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Kristina Goršeta, Dubravka Negovetić Vranić, Tomislav Škrinjarić, Domagoj Glavina

Traumatske ozljede mliječnih zuba: analiza oblika i uzroka

Traumatic Injuries of Primary Teeth: Analysis of Types and Causes

Zavod za dječju i preventivnu stomatologiju, Stomatološki fakultet Sveučilišta u Zagrebu
Department of Pediatric and Preventive Dentistry, School of Dental Medicine University of Zagreb

Sažetak

Uvod: Svrha rada bila je identificirati neke rizične čimbenike vezane za nastanak traume mliječnih zuba i određene oblike zubnih ozljeda kod djece liječene u Zavodu za dječju i preventivnu stomatologiju Stomatološkog fakulteta Sveučilišta u Zagrebu. **Metode:** Istraživanje je provedeno na uzorku od 97 djece u dobi od jedne do pet godina - ukupno su imali 166 ozlijeđenih mliječnih zuba. U skupini su bila 63 dječaka i 34 djevojčice, a bio je primijenjen epidemiološki model "sredstvo-domaćin-okružje". Dobiveni podaci zatim su uneseni u bazu podataka pripremljenu za ovaj projekt u programu Microsoft ® Access. **Rezultati:** Analiza je pokazala da se najviše ozljeda dogodi kod djece između dvije i četiri godine, a omjer između dječaka i djevojčica iznosi 1,8 : 1. Najčešće su zahvaćeni maksilarni središnji sjekutići - u 79 posto slučajeva. Lateralna luksacija, kao česta ozljeda, zabilježena je kod 34, 9 posto djece. Većina ozljeda dogodila se kod kuće (62,8 %) ili na igralištu (15,1 %). Glavni uzroci traume bili su udarci u tvrdi predmet (49,5 %) i padovi (36,1 %). **Zaključak:** Laksacija i subluksacija dominantna su vrsta traumatskih ozljeda mliječnih zuba (66,2 %). Uglavnom se događaju tijekom igre ili su posljedica pada. Budući da je najčešće mjesto nastanka u kući (62,8 %), roditelji i skrbnici trebaju biti obaviješteni o tome kako mogu spriječiti traumatske ozljede kod male djece.

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Adresa za dopisivanje
Dr. Kristina Goršeta
Sveučilište u Zagrebu
Stomatološki fakultet
Zavod za dječju i preventivnu stomatologiju
Gundulićeva 5, 10 000 Zagreb
Tel: +385 (0)1 4802 111
Fax: +385 (0)1 4802 159
gorseta@sfzg.hr

Ključne riječi
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Uvod

Glavna svrha dijagnoze i liječenja traumatskih ozljeda mliječnih zuba jest kontrola boli i sprječavanje mogućih oštećenja zametka trajnog zuba (1). Hipoplazija, uključujući diskoloraciju cakline i/ili defekte cakline, najčešća je malformacija koja nastaje kao posljedica traumatske ozljede primarne denticije (2-5). Poznavanje rizičnih čimbenika ključno je za učinkovitu prevenciju. Njihov je broj povezan s nastankom zubnih ozljeda. U ovom smo istraživanju željeli identificirati najčešće ozljede i neke rizične čimbenike vezane za traume kod mliječnih zuba.

Metode

Analiza vrste ozljede zuba i uloga potencijalnih rizičnih čimbenika obavljena je na uzorku od 97 djece u dobi od jedne do pet godina – ukupno su imali 166 ozlijeđenih mliječnih zuba. U skupini su bila 63 dječaka (64,9 %) i 34 djevojčice (35,1 %). Svi su priložili detaljne stomatološke i medicinske anamneze. Analizirani čimbenici uključivali su vrstu ozljede zuba, distribuciju prema dobi i spolu, oštećene zube te uzrok i mjesto nastanka dentalnih trauma. U istraživanju je bio primijenjen epidemiološki model "sredstvo-domaćin-okoliš". Klasifikacija traumatskih ozljeda bila je obavljena prema klasifikaciji Andreasena i Andreasena, a temelji

Introduction

The main objective of diagnosis and treatment of traumatic injuries effecting primary dentition is pain management and prevention of possible damage to the developing tooth germ (1). Hypoplasia, including enamel discoloration and/or enamel defects is the most frequent malformation sequel of traumatic injuries to the primary dentition (2-5). The knowledge of risk factors is essential for an effective prevention. A number of risk factors are associated with occurrence of dental injuries. The purpose of this study was to identify the most common type of injury and some risk factors related to the occurrence of dental trauma in deciduous teeth.

Material and methods

The assessment of the type of dental injury and the role of potential risk factors was carried out in the sample of 97 children aged 1 to 5 years, with injured 166 primary teeth. The sample of 97 patients included 63 boys (64.9%) and 34 girls (35.1%). Detailed dental and medical histories of injured children were collected. The analyzed factors included type of dental injury, age and sex distribution, affected teeth, cause and place of dental injury. The epidemiological model "agent-host-environment" has been applied in the study.

The classification of traumatic dental injuries was performed according to the classification proposed by Andreasen

se na sustavu koji je prihvatila Svjetska zdravstvena organizacija (6). Uključuje sljedeće ozljede:

1. Ozljede tvrdih zubnih tkiva i pulpe:
   1.1. Fraktura cakline: infrakcija cakline
   1.2. Fraktura cakline i dentina (nekomplicirana fraktura krune) bez zahvaćene pulpe
   1.3. Kompliciranа fraktura krune koja zahvaća caklinu i dentin s otvorenom pulpom
   1.4. Fraktura korijena
   1.5. Fraktura krune i korijena
2. Ozljede parodontnog tkiva (luksacija): konkuzija, subluksacija, lateralna luksacija, ekstruzijska luksacija i intruzijska luksacija.
3. Avulzije

Podaci su uneseni u bazu podataka pripremljenu za ovaj projekt u programu Microsoft ® Access.

Rezultati

Analiza je pokazala da su ozljede najčešće kod djece u dobi između dvije i četiri godine. Vrh distribucijske krivulje je na dvije godine za djevojčice i na tri godine za dječake (Slika 1.). Pritom su važni rizični čimbenici okružje, neki oblici ponašanja i fizičke aktivnosti. Bio je analiziran i utjecaj spola - frekvencijski omjer između dječaka i djevojčica iznosio je 1,8 : 1. To pokazuje da su dječaci u većoj opasnosti kad je riječ o nastanku traume nego djevojčice.

Najčešće su bili zahvaćeni maksilarni središnji sjekutići (79 %) s vrlo malom razlikom između desne i lijeve strane (Slika 2.). Analizirane vrste ozljeda prikazane su u Tabli-

& Andreasen. It is based on a system adopted by the World Health Organization (6) and includes the following injuries:

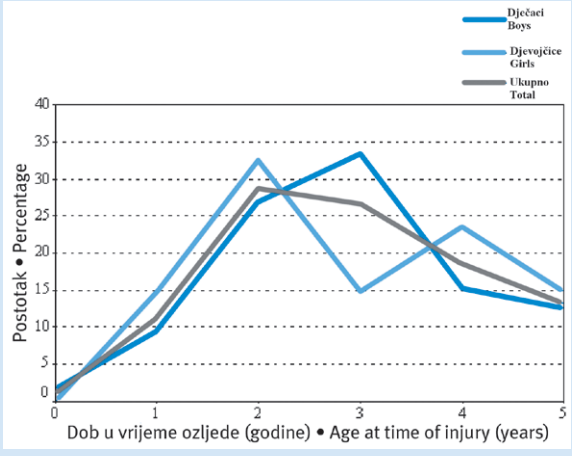
1. Injuries to the hard dental tissues and the pulp:
   1.1. Enamel fracture: enamel chipping or crack
   1.2. Enamel and dentin fracture (uncomplicated crown fracture), without pulpal involvement
   1.3. Complicated crown fracture involving enamel, dentine and exposure of the pulp
   1.4. Root fracture
   1.5. Crown-root fracture
2. Injuries to the periodontal tissues (luxation injuries): concussion, subluxation, lateral luxation, extrusive luxation, and intrusive luxation
3. Avulsion

Data were entered into a data base program (Microsoft® Access) designed for this project.

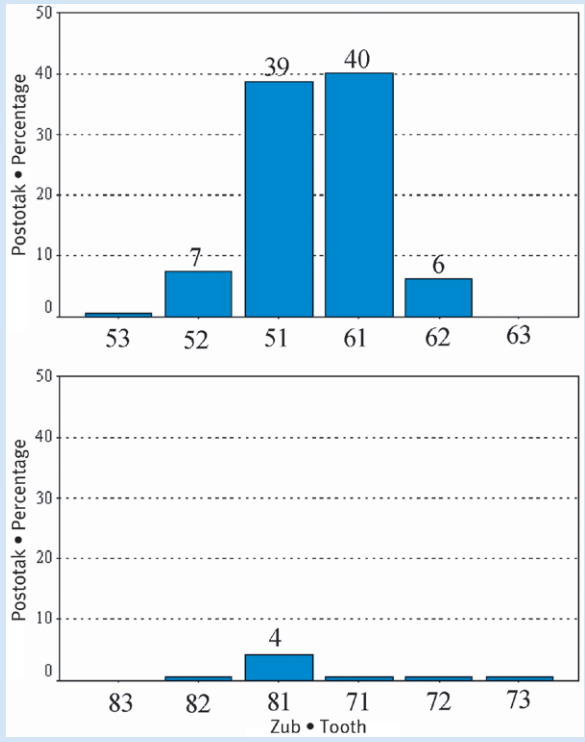
Results

The analysis has shown that the highest frequency of injuries occurred in children between 2 and 4 years of age. The peak of distribution curve was at 2 year for girls and at 3 year for boys (Figure 1). Important risk factors for dental injuries were environmental circumstances, some behavioral characteristics and physical activities. The influence of sex was also observed. The frequency ratio between boys and girls was 1.8: 1. It shows that boys are at greater risk for trauma than girls.

The most frequently affected teeth were maxillary central incisors (in 79 %), with a non-significant difference between the right and the left side (Figure 2). The types of inju-



Slika 1. Distribucija ozljeda zuba prema dobi i spolu u mliječnoj denticiji (N=97)
Figure 1 Distribution of dental injuries related to age and sex in primary dentition (N=97)



Slika 2. Distribucija ukupnih ozljeda prema pojedinom zubu mliječne denticije (N=97)
Figure 2 Distribution of total injuries to the primary teeth (N=97)

ci 1. Većina se odnosila na luksacije. Lateralna luksacija kao najčešća, bila je zabilježena u 34,9 posto slučajeva (Slika 3.). Intruzije je imalo 18,7 posto pacijenata (Slika 4.), a avulzije 12 posto. Ozljede tvrdih tkiva bile su rjeđe. Glavni etiološki čimbenici dentalnih ozljeda bili su udarci u tvrde predmete (49,5 %), zatim različiti padovi (27,4 %) i padovi na stubama (8,2 %). Uglavnom su padovi bili glavni uzrok traume (36,1%). Nezgode s biciklima prouzročile su 12,4 posto svih ozljeda (Slika 5.). Sportske aktivnosti razmjerno su rijedak uzrok dentalne traume u mliječnoj denticiji (2,1 %). Većina ozljeda dogodila se kod kuće (62,8%) i na igralištu (15,1%) (Slika 6.).

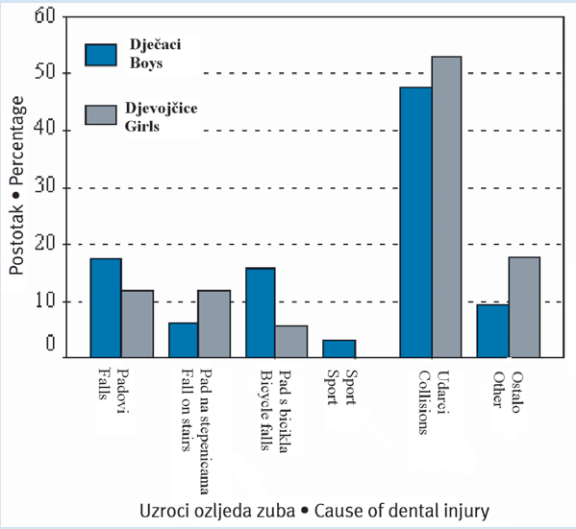
ries observed are summarized in Table 1. The vast majority of injuries were related to the luxations. Lateral luxation as the most common type of injury was observed in 34.9% of cases (Figure 3). Intrusions were observed in 18.7% of patients (Figure 4) and avulsion in 12%. Hard tissue injuries were less frequent. The main etiological factors of dental injuries were crashes against hard objects (49.5%), followed by falls (27.4%) and falls on stairs (8.2%). The falls were the main cause of trauma (36.1%). Bicycle accidents caused 12.4% of all dental injuries (Figure 5). Sports activities were found to be relatively rare cause of dental trauma in primary dentition (2.1%). Most injuries of primary dentition occurred at home (62.8%) and on the playground (15.1%) (Figure 6).

Tablica 1. Distribucija prema vrsti ozljede mliječnih zuba kod djece u dobi od 1 do 5 godina (N=166)
Table 1 Distribution of particular type of injuries to the primary teeth in children 1-5 years of age (N=166)

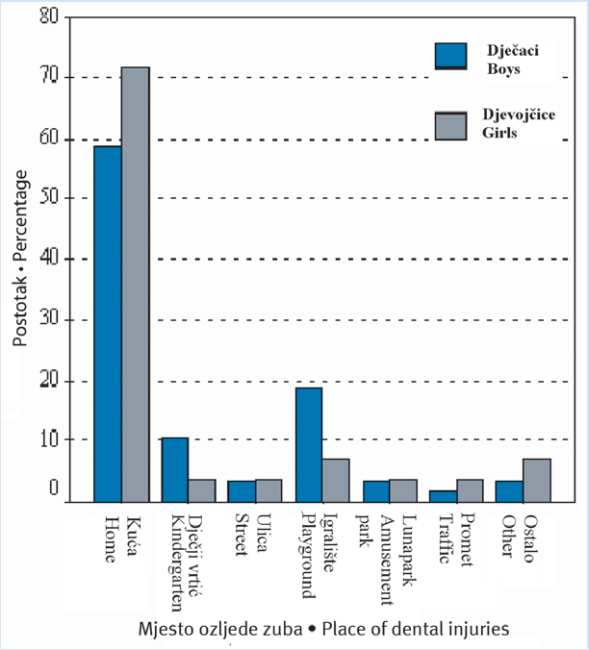
Vrsta ozljede • Type of injury	Dječaci • Boys		Djevojčice • Girls		Ukupno • Total	
	N	%	n	%	n	%
Fraktura cakline • Enamel fracture	1	1	0	0	1	0,6
Nekomplicirana fraktura krune • Uncomplicated crown fracture	11	10,7	2	3,2	13	7,8
Komplicirana fraktura krune • Complicated crown fracture	9	8,7	7	11,1	16	9,6
Fraktura korijena • Root fracture	2	1,9	1	1,6	3	1,8
Fraktura krune i korijena • Crown-root fracture	3	2,9	0	0	3	1,8
Lateralna luksacija • Lateral luxation	39	37,9	19	30,2	58	34,9
Intruzijska luksacija • Intrusive luxation	16	15,5	15	23,8	31	18,7
Ekstruzijska luksacija • Extrusive luxation	3	2,9	4	6,3	7	4,2
Subluksacija • Subluxation	8	7,8	6	9,5	14	8,4
Avulzija • Avulsion	11	10,7	9	14,3	20	12

Slika 3. Lateralna luksacija desnog gornjeg središnjeg sjekutića (a) i pogled na luksirani zub s okluzalne strane (b)
Figure 3 Lateral luxation of the right upper central incisor (a) and occlusal view of the luxated tooth (b)

Slika 4. Intruzija lijevog gornjeg središnjeg i lateralnog sjekutića
Figure 4 Intrusive luxation of the left upper central and lateral incisors



Slika 5. Distribucija najčešćih uzroka ozljeda mliječnih zuba (N=97)
Figure 5 Distribution of the most frequent causes of injuries to the primary teeth (N=97)



Slika 6. Distribucija ozljeda mliječnih zuba prema mjestu nastanka ozljede (N=97)
Figure 6 Distribution of the places where traumatic injuries to primary teeth occured (N=97)

Rasprava

Analizirani uzorak obuhvatio je djecu s traumom zuba koja su došla na stomatološko liječenje. No, mnogo njih s vrlo blagim oblicima zubnih ozljeda, često ne zatraži liječenje. U nekim je studijama istaknuto da je prevalencija dentalnih ozljeda bila najviša između treće i četvrte godine života (2, 7, 19). U ovom istraživanju distribucija prema dobi pokazuje da se većina ozljeda dogodila kod djece u dobi između dvije i četiri godine. Rizik za nastanak traume povećava se kad dijete počne samostalno hodati. Ova je studija također potvrdila da su dječaci u rizičnijoj skupini od djevojčica (8-10).

U vrlo opširnoj epidemiološkoj studiji provedenoj na 20 tisuća djece u dobi od jedne do osam godina, Skaare i Jacobsen (19) dokazali su da je najviša incidencija ozljeda mliječnih zuba u dobi od tri i pol godine. Većina se dogodila ili kod kuće (38 %) ili u dječjem vrtiću (32%). Dominirale su blage ozljede parodonta - subluksacija i konkuzija (59 %), a slijede teže - luksacija i avulzija kod 29 posto ozlijeđene djece. Gornji središnji sjekutići bili su pogođeni traumom kod 92 posto djece (19).

U ovom istraživanju pokazali smo da je omjer ozlijeđenih djevojčica prema dječacima iznosio 1:1,8. To bi se moglo objasniti činjenicom da su dječaci mnogo aktivniji i češće se nasilno ponašaju (10, 11). Lateralna luksacija, kao najčešći oblik ozljede, zabilježena je u 34,9 posto slučajeva, a zatim slijedi intruzijska luksacija s 18,7 posto. Mnogi su autori također istaknuli subluksacije i luksacije kao najčešće ozljede u mliječnoj denticiji (8, 9, 12, 13, 14, 15). Glavni uzroci bili su udarci u tvrde predmete (49,5%) i padovi (36,1%). Ima nekih razlika između studija i zemalja u vezi s najčešćim uzrokom dentalne traume, iako se čini da prevladavaju padovi (8,

Discussion

The present sample included only children with dental trauma presented for dental treatment. Many children with very mild types of dental injuries frequently do not present for the treatment. Some studies have indicated that the prevalence of dental injuries was the highest between 3-4 years of age (2, 7, 19). In the present study, the age distribution shows that the vast majority of injuries occurred between 2 and 4 years of age. The risk of trauma increases when the child starts walking alone. This study has also demonstrated that boys are at higher risk for dental injury than girls (8-10).

In the very comprehensive epidemiological study performed of 20000 children aged from 1 – 8 years by Skaare and Jacobsen (19) observed the highest incidence of injuries of primary teeth in 3.5 year old. The most injuries occurred either at home (38 %) or at kindergarten (32 %). The mild periodontal injuries (subluxations and concussions) were dominated (59 %) followed by severe periodontal injuries (luxations and avulsion) involving 29% of injured children. The upper central incisors were affected by trauma in 92 % of all injured teeth (19).

The present research showed that the female to male ratio was 1:1.8. This might be explained by observations that boys are much more active than girls and show more violent behavior (10, 11). Lateral luxation as the most common type of injury was observed in 34.9% of cases, followed by intrusion luxation (18.7%). Many other authors also reported subluxations and luxations as the most frequent injuries in the primary dentition (8, 9, 12, 13, 14, 15). The crashes against hard objects (49.5%) and the falls (36.1%) were the main cause of trauma to the primary teeth. There are some

9, 13, 15-18). Kao i neke druge studije (19) i ova je pokazala da se većina ozljeda primarne denticije dogodila kod kuće (62,8 %) i na igralištu (15,1 %). U nastojanju da se smanje posljedice ozljeda mliječnih zuba na trajne nasljednike, važno je postaviti odgovarajuću dijagnozu i što prije početi s hitnim liječenjem. Praćenje ozlijeđenih zuba preporučuje se do erupcije trajnih nasljednika.

Većina komplikacija tijekom ozljeda mliječnih zuba nastaje zbog infekcije i nedovoljne oralne higijene. Kako bi se to izbjeglo, važno je roditelje obavijestiti o odgovarajućoj higijeni kod kuće. Zadaća stomatologa trebala bi biti provedba komunikacije i kontrole ponašanja kako bi se osigurala psihološka potpora roditeljima i ozlijeđenom djetetu umanjio strah nakon ozljede zuba.

Zaključak

Traumatske ozljede zuba češće su kod dječaka nego djevojčica. Uzrok su drugačije aktivnosti dječaka. Za oba su spola prve godine života razdoblje kada su najviše skloni ozljedama. Opasnost da si ozlijede sjekutiće bila je najveća kod djece od dvije do tri godine. U toj dobi njihov je dom mjesto gdje se događa većina trauma i zato bi roditelji ili skrbnici trebali biti uključeni u program primarne prevencije ozljeda mliječnih zuba.

Traume su se najčešće događale tijekom igre i bile su posljedice pada. Za većinu ozljeda s dislokacijom preporučuje se konzervativnije liječenje, jer većina njih zarasta spontano ako roditelji kod kuće provode odgovarajuće mjere oralne higijene (3). Repozicija nekih vrsta lateralne i ekstruzijske luksacije može biti potrebna ako ozlijeđeni zubi remete normalnu okluziju ili djetetu predstavljaju estetski problem.

Roditelji i nastavnici trebaju svakako biti obaviješteni o mogućnostima prevencije ozljeda zuba, o postupcima koje treba poduzeti u slučaju nesreće i o tome koliko je važno hitno liječiti ozljede zuba kod djece.

differences between the studies and countries regarding the predominant causes of dental trauma, although falls appear to be most common factor (8, 9, 13, 15-18). Like some other studies (19), the present study showed that most of injuries to the primary dentition occurred at home (62.8%) and on the playground (15.1%).

In attempt to minimize sequelles of injuries to the primary teeth on the permanent successors it is important to obtain proper diagnosis and to start with emergent procedure as soon as possible. The follow up of the injured teeth is recommended up to the eruption of permanent successors.

Most complication during injuries to the primary teeth are due to the infection and inappropriate oral hygiene. To avoid this, it is important to keep parents informed on providing proper oral hygiene at home. The role of dentist should be to use proper communication and behavior management in order to provide psychological support to the parents and injured child with the aim to minimize anxiety after dental injury.

Conclusion

Traumatic dental injuries are more common among boys than girls. It could be attributed to the rougher nature of boys' activities. For both sexes, the first years in life were the most accident-prone periods. The risk for incisor injuries was the greatest for children between 2-3 years of age. At this age, the home is the place where most traumas occur and parents or caregivers should be included in the program of primary prevention of injuries of primary teeth.

The trauma most often occurred during children's play and were consequences of falls. More conservative treatment for the vast majority of displacement injuries is recommended because most of them heal spontaneously if proper oral hygiene measures are taken at home by parents (3). Reposition of some types of lateral and extrusive luxations might be necessary in cases when displaced teeth interfere with normal occlusion or represent aesthetic problem to the child.

The parents and educators should be informed about possibilities for prevention of dental injuries, actions to be taken in case of an accident and the importance of immediate treatment of the injured child.

Abstract

Introduction: The purpose of this study was to identify some risk factors related to the occurrence of dental trauma to the deciduous teeth and to identify particular type of dental injuries in children referred to Department of Paediatric Dentistry, School of Dental Medicine, University of Zagreb. **Methods:** The study was carried out in the sample of 97 children, aged 1 to 5 years, with injured 166 primary teeth. The sample of 97 patients included 63 boys and 34 girls. The epidemiological model "agent-host-environment" has been applied in the study. Data have been entered into a data base program (Microsoft® Access) designed for this project. **Results:** The analysis has shown that the highest frequency of injuries occurred in children between 2 and 4 years of age. The frequency ratio between boys and girls was 1.8:1. The most frequently affected teeth were maxillary central incisors (in 79 %). Lateral luxation as the most common type of injury was observed in 34.9 % of cases. Most of the injuries occurred at home (62.8%) or on the playground (15.1%). Crashes against hard objects (49.5%) and falls (36.1%) were the main causes of trauma. **Conclusion:** Predominant types of traumatic injuries to the primary teeth are luxations and subluxations (66.2%). The most of injuries to the primary teeth occurred during children's play and were consequences of falls. Since the most common place of incident occurrence is the home (62.8%). The parents and caregivers should be informed about possibilities for prevention of traumatic injuries in young children.

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Address for correspondence
Kristina Goršeta DDS
University of Zagreb
School of Dental Medicine
Department of Pediatric and Preventive Dentistry
Gundulićeva 5, HR-10000 Zagreb
Tel: + 385 1 4802 111
Fax: + 385 1 4802 159
gorseta@sfzg.hr

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Tooth Avulsion; Tooth Injuries; Tooth, Deciduous

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