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Sinus floor elevation with platelet-rich fibrin

Christophe HOUEL (1) **P** , Nathalie NURDIN (2) , Mark BISCHOF (3, 2) , Nicolas REENERS (4) , Rabah NEDIR (2, 4) **F**

(1) Ardentis Clinique Dentaire, Swiss Dental Clinics Group, Le Mont-sur-Lausanne, Switzerland,

(2) Ardentis Clinique Dentaire, Swiss Dental Clinics Group, Vevey, Switzerland,

(3) Ardentis Clinique Dentaire, Swiss Dental Clinics Group, Lausanne, Switzerland,

(4) Ardentis Clinique Dentaire, Swiss Dental Clinics Group, Yverdon-les-Bains, Switzerland.

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Background: Sinus grafting with delayed implant placement is indicated when the maxilla is severely atrophied and/or when no period without denture is requested. Many grafting materials are used to gain bone volume for implant placement. Autogenous bone grafting has been widely used despite increased morbidity. Bone substitutes avoid problems related to bone harvesting at secondary surgical sites but are reported to undergo a slow regeneration process. Until now, platelet-rich fibrin (PRF) has been proposed as substitution grafting material with simultaneous implantation (Diss et al. 2008, Mazor et al. 2009).

Aim: A patient asked for maxillary implant placement to support a full prosthesis with the least invasive shortest treatment; he requested no period without denture during the treatment. Sinus grafting was performed with only PRF through a crestal approach and implant placement was delayed. The 1-year clinical performance of implants was assessed.

Material and methods: A 69-year-old woman presented for maxillary full rehabilitation. Posterior to the maxillary bicuspids, the residual bone height was ≤ 5 mm. PRF grafting was prepared from the patient's centrifuged blood (Choukroun et al. 2001). Through crestal sinus floor elevation, osteotomy sites were enlarged and the membrane integrity was controlled. PRF pieces were introduced, and flaps sutured. Twelve weeks later, Bone Level[®] (sites #13, 14, 23 and 24; $\varnothing 4.1$ mm, length 10mm, Straumann AG) and TE[®] implants (sites #16 and 26; $\varnothing 4.8-6.5$ mm, length 10mm, Straumann AG) were placed without tapping in a submerged manner. The 4-month healing period was uneventful. After exposure, implants were restored with an overdenture relying on six implants connected with two bars. Computed tomography scans and radiographs were performed before surgery and during the 1-year follow-up after loading.

Results: All implants achieved primary stability although bone density was poor. They were successfully loaded. After one year, they were clinically stable with a functional load. In the sinuses, newly formed mineralized tissue was visible but regenerated bone volumes were limited. Implants #26 and #16 showed a residual protrusion into the sinus of 2 and 4mm respectively.

Conclusions: This case report has shown that sinus grafting via a crestal approach can be managed within duration of 3 months using PRF. The introduction of PRF has contributed to maintain space for bone regeneration; however, bone density was poor and peri-implant bone formation was low.