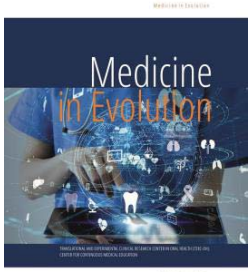
Oral hygiene compliance in orthodontic patients



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Abstract

Aim and objectives; The aim of this study was to highlight the importance and conscientiousness of proper hygiene with the help of prophylactic means in fixed and mobile oro-dental therapy, as just wearing the orthodontic appliance is not enough without being accompanied by proper oral hygiene.

Material and methods; the orthodontic appliance itself along with its components represent retention areas and additional obstacles to achieving proper hygiene. The accumulation of food debris and bacterial plaque creates an environment conducive to the multiplication of bacteria, leading to carious lesions, gingival inflammation and the appearance of halena. In order to prevent this we followed 3 steps oral hygiene lessons. Precisely for this reason, on the occasion of this research, the following objectives will be pursued: knowledge and correct use of methods for cleaning fixed and mobile braces; correct understanding and occupation of all ways to sanitize the oral cavity; knowledge of the food influence on the success of orthodontic therapy. Patients should understand that without proper hygiene associated with orthodontic therapy, which involves the use of oral aids and orthodontic appliances, the desired results cannot be achieved.

Results; In a percentage of 19% of the wearers of fixed dental appliances, the bacterial plaque of grade 3 was noticed, in a percentage of 31% of grade 2, in a percentage of 38% of grade 1 and in a percentage of 12% of grade 0, fact resulting in patients wearing fixed orthodontic appliances having more difficult oral hygiene

Conclusions; The study suggests that participants who received a post-treatment communication reported higher level of oral hygiene compliance than participants in the control group.

Keywords: orthodontic appliances, oro-dental hygiene, prophylactic means, oral health, periodontal disease, objective clinical examination

INTRODUCTION

The patient during orthodontic treatment should be more careful about oral hygiene, nutrition and microbial plaque removal technique because the orthodontic appliance retains more plaque than the free tooth surface and of course involves great responsibility and constant effort during orthodontic treatment. [1]

Maintaining proper hygiene is absolutely necessary to get an adequate result at the end of treatment. Often, the presence of poor hygiene in orthodontic appliances leads to the formation of visible marks on the surface of the teeth, especially around the brackets, gathering a thick film with negative repercussions on dental and oral health. [2]

One of the consequences of poor oral hygiene is the appearance of tartar deposits, leading to bad breath and noticeable gingivitis, manifested by increased volume, spontaneous gingival bleeding and brushing. It seems that dental inflammation, meaning gingivitis, influences dental movements by increasing the period of wearing the orthodontic appliance. [3] In order to obtain adequate results, it is very important to place a major emphasis on this aspect, namely the dialogue with the patient about oral hygiene and its importance in the context of orthodontic treatment. In this case, the research aims to improve the appearance of the dialogue in order to explain in the most accurate and clear way to allow the patient to understand the doctor's message in the way that he himself can perform the correct technique in the best conditions, brushing during the day. [4, 5]

The patient will have to consciously realize the importance of a rigorous and demanding oro-dental hygiene, respectively all the elements from which he will be able to benefit from what it means to maintain an adequate oral hygiene. Another important factor is the information and training of the patient on the adjuvant methods of oral hygiene, such as brushes between the teeth, floss and mouthwash. [6] Bacterial plaque control in young patients wearing orthodontic appliances is essential to maintain healthy gums and get the best results, because in the case of an inflamed and bloody periodontium significantly reduces the progress of orthodontic treatment and increases the period of maintenance of the orthodontic appliance in oral cavity. [7] That is why preventing dento-maxillary anomalies means knowing the causes and mechanisms of action, instituting the most effective prophylactic measures from early childhood, paying full attention to interceptive orthodontics and applying prophylactic means at all ages. [8]

Bacterial plaque control in young patients wearing orthodontic appliances is essential to maintain healthy gums and get the best results, because in the case of an inflamed and bloody periodontium significantly reduces the progress of orthodontic treatment and increases the period of maintenance of the orthodontic appliance in oral cavity. [9] That is why preventing dento-maxillary anomalies means knowing the causes and mechanisms of action, instituting the most effective prophylactic measures from early childhood, paying full attention to interceptive orthodontics and applying prophylactic means at all ages. [10]

Aim and objectives

The aim of this study is to highlight the importance and need for proper hygiene with the help of prophylactic means in fixed and mobile orthodontic therapy, because the mere wearing of braces is not enough without being accompanied by proper oral hygiene.

Specific objectives:

- ✓ Knowledge and correct use of cleaning methods for fixed and mobile braces;
- ✓ Understanding and correct occupation of all ways to sanitize the oral cavity;
- ✓ Knowing the food influence on the success of orthodontic therapy.

MATERIAL AND METHODS

The study was performed on a number of 30 patients aged between 8 and 25 years, in both sexes, cases were selected that showed the appearance of bacterial plaques located in patients wearing orthodontic appliances. However, the retention of this plaque is favored by the wearing of the orthodontic appliance that prevents the routine maneuvers of oral hygiene, being the first phenomenon that can lead to decline by the patients of a correct maintenance of oral hygiene.

Patients were divided into 2 categories, men and women, from which 3 other subgroups were selected divided as follows:

- *Patients with good oral hygiene* who have not received oral hygiene instructions from their doctor;
- *Patients with poor oral hygiene* who have received instructions from the doctor on oral hygiene techniques;
- *Patients with poor oral hygiene* who did not follow the instructions received from the doctor and voluntarily gave up the applications.

The data collected were recorded in a clinical file: identity data, age, initial clinical situation, periodontal status, degree of gingival inflammation, indices of bacterial plaque initial and after treatment. The first group did not receive instructions from the doctor and maintained proper oral hygiene. The second group received oral hygiene instructions from the doctor on the brushing technique and the use of adjuvant brushing techniques, meaning interdental brushes, dental floss and mouthwash. The third group voluntarily refused to apply this therapy due to factors that negatively influence the maintenance of proper oral hygiene, the presence of brackets, rings and elastics that prevent the perfect penetration of the regular toothbrush complicating the maneuvers.

The study was carried out in three stages:

- Oral examination;
- Dental hygiene lesson for patients wearing fixed and mobile orthodontic appliances (consisting of 3 weekly lessons);
- Oral re-examination (after three months).

At the oral examination we followed:

- White spots of dental demineralization
- Education lesson 1
- BIP score for estimating the level of bacterial plaque

Oral hygiene lesson 1

Purpose: orientation for the removal of bacterial plaque

Description - The formation and composition of bacterial plaque, the relationship with oral disease and especially its connection with the patient's condition. It is performed using a highlighting agent (fig. 1, 2, 3,), which is a training method that can highlight to the little patient what needs to be done. Bacterial plaque is invisible on most teeth without staining. The words were not enough to convince the children and make them believe that the bacterial colonies are on their teeth and that the multitude of microorganisms are the agents responsible for the bacterial plaque.

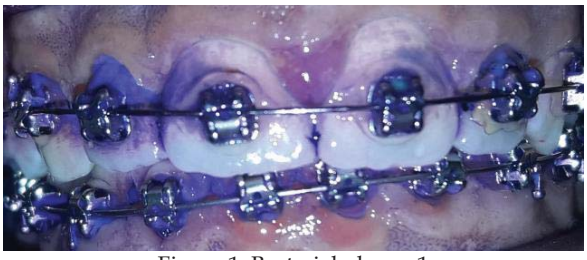

Figure 1. Bacterial plaque 1

Figure 2. Bacterial plaque 2

Figure 3. Bacterial plaque 3

Oral hygiene lesson 2

Purpose: oro-dental hygiene in patients with fixed orthodontic appliances.

Description: virtual display, demonstrations on the model, complete kit presentation in order to obtain proper hygiene.

During the presentations we noticed:

- Activation of the dental brace screw at regular intervals, specified by the orthodontist;
- Explaining the importance of wearing braces, for the entire recommended duration and in accordance with the instructions received from the orthodontist;
- Guidance to a correct diet of subjects wearing fixed dental appliances such as: strict elimination from the diet of sticky foods that are deposited on the tooth surface, but also on the orthodontic appliance, hard foods that can lead to deformation of the braces and rupture of the plastic portion afferent.

Oral hygiene lesson 3

Proper education for a correct cleaning, through direct presentation and exemplification of the products used in dental hygiene, for patients wearing orthodontic appliances as follows:

- Brushing the orthodontic appliance
- Use of the interdental toothbrush
- Using dental floss
- Use of oral irrigator

- The importance of using mouthrinse, mouthwash
- Proper nutrition of people wearing orthodontic appliances

RESULTS

In a percentage of 19% of the wearers of fixed dental appliances, the bacterial plaque of grade 3 was noticed, in a percentage of 31% of grade 2, in a percentage of 38% of grade 1 and in a percentage of 12% of grade 0, fact resulting in patients wearing fixed orthodontic appliances having more difficult oral hygiene (fig. 4)

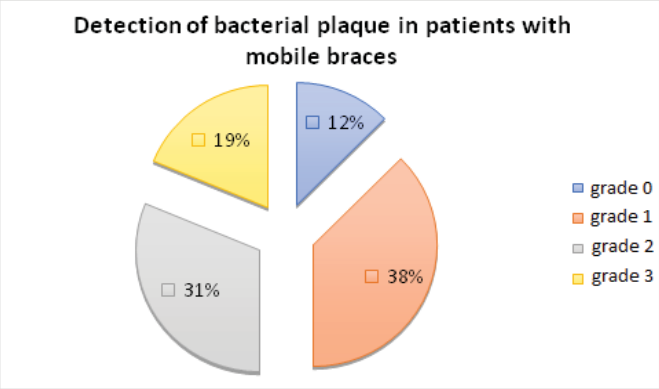

Figure 4. Detection of bacterial plaque

Compared to the initial examination of dental plaque, after 3 months a real improvement in the status of oral hygiene can be found, so there are no subjects with grade III dental plaque, and subjects with grade II dental plaque have decreased significantly, also the percentage of subjects without dental plaque increased by 30%. Continued oral cleaning and proper application of oral cleaning techniques will improve the oral hygiene status of patients wearing mobile orthodontic appliances. A good determination in close connection with a sustained oral hygiene training both in children wearing mobile braces and in their parents or relatives give positive effects.

The problems found in the analyzed subjects were white spots or enamel demineralizations in a number of 13 subjects in the group of 30, of which 8 were wearing a fixed orthodontic appliance for 2 years, or even more. White spots or demineralizations are usually highlighted when removing the orthodontic appliance, and for their treatment or prevention it is recommended to apply fluoride gels or varnishes. During orthodontic treatment, it is recommended that toothbrushing be performed with fluoride-containing toothpastes and frequent rinses with fluoride-rich mouthwashes. (fig. 5)

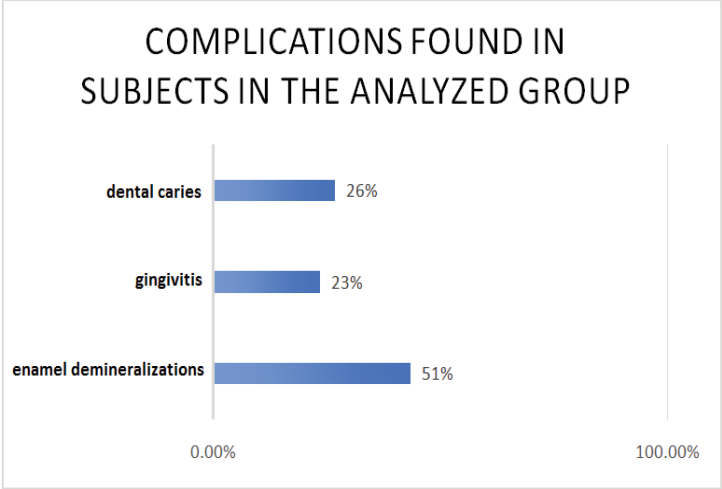

Figure 5. Complications found in subjects in the analized group

More than 50% of the subjects in the analyzed group have been wearing orthodontic appliances for a year, a year and a half, a number of 7 patients have been wearing orthodontic appliances for more than 2 years, a number of 5 subjects have been wearing orthodontic appliances for at least 6 months, and a number of 2 patients have been wearing braces for about 3 years. (Fig. 6)

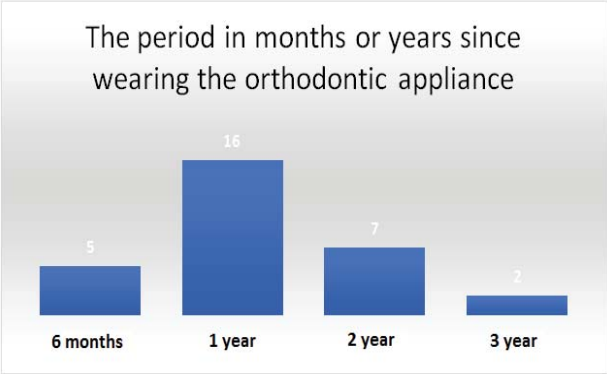

Figure 6. The period in months or years since wearing the orthodontic appliance

The brushing statistics in the analyzed group are relatively good because a number of 13 subjects brush their teeth twice a day, and a number of 11 subjects brush their teeth after each meal, only a number of 2 subjects declare that they perform occasional dental brushing, resulting in the equivalent of 2-3 weekly toothbrushes. A percentage of 53.33% of the subjects choose the electric toothbrush, a percentage of 26.66% of the patients prefer the manual toothbrush and a percentage of 20% perform the toothbrushing with the orthodontic toothbrush, special with "V" groove. (Fig. 7)

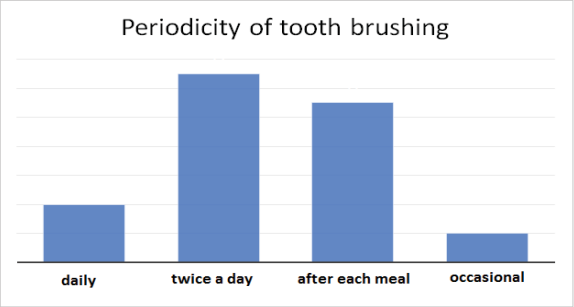

Figure 7. Periodicity of tooth brushing

The most common problems were in subjects who used the manual toothbrush, then in the toothbrush with "V" brushes. Subjects using electric toothbrushes had significantly fewer problems than those using manual toothbrushes p = 0.005. (fig. 8, 9)

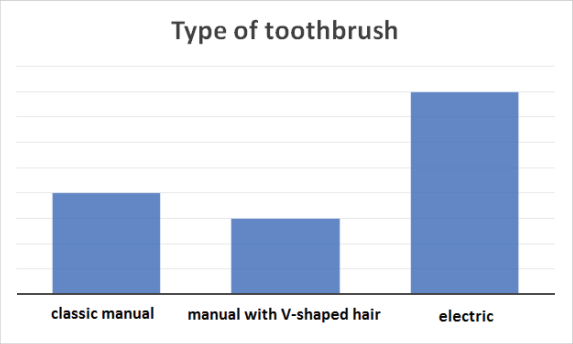

Figure 8. Type of toothbrush

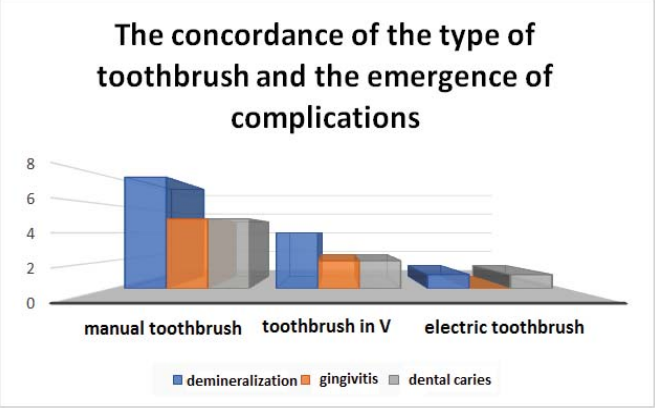

Figure 9. The concordance of the type of toothbrush and the emergence of complications

A percentage of 90% of the subjects from the analyzed group use dental floss at least once a day, which would not be relatively okay if we were talking about subjects wearing orthodontic appliances, but we can discuss the fact that a percentage of 40% of the subjects stated that they use dental floss after every meal, 33.33% use dental floss twice / day and only 10% never use dental floss. (Fig. 10)

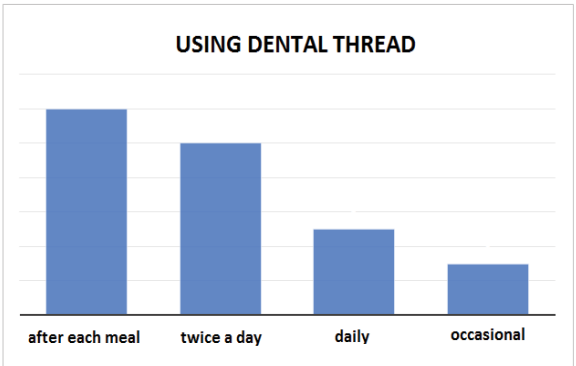

Figure 10. The use of dental thread

A percentage of 90% of the subjects in the analyzed group perform rinsing at least once a day with mouthwash, which would not be okay if we were talking about subjects wearing orthodontic appliances, so we can say that a percentage of 26.67 % of the subjects state that they perform rinses after each meal, a percentage of 43.33% rinse twice a day, and only 10% do it occasionally. (Fig. 11)

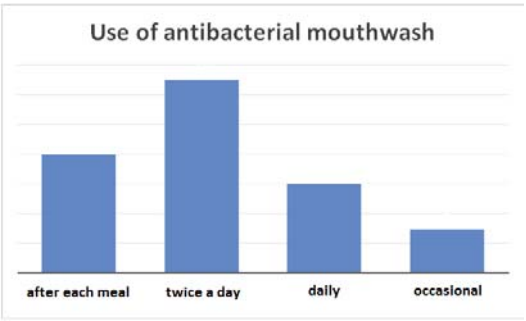

Figure 11. The use of antibacterial mouthwash

A percentage of 16.67% of the analyzed subjects state that they use the interdental brushes after each meal, or whenever it is necessary. (fig. 12). A percentage of 43.33% of patients use it in the morning and evening, a percentage of 16.66% use it daily, especially in the evening before bedtime, and a percentage of 23.33% use it occasionally. 20% of the subjects also use fluoride gel in combination with interdental brushes, but claim that their breckets come off. 16.66% use interdental brushes together with fluoride toothpaste. (fig. 13, 14)

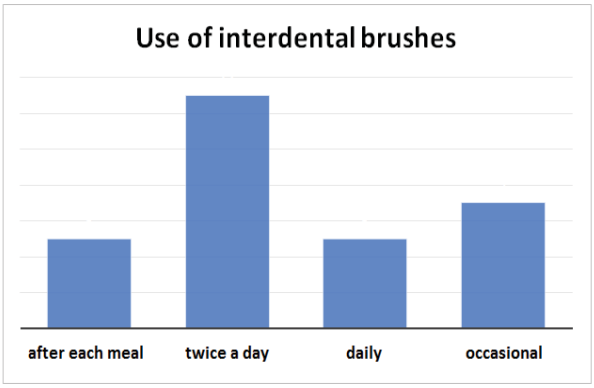

Figure 12. The use of interdental brushes

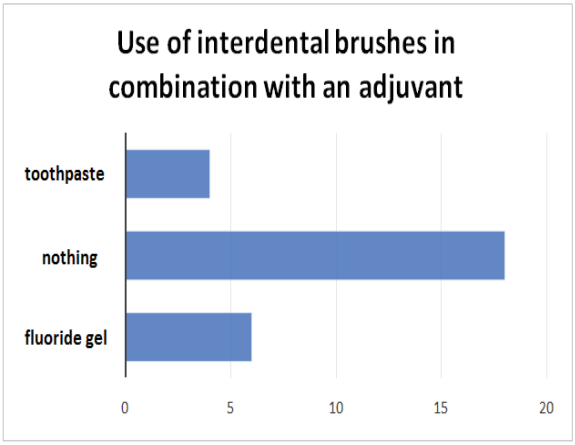

Figure 13. The use of dental brushes in combination with an adjuvant

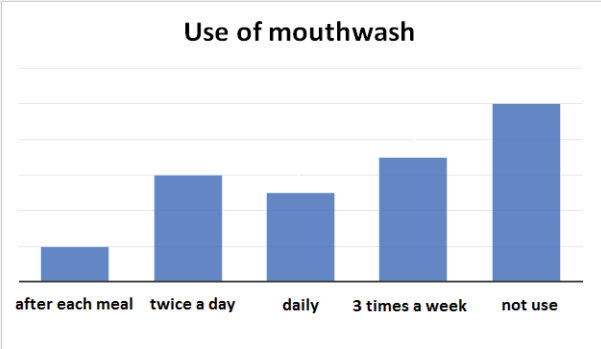

Figure 14. The use of mouthwash

A percentage of 6.66% of patients use the oral irrigator after each meal, a percentage of 20% of them use it 2 times / day, usually in the morning and evening, a percentage of 16.66% use it daily, a percentage of 23.33% do it 2-3 times a week and a percentage of 33.33% do not use the oral irrigator at all. From the image below it is found that subjects who use the oral shower have fewer problems than those who do not use it at least daily, the difference was observed to be statistically significant p = 0.005. (fig. 15)

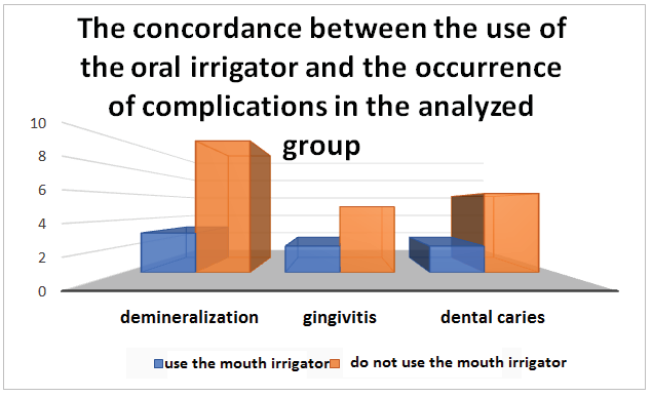

Figure 15. The concordance between the use of oral irrigator and the occurrence of complications

Professional cleaning has a major role in sanitizing orthodontic appliance wearers. A percentage of 40% of the subjects state that they have done professional brushing twice before, a percentage of 23.33% once, a percentage of 6.66% three times, and a percentage of

3.33% of or it was needed. In addition to professional toothbrushing in 83.33% of subjects, descaling was performed, where needed. (Fig. 16)

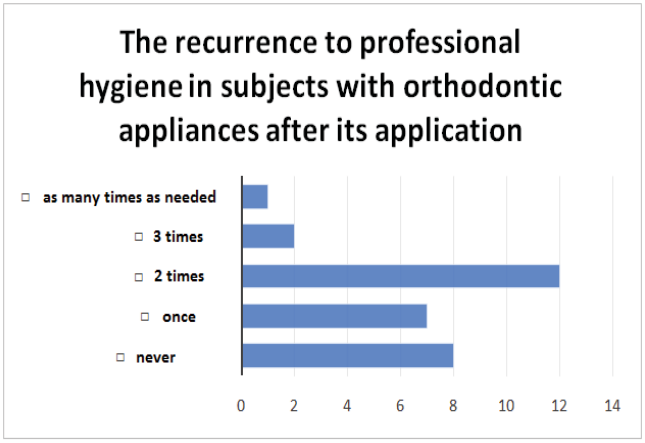

Figure 16. The recurrence to professional hygiene in subjects with orthodontic appliances

The information on correct sanitation for subjects wearing orthodontic appliances shows that 93.33% of subjects say that they have documented with the help of the Internet, with the aim of performing a correct toothbrushing, using the floss, sanitizing the device dental by watching videos on the You-Tube channel. A percentage of 86.66% state that part of the information regarding the correct sanitation was done through communication with family members or friends who wear a fixed dental appliance and a percentage of 73.33% of the subjects were informed by orthodontist and nurse or dental prophylaxis. (fig. 17)

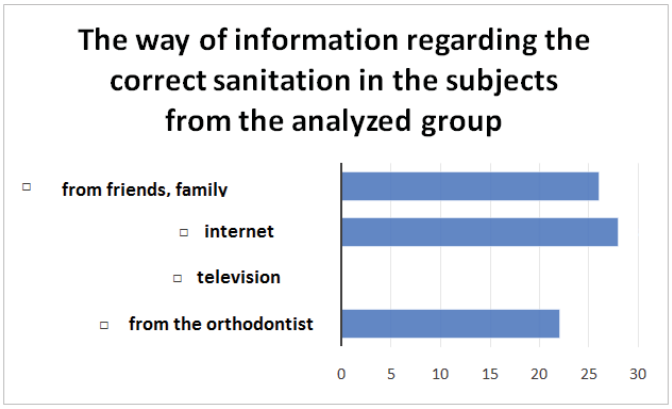

Figure 17. The way of information regarding the correct sanitation in the subjects from analyzed group

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DISCUSSIONS

Enamel demineralization, which occurs in orthodontic braces, occurs in the form of white spots that may disappear due to surface abrasion or due to repeated deposits of mineral deposits after treatment. Modern procedures for examining white spots are: optical caries monitor, quantitative laser fluorescence and light-induced fluorescence (QLF), digital imaging with optic fiber transillumination and computer analysis of digital photographs. [11]

It should be noted that the remineralization of enamel after removal of the orthodontic appliance should be a priority for the orthodontist and influence the use of fluoride preparations to prevent the destruction of the tooth in the altered area. Training patients on proper oral hygiene is especially important to combat complications after orthodontic treatment.[12]

The oral irrigator with antibacterial substances is fundamental for maintaining dental health and for avoiding complications after orthodontic treatment. The gingival stimulator has a particularly important role in combating gingivitis. Manual toothbrushing is inferior to electric brushing, and manual brushing can highlight the preponderance of orthodontic toothbrush with groove. The use of interdental brushes in combination with fluoride gels is beneficial in preventing complications after orthodontic treatment, but it should be noted that fluoride gel detaches the brackets, which means that long-term use is not recommended. [13]

Fluoride treatment is imperative to be used immediately after the removal of braces, from the moment it was noticed that the demineralization of the enamel is increased. The use of antibacterial and anti-inflammatory mouthwash is important for proper hygiene of the oral cavity. The use of the dental floss after each meal also reduces the degree of deposition of dental plaque. Motivation and training of patients at each medical check-up, in order to maintain optimal oral hygiene around braces is fundamental to achieve a full effect of fluoride. It is recommended to brush daily with fluoride toothpaste twice a day and use interdental brushes to remove bacterial plaque around the brackets. [14] Daily use of mouthwash with fluoride (0.05% sodium fluoride) or rinsing with mouthwash with essential oils may be prescribed. Carrying out oral prophylaxis when necessary and repeating the explanations during each appointment for patients who do not meet the requirements. Use of local fluoride in the form of varnishes, around the brackets of non-compliant or high-risk patients, at an interval of six months. Cementing modified CIS strips with high quality resins and using sealing solutions that remove fluoride around the brackets. Educating patients about proper nutrition is especially important in combating the appearance of carious lesions during orthodontic treatment.

CONCLUSIONS

The study suggests that participants who received a post-treatment communication reported higher level of oral hygiene compliance than participants in the control group.

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