Craniomaxillofacial Trauma in Children: A Review of 3,385 Cases With 6,060 Injuries in 10 Years

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Purpose: Trauma is the leading cause of diseases and death in children. The goal of this study was to assess the impact of the main causes of accidents among children resulting in pediatric craniomaxillofacial trauma.

Patients and Methods: Between 1991 and 2000, data for 3,385 patients younger than 15 years of age who sustained a total of 6,060 craniomaxillofacial injuries were recorded for cause of injury, age and gender distribution, frequency and type of injury, injury mechanisms, localization and frequency of soft tissue injuries, dentoalveolar trauma, facial bone fractures, and concomitant injuries. Univariate statistical analyses were followed by logistic regression analyses for the 3 injury types to determine the impact of the main injury causes on the type of injury at different ages in pediatric facial trauma patients.

Results: Play (58.2%), sport (31.8%), and traffic accidents (5%), acts of violence (3.9%), and other causes (1.1%) were noted. A total of 389 patients (11.5%) had 615 fractures, 2,582 patients (76.3%) had 3,384 dentoalveolar injuries, and 1,697 patients (50.1%) had 2,061 soft tissue injuries. The girl-to-boy ratio was 3:5, and the mean age was 7 ± 4.4 years. For children sustaining facial trauma, logistic regression analyses revealed increased risks for fractures (+238%) and soft tissue lesions (+89%) in children involved in traffic accidents. Dental trauma was more frequent (>+38%) in both sport and play accidents (all $P < .001$).

Conclusions: This study dissected the distinct impact of injury mechanisms in pediatric craniomaxillofacial trauma. Logistic regression analyses revealed statistically highly significant outcome differences in pediatric facial trauma depending on the injury mechanism.

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Trauma is the leading cause of morbidity and mortality/death in children.[1] Head trauma prevails, yet the percentage of severe pediatric maxillofacial trauma is still moderate compared with that in adults. Among all causes of pediatric maxillofacial trauma, the majority accounts for dentoalveolar trauma and soft tissue

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injuries, whereas the frequency of facial bone fractures is considerably low.[1-7]

Surpassing all other major diseases of children in frequency and consequence, trauma affects 1 of every 3 individuals annually.[1] A review of the current literature has shown great statistical variation regarding pediatric maxillofacial injury. Estimates regarding the incidence of pediatric facial fractures range between 1% and 14.7% for victims under the age of 16 and 0.87% to 1% for those younger than 5.[1-8]

Independent from the presence of craniomaxillofacial injuries in children, the general management of children after trauma requires special attention for several critical differences compared with adults, as follows. 1) Children are more prone to hypothermia due to a larger body surface area–to–overall mass ratio than adults. 2) Children may maintain a normal or borderline blood pressure level despite significant fluid loss and then decompensate rapidly. 3) Abdominal girth and the volume of the peritoneal cavity in infants and young children are relatively small. Significant intra-abdominal bleeding results in a rapid change in girth. 4) Children frequently swallow air when they are injured or frightened, resulting in gastric dilatation. This may be a source of confusion when evaluating the patient to rule out an acute abdomen. 5) The chest wall in children is pliable; major thoracic injuries may exist with fewer than expected signs of external trauma. 6) Infants are obligate nasal breathers. At the same time, their nasal air passages are relatively narrow and easily obstructed.[1-4,9-11]

A child is more difficult to examine both clinically and radiologically. The small size, lack of development, and lack of pneumatization of paranasal sinuses make the diagnosis of maxillofacial trauma by radiographic examination much more difficult in the child than in the adult. Clinical evaluation and palpation in the child are less rewarding diagnostically than in the adult. The maxilla and mandible of a child contain unerupted teeth or there is a mixed dentition. This produces a more stable structure, requiring greater force to cause a fracture, and makes fixation more difficult via either internal means or by intermaxillary fixation. The lack of pneumatization, developing bone, and mixed dentition all contribute to elasticity and stability, requiring greater force to produce a fracture. Thus, concomitant intracranial and other trauma may accompany maxillofacial trauma in children more frequently than in adults.[11-14] Because the facial bones of the child heal much more rapidly than do those of the adult, stabilization is required at an earlier time, usually within 5 days. Unwarranted operative intervention in the child, including unnecessary internal fixation, inadequate treatment, or recognition of chondritis, hematoma, or seroma, may lead to greater long-term deficits and deformities in the child than in the adult. Due to these basic principles, children are a peculiar subpopulation of craniomaxillofacial trauma patients.[15-18]

The purpose of this study was to provide a comprehensive overview regarding the full scope of craniomaxillofacial trauma in pediatric patients to assist the clinician in the assessment of this unique and highly specialized area of traumatology. The study, including evaluation of facial bone fractures, dentoalveolar trauma, and soft tissue injuries, as well as concomitant injuries, also investigated the impact of the 4 main causes of accidents resulting in pediatric facial injury. Furthermore, statistical patterns in craniomaxillofacial trauma of pediatric patients were compared with accident causes based on logistic regression analyses.

Patients and Methods

During a period of 10 years (January 1, 1991, through December 31, 2000), 3,385 patients younger than 15 years with craniomaxillofacial trauma were registered at the Department of Oral and Maxillofacial Surgery in the University Hospital of Innsbruck, Austria. Data were collected for medical history, symptoms reported or pathologic signs displayed by the patients, and results of clinical and radiologic examination.

The records of patients were studied according to frequency and type of injury (facial bone fractures, dentoalveolar trauma, and soft tissue injuries), as well as to age and gender distribution, monthly and yearly distribution, nationality of patients, cause of accidents, and concomitant injuries. Patient characteristics were analyzed using descriptive statistics. Comparisons were performed with χ^2 tests, Fisher's exact test, and Mann-Whitney U test, as appropriate. This

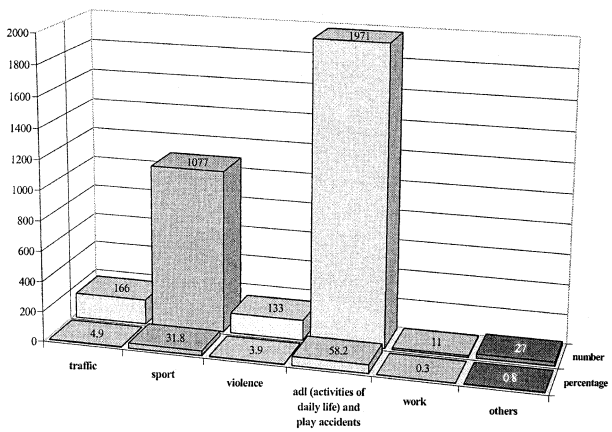

FIGURE 1. Craniomaxillofacial trauma in 3,385 children and causes of injury (1991 to 2000).

Table 1. DESCRIPTION OF THE SAMPLE: CRANIOMAXILLOFACIAL TRAUMA 1991 TO 2000 (N = 3,385, 6,060 INCIDENTS)

Variable	
Age (yr)	
Mean	7.08
SD	4.36
Minimum	0
Tenth percentile	2
Twenty-fifth percentile	3
Median	7
Seventy-fifth percentile	11
Ninetieth percentile	14
Maximum	15
Gender (n)	
Male	2,116
Female	1,269
Injury type (n)	
Facial bone fractures	615
Dentoalveolar trauma	3,384
Soft tissue lesions	2,061
Cause of injury (n)	
Activities of daily living	1,971
Sports	1,077
Violence	133
Traffic	166
Work	11
Others	27
Mechanism of injury (n)	
Falls	1,850
Collisions with objects	391
Struck by equipment	97
Collisions with other person	184
Lift accidents	20
Traffic collisions	99
Blows (eg, fist)	277
Others	64
Undefined play accident	311
Unknown	91
Suicide	1

was followed by logistic regression analyses for the 3 injury types to determine the impact of the 4 main causes of craniomaxillofacial injury. Of the 3,385 children, 40 cases had to be excluded from the logistic regression model due to missing values in 1 or more variables. The final regression model included the variables age, gender, and type of facial trauma. Odds ratios and their 95% confidence intervals were calculated to represent the relative risk of the variables of age, gender, violence, and play, sport, and traffic accidents.

Results

From January 1, 1991, to December 31, 2000, 3,385 children and young adolescents, younger than 15 years of age, were treated at the University of Innsbruck's Department of Oral and Maxillofacial Surgery. They sustained 6,060 craniomaxillofacial injuries. Play accidents (1,971) were the major causes of injury (58.2%), followed by 1,077 sport injuries (31.8%), 166 traffic accidents (5%), 133 assaults (3.9%), and 11 work-related accidents (0.3%). Less than 0.8% of all accidents (27) were due to other causes (Fig 1).

AGE AND GENDER DISTRIBUTION

The age of patients at the time of injury ranged from 0 to 15 years, with a mean age (SD) of 7 ± 4.4 years. Ten percent of the patients were younger than 2 years, and 50% were between 3 and 11 years old; 10% were older than 14 years (Table 1).

The overall age distribution revealed that 1.7% of all children were younger than 1 year. Children between 1 and 4 years of age accounted for the highest percentage of accidents among all ages (26.3%). While decreasing to the sixth year of life (5.8%), a second peak of accidents followed in the eighth year of life (7.5%). In all preceding years, children had lower percentages (Fig 2). A greater proportion of injured patients were boys (n = 2,116) compared with girls (n = 1,269), resulting in a ratio of nearly 5:3 (Table 1).

YEARLY AND MONTHLY DISTRIBUTION AND NATIONALITY OF PATIENTS

The yearly distribution of accidents showed an increase in the first 5 years, leveling to about one injured child per day in a year in the remainder of the years (Fig 3). The monthly distribution peaked in the summer season in August (10%) and during the spring season in May (9.2%) and revealed the lowest occurrence in the fall season in November (5.9%) (Fig 4). Of all of the patients, 14% were from abroad. There were 86% Austrians, 6% Germans, and 8% from other countries (Fig 5).

INJURY TYPES

A total of 389 patients (11.5%) had 615 facial bone fractures (either in combination with dentoalveolar

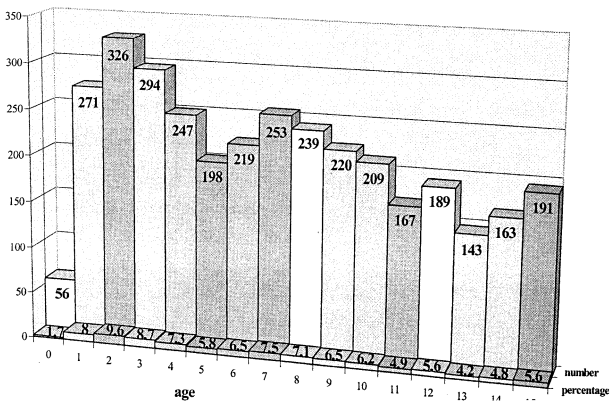

FIGURE 2. Age distribution of 3,385 children with 6,060 craniomaxillofacial injuries (1991 to 2000).

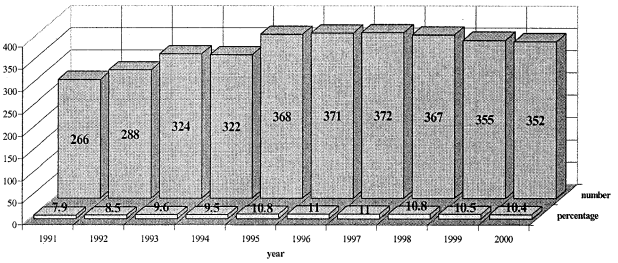

FIGURE 3. Yearly distribution of 3,385 children with 6,060 craniomaxillofacial injuries (1991 to 2000).

trauma or soft tissue lesions, both, or isolated), 2,582 patients (76.3%) had 3,384 dentoalveolar injuries, and 1,697 patients (50.1%) had 2,061 soft tissue injuries. Patients with injuries outside the face were referred for evaluation in 42 cases (1.2%). The occurrence of the 3 injury types and their combinations in all 3,385 children are displayed in Table 2, and the dominant injury type per accident is represented in Figure 6.

Facial Bone Fractures

There were 615 facial bone fractures in 389 patients. Midface fractures accounted for 64.5% and mandible fractures accounted for 35.5% of the cases. The type of fracture (24 sites), the number of facial bone fractures, and their percentages of the total are listed in Table 3.

Dentoalveolar Trauma

Among 3,384 dentoalveolar injuries in 2,582 patients, 56.3% were subluxations, 28.8% were crown fractures, 1.3% were root fractures, 7.2% were avulsions, 4.4% were intrusions, and 2.0% were tooth concussions (Table 4).

Soft Tissue Injuries

Among 2,061 soft tissue injuries in 1,697 patients, 51.9% were lacerations, 22.6% were abrasions, 13.8% were contusions, and 11.7% were hematomas (Table 5).

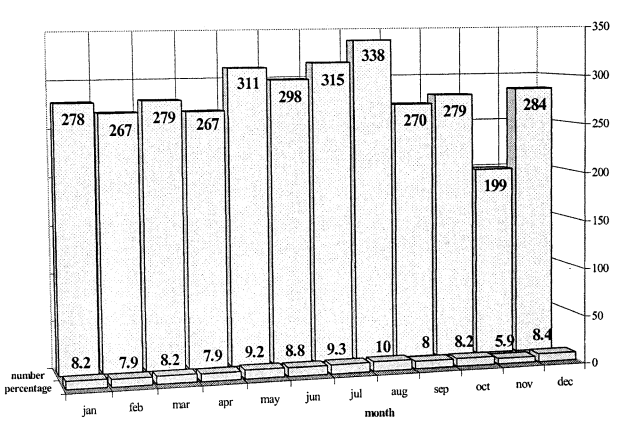

FIGURE 4. Monthly distribution of 3,385 children with 6,060 craniomaxillofacial injuries (1991 to 2000).

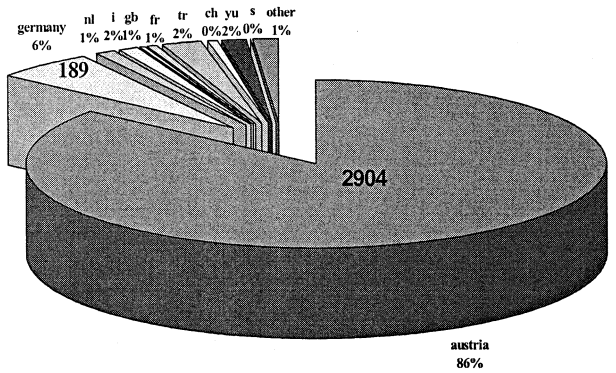

FIGURE 5. Nationality of 3,385 children with 6,060 craniomaxillofacial injuries (1991 to 2000).

Concomitant Injuries

Children with craniomaxillofacial trauma sustained 215 severe associated injuries (6.3%), mainly craniocerebral injuries (80.5%) with and without operative interventions, chest and abdominal injuries (7%), spine injuries (0.9%), and fractures of extremities (11.6%) (Table 6).

REGRESSION ANALYSES

The results of logistic regression analyses for facial bone fractures, dentoalveolar trauma, and soft tissue injuries overall are reviewed in Tables 7, 8, and 9, including highly statistically different mean ages of occurrence as well as nonoccurrence for specific injury types in children. The probability of sustaining facial bone fractures, dentoalveolar trauma, and/or soft tissue injuries generally varied with statistically highly significant differences depending on the injury mechanism ($P < .001$).

Age-related differences were discerned for patients analyzing the injury types. The mean age of patients with dentoalveolar trauma was 6.8 ± 4.2 years, compared with patients with soft tissue injuries (7.4 ± 4.4 years) and patients with facial bone fractures (9.7 ± 4

Table 2. CATEGORY OF INJURY IN ACCIDENTS WITH CHILDREN 1991 TO 2000

Category of Injury	n	%
Soft tissue lesions	509	19.8
Dentoalveolar trauma	1,526	59.5
Facial bone fractures	86	3.4
Soft tissue plus dentoalveolar trauma	101	3.9
Soft tissue plus bone fractures	168	6.6
Dentoalveolar plus bone fractures	34	1.3
Soft tissue plus dentoalveolar plus bone fractures	101	3.9
Injuries outside the face	42	1.6
Total	2,567	100

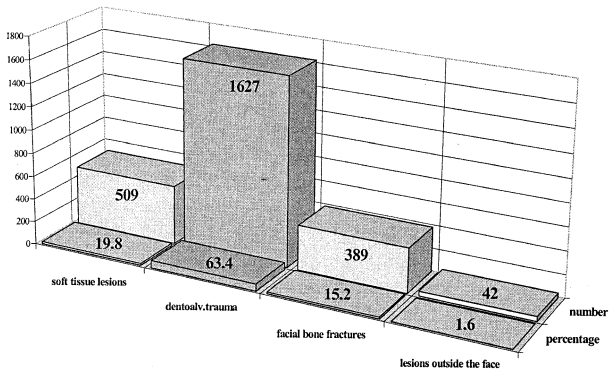

FIGURE 6. Dominant injury type per accident, 1991 to 2000 (n = 3,385).

years). All differences were statistically highly significant ($P < .001$).

The risk to sustain bone fractures in facial trauma of children increased with every year of age by 14%; there also were significant gender differences. There was a 2.38-fold risk (+238%) for bone fractures in children involved in traffic accidents in comparison with other injury types. Violence and sports accidents did not reveal statistically significant differences for bone fractures in children compared with other injury mechanisms or types. In contrast, the probability of suffering bone fractures is diminished in play-related accidents by 40% ($P < .005$) (Table 7).

There were elevated risks for dentoalveolar trauma of 5% per year for younger children compared with older children, yet there were no gender differences in dentoalveolar trauma. Also, the probability of sustaining dentoalveolar trauma ($P < .005$) was increased in sports-related accidents by 38% and in play accidents by 39% but reduced in assaults by 39%. Interestingly, traffic accidents did not reveal statistically significant differences for dentoalveolar trauma in children compared with other injury mechanisms or types (Table 8).

Furthermore, age and gender did not reveal statistically significant differences for soft tissue injuries. The probability of sustaining soft tissue injuries ($P < .005$) is heightened in traffic accidents by 89%, yet reduced in play accidents by 29%. Finally, in sports-related accidents and during assaults, no statistically significant differences existed for the probability of sustaining soft tissue trauma (Table 9).

Table 3. FACIAL BONE FRACTURES: ACCIDENTS WITH CHILDREN 1991 TO 2000 (N = 615)

Type of Fracture	n	%
Le Fort I	2	0.2
Le Fort II	5	0.8
Le Fort III	3	0.5
Zygoma right	40	6.5
Zygoma left	38	6.2
Zygomatic arch right	6	0.9
Zygomatic arch left	8	1.3
Orbital floor right	54	8.7
Orbital floor left	53	8.6
Frontal bone right	17	2.8
Frontal bone left	15	2.4
Maxilla right	8	1.3
Maxilla left	11	1.8
Maxillary process right	56	9.1
Maxillary process left	46	7.5
Nose	36	5.9
Mandible symphysis	10	1.6
Mandible right	36	5.9
Mandible left	36	5.9
Collum right	28	4.6
Collum left	51	8.3
Mandibular process right	12	2.0
Mandibular process left	12	2.0
Caput	32	5.2
Total	615	100

NOTE. Midface fractures accounted for 64.5%; mandible fractures, 35.5%; number of patients, 389; number of fractures, 615.

Table 4. DENTOALVEOLAR INJURIES: ACCIDENTS WITH CHILDREN 1991 TO 2000 (N = 3,384 INJURIES, 2,582 PATIENTS)

Dental Trauma	n	%
Crown fractures	975	28.8
Root fractures	45	1.3
Luxations	1,904	56.3
Losses	244	7.2
Contusions	68	2.0
Intrusions	148	4.4
Total	3,384	100

Discussion

In this study, we evaluated pediatric facial trauma in 3,385 children younger than 15 years with a total of 6,060 craniomaxillofacial injuries over a period of 10 years. A yearly breakdown showed that about 1 child needed treatment for facial injuries per day at this hospital serving an area of 500,000 inhabitants. Of all the patients, 86% were Austrians and 14% were from

Table 5. SOFT TISSUE INJURIES: ACCIDENTS WITH CHILDREN 1991 TO 2000 (N = 2,061 INJURIES, 1,697 PATIENTS)

Soft Tissue Injury	n	%
Lacerations	1,069	51.9
Excoriations	466	22.6
Contusions	285	13.8
Hematomas	241	11.7
Total	2,061	100

Table 6. ASSOCIATED CRANIOCEREBRAL AND OROFACIAL INJURIES IN CHILDREN WITH CRANIOMAXILLOFACIAL INJURIES 1991 TO 2000 (N = 3,385 CHILDREN)

Injury Region	n	%
Brain	173	80.5
Abdomen	8	3.7
Extremities	25	11.6
Vertebra	2	0.9
Trunk	7	3.3

abroad. The monthly distribution peaked in the summer season in August (10%) and during the spring season in May (9.2%) and was the lowest in the fall season in November (5.9%), which is consistent with other reports.[2,3,5-7,11]

When comparing all 9,543 recorded injured patients at this institution in the same period,[6] 1 of 3 injured patients was a child, and only 4% of all patients were children with facial bone fractures. Although the second finding—that children account for a relatively small percentage of all fractures—is consistent with other reports,[1,4-8,12,13,19,20] the high occurrence of pediatric facial trauma involving soft tissues and dentoalveolar arches is underestimated in the literature.[2,4,10-13,21,22] Our study confirms Haug and Foss's[1] statement that dental and dentoalveolar injury is frequently overlooked in surveys that review pediatric maxillofacial injury. Children between 1 and 4 years of age accounted for the highest percentage of accidents in all ages (26.3%) sustaining mainly dentoalveolar injury to the primary dentition and soft tissue injuries. A second peak of accidents followed in the eighth year of life (7.5%), affecting the newly erupted permanent incisors, especially in the maxillary arch. Younger children were more prone to dentoalveolar trauma (6.8 ± 4.2 years) and soft tissue injuries (7.4 ± 4.4 years). Further, younger children had elevated risks for dentoalveolar trauma of 5% per year compared with older children, yet there existed no gender differences for girls compared to boys in dentoalveolar trauma. Interestingly, age and gender revealed no statistically significant differences for soft tissue injuries.

Older children sustained facial bone fractures (9.7 ± 4 years). The risk of bone fractures in facial trauma of children increased with every year of age by 14%. Surprisingly, there again existed no gender differences. A greater proportion of injured patients were boys compared with girls, resulting in a ratio of 1.8:1, which coincides with most other reports of a ratio of 2:1.[1-4,14,19,22-27] All differences were statistically highly significant ($P < .001$) for mean ages of occurrence as well as nonoccurrence of facial bone fractures, dentoalveolar trauma, and soft tissue injuries. The mean age in this series was 7 ± 4.4 years. It is speculated by several authors[1-4,9-14,19-27] that these age-related variations in injury types are attributable to head-body relationship changes and development status of facial structures, especially teeth and sinus.

Although many studies focused on either facial fractures[23-27] or dental trauma[28,29] or soft tissue injuries alone,[30,31] we analyzed the occurrence of the 3 injury types as well as their combinations, the dominant injury type per accident, and concomitant trauma in this survey. A total of 2,582 patients (76.3%) had 3,384 dentoalveolar injuries; 56.3% accounted for tooth subluxations, 28.8% for crown fractures, 7.2% for avulsions, 4.4% for intrusions, 2.0% for tooth concussions, and 1.3% for root fractures. Among 2,061 soft tissue injuries in 1,697 patients (50.1%) 51.9% were lacerations, 22.6% abrasions, 13.8% contusions, and 11.7% hematoma. Authors claim these injuries require special attention because healing occurs faster than in adults and hypertrophic scars and keloids may form easier in this patient population.[1,2,9,10,13,26,30]

A total of 389 patients (11.5%) had 615 facial bone fractures either isolated or in combination with den-

Table 7. LOGISTIC REGRESSION ANALYSIS: FACIAL BONE FRACTURES FROM ACCIDENTS IN CHILDREN (N = 3,345)

	Facial Bone Fracture		Significance (Crude)	Odds Ratio (Adjusted)	Odds Ratio (95% Confidence Interval)	Significance (Adjusted)
	Yes	No				
Age (yr)	9.67 ± 3.95	6.74 ± 4.3	$P < .001$	1.139 per year	1.105 to 1.173	$P < .001$
Gender			$P < .001$			
Female	131/1,262 (10.4%)	1,131/1,262 (89.6%)		Reference		
Male	250/2,083 (12.0%)	1,833/2,083 (88.0%)		1.020	0.807 to 1.288	$P = .869$
Accidents			$P < .001$	Reference		
Traffic	49/166 (29.5%)	117/166 (70.5%)		2.376	1.778 to 3.177	$P < .001$
Sports	184/1,076 (17.1%)	892/1,076 (82.9%)		1.016	0.833 to 1.240	$P = .875$
Violence	19/133 (14.3%)	114/133 (85.7%)		0.684	0.464 to 1.009	$P = .056$
Play related	129/1,970 (33.9%)	1,841/1,970 (62.1%)		0.605	0.484 to 0.758	$P < .001$

Table 8. LOGISTIC REGRESSION ANALYSIS: DENTOALVEOLAR TRAUMA FROM ACCIDENTS IN CHILDREN (N = 3,345)

	Dentoalveolar Trauma		Significance (Crude)	Odds Ratio (Adjusted)	Odds Ratio (95% Confidence Interval)	Significance (Adjusted)
	Yes	No				
Age (yr)	6.78 ± 4.18	8.05 ± 4.76	$P < .001$	0.946 per year	0.926 to 0.967	$P < .001$
Gender			$P < .001$			
Female	985/1,262 (78.1%)	277/1,262 (21.9%)		Reference		
Male	1,568/2,083 (75.3%)	515/2,083 (24.7%)		0.936	0.790 to 1.109	$P = .442$
Accidents			$P < .001$	Reference		
Traffic	109/166 (65.7%)	57/166 (34.3%)		0.843	0.650 to 1.094	$P = .198$
Sports	805/1,076 (74.8%)	271/1,076 (25.2%)		1.384	1.178 to 1.626	$P < .001$
Violence	73/133 (54.9%)	60/133 (45.1%)		0.618	0.468 to 0.816	$P < .001$
Play	1,566/1,970 (79.5%)	404/1,970 (20.5%)		1.387	1.175 to 1.638	$P < .001$

toalveolar trauma or soft tissue lesions, or both. Formerly, we studied the occurrence of 7,061 facial fractures in 3,578 patients, revealing that 37.5% of all 9,543 facial trauma patients had fractures.[6] Although 51.8% of all 6,158 patients above 15 years of age had a total of 6,446 fractures, only 11.5% of 3,385 children sustained a total of 615 fractures. Besides this almost 5 times reduced likelihood of facial bone fractures in pediatric facial trauma in comparison to adolescent and adult trauma, the frequency of 2 fractures per adult with bone fractures is decreased in children to a frequency of 1.6 fractures per child.[6]

Facial fractures in children were 3 times less likely combined with soft tissue injuries (6.6%) of the face compared with data from adults (20.3%).[6] Differences for combined dentoalveolar trauma and bone fractures between adults (1.6%) and children (1.3%) were minimal. Among the types of fractures with a total of 24 different sites, midface fractures accounted for 64.5% and mandible fractures accounted for 35.5% of the cases, which is similar to results in recent articles.[2,3]

In our series on children, a total of 6.3% had concomitant injuries, mainly craniocerebral injuries (80.5%) and fractures of extremities (11.6%), followed by trunk (7%) and spine injuries (0.9%). These concomitant injuries most frequently occurred in children with facial bone fractures, revealing almost every second child with facial bone fractures had concomitant injuries. This pattern of injury distribution was also reflected in analyses of trauma statistics on children[2,3,10,12-14,19-22] where musculoskeletal and head trauma were the most frequent associated injuries. In comparison to these findings in children, concomitant injuries in facial trauma of the adult population account for a distribution around 20%.[6,32,33]

The majority of accidents occurred during playing (58.2%), followed by accidents during sporting activities (31.8%), traffic accidents (5%), assaults (3.9%), and work-related accidents (0.3%). This allotment of injury causes differed from rankings of other studies, some of which have identified road accidents and some falls as the primary cause.[1-5,7,9-14,19-27,34-36] Regression analyses revealed statistically highly significant differences for injury types depending on the injury causes. In our series, children involved in traffic accidents had a 2.38-fold risk (+238%) for bone fractures in comparison to other injury types, confirming findings of other reports.[2,3,14,19,20] Violence and sports accidents did not reveal statistically significant differences for bone fractures compared with other injury mechanisms or types. In contrast, the probability of

Table 9. LOGISTIC REGRESSION ANALYSIS: SOFT TISSUE INJURIES FROM ACCIDENTS IN CHILDREN (N = 3,345)

	Soft Tissue Injury		Significance (Crude)	Odds Ratio (Adjusted)	Odds Ratio (95% Confidence Interval)	Significance (Adjusted)
	Yes	No				
Age (yr)	7.38 ± 4.43	6.77 ± 4.27	$P < .001$	1.016 per year	0.997 to 1.035	$P = .098$
Gender			$P < .001$			
Female	618/1,262 (49.0%)	644/1,262 (51.0%)		Reference		
Male	1,066/2,083 (51.2%)	1,017/2,083 (48.8%)		1.047	0.909 to 1.207	$P = .525$
Accidents			$P < .001$	Reference		
Traffic	118/166 (71.1%)	49/166 (28.9%)		1.889	1.444 to 2.470	$P < .001$
Sports	581/1,076 (54.0%)	495/1,076 (46.0%)		0.889	0.763 to 1.036	$P = .131$
Violence	71/133 (53.4%)	62/133 (46.6%)		0.841	0.638 to 1.108	$P = .218$
Play	914/1,970 (46.4%)	1,056/1,970 (53.6%)		0.709	0.606 to 0.828	$P < .001$

sustaining bone fractures is diminished in play-related accidents by 40% ($P < .005$).[6,37]

The probability of sustaining dentoalveolar trauma ($P < .005$) was increased in sports-related accidents by 38% and in play accidents by 39% but reduced in assaults by 39%.[38] Traffic accidents did not reveal statistically significant differences for dentoalveolar trauma in children compared with other injury mechanisms or types.

The probability of sustaining soft tissue injuries ($P < .005$) was heightened in traffic accidents by 89%, yet reduced in play accidents by 29%. On the other hand, sports-related accidents and assaults showed no statistically significant differences for sustaining soft tissue trauma.

In this article, we provide evidence that databases such as the one instituted at our hospital raise and establish awareness of causes of and reasons for pediatric trauma. *Trauma,* defined as bodily injury resulting from an external force, is the leading health problem that children are facing today. It is the most preventable and treatable public health disease.[1-8,17-22,28-30,32-40] Databases of pediatric trauma cases corroborate high-frequency categories of injury and verify effectiveness of developed prevention programs. Outcome assessment of such databases in multidisciplinary morbidity and mortality conferences leads to improved patient care and better educated health care providers. Treatment cost reimbursement may become more direct and indirect cost related. Analysis of hospital costs based on these databases will encourage more efficient use of hospital resources. They are needed for quality assurance as a planned and systematic method of evaluation that measures the adequate degree of and compliance with selected optimal trauma care standards.[39] In general, databases are recognized as great assets and are used to satisfy a variety of internal as well as external needs and provide important support to install safety programs, to increase public awareness, and to decrease morbidity and mortality resulting from pediatric trauma.

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