Occurrence of oral trauma in young epileptic patients

ABSTRACT

Aim People with reduced efficiency, as well as those who experience seizures, are prone to traumatic injuries within the facial skeleton. This study aimed to evaluate the incidence of traumatic injuries of the oral cavity in epileptic children and youths from special-care schools.

Materials and methods The study was carried out in children and youths with intellectual disability attending special-care schools in the city of Poznan (Poland). The study group comprised 63 epileptic students (31 female and 32 male), aged 6-20 years. Information on disease prevalence was obtained from medical records. The control group consisted of 63 students (23 female and 40 male), aged 7-20 years, not suffering from epilepsy, randomly selected from individuals in the same schools. The examination included assessment of dental traumatic injuries (crown fracture or traumatic tooth loss). Statistics: For statistical analysis relating to differences in the occurrence of injuries of teeth between epileptic subjects and control group, the chi-square test was used, but in case of a low number of observations, chi-square with Yates’s correction.

Results Crown’s fracture of permanent teeth was reported in 10 subjects (15.9% of all patients), which involved 13 permanent incisors. Tooth loss as a result of the injury was seen only in one 14-year-old subject. However, in the control group, symptoms of crown’s fracture were found in six permanent teeth in 4 patients (6.4% of all subjects).

Conclusion It is necessary to provide appropriate dental care to epileptic patients because of the risk of injuries and the need for a special prosthodontic rehabilitation.

Keywords Disabled; Epilepsy; Students; Traumatic injuries.

Introduction

Oral health status of intellectually disabled and chronically ill patients is determined, among others, by both existing systemic disease as well as disability. It was repeatedly reported that in this population, the loss of teeth often occurs not only due to failure to treat complications of dental caries, but also because of the difficulties in carrying out therapeutic procedures [Gerreth and Borysewicz-Lewicka, 2008]. However, traumatic injuries of the mouth are also observed during epileptic seizures or falls associated with loss of balance [Ogunbodede et al., 1998; Holan et al., 2005; Tsai, 2001]. The most commonly affected teeth are the central maxillary incisors [Holan et al., 2005]. Predisposing factors to traumatic dental injuries, as in generally healthy subjects, are increased overjet with protruding anterior teeth and insufficient lip closure [Tsai, 2001]. Moreover, in patients with reduced intellectual ability, self-injury can occur both within the oral tissues [Johnson et al., 1996; Saemundsson and Roberts 1997; Verri et al., 2000], maxillofacial area [Aragon and Burneo, 2007] as well as to other areas of the body [Murshid, 2005]. Furthermore, it should also be mentioned that some drugs recommended by dentists can jeopardize seizure control because of their interaction with antiepileptic drugs [Aragon and Burneo, 2007].

It is known that the consequences of dental traumatic injuries may directly or indirectly influence the quality of life of affected subjects, causing functional, aesthetic, psychological and social problems [Dos Santos and Souza, 2009].

The aim of this study was to evaluate the incidence of traumatic injuries of the oral cavity in epileptic children and youths from special-care schools.

Materials and methods

The study was carried out among disabled and chronically ill children and youths, aged 6-20 years, attending special-care schools in the city of Poznan (Poland). In such institutions students with varying degrees of intellectual disability (mild, moderate, severe and profound) as well as with different associated systemic diseases are taught, including those aged over 18 years.

Prior to the study the data concerning the number of students as well as their degree of intellectual disability, in particular sex and age groups, were obtained from the headmasters of each school. Also the means of the research implementation were discussed and teachers passed this information subsequently to parents or caregivers with a written request for consent to perform clinical examination in their children. Moreover, all parents/caregivers were asked to fill in a questionnaire.
aiming to collect data concerning systemic diseases as well as medications used by child.

Oral examination was done in those students whose parents/caregivers declared the occurrence of epilepsy in their child, which was also confirmed by medical records kept in schools. The examined group consisted of 63 students (31 females and 32 males), aged 6-20 years, including 16 mildly, 23 moderately, 15 severely and 9 profoundly intellectually disabled (Table 1).

On the other hand, the control group comprised mainly students with diagnosed Down syndrome and those with decreased intellectual ability, not using antiepileptic drugs. It covered 63 students (23 female and 40 male), aged 7-20 years, not suffering from epilepsy, drawn from students of the same schools, including 28 mildly, 29 moderately and 6 severely intellectually disabled (Table 1).

It was found that among the epileptic group, there were 18 subjects with mixed dentition (8 females and 10 males) and 45 with permanent dentition (23 females and 22 males). In the control group, 19 patients had mixed dentition (7 females and 12 males) whereas 44 had a permanent dentition (16 females and 28 males). A dental evaluation on the presence of sequelae of dental traumatic injuries, such as crown fracture or tooth loss was performed.

The oral examination was carried out, only in those patients whose parents gave their written consent, in the school, by one dentist in the nurse’s office or classroom, with the artificial light of a headlamp, using a dental mirror and a probe. Children’s teeth were not cleaned or dried. During the examination a nurse or a teacher was present, to help sometimes with stabilisation of the patient’s head. The children were examined without any pharmacological preparation. The participation of each child in the study was voluntary. Clinical examination was not performed if the child refused to participate or failed to cooperate.

For statistical analysis relating to differences in the occurrence of injuries of teeth between epileptic patients and control group, the chi-square test was used, but in case of a low number of observations, the chi-square with Yates’ correction. The assumed level of statistical significance was p <0.05.

The study was approved by the Ethical Committee of the Poznan University of Medical Sciences (Resolution No. 783/06).

### Results

Among the traumatic dental injuries, in 10 patients (15.9%) was recorded fracture of the crown of a permanent tooth (12 maxillary incisors and one mandibular central incisor - 6 teeth in females and 7 in males) (Table 1). The loss of the right central maxillary permanent incisor due to injury was seen only in one 14-year-old patient, in which two adjacent permanent incisors had fractured crowns. However, in the control group 4 patients with permanent teeth (6.4%) had crown fractures in 6 central maxillary incisors - 2 teeth in females and 4 in males (Table 1). 2. Only four teeth were restored with composite material in a group of epileptic patients (two moderately and one mildly intellectually disabled). One of those patients had central lower left incisor endodontically treated and this tooth was discoloured. None of the teeth had prosthetic crown. The other 9 unrestored teeth included: one tooth with fracture within enamel, 4 teeth with fracture of the crown involving little of the dentine as well as 4 teeth with extensive fracture of the crown involving considerable amount of the dentine but not exposing the pulp. In a total epileptic group injuries affected the following teeth: 4 upper central right incisors, 1 upper lateral right incisor, 7 upper central left incisors and 1 lower left central incisor. In the control group, none of the patients had his/her teeth rebuilt. In 4 teeth fracture within the enamel and little of dentine was observed whereas 2 teeth had extensive fracture of the crown involving considerable amount of the dentine but not exposing the pulp. All fractured teeth in this group involved 3 right and 3 left upper central incisors.

The statistical analysis showed no significant differences in the frequency of tooth injuries between patients suffering from epilepsy and those in the control group.

<table>
<thead>
<tr>
<th>Group of patients</th>
<th>Number of patients N (%)</th>
<th>Number of patients with traumatic tooth injuries</th>
<th>Number of teeth with traumatic injuries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>sex</td>
<td>crown fracture N (%)</td>
<td>tooth loss N (%)</td>
</tr>
<tr>
<td>Epileptic patients</td>
<td>female 31 (49.2)</td>
<td>6 (9.5)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td></td>
<td>male 32 (50.8)</td>
<td>4 (6.4)</td>
<td>1 (1.6)</td>
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<tr>
<td></td>
<td>total 63 (100.0)</td>
<td>10 (15.9)</td>
<td>1 (1.6)</td>
</tr>
<tr>
<td>Control group</td>
<td>female 23 (36.5)</td>
<td>1 (1.6)</td>
<td>0 (0.0)</td>
</tr>
<tr>
<td></td>
<td>male 40 (63.5)</td>
<td>3 (4.8)</td>
<td>0 (0.0)</td>
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<tr>
<td></td>
<td>total 63 (100.0)</td>
<td>4 (6.4)</td>
<td>0 (0.0)</td>
</tr>
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</table>

**TABLE 1** Number of examined students with respect to those with traumatic injuries.
Discussion

Injuries of the mouth in disabled and chronically ill patients was described also by Ogunbode et al. who carried out a study in 56 patients in Nigeria aged 12-56 years treated for epilepsy and found traumatic anterior dental injury in as many as 46.4% of the sample [Ogunbode et al., 1998]. Moreover, these authors noticed that it was traditional practice to force spoons or other hard objects between the teeth during seizures in the belief that this would prevent the subject from biting his/her tongue. However, one can believe that such procedure undoubtedly contributes to the higher rate of traumatic injuries to the teeth. In the present study, carried out in young people, the incidence of traumatic dental injuries was reported in a lower number of patients. A similar percentage (15.4%) was found by Ferreira et al. [2011] in a subgroup of patients suffering from epilepsy in a research carried out in different groups of special needs subjects grouped according to the medical diagnosis.

The data obtained in the present study can also be compared with the results of a group of chronically ill patients with cerebral palsy as that neurological disease may be accompanied by intellectual disability and epilepsy. Holan et al. [2005] in a research carried out among 68 patients with cerebral palsy, aged 7-21 years, reported the incidence of sequelae of injuries in 57% of individuals. Other results were shown by Dos Santos and Souza, who revealed the presence of traumatic dental injuries in 20.0% of children, aged 1-15 years, with cerebral palsy, while in the control group the percentage was higher and amounted to 32.0% [Dos Santos and Souza, 2009]. The authors also noted that patients in the study group received dental treatment less frequently after injuries of the teeth. Costa et al. [2008] conducted an analysis of the dental charts of 500 patients suffering from cerebral palsy and noted that 10.6% of them had sustained some type of dental injuries and the most frequent type (84.9%) were fractures of the enamel or enamel and dentin without pulp exposure. The authors also found that out of 500 subjects with cerebral palsy, 225 patients (45%) had been diagnosed with epilepsy and in this group 26 (11.5%) had suffered some type of dental trauma. On the other hand, Feldman et al. [1997] reported the presence of traumatic tooth injuries in 11.9% of Special Olympics athletes in the United States.

Murthy et al. carried out the examination in 231 children from special schools as well as in 231 their healthy counterparts [Murthy et al., 2013]. The prevalence of traumatic dental injuries in the study group of disabled patients was 12.1% whereas in healthy children it amounted to 6.9%. The children with visual deficiency had the highest prevalence of traumatic dental injuries (25.0%) followed by children with multiple disabilities (20.0%) and than those with orthopaedic disability (15.0%), cerebral palsy (12.5%), mental retardation (11.4%), hearing deficiency (10.0%) and Down syndrome (5.9%). In the present study, the upper central permanent incisors were most often affected by traumatic injury which is in accordance with the research by Murthy et al. [Murthy et al., 2013]. The authors found out that those teeth were the most often involved in both, the study group of disabled patients as well as control group of healthy children. Such a situation is related to their anatomical position. On the other hand, fracture of the crown within enamel as well as enamel and dentine were the most common injury in both groups of patients which is also in agreement to research of Murthy et al. where uncomplicated crown fracture was more common [Murphy et al., 2013].

As literature data shows, patients with disabilities are prone to dental injuries due to systemic disease, often associated with the occurrence of seizures [Tsai, 2001]. Additionally, in patients with epilepsy, the oral health status is significantly poor, and they have fewer restored and replaced teeth compared to healthy subjects [Aragon and Burneo, 2007]. It is also suggested that dentists offer simpler and quicker treatment methods in these patients [Aragon and Burneo, 2007]. In present study, only 4 out of 13 teeth were restored in a group of epileptic patients whereas in the control group of intellectually disabled individuals none of the patients had his/her teeth rebuilt.

Tsai described a case of severely mentally retarded girl suffering from cerebral palsy and seizure disorder [Tsai, 2001]. Dental examination of the patient showed the permanent dentition with multiple caries, gingivitis and gingival hyperplasia, Angle Class I/1 malocclusion with overjet and deep overbite as well as sequelae to trauma affecting the maxillary central incisors. The girl was treated under general anaesthesia. However, due to repeated injuries there were frequent damages of the upper incisors. Therefore, after extrusive injuries of all four upper maxillary incisors with alveolar bone fracture, the decision was made to extract them and rehabilitate with a band-retained denture. According to the author, in a 4-year follow-up after the treatment there was no further traumatic damage to the maxillary anterior area due to later episodes of seizures [Tsai, 2001].

Patients with seizure disorders are more prone to oral and facial trauma than healthy subjects [Martin, 2003]. Martin described the case of 12-year-old patient who sustained displacement of a lateral incisor into the nasal cavity and complete bony intrusion of the three other maxillary permanent incisors due to a fall following a seizure [Martin, 2003]. It is worth to mention, that in patients with reduced intellectual ability, self-injury can occur both within the oral tissues [Johnson et al., 1996; Saemundsson and Roberts 1997; Verri et al., 2000], as well as to other areas of the body [Murshid, 2005].

Murshid [2005] conducted a study among 20 autistic
patients, with mean age of 9.6 years, in Riyadh. The author noticed that 70% of children showed signs of trauma, while 30% had injuries to the head region as a result of head banging on the walls and furniture. Another 15% of children had scratches on the sides of their faces due to head banging and hair pulling, whereas the most common trauma was recorded in the hands and fingers and it was observed in 75% of children. Such injuries were due to repeated self-biting habit and touching hot beverages or food. One patient reported signs of localised gum recession in the maxillary anterior region due to repeated picking with the nails [Murshid, 2005].

Unfortunately, despite the considerable needs of chronically ill and disabled patients resulting from traumatic dental injuries, they do not always receive a professional dental care. Károlyházy et al. [2003] in a study on a population suffering from epilepsy noticed that these patients have a significantly low number of filled teeth as well as relatively fewer missing teeth replaced by some form of prosthesis. Among the reasons for such a situation the authors found worse socioeconomic status of epileptic patients. They also stressed that dentists choose simpler and quicker treatment methods, e.g. tooth extraction, instead of more complicated procedures in those patients. This can result in more teeth removed and the earlier occurrence of edentulous state in this population. However, the possible causes of this condition are to be sought in the inadequate knowledge of dentists about the disease and the fear of a potential seizure attack in the dental clinic [Károlyházy et al., 2003].

Many authors point to the need for rehabilitation of epileptic patients with the use of fixed prosthesis in order to prevent their dislodgement during seizures [Károlyházy et al., 2003], highlighting the need to include additional abutments [Aragon and Burneo, 2007]. However, in the case of the use of partial dentures they should be anchored with precision attachments, while in complete dentures it is recommended to use metal plates which are more resistant to fracture than acrylic ones [Károlyházy et al., 2003, Károlyházy et al., 2005].

Unfortunately, treatment of traumatic tooth injuries in severely and profoundly disabled patients is questionable, mainly due to the lack of cooperation from the patient. Therefore, often the treatment of choice is to carry out dental procedures under general anaesthesia, which often results in a significant number of extracted teeth.

Conclusion

Disabled patients suffering from epilepsy, as following the literature data, are extremely prone to traumatic dental injuries. Undoubtedly, this may directly or indirectly affect the quality of life of those people causing functional problems, such as impairment of speech or eating, but also aesthetic, psychological and social difficulties.

It is necessary to provide appropriate dental care to epileptic patients aimed at the risk of injuries as well as the need for a special prosthetic rehabilitation.

References

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