Abstract

This article reviews the literature and research on fluoride-releasing adhesive resin. Secondary caries is the primary cause of dental restoration failure. One method for reducing this problem is to use fluoride containing restorative materials. This review focuses on the properties of fluoride-releasing adhesive resins in terms of fluoride releasing, fluoride uptake, secondary caries inhibition, durability and dentine bond strength. Many studies have shown that these adhesive resins promote good adhesion to dentine substances. Moreover, fluoride ions released from the adhesives could penetrate and diffuse into the cavity wall dentine and prevent secondary caries by reinforcement of the dentine wall.

Keywords: fluoride-releasing adhesive resin, fluoride-containing dentin bonding
In primary caries, fluoride and glass ionomer cements have been used as cavity liners.

Sodium fluoride luting agent

Glass ionomer cement

Pre-reacted glass ionomer fillers

Protect Bond

Clearfil ABF

Fluro-aluminosilicate glass : FASG

ABF

Secondary caries

Pre-reacted glass ionomer fillers

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Secondary caries

Pre-reacted glass ionomer fillers
Table 1  Adhesives, components and manufacturers of dental adhesives used in the studies\(^{(9,12-15)}\)

<table>
<thead>
<tr>
<th>Adhesive</th>
<th>Company/Manufacturer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clearfil Protect Bond (ABF)</td>
<td>Kuraray Medical Inc., Tokyo, Japan</td>
</tr>
<tr>
<td>Primer &amp; Bond : MDP, HEMA, water, TEGDMA, photoinitiator, FASG, methacrylate-10</td>
<td>Tokuyama Dental, Tokyo, Japan</td>
</tr>
<tr>
<td>Reactmer Bond Bond A : F-PRG, FASG, solvent, initiator, water, Bond B : 4-AET, 4-AETA, 2-HEMA, UDMA, solvent, photoinitiator</td>
<td>Shofu, Kyoto, Japan</td>
</tr>
<tr>
<td>FL-BOND (Imperva Fluoro Bond) Primer A : water, solvent, initiator Primer B : 4-AET, 4-AETA, 2-HEMA, TEGDMA, initiator Bonding agent : F-PRG, 2-HEMA, UDMA, TEGDMA, initiator</td>
<td>Shofu, Kyoto, Japan</td>
</tr>
<tr>
<td>FL-BOND S-1 (Fluoro Bond shake-one) Bond A : S-PRG, FASG, initiator, water, solvent Bond B : 4-AET, 4-AETA, 6-MHPA, 2-HEMA, Bis-GMA, initiator</td>
<td>Shofu, Kyoto, Japan</td>
</tr>
</tbody>
</table>

**Materials and Methods**

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**Tables and Figures**

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**References**

\(^{(9,12-15)}\)

**Figure Legends**

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**Discussion**

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**Conclusion**

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Han and colleagues studied the effect of using different calcium phosphates (CaPs) as fillers in dental adhesives to improve microleakage and bond strength compared to traditional fluorides. They found that using PRG-Ca (Précipitated Calcium Hydroxide) as a filler significantly reduced microleakage compared to other fillers.

Several studies have investigated the use of bioactive materials such as calcium phosphates (CaPs) and fluorides in dental adhesives to improve their physical properties and reduce microleakage. Han and colleagues explored the potential of using PRG-Ca as a filler in dental adhesives to enhance microleakage and bond strength. The results of their study showed that PRG-Ca fillers improved the performance of dental adhesives compared to other fillers.

In a separate study, Ikemura et al. investigated the use of different bond systems and calcium phosphates as fillers in dental adhesives to improve microleakage and bond strength. They found that using PRG-Ca fillers in dental adhesives significantly reduced microleakage compared to other fillers.

It is important to note that the use of bioactive materials such as calcium phosphates (CaPs) and fluorides in dental adhesives has become increasingly popular due to their ability to improve physical properties and reduce microleakage. Further research is needed to better understand the mechanisms of these materials and to develop new bioactive dental adhesives with improved performance.

In conclusion, the use of PRG-Ca fillers in dental adhesives has shown promising results in improving microleakage and bond strength. Further research is needed to better understand the mechanisms of these materials and to develop new bioactive dental adhesives with improved performance.
Acid resistance zone (inhibition zone) or the acid resistance zone which indicates the depth of acid resistance described by Tsuchiya (13,14,16,19,20). We determined the acid resistance zone according to the method of Tsuchiya (19,20).

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10. Tay FR, Sano H, Tagami J, et al. Ultrastructural study of a glass inomer-based, all-


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