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Adolescents, self-perception versus oral hygiene

Ilma Robo^{1*}, Saimir Heta², Sonila Kapaj³, Mario Llanaj⁴ and Vera Ostreni⁵

Abstract

Background Oral hygiene is the individual approach to mechanical actions performed properly with the right elements at predetermined time intervals. This information is reflected in an almost illogical and very understandable way to children aged 3–6 years, who conceive the whole procedure as something advised by the parent. In teenage patients, this procedure is considered to be learned by now and turned into a routine of individual hygiene.

Methods The primary aim of the study involved the comparison of residual cross-sectional data with retrograde data. Retrograde data are data collected about oral hygiene, in 2010, among children of a state kindergarten. So the data collected in 2010 were reprocessed to compare them with the data collected in 2020 through questionnaires for exactly the same current age group of 9–14 years, but after 10 years.

Results The impact of filling and decayed teeth is reflected in the appearance and self-esteem of the adolescent's age expressed in percentage was about 36%. Prevention of caries and periodontal diseases by means of oral hygiene is evaluated positively in 58% of cases. Students aware of the dentist's role in identifying dental diseases that can have an impact on the systemic health of the organism are 85%, and the answers for impact and lack of connection reach 15%.

Conclusions A significant improvement is observed in the awareness of oral hygiene and the care exercised to achieve it properly during the 10-year time interval. This improvement is recorded with distinct numerical values in this study.

Keywords Oral hygiene, Self-assessment, Hemorrhage index, Bacterial plaque, Adolescent, Age 3–6 years

Background

Oral hygiene is evaluated with clinical data. Oral hygiene is the individual approach to mechanical actions performed properly with the right elements at predetermined time intervals (Priya et al. 2013; Casa-Levine and Nappo-Dattoma 2022; Tadjoedin et al. 2017; Robo et al.

2021; Rogers et al. 2022). This information is reflected in an almost illogical and very understandable way to children aged 3–6 years, who conceive the whole procedure as something advised by the parent (Casa-Levine and Nappo-Dattoma 2022; Kurokawa et al. 2022; Robo et al. 2019). On this element registered at this age, the children's individual approach to appointments and dental treatments in the continuity of the individual's growth, in order to reach the second stage of data collection on oral hygiene, which includes the age of 9–14 years, adolescents who have expressed data sorted according to the questions of the questionnaire. The goal is to compare retro and cross-sectional data on oral hygiene, data collected at different time points, but for the age range included in the study, it is captured at the age of 3–6 years and then at the age of 9–14 years (Tadjoedin et al. 2017;

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Robo et al. 2019; Gund et al. 2022; Corchuelo-Ojeda et al. 2022; Syamkumar et al. 2022).

The initial aim of this study was to document data on the personal experiences of students aged 9–14 years about how to maintain oral hygiene, about the elements by means of which oral hygiene is maintained and about experiences in dental treatments, even in relation to the dentist–patient relationship. These data were obtained from the questionnaires distributed to these students of this age range.

The primary aim of the study involved the comparison of residual cross-sectional data with retrograde data. Retrograde data are data collected about oral hygiene, in 2010, among children of a state kindergarten. So the data collected in 2010 were reprocessed to compare them with the data collected in 2020, exactly for the same current age group of 9–14 years.

It is emphasized that the confirmation of data reprocessing was obtained based on the rules of respecting copyright (Robo et al. 2021). There are many studies on which method of brushing teeth is the best, the most productive, but the results have room for discussion. 10–13 As long as the method of brushing teeth has as its primary orientation the mechanical removal of bacterial plaque, all movements with a brush should aim precisely at the mechanical removal of bacterial plaque with the secondary purpose of massaging the gums.

The movements of the brush are devised by different authors depending on the method of brushing the teeth; sometimes, it is precisely the way of movement of the brush that influences the name of the method of brushing the teeth. This is how it can be most easily fixed in the patient's memory and how it can be applied most easily by him. The method with horizontal movements according to literature sources due to horizontal movements can usually give the appearance of gingival recessions and tooth abrasion, mainly in the teeth that, with their longitudinal axis, break the roundness of the arch (Syamkumar et al. 2022; Varkey et al. 2022; Obregón-Rodríguez et al. 2019; Kamran et al. 2019).

Methods

The study was conducted in two population groups at two different time periods. The study aims to collect data related to oral hygiene, but first in a cross-sectional and retrograde perspective. Cross-sectional data were collected through questionnaires purposely prepared for this study, among students aged 9–14 years, a group of individuals numbering 52. The retrograde data were obtained based on all respect of the copyright, from a study presented at the Student Conference organized at the Albanian University in 2010. The copyright granted by the coordinating teacher of the topic, referred to the

year 2010. The retrograde data are reprocessing of the basic data of the study in question. These data aim to derive relations on the periodontal status of children aged 3–6 years registered in a state kindergarten in 2010. It is emphasized that there is no repetition of figures, but reprocessing and re-presentation in a different perspective of the data collected at that time. In appendices of this study, copyright is reserved and a copy of the agenda and abstract of the Student Conference, organized by the Albanian University, presented in 2010. The comparison of data from the two groups included in the study best fulfills the purpose of this study. It is mainly attempted to look at possible correlations as the individual importance to oral hygiene evolves, from childhood to adolescence. The questions of the questionnaire distributed to teenagers in 2020 were focused on questions about how often children went to the dentist, when was their first visit to the dentist, at what age, how do they remember this visit, have they managed to perform dental treatment in this visit, what do you know about bacterial plaque and what does it cause, what about bleeding gums and what causes it, how can you protect yourself from gingival bleeding, how do you brush your teeth and what is the element of oral hygiene with important between brushing, flossing or toothpaste, they think that oral health affects systemic health.

The presence of bacterial plaque is recorded by the plaque index. Due to the young age of the individuals in the second group included in the study (3–6 years), it was preferred to choose the visual index of recording the presence of bacterial plaque. Figure 1 shows a copy completed in 2010 of the used bacterial plaque index.

The questionnaire evaluation was carried out for the first group of patients, aged 9–14 years, after it was explained to them by the dentists what bacterial plaque was and how it affects the appearance of gingival bleeding.

The bacterial plaque index in the second group of children aged 3–6 years, a total of 29 children, was evaluated by dentists after staining the bacterial plaque with the purple solution. The children were instructed in advance how the coloring of the bacterial plate worked, with this dye. It was important to explain to the children that this dye was placed on the area of the gingival sulcus and for everyone to understand that the procedure was not painful. After 5 min after the application, the areas where the dye remained were recorded by the dentists in the indexes with tables, signs that corresponded to the presence of bacterial plaque. Depending on the number of colored teeth, the individual bacterial plaque index was also determined for the child included in the study as a percentage of colored triangles over the total number of

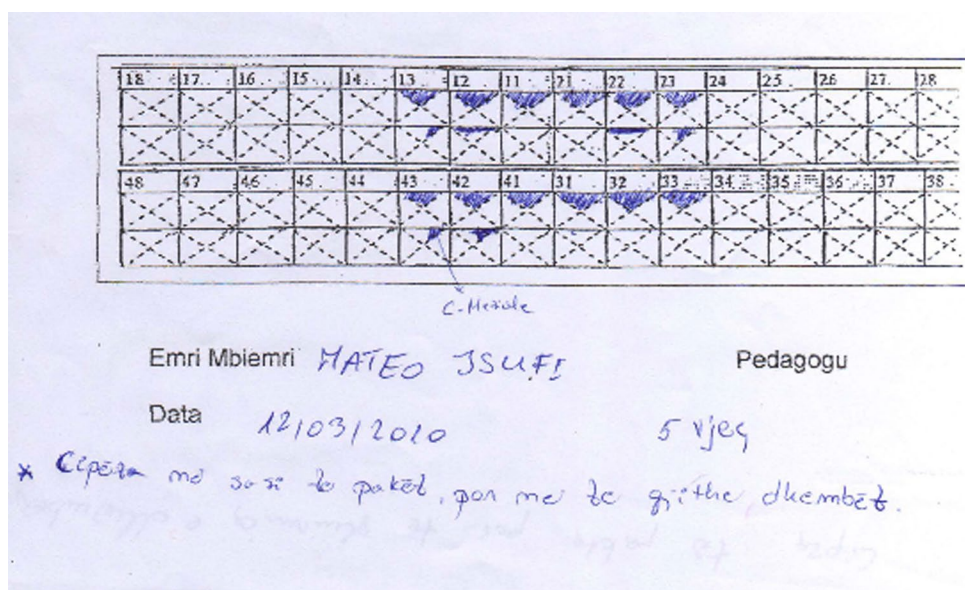


Fig. 1 Completed copy of the visual index of the presence of bacterial plaque. (Notes in Albanian)

triangles according to the number of teeth included in the evaluation.

The teeth are marked according to the tooth numbering system, where each tooth corresponds to a triangle divided by diagonals into four small triangles, respectively, for the mesial, distal vestibular and oral surfaces. Normally, the triangles above belong to the vestibular surfaces and the triangles below belong to the oral surfaces (lingual—palatal). The presence of the bacterial plaque, after it is evident, is recorded by coloring the corresponding triangle where it was noticed. At the end, the bacterial plaque index is calculated as a percentage according to the rule of the number of colored triangles over the total number of triangles multiplied by 100. The index recorded in this way also gives the opportunity to see specific areas of bacterial plaque accumulation based on these areas are also given individual advice on oral hygiene. The plaque stain was applied to the child patients, and then, the triangles

where the bacterial plaque was present were colored in the bacterial plaque index.

This study was approved by Albanian University Institutional Ethics Committee, date 02.06.2021, Tirana, Albania, according to national regulations.

Results

After collecting the data in the basic table of excel, they were processed in order to display the results of the study according to the tables below. Table 1 and Fig. 2 show data about the role of the dentist and dental control in performing oral hygiene and the impact on the systemic health status (Fig. 2). Figure 2 shows the data of Table 1, data presented through the graph included in Fig. 2.

Table 2 and Figs. 3, 4, 5, 6, 7 and 8 show the data collected from the second group of patients for the retrograde data of this study.

Table 1 Data on the answers to the questions of the questionnaire about the role of the dentist and the dental control in the performance of oral hygiene and the impact on the systemic health status

The patients questions	Positive answer	%	Negative answer	%	Total %
Regular visits to the dentist	50	96	2	4	52
Immediate dental treatment after the visit	48	92	4	8	52
Oral health affects systemic health	41	79	11	21	52
Oral care	38	73	14	27	52
Average	44–85%		8–15%		100%

Role of the dentist and dental control

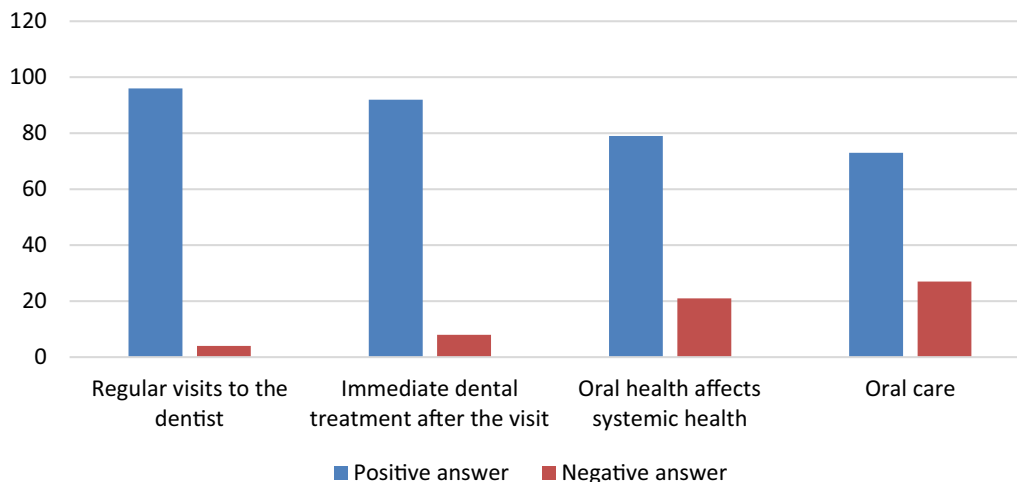


Fig. 2 Data on the answers to the questions of the questionnaire about the role of the dentist and the dental control in the performance of oral hygiene and the impact on the systemic health status

Table 2 Patients of the second group classified as normal and non-normal based on the evaluation according to the bacterial plaque index and the gingival bleeding index

Bacterial plaque Gingival hemorrhage	Normal	%	Not normal	%	Total-%	P value
Normal	5	17	13	45	18–62	Fisher’s exact test
Not normal	9	31	2	7	11–38	The two-tailed P value equals 0.0078*
Average	14–48%		15–52%		100%	

*Fisher’s exact test: The two-tailed P value equals 0.0078

The association between rows (groups) and columns (outcomes) is considered to be very statistically significant



Fig. 3 This figure shows the way of presenting the children with the work methodology. The approach toward children to take the color of the bacterial plate as a “game”



Fig. 4 The figure shows the case of bacterial plaque staining and its presence on almost all the vestibular surfaces of the teeth

Discussion

Etiological therapy of periodontal diseases always focuses on removing the cause, that is, on the bacterial plaque. The bacterial combination of the members of the plaque is based on the close relationship in giving and receiving bacterial products, since all bacteria live in symbiosis with each other in the highly organized structure of the

bacterial plaque. Which member of the bacterial plaque prevails in number and pathogenicity compared to the others and against the level of immunity of the “host” organism is the element that predetermines the appearance of dental pathology, which can be oriented against the destruction of dental structures or oriented against soft tissue structures. Different bacterial flora in different individuals and at different levels of immunity cause



Fig. 5 The clinical case of the presence of good oral hygiene, where the bacterial plaque after its color appears only on the mesial and distal surfaces

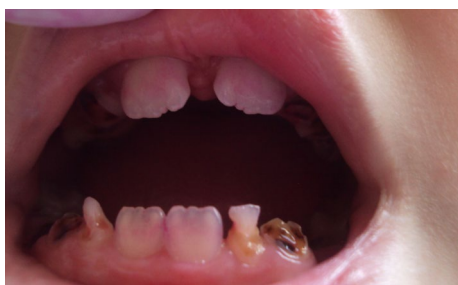


Fig. 6 Another clinical case showing the presence of minimal bacterial plaque and a relatively high number of carious teeth



Fig. 7 Clinical case where the presence of bacterial plaques on the cervicals of all teeth is detected

different dental diseases. There are many studies from many years ago, which suggest that environmental risk factors, behavioral factors and genetic factors are elements that influence the progression of periodontal diseases, as they are diseases that are classified as infectious diseases (Rogers et al. 2022; Kurokawa et al. 2022; Robo et al. 2019). These theories are supported by the literature widely (Gund et al. 2022). The pathological process is

perceived as a polymicrobial infection where organisms with minimal pathogenic potential may also be included.

The well-structured bacterial plaque fixed on the surface of the tooth expresses its action on the tooth structure and on the edge of the gingiva inside the sulcus to then give the consequences against the soft tissues around the tooth, and if it progresses even deeper, it passes to the periodontal ligament and to the bone around the tooth to question the progression of the disease and how long the tooth will withstand the mechanical force of food grinding against the clinical crown and clinical root ratio during the process of coping with rotational and moving vestibulo-oral or mesio forces distal depending on the presence or not of the contact point (Casa-Levine and Nappo-Dattoma 2022; Tadjoedin et al. 2017).

The presence of more bacteria with an orientation toward the destruction of soft tissues gives the appearance of dental diseases with an orientation against periodontal diseases, or on the contrary if the member of the bacterial plaque is *S. mutans*, the orientation of the pathogenicity of the bacterial plaque is against the appearance of dental caries with ability destructive of strong tooth structures (Tadjoedin et al. 2017).

Oral hygiene is a procedure that must be performed by the individual according to some main rules, aimed at achieving the mechanical removal of bacterial plaque in the areas where it is created. Oral hygiene should be thought of as a combination of actions that must be performed correctly and at the right time. The basic elements of oral hygiene are the brush and toothpaste, which should be selected in soft quality. Despite this quality, they must exert mechanical force on the surfaces of the teeth where they are applied, i.e., the brush with the end of its bristles and the paste with granules containing silicon oxide or aluminum must rub the surfaces where the bacterial plaque is created, deposited and persists over time. In addition to this mechanical action, there is also the counseling of the patient to make him aware that the removal of the bacterial plaque must be complete, guiding him on how to approach and bring the brush closer to the surface of the tooth.

There are many studies on which method of brushing teeth is the best, the most productive, but the results have room for discussion. As long as the method of brushing teeth has as its primary orientation the mechanical removal of bacterial plaque, all movements with a brush should aim precisely at the mechanical removal of bacterial plaque with the secondary purpose of massaging the gums. The movements of the brush are devised by different authors depending on the method of brushing the teeth; sometimes, it is precisely the way of movement of the brush that influences the name of the method of

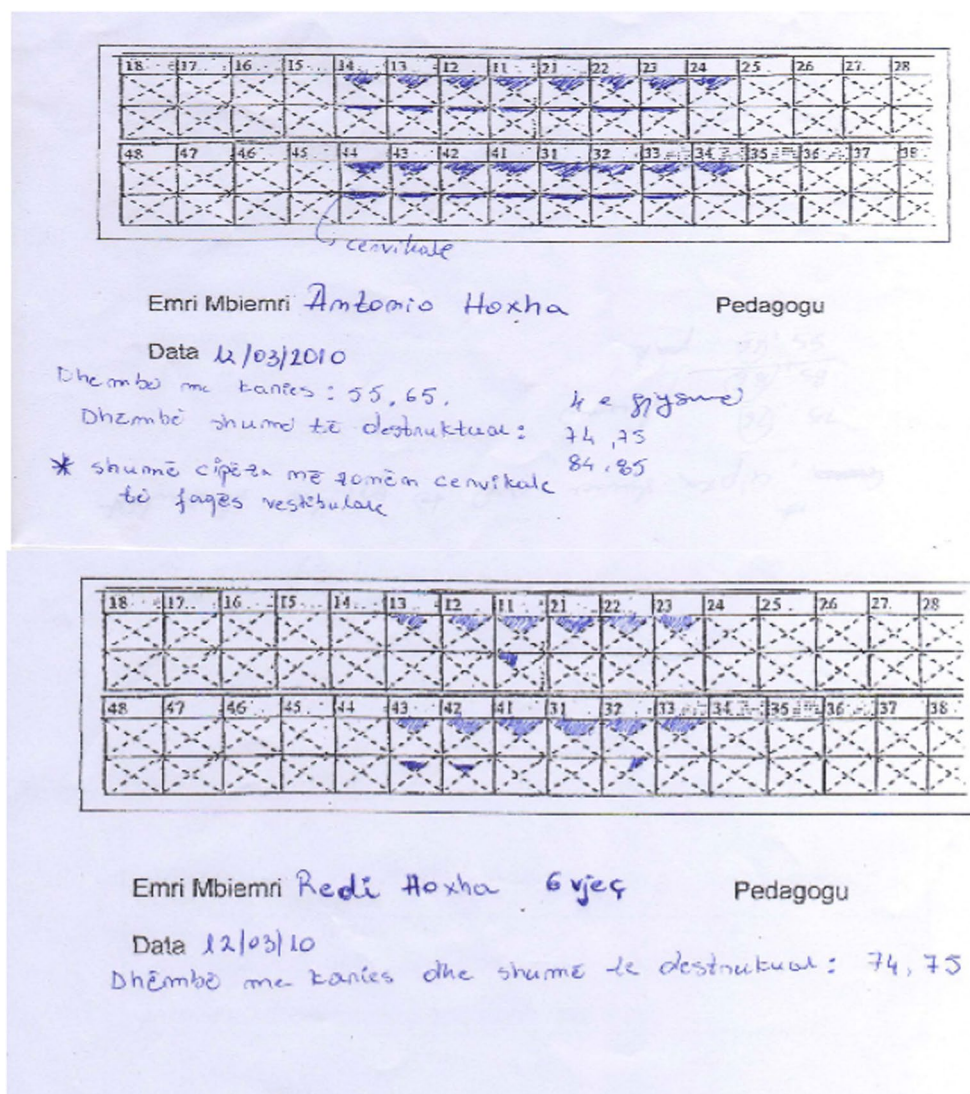


Fig. 8 Clinical case of recording the bacterial plaque index in the areas of the incisor-premolar teeth, especially on the vestibular surfaces

brushing the teeth. This is how it can be most easily fixed in the patient’s memory and how it can be applied most easily by him.

The impact of filling and decayed teeth is reflected in the appearance and self-esteem of this age expressed in % about 36%. Prevention of caries and periodontal diseases by means of oral hygiene is evaluated positively in 58% of cases. Students aware of the dentist’s role in identifying dental diseases that can have an impact on the systemic health of the organism are 85%, and the answers for impact and lack of connection reach 15%. For the second group of children included in the study, we came to the results that periodontal health is divided according to groups: 17% rate for bacterial plaque index and rate for gingival hemorrhage index; 45% not normal for bacterial

plaque index and normal for gingival hemorrhage index; 31% rate for bacterial plaque index and no rate for gingival hemorrhage index; 7% not normal for bacterial plaque index and not normal for gingival hemorrhage index.

The perception that bacterial plaque causes periodontal disease and caries is at a high level of indirect awareness among individuals of this age. It is necessary to instruct at this age about instruments for washing the oral cavity and possibly about how to maintain them. The assessment of periodontal health at the age of 3–6 years should be carried out according to the combination of assessment with bacterial plaque index and gingival bleeding index, since the correlations and interconnection of these two indices are more functional and easily recorded for this age.

Conclusions

In most cases aged 3–6 years, the presence of caries was observed on the distal surface of the first molars and on the distal surface of the second molars; these are the areas where the bacterial plaque is first created; these are the areas where personal hygiene becomes difficult; these are the areas that are best cleaned with flossing, which are difficult to learn and apply to children of preschool age. The method of brushing teeth is hardly applied correctly in children aged 3–6 years. It takes a lot of work on the part of parents and physical time to adapt to the most accurate application of this method. Follow-up meetings should be organized with the children's parents in order to discuss the application and proper care in the children's personal hygiene. A significant improvement is observed in the awareness of oral hygiene and the care exercised to achieve it properly during the 10-year time interval. This improvement is recorded with distinct numerical values in this study.

Acknowledgements

Hera and Henri are the strength and motivation to continue in the field of scientific research. Family is the most beautiful gift in life!

Author contributions

IR collected the scientific data and wrote the manuscript. SH revised and edited the manuscript. Literature research was conducted by SH and SK. ML and VO collected the scientific data. All authors read and approved the final manuscript.

Funding

Not applicable. No funding for this research.

Availability of data and materials

The datasets analyzed during the current study are available from the corresponding author.

Declarations

Ethics approval and consent to participate

This study was approved by Albanian University Institutional Ethics Committee, date 02.06.2021, Tirana, Albania, according to national regulations.

Consent for publication

Not applicable.

Competing interests

The authors declare that they have no competing interests.

Received: 24 February 2023 Accepted: 27 May 2023

Published online: 01 June 2023

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