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Assessment of Knowledge, Attitude and Practice of Gingival Health among Patients under Active Orthodontic Treatment

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ABSTRACT
Information and awareness on gingival health enhances knowledge and from such knowledge comes commitment and motivation for people to alter their lifestyles to prevent gingival and periodontal disease. Repeating the oral hygiene instructions on each visit, prophylactic programs and good oral home care are effective measures to prevent plaque accumulation and gingival enlargement for patients who are undergoing orthodontic treatment. This study is undertaken to assess knowledge, attitude and practice of gingival health among orthodontic patients.
Materials and Methods: *A cross-sectional study was carried out among 180 patients coming to the Department of Orthodontics at KIST Medical College and Teaching Hospital who are undergoing active orthodontic treatment. The questionnaire, was given to all selected patients to complete the answers, included questions about knowledge on gingival health, practices and attitude of patients regarding oral hygiene performance. Statistical analysis was done by SPSS version 21.*
Result: *Knowledge on gingival health reveals that 62.2% of participants were aware of gingival disease. 59.4% of participants followed oral hygiene instructions very often and used interdental aids (dental floss: 58.2%,interdental brush:60.9%,toothpick 67.4%) irregularly. Only 27.8% in this survey followed the oral hygiene instructions very strictly. Use of interdental aids in various age group was found to be statistically significant.*
Conclusion: *Successful plaque control clearly demands appropriate knowledge about gingival health, individuals' practice and attitude to remove plaque with a long term commitment from the dental professional and the patient as cotherapist.*
Keywords: *Knowledge, attitude, practice, awareness, gingival health, orthodontic patients.*

Introduction

The importance of adequate oral hygiene cannot be overemphasized as oral hygiene is intrinsically linked to the quality of treatment results and treatment times. Disease control remains of paramount importance. The orthodontist needs a perfectly healthy periodontium, in the sense of complete absence of infectious or inflammatory conditions, prior to undertaking any treatment plan involving comprehensive orthodontics. It is given that the orthodontist must proceed through the course of treatment while maintaining a healthy periodontium and finish the case in such a way so as to maximize the patient's individual ability to keep their teeth and gingiva healthy for the rest of their life.

While it has been stated that fixed orthodontics do not cause periodontal damage if basic principles are followed in compliant patients with good oral hygiene,[1] it is generally experienced that a significant percentage of orthodontic patients experience hygiene challenges and many

demonstrate adverse effects from poor hygiene control during treatment.[2] Orthodontic attachments have the potential to cause plaque accumulation and increase the pathogenicity of the microbes.[3] This tendency is often dealt with by thorough professional prophylaxis. Repeating the oral hygiene instructions on each visit and rubber cup prophylaxis are effective measures to prevent plaque accumulation and gingival enlargement. [4]

Prophylactic programs and good oral home care for patients who are undergoing orthodontic treatment is of paramount importance.[5] This study was undertaken to assess knowledge, attitude and practice of gingival health among orthodontic patients.

Materials and Methods

This is a cross-sectional study which was carried out among 180 patients coming to the Department of Orthodontics at KIST Medical College and Teaching Hospital who are undergoing active orthodontic treatment. The study was conducted after receiving permission from Institutional Review Committee. Both new/ old cases, systemically healthy male / female patients who did not smoke were included. Both open and closed end questions were included in the questionnaire survey. Questionnaire to assess awareness on gingival health was covered about knowledge on gingival health, practices and attitude of patients regarding oral hygiene performance during active orthodontic treatment.[6] This study was conducted during February 2016 - July 2016.

After taking informed consent, a questionnaire was given to all selected patients to complete the answers, with prior explanation to fill the questionnaire. Questions were given with choice answers, easily understandable and brief in manner. One investigator was available while filling questions, and participants were encouraged to approach investigator for any clarification. All recorded data were statistically analysed using SPSS version 21 data analyser.

Result

The study population included 180 patients under active orthodontic treatment who agreed to fill in the questionnaire. Descriptive analysis was performed regarding patient responses to the questionnaire. The chi-square test was used to evaluate relationships between variables. The level of significance was set at 5%.

Knowledge on Gingival Health

	YES	NO
AWARENESS ON GINGIVAL DISEASE	62.2%	37.8%
GUM PROBLEMS	17.2%	82.8%
ANY BLEEDING GUMS	35.6%	64.4%
EFFECT OF PROLONG BRUSHING	48.9%	51.1%
HALITOSIS	23.3%	76.7%

Knowledge on gingival health reveals that 62.2% of participants were aware of gingival disease. 82.8% didn't have any gum problem and only 35.6 % reported about having bleeding gums. 51.1% were aware of effects of prolong brushing. 23.3% of the participants felt they had halitosis.

Practice of Gingival Health Related Issues among Orthodontic Patients

METHOD OF TEETH CLEANING	TOOTHBRUSH & TOOTHPASTE	POWDERS	OTHERS (SPECIFY)
	97.2%	2.8%	
DAILY BRUSHING FREQUENCY	ONCE	TWICE	MORE THAN TWICE
	20.6%	71.1%	8.3%
TIME TAKEN PER BRUSHING	1MIN	2MINUTES	MORE THAN 2 MINUTES
	9.4%	57.2%	33.3%

BRUSH CHANGE FREQUENCY	LESS THAN 3 MONTHS	3-6 MONTHS	MORE THAN 6 MONTHS
	56.7%	40.6%	2.8%
BRUSHING TECHNIQUE	SCRUB	ROLL	VERTICAL
	34.4%	36.1%	29.4%
USE OF MOUTHWASH	YES	NO	
	16.1%	83.3%	

Majority of the participants (97.2%) used toothbrush and toothpaste to clean their teeth twice daily (71.1%). 57.2% spent around two minutes to brush their teeth and most of them followed scrub (34.4%) or roll (36.1%) technique for brushing. 56.7% frequently changed their toothbrush, that is, in less than three months where as 40.6% changed their tooth brush between 3-6 months. Only 16.1% said that they use mouthwash other than routine brushing of their teeth.

Orthodontics Patients' Attitude towards Oral Hygiene

SCALING			YES	NO
			59.4%	40.6%
USE OF INTERDENTAL AIDS			YES	NO
			75%	25%
FOLLOW ORAL HYGIENE INSTRUCTIONS				
VERY STRICTLY			27.8%	
YES VERY OFTEN			59.4%	
NOT AT ALL			12.8%	
	ONCE	TWICE	MORE THAN TWICE	IRREGULAR
DENTAL FLOSS	30.6%	8.2%	3.0%	58.2%
INTERDENTAL BRUSH	30.8%	7.5%	0.8%	60.9%
TOOTHPICK	25.9%	5.9%	0.7%	67.4%

Only 59.4% of the participants who were under active orthodontic treatment had undergone professional cleaning of teeth. 59.4% of participants followed oral hygiene instructions very often and used the interdental aids (dental floss: 58.2%, interdental brush: 60.9%,toothpick 67.4%) irregularly. Only 27.8% in this survey followed the oral hygiene instructions very strictly.

Age Group

AGE GROUP	<15 YEARS	15-18 YEARS	>18 YEARS
	20%	23.9%	56%
Effect of prolong brushing	<15 years	15-18 years	>18 years
Yes	36.1%	39.5%	57.4%
No	63.9%	60.5%	42.6%
p value: 0.033			
Interdental cleaning aids	<15 years	15-18 years	>18years
Yes	75%	60.5%	81.2%
No	25.0%	39.5%	18.8%
p value: 0.032			

Dental floss	Once	twice	More than twice	irregular
<15 years	23.1%	11.5%	0%	65.4%
15-18 years	46.2%	23.1%	0%	30.8%
>18 years	28.0%	2.4%	4.9%	64.6%
p value: 0.003				

Majority of the patients in the age group <15 years (63.9%) and between 15-18 years (60.5%) were not aware of the effect of prolong brushing. However, 57.4% of the participants above 18 years were aware about the effect of prolong brushing.

Use of interdental aids in various age group was also found to be statistically significant.

Discussion

To state that fixed orthodontic appliances impede optimal oral hygiene in patients is to state the obvious. It is established that poor patient oral hygiene affects orthodontic treatment outcomes, impacts quality of orthodontic treatment and prolongs treatment time. It has been stated that each "poor oral hygiene" entry into a patient chart relates to a 0.67 month increase in treatment time.[7] The placement of fixed orthodontic appliances complicates the use of standard oral hygiene measures[8] as orthodontic appliances protect the dental plaque from mechanical removal.[9] Inadequate plaque control among orthodontic patients may make them more prone to gingivitis and periodontitis. Proper oral hygiene maintenance during active orthodontic treatment should not be overlooked. This can be achieved only if knowledge, attitude and practice of gingival health among patients under active orthodontic treatment are enhanced.

Knowledge on Gingival Health

Poor maintenance of oral hygiene is due to either lack of knowledge or negligence by patients themselves. If patients are not given with proper instructions then it may be one big reason for patient's non-compliance.[10,11]

The current evidence suggests that the accumulation of microbial plaque on the tooth surface is a direct cause of gingivitis and that gingivitis may precede periodontitis. [12,13] It is well known the presence of bands, brackets, wires and other orthodontic attachments make the patient's teeth highly susceptible to plaque accumulation.[14]

Toothbrushing remains the mainstay of oral health measures in the western world, but despite the widespread use of both toothbrush and fluoride toothpaste, the majority of the population do not clean their teeth thoroughly enough to prevent plaque accumulation. This is attributed to be a result of a lack of understanding of the disease process.[15] In this study, knowledge on gingival health reveals that 62.2% of participants were aware of gingival disease. 82.8% didn't have any gum problem and only 35.6 % reported about having bleeding gums. 51.1% were aware of effects of prolong brushing. 23.3% of the participants felt they had halitosis.

On awareness of gingival health, comparatively this survey showed many were having awareness while some were not aware of that.[6] Information and awareness on gingival health enhances knowledge and from such knowledge comes commitment and motivation for people to alter their lifestyles to prevent gingival and periodontal disease.

Practice of Gingival Health Related Issues among Orthodontic Patients

Many patients do not exactly know how to maintain high oral hygiene standards which may be conducive to excellent orthodontic treatment outcomes.[16] Majority of the participants in the present study (97.2%) used toothbrush and toothpaste to clean their teeth twice daily (71.1%). Electric toothbrushes with a rotational brush are significantly more effective in removing supragingival plaque from bracketed teeth compared to a manual toothbrush.[17]

Overall benefit is suggested by mechanical plaque removal by cleaning twice daily as well as the adjunctive chemical benefit derived from delivering toothpaste.[18,19]

56.7% frequently changed their toothbrush, that is, in less than three months where as 40.6% changed their tooth brush between 3-6 months. Filament wear can eventually decrease cleaning efficiency. If splayed extensively, the filaments can potentially cause tissue injury. Compulsive toothbrushing, with excessive force, can lacerate the gingiva and cause cervical notching of the teeth.[20]

In this survey, most of them followed scrub (34.4%) technique for brushing. Study show that roll, horizontal scrub and Charters' techniques all had limited effect on the approximal tooth surfaces.[21] To an extent, Charters' technique addressed the presence of proximal plaque because the method involves holding the head of the brush so that the filaments are at 45 degrees to

the tooth surface and pointing in an occlusal direction, whilst using a gentle vibratory motion.[22] 33.3% spent more than two minutes to brush their teeth. Proper brushing is ideal for good gingival health, while prolong brushing may distort the gingival tissues. Wasting diseases like abrasion are mainly caused by improper and prolong brushing.

Only 16.1% said that they use mouthwash other than routine brushing of their teeth. It may be concluded that chlorhexidine does appear to have a significant effect on untreated gingivitis but the resolution of inflammation may be facilitated much more readily by undertaking professional cleaning and an improvement in oral hygiene. It also became apparent that the effects of chlorhexidine were not as effective when pre-existing plaque and gingivitis existed and where no oral hygiene instruction or professional cleaning was undertaken.[23]

With some other mouthwashes, adjunctive benefits to plaque and gingivitis have also been shown in numerous randomized controlled 6-months studies.[24]

Attitude of Orthodontic Patients towards Gingival Health

Only 59.4% of the participants in this study who are under active orthodontic treatment had undergone professional cleaning of teeth. However, despite receiving appropriate instructions, many individuals fail to follow instructions; also many of them lack knowledge on maintenance. It is important to motivate them to compile the instructions and maintain oral health. It is always needed to assess the knowledge of orthodontic patients on gingival health.[6]

In this study also only 27.8% followed the oral hygiene instructions very strictly. Only 59.4% of patients enrolled in this study used interdental aids and that too irregularly though they were given a proper oral hygiene instructions with an emphasis to use interdental aids.

A recent study found that 62% of orthodontists questioned reported inadequate patient oral hygiene during treatment. Additionally, when more oral hygiene information was given to the patient following a poor oral hygiene finding, over 50% of orthodontists reported no improvement. Only 1/6th of patients taking more oral hygiene information actually demonstrated oral hygiene improvement. [25]

Gray and McIntyre conducted a systematic literature review to determine the effectiveness of orthodontic oral health promotion upon gingival health, and it has been found that an oral health promotion program for patients undergoing fixed appliance orthodontic treatment produces a short-term reduction in plaque and improvement in gingival health.[26]

Oral hygiene instruction and reinforcement of the same must be done during each recall visit of orthodontic treatment. Also some patients need to be reminded to concentrate cleaning the cervical area of their teeth below the brackets. A continuous education and awareness on oral hygiene not only will reduce the prevalence and severity of iatrogenic tissue damage but also will extend the long term benefits of orthodontic therapy.

Ashkenazi et al showed a significant positive correlation between compliance with preventive measures and number and frequency of recall appointments in which patients receive reinforcement. This showed the importance of repeating the instruction in order to increase the compliance.[27] McGlynn et al. compared two oral hygiene programmes in orthodontic practice. The first programme used a self management oral hygiene booklet and was monitored by the orthodontist. In the second programme, patients were provided with oral hygiene aids and 'lectured' repeatedly by the orthodontist on the benefits of good oral hygiene. The second group showed some improvement in oral hygiene, but there was a greater improvement in the first group, due to behavioral self management. This result supports the likelihood that the prescription of disclosing tablets, a self-motivation tool, may improve oral hygiene.[28]

The importance of interproximal plaque control, and its effectiveness at reducing inflammation, are well documented. [29]

In this study, the participants used the interdental aids (dental floss: 58.2%,interdental brush: 60.9%, toothpick 67.4%) irregularly. It is appreciated that the toothbrush alone is not capable of removing plaque in the interproximal region. It is suggested that interdental cleaning devices should be recommended according to individual dexterity, preference and interdental anatomy.

No matter how technically perfect a dental health care provider treats a patient's dental problem, unless the patient gets involved in the daily process of caring for his or her teeth, a patient's dental and oral health will not be optimal.

This survey, however, did not include any question on the type of food the participants consume as diet also affects the accumulation of plaque on teeth and other orthodontic attachments which in turn affects gingival health.

The consistency of the diet affects the rate and amount of plaque formation: soft, sticky foods favor plaque formation; hard, crispy foods do not. Sugar, easily metabolized and utilized by plaque bacteria, is an excellent nutrient for these organisms. Because the length of time that sugars and carbohydrates are available to bacterial plaque is important, the frequency is as important as the amount ingested. People who eat high-protein, low-fat and low-carbohydrate diets accumulate less plaque.

Age Group

Throne & Rise assessed the dental health behavior of a population of 3339 people in Norway representing four age groups (13-14, 23-24, 35-44 and 45-54 years). They determined that toothbrushing and interdental cleaning habits were associated with the early dental health norms set by the family. Receiving advice on how to clean teeth was the strongest predictor of interdental cleaning behavior.[30]

Majority of the participant, in this survey, in the age group <15 years (63.9%) and between 15-18 years (60.5%) were not aware of the effect of prolong brushing. Use of interdental aids in various age group were also found to be statistically significant.

Mostly young patients are referred for orthodontic treatment and they often suffer from plaque related gingivitis.[31] Adolescents have certainly been shown to suffer worse gingivitis than adults during orthodontic treatment.[32] Motivating and making them to practice oral hygiene measures in young age groups will certainly enhance the levels of oral hygiene standards.[33,34]

Conclusion

A need related oral hygiene training program has to be based on risk analysis and tailored to the individual's needs by providing them information which increases knowledge and helps people become aware of their oral health. The dentist or hygienist should evaluate the effectiveness of the patient's home hygiene procedures and then make appropriate suggestions for improvement. The professional must also objectively select products and procedures based on safety, efficacy and adverse effects. A professional cleaning is recommended at least twice a year to remove plaque and calculus, both above and below the gingival margin. It is certain that for a motivated, well-instructed person with the time and skill, mechanical plaque control with combination of tooth brushing plus interproximal oral hygiene aids proves as the optimal method of controlling plaque accumulation. Successful plaque control clearly demands a long term commitment from the dental professional and the patient as cotherapist.

The objective is to guide them to action with the development of skills and to assist the patient's efforts to integrate oral health practices into their life.

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