Mini-implants? For sure!

Mini-implants be can particularly useful in atrophied jaws, where implants with a standard diameter reach their limits. This also applies to patients for whom invasive procedures pose a general medical risk. This because, thanks to the small diameter of less than 3 mm, mini-implants can often be inserted in patients with a very narrow jaw ridge without bone augmentation in a less invasive procedure.

The indication for which mini-implants are most frequently used in our practice is to improve the hold of full dentures in the lower jaw. In general, edentulism is referred to as a disability that can even result in an increase in mortality [1,2]. A purely mucosa-supported prosthesis is not an adequate replacement for missing teeth: in the atrophied lower jaw in particular, poor retention is often achieved due to the limited possibilities for retention. Among other things, this can lead to an avoidance of social contacts, as well as to physiological difficulties in eating and thus to malnutrition.

By inserting implants, it is possible to fix the prosthesis and thus achieve an enormous improvement in quality of life [3].

However, conventional implant therapy is not an option for some of these patients. Seniors with medical risk factors in particular have doubts about major surgical interventions [4], especially when augmentative measures are required for conventional implants. In addition, the cost factor plays a major role for many patients. Mini-implants offer a safe, cost-effective and minimally invasive alternative that is readily accepted by many patients [5-8].

A prerequisite for safe use is sufficient implantology experience and attendance at appropriate training events, since the recommended surgical protocol should be followed exactly during insertion, in order to achieve an optimal treatment result. The following case study shows how to proceed with the treatment.

Patient case | The patient, born in 1973, came to our practice for the first time in 2011. She had been referred due to periodontal complaints, in order to find out about the possibilities of implant treatment, among other things. The patient had a fixed denture in the upper jaw and a partial denture in the lower jaw (Fig. 1 and 2). The initial examination showed that the four remaining teeth in the lower jaw were not worth preserving due to massive periodontal damage, and tooth 16 also had to be extracted. Generalized chronic periodontitis was diagnosed. The dentures in the upper jaw were also insufficient.

Pre-treatment | First, teeth 16, 34, 33, 32 and 43 were extracted, the lower jaw was temporary treated and professional tooth cleaning and oral hygiene training were carried out at the same time. Closed periodontal therapy followed, followed by a check-up and planning of the definitive denture (Fig. 3).

After completing the pre-treatment, the patient decided in May 2011 to initially only have the lower jaw fitted with a definitive, mucosa-supported prosthesis. In order to prevent the progressive atrophy of the jawbone, it was planned to insert four MDI mini dental implants (3M ESPE) after the extraction alveoli had healed in the interforaminal area of the lower jaw. An existing mucosa-supported prosthesis can be anchored to these directly postoperatively after minor modifications. The main argument against the use of conventional implants was the higher costs associated with this procedure.

Fig. 1: Initial situation

Fig. 2: Remaining teeth in the lower jaw.

Surgical intervention | For planning the surgical intervention in October 2011, the existing dentures served as a measuring template. Measuring balls with a diameter of 5 mm were attached to the prosthesis (Fig. 4) and their position on the prosthesis was documented. Then a panoramic tomographic image was taken (Fig. 5) and the position of the implants was determined, taking into account the course of the nerves. The measuring balls served as a reference for the transfer of the planning into the patient's mouth. The desired implant positions were then transferred to the mucosa using a sterile surgical marking pen (Fig. 6 and 7).

Then four mini-implants with a diameter of 1.8 mm and a length of 13 mm were successively inserted transgingivally. For this purpose, the pilot drilling was carried out with single-use drills, with a diameter of 1.1 mm. The drilling depth should be one third to half the length of the implant. In order to check the parallelism, the drills used can be screwed into the drill holes (Fig. 8).

Various instruments are available for the actual implant insertion, which are to be used one after the other and should be changed each time clear resistance is felt: the plastic cap with which the implant is removed from the sterile packaging (Fig. 9), an initial screwdriver (Fig. 10),

Fig. 3: Situation after extraction of teeth 34, 33, 32 and 43

Fig. 4: Prosthesis with measuring balls for X-ray measurements.

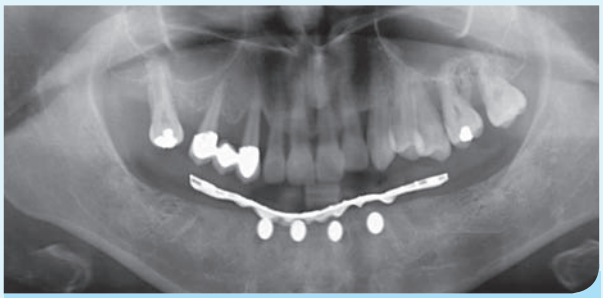

Fig. 5: Panoramic tomographic image with reference spheres.

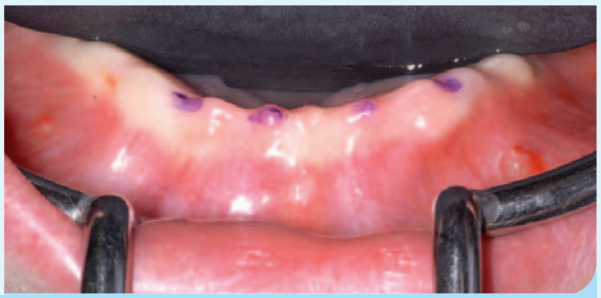

Fig. 6: Marking of the planned implant positions...

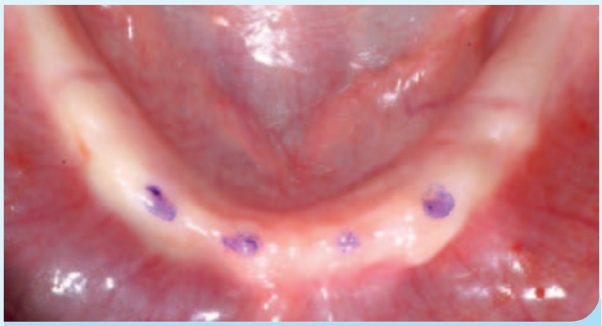

Fig. 7: ... on the mucous membrane.

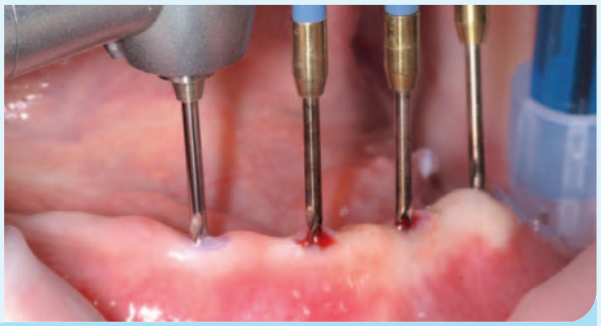

Fig. 8: Pilot drilling - the single-use drills already used serve as paralleling aids.

a wing screwdriver (Fig. 11) and finally a torque ratchet. In the present case, a very good primary stability (over 35 Ncm) was achieved, which enables immediate loading in the lower jaw. This is ensured, among other things, by the self-cutting design of the mini-implants, the small drilling depth and the use of a pilot drill, which has a smaller diameter than the implants:
this causes condensation and compression of the surrounding bone, which provides additional stability. Figures 12 and 13 show the situation immediately after the implant placement.

Conversion of the prosthesis | In order to be able to continue using the existing prosthesis, a modification was necessary: for this purpose, the implant positions were marked in the prosthesis base using impression material (Fig. 14) and then the corresponding areas were generously ground out. Cut spacers were placed on the ball heads of the mini-implants (Fig. 15) and metal housings of the MH-2 type were placed on them (Fig. 16). A try-in of the ground prosthesis then took place. This should lie tension-free in the starting position on the mucous membrane (it may have to be reground accordingly). After conditioning, the basal cavities of the lower jaw prosthesis that had

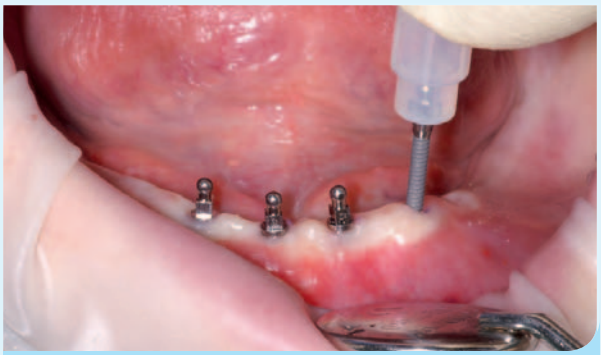

Fig. 9: Implant insertion with plastic cap.

Fig. 10: Screw in further with the initial screwdriver.
Fig. 11: Use of the finger wrench.

Fig. 12: Four mini-implants in the interforaminal area of the lower jaw.

Fig. 13: Conditions immediately after implantation.

Fig. 14: Marking of the implant positions using impression material in the prosthesis base.

Fig. 15: Mini-implants with spacer sleeves.

been ground free were filled with SECURE Hard Pick-Up Material (3M Espe) (Fig. 17). By inserting the prosthesis with cold-curing resin in the patient's mouth and asking her to bite down, the housing could be integrated into the prosthesis without tension. After setting, the prosthesis is removed, finished and polished. Figure 18 shows the result after preparation.

Quality of life | The patient was pleased that she was allowed to eat immediately after the treatment and had no postoperative pain. Immediate loading is possible thanks to the so-called soft-loading principle, in which the prosthesis is supported by the mucosa and only retained by the implant. As a result, the masticatory forces are not transferred directly to the implants, and the applied load is lower than with a fixed restoration on implants. In the subsequent check-up examinations, no irritation was found. A clinical and radiological review in May 2014 confirmed this once again (Fig. 19-21): the mini-implants were osseointegrated and the probing depths in the lower

Fig. 16: Attached matrices (MH-2).

Fig. 17: Filling the gaps with cold-curing resin.

Fig. 18: Prosthesis with polymerized matrices.

Fig. 19: Prosthesis in the patient's mouth.

Fig. 20: Healthy soft tissue conditions in a check-up three years after implant treatment in May 2014.

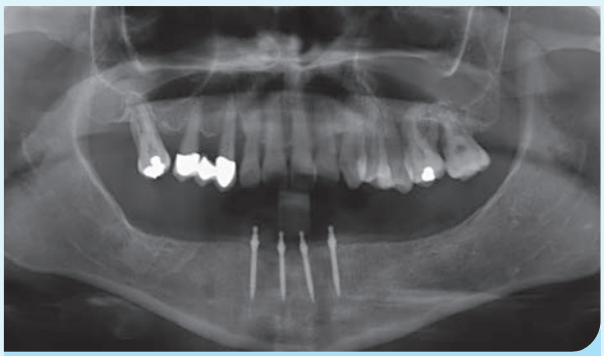

Fig. 21: X-ray control three years after implant treatment in May 2014.

jaw were less than 1 mm. The new restoration of the upper jaw is currently being planned.

Conclusion | Mini-implants enable an expansion of the treatment spectrum in everyday practice and offer a very useful alternative to conventional implant therapy for certain indications and for some patient groups. Assuming the appropriate implantological and anatomical knowledge and sufficient practical experience, safe and predictable treatment successes can be achieved.

Literature at www.zmk-aktuell.de/literaturlisten

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