Guided by the light

David Burgess embraces the potential of new technology to perform an internal sinus lift using smart navigation

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By Robert Hayes

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A 52-year-old female patient was concerned about the appearance of her smile. Her upper right first molar and second premolar had been missing for several years (Figures 1 and 2). She was otherwise a fit and healthy non-smoker.

The patient was unwilling to consider a denture and was not keen for the symptomless adjacent teeth to be prepared for bridgework, particularly the upper right first premolar, which was unfilled.

She did not wish to have any form of removable prosthesis. She chose to have implant-supported crowns, as she wanted the final restoration to be as close as possible to having natural teeth.

Clinical examination and planning
Clinical examination suggested that the buccopalatal width of the maxillary ridge was wide enough to consider flapless surgery. This had added appeal, as the patient was travelling a great distance for the treatment, so wished to minimise the number of appointments and the potential for postoperative complications.

Computer-guided dynamic navigation with Navident by Clarovav was used in the preparation of this case.

Scanning and planning took place during the assessment visit, 48 hours before implant surgery.

A Navistent was fabricated and a fiducial marker attached, prior to the CBCT scan.
Radiographic and CBCT examination revealed approximately 9mm of bone depth, from crest of ridge to floor of maxillary antrum, in the upper right second premolar site, and no more than 5mm bone depth in the first molar site.

Planning took place immediately after the scan, with the patient present so she could see the proposed treatment on the Navident software.

She felt reassured by the care being taken to achieve optimum implant positioning, with minimal risk of potential complications, and was extremely impressed with the technology.

The Navident planning software allowed the placement of the implants to be restoratively driven.

The size, shape and position of the intended crowns was planned prior to treatment and the consequent position of the implants determined, so that the optimum restoration could be achieved.

Due to the limited bone depth in the first molar site, augmentation of the ridge was planned by utilising the internal sinus lift (or Summer's) technique.

The minimally invasive procedure allowed placement of dental implants in a site with reduced bone depth, without causing iatrogenic sequelae through damaging an intact Schneiderian membrane.

**Flapless procedure**

Treatment was carried out under local anaesthesia. The flapless procedure resulted in minimal trauma to the gingival tissue overlying the ridge.

The previously constructed Navistent, and the drill tag and jaw tag supplied by Claronav, were prepared immediately prior to surgery (Figure 3).

In accordance with the Navident protocol, the axis of the drill and tip of the pilot drill were calibrated (Figures 4 and 5) and verified before site preparation commenced (Figure 6).

Using computer-guided surgery, the pathway of the drill could be followed clearly on the computer screen positioned in front of the patient (Figure 7).

Approximately 1mm of bone was left intact in the upper right first molar site ready for the sinus lift.

Navident provided visual confirmation of the position of the drill tip to accurately gauge the correct depth (Figure 8).

Preparation continued using a 3.5mm drill bit, which, again, was calibrated and verified before use (Figures 9 and 10).

A 3.5mm diameter and 8mm length Dentsply Ankylos C/X implant was placed 1mm subcrestally in the upper right second premolar site.

A guide pin was placed in the upper right first molar site to check the depth and alignment (Figure 11).

The Navistent was removed and the site was prepared for the sinus lift osteotome (Figures 12 and 13). The osteotome was
tapped gently with a surgical mallet until the remaining thin layer of bone infractured and was elevated (Figure 14).

The Schneiderian membrane was carefully raised through manipulation with the osteotome and a heterogeneous bovine bone graft material (Bio-Oss) was introduced into the implant site (Figure 15). A 4.5mm diameter and 6.6mm length Ankylos C/X implant was then placed 1mm subcrestally (Figures 16 and 17).

Both implants had good primary stability on placement. Ankylos Balance posterior sulcus formers were fitted, without the need for additional closure with sutures (Figure 18).

**Implant placement in optimum bone**

Navident was used to guide the implant site preparation dynamically, to ensure implants were placed in the pre-determined position without the need for a static drilling guide.

This facilitated placement of the implants in the optimum amount of bone without inadvertent damage to the maxillary sinus membrane. It also ensured that their alignment made future impression taking and restoration straightforward.

The ability to watch the drill virtually on the CBCT scan, as the implant sites were prepared, allowed the exact point at which to cease vertical drilling to be judged visually.

Assessment, planning and placement were carried out within 48 hours, due to the patient’s limited ability to attend for appointments. Using Navident, there is no reason why this could not be achieved in one visit. The implants will be restored two to three months after placement, with custom-made titanium abutments and zirconia crowns.

Computer-guided navigation enabled the implants to be placed reliably and predictably within optimum bone, without the need to reflect a flap (Figure 19). Consequently, the patient experienced no postoperative swelling or bruising and she reported very little discomfort after treatment.

This outcome satisfied the primary objective of aiming for clinical perfection, while ensuring the patient experienced the least trauma possible. IDT
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- Provides even greater value from your CBCT data

“What makes Navident stand out is it precisely guides the surgeon to prepare and place the implant. The software shows the drill position on the scan in real time, as it enters the jaw.”

David Burgess BDS DPDS MScConSed
Carbis Bay Dental Care, St Ives, Cornwall

*Average error of 0.4mm in internal bench tests with a range of operating conditions.

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