INJURY BULLETIN

Queensland Injury Surveillance Unit

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Facial Injury

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QISU collects and analyses data from emergency department injury presentations on behalf of Queensland Health. Participating hospitals represent three distinct areas of Queensland.

QISU publications and data are available on request for research, prevention and education activities.

HOSPITALS:
Mater Children's, Mater Adult, Queen Elizabeth II Jubilee, Princess Alexandra, Redland, Logan, Royal Children's, Mount Isa , Mackay Base, Proserpine, Mackay Mater, Sarina, Clermont, Dysart and Moranbah.

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Summary

- Facial injuries are a common cause for presentation to the Emergency Department across all ages representing 8% of all injury presentations in our data.
- Men are over-represented in the data, presenting three times more frequently with facial injury and four times more frequently with facial fractures.
- 34% of all facial injuries and 44% of facial fractures in adults occur due to assault. There is a clear link between alcohol use and assault. The peak ages for assault are 15 to 24 years for males and 15 to 39 years for females.
- Sports related injuries were the second most common cause for facial fractures in adolescents and adults (43% for children aged 10 to 14 years and 23% for adults aged 15-64 years).
- Custom made mouthguards have proven efficacy in reducing facial injury, particularly dental and upper jaw injury.
- Dental injury tends to be disproportionately costly and may involve long-term corrective procedures.

Introduction

Facial injuries are a common cause for presentation to the Emergency Department (ED) across all ages. Whilst there is a combination of major and minor injuries, the significant ones require complex reconstructive surgery and rehabilitation. Even minor facial injuries which cause scarring can be costly and have a personal impact on the injured person. This issue of the bulletin outlines the common causes of facial injury and discusses the nature of more serious facial injury at different ages.

Facial injury may be the result of blunt trauma, penetrating trauma or burns (resulting from exposure to hot objects, liquids or irritants). The pattern of injury varies according to age. In toddlers, facial injuries are frequently minor, the majority caused by low falls or collisions with people or objects. In adults, facial injury is most frequently due to assault or transport related trauma and facial fractures are common.

Methods

Data was collected through the QISU surveillance system from the participating hospitals listed (to the left). Injury presentations are coded at the presenting hospital according to the nature and cause of the injury. Data was extracted from the database by searching for facial injury in the presenting description and through analysing final diagnosis fields for codes relevant to facial injuries. Intra-ocular injuries

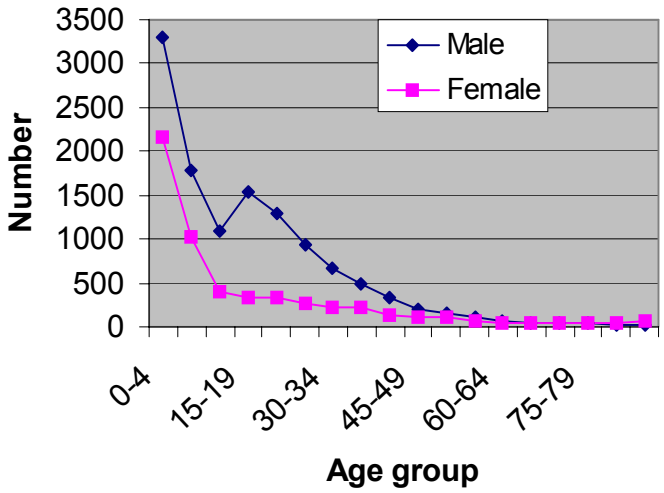

Figure 1 QISU Emergency Department presentations, 1998-2002, facial injuries by age and sex

were excluded. In the case of patients with multiple injuries, a final diagnosis code may be made according to a more significant injury, for example a concurrent intracranial injury. Similarly some facial injuries may not be recognised until later. Therefore some cases of facial injury may not have been identified for our analysis.

Results

During the period 1998 to 2002, there were 17,886 presentations to participating emergency departments with facial injuries (excluding intra-ocular injuries). This represents 8% of all injury presentations for this period.

There was a bimodal distribution of injuries according to age, with peaks in ED presentations in the 0 to 4 year age group and the 15 to 19 year age group. Males presented more frequently than females in every age group except for those >65 years (Figure 1). The nature of injury varied across age group, with a higher proportion of injuries in children resulting in superficial injuries and a higher proportion in adults resulting in facial fractures (Table 1). Burns represented a small proportion of all facial injury presentations (0.5%). Burns, including facial burns have been discussed in a previous QISU Injury Bulletin (No 55). The pattern of facial fractures remains relatively constant over age, with mandibular and dental fractures occurring most commonly.

Children

Causation varied significantly across different age groups. For children less than 14 years of age, greater than 75% of injuries were due to falls or collisions with people or objects. Peak presentations due to falls or collisions occurred in the 1 to 4 year age group (Figure 2). The majority of these injuries were superficial (minor abrasions, bruises and lacerations) with 10% requiring hospital admission overall.

For facial injuries in children resulting in fracture, the age distribution was significantly different with facial fractures being sustained more commonly in the 10 to 14 year age group (Figure 3). The majority of fractures were sustained during recreational activities, with the breakdown according to more frequent activity shown in Table 2.

Of a total of 213 child presentations with facial fractures, 31 were due to assault (16%). Cycling injuries were the second most common single cause for presentation after assault, accounting for 21 (10%) of all fracture presentations in this age group. Five fracture presentations were due to motor vehicle crashes (MVC) (2%). Organised sports activities accounted for 83 out of the 213 presentations (43%) with facial fractures with the majority of these occurring whilst playing league football 17/213 (8%). Unstructured play and other activities accounted for the remaining presentations.

Age Group	Superficial	Laceration	Fracture	Burn	Dental	Other	Total
<1	247	189	6	6	1	33	482
1-4	1,139	3,537	75	13	30	182	4,976
5-9	617	1,869	136	6	32	158	2,818
10-14	418	690	213	6	16	169	1,512
15-24	756	1,788	570	30	23	339	3,506
25-64	889	2,269	532	25	12	452	4,179
>65	94	243	45	3	0	28	413
	4,160	10,585	1,577	89	114	1,361	17,886

Table 1 QISU Emergency Department presentations, facial injuries by age and nature of injury, 1998-2002

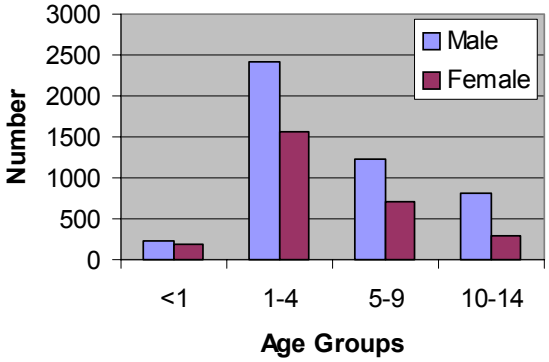

Figure 2 QISU Emergency Department presentations, facial injuries in children, falls and struck by, 1998-2002

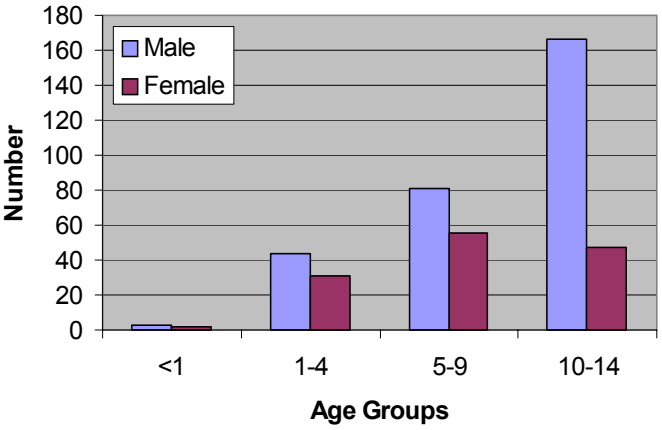

Figure 3 QISU Emergency Department presentations, facial fractures in children (0-14), 1998-2002

Adults

The pattern of facial injury in adults (15-64 years) is different with the majority of facial injuries occurring due to assault (34%), with 3% reportedly due to spousal assault. Twenty-three percent were sports related injuries (excluding assaults) while motor vehicle and motorcycle passenger or driver injuries accounted for 12% of facial injuries in this age group. Nine percent of adult facial injuries were unintentional work-related injuries.

For adults aged over 65 years, females were over-represented being 1.4 times more likely than males to present with a facial injury. Most facial injuries in this age group (66%) occurred at the place of residence (private home or care facility). The majority (69%) of facial injury presentations were due to falls particularly for females who were 1.7 times more likely than males to present for this reason.

For facial injury resulting in fracture in adults, assault is the most common cause. Males were more frequently affected across all ages with a peak incidence in the 15 to 24 year age groups (Figure 4). Assault accounted for 34% of all male facial injuries between the ages of 15 and 64 and 45% of facial fractures. For females the frequency is lower but more evenly spread with almost equal numbers across the 15 to 39 year age groups (Figure 5). As with males, assault in females accounted for a similar proportion of facial injuries and fractures (35 and 44% respectively) although the overall number was lower. Males were three times more likely than females to present with a facial injury due to assault and four times more likely to present with a facial fracture due to assault.

The majority of assaults occurred at home (24%) on the street (21%) or at a drinking establishment (17%).

Activity	No.
Baseball	10
Basketball	4
Cricket	7
Football Australian	3
Football League	17
Football Union	7
Soccer	12
Football other or unspec	15
Hockey	2
Gymnastics	1
Golf	5
Swimming/ Diving	10
Cycling	21
Roller-blading	2
Skateboarding	2
Horse riding	4
Mini bike/ trail bike riding	2
Trampolining	3
Play– unstructured	16
Other sports activity	9
Other activity	19
Unspecified	6
MVC pedestrian/ passenger	5
Assault	31
Total	**213**

Table 2 QISU Emergency Department presentations, facial fractures in children aged 10-14 years, by activity, 1998-2002

Discussion

Facial injuries occur by a variety of mechanisms that are age relevant. Although males are over represented for most types of injuries in our data, the frequency of male presentations with facial injuries is disproportionately high. This may be due to a variety of factors. For injuries sustained by children this probably reflects greater participation in contact sports and general aggressive play for male children. How-

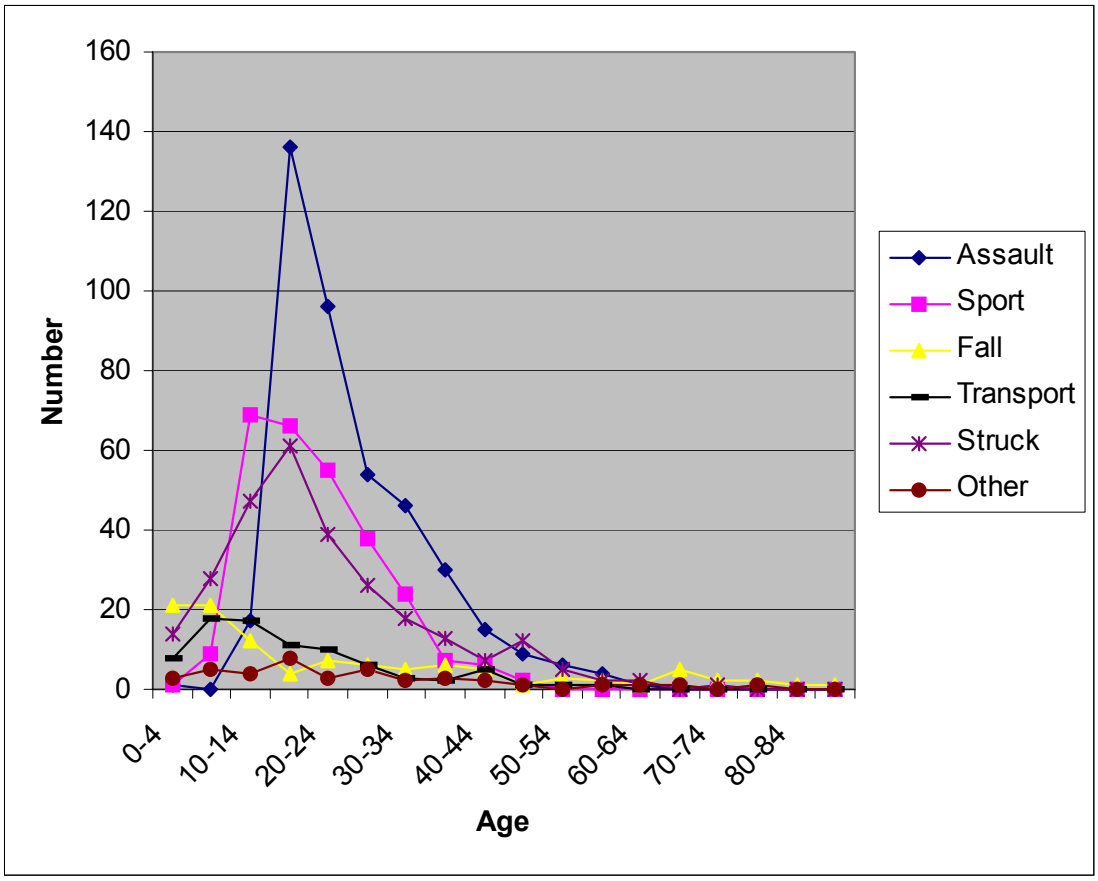

Figure 4 QISU Emergency Department presentations, male facial fractures by cause and age, 1998-2002

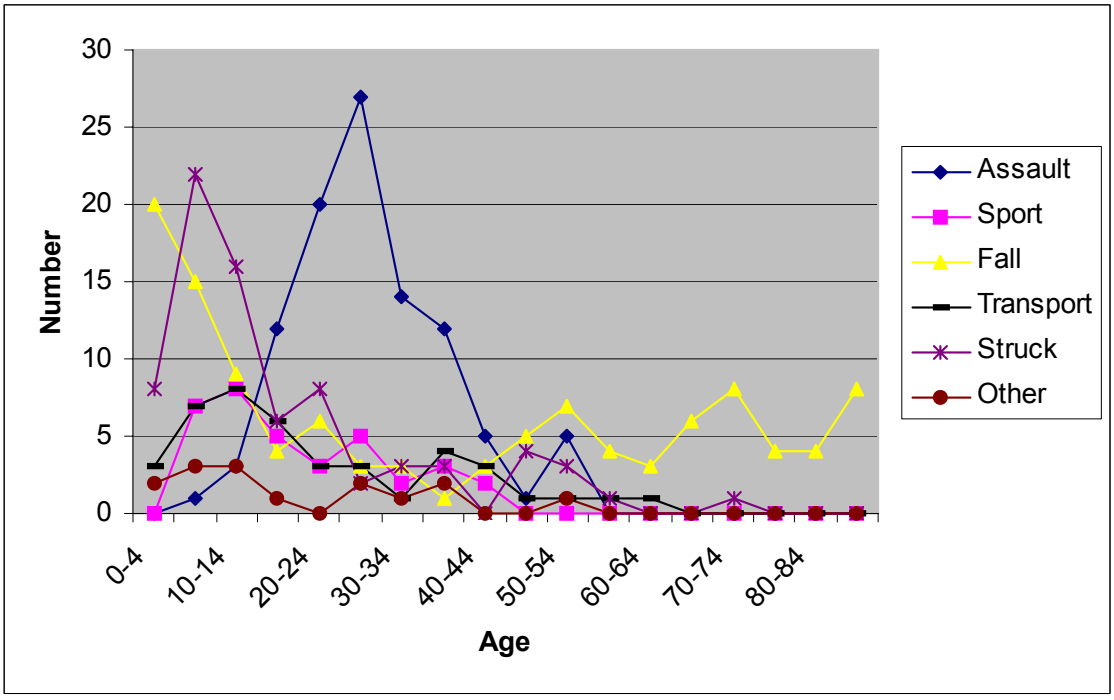

Figure 5 QISU Emergency Department presentations, female facial fractures by cause and age, 1998-2002

ever, this pattern also holds true for toddlers and is similar to the comparative rates seen for toddler drowning in males compared to females. This may be accounted for by more adventurous play and perhaps a less protective style of supervision.

For adults, transport crashes as a cause of facial injury has been noted to be on the decrease, with a rise in the proportion of injuries due to interpersonal violence[1]. Males are over represented in both categories in our data. Although assault accounted for a similar proportion of facial injury presentations for males and females in our data, males were three times more likely to present with a facial injury following violent assault. It is presumed that for both male and female victims of assault, the perpetrator is most likely male[1]. Although this is not clear from our data. Females, particularly in situations of domestic violence, are perhaps less likely to present with their injuries. If they do present, they may also not identify that they have been assaulted. This may account for the lower number of female presentations with facial injury due to assault in our data. This pattern of facial injury due to assault is reflected in recent statistics from the UK, where a clear association between alcohol, male violence and facial injury has been found[1].

Transport related injury still accounts for the majority of severe facial injury[2]. A recent review of adult facial injuries from transport related injuries (car, motor bike, cyclist and pedestrian) in Queensland was performed using Motor Accident Insurance Commission data[3]. This identified peak rates for facial injuries due to motor vehicle crashes between 18 and 22 years, probably reflecting driver inexperience and concomitant alcohol/ drug use. Overall there was no significant difference in incidence between males and females injured in motor vehicle crashes. There were more injured passengers than drivers, predominantly back seat car passengers. This may reflect positioning of air bags and wearing of restraints in cars. For motor bike injuries, the peak age for facial injury was 23 to 27 years even though there were three times more motorcycle licensees in QLD in the 40 to 49 year age group. There are seven times as many males as females with motorcycle licences in QLD. When taking this into account females suffered facial injuries due to motorcycle crashes 1.5 times more frequently than males. However the study does not distinguish between motorcycle passenger and driver injuries.

Although the majority of facial injuries result in minor bruising or lacerations, this represents a significant workload in terms of clinical assessment, diagnostic imaging and management. Facial injuries that result in admissions represent the more severe end of the spectrum but also reflect the age of the person injured and complexity of treatment required. Young children and older people are more likely to be admitted for observation for concurrent head injury or anaesthetic management following a facial injury.

In a review of dental injuries requiring admission in children aged 0-14 years at Royal Children's Hospital, Brisbane, the average age was 5.5 years. One to two year-olds made up 30% of the group[4]. As children in this age group are more likely to require sedation in order to treat their dental injury, they are more likely to present to a paediatric hospital and be admitted. In contrast, other studies have shown that in outpatient dental clinics, the peak age for presentation with dental trauma is between six and ten years of age[5]. Many dental injuries, particularly in adults, will be managed by dental services outside the hospital system. Even minor dental injuries are potentially costly and may require long term corrective procedures.

Prevention

Prevention techniques vary according to age. The majority of injuries in children occur during unstructured play and result in minor facial trauma. General provisions such as safe play areas for young children with soft surfaces and well designed play structures will minimise falls and their impact. Parental supervision is always an important component and the need for ongoing education for parents and carers regarding reasonable risk and perception at various age and developmental stages is important. For older children, provision and wearing of appropriate safety gear for organised sport will minimise injury[6]. There have been increasing efforts to modify sporting rules to make play appropriate for different age groups. Some sporting codes carry an increased risk of injury. The QISU Bulletin on sports injuries May 2000, highlighted the inherent risk of injury for those playing football, with the highest risk associated with playing league.

Custom-made moulded mouthguards, have proven efficacy in contact sports in reducing both dental and oral trauma as well as minimising concussion following lower jaw impacts[7]. The wearing of mouthguards during training and competition has not been consistently adopted across various contact sporting codes. Parents or players inquiring about the advisability of using mouthguards may receive conflicting advice from different sports organisations depending on their individual policies. Mouthguards have been compulsory in the United States for high-school and college football for forty years and have been estimated to reduce the proportion of face and mouth injuries from 50% to <0.5% of all football related injuries[7]. The New Zealand Rugby Union has recently adopted a "no mouthguard, no play" rule for all domestic players allowing a player without a mouthguard to be sent off the field[8]. In contrast, the Queensland Rugby Union does not recommend the use of mouthguards (personal communication).

For cyclists, bicycle helmets, when worn appropriately, have been shown to reduce injury to the upper face, but not the lower face. This combines with their proven role in reducing intracranial trauma[9]. Helmet use has not been consistently adopted in Australia. Although helmet use has been legislated

for cyclists using roads and bikeways, compliance is still a problem. Bicycle helmets with facial protection are compulsory for BMX competition.

For motor vehicle injuries, seatbelts (in particular lap-sash belts) have been the major factor in reducing facial and other injuries. There was an estimated drop in car occupant fatalities of 25% following the introduction of Australian seatbelt laws in 1971[10]. Improved compliance with seatbelt wearing as well as improved motor vehicle design can be expected to further minimise facial injury. Air bags play a clear role in reducing impact to the head and face during and accident, but only offer protection to the driver and front seat passenger. Side air bags have also been shown to reduce impact but again are not widely available. For motorcyclists, a well-fitted full-face motorcycle helmet will offer protection from facial as well as head injury.

Interpersonal violence as a cause of facial injury is more difficult to target. Promoting safe and responsible drinking and driving will partly address the issue. This requires individual action as well as heightened point of sale responsibility for licensed establishments and targeted policing. Some communities have responded to the issue of alcohol associated violence by placing restrictions on the sale of alcohol and changing the manner in which it is sold, replacing glass containers with plastic cups. Addressing this issue beyond public entertainment venues requires broad social measures aimed at strengthening social support for families and promoting education and employment opportunities to break the cycle of alcohol and violence.

Facial injuries in the elderly frequently result from falls in the home. In contrast to facial injuries at other ages, females present to hospital more frequently than males. This probably represents a gender imbalance as more females survive beyond 65 years. The risk of falling can be minimised by promoting exercise to maintain balance and function and removing trip hazards such as loose cords and rugs. Stairs and baths should be fitted with hand rails. Regular reviews of medication regimes will allow optimal control of medical problems whilst avoiding side effects such as hypotension and hypoglycaemia which can contribute to a fall.

Conclusion

Facial injury is prevalent and costly for our community. Males are disproportionately affected. This problem can be reduced by changing perceptions to the use of protective gear during sporting activities and by addressing male violence and patterns of alcohol consumption.

Further Information

Child Injury Prevention

- Kidsafe – www.kidsafe.com.au

Sport

- Sports Medicine Australia- www.sma.org.au
- Smart Play- www.smartplay.com.au Go to resources/links

House design

- Smart Housing– www.smarthousing.qld.gov.au

Home modification

- Home Assist Secure – Information and advice for people 60 years and over www.housing.qld.gov.au Go to quick links – Home Assist Secure for list of phone numbers

These sites can all be accessed via - safecommunitiesQld.org

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