

## Orthodontic Treatment Requirements and Approaches in Children with Bleeding Disorders

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### Abstract

**Aim:** In history, orthodontic treatments were avoided in haemophiliac patients. However, since orthodontic treatment is consistent with general health and is a necessity for medically compromised patients, it is not a contradiction anymore. The purpose of this study is to investigate the orthodontic treatment needs of haemophiliac children in Turkey, to determine the approaches and fears of orthodontic treatment among parents and to create a treatment protocol to inform parents and doctors.

**Material and Method:** The study is designed as a cross-sectional study comparing oral health and malocclusion index of haemophiliac patients with matched healthy subjects. Study and control groups included 58 children from five to fifteen years old. DMFT and dmft indexes were used for caries index; ICON and IOTN indexes and questionnaires were used to evaluate the need for orthodontic treatment.

**Results:** dmft averages of the study group were statistically significantly higher than the control group. The ICON and IOTN averages of the study group were statistically significantly higher than the control group.

**Conclusions:** Parents need to be informed more about the possibility that haemophiliac children may have orthodontic treatment. Preventive and interceptive orthodontic treatments performed in the early period are of great importance. Paediatric dentists must have the knowledge for treatment of these patients.

**Keywords:** Blood coagulation disorders; Haemophilia; Orthodontics; Paediatric dentistry

### Introduction

Although malocclusion is not a life-threatening condition, it should be considered as an important public health problem due to its incidence, the possibility of prevention and the possibility of treatment.<sup>1</sup> Among oral health problems, malocclusions are in the third place after caries and periodontal diseases.<sup>1</sup> The World Health Organization describes this disorder as an anomaly that may affect a person's physical or emotional health and emphasizes that it is a condition to be treated [1]. In our age, the need for orthodontic treatment is no longer a necessity only in healthy individuals. Orthodontic treatment is also a requirement for individuals with serious health problems. Among these health conditions, bleeding disorders are the most frequent systemic disease which results in

prolonged and excessive bleeding [2]. Inherited bleeding disorders account for approximately one in ten thousand live births. Haemophilia A is the most common of these and accounts for about 80% of bleeding disorders [3]. Hemophilia A is an X chromosome linked recessive inherited bleeding disorder. It is characterized by a defect in the clotting mechanism [4,5].

In history, orthodontic treatments were avoided in patients with bleeding disorders. However, it is not a contradiction anymore. Since, orthodontic treatment is consistent with general health and it is a necessity for medically compromised patients [2]. However, during orthodontic treatment in patients with bleeding disorders, special consideration should be given for two main topics. First one of these is viral infection risk [6]. Viral infection is a risk regarding the use of concentrates which carries a small risk of transmitting viral infection despite careful donor selection and screening. Dentists should be careful in this regard. Second topic is

bleeding risk [6]. Orthodontic treatment does not increase bleeding risk. Nevertheless, excellent oral hygiene is of great importance during orthodontic treatment. Because, it is desirable to avoid gingival bleeding before it occurs [6]. Moreover, fixed orthodontic appliances are preferable to removable appliances. Since, removable appliances can cause gingival irritation [6]. On the other hand, fixed orthodontic appliances may cause chronic irritation and bleeding. Thus, special care is required to avoid mucosal cuts when placing and removing archwires [6]. To avoid bleeding, archwires should be secured with elastomeric modules rather than wire ligatures, which carry the risk of cutting the mucosal surface [6]. During the orthodontic treatment in patients with bleeding disorders, the duration of orthodontic treatment should be kept to a minimum to reduce the potential for complications [7].

Orthodontic treatment improves the physical appearance and self-confidence and it corrects the chewing function of the patients. Accordingly, it can be said that this treatment is more necessary for patients with systemic disease than healthy individuals [8]. The literature presents only one study about the frequency of malocclusion in hemophiliac patients. This study, evaluated the high school students of the hemophilia group with an average age of 16.6. There aren't any studies evaluating malocclusion frequency in children. In addition, there are no studies in the literature that assess the orthodontic treatment perspective, the anxieties and knowledge levels of parents of hemophilia children [9]. Due to the lack of concern with this issue, the aim of this study is to investigate the malocclusion and orthodontic treatment needs of hemophiliac children in Turkey, to evaluate the level of knowledge of the parents on this subject and finally to create a treatment protocol to inform parents and doctors.

## Material and Method

This research is a multicentre study carried out with Marmara University; Department of Paediatric Dentistry, Istanbul University; Department of Paediatric Haematology and Oncology and Ege University; Department of Paediatric Haematology. The study is designed as a cross-sectional study comparing oral health and malocclusion index of hemophiliac patients with matched healthy subjects. Both study and control groups included 58 children from 5 to 15 years old. The study group is selected from patients who were attended to haemophilia summer camps from all over the country which are organized by Haemophilia Society of Turkey and

Haemophilia Federation of Turkey. Healthy children are randomly selected from the students of a primary and secondary school. The inclusion criteria are; the diagnosis of bleeding disorder, ages between 5 and 15 years old, non-presence of mental retardation, non-presence of any inconvenience that prevent communication, non-presence of another systemic problem. In order to understand the parents' point of view, subjective orthodontic treatment need was assessed with a questionnaire which is based on scientific literature. To evaluate the real orthodontic treatment, need oral cavities were examined and orthodontic treatment need indexes were used [10,11].

We asked the question: 'Do you think your child has crowding at his/her teeth?' to both groups to assess their awareness about crowding at their children. Moreover, we asked 2 additional questions only to study group in order to evaluate the knowledge and attitude of the parents about orthodontic treatment of hemophiliac children which are 'Do you think hemophiliac children can have orthodontic treatment?', 'Do you think orthodontic treatment would affect your child's health negatively?'. To assess the orthodontic treatment needs of patients objectively ICON and IOTN indexes were used which are internationally validated. ICON is the abbreviation of the Orthodontic Index of Complexity, Outcome and Need, IOTN is the abbreviation of Index of Orthodontic Treatment Needs [10,12]. Other than malocclusion, we also examined the oral health and caries prevalence in deciduous and permanent dentition. For this reason, DMFT indexes are used which measures decayed, missing and filled teeth [4].

## Statistical Analysis

The data was subjected to statistical analysis by using NCSS (Number Cruncher Statistical System). Statistical analyses were applied by independent t test, Kruskal Wallis test, Chi-Square test, Mann Whitney u test. The level of significance was smaller than 0.05.

## Results

Brushing frequency, ICON, AC and dmft scores showed statistically significant difference between groups. Results are summarized in Tables 1-4. Brushing frequency, dmft index and the ICON-IOTN/AC averages are higher in the haemophilia group (Tables 1 and 2).

		Group A (Haemophilia) n:58		Group B (Control) n:58		p
Age		9.02±3.58		9.26±0.79		0.617+
Brushing frequency	More than once daily	18	31.03%	13	22.41%	0.002*
	Once daily	24	41.38%	12	20.69%	
	Few times in a week	14	24.14%	18	31.03%	
	Less than once a month	2	3.45%	15	25.86%	
Chi-square test, Independent t test						

**Table 1:** Brushing frequency.

	Group A n:58	Group B n:58	p
ICON	41.28±16.99	34.1±15.51	0.019*
AC	4.33±1.72	3.67±1.65	0.038*
DHC	2.88±1.22	2.48±1.22	0.082
dmft	1.57±2.7	0.45±1.29	0.005*
DMFT	1.28±2.13	0.98±1.18	0.362
Independent t test, Mann Whitney U test			

**Table 2:** Evaluation of the index results.

		Group A (Haemophilia) n:58		Group B (Control) n:58		p
Do you think your child has crowding/irregularity at his/her teeth?	No	22	37.93%	28	48.28%	0.005*
	Yes	11	18.97%	21	36.21%	
	Maybe	22	37.93%	6	10.34%	
	I don't know	3	5.17%	3	5.17%	
Mann Whitney U test						

**Table 3:** Subjective Orthodontic Treatment Need.

Questionnaire	Answers	N	%
Do you think haemophiliac children can have orthodontic treatment?	No	15	25.86
	Yes	16	27.59
	I don't know	27	46.55
Do you think orthodontic treatment would affect your child's health negatively?	No	20	34.48
	Yes	16	27.59
	I don't know	22	37.93
Mann Whitney U test			

**Table 4:** Parents Knowledge about Orthodontic Treatment.

## Discussion

As we questioned brushing frequency, statistically significant difference was observed between two groups. It becomes clear that brushing frequency is higher in the hemophilia group (Table 1). Similar to the results in our study, the frequency of tooth brushing was found higher in the hemophilia group in studies conducted abroad. According to these studies, the oral health parameters in the hemophilia group are better than the oral health data of the control group [3,13,14]. Parents of children with hemophilia are more concerned about their child's dental health than the control group. The reason for this may be a fear of the dentist due to the child's general health. In other words, if the child's oral and dental health deteriorates, this will lead to a more difficult treatment process.

For this reason, parents are given more attention to their children's oral hygiene than the control group. Contrary to these findings, Başkırt et al. [4] in their study of individuals in the 14-35 age range evaluated in patients with hemophilia in Turkey is lower than in healthy people and brushing frequency of tooth brushing habits have said could give preliminary information about oral health.

The ICON and IOTN/AC averages of the hemophilia group were found to be statistically significantly higher than the control group. This means that the need for orthodontic treatment is higher in children with hemophilia (Table 2). In the study in which Azhar et al. [9] evaluated 52 hemophilia patients with healthy control group in 2006, IOTN index was found higher in hemophilia patients compared to the control group. These findings support the results of our study. Azhar et al. (2006) argued that preventive and stopping orthodontic treatments are more important in these patients because of the higher need for orthodontic treatment in hemophilia patients. These findings are also compatible with other studies emphasizing that hemophilia patients are suitable for orthodontic treatment like other healthy individuals [15,16]. In addition, the authors were also able to learn about the underlying skeletal pattern, since more detailed investigations can be made with cephalometric analysis and radiographic examinations.

Although objective treatment need is higher in the study group, when the parents were asked whether their child has crowding teeth only almost 18.97% of the study group answered 'yes'. While 37.93% thinks they do not have crowding. The results have statistically significant difference between study and control groups (Table 3). When we asked 'Do you think hemophiliac children can have orthodontic treatment?' while almost 25.86% thinks that orthodontic treatment can not be done due to hemophilia, a little over 46.55% said they had no information on this issue. Almost 27.59% thinks hemophiliac children can have orthodontic treatment. In addition to this we assessed "Do you think orthodontic treatment would affect your child's health negatively?" question. The majority of the parents are not educated enough in this matter as 37.93% replied they do not know, while %34.48 think it would (Table 3).

Although hemophiliac children have more regular brushing habits than the healthy children, the deciduous dmft index, is found higher in study group. There was no statistically significant difference between permanent dentition DMFT averages. For this reason, it is important to inform the family early and to initiate preventive treatment especially in young children at an earlier age (Table 2). In our study, a relationship was established between higher need for orthodontic treatment and higher dmft index in hemophilia children. During the primary dentition period, dmft index was found to be significantly higher in children with hemophilia. Primary teeth occupy mesiodistal space for permanent teeth. Consequently, loss of mesiodistal dislocation caused by decay, filling and missing in the primary teeth may

cause malocclusion in permanent dentition. Therefore, ICON and IOTN index, which indicate the need for orthodontic treatment in children with hemophilia, may be higher. This clearly shows how important preventive orthodontic treatments are in children with hemophilia. The child dentist should be conscious about this and have the knowledge to feel sufficient to interfere with the hemophilia patient.

## Conclusion

The first important point of the study is parents need to be informed more about the possibility that haemophiliac children can have orthodontic treatment. Orthodontic treatment does not pose a risk for the health of these children, on the contrary, it affects the general health of the child more positively. Secondly, early diagnosis of developing malocclusion can reduce complex orthodontic problems. Therefore, preventive and interceptive orthodontic treatments performed in the early period are of great importance for these patients. Pediatric dentists and orthodontists should be educated in this matter. Finally, it is possible for Hemophilias patients to have orthodontic treatment including orthognathic surgery by consulting with a hematologist.

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