Flexible healing modes using a special connection

Transgingival Healing is often the Better Alternative

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Allowing implants to heal transgingivally is a conservative approach that obviates the exposure of peri-implant tissue and saves the patient an operation. Here the implant-abutment-connection and the available abutments play a crucial role. In this article the author describes the main features of the method and his experience gained with the Ankylos system.

According to the literature, transgingival-healing implants are just as successful as closed-healing implants. This applies both to the survival rate and the anticipated bone resorption [1, 3, 4, 7]. Factors affecting the chances of success, independent of the implant system, may, however, play a role [2, 6]. It appears advantageous for the bone stability if the implants used are one-piece implants or have properties similar to one-piece implants [6]. Increased lateral and apical bone resorption of the joint surface is anticipated in the case of two-piece implants with an unsealed or insufficiently rigid connection. The type of surface could also have an influence on success, with a microrough structure having an advantage over smooth surfaces [2].

In regard to clinical aspects, the single-session procedure has a whole series of advantages: The soft tissue can stabilize undisturbedly during transgingival healing. The dimensions of the gingival epithelium and the connective tissue attachment are already easy to assess at the time of impression-taking. The blood supply of the implantation region is also preserved. Conversely, in the case of the closed protocol, the already mature peri-implant soft tissue is separated during the course of exposure. It then has to reheal so that the length of the soft tissue fixation may once again change.

It should be borne in mind that the transgingival approach spares the patient the uncovery procedure. Even if the emergence profile often still has to be corrected prior to the final restoration, time is usually saved nonetheless, because contouring with temporary restorations or soft tissue procedures is often also necessary after exposing a closed-healing implant.

Fig. 1
The internal fastening screw allows free positioning in rotational symmetry for the Ankylos abutment.
The conical connection turns the two-part implant into a virtual one-part implant.

The role of the implant-abutment connection

The Ankylos implant system (Dentsply Friadent, Mannheim, Germany) was originally designed as a system for submerged healing [9]. On account of the special properties of the conical connection between the implant body and the abutment, it is also suitable for transgingival healing. In contrast to other two-part systems, Ankylos functions like a one-part implant after the abutment is fitted (Fig. 1). The reason for this is the solid and interlocking connection of the abutment to the implant via the cone [12].

A virtually bacterially-proof connection is achieved with very low force applied at the retaining screw (15 Ncm compared with 35 Ncm for an external hex screw), which is also free of micro-movements. These

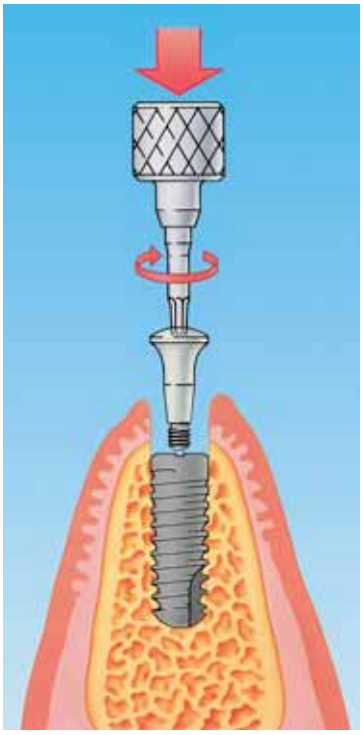

Fig. 2 As a result of their rigid and bacteriologically sealed connection, Ankylos implants can be fitted just below the bone level. The illustration schematically shows how the one-part sulcus former for the posterior region is screwed in.

Fig. 3 With their different diameters and heights, Ankylos sulcus formers can be adapted to the individual soft tissue dimensions.

are hardly avoidable with externally flush butt joint connections and today they are viewed as the most important cause for bone resorption in the microgap region [5, 10, 7].

The principle of platform switching is also utilized in the Ankylos connection [8]. The gap region is displaced towards the center thereby creating additional space for hard and soft tissue. Bone resorption lateral and apical from the connection gap, which occurs with externally flush systems, can usually be avoided. As the abutting surface of the Ankylos Plus implant is also osteoconductive, the bone can build up to above the shoulder. Hard and soft tissues are also stabilized, which is scientifically documented for the transgingival approach [11]. This property of the connection is supported by the implant shoulder being inserted up to 1 mm below the bone level due to the sealed and rigid connection (Fig. 2).

Practical approach: surgery

In the transgingival method, Ankylos implants can be set individually and optimally dependent on the height of the soft tissue and according to the periimplant bone availability. The implant of the appropriate length is placed at or slightly beneath the level of the bone ridge. The transgingival component is then selected in the required length to match the soft tissue. This can either be a sulcus former, a temporary abutment or a permanent abutment with a temporary restoration.

The sulcus former is available in diameters of 3.3 to 7.0 mm and sulcus heights from 0.75 mm to 4.5 mm (Fig. 3). As the connection cone is identical for all implant diameters, there are many different options for the vertical and horizontal soft tissue dimensions.

However, for implants originally of transgingival design and preset height of the transgingival cuff, compromises have to be made in the vertical position in some cases given differences in mucous membrane thickness. The titanium material of the transgingival part can lead to shadowing with thin soft tissue. This occurs with low soft tissue thickness or small gaps, for example with lateral maxillary or mandibular incisors. The transgingival part may also lead to esthetic problems with recessions.

In our experience, problems with the soft tissue thickness do not arise with the Ankylos system due to different transgingival components. The two-part principle also allows a more flexible response if the tissue conditions change during the healing phase. In this case, an abutment post can be inserted for the prosthetic restoration with a different sulcus height to the sulcus former previously used.

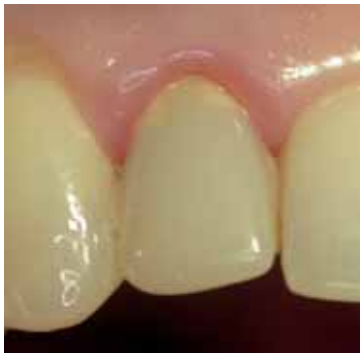

Fig. 4 Initial presentation, tooth 12 was not worthy of preservation.

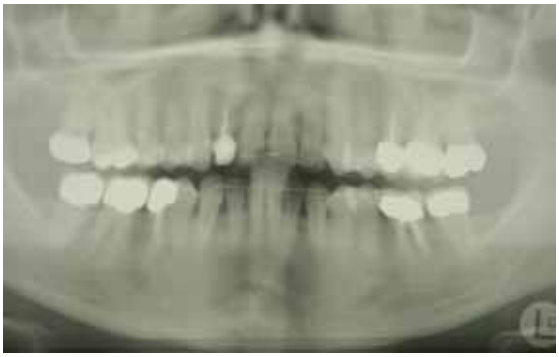

Fig. 5 Initial OPG.

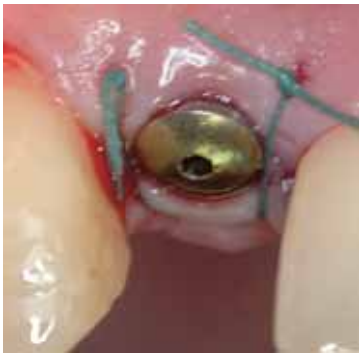

Fig. 6 Extraction of tooth 12 and immediate implantation.

Case documentation

We can look back on experience gained with 247 patients in our practice using transgingivally-healed Ankylos implants in the period between October 2000 and January 2007. The period of observation extended over 3 to 73 months with a mean value of 26 months. Seven implants were lost (loss rate 1.3 %). Bone was augmented for 33 implants. Figures 4 to 10 show an example of a typical transgingival implant with subsequent full ceramic restoration in the anterior region.

Broken down according to indications, the following picture emerges (Tab. 1): the most common indication was the edentulous mandible with 209 implants in 59 patients. The second largest group was formed by 142 patients with 201 single-tooth implants. Of these, 45 implants were placed in the esthetically relevant region of 14 to 24 and in the mandibular anterior region. A total of 13 patients were treated with fixed bridges using 35 implants. At the time of the survey, 71 implants in 33 patients had not yet been restored or were restored in another practice.

In our practice the transgingival protocol is about just as frequently applied as the closed protocol. Viewed overall, the Ankylos implant system behaves the same irrespective of the implantation mode. However, transgingival healing is more convenient for the patients in many cases, as exposure of the implant after healing is no longer necessary. Also the option of varying the mucous membrane emergence height in the prosthetic phase makes the approach described very flexible from an esthetic perspective.

Discussion and outlook

The results presented here agree with studies published on the Ankylos system. In an extensive study conducted at the University of Frankfurt for 5,439 implants over an average observation period of four years and nine months, a success rate of around 98 per cent was recorded [9]. The bone level for the successful implants generally remained stable as was the case for the soft tissue level. The implants were fitted according to different protocols; there was no breakdown into transgingival or closed healing.

Indication	Number of patients	Number of implants	Number of losses	Number of augmentations	Mean observation period (months)	Observation period: min-max
Implant-supported bridges	13	35	1	5	32	.8-70
Single-tooth restorations	142	201	1	23	32	.1-73
Restoration on edentulous mandibular	59	209	1	3	34	.7-76
Not yet restored	12	24	1	1	5	.3-12
Restoration alio loco	21	47	3	1	27	.5-66

Tab. 1 Statistics on transgingivally-healed Ankylos implants during the period between October 2000 and January 2007 (Dr Patric Renner's practice).

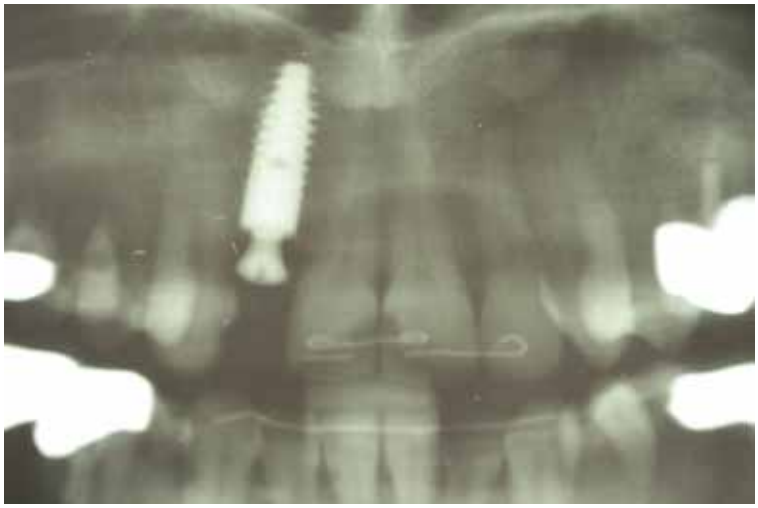

Fig. 7 Postoperative OPG.

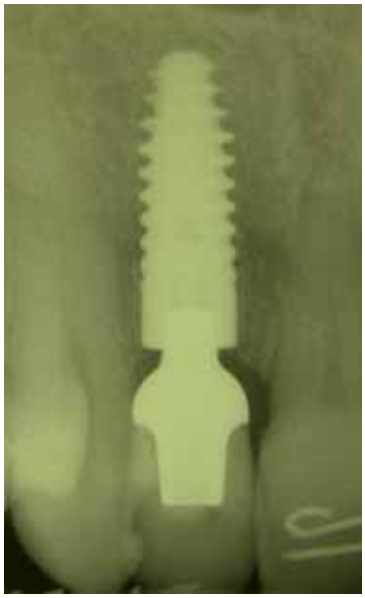

Fig. 8 X-ray EZA (analog), six months after insertion.

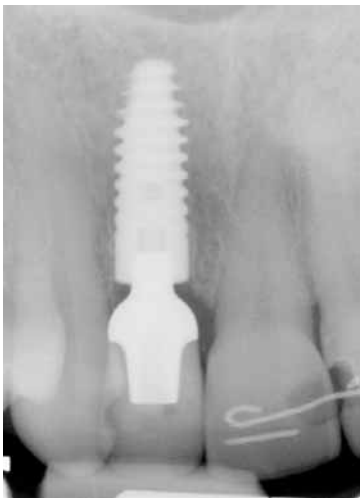

Fig. 9 X-ray EZA (digital), 15 months after insertion.

Fig. 10 Examination approximately two years after insertion.

Another working group found a stable bone level and favorable soft tissue conditions for 20 gingival implants and immediately restored single implants in the posterior region [1]. Compared with one-part implants of preset gingival height or two-part implants with external-flush micro-movement connections, the Ankylos system with its solid and interlocking conical connection has clear advantages in my view, which means that the use of transgingival healing is particularly recommended on a case-by-case basis. This evaluation is based on the literature quoted and personal clinical experience. ■

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