DENTAL TRAUMA

Public Health Aspects

IADT EDUCATION COMMITTEE / Ulf Glendor DDS, PhD
Dental trauma takes longer to treat and is more expensive than many other bodily injuries treated on an outpatient basis (1,2).
Dental Trauma Affects Quality of Life

An untreated dental trauma affects an individual 20 times more, compared to those who have never suffered a dental trauma \((^{3-6})\).

The dominating problem was chewing, eating food and school activities \((^{3-6})\).
Prevalence of Traumatic Dental Injuries
The prevalence of dental trauma is still high world wide

Statistics from many countries show that about:

- One third of preschool children
- One fourth of school children
- One third of adults

...have suffered a dental trauma at least once during their life time (7).
A comparison of *oral* and *non-oral* accidental injuries in all ages during one year (8)

About 90% of all dental traumas occur before the age of 20 (8).
Proportion of accidental injuries in the age interval 0-30 years during one year (8)
Incidence of Traumatic Dental Injuries
Incidence of dental trauma by age and gender \(^{(9)}\)

Incidence: 13 / 1 000 / year

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Repeated Traumatic Dental Injuries
During a 12-year period (age interval 6-18 years) (10):

- 49% of school children with a dental trauma suffered more than one dental trauma event.
- In average these patients suffered 2.9 episodes during the 12-year period.
- There was no significant difference in gender or severity regarding number of dental trauma events.
- 45% of those patients who suffered more than one trauma event injured the same tooth again.
Number of dental trauma events and age (10)

The risk of receiving more dental trauma events increased significantly (8.4 times) if the first event occurred at 9 years of age instead of at 12 years of age.

<table>
<thead>
<tr>
<th>Number of trauma episodes per patient</th>
<th>Number of patients</th>
<th>Age at first episode&lt;sup&gt;1&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>42</td>
<td>11.4 (3.6)</td>
</tr>
<tr>
<td>2</td>
<td>17</td>
<td>8.6 (1.9)</td>
</tr>
<tr>
<td>3</td>
<td>15</td>
<td>8.9 (2.5)</td>
</tr>
<tr>
<td>4</td>
<td>8</td>
<td>8.0 (1.6)</td>
</tr>
<tr>
<td>2-4</td>
<td>40</td>
<td>8.6 (2.1)</td>
</tr>
</tbody>
</table>

<sup>1</sup>Standard deviations within parentheses.
Accident Sites
Predisposing Factors and Etiology
Predisposing factors of dental traumas \(^{(11)}\)

- Overjet with protrusion
- Inadequate lip coverage / closure
Causes of dental traumas (11)

- Falls
- Collisions
- Being struck by an object
- Material deprivation
- Emotionally stressful states (non-nuclear family, paternal abuse)
- Mobbing
- ADHD
- Epilepsy
- Cerebral palsy
- Learning difficulties
- Hearing or visual impairment

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Continued…

- Child and elderly physical abuse
- Assaults
- Torture
- Inappropriate use of teeth
- Oral piercing
- Extreme sports
- Iatrogenic injuries
Sports is an important cause of dental trauma (8)

<table>
<thead>
<tr>
<th>Place of injury related to age and gender (in percent).</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-15 years</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Traffic</td>
</tr>
<tr>
<td>Around home</td>
</tr>
<tr>
<td>School</td>
</tr>
<tr>
<td>Sports stadium</td>
</tr>
<tr>
<td>Other</td>
</tr>
<tr>
<td>16-30 years</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Traffic</td>
</tr>
<tr>
<td>Around home</td>
</tr>
<tr>
<td>Work</td>
</tr>
<tr>
<td>Sports stadium</td>
</tr>
<tr>
<td>School</td>
</tr>
<tr>
<td>Spare time/Pleasure</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

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When Do Most Traumatic Injuries Happen?
Time of day of oral injuries in the age interval 0-30 years during one year (8)

2 out of 3 individuals in the age interval 16-30 years were injured between 18.00-06.00 hours.
Day of week of *oral* and *non-oral* injures in the age interval 16-30 during one year (8)

2 out of 3 individuals in the age interval 16-30 years with oral injuries were injured at week ends.
A comparison of resources spent between dental trauma and other bodily injuries
A comparison between dental trauma and other bodily injuries concerning average number of visits per individual \(^{(1,12)}\)

<table>
<thead>
<tr>
<th>Dental trauma</th>
<th>Permanent teeth</th>
<th>Other bodily injuries treated at outpatient care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glendor et al. 2000</td>
<td>Uncomplicated dental injuries*</td>
<td>Other bodily injuries treated at outpatient care</td>
</tr>
<tr>
<td>A 2-year prospective study of patients 6-19 years of age (^{(12)}).</td>
<td>4.1</td>
<td>1.5</td>
</tr>
<tr>
<td></td>
<td>Complicated dental injuries**</td>
<td></td>
</tr>
<tr>
<td></td>
<td>8.9</td>
<td></td>
</tr>
<tr>
<td>Other bodily injuries</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lindqvist &amp; Brodin 1996</td>
<td>Other bodily injuries treated at outpatient care</td>
<td></td>
</tr>
<tr>
<td>A 1-year retrospective study including all ages (^{(1)}).</td>
<td>1.5</td>
<td></td>
</tr>
</tbody>
</table>

*Uncomplicated=the pulpal tissue is *not* exposed and the tooth is *not* dislocated.

**Complicated=exposure of the pulpal tissue and/or dislocation of the tooth.
### Treatment costs of dental trauma (US$) (13-15)

<table>
<thead>
<tr>
<th>Study</th>
<th>Primary teeth</th>
<th></th>
<th>Permanent teeth</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Glendor et al. 2001 (13)*</td>
<td>68</td>
<td>114</td>
<td>200</td>
<td>606</td>
</tr>
<tr>
<td>Borum &amp; Andreasen 2001 (14)*</td>
<td>60</td>
<td>200</td>
<td>110</td>
<td>926</td>
</tr>
<tr>
<td>”Pessimistic”</td>
<td>-</td>
<td>-</td>
<td>420</td>
<td>1490</td>
</tr>
<tr>
<td>Wong &amp; Kolokotsa 2004 (15)**</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>858</td>
</tr>
</tbody>
</table>

*During a period of 2 years. **During a period of 11 years.

### Treatment costs of non-oral injuries (US$) (13)

<table>
<thead>
<tr>
<th>In- resp. out patient care</th>
<th>Non-oral: children or in all ages</th>
<th>Sweden</th>
<th>Netherlands</th>
<th>USA</th>
</tr>
</thead>
<tbody>
<tr>
<td>In- and out patient care</td>
<td>Children</td>
<td>506</td>
<td>-</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td>All ages</td>
<td>-</td>
<td>1000</td>
<td>-</td>
</tr>
<tr>
<td>Out patient care</td>
<td>All ages</td>
<td>88</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
Knowledge among lay people and professional care givers in how to act at the scene of a dental trauma is scarce
Many people lack knowledge \(^{(16)}\)

- Children and adolescents
- Parents
- Physical trainers and active sportsmen
- School- and physical teachers
- Acute medical staff at emergency centres
- Medical students
- Doctors
- School nurses
- Fire brigades, ambulance personnel
- Lay people
- Correct and sufficient information about dental trauma in First Aid Textbooks and manuals is lacking.
What has been done recently to increase knowledge among lay people and caregivers? (17)

- Short lessons including discussion about replantation of a totally luxated tooth.
- Distribution of brochures and posters about Dental First-aid.
- Telemedical.
- Manuals in waiting rooms.

Lessons and manuals must be repeated / updated regularly, which is costly and time-consuming.

- Today lay people prefer to use the following methods to look for knowledge:
  - Internet
  - Dental personnel
  - Television
The following is known:

- The main part of 16-30 year olds are injured outside working hours (evenings and weekends) when many emergency dental clinics are closed.

Which means:

- Those who are present at the scene of a dental accident are the first to take care of the injured person.
- If acute clinics are closed they must take care of the dental trauma until they reach an opened dental clinic.
Does it pay off to act correctly already at the scene of a dental accident?
The prognosis of an avulsed permanent front tooth

The estimated risk (%) of losing a replanted permanent tooth with a fully root formation and a closed apex

<table>
<thead>
<tr>
<th>Time and type of storage medium before replanting</th>
<th>Estimated risk for a lost tooth after:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 year</td>
</tr>
<tr>
<td>Dry storage time before replanting:</td>
<td></td>
</tr>
<tr>
<td>0-4 minutes</td>
<td>1.5%</td>
</tr>
<tr>
<td>5-60 minutes</td>
<td>1.1%</td>
</tr>
<tr>
<td>61+ minutes</td>
<td>-</td>
</tr>
<tr>
<td>Dry storage no more than 4 minutes followed by a correct transport medium like MILK, SALIVA or SALINE.</td>
<td>2.1%</td>
</tr>
</tbody>
</table>

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Looking for knowledge at Internet

Many people of today use the Internet to look for knowledge. Tools to help the searcher to secure relevant information are still lacking in dentistry. A recently published paper compared information about mouth guards found at Internet and published in scientific papers at Pub Med, which are not easily reachable for lay people.
Surfing for mouth guards: assessing quality of online information (19)

M & M. Internet search, two scoring systems.

Results. Of 223 websites, 39 were designated valid and evaluated. The Public Institution Web site (Health Canada) presented 31 out of 34 scores.

Conclusion. There is a high amount of information about mouth guards on the Internet but the quality varies. It should be the responsibility of health care professionals to suggest and provide reliable Internet URL addresses to patients. An appropriate search terminology and search strategy should be made available to persons who want to search beyond the recommended sites.
It is easy to distribute GuideLines via Internet.

- The dental institutions have to suggest and provide lay people and other care givers with suitable dental links.
- Dental applications, e.g. in smartphones, could easily reach a person anywhere with information concerning a dental trauma already at the scene of an accident.
- When the application is downloaded to the smartphone there is no need for Internet. Updates are free and are sent automatically to the app.

The app "DENTAL TRAUMA" is a Dental First Aid app which is endorsed by the International Association of Dental Traumatology (IADT). This app can be found on IADT homepage, on App Store and Google Play.
The app DENTAL TRAUMA

Presented in 18 languages
The target groups of the DENTAL TRAUMA app

- Parents
- School personnel
- Sports or physical trainers
- Emergency personnel at hospitals or clinics
- Ambulance/Fire brigades/Police
- Receptions in dental clinics
- …and probably more.
Conclusion

- The prevalence of dental trauma is still on a high level worldwide.
- A dental trauma affect quality of life.
- Dental traumas are costly and time consuming to treat.
- Dental trauma events often occur outside office time, which may result in a worsened prognosis.
- The knowledge about how to act at the scene of a dental accident is of major importance, especially concerning avulsed permanent teeth.
- The IADT GUIDELINES and the DENTAL TRAUMA First Aid app are of great help to inform about how to professionally treat a dental trauma, and what to do at the scene of accident and later at home.
Thank you for listening


18. www.dentaltraumaguide.org


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