Using real 3D images for Aesthetic implant surgery

Dental surgery has been based on findings on 2D images, such as the panoramic X-ray, buccal or occlusal view photography, etc. For 15 years now, CT images can be used to get a clear view on the patient's anatomy. CT images can be imported by SimPlant software which shows 3D images, so you can understand your patient's anatomy better. In the pictures below you can see the difference between the information you see on 2D and what you see on 3D images. Most doctors would perform a simple or flapless implant placement based on the 2D images, but how many would proceed with implant surgery based on the 3D view? Sometimes, the 2D CT images (axial and sagittal) of a patient's anatomy can cause practitioners anxiety, due to a misunderstanding of how to read the data. Our brains are accustomed to 3-D imagery. In aesthetic areas, a careful plan is particularly necessary.

Case presented by
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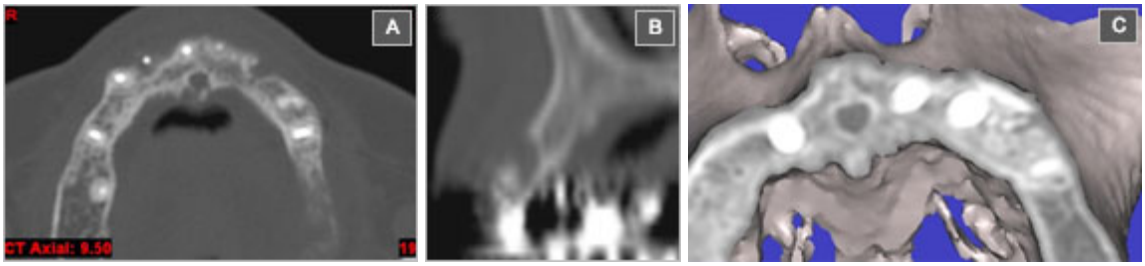
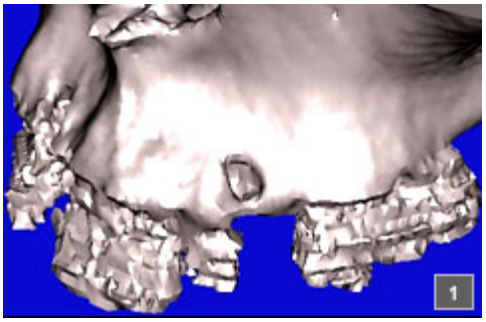
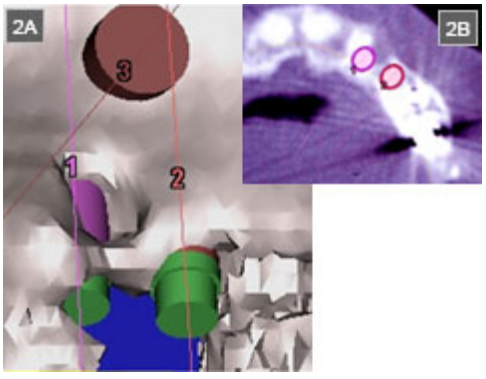




Diagnosis

The patient is a healthy 55-year old woman, presenting with a sectioned bridge due to root fracture and endodontic pathology in upper left lateral incisor. The 2D images did not give a clear view on the patient's anatomy, which made the preparation of the surgery difficult (**A, B**), 3D images were necessary to plan the placements of the implants accurately, so good aesthetic results could be guaranteed. (**1**)

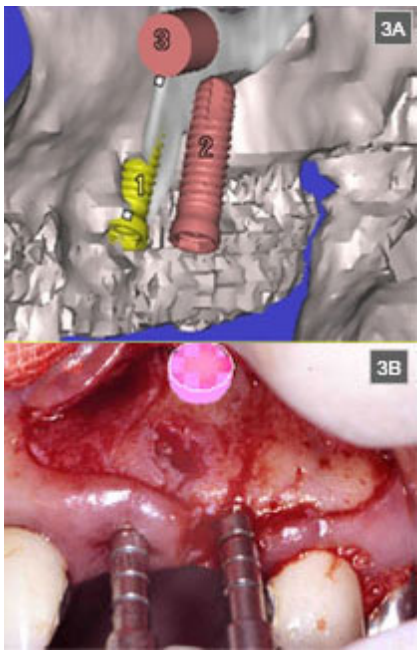


Planning Surgery

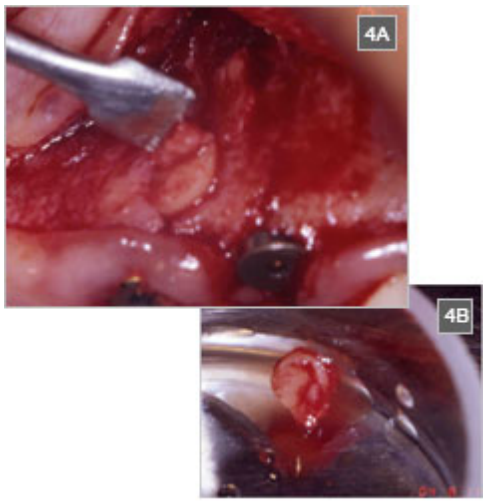
Using SimPlant Software a treatment plan was devised. (**1, 2A, 2B, 3A**)

On the 3D images, the dimensions of the bone fenestration could be assessed and the ideal position of the implant could be defined accurately. A Multi-layered graft seemed necessary to place the implant. We want to place the implant with an initial stability of 35 N/CM.
If initial stability and the gingival region are kept intact, aesthetics and function are highly predictable resulting in shortened clinical treatment time.

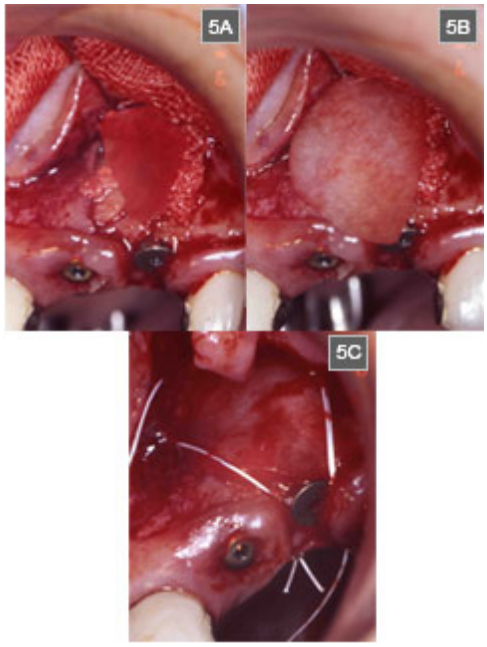
Surgery



The incision was performed cautiously for papilla preservation.(**3B**) The flap was reflected with careful cut to expose the dimensions of the bone fenestration seen on the planning in SimPlant. (**3A**)



Sequentially, an autogenous bone block (4mm thickness) was harvested using a trephine drill with an interior diameter of 6.3mm. The bone block came from refracting the same flap.(**4A, 4B**) A Multi-layered graft can now be prepared.



If possible, use autogenous bone around an implant in the aesthetic area. Bone filling materials such as b-TCP or HA for GBR space creation are strongly advised in canine areas

where the labial aspect is thin. The materials are covered with a membrane of long-term resorption type(**5A**) and then put on a short-term resorption collagen membrane.(**5B**) (Double Membrane method) (**5C**)

After 2 weeks

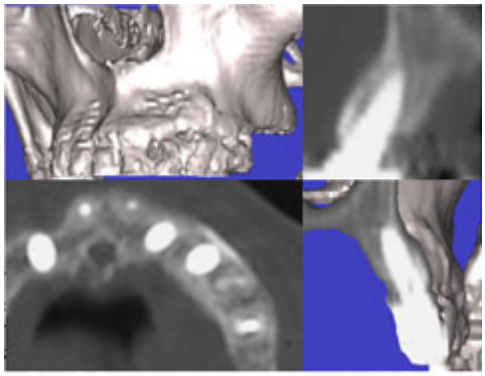
After 1 month

After 6 weeks

After 2,5 months

Result

The final result is obtained after two months. The gingival region is kept intact without jeopardizing functional nor esthetical wishes from the patient. She has her beautiful smile and an implant that keeps its required stability.
The post-operative healing went without swelling or pain.



Two years later, a new CT-scan of the patient was taken and the images were inserted in SimPlant to get a detailed overview of the result of the surgery. As the pictures show, the implants were placed well and with high stability.

CONCLUSION:

The placement of the implant was planned well using SimPlant. SimPlant gives the most accurate representation of the anatomy to aid in planning the surgery. The 3D images were valuable because potential problems were clearly visible. The 2D images didn't show the possibility of problems. Due to this planning preparation in SimPlant, the clinical treatment time was markedly shortened.