuge.

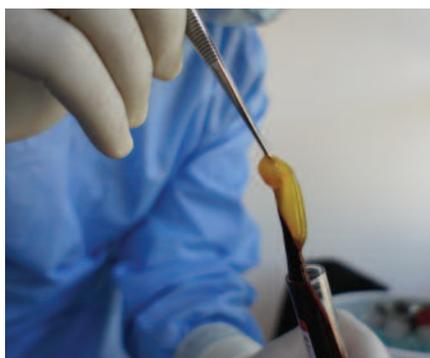


Figure 2: A-PRF clot.

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State of research

In the year 2003 Lundgren et al. published a concise paper¹ showing the spontaneous bone formation in the sinus after removal of a cyst.¹ The space that was once filled with the cyst became filled with bone without any further operations. Lundgren and his colleagues proposed that if space is maintained, bone can form without the use of biomaterials. Lundgren then did a study that was published in 2004, where 19 dental implants were placed with the Summers technique and no biomaterial was used.² In this procedure, the implants are used as “tent pegs” that hold the Schneiderian membrane from collapsing to the floor of the sinus; the blood that fills the gap then turns to bone in time. The results were that a lot of extra bone had formed around the implants without the use of biomaterials.

Other authors followed and published similar studies that confirmed Lundgren’s results.³⁻⁹ To get a good filling of blood can be a challenge in this procedure because one cannot predict how much blood there will be between the sinus floor and the Schneiderian membrane after the operation. A-PRF can be seen as a good and advanced blood clot that is easy to obtain. In addition, one can control how much the filling will be. In 2009 Mazor and colleagues published a paper where A-PRF was used to fill this space.¹⁰ 25 sinus lifts were performed in 20 patients and 41 dental implants placed. The authors used the same method as Lundgren did earlier, except for filling the space between the sinus floor and the Schneiderian membrane with A-PRF membranes. The results showed an increase in bone height between 7 and 13 mm (mean \pm SD: 10.1 \pm 0.9 mm).

Mazor and colleagues also took examples for histology six months after the operation that showed a well formed bone full of osteoblasts and osteoclasts in their lacunae. In 2013 Tajima and colleagues published a similar paper where the mean bone height increase was 7.5 mm.¹¹ It can be seen from Figs. 1–10 below that the bone does not go all the way over the apex of the implants. Therefore, it is helpful to look at a paper published by Palma and colleagues: in an animal study, they discovered that although there was not bone over the apex of the implants, the apex was covered by the Schneiderian membrane.¹² A-PRF has been well introduced in the literature over the last years by Dohan and colleagues.¹³⁻¹⁶

Cases

Two patients were treated in Godt Smil Odense over 16 months. Both of these patients had one thing in common, they did not want any animal products to be used in the



Figure 3: Case 1, pre-operative.

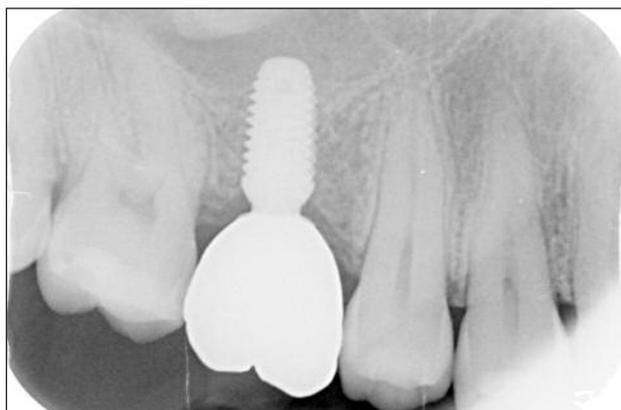


Figure 4: Case 1, immediately after operation.

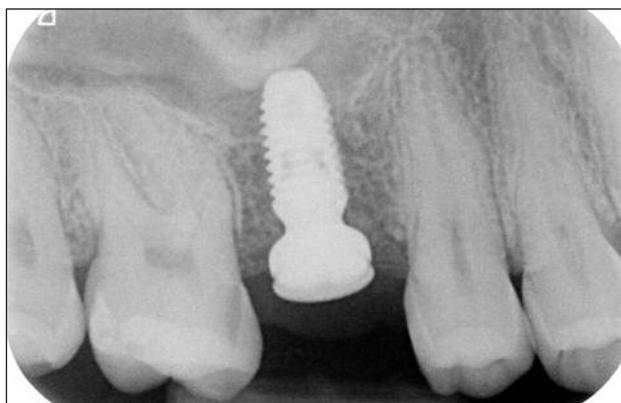


Figure 5: Case 1, 14 weeks after operation.

treatment and therefore choose to use A-PRF as their sole grafting material. Both patients were in good general health and do not smoke. Venous blood was sampled with a so-called butterfly (Vacurette® Greiner bio-one) and the rule is 10 ml of venous blood for every dental implant, plus 10 ml for each mm of planned bone height. The blood is collected in 10 ml tubes (A-PRF®+) and are centrifuged according to Choukroun’s protocol.



Figure 6 & 7: Case 1, six months post-op.



Figure 8: Case 2, pre-operative.

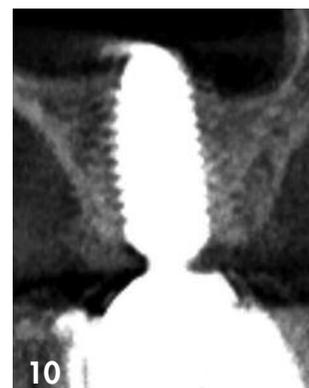


Figure 9 & 10: Case 2, six months after operation.

Operation

Premedication is 2,000 mg Imadrax (Amoxicilin), 1,000 mg Pinex (Paracetamol) and 400 mg Ibumetin (Ibuprofen) 60 minutes before treatment. The oral cavity was rinsed with 0,2 % Chlorhexidin for one minute. Local anaesthesia was administered buccally and palatally (Xyloplyin® dental adrenalin 20 mg/ml + 12.5 microgram/ml lidocaine hydrochloride + adrenalin. The mucoperiosteal trapizoid flap was raised and osteotomy was performed using the Summers technique. A-PRF membranes were placed into the sinus underneath the Schneiderian membrane. Valsalva tests were negative for both patients. The dental implant (K3Pro Sure) was inserted and the last A-PRF membrane was placed over the area, underneath the incision line.

Both dental implants had good primary stability. Sutures were Glycolon 6-0 (Resorba). No further bone augmentations were done. Postoperative medication was Imadrax (Amoxicillin), 500 mg 4 times a day for three days, Ibumetin (Ibuprofen, 400 mg) in combination with 1,000 mg Pinex (Paracetamol) as needed. Both patients were

instructed to remain on soft diet for the next two days, no physical activity for seven days. Abutment operation was performed after twelve weeks and both dental implants received a screw-retained Prettau® full-ceramic crown.

Discussion

It is not possible to have valuable results from a small case presentation like this, but it is clear that a considerable amount of bone has formed around the implants, both dental implants were stable six months after loading. There was no BOP at control three months after loading. Previous publications on this matter confirm that it is safe to use A-PRF to increase the bone height in sinus maxillaris using the Summers technique when the primary stability of the implant is good.^{3, 4, 10, 11, 17} Further research in this area is much needed.

Editorial note: A different documentation of the same cases has been published in The Icelandic Dental Journal. A list of references is available from the author.

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