

• implants

the international C.E. magazine of oral implantology

4²⁰¹²

_c.e. article

Graftless solutions
in implant dentistry
(Part 2)

_c.e. article

New concepts
in computer-guided
implantology

_industry

The evolution
of sinus lift
techniques



Stay on top of new techniques, products with *implants*



Publisher Torsten Oemus

_Thanks to rapidly advancing technology, the field of implant dentistry is always changing and evolving. Clinicians must be vigilant in their efforts to keep up with new techniques, new products and new technology that could affect treatment planning.

And that's what makes the publication you are holding right now so valuable.

For this issue of *implants*, we've assembled a collection of articles from a variety of respected names in dentistry. These expert clinicians are sharing their first-hand knowledge and expertise with you. In this issue, you can read about graftless solutions in implant dentistry, and you can also learn about new concepts in computer-guided surgery. We also have news on implant products and technology.

But there's more.

Every issue of *implants* magazine also contains a C.E. component. By reading the set of articles (beginning on Page 6) on "Graftless Solution in Implant Dentistry: Part Two" by Drs. Jivraj and Zarrinkelk and "New concepts in computer-guided surgery" by Dr. Telara and then taking short online quizzes about these articles at www.DTStudyClub.com, you will gain one ADA CERP-certified C.E. credit.

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I know that taking time away from your practice to pursue C.E. credits is costly in terms of lost revenue and time, and that is another reason *implants* is such a valuable publication.

I hope you enjoy this issue and that you get the most out of it.

Sincerely,



Torsten Oemus
Publisher



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Cover image provided by BIOMET 3i.

The image depicts the NanoTite
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Graftless solutions in implant dentistry: Part 2

Authors_Saj Jivraj, BDS, MSED, and Hooman Zarrinkelk, DDS

_c.e. credit part I

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Diagnosis, treatment planning and delivery of the immediate load prosthesis

_Treatment protocol

The treatment protocol for graftless solutions involve a number of requirements.

- 1) It has a reduced number of implants
- 2) The protocol has been popularized by the All on 4™ solution (Nobel Biocare). Clinicians should be aware that the graftless protocols may involve placement of more than four implants.
- 3) Anterior implants are placed straight
- 4) Posterior implants are tilted to avoid grafting procedures
- 5) The patient is provided with fixed rigid acrylic prosthesis which splints all the implants and provides cross arch stabilization
- 6) The prosthesis is immediately loaded.

This type of prosthesis is indicated for patients:

- 1) In which good lip support can be provided without a flange.
- 2) In which patient does not want to go through grafting procedures.
- 3) In which sinus is a limit posteriorly.
- 4) In which cost is a factor.

_Patient requirements

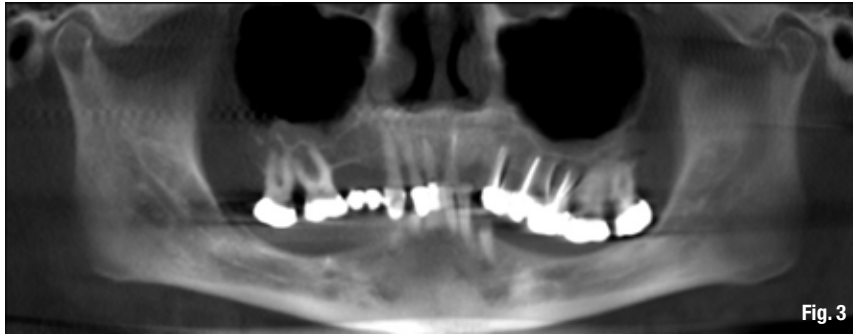
There are certain requirements that must be adhered to ensure clinical success.

The patient must be in good overall health. The patient must have a good understanding of the prosthesis design. In particular, the patient must be made aware that there will be pink acrylic replacing lost hard and soft tissue. For edentulous patients, this may be something they have become accustomed to.

Fig. 1 _Patient A smile line.
Photos/Provided by Dr.Saj Jivraj

Fig. 2 _Intra-oral view of patient A.





For dentate patients, they must be made aware that alveolectomy will be performed and the lost tissue will be replaced by pink acrylic.

Practitioner requirements

All practitioners involved must have undergone significant hands-on training and be comfortable with immediate function procedures. Practitioners must have adequate inventory to ensure clinical success. This includes having additional implants, abutments and temporary cylinders on hand should they be required. Inventory planning should be carried out way ahead of time.

Dental laboratory support

From a laboratory perspective, the provisional complete denture must be ready. Denture base resin must be available and adequate instrumentation to finish and polish the prosthesis. It is the dental technician's responsibility to complete all the non-clinical phases of treatment after the clinician has indexed the prosthesis intra-orally.

Case presentation

When a patient presents who is a candidate for graftless solutions, a comprehensive clinical and radiographic examination must be undertaken. This should include CBCT scan, periapical and panoramic radiography. Time must be spent on diagnosis and treatment planning to ensure a predictable outcome.

Key diagnostic determinants that the clinician must focus on are:

- Hard and soft tissue missing.
- Ridge display during smiling.
- Bone quantity and quality.
- Restorative space required.

Patient A presented for evaluation (Figs. 1, 2). She had not seen a dentist for the last 20 years and, like many patients, her fear was the thought of wearing complete dentures. She presented with a failing dentition and requested implant therapy such as fixed implant-supported restorations. All options were discussed with the patient. The patient's desire was to proceed with implant-supported fixed dentures adopting a graftless approach.

Treatment planning required:

- Panoramic radiograph
- CBCT
- Clinical evaluation

Panoramic radiograph: On evaluation of the panoramic radiograph, the following was found: failing dentition with recurrent caries beneath multiple restorations, low sinus floor, posterior mandibular resorption limiting implant placement in this region and a high mental nerve (Fig. 3). On evaluation of the panoramic radiograph, it was apparent that there was bone availability in zones 1 and 2.

CBCT: This provides the clinician with more accurate anatomical measurements and 3-D topography of the osseous architecture. A safe guideline in

Fig. 3_ Panoramic radiograph of Patient A, illustrating high mental nerve, irregular occlusal plane, bone present in zones 1 and 2.

Fig. 4: Excessive lip support due to flaring of anterior teeth.

Fig. 5_ Excessive tooth display . Patients displays gull wing smile line.

Fig. 6_ Overerupted maxillary incisors.



Fig. 7_ Intra-oral situation.**Fig. 8_** Problem list includes over-erupted anterior teeth, posterior mandibular resorption, irregular occlusal plane and failing dentition.**Fig. 9_** Provisional complete dentures.**Fig. 10_** Flap elevated in preparation for alveolectomy.**Fig. 7****Fig. 8****Fig. 9****Fig. 10**

terms of osseous requirements is that there should be 5 mm of bone width and 10 mm of bone height in the maxilla and 5 mm of bone width and 8 mm of bone height in the mandible.

Clinical evaluation

The clinical evaluation had the following results:

- **Facial and lip support:** As a result of inadequate posterior support, the anterior teeth had flared and were over-supporting the lip
- **Smile line and lip length:** Gingiva was visible when the patient produced an exaggerated smile
- **Incisal edge position:** Conventional prosthodontic guidelines dictate that the incisal edge position should be determined by esthetics and phonetics. The incisal edge should be positioned just palatal to the vermillion border of the lower lip.

Esthetically, there should be 2-3 mm of the incisor visible when the patient is in repose; this display is less for an elderly patient. Other guidelines for incisal edge position include the "S" position and the "F" sound. In this particular patient, it appeared the incisal edge flared forwards and over-erupted. The patient appears to be showing too much incisal edge, and this will need to be addressed when deciding its definitive position (Fig. 4).

- **Interarch space:** As a result of missing posterior mandibular teeth and a diagnosis of lack of posterior support, the interarch space had been compromised. Over-eruption of posterior maxillary teeth resulted in inadequate restorative space posteriorly. Over-eruption and flaring of both maxillary and mandibular anterior teeth resulted in a deep vertical overlap of anterior teeth and in adequate restorative space (Fig. 5).

_Gaining restorative space

In patients who require extensive restorative

therapy, restorative space constraints frequently arise. The treating clinician must decide how to gain space so restorations with adequate mechanical integrity can be fabricated.

There are a few techniques to gain space for the patient about to undergo full-mouth extractions and implant placement:

- Restoration of the vertical dimension of occlusion
- Alveolectomy
- Combination of the above.

Restoration of the vertical dimension of occlusion: This assumes the patient has lost vertical dimension, when in reality they may not have. Physiological adaptations to alterations in OVD (Occlusal Vertical Dimension) are highly individual. It can be extremely unstable in some patients but successful in others. We cannot predict in which patient it is likely to be successful; there are no scientific guidelines to do this. There is just clinician experience over time.

Guidelines were established by Di Pietro¹, who discussed the significance of the Frankfort Mandibular Plane Angle and its relevance to restorative dentistry. He mentioned in his article that patients with a low FMA are predisposed to a decrease in OVD; these patients are more likely to return to their former occlusions if the OVD is opened. Patients with high FMA angles are the opposite and can tolerate an increase in OVD.

So what limits are there to increasing OVD? There are, in fact, no specific measurements; the increase is dictated by restorative space required, esthetics and phonetics.

Clinicians are divided in theories regarding alteration of OVD. Some believe we cannot alter it, and if we do, it will go back to its pre-treatment position.²

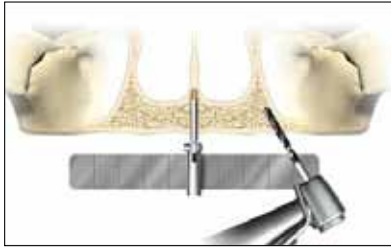


Fig. 11



Fig. 12



Fig. 13

Others believe we can alter it as much as we need, and it will be stable.^{3,4}

There is a consensus that if OVD alteration is required, it is altered as little as possible to achieve the clinician's restorative objectives. To summarize, it is possible to alter the OVD and from a muscular perspective and not suffer negative sequelae as long as the alteration occurs within the patient's physiologically adaptable range.

Alveolectomy is often required when teeth have over-erupted and there is an excess of bone, which compromises the restorative space.

_Decision making for Patient A

A majority of the space for Patient A was created by alveolectomy. The rationale for that being:

- Patient A's lip was over-supported because of the lack of posterior support and flaring of the maxillary anterior teeth.
- Over-erupted maxillary and mandibular anterior teeth with excess bone.
- Maxillary incisal edge is in incorrect position. Requires repositioning 3 mm apically. This will allow the transition zone to be concealed. This will also require alveolectomy to provide adequate restorative space (Fig. 6).

A duplicate set of mounted diagnostic casts are required. One set of casts is used as a reference; the second set of casts is used for the diagnostic tooth set up. On this set, model alveolectomy is performed and communicated to the surgeon via a bone reduction guide.

_Treatment sequence

- Visit 1 – At the first visit, the following is required:
 - a) Pre-operative and extra-oral photos.
 - b) Preliminary impressions; these should capture the full depth of the sulcus and all anatomical landmarks.
 - c) Smile line evaluation.
 - d) Lip support and lip length evaluation.
 - e) Vertical dimension evaluation.
 - f) Inter-arch relationships.

- Visit 2 – At this visit, jaw relationships are established using conventional prosthodontic guidelines. The following is required:

- a) Smile line, midline and canine lines.
- b) Lip support.
- c) Occlusal plane.
- d) Occlusal vertical dimension.
- e) Centric relations.
- f) Tooth shape, mould and shade.

- Visit 3 – If the patient is fully dentate, a try-in appointment is not feasible. As clinicians, we use anatomical landmarks to position teeth and orientate the occlusal plane. If the patient is edentulous, the following needs to be evaluated at the diagnostic tooth set-up:

- a) Smile line, mid-line and canine lines.
- b) Lip support.
- c) Occlusal plane.
- d) Occlusal vertical dimension.
- e) Centric relations.
- f) Tooth shade and shape selection.

Fig. 11_ Tilted implant placement. Posterior implants placed parallel to the anterior wall of the maxillary sinus.

Fig. 12_ Multi-unit abutments placed with abutment driver.

Fig. 13_ Severe lack of lip support requires the patient to wear a prosthesis with a flange.

Fig. 14_ Plastic healing caps placed on multi-unit abutments.

Fig. 15_ Goal of implant placement is to have four or more implants placed with multi-unit abutments attached in preparation for immediate loading.



Fig. 14

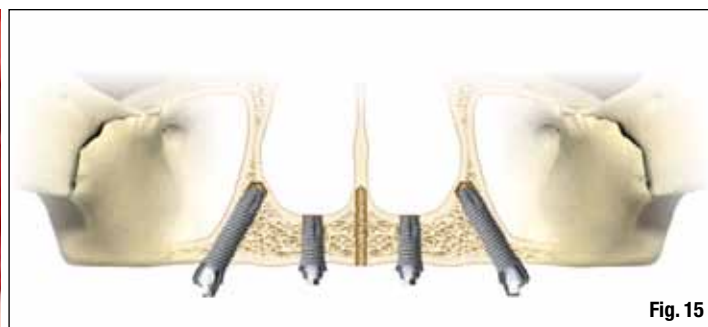


Fig. 15