more complicated surgical procedure in the rehabilitation of severely resorbed posterior mandible.

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Optimal implant planning in the esthetical zone

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Background: Digital diagnostics is to be preferred by Implant treatment planning in the esthetical zone. Due to prosthetic reasons so called "backward" planning from the prosthetic end situation is preferable. Nowadays different computer programs are on the market for virtual treatment planning. Due to different reasons the use of a CBCT-scan in planning implants in the esthetic zone is not always indicated. Reasons not to do so might be scattering of neighboring teeth and extra costs. In many cases in the frontal region the tooth that is to be replaced is still present at the moment of first consultation. Often this tooth is in the ideal horizontal and vertical position and provides information of the surrounding soft tissues. In a number of cases the tooth, is seated with a crown and therefore will appear on the CBCT-scan with scattering. This means loss of valuable information.

Aim: We share a method of treatment planning to save extra costs and to withdraw the most out of a CBCT-scan in the use of pre-prosthetic digital treatment planning.

Methods: At first we make an impression. With a vacuformer system we make a splint. We attach eight markers following the double scan protocol of Nobelclinician®. (Poster EAO 2010). Before a second scan of the splint is made a prosthetic tooth is placed at the restoring site taking into account the ideal gingival margins. A hole is made for the prosthetic screw. The scan data is imported in Nobelclinician®. For a dental team it is now easy to communicate the most appropriate prosthetic positioning and outcome. It is suitable for patient instructions, treatment planning and outcome. Furthermore the splint is used as a surgical guide and additionally the prosthetic crown as a temporary restoration on the implant. For the present study 15 patients are treated according this protocol. After treatment questionnaire forms were provided for immediate post-operative evaluation. A VAS (0–10) was used to assess predictability outcom, costs, possibility to communicate and user-friendliness.

Results: The different VAS scores are for predictability 9.5, costs 9.5, and possibility to communicate 8.2, user-friendliness 8.5.

Conclusions and clinical implications: It is possible to predictably estimate the final outcome situation using the "backward" planning. The team can command in a virtual environment. This technique is cost saving and very predictable. We also use the splint as a guide during surgery. This technique is suitable for the use of prosthetic planning, surgical and restorative reasons without extra costs.

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Risk factors associated with implant survival in the atrophic maxilla: clinical implications

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Background: Rehabilitation of the atrophic posterior maxilla can be simplified by placing implants with the osteotome sinus floor elevation (OSFE) technique. Simultaneous bone grafting is recommended even though peri-implant bone formation after sinus augmentation without grafting has been documented. The long-term influence of other parameters on implant survival has not been reported as extensively.

Aim: (1) To evaluate the long term survival rate of rough surfaced short implants placed with the OSFE technique in extremely atrophic maxillae. (2) To identify and quantify variables as risk factors associated with the success of implants placed in these conditions.

Methods: Between June 2000 and December 2007, 279 rough surfaced implants (Straumann AG, Basel, Switzerland) were placed by means of an OSFE in reduced maxillary residual bone height (RBH) $\leq$6 mm. All implants were evaluated in 2011 (3–10 years of function). Twenty-eight variables were selected for the statistical analysis. These variables were distributed in four categories related to: patient, site, implant, and technique. Four equations were constructed using the variables of each category. Consequently, Multivariate Cox regression analysis with a robust standard error adjusted for clustering effect was applied using Stata® 12 software. Variables with a statistically significant hazard ratio were selected from each equation and integrated into the final model.

Results: A total of 184 patients received 279 implants. One hundred and eighty patients (274 implants) were observed after 3–11 years of function, four patients (five implants) were lost to follow-up, 14 implants failed. Cumulative survival rate according to life-table analysis was 82%. Fifty per cent failed implants were placed in less than 3 mm RBH. Results from Cox regression analysis showed that residual bone height, crestal bone type, implant rotation at rehabilitation time, and presence of grafting material can be considered as risk factors with *P* values respectively 0.001, 0.018, 0.002, and 0.015. With every 1 mm increase in RBH, the risk of implant failure decreased by 55%. Presence of cortical crest at implantation site reduced the risk by 77%. An implant that rotated at the time of commencing the prosthetic rehabilitation had 893% more risk of subsequent failure. Finally, adding intra-sinus grafting material increased the risk of implant failure by 267%.

Conclusions and clinical implications: This study confirmed that grafting is not required to obtain long term osseointegration and to maintain function from 3 to 10 years in reduced maxillary bone. Survival of implants placed with OSFE tech-

nique in RBH $\leq$ 6 mm was optimized by: (1) increased RBH, (2) presence of crestal cortical bone, and (3) absence of grafting material.

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Narrow implants as an alternative to pre-implant bone grafts

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Background: Since few years, the importance of respecting periodontium and the increase of non-implantable cases by standard diameter implants, have led practitioners to narrow diameter implants: less than or equal to 3.5 mm. This article offers a literature review and a preliminary clinical study. The use of narrow implants is an alternative to guided bone regeneration, so it is interesting to compare the clinical results of narrow implants in native bone to standard implants in grafted bone.

Aim: The aim of our work is to conduct a retrospective study to evaluate the success rate and the survival rate of 36 narrow implants (23 pure titanium and 13 Titanium-Zirconium) placed in our department by 12 practitioners (from 0 to 7 years post-op, mean = 2 years).

Methods: Clinical data about the patient, indications and medical history, the bone site, surgery, prosthesis, occlusion, periodontal behavior and overall satisfaction were collected during classic booster sessions using panoramic and retroalveolar radiographs and periodontal probing. Inclusion criteria are good general health, absence of mucosal inflammation or pathology during surgery and sufficient oral hygiene. Exclusion criteria are smoking >10 cigarettes per day, medical history of chemotherapy or radiation therapy (head and neck), leukocyte disease, uncontrolled diabetes, excessive dental tightening, non compliance, alcohol abuse, immunosuppression or taking corticosteroids and inadequate oral hygiene. The first success criteria was the absence of mobility, infection, pain or paresthesia, peripheral radiolucency, and a marginal bone resorption $\leq$1.5 mm the first year and $\leq$0.2 mm in the following years. The second was a probing depth $\geq$4 mm at any side around an implant.

Results: The narrow diameter implants have a survival rate of 100% for the titanium–zirconium and 87.0% for pure titanium. The success rates are 76.9% of titanium–zirconium and 60.9% for pure titanium. These rates are comparable to the rates of standard implants placed in grafted bone. The use of implants in titanium–zirconium alloy seems to be biologically accepted by the periodontium and presents promising results.

Conclusions and clinical implications: The results illustrate the apprehension of practitioners to choose narrow implants of pure titanium. At patient recalling, some were unreachables and others had fracture of implant or lost of osseointegration. Also, 12 implants in the same patient were placed in an unfavorable context of multiple systemic diseases. The treatments using take into account periodontal, prosthetic and occlusal notions. The titranium–zirconium narrow implants have convincing clinical results, and therefore, it seems useless to graft beforehand when there is no aesthetic interest. Nevertheless, biocompatibility of titanium–zirconium implants should be confirmed in the coming years.

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Zygoma implants, a technique to restore function in maxillary atrophy

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Background: Severe maxillary bone atrophy due to important sinus enlargement, bone reabsorption or a combination of both, is occurring (very) frequently in our practice. The most common solutions are bone grafting and/or sinus lift, but these techniques have high morbidity with an inconstant success rate.

Aim: Working in private practice we looked for an alternative technique to bone graft. Our goal is to evaluate if zygoma implant are a good alternative.

Methods: The present paper shows the results of a study on 80 patients treated from 2005 to 2011. Out of 60 patients were fully edentulous and 20 had mono lateral endentulism. Even if with no statistical significance, it is worth highlighting that the data show 100% success rate. In four cases, we applied a two-stage procedure; in all other cases, immediate loading was practiced. In 20% of the cases, we performed an immediate post-extractive procedure.

Results: A part from light post operative complications (swelling, hematoma and light discomfort), in general the patients did not complain about any severe problems. All the patients were treated in general anaesthesia. Four patients experienced sinusitis, two as an early complication (respectively 2 and 4 months after surgery) and two of them as a late complication (6 years after surgery). All the cases were treated with medical therapy and the sinusitis was completely resolved. In one case there was a temporo-mandibular joint dysfunction after surgery, probably due to excessive mouth opening during surgery.

Conclusions and clinical implications: From our experience, we can conclude that zygoma implants are a really suitable technique in patients with severe bone reabsorption. The technique permits faster restoration with little discomfort for patients, at a comparable cost with bone graft. Reducing the risk of early sinusitis, the most important complication in our opinion, is the object of our present investigations.