Case study 40

Use of narrow implants for restoration of missing anterior teeth

Dr. Amir Gazmawe

AlphaBio TEC
Simplantology

Dr. Amir Gazmawe

Dr. Amir Gazmawe is a 2001 graduate of the Dental Medicine School of Hebrew University-Hadassah in Jerusalem and completed a post-graduate specialization in prosthodontics at the same institution in 2008. Dr. Gazmawe has extensive experience in the area of prosthodontics using implants and was a member of the corps of clinical guides at the Dental Implant Center at Hadassah Ein Karem. He is a prosthodontics advisor at the high-risk unit at Poria Hospital in Tiberias as well as a students' guide at the Dental Medicine School in Jerusalem. Dr. Gazmawe lectures in Israel and abroad on the subject of integrated implant prosthodontics and dental aesthetics. Dr. Gazmawe manages a private implantology and prosthodontics clinic in Ramat Hasharon.

Abstract

Missing teeth in the anterior region constitutes a surgical and rehabilitative challenge. This case describes a patient with mandibular partial edentulism, who is interested in permanent restoration at minimal cost.

Introduction

Missing teeth in the anterior region constitutes a surgical and rehabilitative challenge. In implantology, the location of the implant and the support of the bone around the implant are of great importance. The decision as to the diameter of the implant to be inserted in the anterior ridge and the placement of the abutment is important from both surgical and prosthodontics perspectives. Narrow implants are intended as a solution to narrow, resorbed and undeveloped ridges. The advantages of narrow implants in the anterior region are many:

A. Greater bone support around the implant.
B. A larger safety zone around the adjoining teeth or implants.
C. Better maneuverability in placement of the implant (near nerves, sinuses, etc.).
D. Reduces need for augmentation for implant placement in ridges with limited marginal thickness.
E. Allows one stage augmentation and implantation.
F. Due to its exterior geometry, enables good initial stability and even immediate loading in narrow ridges.
G. They provide a simple solution to missing teeth when the anterior-posterior spread is reduced (loss of space as a result of tooth migration or congenital absence of permanent teeth).

In today's implant market there is a wide range of implant systems, including narrow implants in a variety of concepts. Most of these systems are based on one-piece implants that are primarily suited to the restoration of single teeth due to the inability to correct the implant angulation. One of the reasons for the existence of this type of narrow implants is the mechanical limitation, particularly in implants the diameter of which is less than 3.2 mm, in which the implant-abutment connection is notably weak. The indication for use of this type of implant is in cases of immediate loading. With regard to narrow implants that are not one-piece implants, there is a minimum diameter of the cervical region of the implant required in order to allow placement of an abutment that is resistant to lateral forces; usually the minimum diameter is 3.2 mm, while the platform may be either internal or external.

An implant system that allows placement of the abutment separately from the implant gives the system many advantages, such as:

A. Precise restoration due to the ability to take impressions at the implant level and prepare abutments better suited to the case in angulation and structure.

B. The ability to cover the implant when there is reduced initial stability or the need for augmentation or manipulation of soft tissue.

C. Construction of a multi-unit restoration in a precise and passive manner.

The shape of the platform for narrow implants is also important, and the internal platform hexagon has both aesthetic and biological advantages, as does the placement method that includes platform switching, which reduces the resorption of cervical bone that occurs after loading the implant.

Case description

Male, approx. 60 years old, generally healthy, non-smoker and without any known sensitivities presented for treatment due to missing mandibular teeth. He was interested in permanent restoration at minimal cost.

Intra-oral examination

Upon examination, poor oral hygiene, deep pockets around teeth 31, 32, 42, of 5-6 mm, class-3 mobility, missing anterior teeth and missing molars, lack of occlusal support due to missing teeth. Secondary caries can be seen in teeth 37 and 45.

1 X-ray upon admission (missing front and back teeth, loss of support around incisors)

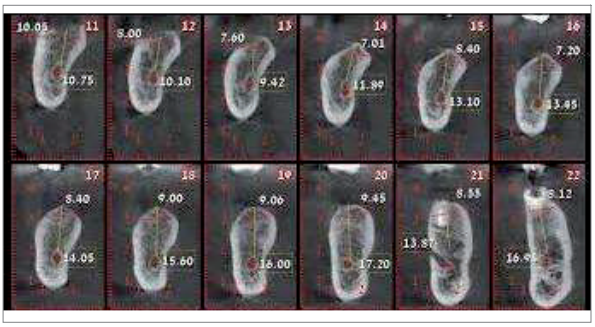
2 Clinical photo upon admission (teeth 42 and 32 are mobile with pockets up to 6 mm)

Radiographic findings

Considerations in selecting the implants and drawing up a treatment plan based on the CT imaging (Image no. 3) it may be seen that in the anterior region 32-42 there is sufficient bone height (over 16 mm) but the average width bone is 5 mm. In order to position standard implants (with a diameter of 3.75 mm) buccal augmentation is necessary, which will extend the treatment time, add significantly to the cost of treatment and place the possibility of immediate loading in the anterior region in doubt. It was therefore decided to use implants with a narrow platform (NICE implant, Alpha Bio Tec, Israel), which have a diameter of 3.2 mm and a narrow implant body. This implant system allows insertion without the need for augmentation and provision of minimal initial stability for immediate loading (35 Ncm). The further advantage of this system is platform switching, in which the diameter of the abutment is narrower than the diameter of the implant, which has been proven to be advantageous in reducing resorption of crestal bone, which may detract from the aesthetic result of restoration in the anterior region.

Another characteristic of the NICE implant platform is the conical connection, which allows distancing the pressure points and the implant-abutment friction away from the crestal bone, which also contributes to reducing the crestal bone resorption. In the posterior region of the mandible there is good availability for placement of wide implants with a diameter of 5 mm and a length of 13 mm (ATID, Alpha Bio, Israel) and the connection of abutments with a smaller diameter to reduce resorption of the crestal bone. Due to the patient's financial limitations it was decided to place 2 implants in the right and left posterior regions of the jaw and to construct a three-unit bridge on each side of the posterior mandible. In the anterior region 2 implants will be placed in the position of the lateral teeth and a bridge (partial permanent denture) supported by implants placed at 32-42 without augmentation.

3 CT of the anterior region



4 CT of the posterior region

Treatment plan

The treatment plan presented was restoration of the anterior region by means of a permanent prosthesis supported by implants at position 32 and 42 and temporary immediate restoration with immediate loading. The posterior region will be restored by fixed partial denture supported by implants with subsequent loading, and temporary restoration in the form of a removable partial denture to provide posterior occlusal support for the duration of treatment.

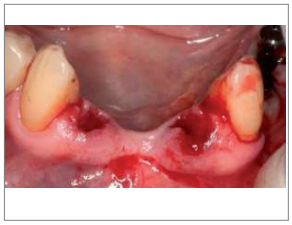
Materials in use

2 NICE implants Ø 3.2 mm L 13 mm, 4 ATID implants Ø 5 mm L 13 mm

Surgery and restoration phase

The first stage consisted of initial preparation including patient training on improving oral and dental hygiene and habits and removal of tartar. Then, the following steps have been performed:

1. Raising a flap in the posterior region and insertion of 4 ATID (Alpha Bio, Israel) implants, Ø 5 mm L 13 mm and applying torque of 45 Ncm in positions of teeth 34, 36 and 45, 47.
2. After initial periodontal treatment and satisfying hygiene control, impressions were taken and a temporary hollow bridge was made for immediate restoration of teeth 32-42.



3. Extraction of teeth 32 and 42 and insertion of 2 NICE implants with a diameter of Ø 3.2 mm L 13 mm, without opening a flap.

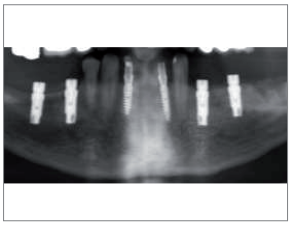
4. Initial drilling with a 2-mm drill to the full depth and addition drilling with a 3.0-mm drill to a depth of 5 mm (type 2 bone).

5. Initial manual insertion, separation of carrier and continued mechanical insertion up to a torque of 40 Ncm.

6. Continued insertion of the implant using a special ratchet wrench.

7. Attachment of straight abutments.

8. Reline of temporary bridge, processing of the connection area and pontic areas to give anatomical form to the temporary restoration attachment. Immediate temporary prosthesis.



9. Waiting for healing, 3 months. Panoramic X-ray after 3 months, shows successful integration of the implants.

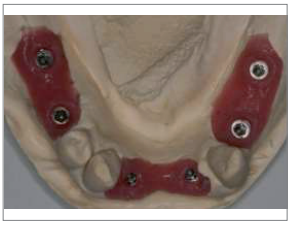
10. Removal of the temporary anterior prosthesis after confirmation X-ray.

11. Soft tissue and implant stability evaluation before impression taking.

12. Implants level impression taking using appropriate transfers: Attachment of posterior transfer abutments and anterior transfers at the implant level.

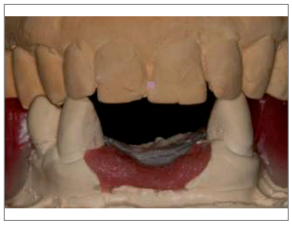
13. Use of snap transfers at the abutment level.

14. Analogs connection after impression removal.

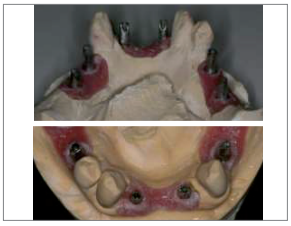


15 Preparation of the working model.

16 Preparation of bite rim to record intermaxillary relationship.



17 Mounting of model in intermaxillary relationship.



18 Preparation of abutments and metal framework based on the temporary bridge and adjoining teeth and the intermaxillary ratios.

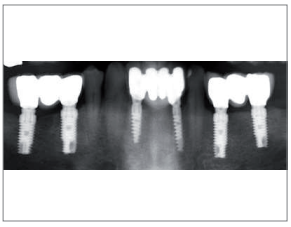
19 Attachment of abutments in mouth.

20 Checking passive fit of metal framework intra-orally

21 Porcelain buildup on working model

22 Delivery of the prosthesis, connection of the abutments using new screws. Tightening the abutments to a torque of 30 Ncm

23 Placement of the prosthesis.



24 Final X-ray.

25 Follow-up X-ray of the anterior region after half a year, showing the high bone stability due to the unique design of the implant and abutment.

Summary

Implant-supported restoration in resorbed ridge is challenging from an implantology and prosthodontics perspective. Narrow implants allow predictable restoration and may spare the patient complex augmentation procedures which prolong treatment and increase costs. This method allows implantation with immediate loading without increasing the risk of failure. NICE implants allow simpler and safer insertion in the anterior regions while preserving the biological and mechanical fundamentals that are important for preserving the bone around the implants, due to their conical connection and platform switching. At the same time they provide a good aesthetic and prosthodontic option in areas where the ridge thickness is limited.

Acknowledgement

Leon Eliasuf, Petach Tikva - technician

References

1. Andersen, E., Saxegaard, E., Mork Knutsen, B. & Haanaes, H.R. (2001) A prospective clinical study evaluating the safety and effectiveness of narrowdiameter threaded implants in the anterior region of the maxilla. International Journal of Oral & Maxillofacial Implants 16: 217– 224.
2. Anner, R., Better, H. & Chaushu, G. (2005) The clinical effectiveness of 6 mm diameter implants. Journal of Periodontology 76: 1013–1015. Aparicio, C. & Orozco, P. (1998) Use of 5-mmdiameter implants: periotests values related to a clinical and radiographic evaluation. Clinical Oral Implant Research 9: 398–406.
3. Becktor, J.P., Isaksson, S. & Sennerby, L. (2004) Survival analysis of endosseous implants in grafted and nongrafted edentulous maxillae. International Journal of Oral & Maxillofacial Implants 19: 107–115.
4. Brocard, D., Barthet, P., Baysse, E., Duffort, J.F., Eller, P., Justumus, P., Marin, P., Oscaby, F., Simonet, T., Benque´, E. & Brunel, G. (2000) A multicenter report on 1022 consecutively placed ITI implants: a 7-year longitudinal study. International Journal of Oral & Maxillofacial Implants 15: 691–700.
5. Buser, D., Mericske-Stern, R., Bernard, J.P., Behneke, A., Behneke, N., Hirt, H.P., Belser, U. & Lang, N.P. (1997) Long-term evaluation of nonsubmerged ITI implants. Part 1: 8-year life table analysis of a prospective multicenter study with 2359 implants. Clinical Oral Implants Research 8: 161–172.
6. Comfort, M.B., Chu, F.C.S., Chai, J., Wat, P.Y.P. & Chow, T.W. (2005) A 5-year prospective study on small diameter screw-shaped oral implants. Journal of Oral Rehabilitation 32: 341–345. Del Fabbro, M., Testori, T., Francetti, L. & Weinstein, R. (2004) Systematic review of survival rates for implants placed in the grafted maxillary sinus. International Journal of Periodontics and Restorative Dentistry 24: 565–577.
7. Friberg, B., Ekestubbe, A. & Sennerby, L. (2002) Clinical outcome of Bra˚nemark system implants of various diameters: a retrospective study. International Journal of Oral & Maxillofacial Implants 17: 671–677.
8. Hallman, M. (2001) A prospective study of treatment of severely resorbed maxillae with narrow nonsubmerged implants: results after 1 year of loading. International Journal of Oral & Maxillofacial Implants 16: 731–736.
9. Henry, P.J., Laney, W.R., Jemt, T., Harris, D., Krogh, P.H., Polizzi, G., Zarb, G.A. & Herrmann, I. (1996) Osseointergrated implants for singletooth replacement: a prospective 5-year multicenter study. International Journal of Oral & Maxillofacial Implants 11: 450–455.
10. Ivanoff, C.J., Gro¨ndahl, K., Sennerby, L., Bergstrom, C. & Lekholm, U. (1999) Influence of variations in implant diameters: a 3- to 5-years retrospective clinical report. International Journal of Oral & Maxillofacial Implants 14: 173–180.
11. Naert, I., Koutsikakis, G., Quirynen, M., Jacobs, R. & van Steenberghe, D. (2002) Biologic outcome of implant-supported restorations in the treatment of partial edentulism. Part I: a longitudinal clinical evaluation. Clinical Oral Implants Research 13: 381–389.
12. Polizzi, G., Fabbro, S., Furri, M., Herrmann, I. & Squarzoni, S. (1999) Clinical application of narrow Bra˚nemark system implant for single-tooth restorations. International Journal of Oral & Maxillofacial Implants 14: 496–503.
13. Schwartz-Arad, D., Herzberg, R. & Dolev, E. (2004) The prevalence of surgical complications of the sinus graft procedure and their impact on implant survival. Journal of Periodontology 75: 511–516.
14. Stellingsma, C., Meijer, H.J.A. & Raghoebar, G.M. (2000) Use of short endosseous implants and an overdenture in the extremely resorbed mandible: a five-year retrospective study. Journal of Oral and Maxillofacial Surgery 58: 382–387.
15. van Steenberghe, D., Lekholm, U., Bolender, C., Folmer, T., Henry, P., Herrmann, I., Higuchi, K., Laney, W., Linden, U. & Astrand, P. (1990) The applicability of osseointegrated oral implants in the rehabilitation of partial edentulism: a prospective multicenter study on 558 fixtures. International Journal of Oral & Maxillofacial Implants 5: 272–281
16. Vigolo, P. & Givani, A. (2000) Clinical evaluation of single-tooth mini-implant restorations: a fiveyear retrospective study. Journal of Prosthetic Dentistry 84: 50–54.
17. Vigolo, P., Givani, A., Majzoub, Z. & Cordioli, G. (2004) Clinical evaluation of small-diameter implants in single-tooth and multiple-implant restorations: a 7-year retrospective study. International Journal of Oral & Maxillofacial Implants 19: 703–709.
18. Winkler, S., Morris, H.F. & Ochi, S. (2000) Implant survival to 36 months as related to length and diameter. Annals of Periodontology 5: 22–31.
19. Wyatt, C.C.L. & Zarb, G.A. (1998) Treatment outcomes of patients with implant-supported fixed partial prostheses. International Journal of Oral & Maxillofacial Implants 13: 204–211.
20. Zinsli, B., Sa¨gesser, T., Mericske, E. & MericskeStern, R. (2004) Clinical evaluation of smalldiameter ITI implants: a prospective study. International Journal of Oral & Maxillofacial Implants 19: 92–99

Alpha-Bio Tec's products are cleared for marketing in the USA and are CE-marked in accordance with the Council Directive 93/42/EEC and Amendment 2007/47/EC.

Alpha-Bio Tec complies with ISO 13485:2003 and the Canadian Medical Devices Conformity Assessment System (CMDCAS).

MEDES LIMITED
5 Beaumont Gate, Shenley Hill
Radlett, Herts WD7 7AR. England
T./F. +44.192.3859810

www.alpha-bio.net

995-8349 R1/09.15 © Alpha-Bio Tec - All Rights Reserved