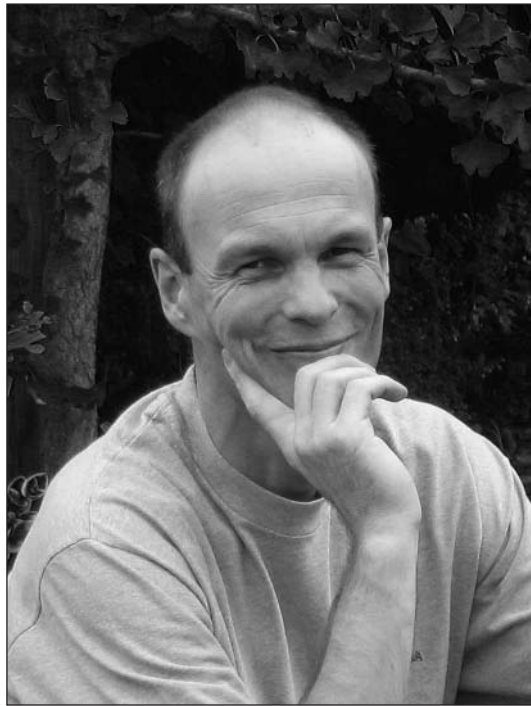


Esthetics with Resin Composite
Basics and Techniques

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with contributions from Dr. med. dent. Walter Denner

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Burkard Hugo
1960–2006

Preface

Preface

Our society places great value on beautiful teeth as an important requirement for an attractive smile. These days, esthetic corrections in the anterior dentition are carried out mainly with the aid of restorations fashioned in the laboratory or through orthodontic intervention. Instead of these time-consuming and costly techniques, it is often possible to use less invasive, or even noninvasive, measures to achieve results which are highly valued by patients. Given a mastery of the key ground rules of esthetics, the skillful use of resin composites – with no need to use a dental laboratory – can deliver highly attractive results which compare very favorably with a restoration constructed in the laboratory. Following his sadly premature death, the late Dr. Burkard Hugo, an extremely gifted dentist and university lecturer, leaves this book as his legacy; in it, he demonstrates the diverse treatment options now available to us with the direct resin

composite technique. The reader of this book will not fail to be surprised, amazed, and filled with admiration at the presentation of so many impressive treatment outcomes. Some of these achieve such perfection that it is difficult to believe that the patient's initial situation was possible. Indeed, many readers are sure to be motivated to look more closely into these treatment options. This book will provide you with all the necessary information, tips, and tricks which will be of great help in achieving such wonderful treatment outcomes. If you become familiar with the treatment techniques presented here, you will be sure to gain great job satisfaction, and have very satisfied and happy patients. In reading this book, I hope your interest and curiosity are rewarded with the discovery of previously undreamed-of treatment options.

Prof. Dr. Bernd Klaiiber

Foreword

Foreword

Esthetics and minimal invasiveness are two of the key current topics of restorative dentistry. Burkard Hugo managed to combine these highly divergent aspects of modern dentistry in a unique way, and passed on his knowledge in numerous lectures and courses. Latterly, in order to hone his restorative and esthetic skills even further, Burkard Hugo embarked on a course of further specialization as an orthodontist. His drive for knowledge, research, and invention could only be stopped by the relapse of a serious illness he had almost managed to overcome. In the last year of his life, he worked on this book, leaving it as a legacy of his theoretical and practical grasp of dental medicine. As his friend and colleague, I was honored to be given the task of filling in any gaps and of making his opus ready for publication. In Burkard Hugo's and my name, I would like to extend heartfelt thanks to our wives, Dorothea Hugo and Dr. Stefanie Denner, for their active help and support.

Esthetics with Resin Composite – Basics and Techniques shows how the options of highly esthetic direct resin composite restorations in the anterior dentition can be combined with strict, consistent adherence to a minimally invasive approach. Following an introduction to the basics of facial and dental esthetics, a long series

of step-by-step images provide a detailed demonstration of the methods and techniques of direct anterior tooth restoration using resin composite. In contrast to restorations made up in the laboratory, or costly and time-consuming orthodontic correction, the minimally invasive resin composite restorations presented here can be completed in a single treatment session. Thus, the morphological resin composite layering technique and its uses in various clinical situations are described in detail, together with an innovative matrix technique that solves many of the problems of conventional matrix use. The extensive presentation of complex clinical cases provides the dental practitioner with insights into potential modern uses of resin composite for the build-up of anterior teeth, the closure of approximal gaps, the closure of black triangles, for changes of position and shape, and for directly constructed, fiber-reinforced fixed dental prostheses. Sections on the correction of tooth discoloration and the repair of resin composite restorations are also included.

This book has been written by practitioners for practitioners and is intended for dentists and orthodontists, and also for students of dental medicine.

Walter Denner

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Sample case 3 (Figs 4-25 to 4-33)

Tissue loss: Class IV build-up, small to medium-sized defect



Baseline situation



Final situation

Fig. 4-25 Anterior view of the baseline situation: old, discolored macrofiller resin composite restoration in the incisal third of tooth 21. The homologous neighboring tooth 11 is intact but with slight incisal abrasions. There is characterization with translucent effects in the mesial and distal enamel.



Fig. 4-25



Fig. 4-26

Fig. 4-26 The palatal view shows the incisal composite build-up on tooth 21 and the marked discoloration at the restoration margin.

Fig. 4-27 Labial view of the preparation of tooth 21: the enamel bevel has been fashioned smooth. The centrally exposed dentin shows slight discoloration tendencies.



Fig. 4-27



Fig. 4-28

Fig. 4-28 Trial positioning of the silicone template, which has been cut to shape for construction of the posterior wall.

Fig. 4-29 Tooth 21: open partial matrix technique with wedging. The palatal enamel wall and two lateral enamel walls have been completed.



Fig. 4-29



Fig. 4-30

Fig. 4-30 Incisal view: the enamel shell leaves room for the dentin layering that is to follow.

Fig. 4-31 The dentin core has been built up using two masses (BioStyle D3, D2), with discrete mamelons; some room has been left laterally for the Effect Blue mass.



Fig. 4-31

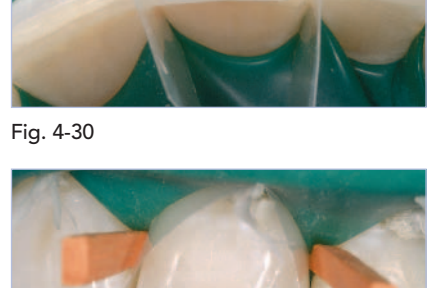


Fig. 4-32

Fig. 4-32 Situation following labial and incisal application of the enamel mass (BioStyle S uni). Only a thin layer of enamel has been applied onto the dentin core at the incisal edge.

Fig. 4-33 The finished restoration is nicely integrated.

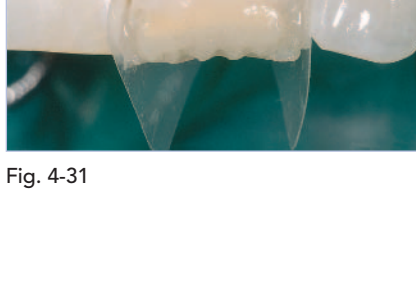


Fig. 4-33

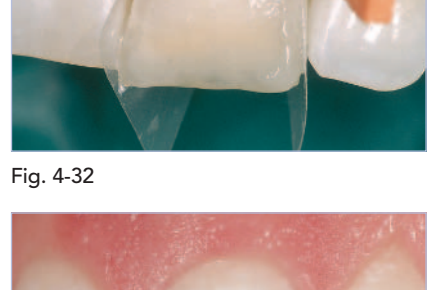


Fig. 4-33



Fig. 4-525



Fig. 4-526



Fig. 4-527



Fig. 4-528



Fig. 4-529



Fig. 4-530



Fig. 4-531



Fig. 4-532



Fig. 4-533



Fig. 4-534

Fig. 4-525 Anterior view of the baseline situation in occlusion: loss of tooth 41 due to periodontal causes; the anterior overbite is very short, with a tendency towards end-to-end bite.

Fig. 4-526 View of the anterior mandible: predominantly horizontal loss of attachment involving all the incisors.

Fig. 4-527 Lingual view of the anterior mandibular teeth.

Fig. 4-528 A view of the master cast following the discrete preparation of repositioning troughs on the lingual surfaces of teeth 42 and 31.

Fig. 4-529 Incisal view of the master cast: the repositioning troughs, the discrete hollows around the circumferences of the teeth, and the space where the crown is to slot in are all clearly apparent.

Fig. 4-530 The all-ceramic FDP molded out of Empress material is now in situ.

Fig. 4-531 Labial view of the pontic and the inner surface of the adhesive wings.

Fig. 4-532 Lingual view of the all-ceramic adhesive FDP with the shaped lingual surfaces. Note the width of the links between the pontic and the adhesive wings.

Fig. 4-533 Final situation of the anterior mandible with the Empress FDP slotted in to replace tooth 41. Symmetrical distribution of the widths of the mandibular incisors has been achieved.

Fig. 4-534 Lingual view of the final situation following adhesive fixing.

Fig. 4-535 Incisal view of the final situation.



Fig. 4-535

4.6.2 Fiber-reinforced resin composite

New preimpregnated fiberglass materials are now available to optimize the mechanical and physical properties of resin composite FDPs.

The use of fiber-reinforced composites (FRCs) is becoming increasingly more significant. Thus, FRCs are used not only to reinforce removable tooth- or implant-supported FDPs, but also for splinting in the presence of periodontal lesions, for root canal posts, and during the orthodontic retention phase.^{141–146} The clinical success of an FRC reconstruction depends on the application technology criteria, such as the marginal integrity of the restoration, as well as on the strength of the fiber reinforcement.¹⁴⁷ The polymer matrix and the type of fiber reinforcement both have a key influence on the physical properties of the FRC construction, such as rigidity, strength, and toughness. The properties of the resin composite bond to the FRC framework of the FDP affect the durability of the restoration. The FRC substrate contains various materials, from polymers to inorganic fiberglass fillers. The internal adhesion of the FRC, which influences the cohesive strength, is determined by the strength of the bond between the fibers and the polymer matrix. Silanizable glass and silicon fibers are the most suitable materials in this regard.¹⁴⁸ Less satisfactory adhesion with the plastic matrix is found with polyethylene fibers of ultra-high molecular weight (eg, Ribbond, Ribbond Inc., USA; Connect, Kerr, USA).¹⁴⁵ These adhesion problems can be improved by leaving an intact oxygen inhibition layer on the FRC surface before applying the build-up or facing resin composite. This procedure is used in the Fibrekor system (Jeneric Pentron, USA) and the everStick system (Stick Tech, Finland).¹⁴⁹

4.6.3 Treatment planning for direct adhesive FDPs versus orthodontic closure of gaps

In principle, there are two possible types of structure: a conventional dual-wing abutment design, and a single-wing “free end” design, in which the pontic is attached to one abutment tooth only (Fig 4-536).

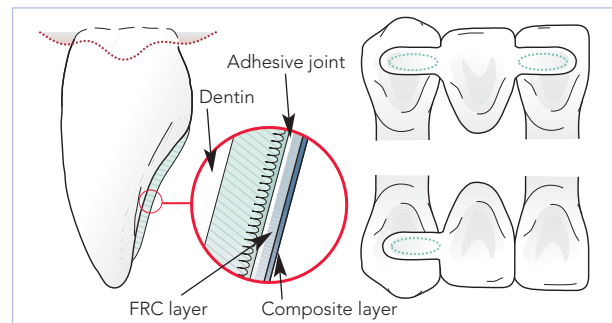


Fig. 4-536 The diagram shows two possible structural forms for FRC FDPs: (conventional) dual-wing abutment design and single-wing, free-end design. The way in which the FDP is affixed to the abutment tooth (its diagrammatic cross-section is shown) is identical for both variants (modified from Meiers and Freilich¹⁵¹).

Both methods are presented in the following case examples. Treatment planning should consider both the orthodontic and restorative treatment options, taken against the background of the patient's own wishes and economic circumstances. In situations where the gap is to be maintained or opened, it will be necessary to take into account the prerestorative positions of the teeth, the size of the gap, and the distribution of other teeth and gaps. One point to keep in mind is that changes in the widths of the neighboring teeth are always possible by reshaping the teeth locally, either by taking back the enamel or through additive composite build-ups. These methods can be used to adjust the size of the gap to the space required or to make any necessary shape changes to the adjoining teeth. In any case, the overall planning should be dependent on the baseline skeletal and dental situation. Factors that need particular