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# Screw-Retained Implant-Supported Restoration

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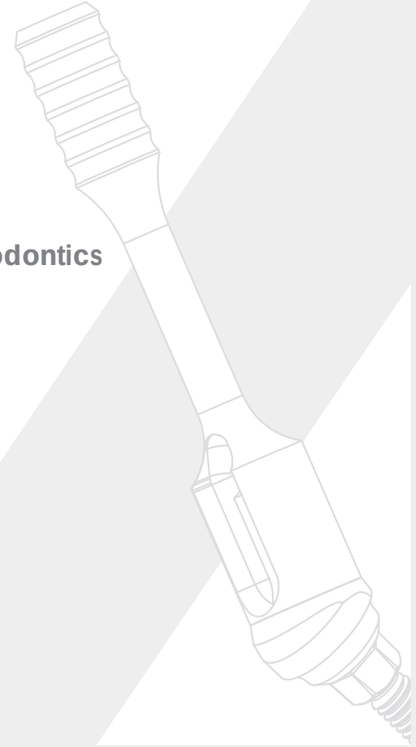



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# Screw-Retained Implant-Supported Restoration

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In the early days of implant use for fixed prosthesis, the proposed concept relied mainly on screw-retained restorations, in order to allow prosthesis retrievability (an option for removal of the restoration) for maintenance and repair, due to a considerable proportion of failures (Adell, 1983).

Today, the need for retrievability and screw-retained prostheses has decreased significantly due to:

- Increase in implant success and survival rate due to implant surface improvement (Brånemark, 1995).
- Wide assortment of prosthetic appliances, appropriate to a variety of clinical indications.
- Increase in the quality and precision of prosthetic appliances.
- Improvement in the characteristics of prosthetic dental materials (methacrylate, composite resins, dental ceramics).
- Increase in the demand for esthetics in the posterior dentition as well.

The indications for screw-retained restorations are now limited to situations characterized by:

- Scarcity of restoration-supporting implants (edentulous jaw restoration on 4 or 6 implants).
- Hybrid dentures.
- Decreased intermaxillary space (Misch 1993).
- Enlarged cantilever (buccal or distal).

The difficulties in production of screw-retained fixed prostheses:

- Achievement of a passive fit of the prosthesis on the implants, due to possible distortions in the metal casting process (an advantage for CAD/CAM milled prostheses) and during teeth shape buildup, heat curing of the acrylic or baking of the ceramics (Hebel 1997).
- An increased chance of screw loosening or coping / screw fractures (Michalakis 2003).
- Compromised occlusal continuity (holes in the occlusal surface) that might increase fractures of the ceramic layer (Phillips 1997).
- Damage to the occlusal surface and compromised ability to establish normal contacts (Ekfeld 1983).
- Compromised esthetics of the restoration, especially when the screw aperture is adjacent to the buccal surface of the restoration.
- Need for additional prosthetic parts and more clinical stages for performance of the work.

## Clinical case:

A 65-year-old female patient, suffering from mild hypertension, edentulous for a long period of time and using full removable prostheses, is interested in a fixed restoration in the mandible, due to instability of the mandibular prosthesis.
At the clinical examination, edentulous jaws are found, with two-dimensional (vertical and horizontal) resorption of the residual ridges, and a significantly retrognathic mandible, which is not typical of edentulous jaws.

An intra-oral photograph demonstrating the extreme ridge resorption

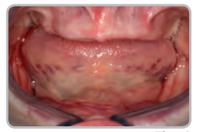

Fig. 1

The problematic nature of the case:
The CT scan shows the sharp lingual inclination of the ridge. Accordingly, in order to construct a fixed prosthesis that will contain normal OJ and OB with the maxillary prosthesis, two implant positions are possible:

1. A position buccal to the ridge (this requires a large augmentation in the buccal area).
2. Placing the implants in a lingual inclination and construction of a prosthesis with a large buccal cantilever (this might give rise to esthetic and phonetic problems, reduction of the lingual space, limited retention and a problematic insertion path).

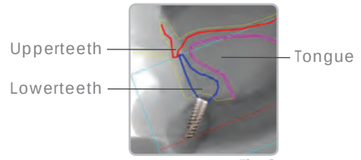


Fig. 2

The patient refused to undergo complex surgical procedures of bone regeneration, and a decision was made to place eight implants in the mandible, according to the inclination of the residual ridge, and to construct a fixed Hybrid Denture prosthesis.

After three months, an implant level impression was taken and a diagnostic wax-up was examined, according to which a silicone buccal index was created in order to explore the prosthetic possibilities.

Preparation of the implant level cast

Fig. 3

Diagnostic wax-up (notice the large BL width of the restoration – 16 mm)

Fig. 4

Buccal index showing the position of the teeth relative to the implants

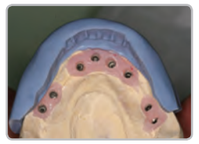

Fig. 5



At this stage, a decision was made to use a system which would correct the prosthetic screw position buccally, in order to decrease the restoration width.
The Alpha-Universe Multi-Unit Abutment System is used for angulated screw-retained restoration with an internal hexagon, and allows for a correction of 17 or 30 degrees at different gingival heights. The system enables examination of the correction angle during restoration planning with the help of a plastic guide, which is also used to transfer the multi unit abutment base into the mouth. The system consists of a base and a cover screwed into it.

This case demonstrates that, in order to build a restoration that provides a response to the patient's functional, esthetic and phonetic needs without performing complex surgery, a smart implant-connection system that will allow restoration flexibility is required.
The Alpha-Universe Multi-Unit Abutment System provides a good solution in situations where screw-retained restoration on inclined implants is indicated.

Corrected screw angle
Angle of the implant

Fig. 6

Attaching the Alpha-UniBase for correction of the implant position

Fig. 7

Choosing bases according to the wax-up index, gingival height and inclination

Fig. 8

After taking out the guides

Fig. 9

Connecting TCT type abutment covres for screw-retained restoration

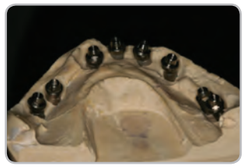

Fig. 10

Abutment insertion to the mouth with the plastic guides, and taking abutment level impression, with an open tray, following fixation of transfers to the abutments

Fig. 11

Preparing an abutment level working cast (TCT analogs)

Fig. 12

Casting the metal coping according to the diagnostic buccal index

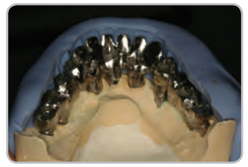

Fig. 13

Restoration buildup guided by the desirable occlusal characteristics

Fig. 14

The PFM bridge tissue-facing side)

Fig. 15

Ceramic buildup according to the buccal index

Fig. 16

Fixation of the screw- etained bridge in the mouth and closure of the screw holes with composite material

Fig. 17

Final prosthesis delivery

Fig. 18

A good esthetic result with no functional or phonetic disturbance

Fig. 19

End-of-treatment panoramic X-ray

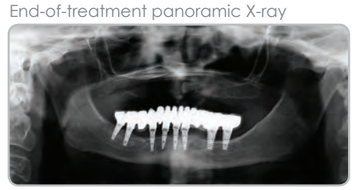

Fig. 20