Anxiety and pain during dental treatment among children with haemophilia

ABSTRACT

Aim Dental interventions are potentially overwhelming for children with haemophilia; the study was designed to assess the levels of dental anxiety related to the first dental intervention for these children.

Materials and methods Fifty-six boys with severe haemophilia A and B and 56 healthy peers between the ages of 7-12 in need of primary dental extraction were chosen for this study. Facial Analog Scale and Visual Analog Scale were applied to all participants.

Results No significant differences among the groups were detected by means of the dental anxiety scores (FIS) and pain scores (VAS). The FIS scores of children who had experienced dental pain before the treatment were significantly higher regardless of the group they were part of (p=0.001).

Conclusion Children with haemophilia are not at an increased risk of dental anxiety using special precautions and with the help of adequate treatment regimens. Pain is a predictor for dental fear and anxiety on dental chair both for children with haemophilia and healthy ones.

Keywords Bleeding disorders; Children; Dental anxiety; Haemophilia.

Introduction

According to the WFH (World Federation of Haemophilia) data the number of people with haemophilia per 100,000 ranges between 3 and 81 in the Eastern Mediterranean Region [Evatt, 2005].

The Çukurova University Department of Paediatric Hematology is one of the foremost haematology clinics of the East Anatolian region which serves as a multidisciplinary centre. In addition to the prophylactic factor, replacement therapy requiring constant medical visits, medical and dental interventions often require the need for factor replacement therapy which is an “on demand” bolus injection.

Nowadays, adequate factor replacement therapy and local measures permit safe dental extraction expectation similar to those in subjects without bleeding disorders when a careful regimen is followed [Zanon et al., 2000; Jover-Cerveró et al., 2007]. Up to 30% of subjects with mild haemophilia may never experience significant bleeding [Nilson et al., 2011], however the specific management of severe and moderate haemophilia patients’ requires outpatient or hospital admission for the preparation of minor and/or major surgery due to the need to administer pre-operative factor replacement and postoperative monitoring [Brewer and Correa, 2006].

Dental anxiety is common among children and is often linked to previous bad experiences causing fearful behaviour in dental settings [Klingberg and Broberg, 2007; Klinberg, 2008; Locker et al., 1999]. Some of the factors which may be associated with dental anxiety are gender, age, pain, oral health education, type of treatment and general behavioural problems [Alwin et al., 1994; Wogelius et al., 2009; Nicolas et al., 2010; Peretz and Efyrat 2000; Wogelius and Poulsen, 2005; Milgrom et al., 1995]. Among the childhood experiences, previous dental and medical experiences have a great impact on dental fear [Nicolas et al., 2010; de Menezes Abreu et al.; 2011; Majstorović et al., 2001]. Systemic diseases have proved to be important in the context of development of dental fear and anxiety in children in particular, paediatric cancers, cleft lip/cleft palate, attention deficit hyperactivity disorder, Williams syndrome and other systemic disorders requiring frequent medical visits [Lucas, 1959; Wogelius et al.; 2009; Vogels et al., 2011; Moskovitz et al.; 2005; Blomqvist et al., 2007; Karjalainen et al., 2003]. There is no disease-specific literature which details the levels of dental anxiety associated with dental treatment in children with haemophilia but it may be hypothesized that these children have similarly experienced a high number of invasive medical procedures which may lead to dental anxiety and cause remarkable limitation during dental treatment. It is well documented that the children with haemophilia experience emotional life stress because of their systemic condition [Lucas, 1959; Ghanizadeh and Baligh-Jahromi, 2009; Riley et al., 2011; Talaulikar et al., 2006] and while working with children with haemophilia, the resultant anxiety due to previous frequent medical visits, need for factor replacement therapy, fear of medical personnel, fear of bleeding, needle phobia, dental neglect and the other reasons associated with a lifelong systemic disease may be overwhelming for children and result in treatment limitations [Majstorović
At present there are limited studies about dental anxiety among children with haemophilia. The aim of this paper is to evaluate the anxiety of children with haemophilia receiving dental treatment for the first time.

**Patients and methods**

The sample was chosen from a total population of boys with haemophilia (hemophilia mostly affects male population) referred by the Çukurova University Haematology Department to the Pediatric Dentistry Clinics during the period 2006-2012. Among the 168 boys with haemophilia who visit the dental clinic 63 boys needed dental extractions on their first dental appointment. Four boys and their parents did not accept the treatment and 3 boys rejected to participate in the study. Fifty-six boys with severe haemophilia A and B between the age of 7-12 who needed primary dental extraction were matched with a control group of healthy peers who were also requiring extraction of primary teeth. All the patients’ parents gave informed consent and children gave assent to both the dental interventions and inclusion in the study. The ethical approval was given by the Ethical Committee of the Faculty of Dentistry of Çukurova University.

The patients selected for this study were having their first visit to a dental clinic and had never experienced dental treatment in the past. Especially among the haemophilia group access to dental treatment is an issue regarding their systemic factor replacement requirements and inclusion in the study. All the children received dental and radiographic examination.

The inclusion criteria for dental extractions were as follows: non-restorable crown, internal resorption, dentigerous or follicular cyst development in corresponding area, periapical or interradicular lesion, physiological root resorption causing mobility, carious perforations of the floor of the pulp chamber and excessive pathological loss of bone support.

The pain history was determined by questioning absence and presence of pain before the extraction. Following diagnosis, all study participants were referred to the haematology department for liaison regarding their systemic factor replacement requirements for the proposed dental surgery as detailed in Table 1 [Brewer and Correa 2006; Australian Haemophilia Centre Directors’ Organisation 2005]. In order to reduce the likelihood of postoperative mucosal bleeding due to gingivitis and local inflammation, intensive oral hygiene instructions were provided to all boys on their first visit and oral tranexamic acid was started 24 hours before the dental extraction procedures.

A non-pharmacologic behavioural management technique was chosen for all children; dental equipment was shown at the first appointment, handpieces were introduced and tell-show-do method was used.

In both groups, all dental extractions were performed for each participant by the same clinician in the same environment of the paediatric dentistry clinic. The observation and recording of Facial Analog Scale and Visual Analog Scale were completed independently by a second calibrated clinician who was not involved in the dental treatments of children. All extractions were completed under local anaesthesia and administered via infiltration technique for maxillary teeth or inferior alveolar nerve block for mandibular teeth. The anaesthetic solution used for each patient was articaine 4% with 1:10000 epinephrine and the same chairside procedure was followed for both groups but with the addition of oxidized cellulose (Surgicel®) for the haemophilia group in order to reduce the risk of prolonged bleeding. Each participant of both groups was encouraged to apply a gauze pad on the extraction site for 30 min postoperatively.

Detailed postoperative instructions were given to the patients and their parents, including no mouth rinsing and a soft diet for 24 hours. After 24 hours use of salt water mouthwashes and regular brushing were advised. Postoperatively, the healthy control group was monitored by a dentist while the haemophilia group was monitored by the patients’ hematologists for 2 hours after the extraction. In addition, the haemophilia group was advised to use tranexamic acid mouthwash as prescribed for 3 days. Last but not least emergency contact details were given to all participants.

Two days after the extraction all patients of both groups were called by telephone and asked if they had experienced intense bleeding episodes which may have disturbed their daily activities.

The dental anxiety of the children in both groups was evaluated in the waiting area by means of the Facial Image Scale before the clinical procedure was initiated [Buchanan and Niven, 2002]. The Facial Analog Scale was applied to the children according to Buchanan and Niven [2002]. Five faces ranging from very happy to very unhappy were aligned, and the children were asked to point at the face they most feel like at that moment. Scores ranged from one, the most positive, to five, the most negative face expression. After the same dental procedures applied to both groups by the same dentist, the pain perception levels of the children were evaluated by the Visual Analog Scale in the dental setting. The length of the line from the left-hand margin to the mark determines the magnitude of pain for that individual and the VAS line used in this study was approximately 100 mm long with each end anchored by extreme descriptors, “no pain” and “very severe pain”: Two weeks after extraction the children were called for the reapplication of the FIS in order to understand the effects of dental intervention. The children completed the FIS survey in the dental clinic.

Data were analysed with the software SPSS 16.0 (SPSS...
Inc., Chicago, IL, USA). In order to compare the groups the Mann-Whitney U test and \( \chi^2 \) were used. The level of significance was set at 0.05 and the confidence interval was 0.95. Mean values and standard deviations were calculated for FIS and VAS scores.

**Results**

There were 56 boys in the study group and 56 boys in the control group. The mean age of the healthy controls was 9.05±1.61 and the mean age of the study group subjects was 8.82±1.58. There were no significant difference by age between the two groups (\( p=0.955 \)) (Table 2). All teeth extracted in this study were primary molars. The number of the maxillary primary molars extracted was 23 for the healthy group and 20 for the haemophilia group, while the number of mandibular primary molars extracted was 33 for the healthy group and 36 for the haemophilia group (Table 1).

As shown in Table 1 the highest number of teeth extracted were mandibular teeth. The number of mandibular and maxillary extracted teeth was not statistically different between the groups (\( p=0.560 \)).

Table 2 shows the distribution of the facial image scale (FIS) by groups. The majority of children -30 showed a moderate FIS score of 3. Eighteen children of the study group showed a FIS score of 5 while 13 controls showed a FIS score of 1. The FIS score of 3 rose drastically to 51. The lowest FIS score is 1, or highest dental anxiety, was not chosen by children with haemophilia after treatment. There was no significant difference between the FIS scores of the groups (median of control group 3 vs. median of haemophilia group 3; \( p=0.637 \)) (Table 3). As shown in table 3, no differences were found among the groups regarding both dental anxiety scores (FIS), pain scores (VAS), and dental anxiety scores after two weeks from dental intervention.

Pain history was determined by asking about absence and presence of pain before the extraction. When questioned, 38 children said “Yes, I have pain because of my tooth”, while 74 answered “No, I have no pain because of my tooth” before the extractions. The distribution of one question on pain was statistically different only for the facial image scale measured before the intervention (\( p=0.001 \)) but there were no significant difference between the groups by visual analog scale results (\( p=0.615 \)) and FIS scores two weeks later the extraction (\( p=0.147 \)) (Table 3).

**Discussion**

Children with haemophilia constitute a very small portion of the total population, and probably this is the reason why there is little literature about dental interventions in this group. Furthermore dental anxiety is an almost neglected issue amongst other medical complications for children with haemophilia.

In this study, none of the children had excessive bleeding episodes after the primary tooth extraction. The prevention of bleeding complications by recording

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**Table 1** Mean age of children participating in the study and number of children having maxillary and mandibular primary molar extraction. \( p<0.05 \) was accepted statistically significant.

<table>
<thead>
<tr>
<th>GROUPS</th>
<th>NUMBER OF PARTICIPANTS</th>
<th>AGE MEAN±SD</th>
<th>MAXILLARY PRIMARY MOLARS NUMBER, %</th>
<th>MANDIBULAR PRIMARY MOLARS NUMBER, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Group</td>
<td>56</td>
<td>9.05±1.61</td>
<td>33 58.9%</td>
<td>23 41.1%</td>
</tr>
<tr>
<td>Hemophilia Group</td>
<td>56</td>
<td>8.82±1.58</td>
<td>36 64.3%</td>
<td>20 35.7%</td>
</tr>
</tbody>
</table>

Significance of Difference \( \chi^2 \) \( p=0.955 \) \( p=0.560 \)

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**Table 2** FIS scores and VAS scores of study and control groups and the significant differences.
a detailed clinical history to ensure adequate planning of treatment and taking special care to avoid soft tissue damage during dental treatment of such patients can avoid undesirable bleeding episodes. Also it should be added that in this study only primary teeth extractions were performed, which may have resulted with less damage to the soft tissues and rapid improvement of healing comparing with permanent teeth extractions.

On the other hand, psychosocial aspects of dental and medical interventions for medically compromised children must be discussed as anxiety and fear can affect the quality of treatment and motivation of patient. Age and sex are controversial predictors for dental anxiety [Klingberg and Broberg, 2007]. Gender is known to be a factor for dental anxiety, however the results vary in different studies [Kleiman, 1982; Peretz and Efrat, 2000; Milgrom et al., 1995]. In our study there were no significant difference for age between the groups and all the participants consisted of boys. In this study dental extraction was the first dental interventions that children were facing, which was a requirement for our research because dental anxiety is closely related with the dental clinic attendance frequency of the patients [De Menezes Abreu et al., 2011].

General medical fear and anxiety can also lead to dental anxiety [Klingberg and Broberg, 2007]. Anxiety symptoms are frequent in the children and adolescents with haemophilia and a limited number of them suffer from major depressive disorder or separation anxiety disorder [Ghanizadeh and Baligh-Jahromi, 2009]. The requirement for factor replacement can force the dentist to try to avoid multiple treatment sessions. In this situation dentist may focus more on medical aspects of the dental treatment than the psychological and emotional aspect of the treatment which can be seen as another disadvantage for children with haemophilia. However, with careful anxiety management precautions in our study there were no significant differences between the anxiety levels of children with haemophilia and the healthy group according to FIS scores. These findings were similar to the results of Klinberg and Broberg [2007], in that there were no significant difference of dental anxiety between healthy children and children going through cancer therapy, conversely to the common consideration [Wogelius et al., 2009]. In fact, dental treatment seems very easy to bear compared with the extensive medical treatment of cancer therapy. It may be hypothesised the same for haemophilic children, who have to undergo multiple home infusions and other interventions associated with their disorder. Another similarity with cancer therapy maybe that children with haemophilia may have developed effective coping strategies in the form of techniques, thoughts, and behaviours used to deal with stress that may also protect against dental anxiety. Furthermore, children with haemophilia are facing intense medical treatment episodes from time to time, resulting with forming strong relationships with their medical team and therefore the children’s learned coping strategies may partly be a result of trustful relationships between the children and the medical team [Wogelius et al., 2009].

Pain due to lack of necessary dental care and dental caries is known to aggravate dental fear [Milgrom et al., 1995; Ramos-Jorge et al., 2012]. This agrees with our study in which the children who reported pain before dental extraction had significantly higher FIS scores than those children who did not. However, there was no relationship between pain before dental intervention and pain after dental intervention and no significant difference was found for VAS scores between children declaring pain and those children stating no pain. Two weeks after the intervention the effect of pain before treatment had disappeared because the FIS scores did not show any statistically significant difference with this regard. According to our findings the only predictor for dental anxiety was pain before the dental treatment regardless of the systemic condition of the children. There were no significant differences between the groups by FIS score after dental interventions showing that adequate dental and medical precautions, such as good haemostatic measures and appropriate local anaesthesia, prevented dental anxiety for children of either group.

It is important to document that there seemed to be no increased tendency for haemophilic children to exhibit dental anxiety when compared to the control group. However more studies with a larger sample size are required to confirm this, possibly multicenter studies.

**Conclusion**

Experiencing toothache prior to dental treatment is a predictor for dental fear and anxiety in the dental chair both for children with haemophilia and healthy children. However, haemophilic children do not appear to be at increased risk of dental anxiety by virtue of their condition where treatment is provided by teams they trust and with the help of an adequate haemostatic treatment regimen. Therefore, appropriate prevention and good quality treatment is required in children with haemophilia to prevent them from acquiring unnecessary dental fear.
that will cause them to avoid dental treatment or avoid dental attendance in the future.

References

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