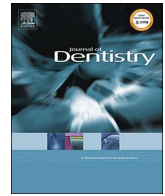




Contents lists available at ScienceDirect

Journal of Dentistry

journal homepage: [www.elsevier.com/locate/jdent](http://www.elsevier.com/locate/jdent)

# Complete rehabilitation of compromised full dentitions with adhesively bonded all-ceramic single-tooth restorations: Long-term outcome in patients with and without amelogenesis imperfecta

Andrea Klink, Martin Groten, Fabian Huettig\*

Department of Prosthodontics, Center for Dentistry, Oral Medicine, and Maxillofacial Surgery, Tuebingen University Hospital, Tuebingen, Germany

## ARTICLE INFO

### Keywords:

Dental enamel hypoplasia  
Permanent dentition  
Dental adhesives  
Dental crowns  
Ceramics

## ABSTRACT

**Objectives:** This clinical follow-up evaluated the long-term outcome of full-mouth rehabilitations with adhesively bonded all-ceramic restorations in patients suffering from amelogenesis imperfecta (AI) or affected by extensive tooth wear including a loss of the vertical dimension of occlusion.

**Materials and methods:** Included for evaluation were all patients treated with adhesively bonded monolithic single-tooth restorations made of silicate or lithium disilicate ceramics; allowing a maximum four missing teeth and a facial feldspathic veneering of LDS anterior crowns. After treatment, patients have been enrolled in a recall program for dental check-ups including quality assessment of the restorations. Patients answered the oral health impact profile (OHIP-14) at their last visit.

**Results:** Seventeen patients (mean age =  $35 \pm 18$  years) were observed up to 16.5 years (mean:  $6.2 \pm 3.8$  years). 12 out of 450 restorations failed due to core fracture ( $n = 7$ ), tooth fracture ( $n = 2$ ), one secondary caries, one chip-off grade 3, and one fixed dental prosthesis due to discomfort. The overall mean survival rate of the single-tooth restorations was estimated 99.4% at 5 and 91.4% at 10 years. The overall mean success rate was estimated 92.6% at 5 and 81.4% at 10 years, mainly due to chip-offs and crack formation (27 out of 31 relative failures). The mean annual failure rates (AFR) range between 1.5 and 2% over the years, but non-AI patients were affected more frequently by early technical complications in the facial veneering of anteriors, resulting in an AFR ranging between 5.2 and 4%. Quality assessment revealed stable color, form and marginal integrity in all patients up to ten years. The distribution of OHIP values is comparable to the representative sample of healthy patients.

**Conclusion:** Adhesively bonded single-tooth restorations provided a high clinical quality in the long-run. However, while the survival and success were excellent in AI patients, restorations in non-AI patients were affected by a higher complication rate, likely related to a higher risk profile due to a history of bruxism and tooth wear.

## 1. Background

Extensive erosion, abrasion, or attrition often calls for an esthetic and functional rehabilitation of a full dentition, including a correction of the vertical dimension of occlusion (VDO) [1–4]. But also patients suffering from genetic enamel defects, such as amelogenesis imperfecta (AI), require a rehabilitation, foremost already at a young age [2,5,6]. One possibility to treat a worn dentition, especially in adolescent patients, is the use of direct resin composites, which have the advantages of relatively low costs and an extensive preservation of healthy tooth substance [7]. In cases where the vertical dimension needs to be increased, direct restorations are only recommended with restrictions,

because restoring the morphology and function of the entire occlusal surfaces demands an outstanding experience of the dentists [4].

Today, ceramic materials in hand with adhesive techniques allow a restoration with minimally invasive preparation [8,9]. But, there is still no evidence and a lack of information which might be the best approach and material regarding the longevity and outcome for patients in need of a complete rehabilitation [10].

All-ceramic materials in combination with adhesive luting agents seem to be a timely treatment option [3,11]. Various studies showed that silicate (SC) and lithium-disilicate ceramics (LDS) are reliable materials for single-tooth restorations in the anterior and posterior; with annual failure rates of about 1% [12–15]. Even early SC such as

\* Corresponding author at: Tuebingen University Hospital, Department of Prosthodontics, Oslanderstr. 2-8, 72076 Tuebingen, Germany.  
E-mail address: [fabian.huettig@med.uni-tuebingen.de](mailto:fabian.huettig@med.uni-tuebingen.de) (F. Huettig).

<https://doi.org/10.1016/j.jdent.2017.12.011>

Received 15 August 2017; Received in revised form 17 December 2017; Accepted 20 December 2017  
0300-5712/ © 2017 Elsevier Ltd. All rights reserved.

pressable IPS Empress 1 (Ivoclar-Vivadent, Schaan, Principality of Liechtenstein) revealed a survival rate of 92% – 99% after 3.5 years, and crowns made from Celay-based Vitablocs (Vita Zahnfabrik, Bad Säckingen, Germany) survived 82.1% after 5 years [14,16].

LDS crowns, namely made of IPS Empress 2, e.max press/e.max CAD (all Ivoclar Vivadent) are reported with survival rates of 89.7% after 5 years, and 86.1% up to 95.5% after 10 years [17–20]. These survival data are based on clinical trials observing on average one up to three restorations in every observed patient. Complex cases (with up to 28 restorations), which encompass the treatment of the complete dentition with crowns or partial crowns, are reported as case reports or case series with limited observation times, only [1–4,21–23].

Such extensive treatments are a major challenge for the dentist, dental technician as well as the patient. This addresses an individual therapy planning to restore the vertical dimension and dynamic occlusion, mostly in an interdisciplinary approach of prosthodontics, maxillofacial surgery and orthodontics [1–3,5,21–23].

Patients suffering from AI are particularly affected by enamel lesions which cause esthetic limitations (discolorations, mainly of yellowish brown shade), high caries activity [22,24], and hypersensitivity (see Fig. 1). Their dentitions are also frequently affected by a loss of the vertical dimension, abnormal tooth eruption, defective root or coronal resorption as well as congenitally missing teeth, malocclusions, or an anterior open bite [25,26]. Due to the defect during amelogenesis, the enamel is compromised for adhesive bonding, too [27]. Whereas sound enamel shows a well-defined etching pattern, the enamel of AI patients shows shallow grooves with very few pits after etching with 35% orthophosphoric acid for 30 s [28]. As a consequence, bonding of ceramics and composites to enamel involves a high risk of failure, depending on the type of AI. Furthermore, bonding to the dentine is controversially discussed due to mineralization. A higher acid resistance impairs the penetration of bonding agents and results in a lower bonding strength [29].

In summary, the long-term success of such complex treatments depends on the material, patients' disposition as well as the dentists' diligence in treatment and adhesive luting of the restorations.

The aim of this clinical follow-up was to identify risks and to estimate the complication and survival rate of single-tooth restorations in a rehabilitation protocol using SC and LDS. Special regard should be given to differences between patients with and without AI. Furthermore, the evaluation should clarify patient reported outcomes of

such treatments assessing their oral health related quality of life.

## 2. Methods

This clinical follow-up is part of a quality control measure of dental treatments with dental consultations. The evaluation was approved by the Institutional Ethical Review Board (425/2015BO2) of Tuebingen University Hospital and the patients gave their informed consent to use data and photographs.

### 2.1. Treatment rationales

Patients visiting the Department of Prosthodontics and asking for an oral rehabilitation due to esthetically and/or functionally compromised dentitions were investigated by a senior dentist. Evaluation and information of the patients included all possible treatment options. This encompasses the need for dental pre-treatments (e.g. root canal treatments, core built-ups) as well as an increase of the vertical dimension of occlusion (VDO) with an removable occlusal appliance when extensive tooth wear due to attrition or erosion was present (see Fig. 2). Adhesively bonded restorations were recommended to the patients with regard to an expected longevity (as compared to composite built-ups) and to avoid a pronounced preparation of remaining healthy tooth substance (as compared to conventionally luted bi-layered porcelain fused to metal (PFM), or silicate layered to Zirconia (S2Z) crowns). Patients who decided for composite built-ups were referred to the Department of Operative Dentistry.

If the VDO needed to be adjusted, the increase was allowed with a maximum change of 4 mm measured at the incisal edge. These patients had been provided with a splint in the lower jaw, which was worn 24/7 for at least 4 months. The adjusted VDO was used for the in-lab wax-up. Such wax-ups and generally the mounted casts of each patient were used for preparation planning in order to remove tooth substance individually. This way, special regard was given to minimize the extent of preparation whilst to reach the minimum occlusal layer thickness in the later restorations, as assigned by the manufacturer. Patients were only allowed for treatment if they were compliant in oral hygiene (bleeding on < 15% of probing sites).



Fig. 1. Clinical situation of a female AI patient (#7) before (a) and six years after treatment completion (b).

Download English Version:

<https://daneshyari.com/en/article/8699302>

Download Persian Version:

<https://daneshyari.com/article/8699302>

[Daneshyari.com](https://daneshyari.com)