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New Trends for Removing Decays: A Comparison between ER-YAG Laser and Traditional Methods

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Introduction
Laser Technology has been highly used in operative dentistry in there cent years and seems to be able to replace traditional methods.

Objectives
The aim of this review is to present the effectiveness of ER-YAG laser for caries removal in comparison to convention alburs.

Materials and Methods
A search was conducted using electronic search engines such as Pub Med and Google Scholar. Keywords used were (Laser, Caries, Removal). The initial search resulted in 191 in Pub Med and 20,400 in Google Scholar. After applying the inclusion and exclusion criteria, which are publications within the last five years, English literature, and clinical trials and literature reviews were included. This narrowed the results to 6 in Pub Med and 2 in Google Scholar. Duplicates were discarded and the 3 most relevant articles were selected. [table 1]

Table -1

Type	Title	Journal	Author	Year
Literature Review	Selective Removal of Dental Caries with A Diode-Pumped Er:YAG Laser	HHS public Access	Yan	2015
Clinical Trial	Caries Removal in Deciduous Teeth Using an Er:YAG Laser: A Randomized Split-Mouth Clinical Trial	Clinical Oral Invest	Valério	2015
Clinical Trial	The Use of Erbium: Yttrium Aluminum Garnet Laser in Cavity Preparation and Surface Treatment: 3-Year Follow-Up	European Journal of Dentistry	Buyukhatipoglu	2015

Results

In 2010, Wen X (et al) stated that ER-YAG laser preparation were reported to result in changes in dentin that may improve adhesiveness. However in 2008, Krausa(et al)mentioned that ER-YAG laser was reported to have a longer working time, leading to patient's discomfort. More recently, ER-YAG laser appeared to be of similar effectiveness and efficiency as bur preparation in caries removal with the latter being more effective on surrounding walls.

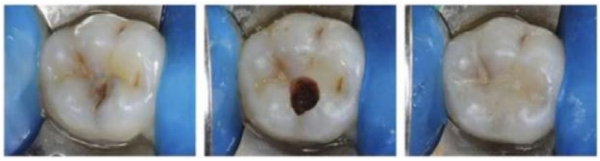

Figure (A) A1 A2 A3

Caries removal and restorations after bur preparation (A) . A1, active carious lesion on the occlusal surface of a deciduous molar, with cavitation reaching the dentin; A2, the preparation after caries removal with the bur; A3, the restoration before the removal of absolute isolation to check the occlusal contacts.

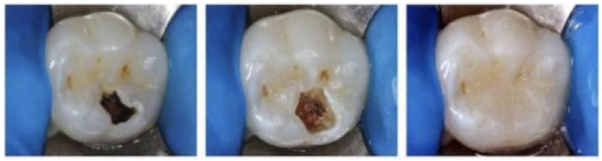

Figure (B) B1 B2 B3

Er:YAG laser preparation (B).B1, active carious lesion with cavitation reaching the dentin located on the occlusal surface of a deciduous molar; B2, the preparation after caries removal with the Er:YAG laser; B3, the restoration before the removal of absolute isolation to check the occlusal contacts.

Discussion

Selected articles were 2 Clinical Trials and one Literature Review. Valerio suggested that ER:YAG laser is considered better than conventional bur preparation in caries removal as it produces physical changes by creating coarse surfaces and it removes smear layer. This will lead to better micro mechanical bonding for adhesives. However, he stated that there is no difference between bur preparation and ER:YAG laser in the amount of Streptococcus Mutans and Lactobacilli found in the affected dentin. These results are likely due to the ability of laser to ablate on moist surfaces of dentin.[2] Similarly, Yan et al found that ER:YAG laser has minimal peripheral thermal damage due to high water content ablation rate in ER:YAG laser.[1]

Rodrigo et al mentioned that both ER:YAG laser and bur preparation methods were effective for caries removal from pulpal wall, however bur preparation is more effective in surrounding walls.[2]

Conclusions

Within this study's limitations, ER-YAG appears to be effective in caries removal, though with a prolonged working-time but there was no significant difference between Er-YAG and conventional procedure in removing carious lesion. More Studies are needed to determine the limitations of ER YAG lasers and for more improvement in the future.

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