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EVALUATING THE NEED TO PREVENTIVE ORTHODONTIC TREATMENT IN KERMAN SCHOOL CHILDREN USING IOTN, ROMA AND COAS INDICES IN 2014

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ABSTRACT

Background and Aims: Nowadays prevention is prior to treatment and this is a crucial insight in orthodontics as well. Despite the high prevalence of malocclusion in children of Kerman, no study has been conducted to measure their need to preventive orthodontic therapy. The aim of the present study was to evaluate the orthodontic need among elementary school children of kerman Iran.

Methods: In this cross-sectional study a cluster random sample of 540 elementary school students (270 boys, 270 girls) were selected and filled COAS (Child orthodontic attitude survey) questionnaire and their ideas regarding their dento-facial health and facial aesthetics were collected. Current occlusion status was evaluated using Angle's classification. Also IOTN (Index of orthodontic treatment need) and ROMA (Risk of malocclusion assessment) indices were respectively used to assess orthodontic treatment need and malocclusion probability in children.

Result: According to Angle classification, 68.9% of students had at least one subgroup of malocclusion. 85 % of the subjects had a risk of malocclusion development in the future due to

ROMA index. Based on DHC (Dental health component of IOTN) 41/8% had no need for treatment, this ratio was 82.3% according to aesthetic component of IOTN. **Discussion and conclusion:** our findings are consistent with previous studies. Kerman elementary students' attendance at orthodontic dental offices is much lower than their estimated orthodontic need due to cultural and economical factors.

Keywords: Kerman, COAS, IOTN, Elementary school students, ROMA.

[I] INTRODUCTION

Prevention is prior to treatment in modern dentistry and is a crucial component of a successful orthodontic treatment. Minimum attention has been made towards preventive dentistry in the oral health care system of Iran. However, there has been an increasing trend among general population, dentists and health care policy makers of advanced societies towards screening the children and early diagnosis of subjects who are susceptible to develop a malocclusion and referring them to the orthodontists to receive a conservative treatment plan (1).

Early diagnosis of dental malocclusions might help to achieve a more conservative and cost-effective treatment plan for children and prevention of dental abnormalities (2, 3). The demand to receive orthodontic treatment means that the patient has the will to improve the teeth status and face appearance. There are different factors contributing to this will including: age, sex, family economic and educational status, type and severity of the abnormality, history of prior orthodontic treatment in the family, dentists' suggestion and spatial distance to the orthodontist's office (4-6).

A review on the reasons to attend at orthodontics office reveals that most of the patients are looking for the correction of their teeth appearance and correction of masticatory muscle's dysfunction is the second reason for attendance (4). Previous studies have revealed that parents and dentists' suggestion for referring to orthodontist has been more influential than friends' and teachers' opinion (7, 8).Thus, making parents aware of the teeth abnormalities has an important role to motivate the teenagers to attend an orthodontic treatment (7, 8).

Epidemiologic functionality, validity, repeatability, simplicity of use, general and professional acceptance and short application are some of the properties of an appropriate index. One of the indices used widely is the index of treatment need (IOTN) which consists of two components: Dental Health

Component (DHC) and Aesthetic Component (AC) (6). Risk of malocclusion assessment (ROMA) is one of the other indices which has been shown to have a good validity in previous studies (9).

Considering the fact that children have a high susceptibility to develop malocclusion in their adolescent and adulthood as demonstrated in previous studies (5) and the importance of early diagnosis and treatment in this range of age, the objective of the current study was to evaluate the above mentioned indices in elementary school children of Kerman to determine their need to the orthodontic preventive treatments and the chance to develop malocclusions in the future. Data provided by this study helps health policy makers to plan accordingly based on the evidences to manage preventive dental programs in this population.

[II] MATERIALS AND METHODS

All the procedures were approved by kerman university of medical sciences ethics committee (ethics code: KMU/ 92/112). Subjects were free to participate in the study and could leave the study procedure at any point. They were assured that the data would be confidential and would be used only for the current study.

Children's need to orthodontic treatment was evaluated using IOTN index. It is comprised of two sub-indices (DHC and AC). DHC has five grades, grades one and two reveal the lack of need to orthodontic treatment or minimum treatment needed, grade three demonstrates the moderate need to orthodontic treatment and grade four and five imply the definite need to treatment (6). Aesthetic component of this index is comprised of ten photographs and subjects are asked to choose the similarity of their teeth with any of the photographs. Those who chose photographs of one to four do not need the treatment or just need mild interventions, grade five to seven are those who are in intermediate level of orthodontic treatment need and subjects with grade eight to ten have the definite need to orthodontic treatment (9, 10). The susceptibility to develop malocclusion is also evaluated using ROMA index. This index has five grades: grade one has no need to treatment and is considered normal. Grade 2 subjects have mild abnormalities that need simple orthodontic treatments. Subjects in grade 3 have the need to complex orthodontic treatments due to the average orthodontic problems (11). Subjects in grade four and five have simultaneous orthodontic and medical systemic problems and need a mutual collaboration between orthodontists

and physicians. Validity of this index has been evaluated by Grippaudo (12).

Sample size was calculated based on previous studies reporting the prevalence of malocclusion in Kerman teenagers (70- 95% in different studies) (13, 14).

540 subjects were chosen to be examined and fill the questionnaire for the current study using cluster sampling method. Ten schools were randomly chosen and one class was chosen from each school. The questionnaire for parents' opinion regarding the need they felt for the orthodontic treatment of their children and history of referring to a dentist for orthodontic reasons was distributed among the children. The parents were asked to sign an informed consent for the examiner to examine the teeth of their children.

COAS questionnaire was translated by the corresponding author using help from a professional English translator. Validity and reliability of the questionnaire was evaluated using expert opinion from ten orthodontists. Croenbach's alpha was calculated for the COAS Persian version and parents' opinion questionnaire and was 95% and 97% for the two questionnaires respectively.

Examination was performed by an undergraduate student who was trained by the corresponding author and photographs were taken by him for the AC of IOTN index. A total of 540 subjects (270 male, 270 female) were examined in the current study.

Dental occlusion was evaluated and classified according to Anlge's method (15).Skeletal pattern of the face was evaluated using profile view of the subjects. Children were then asked questions regarding their opinion about tooth and jaw system health and face aesthetics using questions derived from COAS questionnaire. General explanations about orthodontics and brackets were given to the subjects to help them comprehend the questions.

Descriptive statistics, t-test, ANOVA and post-hoc tests were used to analyze data. SPSS v.21 (IBM, USA) was used to analyze data. $P<0.05$ was considered statistically significant.

[III] RESULTS

Subjects were from six grades of elementary school within the 6-11 years old age range (270 boys, 270 girls). The susceptibility to develop malocclusion in the future is demonstrated according to ROMA questionnaire. 11.5% of the girls and 18.1% of the boys were in ROMA grade one. Students of the sixth (15.5%) and first grade (14.5%) of the schools had the highest chance to develop malocclusion according to ROMA index in the boys and girls respectively. Girls had a higher chance to

develop malocclusion according to ROMA index than the boys and this difference was statistically significant ($p<0.01$).

Skeletal form of the face was evaluated in subjects. 52.5% of boys and 61.1% of girls had a normal profile, 40% (boys) and 34.1% (girls) had a convex profile and 7.5% (boys) and 4.8% girls) had a concave profile. There was no significant difference between Angle's score of boys and girls ($p>0.05$). Girls had a better skeletal pattern in comparison to boys ($p<0.05$). 44.1% of boys' parents and 39.6% of girls' parents expressed the need to orthodontic treatment for their children and the difference between the two groups was significant ($p=0.02$) but only 7.8% of boys' parents and 8.5% of girls' parents had referred to an orthodontist. According to the AC component of IOTN, the average score for girls and boys were 2.91 and 3.05 respectively. The difference between two groups was not statistically significant ($p>0.05$).

Results of dental health component of IOTN were as follows: 43.3% of boys and 40.4% of girls did not need any preventive treatment, 36.3% of boys and 31.8% of girls had an intermediate need to treatment and 20.4% of boys and 27.8% of girls had a definite need to preventive treatment. There was no significant difference between boys and girls in DHC index value ($p>0.05$).

28.2% of boys and 35.9% of girls expressed the need to orthodontic treatment. A higher number of girls expressed the need to orthodontic treatment according to COAS questionnaire ($p=0.02$). There was no significant difference between boys and girls in their expressed need to orthodontic treatment ($p>0.05$).

[IV] DISCUSSION

According to the findings of the current study, 68.9% of subjects had one type of malocclusion at least. This finding is consistent with moemenidanayi et al. study. They demonstrated that 64.2% of students had at least one type of malocclusion (16).

Sahafian (17) and Ramezanzadeh (18) estimated the prevalence of malocclusion about 95.3% and 32.6% for Mashhad and Neishabur students respectively. Results of the current study are not consistent with these two studies. This might be due to the use of difference indices and difference in sample size. Another factor that might have contributed to this difference is that subjects of the mentioned studies were above 13 years old and the prevalence of malocclusion was demonstrated in adolescent and not child population (17, 18).

There was no significant difference in Angle score betweenboys and girls. There was a significant difference in skeletal form of the face and girls had a better occlusion status in comparison to boys, which is consistent with Oshaghi et al. study in Shiraz (19). This finding is also consistent with the studies of Otuyemi et al. and Onyeaso et al. studies which have demonstrated the same prevalence of malocclusion (20, 21).

Findings of the current study demonstrated that DHC had a weak correlation with the treatment need expressed by parents, so that a large number of subjects needing treatment according to DHC expressed the need for treatment, but a few portion of this population were able to visit an orthodontist. This was due to the fact that their parents didn't feel any need for orthodontic treatment for their children.

According to the AC of IOTN, most of the subjects were in grade two of this component and thus limited need for orthodontic treatment. Jamilian et al. demonstrated that 76.5% of subjects didn't need any orthodontic treatment, 15.2% needed intermediate treatment and 8.3% were in definite need to orthodontic treatment. These results are consistent with our findings in the current study (22).

Results of the DHC revealed that 41.8% didn't need any treatment, 34.1% had intermediate need to treatment and 24.1% had definite need for treatment. Another study performed in Kerman estimated the latter prevalence about 35% which is higher than the present study. This difference in the percentage of subjects needing definitive orthodontic treatment might be due to the reduction in first molar extraction because of improvement in socioeconomic status of the population. Safavi et al. (23) demonstrated that 20% of the subjects had the definite need for treatment which is consistent with our findings. In another study by Jamilian et al. (22), 5.2- 7.4% had the definitive need to orthodontic treatment.

Ucuncu et al. (2001) demonstrated that 38.8% of Turkish children needed orthodontic treatment according to IOTN (24). Findings of the current study are not consistent with their study. This might be due to the fact that we did not use radiographic examination in our study. We suggest further studies using radiographic diagnostic aids to estimate the malocclusion in this specific population.

Hossein-zadehnik et al. (25) demonstrated that according to DHC , about half of the 12 years old students had the need to treatment in Abadeh, Iran.

The need to orthodontic treatment according to AC was lower than that estimated using DHC. This finding demonstrates that there is a difference between the subjects' perceived occlusal status and what that is diagnosed by the dentist as the need for correction. Therefore, AC might not be an appropriate index for screening purposes and DHC would be a better screening choice. Furthermore, it must be noted that subjects evaluate the need to orthodontic treatment based on the status of anterior teeth, while DHC is founded on the overall occlusal status evaluated by an expert.

COAS questionnaire findings were also of interest. 62% of the subjects did not express the need to orthodontic treatment and 68% did not have the will to undergo an orthodontic treatment. This is while only 41.8% of the subjects did not have the need to orthodontic treatment according to DHC. This inconsistency might be explained through the fact that the subjects did not have a proper perception of orthodontic treatment and its goals.

Findings of the current study revealed that there is no significant difference between different genders in their expressed need to orthodontic treatment, which is consistent with the study of fayyazmonfared et al. (26). On the other hand, in Mandallet al. study, the demand has been reported to be higher in boys and in another study by Wheeler et al. , girls had a higher expressed need to treatment (4, 7). In the current study, both boys and girls had a positive attitude towards improving their appearance which might be due to the fact that both groups have the conception that a better appearance might lead to more success in future.

The need to orthodontic treatment expressed by parents and subjects were 41.8% and 38% respectively which is consistent with hosseyn-zadeh et al (25).

[V] CONCLUSION

Results of the current study demonstrated that AC as an subjective method done by patients might not be an appropriate screening tool forassessing childrens' need to orthodontic treatment in comparison to DHC and Angle's classification which are objective methods conducted by a dentist.

Another important finding of the current study is the fact that a few portion of the subjects have referred to the orthodontists despite the need to orthodontic treatment. This might be considered as an alarm for the health care policy makers, since this fact might lead to an increased prevalence of severe abnormalities that need complex and costly treatments in the future. We suggest that more services would be provided in

university specialty clinics and more treatment modalities be covered by insurance companies to reduce the burden of future treatments.

Future studies in specific populations such as those with systemic diseases and lower socioeconomic classes are recommended to provide a more appropriate treatment modality for those subjects.

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