



Do erbium lasers promote changes in the tooth enamel during debonding of ceramic laminate veneers? A systematic review

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Abstract

The longevity of ceramic laminate veneers can be influenced by several factors, which can result in the need for a removal process. Laser removal has emerged as a good alternative to facilitate the procedure, and its repercussions on tooth enamel have been investigated. We aimed to evaluate the efficacy of erbium lasers for debonding ceramic laminate veneers without damaging the tooth enamel. This systematic review based on the PICOS model adhered to the PRISMA statement. The PubMed/MEDLINE, Web of Science, Embase, and Scopus databases were systematically searched until December 1, 2022, and 2902 studies were retrieved. After screening, four in vitro studies that analyzed the dental morphology using scanning electron microscopy, optical analysis, stereomicroscopy, or x-ray dispersion spectroscopy were included. The risk of bias was assessed using the Cochrane Collaboration tool. Our findings suggest that erbium lasers are useful for ceramic laminate veneer removal without damaging the tooth enamel. However, the removal is influenced by the type and thickness of ceramic and type of cement used. It could be concluded that the application of Erbium laser did not promote superficial changes in the dental enamel. This effect was observed in all analysis performed.

Keywords Dental enamel · Erbium laser · Laminate veneers · Laser therapy · Tooth wear

Introduction

In recent years, the use of ceramic laminate veneers in dentistry has increased considerably, owing to their advantages and applications. In addition, several dental ceramic systems have been developed to meet patient expectations [1–3].

Ceramic laminates offer excellent fracture resistance and high esthetics and are a minimally invasive treatment

approach [4, 5]. They are indicated for the correction of dental defects in form and position, diastemata closure, replacement of old composite restorations, restoration of teeth with incisal abrasions or tooth erosion, masking enamel defects, and covering or reducing tooth discoloration such as fluorosis and tetracycline staining [6]. However, disadvantages such as marginal caries, fractures, and infiltration of the resinous film impair the longevity of these restorations [7–9]. The ceramic or glaze layer can deteriorate over time because of acidic influences and functional wear [10, 11]. Another important reason for veneer removal is discoloration and esthetic corrections, which are driven by the advancement of dental practices and higher esthetic demand [2, 12].

Quality cement guarantees long-term success [13], but ceramic laminate veneers have a limited lifespan and are replaced after a certain period [14]. Laminates are bonded to the surface of the dental enamel, and their removal requires care and the selection of a procedure that does not damage the underlying tooth structure. Therefore, removal methods focus on reducing effort and trauma [5].

The conventional removal procedure involves the use of rotary instruments such as drills. However, these require

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