Understanding bone height gain
Amr Zahran, Samar El Khouly, Ahmed El Barbary and Omar Ashour present a randomised, controlled trial on sinus lift procedures

Dynamic navigation
Accurately planning and placing implants for patients without secure support for an optical marker

CBCT in implant dentistry
Johan Hartshorne considers the essentials for using CBCT in practice

Smart art
Boost your business with an artistic approach to implant aesthetics

London calling
Why the London Dentistry Show is this year’s must-attend event

Earn three hours of enhanced CPD with this issue
Precise freehand implant placement

David Burgess explains how he used dynamic navigation to accurately plan and place implants for a patient who presented without secure support for an optical marker

A 75-year-old male patient’s lower incisors had become increasingly mobile over recent years (Figure 1). He was a healthy non-smoker and his maxilla had previously been restored with an implant-supported full-arch bridge.

The lower left central incisor was extracted some time ago and had been splinted to the remaining lower anterior teeth with light-cured composite, as a temporary solution. With increasing mobility of the remaining lower incisors, the lingual composite splint had repeatedly fractured and the patient was keen to seek a more permanent restorative solution.

He was not prepared to wear a denture, and did not wish to compromise the health of his remaining lower canines by using them to support a fixed bridge.

The lower left first premolar was mobile and the lower right first molar had previously been extracted.

The patient opted for a treatment plan involving extraction of the remaining three lower incisors, along with the mobile lower left first premolar. Dental implants would be placed in the lower lateral incisor sites, as well as the lower left first premolar and lower right first molar sites. A laboratory-made temporary bridge was to be fitted to the lower lateral incisor implants during the same visit as the implant placement.

Planning for accurate placement

Prior to any extractions, an intraoral scan of the lower teeth was carried out using a 3shape Trios scanner.

An acrylic temporary bridge was made by the dental technician to replicate and replace the four lower incisors. The temporary bridge was constructed with the teeth hollowed out, to allow fixture to implant abutments.

A pre-treatment scan was taken, using a Morita 3D cone beam computed tomography (CBCT) system, to assess bone volume.

As an advocate of dynamic navigation to enhance precision and safety in implant placement, my plan was to use the real-time information and guidance provided by Navident to ensure the implants were accurately positioned, enabling the temporary bridge to be fitted directly onto the abutments.

Trace and Place

The first version of Navident required a thermoplastic support to be moulded over remaining teeth, to hold a radiographic marker for the CBCT scan and an optical marker during surgery. In this case, construction of a secure support was not possible, due to the arrangement of the teeth. Additionally, the mobile incisors were splinted to each other, and to the lower canines, with lingual composite resin, which would compromise the construction of a support.

Navident 2.0, with Trace and Place, avoids the need for a radiographic marker, instead achieving registration of the real jaw to the

Dr David Burgess BDS DPDS MScConSed has placed more than 3,500 implants, approximately 600 of those with dynamic navigation.
Using a horizontal SDI and an improvised attachment for dynamic navigation with Navident Trace and Place ensured the anterior implants were positioned precisely

Innovative technique

The solution was to place a horizontal small diameter implant (SDI) in the central area of the mandibular ridge, to which an improvised attachment could be fixed as a support for the Jaw Tracker. This left the remaining reference teeth free for tracing, and ensured the surgical site was visually and physically unobstructed.

A further CBCT scan was not needed, as tracing registration can be carried out on any representative CBCT scan, and without the need for a radiographic marker.

The CBCT scan data was imported into the Navident planning software (Figure 2). The location of the existing lower incisors was used to plot the position of the proposed implant-supported bridge and plan the ideal position of the four implants (Figure 3). Five reference teeth were marked on the planning software as start points for tracing (Figure 4). A horizontal SDI was placed in the centre of the mandibular ridge and an improvised Jaw Tracker support was attached (Figure 5). The failing lower incisors were extracted and the Jaw Tracker was attached to the SDI with blue composite resin.
The drill axis and tip were calibrated and the accuracy checked – in a process taking only seconds – before the implant sites were prepared using dynamic navigation.

The calibration and verification process helped to ensure the emergence profile of the implants aligned with the temporary bridge (Figures 8a and 8b). Two Dentsply Ankylos C/X implants were placed in the lower left and right lateral incisor sites, according to plan (Figure 9).

Ankylos Balance Base abutments and transfer posts were fitted (Figure 10). Geistlich Bio-Oss was used to fill the voids in the sockets and aid new bone regeneration around the implants during the healing process (Figure 11). The site was closed with Teflon sutures (Figure 12). The screw-retained temporary bridge was attached to the transfer posts (Figures 13a and 13b).

Using a horizontal SDI and an improvised attachment for dynamic navigation with Navident Trace and Place ensured the anterior implants were positioned precisely for the immediate attachment of a pre-constructed, screw-retained temporary bridge (Figure 14).

**Flapless procedure**

The premolar and molar implants were placed at the same time as the anterior implants.

The extracted lower left premolar had drifted and was at an angle, leaving a space large enough for two teeth. Therefore, the implant was placed distal to the extraction site, rather than directly into the socket, in the optimum position to restore with a two-unit cantilever bridge (Figure 15).

Dynamic navigation allowed the lower right first molar implant to be placed using a flapless procedure (Figure 16). Healing caps were fitted and the sites left to heal for three months, before restoration with a two-unit cantilever bridge and a single zirconia crown, respectively.