Original Article

A SURVEY OF ORAL HYGIENISTS REGARDING ORTHODONTIC PATIENTS AND COOPERATING WITH AN ORTHODONTISTS

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ABSTRACT

This study aimed to evaluate the knowledge of oral hygienists working with orthodontic patients and cooperating with orthodontists. In February 2022, members of the Lithuanian oral hygienist society were invited to participate in a 37-question survey. The questionnaire was organized into eight sections representing specific information about the socio-demographic status of the respondents, cooperation with the orthodontist, individual oral hygiene products, patient education, professional oral hygiene, clinical situations, and knowledge. Two hundred and thirty fully completed questionnaires were returned. The mean of the dental hygienists' work experience was 5.28 years. 47% of the respondents answered that white spot lesions (WSL) occurred after the removal of braces, 48.7% answered that WSL did occur, but rarely, and 4.3% answered that they did not notice WSL. Work experience had no significant association (p=0,088) with WSL after braces removal. If a fixed retainer came off of several teeth, 1.7% of oral hygienists would do nothing, 2.2% would remove the wire, and 90.9% would send patients to their orthodontist. 32.2 % of oral hygienists who worked with an orthodontist were more likely to fix detached lingual retention wire (p=0.03), and 24.6% often referred to the orthodontist (p<0,001). Oral hygienists do not consider themselves capable of providing qualified assistance to orthodontic patients in the case of a treatment complication and therefore recommend them to seek the advice of an orthodontist. Oral hygienists state they lack knowledge about the particularity of orthodontic patients' oral care and would be interested in lectures and training to extend this knowledge.

Key words: Oral hygienists, Orthodontic patients, Cooperation, Survey, Oral hygiene.

Introduction

Nowadays more and more people are seeking orthodontic treatment, therefore, it is important to ensure good oral hygiene during orthodontic treatment to prevent caries and periodontal diseases [1, 2]. Thus, the oral hygienist is an inseparable part of orthodontic treatment [3]. The role of the oral hygienist is to motivate patients, provide oral hygiene instructions, recommend adequate tools for individual oral hygiene, ensure the prevention of caries and periodontal diseases, perform periodic check-ups, and cooperate with an orthodontist [4].

Based on scientific data most of the patients after orthodontic treatment have at least one white spot lesion (WSL) [5] and increased plaque and bleeding index values [6]. Demineralization or white spot lesion development in the enamel correlates with orthodontic treatment with fixed orthodontic appliances [7]. People with different types of malocclusion usually have difficulty ensuring proper oral hygiene due to food accumulation and plaque retention in areas of crowding. In addition, bonding attachments to teeth make oral hygiene more difficult and can prolong plaque accumulation on teeth surfaces [7]. Therefore, good oral hygiene, education, prophylaxis, proper oral hygiene skills, and products are essential to prevent possible complications during orthodontic treatment [8].

Although oral care products and motivational systems are constantly changing and new ones are being suggested [9-17], an oral hygienist plays the main role in orthodontic patient education and motivation. Only oral hygienists 'collaboration with periodontists [18] and general dental practitioners [19] has been analyzed, however, there are no available studies about oral hygienists' cooperation with orthodontists.

This study aimed to evaluate the knowledge of oral hygienists working with orthodontic patients and cooperating with orthodontists.

Materials and Methods

Approval for the research was granted by the Kaunas Regional Biomedical Research Ethics Committee (No. BEC-OF-93).

This study was carried out in a form of a survey questionnaire, comprising 37 questions to analyze the oral hygienists' work with orthodontic patients. The research questions were divided into seven parts representing some specific topics: socio-demographic status of the respondents, cooperation with orthodontists, individual oral care products, patient education, professional oral hygiene, clinical situations, and knowledge. Respondents had the opportunity to select multiple answers from the list of options.

Firstly, respondents were asked to identify how many years of clinical work experience they have, the city where they work, the university where they have completed their studies, and the work sector - either private or public.

The second section included questions regarding orthodontist and oral hygienist cooperation at the clinic. It was asked whether the orthodontist works in the same clinic or not, and do oral hygienists evaluate occlusion, and do send patients to the orthodontist when they identify malocclusion.

The third part requested information about oral care products (toothbrushes, single toothbrushes, interdental brushes, irrigators, etc.). Which were suggested to patients and how often.

The fourth section consisted of questions about educational tools used for orthodontic patients. Participants were asked about teeth brushing recommendations (how many times per day), periodic check-ups, individual oral hygiene measures (same or different for each patient), the amount of fluoride used in the polishing paste, and what kind of reminders about individual oral hygiene were given to the patients.

Another part of the questionnaire was regarding professional oral hygiene. Dental hygienists were asked if they determine plaque and bleeding indexes, and how long oral hygiene takes time compared with non-orthodontic patients. Moreover, we gathered information about white spot lesions, fluoride therapy, polishing techniques, and the complexity of oral hygiene with lingual braces [20].

The sixth section was about various clinical situations. Oral hygienist's reaction when braces / fixed retainer fell off, or when archwire injured gingiva. Participants were also asked about the appearance of white spot lesions after braces removal.

Finally, respondents were asked about studies, lectures, and training associated with oral hygiene for orthodontic patients, innovations, and in what topics oral hygienists were interested.

A questionnaire study was conducted in Lithuania from February 2022 to September 2022 by handing out anonymous paper questionnaires to oral hygienists. Also, the survey questionnaire had been sent to participants by email. According to the Lithuanian State Service of Accreditation for health care activities, there are 1579 active oral hygienists' licenses in 2022, The sample size was determined using Paniotto's formula. Reliability was lowered to 90 %.

Statistical analysis was performed by collecting data and analyzing it with the software package SPSS 27.0 (*Statistical Package for the Social Science*). Analyzing the quantitative data, the main characteristics of their dispersion were evaluated: mean (V), standard deviation (SD), median [25-75%], and minimum, and maximum values. Ordinal variables report the number of cases (n) and percentage distribution (%). The Kolmogorov-Smirnov test was used to test hypotheses about the normality of the distribution of parameters. Since the quantitative variables did not satisfy the condition of normality of distribution, the non-parametric Mann-Whitney test was applied to compare two independent samples, and the non-parametric Kruskal-Wallis test was applied to compare more than two independent samples. The significance between differences was evaluated by a chi-square test. The *p*-value of <0,05 was considered statistically significant. The most relevant data were analyzed in the publication.

Results and Discussion

Two hundred and seventy-nine questionnaires were distributed, of which 230 were returned fully completed. Forty-nine surveys were missing one or more required items and have been excluded from the analysis due to the potential impact on the results. The mean of the dental hygienists' work experience was 5.28 years. The median [25-75%] of working experience of Lithuanian oral hygienists in the studied sample was 5.0 [2.0-7.0] years (min - 1 year, max - 20 years). Based on the median of the distribution, we distinguished 2 groups: < 5 years- 113(49.1%) and ≥5 years – 117(50.9%).

The majority of the respondents (211 (91.7%)) were working in the private practice sector, 34 (14.8%) worked in the public sector, 15 (7.04%) mentioned a combination of the public and the private practice sectors, 0.4% worked at the university.

One hundred and seventy (73.9%) respondents evaluated the patient's bite before the oral hygiene procedure. Of which 84 (71.2%) dental hygienists worked with an orthodontist and 86 (76,8%) worked in different workplaces. There was no significant difference (p=0.334 based on the chi-square test). Evaluating the work experience of the participants: 79 oral hygienists (69.9 %) had less than 5 years and 91 (77.8 %) with ≥5 years of experience (no significant difference in work experience (p=0,174) based on the chi-square test).

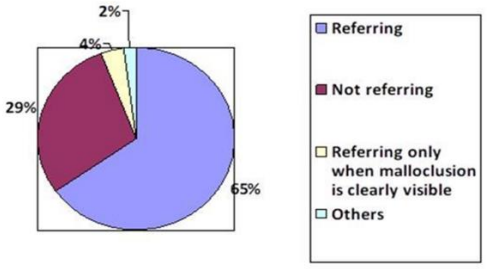

Figure 1. Percentage distribution of patients referrals by oral hygienists to orthodontists

A total of 151 (65.7%) oral hygienists sent the patients for an orthodontist's consultation when necessary **(Figure 1)**, of which 62 respondents had work experience of fewer than 5 years and 89 respondents with ≥ 5 years of experience (p=0.001).

Percentage distribution of recommended oral care products for orthodontic patients: 86.5% regular toothbrush, 76.5% interdental floss, 73.0% single-tooth brush, 30.0% super floss, 23.9% irrigator, 19.1% MI remineralizing paste, 11.7% TePe implant-orthodontic brush™, 8.3% V-shaped brush. There was no significant difference in the recommendations for individual oral care, according to the duration of the dental hygienist's work. V-shaped dental brushes and TePe implant-orthodontic brushes™ were significantly more recommended by those oral hygienists who worked together with an orthodontist (p=0,019; p=0,013).

47% of the respondents answered that white spot lesions (WSL) occurred after the removal of braces, 48.7% answered that WSL did occur, but rarely, and 4.3% answered that they did not notice WSL. Work experience had no significant association (p=0,088) with WSL after braces removal.

If a patient came with the bracket fallen off from a front tooth, 3.9% of oral hygienists would remove the archwire and rebond the bracket, 34.3% would remove the bracket from the arch and instruct them to contact the treating orthodontist, 71.7% would do nothing and instruct them to contact the orthodontist. The respondents' work experience had no significant relationship (p=0,207). Nine (7.6%) oral hygienists who worked with the orthodontist in the same clinic and 0 (0%) working without the orthodontist, when a patient arrives with a fallen-off bracket from the front tooth, would remove an arch and rebond the bracket (p<0.05). Conversely, significantly (p<0.05) more non-working orthodontist oral hygienists (91(81.3%)) would refer patients to the specialist than those who worked with (74(62.7%)).

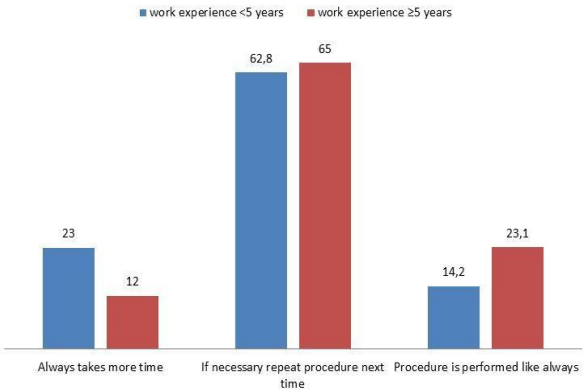

Figure 2. Percentage distribution of time spent on professional oral hygiene of orthodontic patients according to work experience

If a fixed retainer came off of several teeth, 1.7% of oral hygienists would do nothing, 2.2% would remove the wire, and 90.9% would send patients to their orthodontist.

Oral hygienists with less experience took significantly more time to perform professional oral hygiene for orthodontic patients **(Figure 2)**.

116 (50.4%) respondents recommended brushing their teeth after every meal, 151(65.3%) suggested oral hygiene procedures every 3 months and there was no significant difference based on work experience.

Oral hygienists actions when a patient came with a wound on mucosa because of poking archwire: 54(45.8%) respondents who worked with the orthodontist and 28 (25%) non-working with the specialist would cut the wire, 36 (30.5%) oral hygienists working with the orthodontist and 19 (17%) non-working would move the arch to the other side. Answers showed that respondents who worked with the orthodontist in the same workplace were significantly more likely to cut (p=0.001) or move the archwire to the other side (p=0.016) when a patient complained of a wound.

32.2 % of oral hygienists who worked with an orthodontist were more likely to fix detached lingual retention wire (p=0.03), and 24.6% often referred to the orthodontist (p<0,001).

One hundred and nine (47.4%) oral hygienists participated in various lectures/education about orthodontic patients' individual and professional oral care, 226 (98.3%) respondents would like to have training and lectures about these topics: professional and individual oral hygiene for orthodontic patients, removal of braces, patient encouragement for good oral hygiene, etc. (there was no significant difference about education compared with the specialists‘ work experience, p>0,05).

In this research, we analyzed oral hygienists' cooperation with orthodontists.

Survey answers showed that dental hygienists ‘work experience does not have a significant difference in these aspects: evaluation of occlusion, white spot lesions appearance after braces. Taking each aspect separately, occlusal analysis is a difficult process that needs a thorough understanding of dental anatomy, biomechanics, and function. Instead of work experience, the abilities needed for occlusal evaluation are often learned through formal education and continued professional development, which is why results could show no-significant difference above specialists [21]. Speaking about another aspect, white spot lesions are a common complication of orthodontic treatment and are caused by various factors, including poor oral hygiene, dietary habits, and fluoride exposure [5]. Dental hygienists with more work experience may have a

better understanding of these factors and how to educate patients on how to prevent them, but their ability to diagnose white spot lesions after braces removal would likely not be impacted by their work experience [22].

However, the mean working experience of oral hygienists who referred a patient for an orthodontist's consultation is 5.0 [3.0-7.0] years, significantly higher (p=0.002), than those who did not send if a malocclusion is visible. Oral hygienists with more years of experience may have a better understanding of orthodontic problems and are therefore more likely to recognize the need for a referral. Also, specialists who attend continuing education courses and workshops in orthodontics may be more likely to refer patients for treatment [23]. Also experienced oral hygienists may have developed a strong relationship with their patients, making patients more likely to follow their recommendations for referral to an orthodontist [24].

Oral hygienists with less experience take significantly more time to perform professional oral hygiene for orthodontic patients. It may be because less experienced dental hygienists may feel less confident in their abilities and take more time to ensure that the procedure is being performed correctly. Also, oral hygiene for orthodontic patients requires more skills and knowledge because fixed orthodontic appliances could cause gingivitis, and oral hygiene can take more time due to bleeding during the procedure [3].

Oral hygienists who work with orthodontists are significantly more likely to fix a debonded bracket or to move the archwire to the other side when the archwire scratches the gingiva than those not working with the orthodontist. Such results could be because those oral hygienists who work in the same clinic as the orthodontist have more experience with orthodontic patients. That is why non-working with orthodontists oral hygienists referred orthodontic patients to specialists and did not fix the orthodontic problem in the appointment. According to the Lithuanian State Service of Accreditation for health care activities, there were 1579 active oral hygienists‘ licenses in 2022, meanwhile, orthodontists‘ are only 125. Numbers show that for 1 orthodontist there are 12,632 oral hygienists. Oral hygienists and orthodontists could get more knowledge from each another by taking part in collaborative conferences, and seminars and developing a better understanding of each other's roles and responsibilities. Seminars could already be organized at the university. Furthermore, the use of technology such as electronic health records, social media, and digital imaging could help to improve communication between specialists, allowing them to easily share information and collaborate in the care of the patients [25].

In 2017 Thevissen *et al*. described the attitude of dental hygienists, general practitioners, and periodontists toward preventive oral care [18]. They gave similarities in attitude about patient motivational actions between dental hygienists and periodontists (provide interproximal hygiene instructions to every patient, enough time to explain oral hygiene instructions during the procedure, etc). Concerning patient motivational actions, both periodontists (93.8%) and dental hygienists (85.9%) were more inclined to always inform patients about their periodontal condition than were general practitioners (38.5%). These results show that there is cooperation between periodontologists and dental hygienists and the role of the oral hygienist is really important. Therefore, it can be said that the oral hygienist is equally important as the orthodontist during the orthodontic treatment only if these two cooperate.

This study has several limitations that need to be taken into account when interpreting the results. First, the insufficient sample size in the survey results would have been more reliable if we had more respondents. Second, we could have paid more attention to dental hygienists who work in non-private clinics, only 34 of 230 respondents were from this sector.

Conclusion

The study showed that oral hygienists evaluate a patient’s bite and recommend consulting an orthodontist if necessary. They do not consider themselves capable of providing qualified assistance to orthodontic patients in the case of a treatment complication. Therefore, they recommend that the patients seek the advice of a treating orthodontist, especially those who do not work together with orthodontists. Dental hygienists state they lack knowledge about the particularity of orthodontic patients' oral care and would be interested in lectures and training to extend this knowledge.

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