REVIEW ARTICLE

Assessment of Oral Hygiene and Dental Plaque In Patient Undergoing Orthodontic Treatment Using Propolis: A Scoping Review

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Abstract:
Background: Usage of brackets during orthodontic treatment helps in the retention of biofilm due to plaque accumulation, and change in pH to overcome different negative pharmacological problems natural products have been used nowadays. propolis is a bioproduct derived from bees because of its various pharmacological properties and its effects on topical products, it is beneficial to be used which has strong fungal, bactericidal, antiviral and antiparasitic antioxidative properties. Aim: the purpose of this research is to know and understand the effect of propolis in preventing dental plaque and maintaining oral hygiene in patients undergoing orthodontic treatment. Methods: an online search was done using databases from PubMed and Google Scholar to find the articles. database search was done with the following string propolis [Title/Abstract]) AND(orthodontic [Title/Abstract]. results: 8 articles were included in the review to evaluate the better effect of propolis while undergoing fixed or removable orthodontic treatment. Conclusion: Propolis has a significant effect on oral hygiene and preventing dental plaque in patients undergoing orthodontic treatment. Short running title: propolis in orthodontics
Keywords: propolis, orthodontic treatment

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INTRODUCTION

Orthodontic goals involve a stable and proper occlusion, aesthetically pleasing facial features, and a good relationship between their periodontal supportive system.[1] Orthodontic treatment hampers oral hygiene and normal cleansing action of the oral cavity against teeth due to brackets, and appliances leading to accumulation of dental plaque while addressing different types of malocclusion .[2]orthodontic treatment favours an increase in several oral microbial florae and harbours favourable environment for growth.[3]

Gingivitis is the most common inflammatory disease affecting periodontium due to the retention of biofilm and changes in the pH of the oral cavity. dental caries is another disease affecting teeth and starting demineralization.[4]Gingivitis is the most common inflammatory disease affecting periodontium due to the retention of biofilm and changes in the pH of the oral cavity. dental caries is another disease affecting teeth and starting demineralization. [5] Use of brackets during

orthodontic treatment helps in the retention of biofilm due to plaque accumulation, and change in pH to overcome different negative pharmacological problems natural products have been used nowadays.[6]propolis is a bioproduct that is derived from bees because of various pharmacological properties and its effects on topical products its beneficial to be used.

Propolis has been derived from the plant Apis mallifera. propolisis a nontoxic and resinous substance. it's classified into different groups. Plant balsams, volatile oils, acids of phenols, acids of esters, flavonoids, aromatic alcohols and aldehydes, terpenes, fats, -steroids, mineral salts, and vitamins form a dense and sticky mixture of wax and resin which is known as propolis.[7-9]

Propolis has strong fungal, bactericidal, antiviral, and antiparasitic antioxidative properties. Various studies show the anti-inflammatory effects of propolis and its strong anti-immunomodulating effect. Through the reduction of IL-1 m RNA expression, activation of nitric oxide synthase (iONS), and scavenging of free radicals generated by neutrophils and macrophages, It was found that extracts of ethanol with propolis had anti-inflammatory activities.[10]

SEARCH STRATEGY: propolis [Title/Abstract]) AND (orthodontic [Title/Abstract]) from Google Scholar and PubMed.

INCLUSION CRITERIA:

Population: All data consisting of RCT, comparative studies, prospective studies, non randomized control trial etc. used propolis as an active ingredient.

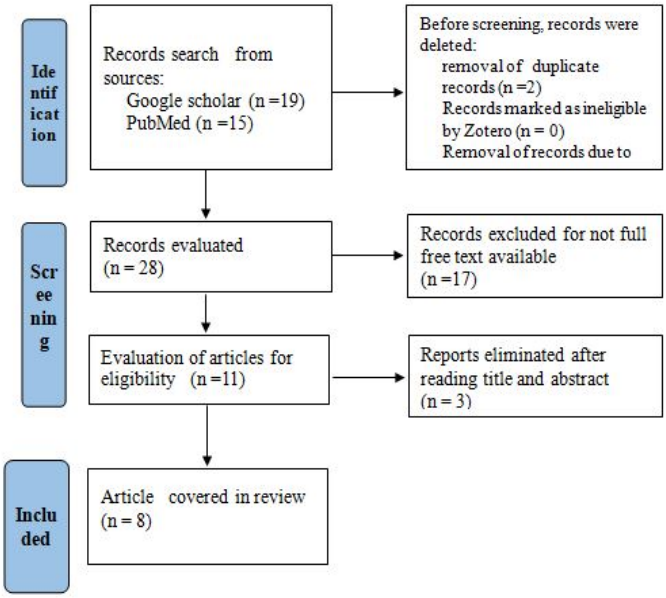
Intervention: Propolis containing mouthwash, dentrifice, lozenges etc.

Control: toothpaste, mouthwashes etc. containing other than propolis.

Outcome: potent agent in reducing plaque and improving oral hygiene.

EXCLUSION CRITERIA: articles available in languages other than English.

MATERIAL AND METHOD:



RESULT

Author	Comparator		Sample size	Outcome	Results
Agnieska et al 2021[3]	Propolis	Without Propolis	Propolis group =21 control=20	The Gingival and periodontal scores were statistically decreased in the propolis group when viewed alongside the control group. (*P*< .05>	An enhancement in oral cleanliness was seen in group A. The gingival bleeding index (GBI) for the whole gingival condition, along with the incisors and molars, all decreased.
Mara et al 2022[11]	Brp	Without Brp	BRP =21 WITHOUT BRP =21	There is a decrease in the number of Lactobacillus species in the group that used the BRP dentifrice.	
Joao et al 2020[12]	Brp	Fluoride without	EACH GROUP =46	BRP-containing toothpaste showed improved clinical and microbiological efficacy.	Two groups reduced GBI significantly.
Farhadifard et al 2021[13]	Brushing+denture cleansing tablets (intervention 1) Brushing+propolis mouth wash (intervention group 2)	Brushing (control)	Sample size =32 Triple blind cross-over trial .in between switching for 1 month.	Cleansing with a denture cleansingtablet has reduced the microbial plaque significantly on removable orthodontic appliances than doing it with a brush alone.	Interventiongroup 1 and the comparator group were statistically significant.Intervention group 2 and the comparatorgroup were statistically insignificant. Statistics showed that intervention groups one and two were significant.
Carolina et al 2020[14]	Green propolis extract		In vitro study on dentistry materials against the formation of different candida species.	This study supports the notion that green propolis inhibits the pathogenic ability ofspecies of Candida and has antifungal activity.	
Deghnani Et al 2021[15-16]	Propolis mouthwash	Chlorohedine Mouthwash	SAMPLE SIZE =37	Propolis can be used as a suitable alternative for chlorhexidine without advertising the effects caused by chlorhexidine.	p values for plaque, gingival, and periodontal and are statistically significant before and after using propolis.p values for the 2 intervention groups are not significant.
Agnieszka Et al 2016	Brazilian propolis toothpaste	Control	Sample Size= 96 Randomized between 2 groups for 35 days	There is a reduction in plaque while using propolis toothpaste.	Plaque and gingival index are assessed for 35 days and there is a reduction in p values significantly in propolis group than the control group.
Agnieska et al 2013	Polish propolis	Placebo	EACH GROUP =25	The biological efficacy oftoothpaste containing Polish propolis is supported by the study.	OPI, GI, and the proportion of Actinomycesand Capnocytophaga. it decreased statistically significantly in the propolissubject compared to the baseline.

DISCUSSION

Propolis has strong fungal, bactericidal, antiviral, and antiparasitic antioxidative properties. Propolis has been shown in numerous studies to have anti-inflammatory properties as well as potent immune-suppressing properties.Agnieska et al (2021)[3] suggested how the antibacterial and anti-inflammatory action of propolis is important in patients with cleft lip and palate in 50 { both control and intervention } individual through RCT. They compare the polish propolis with plant oil. polish propolis contains ethanol extract of flavonoid compounds. There are also acids of phenols including p-coumarin, caffeic and esters, and micronutrients in it. It also contains tectochrysin, chrysin, pinostrobin, and apigenin. Contain in plant oil. Tea Tree Oil (TTO) is a component of plant oil. Terpinen4-ol, -terpinene, a-terpinene, p-cymene terpinolene, and 1, 8-cineole were the major components of TTO. By using steam distillation, Mentha piperitaeoil (menthol) was produced from fresh, carefully chosen leaves. Menthol, menton, and Somerton were the three main ingredients.Mara et al (2022)[11] checked the efficacy of Brazilian red propolis to prevent plaque development and salivary Lactobacillus spp. It was a clinical experiment with a double randomization. .42 participants were allocated into two groups G1 AND G2. Joao et al (2020)[12] evaluated the effectiveness of Brazilian red propolis (BRP)-containing toothpaste in teenagers undergoing orthodontic treatment through a double randomized trial.92 participants were allocated into 2 groups .2 groups Brazilian red propolis and the second one fluoride dentifrice with BRP. Based on the outcome of the gingival bleeding score, denitrifies containing BRP have better clinical action. Farhadifard et al in (2020)[13] compares denture tablets and ethanol extract of propolis in cleansing removable orthodontic appliances to assess the protective nature against biofilm and caries activity.

Carolina et al (2020)[14] this study assessed the effect of green propolis extract on the adhesion and biofilm formation of Candida species in various materials used in dentistry. By using high-performance liquid chromatography, green propolis extract's phytochemical analysis was carried out. By counting the amount of yeast cells clinging to pieces of tooth material in a Neubauer chamber, adhesion was measured. Colony-forming units that were extracted from dental material pieces were counted to determine the production of biofilm. It was determined whether the biofilm adherence was poor,

moderate, strong, or extremely strong. Deghnani et al (2020)[15-16] did a comparative study between propolis and chlorohexidine.30 grams of propolis were used to make the preparation, which was then mixed using 100 ml and then heated at 30 ° C for two hours. As the base concentration, the propolis aqueous extract was purified by 30%. Propolis was mixed in a 1% solution with 0.25% salt concentration and flavourings such as saffron essential oil. Agnieszka et al (2016)[4] have done the Brazilian red propolis comparison research on dental plaque and gingiva in patients receiving treatment under removable and multibracket appliances. Plaque and gingival indices have been assessed over some time. Results showed it is clinically beneficial to enhance infectious illness prevention and management in patients with mouth clefts. In this review, 8 studies have been included and 5 randomized control trials have been included. there are 3 studies have been done in patients undergoing orthodontic treatment for cleft palate and lip. Studies done by Agnieszka et al[3-6] and Farhadifard et al have been done on orthodontic patients treated with removable appliances. Dentifrice containing BRP (Brazilian redpropolis) has been used in 3 studies in comparison to some other control groups. There is only 1 study with green propolis extract that has been done by Carolina et al1[4]. Polish propolis with ethanol extract is done by Agnieszka et al. Parameters checked for evaluating the antiplaque effect of propolis are gingival index plaque index periodontal index and (OHI-S) oral hygiene index over some time. The study done by Mara et al evaluated the anti-plaque effect of caries preventing activity by examining the activity of lactobacillus in dilution on follow-up visits. Jao et al[12] evaluated the oral microflora by salivary examination of S.mutans and concluded the gingival health of the individual undergoing orthodontic treatment.

LIMITATIONS

Data search was done on only 2 standard databases. Data search has not been done on grey literature.The quality of Studies included in the research is poor so meta-analysis cannot be done properly. Standard systematic reviews and meta-analyses are not available so they are not included.

SCOPE OF WORK

All 8 studies have been done on different sample groups which differ in the allocation of subjects.There is no standardized percentage of propolis preparation mentioned in the literature gathered through databases. A study based on standard proportion and concentration should be done.

CONCLUSION

Maintaining good oral hygiene in patients undergoing orthodontic treatment is of utmost importance. Propolis significantly affects oral hygiene and prevents dental plaque in patients undergoing orthodontic treatment. There is no standardized percentage of propolis preparation mentioned in the literature gathered through databases. The concentration varies for different propolis preparations.It needs more randomized control trial studies on a large scale to statistically quantify the effect of propolis.

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