



ORIGINAL RESEARCH PAPER

Dental Science

EFFECT OF THE REMOVAL OF BRACKETS ON THE DENTAL STRUCTURE

KEY WORDS: Damage Enamel Dental, Orthodontic Debonding, Debracketing

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ABSTRACT

The Orthodontic treatment ends with removing the brackets, a process not without complications in the enamel. A systemic review of the subject was carried out between the years 2000 - 2020. It has concluded that the procedure is frequently associated with an increased risk in crack formation and deepening in tooth enamel, and a decrease in the thickness of this.

Was found no significant relationship to alter the post-procedure color. Further studies should carry out on this subject.

INTRODUCTION

According to some epidemiological studies, approximately 30% of the population requires orthodontic treatment (Borzabadi-Farahani., 2011). Currently, many patients opt for orthodontic treatment with fixed devices to solve their malocclusion problems. At the end of the orthodontic treatment, the brackets and residual adhesive are withdrawn, mechanically, since resin remains accumulate dental plaque and can be dyed (Joo et al., 2011).

Have been used different techniques to do this, but none of these allows the removal of waste without damaging the enamel's surface. It should be considered that in the installation of the bracket, it is carried out an acidic engraving that allows the resin to infiltrate the enamel (Lehman, Davidson., 1981). You should also keep in mind the type of material used since composite adhesives and glass ionomer cement differ in shear resistance and the remnant amount left on the surface after disunity.

In removing the bracket, the dentist's experience and the type of instruments used is essential.

This study's objective was to review work-related to damage to tooth enamel after the removal of brackets.

MATERIALS AND METHODS

It reviewed in the PubMed and Epistemonikos database between 2000 and 2020 using English and Spanish articles.

There used the following terms: dental damage enamel, orthodontic debonding, debracketing, and the use of Clinical Queries for selection in the case of PubMed. The inclusion criteria used: damage to the enamel and removal of the adhesive used. Are included bibliographic reviews, systematic reviews, and clinical trials. All articles that did not

have their main topic, the damage caused to the dental enamel level, were excluded.



Figure 1. Flow Chart Of Articles Reviewed

RESULTS

The results obtained from the investigation in the following table, are here summarized:

Table 1. Summary Of Information Obtained From Each Of The Selected Studies.

Study design	Authors	Year	Conclusion
Systematic review	Dumbryt e, et al ⁶ .	2018	There is strong evidence that, after disunity, the number of microcracks is likely to increase.
Systematic review	Janiszew ka-Olszowk a, et al ⁷ .	2014	More efforts must be made to find tools and methods for the complete removal of adhesive residue, minimize enamel loss, and achieve a smooth surface.
Primary study	Ahangar, et al ¹ .	2018	There was a significant increase in the length and number of enamel cracks in each group after disunity.
Primary study	Dumbryt e, et al ⁶ .	2017	Disunity leads to a short-term increase in tooth sensitivity. Microcracks, a

Primary study	Pont, et al ¹⁰ .	2010	form of enamel damage, do not predispose to a more excellent bracket removal sensitivity perception.
Primary study	Su, et al ¹³ .	2008	Iatrogenic damage to the enamel surface after bracket separation was unavoidable. It is not determined whether elemental loss (Ca%) of enamel is of clinical importance in long-term clinical follow-up of the patient population studied.
Systematic review	Chen, et al ⁴ .	2015	After disunity, the number of enamel cracks and pronounced cracks and the enamel cracks' length increased in all.
Primary study	Traklyali, et al ¹⁵ .	2009	There is no substantial evidence in this review that orthodontic treatment with fixed appliances alters the original enamel color. More well-designed and conducted randomized controlled trials are required to facilitate comparisons of results.
Primary study	Tecco, et al ¹⁴ .	2004	Can not be observed Photo-aging induced color changes in orthodontic bonding systems clinically. Polishing with silica burs removes roughness from the enamel surface, which can improve light reflection.
Primary study	Schuler, et al ¹¹ .	2003	In all three studies, a significantly higher frequency of cracks was observed in the enamel (from 65% to 80%), mainly in the cervical third of the tooth crown (from 65% to 80%) and vertical (from 75% to 80%). Compared to the control group (P < 0.05), groups had no difference between the three study groups. The index of enamel lesions was significantly higher in the three study groups than the control group (P < 0.05), with no significant differences between the three study groups.
Primary study			It is detected moderate to substantial enamel surface damage in 44% of all rectangles. Over 88% of all damaged rectangles showed no signs of improvement after 12 months. The more distal a tooth was in the dental arch, the more severe the damage. More than 88% of the teeth had visible

			grooves at the line and cervical area's angle, which must have been caused by tungsten carbide burs. In general, it is evident that the center of the labial surface, where the bracket was attached, was not the most affected area, but the proximal and cervical border.
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DISCUSSION

Enamel damage caused by the removal of fixed orthodontic appliances, resulting from the removal of residual adhesive, is recognized. There is a loss of enamel, increase or formation of microcracks, and alterations in the surface with increased roughness. In the development of these complications, it is relevant to consider the operator's role and the instruments used to remove the residual adhesive. Pont et al. (2010), perform an analysis with X-ray scattering spectrometry; they conclude that iatrogenic damage to the enamel surface after separation of the support is inevitable.

It is not determined whether the elemental loss of enamel is of clinical significance in the patient population's long-term follow-up.

Regarding the change in color of enamel, Chen et al. (2015), in a review about the shift in enamel color after the use of different orthodontic bonding resins and cleaning procedures, conclude that adhesive systems and removal methods Resin could be associated with enamel discoloration, but the evidence was not significant enough.

Finally, we have the formation of cracks at the enamel level; are find different authors who concluded that there was an increase in the number of microcracks, among them Dumbryte et al. (2018) and the number of cracks and their length. On the other hand, Ahangar et al. (2018), concluded that there was a significant increase in their size, in addition to the rise in the number of enamel cracks. Both Su et al. (2012), Tecco et al. (2008), and Schuler et al. (2003), reached the same conclusion, which states that there is a significant relationship between bracket removal with the formation of cracks at the enamel level. Furthermore, Dumbryte et al (2017), looked for an association between crack formation with a short-term increase in tooth sensitivity, finds no significant relationship.

CONCLUSION

Orthodontic treatments with fixed appliances cause irreversible damage to tooth enamel, at the time of removal, depending on the operator and materials and instruments used.

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