



Guided bone regeneration with CAD-CAM titanium meshes for the reconstruction of three dimensional alveolar defects

Lizio Giuseppe* & Baffone Marco

* giuseppelizio@libero.it - University of Bologna, Italy



The aim of this study is to verify the efficacy of customized titanium meshes and particulate bone for the implant-borne rehabilitation of three-dimensional extended alveolar defects. 36 implants and correlated bone regeneration were digitally planned for 13 sites. The CAD-CAM engineering of the mesh for particulate graft containment was performed. The pre- and post-operative CT 3D models were digitally aligned for the calculation of volumetric bone and for the mean bone height gain in the pre-planned implant sites.

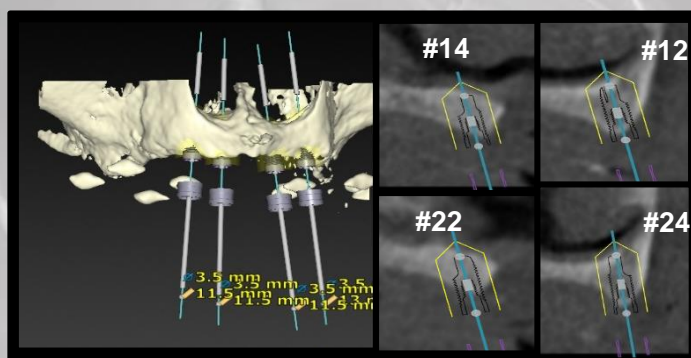


Fig.1 - Virtual prosthetically-guided implant planning



Fig.2 - Pre-operative soft tissue conditions

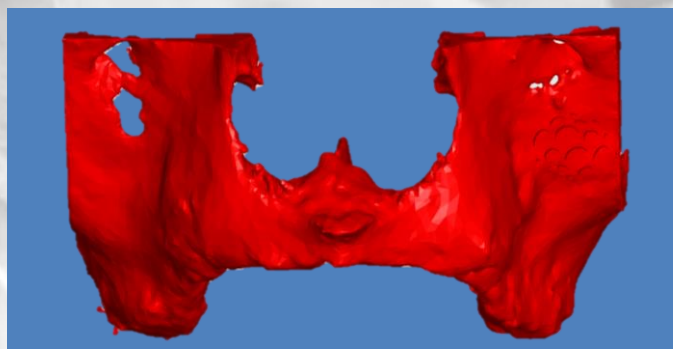


Fig.3 - Three-dimensional CBCT reconstruction

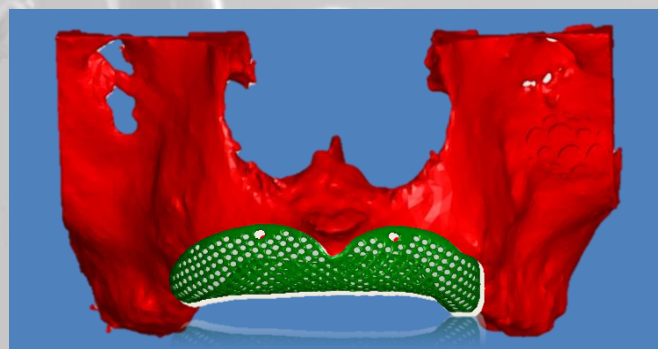


Fig.4 - Three-dimensional CBCT reconstruction + CAD-CAM mesh



Fig.5 - Full-thickness buccal and palatal flap elevation

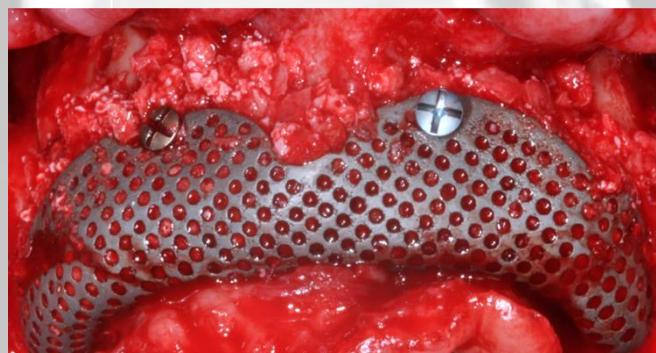


Fig.6 - CAD-CAM mesh fixation and stabilization

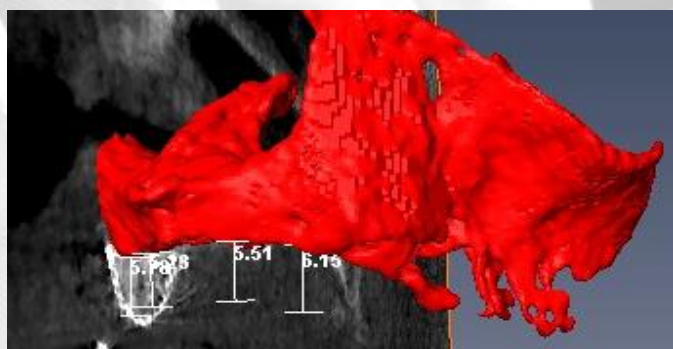


Fig.7 - Linear measurement of bone volume gain

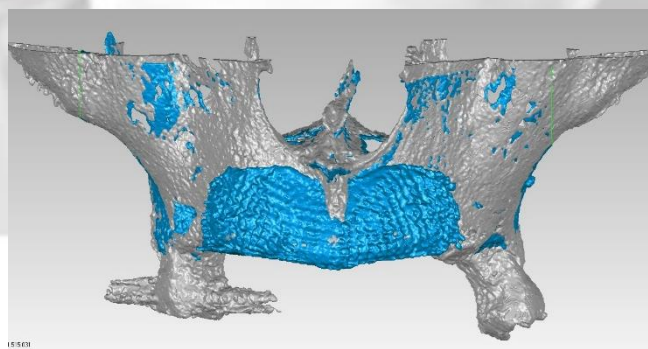


Fig.8 - Three-dimensional measurement of bone volume gain

The mesh exposure rate was 61%: complete failures were observed in 4 sites; while uneventful healing was observed in 9 sites (26 implant locations). The mean bone volume gain was 87,23 % of what virtually planned; while the mean bone height was $3,89 \pm 1,46$ mm. The exposure positively correlated to the volumetric bone loss ($P < 005$).