The impact of good oral habits

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Abstract

At the present time worldwide, although attempts are being made to reduce the number of smokers through various methods, they still exist smoking not only the traditional cigarette but also opting for various other forms of cigarettes such as electronic cigarettes or vaping. The present study investigates the relationship between different types of cigarettes and their effect on periodontal tissues that may lead to periodontal disease. The study included a number of 120 patients diagnosed with periodontal disease and tries to highlight or explore the correlation between smoking habits and the degree of periodontal damage according to smoking habits. Research results show that there is a significant link between conventional or electronic smoking and periodontal disease that is aggravated by the frequency and duration of cigarette smoking. The study also shows the importance of completely giving up both electronic and traditional smoking.

Keywords: smoking, dental plaque, periodontal disease, electronic smoking, oral health

INTRODUCTION

The dental plaque is a complex of bacteria located on the surface of the teeth, and it is fixed in a matrix of bacterial and salivary polymers. Tooth brushing with fluoridated toothpaste is considered to be the "milestone" of caries prevention. The regular use of fluoride medications for oral cavity is the key element in successful caries prevention [1]. Topical use of fluorides, such as toothpastes, mouth rinses, gels, and varnishes, has been shown to decrease caries prevalence and caries experience [2]. The effectiveness of fluoride toothpastes in caries prevention depends on the formulation and fluoride concentration [3]. Studies have shown that tooth brushing twice daily with fluoridated toothpaste is associated with sociodemographic factors, fluoride knowledge, and attitudes towards regular dental care [4]. The use of fluoridated toothpaste has been promoted in China since 1989, but the oral hygiene behaviors of Chinese adolescents are still undesirable [5]. Theobromine-containing toothpastes have also shown enamel remineralization effects and can be considered effective agents in preventing early enamel lesions.

Dental plaque, a complex bacterial biofilm adhering to tooth surfaces, plays a pivotal role in the intricate dynamics of periodontal disease and dental caries. In the context of periodontal disease, the mere presence of plaque initiates a transformative ecological shift within the oral microbiome, fostering an imbalance in acidogenic and aciduric bacteria. This intricate microbial imbalance significantly fuels the progression of the disease [6]. Moreover, plaque undergoes a qualitative shift, intensifying in bacterial complexity and adopting a more anaerobic milieu, thereby further exacerbating the impact on periodontal tissues [7]. On the flip side, dental caries emerges as a consequence of acidogenic bacteria residing in plaque, orchestrating an acidic onslaught that demineralizes tooth enamel [8]. The intricate composition of plaque, particularly the prevalence of specific bacterial species, has emerged as a key factor intricately linked to the onset and severity of dental caries [9]. Additionally, the intricate interplay of poor oral hygiene practices and the prevalence of xerostomia (dry mouth) significantly contributes to the intricate web of factors influencing the development and progression of both periodontal disease and dental caries [10].

Maintaining oral health ideally involves dental brushing after each meal, yet many individuals opt for brushing only in the morning and evening. Research indicates that the frequency of toothbrushing might not notably impact the prevention of dental caries, with marginal differences observed between infrequent and regular brushers [11]. Moreover, investigating the timing of toothbrushing concerning meals and dietary acid intake revealed that brushing immediately after an acid challenge warrants further exploration [12]. It is noteworthy that toothbrushing behavior may vary based on age, occupation, and geographic location [13]. While the recommendation is to brush after each meal, additional research is essential to comprehensively grasp the optimal timing and frequency of toothbrushing for sustaining oral health.

In the pursuit of optimal oral health, adhering to a precise brushing technique is essential. This involves dedicating a minimum of 2 minutes to brushing, with 30 seconds allocated to each hemiarcada, ensuring comprehensive coverage of the vestibular, oral, and occlusal surfaces of the teeth. Additionally, the tongue should be brushed, and ancillary methods such as mouthwash and dental floss should be incorporated [14]. Also a good practice for oral health is to use toothpaste formulas that have been proven to be highly effective [15].

However, prevailing trends in the general population reveal an average brushing time closer to 45 seconds [16]. Notably, the removal of plaque increases with extended brushing times, with a 180-second duration eliminating 55% more plaque than a 30-second interval.

The use of dentifrice, while a common practice, does not significantly enhance plaque removal during brushing [17].

Ensuring proper toothbrush care is imperative, necessitating replacement every three to four months or sooner if the bristles become frayed [18]. The merits of an increased brushing duration, such as the recommended 2 minutes, extend beyond mere plaque removal, showcasing benefits in fluoride delivery and overall oral health. Alarming statistics indicate that only 25.2% of participants meet the criteria for appropriate brushing habits, underscoring the urgent need for comprehensive oral hygiene education [19]. This highlights the integral role of tooth brushing in effective dental education programs and underscores the multifaceted factors influencing biofilm removal and the risk of carious lesions. Associating oral hygiene practices with a nutritious diet emerges as a key strategy in mitigating this risk.

The impact of smoking habits on dental plaque is noteworthy. Research indicates that the utilization of electronic smoking systems, such as electronic nicotine delivery devices (ENDDs) and vape cigarettes, can influence dental plaque microflora, reducing its resident population and increasing the excretion frequency of opportunistic streptococci like S. pneumoniae and S. pyogenes [20]. Moreover, smokers may experience alterations in dental plaque characteristics, making it rougher and more susceptible to adhering food debris and germs, thereby facilitating plaque formation [21]. The accumulation of dental plaque, especially on the lower anterior lingual tooth surface, is associated with smoking [22].

While dentists play a role in aiding patients in smoking cessation, their approach to these conversations may face limitations [23]. In the broader context of oral health, the evolution of oral disorders hinges on various factors, encompassing not only dietary and hygiene habits but also the nuanced aspects of patient behaviors. The critical role of dental education programs, implemented early in life and focusing on effective tooth brushing methods, cannot be overstated [24-25]. Achieving optimal oral health requires an understanding of the multifaceted factors influencing biofilm removal, emphasizing the interplay of brushing efficiency, frequency, techniques, tools, and the quality of toothpaste. Furthermore, associating oral hygiene practices with a nutritious diet emerges as a pivotal strategy in reducing the risk of carious lesions.

Aim and objectives

The objective of this research is to determine the most efficient brushing technique for effectively eliminating bacterial plaque, thereby fostering a comprehensive understanding among students. Simultaneously, our investigation encompasses three distinct varieties of dental floss, delving into their effectiveness in eradicating bacterial plaque from the intricate interproximal spaces—areas where conventional brushing may encounter limitations. This exploration not only focuses on the efficacy of plaque removal but also scrutinizes the accuracy of the specifications provided by the manufacturer for each type of dental floss. Through this multifaceted approach, we aim to provide valuable insights that can contribute to the refinement of oral hygiene practices for optimal plaque control and to enhance the education of students.

MATERIAL AND METHODS

The study includes 120 patients between the ages of 15 and 35 following the rules of medical ethics. The 120 patients were divided into 2 groups, group A of non-smokers and group B of smokers in group B. The females, 65 individuals are nonsmokers, constituting 40.00% of the total, while 25 individuals are smokers, representing 20.83%. For males, there are 55 nonsmokers, accounting for 45.83% of the total, and 10 smokers, making up 15.38%.

The percentages are calculated based on the total number of individuals in each gender category.

The patterns in the distribution of smoking habits across genders reckon a closer examination. Among females, a substantial 40.00% proudly identify as nonsmokers, surpassing their male counterparts at 45.83%. This divergence aligns with broader societal norms, where smoking rates typically tread lower within the female demographic. Within the female cohort, a prevailing 40.00% adhere to a non-smoking lifestyle, indicative of a robust trend. Yet, the 20.83% who embrace smoking form a distinct subset, warranting meticulous exploration into the nuanced factors that propel smoking initiation among females. This investigation is pivotal for tailoring interventions and educational programs that precisely target smoking reduction within this demographic. On the male front, the landscape unfolds differently. A higher percentage of males, at 15.38%, proudly wear the smoker's mantle in comparison to their female counterparts. Despite the majority (45.83%) choosing the path of non-smoking, the presence of a notable proportion of male smokers underscores the enduring challenge of tobacco consumption among men. Unraveling the intricate threads that weave into smoking behavior within this male cohort becomes paramount for devising effective strategies aimed at both preventing and curtailing smoking.

In essence, this data not only illuminates the gender-specific nuances of smoking behavior but also underscores the imperative need for tailored public health interventions. Deciphering the multifaceted factors steering smoking habits among both females and males is the cornerstone for crafting targeted initiatives that effectively grapple with the complex challenges entwined with tobacco use in diverse gender groups.

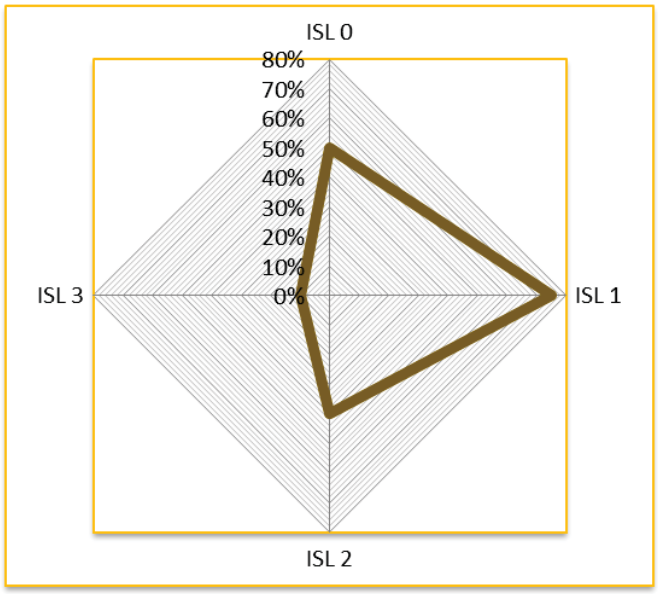

Figure 1. ISL plaque index

Silness and Loe plaque index (ISL) was analysed among individuals included in the study and revealed a multifaceted landscape of oral hygiene. ISL 0 had 23.53% of the individuals in the study which exhibits an optimal oral hygiene status with no visible plaque, a positive indicator, suggesting a noteworthy portion of the population maintains effective plaque control. ISL 1 had the majority of individuals, constituting of 40.00%, which demonstrated the presence of plaque deposits without visible accumulation, suggesting the need for attention to oral hygiene practices, although the plaque is not yet visibly problematic. ISL 2 prevalence was 30.59% exhibiting moderate plaque accumulation,

indicating a intermediate level of oral hygiene, with room for improvement in brushing techniques and overall plaque control. ISL 3 present at 5.88%, representing a smaller segment, presented an abundance of plaque., requiring focused attention and intervention to address the heightened plaque accumulation, as it may contribute to oral health issues if left unaddressed (Fig.1).

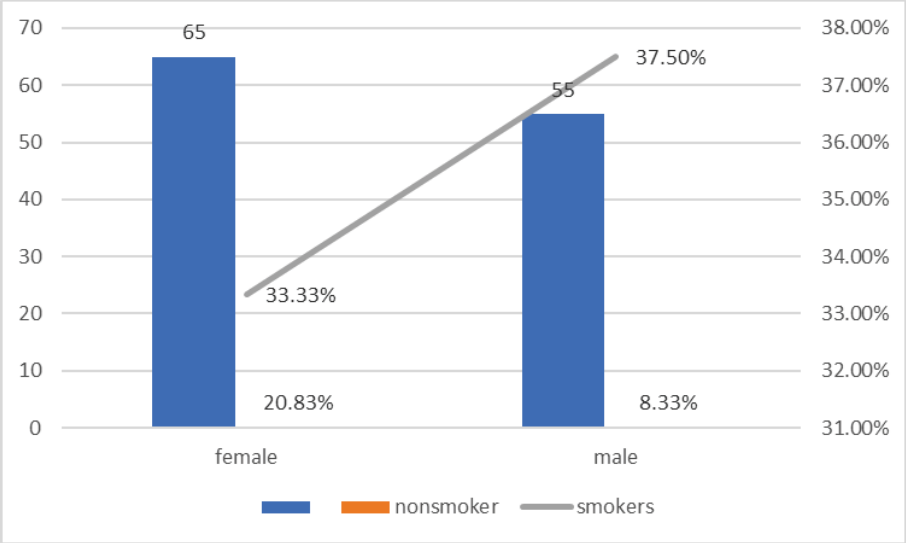

Figure 2. Distribution of smokers and nonsmokers in the gorup

The Silness and Loe plaque index (ISL) data among nonsmokers and smokers provides insights into the oral health status so that no plaque (ISL 0) had 10 individuals nonsmokers in procent of 28.57% showing a slightly higher percentage then smokers that had a procent of 23.53% consisting in 20 individuals. Smokers have a higher percentage of 40% in category of ISL 1 (plaque only detectable with probe) compared to nonsmokers in procent of 42.86%. In category of ISL 2 (moderate plaque), nonsmokers exhibit a higher percentage (22.86%) in this category compared to smokers (30.59%). Abundance of Plaque (ISL 3) had the smallest proportion in both groups, with nonsmokers at 5.71% and smokers at 5.88%.

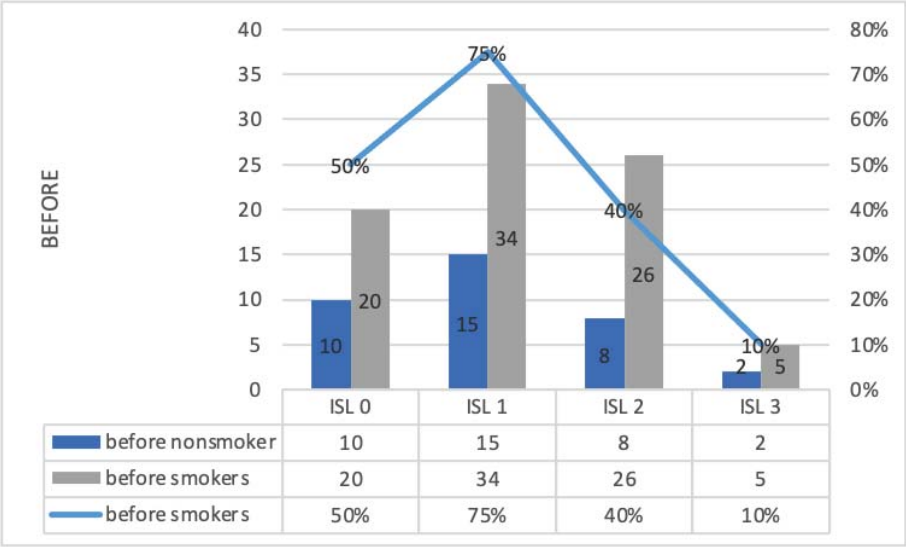

Figure 3. Initial plaque acumulation

Overall plaque accumulation shows that the combined percentages of individuals with plaque (ISL 1, ISL 2, and ISL 3) are 71.43% for nonsmokers and 70.59% for smokers. The difference is minimal, suggesting a comparable prevalence of plaque accumulation in both groups, resulting that the overall prevalence of plaque is relatively similar between nonsmokers and smokers. Both groups showed a considerable percentage for the presence of moderate plaque (ISL 2). This may indicate a common area for improvement in oral hygiene practices for both nonsmokers and smokers. (fig.3)

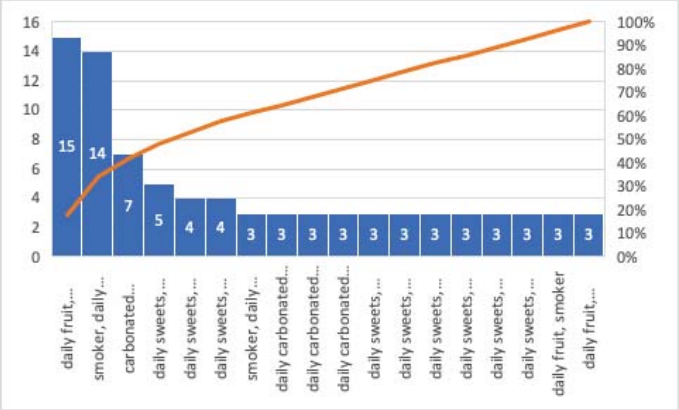

Figure 4. Lifestyle habits

The study included research on specific lifestyle habits for exploring the potential repercussions on oral health. From the 85 people that are smokers, the prevalence of individuals who smoke and consume coffee daily is noteworthy, totaling 14 individuals. This combination raises concerns for heightened oral health issues, given that smoking is a well-established risk factor for periodontal diseases, and when coupled with coffee, known for its staining properties, it could exacerbate dental concerns. A subgroup of individuals who smoke, have daily coffee intake, and engage in frequent alcohol consumption consists of 3 individuals., this combination has been linked to an increased risk of periodontal diseases and other oral health issues, and the interaction among these habits may synergistically impact oral health. The data also indicates a substantial group of individuals of 7, who daily consume carbonated drinks, smoke, and have daily coffee intake which poses a potential triple threat to oral health, as carbonated drinks are associated with dental erosion, smoking is a recognized risk factor for periodontal diseases, and coffee can contribute to staining. Also individuals reporting daily carbonated drinks, snacks between meals, daily fruit consumption, smoking, daily coffee intake, and frequent snacks constituts a group of 3 individuals, having an impact on oral health, having potential in increasing plaque formation and cavities due to frequent snacking and sugary beverage consumption (Fig.4).

Furthermore, the data highlights that the bigest group of individuals, 15 in number, reported being smokers and daily coffee consumers, underscoring the prevalence of these habits in the studied population, which may have the potential consequences on oral health, as both smoking and excessive coffee consumption can contribute to issues such as tooth staining, gum disease, and compromised overall oral health (Fig.4). In summary, the data emphasizes the necessity for targeted oral health interventions and education, especially among individuals with combinations of habits that may pose higher risks.

For all individuals that were included in the study, an instruction was given for the application of an appropriate brushing technique. Bass's brushing technique was applied. Also the individuals were informed about the harmful effects of smoking alone or in combination with any other bad habits, and how it reflect on oral health.

The results for the Silness and Loe plaque index (ISL) after applying Bass's brushing technique among nonsmokers and smokers reveals important insights into the impact on oral health, so that the number of individuals with no plaque (ISL 0) significantly increased after the intervention. Nonsmokers now have 19 individuals in procent of 63.33%, showing a considerable improvement from the initial 28.57%. Smokers also experienced an increase to 41 individuals (52.50%) from the initial 23.53%. For ISL 1 (Plaque Only Detectable with Probe) both nonsmokers and smokers show a decrease in this category, with 14 individuals (46.67%) among nonsmokers and 37 individuals (47.50%) among smokers. The most substantial decrease is observed in the category of ISL 2 (Moderate Plaque), nonsmokers decreased to 2 individuals (6.67%), and smokers decreased to 7 individuals (9.00%) (Fig.5).

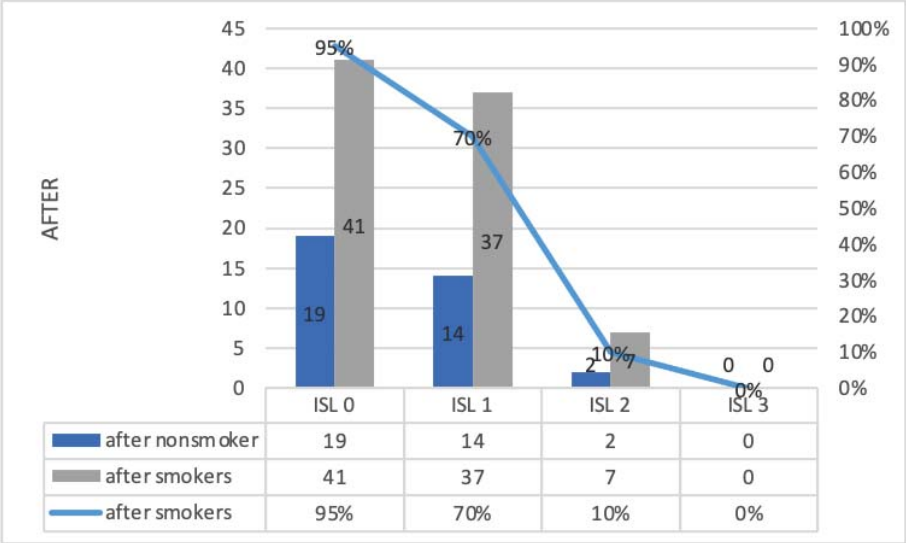

Figure 5. The results after applying good oral habits

After applying Bass's brushing technique, no individuals in either group fall into the ISL 3 category, indicating a successful elimination of abundant plaque in both nonsmokers and smokers. The combined percentages of individuals with plaque (ISL 1, ISL 2) significantly decreased for both nonsmokers (53.33% to 13.33%) and smokers (72.50% to 56.50%) (Fig.5). The data suggests a substantial improvement in oral health for both nonsmokers and smokers after the intervention. The increase in the number of individuals with no plaque and the reduction in moderate plaque suggests the effectiveness of the intervention.

DISCUSSIONS

The data suggests a varied distribution across different ISL categories, indicating diverse oral hygiene statuses within the studied population. The prevalence of ISL 1 suggests a common existence of plaque deposits, emphasizing the importance of regular oral care practices to prevent further accumulation. The presence of individuals in ISL 2 and ISL 3 categories indicates a need for targeted interventions to enhance oral hygiene practices and reduce plaque levels. The significance of regular oral hygiene practices and the potential benefits of tailored interventions to address varying degrees of plaque accumulation among individuals is important

The observed gender-specific smoking patterns have implications for public health initiatives. Tailoring anti-smoking campaigns to address gender-specific motivations and challenges that could enhance their effectiveness. Understanding societal norms and

perceptions surrounding smoking in different genders is crucial for developing targeted interventions that resonate with specific populations.

It's crucial to consider individual factors, such as oral hygiene practices, dietary habits, and other lifestyle factors, to better understand the observed differences in plaque distribution. Targeted oral health education programs could focus on promoting effective plaque removal techniques, without taking into acount smoking status. This could include emphasizing the importance of brushing, flossing, and routine dental check-ups.

To gain a deeper understanding, further investigation into the specific oral health behaviours and practices of both nonsmokers and smokers would be beneficial.

CONCLUSIONS

In conclusion, while there are some variations in plaque distribution, the overall prevalence of plaque is comparable between nonsmokers and smokers. This analysis provides a foundation for developing targeted oral health interventions that address common areas of plaque accumulation for both groups.

While there are differences in the starting points, both nonsmokers and smokers show consistent improvement, highlighting the effectiveness of the intervention across different smoking statuses.

This discussion prompts further exploration into the specific oral health outcomes associated with these diverse lifestyle patterns, ultimately contributing to more personalized and effective oral care.

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