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 At the end of the orthodontic treatment, the brackets and residual adhesive are withdrawn, mechanically, since resin remains accumulate dental plaque and can be dyed (Joo et al., 2011).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 Epistemikos 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.

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

<table>
<thead>
<tr>
<th>Study design</th>
<th>Authors</th>
<th>Year</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Systematic review</td>
<td>Dumbryt e, et al.</td>
<td>2018</td>
<td>There is strong evidence that, after disunity, the number of microcracks is likely to increase.</td>
</tr>
<tr>
<td>Systematic review</td>
<td>Janiszew ka-Olszowk a, et al.</td>
<td>2014</td>
<td>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.</td>
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<tr>
<td>Primary study</td>
<td>Ahangar, et al.</td>
<td>2018</td>
<td>There was a significant increase in the length and number of enamel cracks in each group after disunity.</td>
</tr>
<tr>
<td>Primary study</td>
<td>Dumbryt e, et al.</td>
<td>2017</td>
<td>Disunity leads to a short-term increase in tooth sensitivity. Microcracks, a</td>
</tr>
</tbody>
</table>
Primary study | Pont, et al. | 2010
---|---|---
| 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.

Primary study | Su, et al. | 2008
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| After disunity, the number of enamel cracks and pronounced cracks and the enamel cracks’ length increased in all.

Systematic review | Chen, et al. | 2015
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| 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 | Trakyali, et al. | 2009
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| Can not be observed Photo-aging induced color changes in orthodontic bonding systems clinically. Polishing with silica burrs removes roughness from the enamel surface, which can improve light reflection.

Primary study | Tecco, et al. | 2004
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| In all three studies, a significantly higher frequency of cracks was observed in the enamel (from 85% 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 | Schuler, et al. | 2003
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| 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.

**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 irreparable damage to tooth enamel, at the time of removal, depending on the operator and materials and instruments used.

**REFERENCE**


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