

Importance of Oral Hygiene in Orthodontic Treatment

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Abstract

Background: Orthodontic treatment involves the use of appliances such as braces or aligners to straighten teeth and improve bite. Maintaining good oral hygiene during treatment is crucial to prevent the development of dental caries and periodontal disease. **Methods:** A literature search was conducted using PubMed, Cochrane Library, and Google Scholar for studies published between 2018 and 2022. The search terms used included "orthodontic treatment," "oral hygiene," "dental caries," and "periodontal disease." Inclusion criteria for studies were: (1) written in English, (2) published in peer-reviewed journals, (3) focused on orthodontic treatment and oral hygiene, and (4) included original research. Exclusion criteria were: (1) case reports, (2) reviews or meta-analyses, (3) not focused on orthodontic treatment or oral hygiene. **Results:** A total of 28 studies were included in the systematic review. The majority of the studies were observational in nature and conducted on adolescent patients. The studies consistently demonstrated that poor oral hygiene during orthodontic treatment is associated with an increased risk of dental caries and periodontal disease. Specifically, a poor oral hygiene status was found to be associated with a higher incidence of white spot lesions, gingivitis, and periodontitis during treatment with fixed appliances. **Conclusion:** The results of this systematic review demonstrate the importance of oral hygiene in orthodontic treatment. Patients undergoing orthodontic treatment should be educated about the importance of maintaining good oral hygiene to prevent the development of dental caries and periodontal disease. Dentists and orthodontists should closely monitor the oral hygiene status of their patients during treatment and provide appropriate interventions to improve oral hygiene and prevent the development of oral health complications.

Keywords: Oral hygiene; orthodontic treatment, periodontal disease, dental caries.

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INTRODUCTION

Orthodontic treatment is a popular and effective way to correct misaligned teeth and improve the overall appearance and function of the bite (Sarva Sri *et al.*, 2022). However, while the focus is often on the movement and alignment of the teeth, it is important to remember that maintaining proper oral hygiene is essential to the success of orthodontic treatment (Patil *et al.*, 2021). In fact, oral hygiene plays a crucial role in the overall health of the teeth, gums, and supporting structures during and after orthodontic treatment (Le Foulter *et al.*, 2021).

Orthodontic appliances, such as braces and retainers when applied to the teeth, create small spaces and nooks where food particles and bacteria can become trapped. This can lead to the buildup of plaque, which can cause tooth decay and gum disease if not

removed through proper brushing and flossing (Sharan *et al.*, 2020). In addition, braces can also cause irritation and soreness in the mouth, making it even more important to maintain good oral hygiene to prevent infection and to alleviate discomfort (Khattab, Hajeer and Farah, 2022).

Oral hygiene includes regular removal of food debris and mechanical removal of biofilm for plaque prevention, with the aim of preventing gingivitis, periodontitis and caries (Sälzer *et al.*, 2020). Given that systemic inflammation exacerbates periodontal inflammation, this is likely to avoid systemic illness in the long run (Martínez-García and Hernández-Lemus, 2021).

Proper oral hygiene during orthodontic treatment begins with brushing and flossing the teeth at

least twice a day (Saccomanno *et al.*, 2022). It is important to use a soft-bristled toothbrush and toothpaste with fluoride to clean the teeth and gums. Specialized orthodontic brushes and floss threaders can also be used to help clean around the brackets and wires of the braces. Additionally, using an antimicrobial mouthwash can help to reduce the growth of harmful bacteria in the mouth. Patients' periodontal health has been proven to improve permanently after practising more rigorous dental hygiene (brushing, supragingival scaling) (Kramer and Splieth, 2022).

While orthodontic treatment can take several months or even years, maintaining good oral hygiene throughout the process is essential to ensure that the final result is a beautiful, healthy smile. It can also help to reduce the risk of complications such as tooth decay and gum disease, which can cause damage to the teeth and gums.

A rising number of research have highlighted the importance of maintaining dental hygiene in orthodontic patients (Cosola *et al.*, 2019; Machorowska-Pieniążek *et al.*, 2021; Pilli *et al.*, 2022). However, the content, methodology, and duration of these research vary greatly, resulting in contradictory outcomes. As a result, the goal of our study was to consolidate the information indicating the importance of oral hygiene among orthodontic patients.

METHODOLOGY

This systematic review was conducted in compliance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) (Page *et al.*, 2021). The research question that the systematic review will address. Is "What is the importance of maintaining oral hygiene on the oral health of patients undergoing orthodontic treatment?"

Search Strategy

The PICO method was utilized to establish the study topic, and Boolean operators were applied to produce various keyword combinations. These key words include various keywords, which include "orthodontic treatment," "oral hygiene," "dental caries," "plaque" and "periodontal disease". Science Direct, PubMed, SCOPUS, and clinicaltrial.gov were used to discover available 2018-2022 papers using a variety of aforementioned keyword combinations. The authors claim no conflicts of interest in the study selection process and have not performed any experiments on the issue.

Study selection

The titles and abstracts of the identified studies are screened to determine their relevance to the research question. We include only studies that meet the inclusion criteria, such as study design (randomized controlled trials, observational studies), sample size,

and published in English language. The complete procedure of literature review and study selection was illustrated in the PRISMA Flow chart. Any relevant work available in the English language in peer-reviewed publications and providing important material linked to the goal of this review was evaluated for inclusion. In addition, references to all relevant studies and earlier review articles were manually entered.

Inclusion and exclusion criteria

The criteria for inclusion employed were the ones that follow:

1. Available in the English language in peer-reviewed publications
2. Clinical study relating to the importance of maintaining oral hygiene in orthodontic patients
3. The number of participants was specified.
4. Clinical and observational studies

Articles were omitted if an English abstract was unavailable, single conference reports, case reports. Were excluded, or if the topic was irrelevant to the theme.

Data extraction and tabulation:

Extract the relevant data from the included studies, such as sample size, oral hygiene interventions, outcome measures (decay, gingivitis, plaque index). Data from the included studies was to be gathered and presented using a consistent, time-tested table for evidence synthesis and study quality grading. Each study that met the criteria provided the following information: the lead author, year of publication, study design, sample size, number of patients, patient age, follow-up duration, and importance of maintaining hygiene, study outcomes (gingivitis index, plaque index, oral health related quality of life).

RESULTS

Study Characteristics

Initially 245 publications were obtained by conducting literature search. Total 100 articles were excluded in the start being the duplicate publications. Initial title and abstract screening yielded 61 articles. The 13 review articles were removed. Two articles were removed because of case report. Ten studies did not reported orthodontic patients while eight studies were excluded because of the publication year not included in our study. Twenty eight papers were selected based on Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) requirements (Fig 1). This research included twenty eight investigations (21 Randomized controlled trials and 7 longitudinal studies) involving 2309 individuals. Table 1 displays the study characteristics of included research, as well as the importance of maintaining oral hygiene in each study. The studies included were mix of children, adolescent and adults.

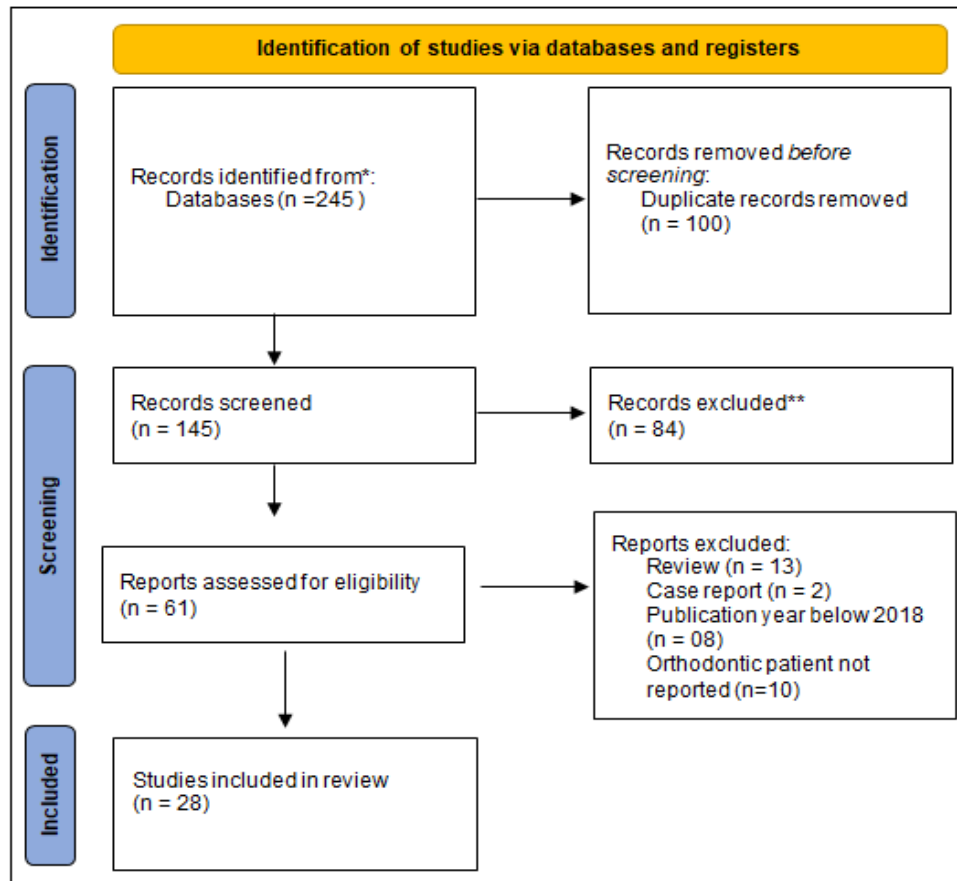


Figure 1

Table 1: Study characteristic of included studies

Reference	Study type	Population summary	Findings	Outcomes measured
(Garcia-Godoy <i>et al.</i> , 2018)	RCT	52 people aged 35.8±11.23 years who were randomly assigned to either the experimental hygiene group or the control group	The importance of maintaining oral hygiene in orthodontic treatments is evident as early as Week 2 and continuing throughout the trial.	<ul style="list-style-type: none"> • number of bleeding sites • whether participants had any bleeding
(Erbe <i>et al.</i> , 2019)	RCT	51 orthodontic patients with fixed appliances aged 13.9 years	The importance of maintaining oral hygiene in orthodontic treatments is plaque and gingivitis reduction.	<ul style="list-style-type: none"> • Plaque • Gingival inflammation • Gingival bleeding
(Cosola <i>et al.</i> , 2019)	Longitudinal	30 orthodontic patients in Italy who were randomly allocated to either using chlorhexidine mouth rinse or ozonated water	The importance of maintaining oral hygiene in orthodontic treatments is significant in reducing gingivitis.	<ul style="list-style-type: none"> • pocket probing depth (PPD) • full mouth plaque index (FMPI) • full mouth bleeding score (FMBS)
(Machorowska-Pieniążek <i>et al.</i> , 2021)	RCT	50 patients with oral cleft treated orthodontically in Poland aged 9-16 years old	The importance of maintaining oral hygiene in orthodontic treatments is important for preventing gingivitis and maintaining oral cavity hygiene, especially in patients with oral cleft.	<ul style="list-style-type: none"> • oral hygiene index (OHI) • the debris OHI D component • the calculus OHI C component • the gingival bleeding index (GBI)
(Pilli <i>et al.</i> , 2022)	RCT	90 people aged 12-18 years in India were in 2 treatment groups with APF as the test and NaF without any control groups.	The importance of maintaining oral hygiene in orthodontic treatments is reducing white spot lesions and gingivitis.	<ul style="list-style-type: none"> • The International Caries Detection and Assessment System (ICDAS) index for scoring the demineralization • Loe and Silness gingival index (GI) for scoring gingivitis

Reference	Study type	Population summary	Findings	Outcomes measured
(Niazi <i>et al.</i> , 2018)	RCT	80 people in Pakistan undergoing orthodontic treatment	The importance of maintaining oral hygiene in orthodontic treatments is significant.	<ul style="list-style-type: none"> • plaque scores
(Erbe, Klees, <i>et al.</i> , 2019)	RCT	59 adolescents with fixed orthodontic appliances	The importance of maintaining oral hygiene in orthodontic treatments is plaque removal efficacy and motivation assessment.	<ul style="list-style-type: none"> • plaque removal efficacy • motivation assessment
(Terrana <i>et al.</i> , 2019)	RCT	60 adolescents with fixed orthodontic appliances, 14.2 years old on average	The importance of maintaining oral hygiene in orthodontic treatments is maintaining a low plaque index.	<ul style="list-style-type: none"> • The post brushing plaque index as measured by the Silness Løe plaque index
(Wall, 2020)	Longitudinal	248 children and adolescents with malocclusions	The importance of maintaining oral hygiene in orthodontic treatments is significant in relation to Oral Health Related Quality of Life.	<ul style="list-style-type: none"> • Oral Health Related Quality of Life (OHRQoL) • Health Related Quality of Life (HRQoL) • self esteem • behavioral problems
(Cunha <i>et al.</i> , 2018)	RCT	20 orthodontic patients who were randomly assigned to receive 3 different treatments	The importance of maintaining oral hygiene in orthodontic treatments is significant for reducing dental biofilm.	<ul style="list-style-type: none"> • Stained plaque index (SPI) • Visible plaque index (VPI) • Gingival bleeding index (GBI)
(Gehlot <i>et al.</i> , 2022)	RCT	36 human adults in India who were either periodontally compromised and randomly allocated to the test or control group.	The importance of maintaining oral hygiene in orthodontic treatments is not statistically significant between the groups.	<ul style="list-style-type: none"> • Plaque index • Gingival index • Bleeding on probing • Probing depth • Clinical attachment level • Alveolar bone levels
(Salles <i>et al.</i> , 2021)	RCT	38 patients in Brazil who wore conventional maxillary complete dentures and mandibular overdentures retained by the O ring system.	The importance of maintaining oral hygiene in orthodontic treatments is reducing PI, GI, PD, and BP indices and providing a high level of patient satisfaction.	<ul style="list-style-type: none"> • biofilm removing capacity • maintenance of healthy oral tissues • patient satisfaction
(Murthy <i>et al.</i> , 2018)	RCT	12 children aged 6-12 years in India who were either instructed to brush their teeth with a regular pediatric toothbrush or with a modified oral irrigation device.	The importance of maintaining oral hygiene in orthodontic treatments is plaque control.	<ul style="list-style-type: none"> • plaque scores in both groups pre and post brushing
(Goyal <i>et al.</i> , 2019)	RCT	45 patients with different types of mouthwash	The importance of maintaining oral hygiene in orthodontic treatments is significant.	<ul style="list-style-type: none"> • levels of P. gingivalis
(Sobouti <i>et al.</i> , 2018)	RCT	54 orthodontic patients	The importance of maintaining oral hygiene in orthodontic treatments is crucial in order to prevent gingival health from deteriorating.	<ul style="list-style-type: none"> • Plaque index (PI) • Gingival index (GI) • Gingival bleeding index (GBI) • Pocket probing depth (PPD)
(Shimpo <i>et al.</i> , 2022)	RCT	22 male and female patients aged 20 years or younger in Japan who were allocated to the fluoride application group or the tooth surface disinfection group	The importance of maintaining oral hygiene in orthodontic treatments is significant in reducing cariogenic bacteria and all parameters obtained by QLF.	<ul style="list-style-type: none"> • cariogenic bacteria • all parameters obtained by QLF
(Shilpa <i>et al.</i> , 2019)	RCT	111 subjects receiving fixed orthodontic treatment in Coorg Institute of Dental Sciences, Virajpet, Coorg district, Karnataka, India	The importance of maintaining oral hygiene in orthodontic treatments is plaque control.	<ul style="list-style-type: none"> • plaque index (PI) • gingival index (GI) • modified papillary bleeding index (MPBI)
(Abozaid and Amer, 2021)	Longitudinal	28 orthodontic patients who were seeking treatment at the Faculty of Dental Medicine at Al Azhar University in Cairo, Egypt	The importance of maintaining oral hygiene in orthodontic treatments is to avoid risk of new caries and periodontal diseases.	<ul style="list-style-type: none"> • Gingival bleeding index (GBI) • Plaque index (PI) • Oral Hygiene Index (OHI S) • Probing pocket depth (PPD)

Reference	Study type	Population summary	Findings	Outcomes measured
(Sum <i>et al.</i> , 2021)	RCT	35 adults aged 22-59 years with treated and stabilised periodontitis	The importance of maintaining oral hygiene in orthodontic treatments is important for reducing orthodontic pain.	<ul style="list-style-type: none"> • experience, duration and maximum intensity of orthodontic pain within the 1st week after bonding • the concentrations of cytokines in the gingival crevicular fluid (GCF)
(Silva <i>et al.</i> , 2021)	RCT	55 people in Brazil aged 15 to 20 years old were in the Fluoride Group (FG; n=17), Xylitol Group (XG; n=19), and Placebo Group (PG; n=19)	The importance of maintaining oral hygiene in orthodontic treatments is significant in preventing non cavitated lesions.	<ul style="list-style-type: none"> • ICDAS index changes • Fluorescence of NCLs
(Grewal <i>et al.</i> , 2019)	Longitudinal	400 young adults aged 18.1 to 25.3 years old in India	The importance of maintaining oral hygiene in orthodontic treatments is significant because it has a positive psychological impact, as there was a significant improvement in self esteem and social interaction of the individuals.	<ul style="list-style-type: none"> • self esteem • social interaction • functional domain measures • aesthetic domain measures
(González, Romero and Peñacoba, 2019)	Longitudinal	78 people with mild or moderate malocclusions recruited from a University Clinic	The importance of maintaining oral hygiene in orthodontic treatments is of great importance to developing a positive change.	<ul style="list-style-type: none"> • Dental self confidence • Psychological impact • Social impact • Aesthetic concern • IOTN AC index
(Sobouti <i>et al.</i> , 2020)	Longitudinal	290 patients aged 14-19 years old with fixed orthodontic appliances in orthodontic centers of Sari, Iran	The importance of maintaining oral hygiene in orthodontic treatments is maintaining a good quality of life.	<ul style="list-style-type: none"> • quality of life (QOL) • oral health impact profile (OHIP)
(Jaeken <i>et al.</i> , 2019)	Longitudinal	215 11-16-year old children in Netherlands at baseline	The importance of maintaining oral hygiene in orthodontic treatments is significant because it can lead to a decrease in the IOTN and OASIS.	<ul style="list-style-type: none"> • Child Perception Questionnaire (CPQ11-14) • the Index of Orthodontic Treatment Need (IOTN) • the Oral Aesthetic Subjective Impact Scale (OASIS) • Harter's Self Perception Profile for Adolescents
(Quaranta <i>et al.</i> , 2018)	RCT	orthodontic patients	The importance of maintaining oral hygiene in orthodontic treatments is plaque control and gingival inflammation levels.	<ul style="list-style-type: none"> • plaque control record • bleeding on probing
(Razavi <i>et al.</i> , 2021)	RCT	75 orthodontic patients aged 13 to 30	The importance of maintaining oral hygiene in orthodontic treatments is significant because it can affect the surface characterization of orthodontic appliances and the friction between orthodontic wires and brackets.	<ul style="list-style-type: none"> • The surface roughness of archwires after the intervention • The friction force between the archwires and brackets
(Yaseen, Qasim and Al-Khatib, 2020)	RCT	12 orthodontic patients aged 15-30 years who were randomly divided into 2 groups	The importance of maintaining oral hygiene in orthodontic treatments is significant.	<ul style="list-style-type: none"> • Ortho plaque index • Gingival index
(Alavi and Yaraghi, 2018)	RCT	40 people in the control group, the CHX gel group, the fluoride varnish group, and the placebo group	The importance of maintaining oral hygiene in orthodontic treatments is reducing the development of plaque and gingivitis and decreasing white spot lesions.	<ul style="list-style-type: none"> • DPI • WSL index • gingival index

Study outcomes

The importance of maintaining oral hygiene in orthodontic treatments is significant (Niazi *et al.*, 2018; Goyal *et al.*, 2019; Yaseen, Qasim and Al-Khatib, 2020;

Gehlot *et al.*, 2022). The importance of maintaining oral hygiene in orthodontic treatments is evident as early as Week 2 and continuing throughout the trial (Garcia-Godoy *et al.*, 2018).

Prevention from periodontal disease and caries

The importance of maintaining oral hygiene in orthodontic treatments is to avoid risk of new caries and periodontal diseases is depicted in one study (Abozaid and Amer, 2021). The importance of maintaining oral hygiene in orthodontic treatments is crucial in order to prevent gingival health from deteriorating (Sobouti *et al.*, 2018) (Erbe *et al.*, 2019) (Quaranta *et al.*, 2018) (Salles *et al.*, 2021) (Alavi and Yaraghi, 2018) (Pilli *et al.*, 2022) (Cosola *et al.*, 2019) Another study showed the importance of maintaining oral hygiene in orthodontic treatments is important for preventing gingivitis and maintaining oral cavity hygiene, especially in patients with oral cleft (Machorowska-Pieniżek *et al.*, 2021) The importance of maintaining oral hygiene in orthodontic treatments The importance of maintaining oral hygiene in orthodontic treatments in maintaining a low plaque index is showed in eight studies (Murthy *et al.*, 2018; Shilpa *et al.*, 2019; Erbe, Klees, *et al.*, 2019). (Terrana *et al.*, 2019). (Erbe *et al.*, 2019) (Quaranta *et al.*, 2018) (Salles *et al.*, 2021) (Alavi and Yaraghi, 2018). The importance of maintaining oral hygiene in orthodontic treatments in decreasing white spot lesions was showed in two studies. (Alavi and Yaraghi, 2018) (Pilli *et al.*, 2022) and preventing non cavitated lesions was described in a one study (Silva *et al.*, 2021). One study showed reducing dental biofilm. (Cunha *et al.*, 2018) and one showed prevention of cariogenic bacteria (Shimpo *et al.*, 2022) upon maintenance of good oral hygiene. One study showed the importance of maintaining oral hygiene in orthodontic treatments is important for reducing orthodontic pain (Sum *et al.*, 2021).

Maintaining good quality of life

The importance of maintaining oral hygiene in orthodontic treatments is significant in relation to Oral Health Related Quality of Life (Wall, 2020). The importance of maintaining oral hygiene in orthodontic treatments in maintaining a good quality of life (Sobouti *et al.*, 2020). The importance of maintaining oral hygiene in orthodontic treatments is of great importance to developing a positive change (González, Romero and Peñacoba, 2019), because it has a positive psychological impact, as there was a significant improvement in self esteem and social interaction of the individuals. (Grewal *et al.*, 2019) The importance of maintaining oral hygiene in orthodontic treatments is significant because it can lead to a decrease in the intention of treatment (Jaeken *et al.*, 2019)

Successful Orthodontic treatment

The importance of maintaining oral hygiene in orthodontic treatments is significant because it can affect the surface characterization of orthodontic appliances and the friction between orthodontic wires and brackets. (Razavi *et al.*, 2021) leading to successful orthodontic treatment providing a high level of patient satisfaction (Salles *et al.*, 2021).

DISCUSSION

Orthodontic treatment is widely acknowledged and accepted in everyday dental practice due to the positive effects it has on the dentofacial complex. The study evaluated oral health status among orthodontic patients before, during, and after treatment. It found that dental plaque accumulation can increase during treatment and lead to gingival and dental effects. Dental plaque accumulation among orthodontic patients can aid in development of gingival and dental effects (Abozaid and Amer, 2021). In contrast, the randomized controlled clinical trial showed that orthodontic treatment does not have any detrimental effect on periodontal health (Gehlot *et al.*, 2022). While another study found that patients who experienced orthodontic pain in the first week of treatment had a higher baseline gingival index, and that the experience of orthodontic pain was associated with increased concentrations of interleukin 1 β in gingival crevicular fluid. However, neither the experience of orthodontic pain nor its duration and intensity were associated with the level of post-bonding OH. Increased gingival inflammation accounted for the longer duration and higher intensity of orthodontic pain in treated and stabilized periodontal patient (Sum *et al.*, 2021).

Good oral hygiene is a key factor required to facilitate uninterrupted orthodontic treatment. The occurrence of periodontal abnormalities is highly dependent on oral hygiene maintenance. The clinical trial showed that adding chlorhexidine gel and fluoride varnish to the patients' oral hygiene regimen can reduce the development of plaque and gingivitis in orthodontic patients (Alavi and Yaraghi, 2018). While another trial found that the combination of sodium fluoride with cetylpyridinium chloride was more potent for plaque control, while chlorhexidine digluconate with cetylpyridinium chloride and Aloe Vera combination showed a better gingival improvement (Yaseen, Qasim and Al-Khatib, 2020). This randomized trial found that acidulated phosphate formulated daily oral rinse is more effective than the weekly once regimen of sodium fluoride oral rinse to prevent white spot lesions (Pilli *et al.*, 2022). Ozone yielded better outcomes than chlorhexidine in the management of gingivitis in orthodontic patients (Cosola *et al.*, 2019). Another randomised controlled trial found that the herbal mouthwash based on *Salvadora persica* showed the greatest reduction in plaque scores (Niazi *et al.*, 2018). The *Persica*-containing mouthrinse may be a better option for oral hygiene in orthodontic patients compared with the chlorhexidine (Razavi *et al.*, 2021). This study finds Polish propolis and plant oils toothpaste improved oral cavity hygiene assessed for incisors and molars in patients with oral cleft treated orthodontically (Machorowska-Pieniżek *et al.*, 2021). While another study demonstrated that Tooth surface disinfection treatment was effective for dental caries prevention and keeping a healthy microbiome during

orthodontic treatment (Shimpo *et al.*, 2022). This study Antimicrobial mouth rinses are favorable in orthodontic patients (Sobouti *et al.*, 2018).

This randomized clinical trial studied the effects of fluoride and xylitol varnishes on non-cavitated lesions (NCLs) during orthodontic treatment. It found that fluoride varnish was more effective than xylitol and placebo varnishes in preventing NCLs. Fluoride varnish produced significantly greater increase in enamel fluorescence compared to xylitol and placebo varnishes in orthodontic patients (Silva *et al.*, 2021).

This randomized clinical trial found that the combination of single-tufted and conventional toothbrushes was effective for controlling dental biofilm formation in orthodontic patients. (Cunha *et al.*, 2018) While a randomized clinical trial found that the modified oral irrigation device is more effective than manual brushing in children (Murthy *et al.*, 2018). This randomized controlled clinical trial studied the plaque removal ability of a triple-headed toothbrush compared to a conventional manual toothbrush in adolescents with fixed orthodontic appliances. The triple-headed toothbrush led to a significantly lower plaque index. The triple-headed toothbrush leads to a significantly lower plaque index compared to the conventional manual toothbrush post-brushing (Terrana *et al.*, 2019). This randomized controlled trial found that the levels of *P. gingivalis* were significantly decreased with probiotic mouth wash during fixed orthodontic treatment (Goyal *et al.*, 2019) This study found that an interactive power toothbrush generated increased brushing times and significantly greater plaque removal versus a manual brush. The interactive power toothbrush provided significantly greater plaque reduction versus the manual toothbrush at 2 and 6 weeks (Erbe, Klees, *et al.*, 2019).

The results showed that Brushing associated with oral irrigation was effective in reducing biofilm, probing depth, and bleeding on probing indices (Salles *et al.*, 2021). The results of another study showed that The manual tooth brush combined with chlorhexidine mouthwash group showed maximum improvement (Shilpa *et al.*, 2019). This randomized, examiner-blind, clinical trial showed that Use of a power brush/irrigator/mouthrinse resulted in statistically significantly greater plaque and gingivitis reductions than prophylaxis followed by manual brushing in patients with fixed appliances over 4 weeks (Erbe *et al.*, 2019). This study finds that the device Combining manual toothbrushing with mechanical interdental device demonstrated better plaque control and gingival inflammation levels in orthodontic patients compared to manual brushing alone (Quaranta *et al.*, 2018).

This study assessed quality of life (QOL) based on oral health impact profile (OHIP) amongst Iranian patients undergoing fixed orthodontic

appliances in orthodontic center of Sari, Iran. The results showed that QOL increases after orthodontics. The QOL of men and women was not different in any of the three measuring stages (Sobouti *et al.*, 2020). This study finds that orthodontic treatment has a positive psychological impact, with a significant improvement in self-esteem and social interaction of the individuals. The severity of malocclusion has a negative impact on the quality of life (Grewal *et al.*, 2019).

The first 6 months of orthodontic treatment seemed to be key to the development of psychosocial dental impact perception in adults (González, Romero and Peñacoba, 2019).

This study found that Treatment of malocclusions improves the oral health-related quality of life of children and adolescents (Wall, 2020).

This study looked at the changes in oral health-related quality of life (OHRQoL) before, during, and after orthodontic treatment in children and adolescents and found that High baseline self-esteem works as a protective factor for oral health-related quality of life after orthodontic treatment (Jaeken *et al.*, 2019).

Plaque buildup, gingivitis, tooth decay, and periodontitis can all develop from poor oral health, causing orthodontic therapy to be postponed or halted. Patients should be instructed on correct oral hygiene measures, which they must strictly follow. Awareness alone will not result in good dental health unless the target audience adheres to it religiously. Although providing oral health education begins with raising awareness, assessing its implementation is a vital indicator of the education's efficacy. Appropriate oral hygiene necessitates suitable gadgets (equipment), proper technique, regular tooth brushing, and sufficient time spent cleaning every single tooth. Individual preventative programmes for patients with orthodontic appliances should be established, and they should include, in addition to health education, teaching on the necessity of frequent cleaning. Patients must be shown the proper method and frequency of dental cleaning. They must also learn about the proper toothbrushes, interdental brushes, and orthodontic brushes.

CONCLUSION

The results of the review showed that poor oral hygiene is a significant risk factor for the development of caries and periodontal disease during orthodontic treatment. Additionally, it was found that orthodontic patients with poor oral hygiene had a higher incidence of white spot lesions, which are an indicator of demineralization. The review also found that maintaining good oral hygiene, through regular tooth brushing and flossing, as well as regular dental check-ups, is essential for preventing these issues during orthodontic treatment. In conclusion, oral hygiene plays a crucial role in orthodontic treatment. It is important

for patients to maintain good oral hygiene during treatment in order to prevent the development of caries and periodontal disease, and minimize the risk of white spot lesions.

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