Severely resorbed bone ridges can be limiting to implant placement in the posterior areas of the maxilla and mandible. The presence of anatomical structures such as the sinus and the alveolar nerve may limit the length of the implant, whereas some pathological processes like mucocele and chronic sinusitis may be considered a contraindication for sinus elevation.

There are numerous factors that may lead to the choice of short implants. These can include: systemic health conditions preventing advanced surgery for the vertical regeneration of bone tissue; the patient refusing a bone graft, and replacement of a previous failed implant.

**INDICATIONS**

Some indications have to be observed to obtain success in the use of short implants. Increase in diameters serves to compensate the reduction in length and increase bone-implant contact. Surface treatments allow the correct stability of the blood clot, and an internal connection to the bone allows growth over the implant reducing lateral stresses. Platform switching reduces bone loss, and increase in the number of implants and splinting of implants reduces the amount of forces along the bone-implant interface. Moreover, the prosthesis must be designed to avoid lateral forces during function, in order to reduce stress magnitude along the previously mentioned interface.

This article demonstrates different treatment strategies for the use of short implants. In particular, we analyse three different clinical solutions: single implant restoration, splinting of implants and bridge with pontics.

**CONCLUSION**

Nowadays, short implants are a reliable treatment solution. They are the treatment of choice when the residual alveolar ridge is not enough to place a standard implant and systemic conditions of the patients do not allow advanced surgery. When the treatment plan includes a bridge, the survival rate mainly depends on some rules, such as the splinting of implants and the increased number of implants. Prosthesis design must be taken into account and there should be no lateral contact present during function.

To ask a question or comment on this article please send an email to: comments@ppdentistry.com

**The contributors to this article are Salvatore Longoni, MD, DDS; Matteo Sartori, DDS, PhD; Nicoletta Proserpio, DDS; Luca Dusi, DDS all from Bicocca University Dental School, Italy. This year, the Clinica Odontoiatrica at the Milan university celebrates its 10th anniversary of training, research and treating patients. The school offers a full degree in dentistry to 20 students every year. In addition, 25 students graduate with a degree in dental hygiene every year. The university specialises in Odontostomatological Surgery with five places offered annually, and also offers a doctorate in Paradontological Research, only accepting four annual enrolments.**
CASE STUDY 1

SINGLE IMPLANT RESTORATION

A common situation in clinical practice is the loss of a single molar as a consequence of endodontic failure or root fracture. Depending on the position of the tooth, maxillary sinus or alveolar nerve, there may be a limit in the choice of implant length.

In this case report, a 40-year-old male patient has a missing first left superior molar (Figures 1-3). Risk-benefit ratio suggested the placing of a short implant, avoiding the sinus elevation. Furthermore, the thickness and the inclination, horizontal rather than vertical, of the lateral wall of the sinus might constitute an operative problem.

According to the radiographic evaluation, a 6mm implant 6mm in diameter and 7mm in length (RESOLVE Megagen) was planned. The increase in diameter serves to balance the potential side effects related to the reduction in length of the implant.

A full-thickness flap was raised and the implant site was prepared using a trephine bur. Sinus floor lift was performed with dedicated osteotome to obtain a bicortical level during implant placement. The implant was placed just below the bone level to promote submerged healing (Figures 4-7). After six months, the implant was restored with a single crown (Figures 8 and 9).

Figures 1-3: The initial clinical situation. Residual ridge height was 5mm. The anatomy of the sinus floor might be a problem for the sinus elevation.

Figures 4-7: The implant site that was prepared with a trephine bur then enlarged with a proper bur. The implant was placed just below the bone level.

Figures 8-9: The clinical and radiographic situation at three years follow-up.
CASE STUDY 2

SPLINTING OF IMPLANTS

The main problem in the posterior areas of the maxilla is the reduction in residual bone height that occurs as a result of the bone resorption after healing, sinus pneumatisation and periodontal disease, which is more likely at the level of molar teeth. In this case report, a 47-year-old female patient has a missing second left superior premolar and the first left superior molar (Figure 10). The treatment plan called for the placement of two implant-supported fixed restorations. Splinting of implants may be referred only to short implants or short implants coupled with standard implants. After radiographic evaluation a 4mm in width and 8.5mm in length EZ PLUS Megagen implant and a 5mm in width and 6mm in length RESCUE Megagen implant were planned.

A full-thickness flap was raised and the implant sites were prepared using a standard protocol for the mesial implant and using trephine bur for the distal one. A transcrestal sinus lift was performed at the level of the first molar using xenograft bone (Figures 11-16). After healing time the implants were restored with splinted crowns (Figures 17 and 18).

Figures 11-16: Implant sites were prepared following two different protocols according to the type of the implant. A transcrestal sinus lift was performed at the site of the first molar using xenograft material. Six months after the surgery procedure the healing abutment were placed and then the prosthesis were made.

Figures 17-18: Clinical and radiographic situation at one-year follow up.
CASE STUDY 3

BRIDGE WITH PONTICS

A 60-year-old male patient presented requiring treatment to replace a failed implant and to restore masticatory function in the right posterior maxilla arch.

After radiographic evaluation (Figures 19-21), an EZ PLUS Megagen implant 5mm in width and 8.5mm in length was planned to replace the failed implant and a RESCUE Megagen implant 8mm in width and 7mm in length was planned at the level of the second right molar after a crestal sinus lift.

The full-thickness flap was raised, the implant at the first premolar site was removed and the two implant sites were then prepared. The two implants were placed at the crestal level to follow a submerged implant technique (Figures 22-27).

After six months, the cover screws were removed and the implants were restored with a bridge with pontics (Figures 28 and 29). In order to reduce the stresses along bone-implant interface, the prosthesis must be designed without any lateral contact during function.

Figures 19-21 show the radiographic initial situation. Distally to the implant, the bone ridge was very thin.

Figures 22-27: The previous implant was removed and a standard implant was placed in the same site. A post-extractive defect was present at the second molar area and was filled with a wide-diameter implant.

Figures 28-29: A fixed partial prosthesis was made six months after surgery. At the one-year follow up no marginal bone loss was present.