

Blade implants in the treatment of thin ridges

Indications and techniques

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The conception of the endosseous blade implant arose from the intuitions of L.I. Linkow and R. Roberts; its development and diffusion, however, must be attributed to Prof. Leonard Linkow, who presented it in 1967 and published on the subject in 1968, thereby making it possible to treat the problem of edentulism of tens of thousands of patients from that time to this day.^{1,2}

Given the thinness of the blade, this implant can be used in any alveolar crest, but it is particularly useful in the thinnest, where the use of root-form implants is difficult and needs bone regeneration procedures. When the ridge is thin, it permits tricortical anchorage³, i.e. the implant is stabilized by press-fit in both the internal and external bone cortex, as well as the deep cortex. This condition represents the optimum to allow immediate loading with a functional provisional prosthesis.

Blade implants are made of titanium. Osseointegration of titanium implants has been confirmed by numerous histological studies, done on any implant shape.

Histological studies on blade implants demonstrate their osseointegration and thickening of bone tissue around their surface consequent to load.^{9,17,18,19} Figures 1a and 1b allow you to appreciate the bone thickening around the neck and body of a blade implant, which represents bone reaction accrued during

11 years of functional work.

Due to the fact that bone response is the same, you can build fixed prosthetic bridges supported by screw and blade implants. Figures 2a-2c were taken immediately after positioning a screw implant and a blade implant in the superior posterior area, in order to build a three-elements bridge. The blade is leaning on the cortical of the maxillary sinus, engaging it in some points.

Blades allow:

- possibility of making the most of even the narrowest alveolar crests;
- adaptability to the majority of anatomical conformations;
- valorization of existing tissue and obviation of bone expansion and regeneration procedures;
- mechanical correction of parallelism issues during implant surgery;
- versatility in adaptation to the deep anatomical structures possible by modifying the implant;
- presence of numerous stabilizing contacts with deep cortical layer;
- possibility of inserting a part of the implant below the intact cortex (as compared to EDE technique);
- adequate management of attached gingiva during implant surgery;
- simple surgical technique performed with standard instruments.

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Figs. 1a–1b_Photo at seven years and radiograph at 11 years of submerged blade implant positioned in zone 1.2 in 1993. (Photos/Provided by Dr. Luca Dal Carlo)

Figs. 2a–2c_Blade implant and screw implant inserted in the superior posterior area. Blade's shoulder has been positioned deep inside the bone. The blade engages in some points the cortical bone of the maxillary sinus.



Fig. 1a



Fig. 1b

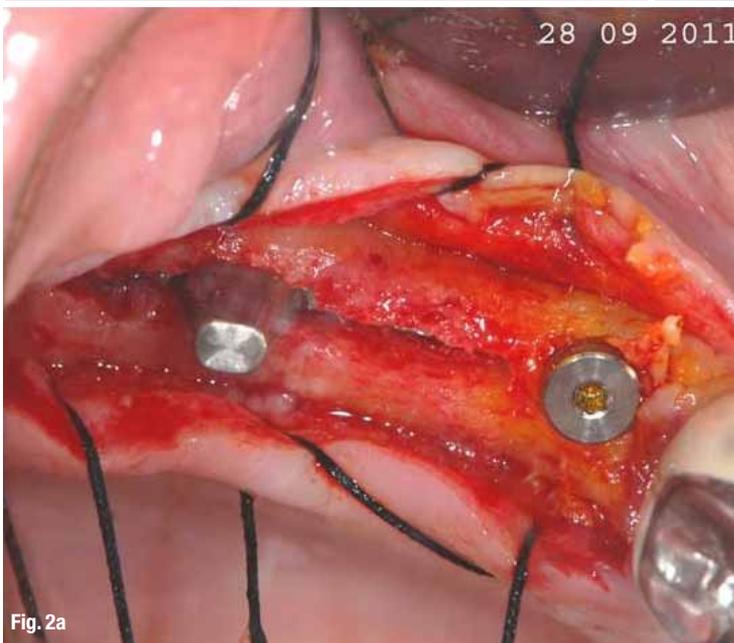


Fig. 2a



Fig. 2b

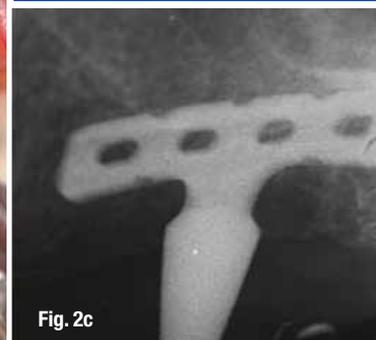


Fig. 2c

Shape modifications

The blade implant can be modified to perfectly suit the deep bone anatomy (Figs. 1a–2c), and the body can be curved to follow the anatomical profile. If the abutment needs to be angled, this can be achieved mechanically, up to a maximum of 20 degrees, before the implant is positioned^{4,5} using two pairs of steel pliers, thus resolving any problems that could arise due to incongruous abutment positioning (Figs. 3a–3c).

Immediate loading

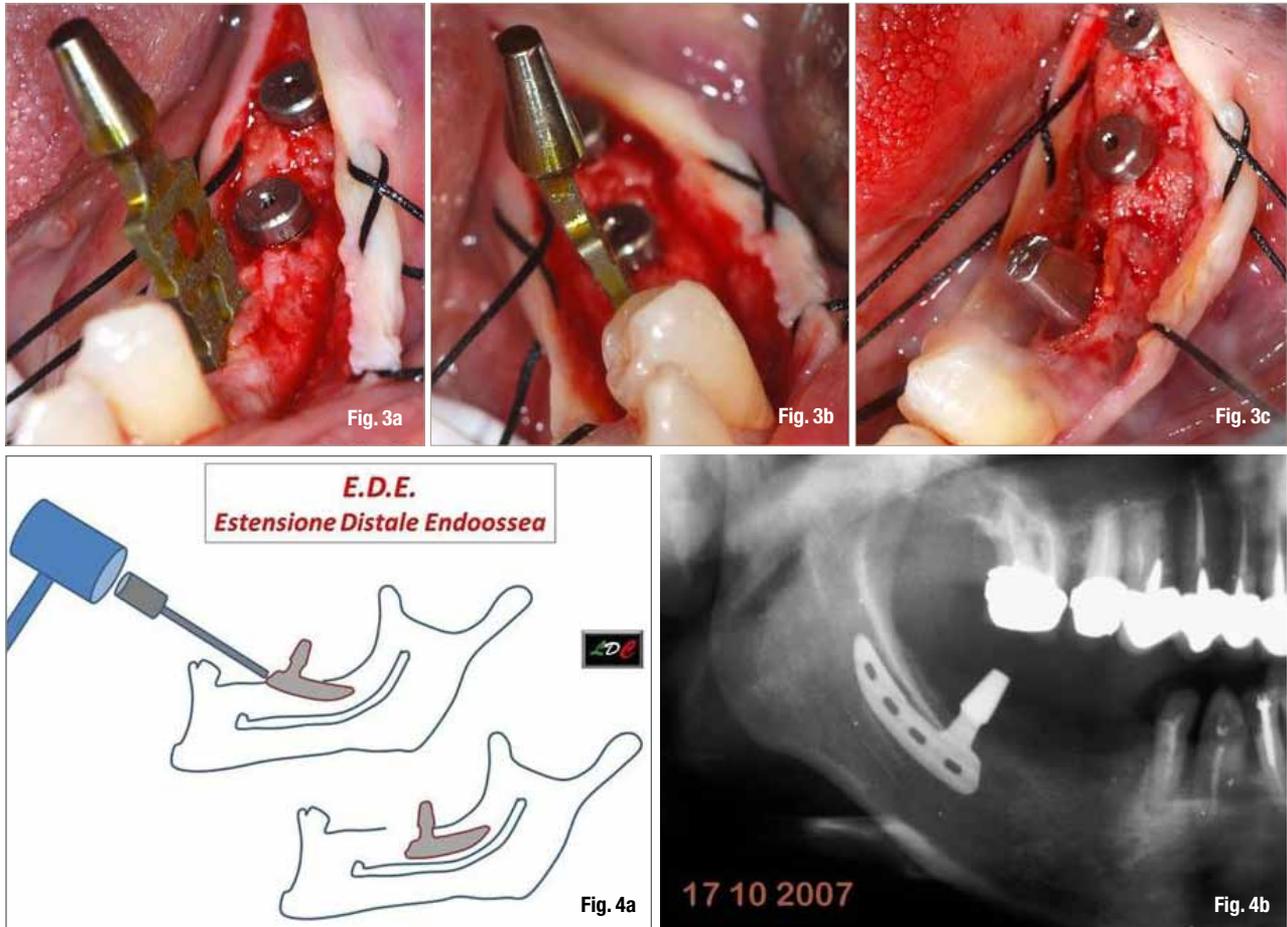
The blade implant can be immediately loaded if

adequate stability has been achieved. Anchoring the implant through two cortical layers and in contact with the deeper cortex should confer best stability.

Static and dynamic occlusion should be meticulously checked upon fitting of both temporary and permanent crowns.⁶

Variations

Several authors have proposed variations on the original technique that fit to certain situations. The technique known as Endosseous Distal Extension (E.D.E.) is particularly useful for treatment of lower posterior sectors featuring scarce bone density.



Used since 1993, E.D.E. was first published in 2001.⁷⁻⁸ The type of blade implant to use is ramus blade, which was conceived during the 1970s by Roberts and Linkow.

The technique involves tracing the implant housing mesial to the implant positioning site, so that the blade is gradually rotated distally until it reaches the distal border of the post housing (Fig. 4a). In this way almost all of the implant is placed beneath the intact bone and soft tissues. The presence of intact superficial bone tissue posterior to the abutment can be seen upon radiographical examination (Fig. 4b).

Reliability

Numerous articles have attested to the long-term stability of this type of implant and document the histological confirmation of their osteointegration, without connective tissue interposition at the bone/implant interface.⁹⁻²²

This kind of procedure is characterized by excellent soft-tissue response.

Conclusions

The blade implant is a valid therapeutic device

useful for treating cases with particular anatomical features such as narrow bone crest and scarce spongy bone in the lower distal sector.

It can be used, due to the numerous forms available, not only in the upper and lower posterior sectors, but also to provide deep anchorage in posterior and anterior (esthetic) sectors alike. It is therefore a treatment of choice in cases where the outcomes of alternative procedures are less predictable and the procedures themselves are more likely to compromise the integrity of the local bone tissue.

Due to the fact they induce the same bony reaction, blade implants can be used in combination with other implant types (Fig. 5).

Furthermore, this method offers excellent response of the surrounding soft tissues. Nonetheless, to prevent failure, practitioners would be wise to bear in mind that blade implants are not indicated in wide alveolar crests or in areas where bone density is insufficient and the implant cannot engage the deep cortical layer.

It is very important that colleagues who want to learn the blade implant technique carefully follow training courses held by expert fellows, who can teach you how to practice this technique while avoiding the mistakes that have caused unfair bad press in the past.

Figs. 3a–3c Blade implant inserted in zone 3.5, where the bone ridge was narrower than posteriorly. Notice how the blade's abutment has been bended to solve parallelism problem, before deep insertion of the implant in the bone.

Figs. 4a, 4b Schematic representation of the E.D.E. technique. The presence of intact superficial bone tissue posterior to the abutment can be seen upon radiographical examination

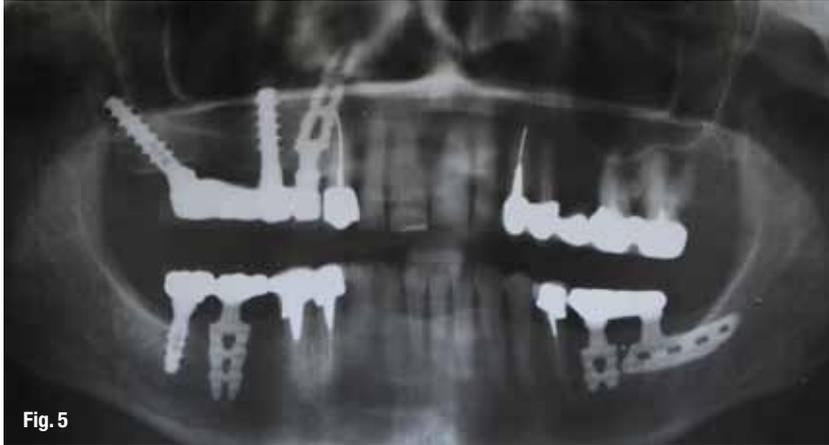


Fig. 5 Combination of different implant types in the same clinical case.

Theoretical and practical courses are organized in New Jersey and Jamaica by Atlantic Dental Implant Seminars (www.adiseminars.com), under supervision of Leonard I. Linkow, blade implants inventor. _

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