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## The effect of subcrestal placement of the polished surface of implants on marginal soft and hard tissues-a retrospective clinical study

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### Introduction

Background and aim: In order to improve the longevity of implants and to achieve esthetically more satisfying results, it has been proposed to place implants with their border between the rough and smooth surfaces below the level of the alveolar crest, thereby obtaining a submucosally located implant shoulder following healing.

### Objectives

The aim of the present retrospective clinical study was to clinically and radiographically evaluate the tissue response to the placement one-stage transmucosal implants with the border between the rough and the smooth surfaces sunk by 1 mm into a subcrestal location.

### Material and Methods

In total, 84 ITI, 13 Brånemark and 5 Type Frialit-2 (n = 102) implants were included in the study. Probing bone levels (DIB), gingival inflammation (GI) and plaque index (PI) were recorded at 2 years, at 3-4 years, and at 5-7 years. Periodontal probing depth (PPD), "attachment" levels, width of keratinised mucosa, distance from the implant shoulder to the marginal mucosa (DIM), the sulcus fluid flow rate (Periotron, Harco, Winnipeg, Canada), and radiologic bone loss over time were measured at the same time intervals. All parameters were assessed at 4 sites around each implant. The mean for each implant was calculated and used for analysis. The Wilcoxon matched pairs signed rank test and the Student t-test were applied to detect differences over time.



Fig. 1: Analyzed implants

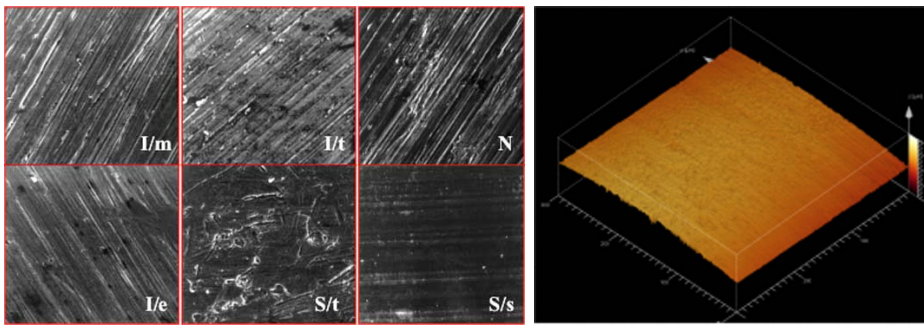


Fig. 2: Analyzed surfaces



Fig. 3: Probing bone Levels (DIB)

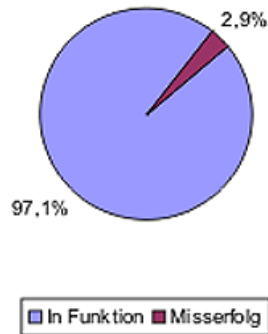


Fig. 4: Overall success-rate of analyzed implants

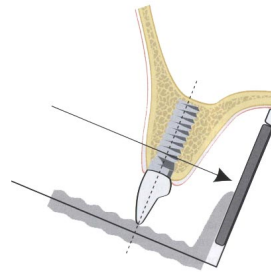


Fig. 5: Distance "implant shoulder-marginal mucosa" (DIM)

## Results

Results showed an overall success-rate of 97.1%. Expected correlations between GI and PI, the sulcus fluid flow and the amount of gingival inflammation (GI), PPD and the amount of angular bone-loss were found to be significant. All implants lost a significant amount of clinical bone height during the first 2 years (1.57 mm,  $p < 0.05$ ). Implants which were placed with a distance between the implant shoulder and the bone crest  $< 1$  (DIB) had an higher amount of bone-loss compared to the implants which were placed with a DIB  $\geq 1$ . Keratinised mucosa was found to decrease over time. Tendencies to increased PPD could be seen when only a small amount of keratinized mucosa was present. This could be associated with the formation of the biological width around dental implants.

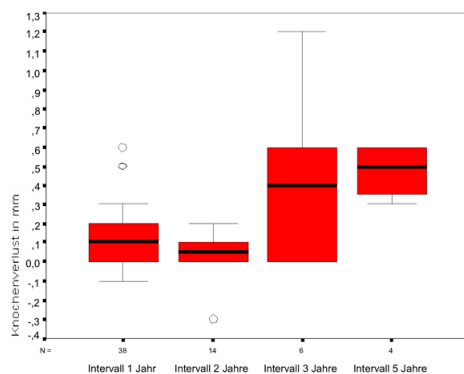


Fig. 6: Probing bone levels (DIB) were recorded at 2 yrs, at 3-4 yrs, and at 5-7 yrs

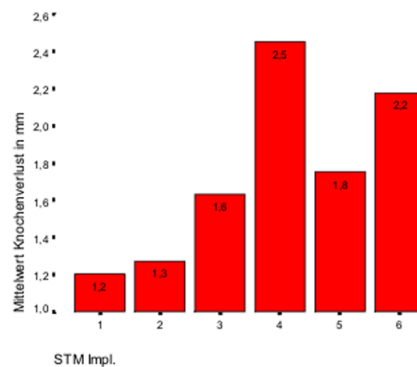


Fig. 7: Probing bone levels (DIB)

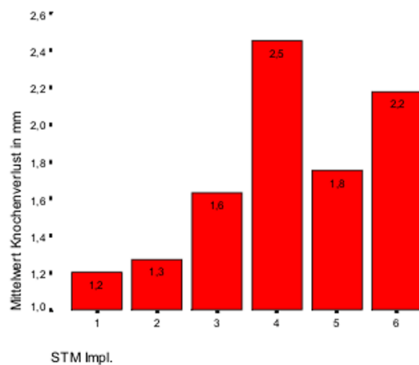
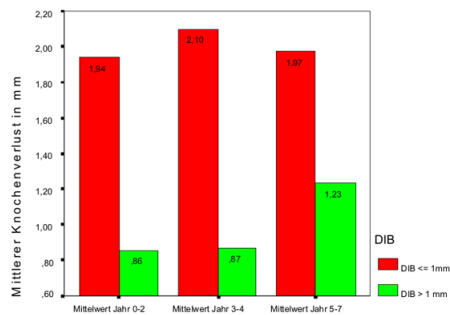


Fig. 8: Comparison of implants with a DIB < 1 and with a DIB > 1 Fig. 9: Decrease of keratinized mucosa over time

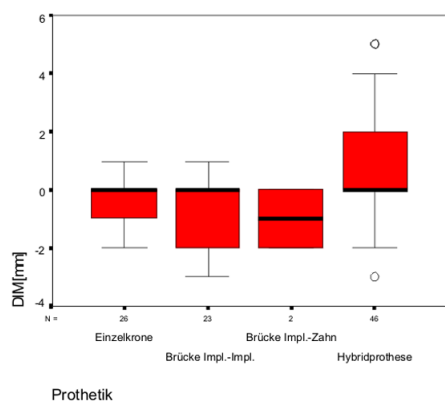


Fig. 10: Relationship between DIM and type of supraconstructions

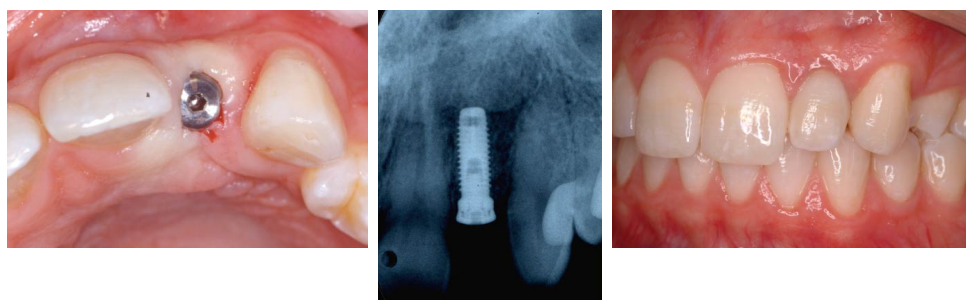


Fig. 11: Recommended method of implant insertion

## Conclusions

I. Success rate of 97,1 % for the analyzed implants is in accordance to the long-term efficiency of currently used dental implants proposed by Albrektsson et al. (1986).

II. The implants which were placed with a distance between the implant shoulder and the bone crest < 1 (DIB) demonstrated a bone level of 0.86 mm (at 12-24 months), of 0.87 mm (at 24-48 months), and of 1.23 mm (at 60-72 months) comparable to the findings of the clinical-controlled study of Hämmerle et al. (1996) with a lost of 1.02 mm after 12 month. The bone adjacent to the polished surface of more deeply placed implants is gaining a higher lost over time.

III. Except for the gingival index at first year evaluation (data not shown), no clinical parameters yielded significant differences between implants which were placed with a distance between the implant shoulder and the bone crest < 1 (DIB) in comparison to the implants which were placed with a DIB >= 1. and control implants at any time. These findings are in accordance to the study results of Hämmerle et al. (1996).

IV. The formation of the biological width around dental implants is obviously more important for the longevity of implants than the osseointegration (Berglundh and Lindhe 1996, Salcetti et al. 1997, Grimm et al. 2002).



**Literature**

1. Albrektsson, T., G. Zarb, et al. (1986). The long-term efficiency of currently used dental implants: A review and proposed criteria of success. *Int J Oral Maxillofac Implants* 1: 11-25.
2. Albrektsson, T. and F. Isidor (1993). Consensus report of session V. Proceedings of the 1st European Workshop on Periodontology. In: N. P. Lang and T. Karring. London, Quintessenz-Verlag: 365-369.
3. Berglundh, T. and J. Lindhe (1996). Dimension of the peri-implant mucosa. Biological width revisited. *J Clin Periodontol* 23: 971-973.
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5. Hämmerle, C. H. F., U. Brägger, et al. (1996). The effect of subcrestal placement of the polished surface of ITI implants on the marginal soft and hard tissue. *Clin Oral Impl Res* 7: 111-119.
6. Salcetti, D., J. Moriarty, et al. (1997). The Clinical, Microbial and Host Response Characteristics of the Failing Implant. *Int J Oral Maxillofac Implants* 12: 32-42.

This Poster was submitted by Prof. Dr. Wolf-Dieter Grimm.

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**Poster Faksimile:**

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**Background and aim:**  
In order to improve the longevity of implants and to achieve esthetically more satisfying results, it has been proposed to place implants with their border between the rough and smooth surfaces below the level of the alveolar crest, thereby obtaining a subcrestally located implant shoulder following healing. The aim of the present retrospective clinical study was to clinically and radiographically evaluate the tissue response to the placement of one-stage transmucosal implants with the border between the rough and the smooth surfaces sunk by 1 mm into a subcrestal location.

**Materials and methods:**  
In total, 84 ITI, 13 Brånemark and 5 Type Frialit-2 (n = 102) implants were included in the study. Probing bone levels (DIB), gingival inflammation (GI) and plaque index (PI) were recorded at 2 years, at 3-4 years, and at 5-7 years. Periodontal probing depth (PPD), "attachment" level, width of keratinized mucosa, distance from the implant shoulder to the marginal mucosa (DIM), the sulcus fluid flow rate (Periotron, Harco, Winnipeg, Canada), and radiologic bone loss over time were measured at the same time intervals. All parameters were assessed at 4 sites around each implant. The mean for each implant was calculated and used for analysis. The Wilcoxon matched pairs signed rank test and the Student t-test were applied to detect differences over time.

**Results:**  
Results showed an overall success rate of 97.1%. Expected correlations between GI and PI, the sulcus fluid flow and the amount of gingival inflammation (GI), PPD and the amount of angular bone loss were found to be significant. All implants lost a significant amount of clinical bone height during the first 2 years (1.57 mm, p < 0.05). Implants which were placed with a distance between the implant shoulder and the bone crest < 1 (DIB) had an higher amount of bone loss compared to the implants which were placed with a DIB ≥ 1. Keratinized mucosa was found to decrease over time. Tendencies to increased PPD could be seen when only a small amount of keratinized mucosa was present. This could be associated with the formation of the biological width around dental implants.

**Discussion**  
I. Success rate of 97,1 % for the analyzed implants is in accordance to the long-term efficiency of currently used dental implants proposed by Albrektsson et al. (1986).  
II. The implants which were placed with a distance between the implant shoulder and the bone crest < 1 (DIB) demonstrated a bone level of 0.86 mm (at 12-24 months), or 0.87 mm (at 24-48 months), and of 1.23 mm (at 60-72 months) comparable to the findings of the clinical-controlled study of Hämmerle et al. (1996) with a loss of 1.02 mm after 12 months. The bone adjacent to the polished surface of more deeply placed implants is gaining a higher loss over time.  
III. Except for the gingival index at first year evaluation (data not shown), no clinical parameters yielded significant differences between implants which were placed with a distance between the implant shoulder and the bone crest < 1 (DIB) in comparison to the implants which were placed with a DIB ≥ 1, and control implants at any time. These findings are in accordance to the study results of Hämmerle et al. (1996).  
IV. The formation of the biological width around dental implants is obviously more important for the longevity of implants than the osseointegration (Berglundh and Lindhe 1996, Salcetti et al. 1997, Grimm et al. 2002).

**Conclusion:**  
In addition to the crustal bone resorption occurring at implants placed under standard conditions, the bone adjacent to the polished surface is also lost over time. From a biological point of view, the placement of the border between the rough and the smooth surfaces into a subcrestal location should not be recommended.

**Literature:**  
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