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SHORT COMMUNICATION

An analysis of pattern of dental injuries after fall accidents in 0- to 2-year-old children – does the use of pacifier at the time of injury make a difference?

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Aim. To assess the relation between type of traumatic injury and use of pacifier at the time of a fall accident in 0- to 2-year olds.

Material and methods. The study draws on data from the database on traumatic dental injuries at the Department of Oral and Maxillofacial Surgery, Copenhagen University Hospital.

Results. The study includes 1125 patients ≤2 years of age, representing a total of 1886 injuries. A total of 176 patients had fallen while using a pacifier, whereas 949 children suffered a fall without using a pacifier. In the pacifier group, 11.9% had crown fractures compared with 20.0% of children who had fallen without a pacifier ($P = 0.012$). Tooth displacement (lateral luxation, extrusion or avulsion) was relatively more frequent in children falling with a pacifier compared to children falling without a pacifier (64.8% *vs* 54.8%; $P = 0.014$). Furthermore, soft tissue injury was less frequent among the former (28.4% *vs* 38.3%; $P = 0.013$).

Conclusions. Injuries occurring while using a pacifier tend to be tooth displacement rather than fractures. This is in accordance with the theoretical consideration that a blunt impact tends to favour displacement, whereas a sharp impact tends to favour fractures of the hard dental tissues.

Theories on mechanisms of traumatic dental injury argue that there will be a tendency for a blunt impact to anterior teeth to cause displacement of the teeth, and for an impact caused by a sharp object to produce fractures of the hard dental tissues.[1] The use of a pacifier is common among young children, and traumatic injury peaks during early childhood.[1,2] When children fall while using a pacifier, the energy from the fall may be transferred from the pacifier to the anterior teeth as a blunt impact. At the same time, the pacifier may confer some protection to the lips. The purpose of this study was to assess whether the use of a pacifier at the time of a fall accident in young children changes the pattern of traumatic injury suffered.

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Material and methods

This study is a register study based on data drawn from the database on traumatic injuries hosted by the Department of Oral and Maxillofacial Surgery, Copenhagen University Hospital, Denmark. We extracted data on traumatic dental injuries in children ≤2 years of age at the time of the accident, reporting to the Department between 1971 and 1983. At that time, the Department's catchment area was the municipality of Copenhagen, with a total population of approximately 1 million. Information on the use of a pacifier and the type of dental injury suffered was collected by the dental officer on duty in the emergency ward at the Department. Only children involved in fall accidents were included in this study.

Traumatic injuries were recorded using an internationally accepted classification.[3] Data were analysed using SPSS (version 13.0, SPSS Inc.,Chicago, Ill., USA). Differences in number of injuries between the two groups were tested using a Mann–Whitney *U*-test, and differences in distribution of injuries were tested using a two-sided Pearson's chi-square test. $P \leq 0.05$ was chosen as level of significance.

Results

A total of 1765 children ≤2 years were identified in the database. Information on the use of a pacifier as well as the type of injury sustained was available in 1125 (64%) of the patients, representing 1886 injuries. The majority of the children were 1 or 2 years of age (Table 1), with boys being slightly younger than girls at the time of injury ($P = 0.041$). A total of 176 patients (15.6%) had fallen with a pacifier (Table 2), and falling with a pacifier was more frequent among girls than among boys ($P = 0.041$).

More than 90% of the patients presented with one or two injured teeth (Fig. 1). The number of injuries did not differ significantly between the two groups ($P = 0.123$). The pattern of injuries varied between the two groups (Fig. 2): compared with children falling without using a pacifier, children falling while using a pacifier had fewer crown fractures, and more injuries with displacement (intrusion, lateral luxation, extrusion or avulsion). The ratio of crown fractures to injuries with displacement was 21 : 154 = 0.136 for children falling with a pacifier, compared with 190 : 709 = 0.268 for children falling without using a pacifier. This difference was statistical significant ($P < 0.005$). Compared to children falling without a pacifier, children falling with a pacifier had significantly fewer soft tissue injuries ($P = 0.013$). Root fractures were relatively rare in both groups.

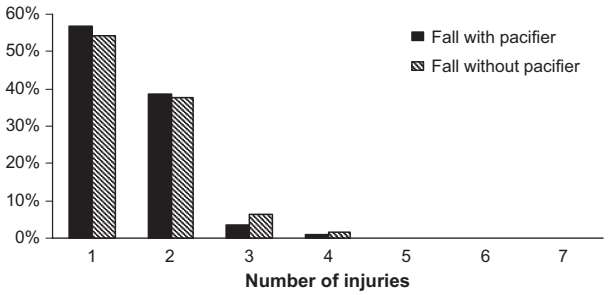

Fig. 1. Number of injuries per child according to fall with or without a pacifier.

Table 1. Distribution (%) of 1125 children ≤2 years according to gender and age.

	0 year	1 year	2 years	Total
Boys	2 (0.3)	390 (59.1)	268 (40.6)	660 (100.0)
Girls	1 (0.2)	240 (51.6)	224 (48.2)	465 (100.0)
Total	3 (0.3)	630 (56.0)	492 (43.7)	1125 (100.0)

Table 2. Distribution (%) of 1125 children ≤2 years according to gender and fall with or without pacifier.

	Fall with pacifier	Fall without pacifier	Total
Boys	91 (13.8)	569 (86.2)	660 (100.0)
Girls	85 (18.3)	380 (81.7)	465 (100.0)
Total	176 (15.6)	949 (84.4)	1125 (100.0)

Discussion

This study indicates that the use of a pacifier apparently influences the type of traumatic injuries sustained by children ≤2 years. The study deploys information obtained from a hospital-based database whose data have been collected during more than 10 years, and it is one of the largest materials available globally for this kind of studies. Thus, the data can be considered representative of patients reporting to an oral and maxillofacial department in a large municipality. The data collection was standardized since the initiation of the database, and an internationally accepted classification of traumatic injuries[3] has been used, which therefore lend the data easily to international comparison. Interestingly, the boys included in this study were younger than the girls, and the girls were more frequent pacifier users than the boys.

As shown in this study, almost 60% of children sustain only one injury, whereas the remaining children sustain a varying number of injuries, the maximum number of injuries

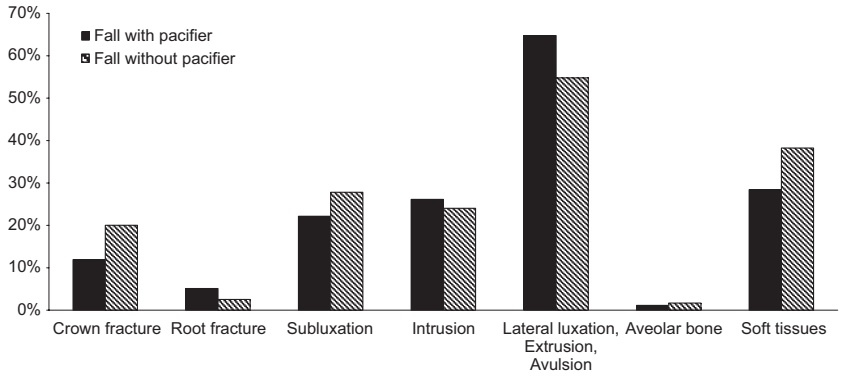

Fig. 2. Distribution of types of dental injuries according to fall with or without a pacifier.

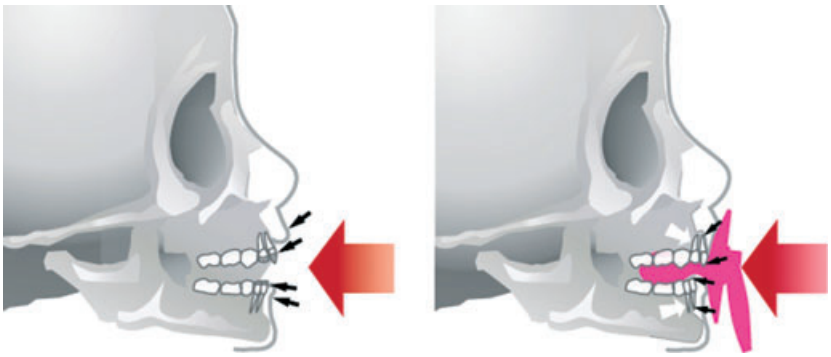

Fig. 3. A fall without a pacifier (left) may dispose to lip lesions and tooth fractures (arrows), whereas an impact in a patient using a pacifier may protect the lips and distribute forces to a larger front area resulting in luxation.

being seven. It could thus be argued that the statistical analysis has not taken any clustering effect into account. Limiting the analysis to those children who had sustained only one injury, however, did not change the results.

To our knowledge, no previous studies on the relation between use of pacifier and type of injury have been published. The findings of this study indicate that the use of a pacifier favours tooth displacement after trauma to a primary tooth. It is interesting to note that an *in vitro* experimental animal study has found mouth guards to protect against crown fractures, root, and root/-crown fractures (but also lateral luxation and extrusion), whereas subluxations, avulsions, and alveolar fractures were more common in teeth protected by a mouth guard.[4] Furthermore, it has been shown that the proportion of fractured teeth out of all dental injuries (fractured teeth and avulsed or luxated teeth) was higher in adolescent football players not using a mouth guard, compared to those using a mouth guard.[5] Our data hence support the theory that a blunt impact to anterior primary tooth will tend to cause displacement, whereas an impact caused by a sharp object will tend to produce fractures of the hard dental tissues (Fig. 3). The lower number of injuries to the lips in children falling with a pacifier compared to children falling without a pacifier can be explained by the protective effect of the shield of the pacifier.

It is however very important to emphasize that as this study is not population based, our findings apply only to children reporting with an injury to a Department for Oral and Maxillofacial Surgery at a University Hospital. Consequently, we are not able to determine whether the risk of the different types of injuries is influenced by the use of a pacifier. Thus a competing explanation for the difference in distribution of injuries according to type may be that the pacifier has a protective effect against injuries, thus

eliminating a number of teeth from the present material. Larger population-based studies are needed to further support these findings.

What this paper adds

- Use of a pacifier at the time of a fall accident in 0- to 2-year-old children may change the pattern of injuries.

Why this paper is important to paediatric dentists

- Paediatric dentists need knowledge about factors influencing traumatic injuries in young children.

Conflict of interest

The authors report no conflicts of interest.

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