



DENTAL RATIO
Dental Implant Systems

AUTHOR



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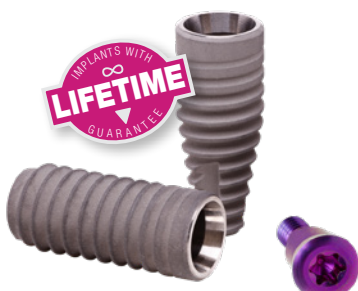
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OKTAGON®

BONE LEVEL
IMPLANTS



Single-tooth Implantation with hard and soft tissue augmentation

INTRODUCTION

A male patient, 42 years old, requested a fixed reconstruction of a lost tooth in the upper left quadrant without having to prepare the adjacent teeth, thus setting the course for the implantological pathway.

The case shows that an apparently simple single-tooth implantation sometimes turns out to be more demanding than initially anticipated.

Hard and soft tissue augmentation is not always part of every practitioner's repertoire, but is nevertheless sometimes essential for the successful and satisfactory completion of implantological treatment.

The case shows single-tooth implantation with an internal sinus floor elevation and subsequent combination of distal wedge excision with connective tissue graft harvesting horizontal for soft tissue augmentation at the implant.

DIAGNOSTICS & THERAPY

Medical history, expectations & planning

The patient has a general medical history of good health, but regularly smokes e-cigarettes.

Nevertheless, he was disturbed by the single-tooth gap in region 26, which had existed for over 10 years (Fig. 1), because it was noticeable, when he smiled and he also sought functional masticatory rehabilitation with a fixed restoration for the lost tooth.



Single-tooth gap in region 26 in occlusal, clinical view



Initial situation:
Section of a panoramic radiograph to assess the preoperative bone situation

The patient has been informed in advance about the risk for the long-term success of the implant, when smoking e-cigarettes [1].

The preoperative panoramic radiograph (Fig. 2) showed a vertical bone dimension of about 10 mm up to the beginning of the sinus floor and a gap of about 8 mm, which was wide enough for conventional placement of an OKTAGON® BONE LEVEL implant Ø 4.8 x 12 mm and subsequent restoration with a crown of molar width.

Image identifier light blue = Region 17 | Other = Region 26

IMPLANTATION, SINUS FLOOR ELEVATION & EXPOSURE

The first surgical procedure was performed outpatient under local anaesthesia. A palatally displaced alveolar ridge incision (Fig. 3) was made in region 26 with horizontal relief in the sulcus of the adjacent teeth, and a buccal mucoperiosteal flap was prepared.

The implant bed preparation was started in the prosthetically optimal position. (Fig. 4).

In accordance with the specified drilling protocol with a bone quality of D3 [2], drilling was initially performed to a depth of 9 mm. Further 3 mm were obtained by internal sinus floor elevation [3], without using bone substitute material.

After checking the implant position and profile drilling, the OKTAGON® BONE LEVEL implant Ø 4.8 x 12 mm was inserted in primary stability and closed with a cover screw (Fig. 5).

After reduction of the mucoperiosteal flap with single button sutures, tension-free primary wound closure in this area was achieved (Fig. 6).

After completion of the implantological procedure, an radiograph was taken (Fig. 7).

The patient rinsed with a 0.12% chlorhexidine digluconate (CHX) solution for around two minutes in the morning and evening until 2 weeks after implantation and applied a 1% CHX gel to the wounds after oral hygiene several times daily [4].

In addition, an analgesic (ibuprofen 600 mg) was prescribed as on-demand medication.

Four months after implantation, exposure was performed using a minimally invasive („keyhole“) approach [5].

The appropriate gingiva former (Ø 5.0 mm) was screwed in hand-tight (Fig. 8).

The further course proceeded without complications.

IMPLANT PROSTHETICS

The final prosthetic restoration of the implant was performed 14 days after exposure. The implant was restored after open-tray implant impression-taking by means of an occlusal screw-retained crown on an indexed titanium adhesive base.

The crown was inserted permanently with 35 Ncm and the screw channel was sealed with Teflon tape and composite (Fig. 9).



Fig. 3
Formation of a mucoperiosteal flap after palatally displaced alveolar ridge incision

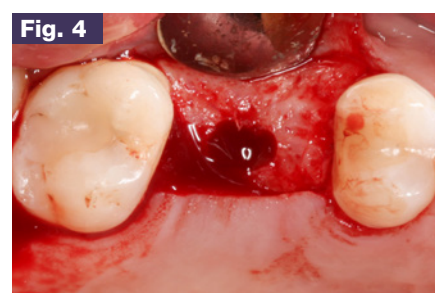


Fig. 4
Implant bed preparation in a prosthetically more optimal position

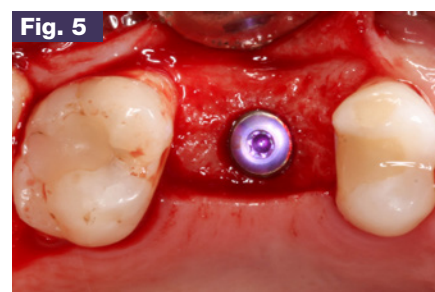


Fig. 5
Intraoperative view after insertion of the cover screw



Fig. 6
Primärer Primary wound closure

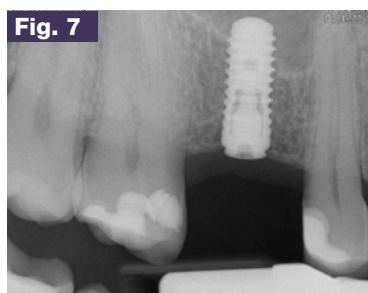


Fig. 7
Postoperative radiograph control



Fig. 8
Situation after exposure (4 months after implantation)

SOFT TISSUE AUGMENTATION & DISTAL WEDGE EXCISION

Five months after inserting the implant crown, the patient commented that he was disturbed by a vestibular horizontal soft tissue defect in which particles of food were increasingly accumulating (Fig. 9).

As surgical crown lengthening was initially planned on the contralateral side of tooth 17 due to a planned crown and the lack of retention expected, it was planned to combine this with connective tissue harvesting in order to compensate for the horizontal volume defect at the implant site.

After local anaesthesia in both areas, classic distal wedge excision was performed in region 17/18 [6].

Following a paramarginal incision line in the palatal and a marginal incision in the buccal portion of tooth 17, this was extended distally in the form of two superficial, parallel incisions and connected via a right-angled T-incision (Fig. 10).

Starting from these parallel incisions, a mucosal flap was undermined (Fig. 11) in order to be able to remove the underlying connective tissue in one piece as a so-called tuberosity graft (Fig. 12).

The mucosal flap was reduced in the apical position and adapted using a continuous loop suture (Fig. 13).

After removing the implant crown, a buccal mucosal flap was prepared into which the tuberosity graft was inserted and fixed with monofilament suture (Fig. 14).

The mucosal flap was readapted and the crown reinserted (Fig. 15). The sutures were removed after two weeks (Fig. 16), and the patient already expressed that he no longer had any problems.

Finally, an radiograph control was performed to have a baseline radiograph for evaluating possible future peri-implant bone changes (Fig. 17) [7].



Fig. 9
Occlusal view of the screw-retained implant crown with visible buccal retraction of the soft tissue contour 5 months after prosthetic restoration



Fig. 10
Incision line of the distal wedge excision on tooth 17



Fig. 11
Mucosal flap preparation in region 17 before harvesting the tuberosity graft

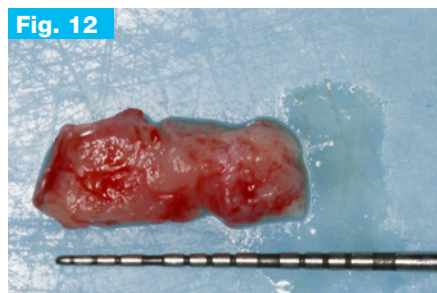


Fig. 12
View of the harvested connective tissue graft from the tuberosity region



Fig. 13
Suture closure with noticeably more apical positioning of the gingiva for surgical crown lengthening on tooth 17

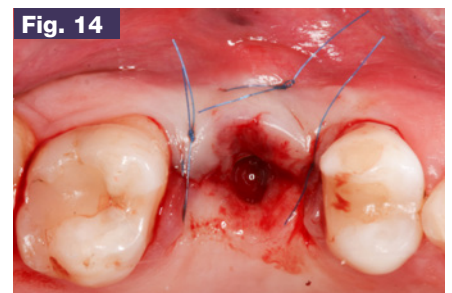


Fig. 14
Direct postoperative occlusal view of region 26 with the connective tissue graft inserted



Fig. 15
Postoperative view after inserting implant crown 26



Fig. 16
Well-filled buccal soft tissue contour 14 days postoperatively



Fig. 17
Radiological control 5 months after prosthetic restoration

DISCUSSION

Up to the time of suture removal following horizontal soft tissue augmentation, the case described can certainly be considered a success. It is not yet possible to report long-term stability at the moment.

The following aspects are worthy of discussion:

(1) *Why wasn't an OKTAGON® TISSUE LEVEL implant used?*

A TISSUE LEVEL implant would have been selected if sinus floor elevation had not been necessary and if transmucosal healing had been conceivable. Furthermore, it could not be ruled out at the outset that a small amount of lateral augmentation would become necessary. However, since primary wound closure was strived for after implant placement, the BONE LEVEL implant was preferred for more secure soft tissue closure above it. The disadvantage of this decision is the steep emergence profile shown in Fig. 17, which would have been flatter with a TISSUE LEVEL implant and may negatively impact the peri-implant bone level over the long term [8]. On a self-critical note, it must be conceded that by choosing a shorter implant, sinus floor elevation could possibly have been avoided and insertion of a TISSUE LEVEL implant may have been possible.

(2) *Why was horizontal soft tissue augmentation not already performed during exposure?*

The horizontal volume defect was already noticed at the time of exposure, but had not been perceived by the patient as disturbing until then. As the clinical parameters (probing depths, no bleeding on probing, healthy appearance of the peri-implant soft tissue) did not indicate a pathological occurrence, it was decided to accept the defect for the time being.

(3) *Why was the restoration screwed and not cemented?*

The question of a screwed or a cemented implant-retained restoration is a recurring one [9]. In this case, the practitioner's clear philosophy is to want to have full control over whether there are cement residues in the peri-implant sulcus, which is ruled out with the screwed solution. Furthermore, the very easy removal of the implant crown without damaging it, which was necessary in the case described, is another positively evaluated factor of screw-retained solutions.

(4) *How is the stability of horizontal soft tissue augmentation to be evaluated?*

Current investigations on both clinical [10] and patient-centred outcomes [11] for the restoration of horizontal soft tissue defects on implants using connective tissue grafts showed that there was still significant horizontal tissue augmentation of 1.19 mm after one year [10]. Although this did not result in a perfect buccal soft tissue contour in 38% of cases [10], it did lead to a more satisfactory outcome from the patient's point of view [11].

CONCLUSION

Implantation that initially appears simple may become more complicated in detail than the practitioner had initially envisaged. This case very clearly shows how, with knowledge of both implantological and periodontal surgical techniques and their combinations, it has so far been possible to achieve a satisfactory result, at least in the short term.

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