

Immediate implantation in the maxillary esthetic zone: results from two decades of clinical research

Summary of the PhD thesis

by

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PUBLICATIONS PROVIDING THE BASIS OF THE THESIS

1. Klinger A, Mijiritsky E, Kohavi D. Biological and clinical rationale for early implant loading. *Compend Contin Educ Dent*. 2006; 27:29-34; quiz 5-6.

IF: -

2. Mijiritsky E. Plastic temporary abutments with provisional restorations in immediate loading procedures: a clinical report. *Implant Dent*. 2006; 15:236-40.

IF: -

3. Mijiritsky E, Mardinger O, Mazor Z, et al. Immediate provisionalization of single-tooth implants in fresh-extraction sites at the maxillary esthetic zone: up to 6 years of follow-up. *Implant Dent*. 2009; 18:326-33.

IF: 1.505

4. Barone A, Marconcini S, Giammarinaro E, et al. Clinical Outcomes of Implants Placed in Extraction Sockets and Immediately Restored: A 7-Year Single-Cohort Prospective Study. *Clin Implant Dent Relat Res*. 2016; 18:1103-12.

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5. Kolerman R, Nissan J, Mijiritsky E, et al. Esthetic assessment of immediately restored implants combined with GBR and free connective tissue graft. *Clin Oral Implants Res*. 2016; 27:1414-22.

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6. Kolerman R, Mijiritsky E, Barnea E, et al. Esthetic Assessment of Implants Placed into Fresh Extraction Sockets for Single-Tooth Replacements Using a Flapless Approach. *Clin Implant Dent Relat Res*. 2017; 19:351-64.

IF: 3.097

7. Kolerman R, Qahaz N, Barnea E, et al. Allograft and Collagen Membrane Augmentation Procedures Preserve the Bone Level around Implants after Immediate Placement and Restoration. *Int J Environ Res Public Health*. 2020; 17.

IF: 2.849

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I. INTRODUCTION

In the last two decades, our group has concentrated mostly on immediate implantation and loading, and we have covered numerous aspects. Our general aim was to contribute to a firm scientific basis for the clinical use of this approach and to establish its safety and reliability. However, for reasons of space, it would be impossible to cover all the work that has been done in this thesis. Instead, this thesis talks about a clinically important and challenging segment.

In the studies covered in this thesis, we concentrated on the maxillary esthetic zone as the most challenging and sensitive area of dental implantation. In all studies, immediate single-tooth replacement with nonfunctional immediate provisionalization. Our aim with these studies was to prove that this approach is a safe and reliable one in this sensitive area, both in the functional and esthetic sense. Some results were only short-term ones at the time of their publishing. Since then, time has proven them to be lasting.

II. OBJECTIVES AND HYPOTHESES

1. As a technical prerequisite, we sought to prove that the use of plastic temporary abutments with provisional nonfunctional restorations is an optimal approach for immediate loading procedures. This we first demonstrated in a proof-of-concept case study and in other studies later, including the ones covered in this thesis.

2. Based on the literature (with short follow-up times), we hypothesized that immediate provisionalization of single-tooth implants in fresh extraction sites in the maxillary esthetic zone could offer long-term implant survival free of complications or other adverse events. This we aimed to prove with prospective studies with long-term follow-up.

3. As esthetic outcomes are of utmost importance in the frontal region, two studies were entirely devoted to testing the hypothesis that immediate provisionalization is favorable not only in the functional, but also in the esthetic sense.

4. Finally, we directly addressed the question of immediate implant placement combined with augmentation procedures. While this question is addressed partially in our other studies, we found that it was of high practical importance, thus we designed a study to examine it. We hypothesized that immediate replacement of a single maxillary tooth by implants combined with guided bone regeneration would be a predictable treatment modality with favorable peri-implant bony response.

III. RESULTS

First, as sort of a preliminary technical question, we sought to prove that the use of plastic temporary abutments with provisional restorations is an optimal approach in immediate loading procedures. We managed to prove this point and we used these abutments throughout our studies. The prefabricated plastic provisional abutments are designed to allow for cementation of a provisional restoration because of horizontal retention sleeves, as well as the fabrication of screw-retained provisional restorations. The use of prefabricated plastic temporary abutments simplifies the connection and adaptation of provisional restorations, especially in immediate loading procedures. These abutments cost less than temporary titanium abutments and are easy and quick to prepare. Furthermore, preparation can be performed intraorally because this manipulation does not produce any heat transmission to the peri-implant bone as do titanium abutments.

The second aim was to prove that our approach could offer long-term implant survival free of complications and adverse events. This we studied through 6 to 7 years of follow-up and got a positive result. The soft tissue reaction was also quite favorable due to the presence of a provisional crown during the healing phase. This preserved the gingival and interdental papilla, resulting in highly esthetic outcomes. The same is true for marginal bone loss around single implants. The technique of immediate (if nonfunctional) loading in extraction sites appeared to be beneficial in many ways. There was no need for second-stage surgery and the need for transitional removable dentures was eliminated, along with its harmful effects on soft and hard tissues.

The third main question was esthetics. The primary means of assessment was the PES/WES assessment. In the first study of this kind, we assessed immediately placed implants combined with GBR and free connective tissue graft. In the other study, we dealt with a group of patients in whose cases a flapless approach was used, and extraction was carried out in a way that the integrity of the

residual bone walls was spared. PES/WES assessment validated immediate anterior maxillary single-tooth replacement and restoration as being a successful and esthetically predictable treatment modality, but with certain caveats. To summarize our esthetic observations, immediate nonfunctional provisionalization in the anterior maxilla does not risk long-term soft- or hard tissue esthetics provided that the bony socket walls are well preserved, and no specific soft tissue risk factor (such as a thin biotype) is present. For patients with damaged socket walls, a staged approach is recommended. Significant mucosal recession is not a necessary or even highly likely sequela of immediate provisionalization in the anterior maxilla. When used in the right patient population, the approach yields outstanding esthetic results.

Finally, we addressed the question of immediate implant placement combined with augmentation procedures directly. Mineralized FDBA particles were used in excess, combined with a non-cross-linked collagen membrane concomitant with immediate implant placement. After a mean follow-up of 34 months, the cumulative implant

success rate was 100%. All but three implants (70/73) were characterized by bone gain, indicating that the peri-implant marginal bone level can be well maintained or enhanced using the proposed treatment protocol. The findings confirm the positive effects of the proposed regenerative techniques in terms of osseous volume preservation during implant placement.

IV. CONCLUSIONS

Through the studies covered in this thesis, we have demonstrated the following and we consider these to be the novel scientific findings related to the work that has been accomplished:

1. The use of plastic temporary abutments with provisional nonfunctional restorations is an optimal approach for immediate loading procedures. This approach has become routine since its introduction.
2. Nonfunctional immediate loading of single-tooth implants in fresh extraction sites in the anterior maxilla results in successful implant integration and stable long-term peri-implant conditions.
3. Immediate nonfunctional provisionalization in the anterior maxilla offers predictably good esthetic outcomes provided that the bony socket walls are well preserved, and no specific soft tissue risk factor is present. As esthetics is a key factor in the anterior region, careful patient selection is essential for these procedures.
4. Mineralized FDBA particles in excess, combined with a non-cross-linked collagen membrane concomitant with

immediate implant placement in the anterior maxilla preserves the crestal bone level around the implants.

Besides their particular importance, the results laid out in this thesis show that immediate nonfunctional provisionalization in the anterior maxilla is a safe and reliable approach, both in the functional and the esthetic sense.

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