

Surgical Guidestents for Placement of Implants

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Osseointegration of implants via the Branemark method, can provide a predictable prognosis for restoration, reconstruction, or rehabilitation of the fully or partially edentulous patient.¹ However, one factor in the formula for successful osseointegration is fixture position. Successful abutment connection and uncomplicated prosthesis fabrication requires properly placed, spaced and aligned fixtures. This is achieved when screw access to the jawbone anchorage unit is positioned within the buccal-lingual confines of the maxillary and mandibular posterior artificial teeth or in the mandibular arch slightly lingual to the anterior replacement teeth. The use of surgical guidestents greatly enhances the surgeon's ability to quickly and accurately determine fixture location and long axis angulation. The following types of guidestents have been found useful for this purpose.

Surgical Guidestents for Use in Osseointegration

There are three basic surgical guidestents useful in osseointegration: 1) fully edentulous; 2) partially edentulous (removable partial denture design); and 3) partially edentulous tooth supported design.

FULLY EDENTULOUS GUIDESTENT

There are two types of fully edentulous guidestents: one provides a general guide to the area of fixture placement, and the second provides a specific guide to the location and angulation of each fixture to be placed. The general guidestent is constructed by duplicating the transitional denture.

The general area of fixture placement is then cut out of the duplicate denture (Fig. 1). Occlusal and incisal surfaces are reduced to one-half the normal height. It is important to maintain the labial surfaces of the teeth. Fixtures are placed within the general cut out area of the modified duplicated denture. In the maxilla, the area between the canine eminence and first molar positions is optimal. Man-

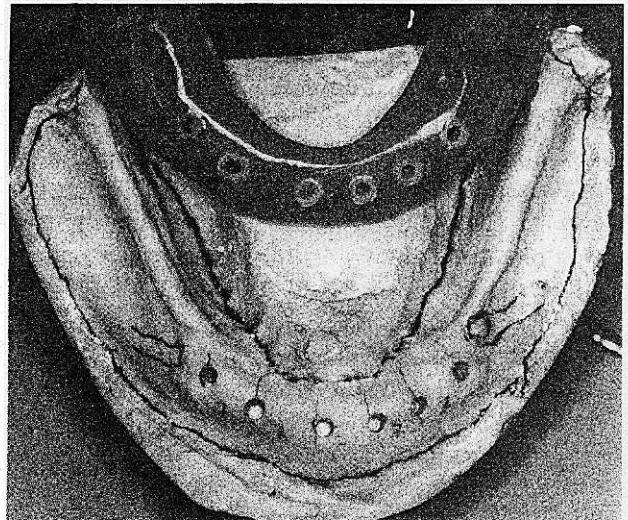


FIGURE 1 (top). General guidestent for mandible directs surgeon to position fixtures within the lingual relief area in the anterior region.

FIGURE 2 (bottom). Specific guidesplint prepared for use in the mandible.

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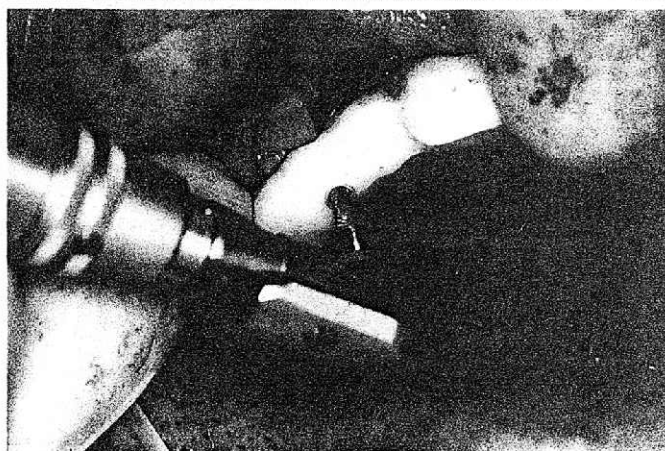
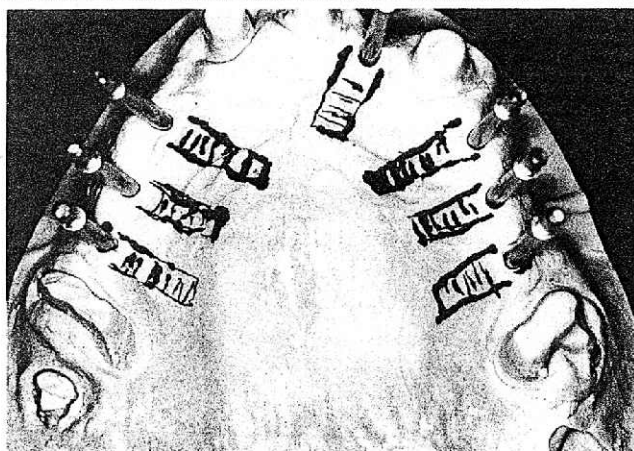
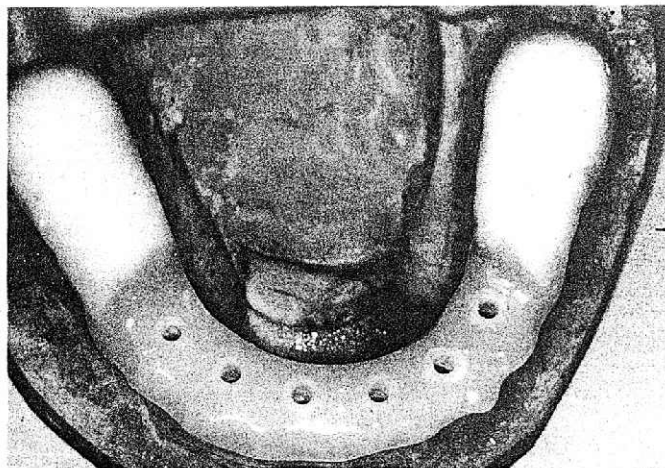
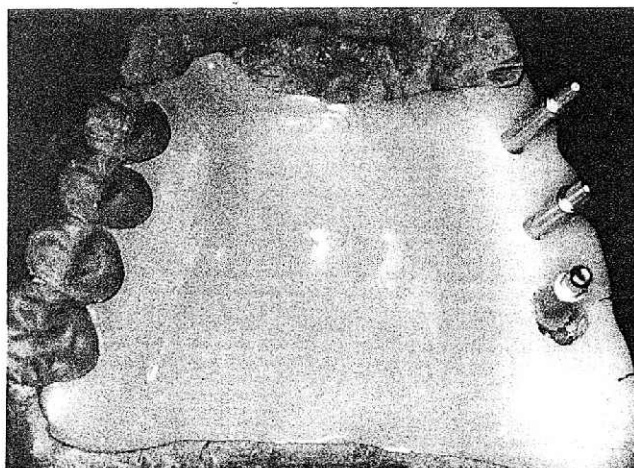


FIGURE 3 (top left). Using radiographic measurements, fixture location and angulation is simulated on the diagnostic cast.

FIGURE 4 (top right). Guidestent overlays the occlusal surfaces of adjacent teeth.

FIGURE 5 (bottom left). Stone cast of prepared teeth and fixture locations.

FIGURE 6 (bottom right). Guidestent is inserted over prepared abutment teeth. Apical pressure on guidestent over the abutment teeth holds it securely in place while the guide drill begins fixture site preparation. Note reduction of edentulous area.

dibular fixtures should be located lingual to the incisal edges of the anterior denture teeth and within the confines of the occlusal surface of the posterior teeth. To avoid cosmetic complications, fixtures should not be angulated facially.

The specific guidestent for the fully edentulous arch uses 2-mm diameter plastic tubes (Component of Pindex Die System, Whaledent International) set in a duplicate of the transitional denture base (Fig. 2). The tubes are precisely positioned and angulated after consultation between the surgeon and the prosthodontist. Clinical examination will indicate the thickness of the overlying mucosal tissue, which may be compensated for by trimming the stone cast prior to drilling the guide holes. This permits the guidestent to be located closer to the bone. Irrigation space between the guidestent and bone, however, must be maintained. During surgery, the flaps are reflected, the guidestent is positioned, and the guideholes are drilled through the tubes. Irrigation and cooling is best accomplished

by positioning the syringe tip in the small space between the guidestent and bone.

When using the fully edentulous maxillary surgical guidestent, a palatal incision, with facial reflection of the flap is recommended. The guidestent is easily positioned and stabilized by the hard palate, the posterior alveolar ridges, and the tuberosities.

PARTIALLY EDENTULOUS: REMOVABLE PARTIAL DENTURE DESIGN

Specific location and angulation can be achieved by determining fixture location on the stone cast (Fig. 3). This guidestent also incorporates the plastic guidetubes. In the maxilla, complete palatal coverage will help stabilize the guidestent. The denture supporting area is covered only to the facial-palatal width of the replacement teeth; it should not include the denture flange extension. This permits the irrigation syringe to be placed

close to the guidehole. Acrylic extension on the occlusal or incisal surfaces of adjacent teeth provides additional stability (Fig. 4).

PARTIALLY EDENTULOUS TOOTH SUPPORTED DESIGN

After abutment teeth are prepared, a diagnostic cast is made (Fig. 5) and a duplicate of the provisional fixed bridge is constructed that contains the plastic guide tubes identifying fixture locations. The pontic areas are reduced occlusally so that only 3 mm of occlusal height remains above the area where the fixtures are to be installed (Fig. 6). This decrease in thickness allows the guide drill to be inserted to a depth in bone sufficient to continue guidance for long axis angulation when the guide-stent is removed.

Discussion

Occasionally, the osseous anatomy envisioned on the diagnostic cast may not represent the true clinical condition when the soft tissue flap is reflected. In this instance the surgical guidestent may not permit the surgeon to center the fixture in the area of greatest bone volume. Free hand fixture placement is then carefully performed using the guidestent to provide the approximate location and inter-fixture space requirements. The surgeon must then use his clinical judgement for fixture angulation, based on his understanding of the prosthetic construction of the tissue integrated prosthesis.

Reference

1. Branemark P-I, Zarb G, Albrektsson T: Tissue-integrated Prosthesis—Osseointegration in Clinical Dentistry. Chicago, Quintessence Publishing, 1985