

Die Quintessenz



Metal-ceramic total rehabilitation with a modern press-to-metal technique in a difficult patient case

Dirk Ziebolz, Dr. med. dent., **Else Hornecker**, OÄ Dr. med. dent., **Rainer F. Mausberg**, Prof. Dr. med. dent.

Department of Operative Dentistry, Periodontology and Preventive Dentistry Georg-August University of Göttingen
Robert-Koch-Straße 40, 37099 Göttingen

Email: dirk.ziebolz@zm-goettingen.de

Björn Eggert, Dr. med. dent., oec. med. Pater Rombuutslaan 8, NL-3419 BE Heerlen

Stefan Mies, master dental technician

Bahnstraße 32, 56743 Mendig

Email: triplepress@online.de

www.triple-press.com

Mies-zahntechnik@online.de

Key words Press-to-metal technique, veneer ceramics, dental anxiety, nicotine withdrawal, compliance
Summary

Within the scope of the oral rehabilitation of a patient suffering from dental phobia and who presented himself after several years without dental treatment with massive damages in teeth and periodontitis, an aesthetic as well as functionally high-quality and at the same time affordable prosthetic management was performed following a systematic pre-treatment. The pre-treatment included measures related to the restoration of the masticatory organ as well as nicotine withdrawal and the establishment of a lasting dentist-patient relationship. In the final prosthetic management in the sense of a full-mouth restoration with elevation of the vertical jaw relation by 6mm, the newly developed triple-press technique was used.

Introduction

Aim of each dental treatment is to restore the function of the stomatognathic system. According to *Marxkors*¹⁰, it is not the short-term repair of the masticatory organ which is deemed a successful treatment but the long-term functioning and resilience of the dental prosthesis as well as the conservation of own teeth for a long period of time in the sense of a definite rehabilitation⁹. The remedy of damages in hard and soft tissues within the scope of an interdisciplinary initial treatment and the controlled achievement of an efficient oral hygiene on the part of the patient on his or her own responsibility are the basis of each comprehensive dental management^{9,10}. The type and scope of the therapy are, however, not determined by the specific need for treatment but by the financial situation of the patient,

because the individual optimal situation should be achieved for the concerned patient within the scope of a responsible planning.

In the prosthetic management of teeth with crown and bridge prostheses, the reconstruction and rehabilitation of crowns with dental materials are given priority. The objective is to maintain or restore the occlusion in statics and dynamics, the phonetics and aesthetics^{7,9}.

While the basic treatment principles experienced only insignificant changes recently, numerous innovations emerged in material and laboratory engineering⁷. The introduction of new materials and innovative technologies in dentistry such as composite, adhesion technique and CAD/CAM components resulted in improved therapeutic options, efficient clinical measures and



Fig. 1 Initial clinical finding at first presentation of the patient in initial examination (here: view of the upper jaw)



Fig. 2 Panorama tomogram initial finding after initial examination

an improvement of the aesthetics of fillings and prostheses. For definite prosthetic treatments, a broad spectrum of different types of crowns is available – from the full casting crown to the full ceramic crown. With regard to material properties and aesthetics, the metal-ceramic prosthesis has reached a high quality and proven itself with excellent long-term results^{5,6}.

Apart from the conventional veneer ceramics, the option to press the ceramic onto the alloy has been available for some time now. The present article shows the metal-ceramic full-mouth restoration with the triple-press technique based on a patient case which is both difficult with regard to the concomitant circumstances and technically demanding. The comprehensive management and treatment of the patient as well as the image documentation of the individual treatment steps took place in a dental surgery (Dr. Eggert, Heerlen, Netherlands); employees of the University of Göttingen provided technical support and scientific guidance.

Case report

Initial clinical situation

The then 25 years old male patient presented himself for dental examination in February 2003. He did not present himself on his own accord but because of massive pressure exerted on him by his employer.

The patient presented a good general condition and reported about no significant health problems in history. According to him, he suffered from attention deficit disorder in childhood, however, this had completely 'disappeared'

in the course of the years. The patient stated that he had been smoking one package of cigarettes a day since he was 14 and that he also would be suffering from a massive dental phobia.

The oral mucosa was inconspicuous apart from the marginal gingiva which showed marked signs of inflammation. Together with a large number of heavily destroyed teeth, infected root remainders and marked carious defects, an inferior oral hygiene was observed (Fig. 1). The periodontal screening index (PSI) showed a Code 3 in all sextants. All teeth showed an increased manoeuvrability of at least Degree I. Figure 2 shows the roentgenologic initial finding in the panorama tomogram.

Treatment planning

The therapy was performed according to a treatment plan agreed with the patient in all details. This also included the explanation of the changes with which the patient would be confronted as well as the planned dental treatment measures. It was also made clear to the patient to which extent his cooperation would be required for the performance and the successful completion of the treatment measures^{8,12}. The treatment planning included the systematic therapy, starting with a surgical pre-treatment and oral health care to restore a caries- and inflammation-free denture, subsequently the treatment of the localised chronic periodontitis as well as the elevation of the occlusion, which had lowered by 6mm, with splints⁸. Subsequently, a comprehensive prosthetic management of the remaining healthy teeth was planned^{7,9}.



Fig. 3 View of the caries-free and preservatively managed upper jaw



Fig. 4 Preservatively sufficiently managed denture after 18 treatment sessions; clearly discernible deep bite with loss of the vertical by 6mm

Systematic Therapy (I) – Initial Treatment

The treatment was started with a professional removal of dental deposits and instructions in oral hygiene. This focused on motivating the patient and instructing on the daily dental care at home^{3,13}. A further objective was to achieve an optimisation of the personal oral hygiene as well as the establishment of a dentist-patient relationship of trust. In addition, first steps for a nicotine withdrawal were initiated. Within the scope of the pre-treatment, nicotine withdrawal and the “elimination” of the dental phobia were given priority. This focused initially on the establishment of a relationship of trust between the patient, the dentist and the dental surgery team⁴. Complementary procedures such as e.g. hypnosis were refrained from. The nicotine withdrawal was carried out during the pre-treatment after a detailed counselling interview^{2,11}. Subsequent to this interview, the patient reduced cigarette smoking considerably. After a one-time acupuncture session, full abstinence from nicotine was achieved¹.

The surgical restoration included the removal of the teeth 18, 16, 35, 37 and 44, which could not be preserved, and the root remainders 24 and 46. The next treatment objective was a caries-free condition. Carious defects and insufficient fillings were managed with adhesively affixed composite fillings (Tetric Ceram and Tetric Flow, Ivoclar Vivadent, Schaan, Liechtenstein) or mounting

fillings (Ketac Molar, 3M Espe, Seefeld) (Fig. 3). In addition, endodontic measures in the teeth 15, 26, 27, and 38 were required. Because of the root curvature, tooth 38 posed a major challenge because it was of particular importance as strategic pillar. During the subsequent periodontitis therapy, the closed

procedure (root cleaning with hand instruments) showed a good success (Figs. 4 and 5).

Apart from the nicotine abstinence achieved in the meantime, further changes in the behaviour of the patient could be observed. He had abandoned his initial reservations against the dental treatment team and was also significantly more at ease and free when dealing with other persons. In the achieved intermediate phase, he started to already call his teeth “very nice”. Among other things, the meanwhile more well-groomed oral appearance contributed to the fact that the patient found a partner.

The further course of the treatment focused on the best possible restoration of the initial masticatory function. Because of the massive destruction of the denture and the teeth, the original bite position had lowered by approx. 6mm (see



Fig. 5 Radiological finding 3 months after completion of the surgical-preservative pre-treatment and subsequent periodontal treatment



Fig. 6 Occlusion splint to raise the lowered occlusion (at first by 3mm, after 3 months by a further 3mm)



Fig. 7 View of the teeth prepared in one session

Fig. 4). In order to set a "physiological" bite situation, the vertical jaw relation was to be elevated. This was done using lower jaw plastic splints with adjusted surface which were worn by the patient the whole day for 4 months each. In a first step, the occlusion was elevated by 3mm and by a further 3mm in a second step (Fig. 6). During and after the bite elevation, the patient had neither subjective complaints nor functional problems.

Systematic Therapy (II) – Prosthetic management

Having completed the pre-treatment and given continued nicotine abstinence, the prosthetic management was planned. For this purpose, a wax-up of the desired bite height was made, on which later the moulds for the temporary appliance were prepared.

The financial situation of the patient was tense. Thus, a reasonable solution had to be found which had to be both acceptable from the aesthetic and periodontal point of view and functional, taking into consideration the adolescent age of the patient. Because high-gold alloys were out of the question for cost reasons, a non-precious metal alloy had to be used. A solution of pure metal would have had the disadvantage that the individual crowns would have had a considerable weight. After a discussion among the dental treatment team members and the dental technician it was decided to use the newly developed Triple-Press® technique (co. of Triple Press, Mendig; information and supply via the address of the co-author *Mies* printed at the beginning of this article). Using this technique, ceramic is pressed onto a traditionally created metal framework.

Within the scope of the Triple-Press technique, the individual occlusion is first set directly in the patient's mouth using the finished modelled "wax crowns" using the IWPS (individualised wax pattern system) belonging to the system, viz specifically prepared finished wax parts for the relevant teeth and tooth forms. During this phase, the hygiene-capable layout of the interdental spaces can be checked. There also exists the option not only to have the masticatory movements be simulated in the articulator but to have them performed in the patient's mouth. After corresponding corrections by the dentist, the model is equipped with press channels and invested using the investment mass Triple Vest belonging to the system. The cavity created by the so-called lost wax technique is filled with a feldspar ceramic (GPS ceram cameleon blank, co. of Triple Press).

In the case presented here, the preservatively pre-treated teeth were prepared in a first "prosthetic session" (Fig. 7). The bite position achieved using the occlusion splint was registered intra operationem and encoded. Subsequently, the frameworks were prepared of a nickel-free NP alloy in the dental laboratory based on the modelled wax veneer and checked for fitting accuracy, care capability and occlusion in the patient's mouth during the next treatment session. In the meantime between the individual sessions, the patient wore temporary appliances which were produced based on the individual wax-up with the achieved bite elevation. After framework fitting, the individual crowns and five bridges were finished in the laboratory.

In a further session, the final crowns and bridges were fitted and the fitting accuracy, occlusion and hygiene capability were checked again



Fig. 8 Fitting of the final prostheses with control of hygiene capability



Fig. 9 Control of the prostheses after 12 months. The periodontal condition is good, the exploring depths are max. 3mm

and the restoration was finally positioned with GC Fuji Plus (GC Germany, Munich) (Fig. 8). After careful setting of the desired occlusion within the scope of the framework fitting, no further changes in the final crowns were required. A temporary positioning or trial wearing of the final prostheses was not required.

The patient presented himself for a first check after 1 week. The occlusal conditions continued to pose no problems. The patient, however, required a certain re-training with regard to the interdental space hygiene for the bite situation which was completely new to him.

The prostheses were regularly checked and have been in situ now for 3 years (Fig. 9). Using the Triple-Press technique, the patient was able to save with regard to the dental laboratory costs: The own contribution for dental services for such a "total reconstruction" was approximately Euro 1,500 less than compared with conventionally prepared metal-ceramic veneers.

Final assessment

Our 25 years-old patient at first presented extremely unfavourable initial conditions: a completely neglected denture, massive dental phobia, and long years of nicotine abuse. It was primarily the pressure exerted by the employer and later also the patient's own wish to lastingly change this situation as well as the patience and empathy of the dentist/dental surgery team which resulted in a development of a positive treatment atmosphere. On this basis, healthy and stable oral conditions as essential prerequisite for the success of the later prosthetic rehabilitation, which then was performed in a second step, could be achieved in a first step through systematic pre-treatment.

Because the use of high-gold alloys was not possible for our patient for cost reasons but an aesthetically attractive result was desired nevertheless, the Triple-Press technique was used for reconstruction. This technique is an alternative to the conventional metal-ceramic technique. Apart from the excellent mechanical properties such as abrasion resistance and compound stability, a good aesthetical and functional result can be achieved. A further advantage is the significantly lower costs for the dental services.

After a total treatment time of 2 years, the oral rehabilitation of the patient was completed. The "full-mouth restoration" is tolerated by the patient without any problems and has been in situ until now, i.e. after three years of wearing. In order to maintain this also periodontally inflammation-free situation, the patient was integrated into a recall programme which initially provided for an interval of three months. Upon expiry of one year, the recall interval was then set to 6 months.

Conclusions for practice

The presented case of a young adult with massive dental phobia and correspondingly defective denture as well as little financial means is to demonstrate with which challenges a dentist / dental surgery team is confronted in the oral restoration of such patients and how this task can be managed. Considering the individual situation,

the following steps are decisive for a long-term success:

- reduction of anxiety and establishment of a sustained relationship of trust to the dentist/dental surgery team as prerequisite to start a long-term and complex treatment;
- elimination of changeable risk factors, i.e. e.g. nicotine withdrawal and establishment of a good oral hygiene at home;
- strict compliance with a systematic treatment sequence build on each step;
- prosthetic rehabilitation taking into consideration the financial means of the patient. In this respect, the Triple-Press technique represents a suitable alternative to conventional metal-ceramic crowns and bridges with a high level of aesthetic as well as occlusal, functional and hygiene design options;
- integration into a need-orientated recall programme.

;58(7):00-00