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<th><strong>Title</strong></th>
<th>The prevalence and prevention of sports-related dental trauma in Hong Kong adolescents</th>
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<td>Chan, Shiu-man, Victoria</td>
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The Prevalence and Prevention of Sports-related Dental Trauma in Hong Kong Adolescents
The Prevalence and Prevention of Sports-related Dental Trauma in Hong Kong Adolescents

2011 Community Health Project

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ABSTRACT

Background: Traumatic dental injuries (TDI) is one of the most prevalence problems in sport injuries. It is anticipated that around 33% of TDI are sports-related.

Aims: 1) To investigate the prevalence of sports-related oral injuries among secondary school students, 2) To evaluate the knowledge of dental injuries management, and 3) To investigate and promote the use of mouthguards in contact sports among secondary schools and Taekwondo training centres in Hong Kong.

Materials and Methods: Five local secondary schools were randomly chosen by stratified random sampling method from the list of Education and Manpower Bureau online. Basketball school team players and students from form 2 and form 5 students were invited to take part in this study. Members from the International Taekwondo Association were selected as the third group. Informed consents were obtained before the distribution of questionnaires, and twelve anterior teeth of the subjects were examined using an LED light with a disposable mirror. Soft tissues, Temporomandibular Joint and the dental status of possible history of TDI were recorded clinically, while the history and extent of TDI were also explored. Knowledge on immediate management of tooth avulsion was also recorded; furthermore, the usage and acceptance of mouthguard were investigated.

Results: A total of 1214 students participated in this study. 58 Taekwondo players, 122 Basketball school team members and 301 form 2 and 5 students were clinically examined and the rest just completed the questionnaires. It was found that no significant differences between the Taekwondo players, Basketball school team members and others in terms of the prevalence of clinically examined sports-related TDI (24% vs. 26% vs. 30%, p>0.05, Chi-square test) and self reported sports-related TDI (17% vs. 18% vs. 11%, p>0.05, Chi-square test). Only around 20% (249/1233) of all subjects knew how to deal with tooth avulsion correctly and also a very small portion of them, around 7% (83/1213) of the subjects claimed that they had ever worn a mouthguard during either practices or matches.

Conclusion: The prevalence of sports-related TDI among Taekwondo players and Basketball school team member are similar to general public. However, the students’ knowledge on management tooth avulsion was inadequate and they did not know that the usage of mouthguard can prevent sports-related TDI.
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</table>
1. **Chapter 1 Introduction**

Traumatic dental injuries (TDI) are common occurrences in children and adolescents (Schatz and Joho 1994, Gutmann and Gutmann 1995, Roberts and Longhurst 1996). One of the few prospective studies with reliable data reported that more than one third of children and adolescents had experienced one or more episodes of TDI by the time they reach the age of 16 years (Borssen and Holm 1997). In a recent review (Glendor 2009), a number of aetiologies and risk factors were found to be related to TDI such as oral factors (e.g. overjet), environmental factors (e.g. material deprivation), and human behaviour (e.g. risk-taking). Besides the aforementioned factors, a US Department of Health and Human Services report in year 2000 indicated that approximately 33% of all TDI and up to 19% of injuries to the head and face were sports related and another study reported that 32.3% of patients with a TDI visited a university clinic because of sports injuries (US Department of Health and Human Services 2000) and amateur athletes had been found to suffer from TDIs more often than professional athletes (Mourouzis and Koumoura 2005). A significant number of oral and dental injuries are a result of participation in contact sports such as American football, rugby, soccer, boxing, wrestling or Taekwondo (Glendor 2009). The associated costs of treatment are high and disproportionate to the number of accidents.

TDI can affect the permanent dentition and its presentation varies from a minor enamel chip to the extensive maxillofacial damage involving the supporting structures and displacement or avulsion of teeth (Glendor 2009). Studies suggested that there is also an impact of treatment of dental trauma on the quality of life of the individual; children with an untreated TDI were twenty times more likely to have an impact on their Quality of Life because of the TDI than those without it (Cortes et al. 2002). Therefore it is strongly recommended that immediately after an episode of dental trauma, basic emergency care should be provided. However, studies from overseas revealed that there is a need for educational campaigns aiming at members of the lay public likely to be involved in the emergency management of traumatically avulsed teeth (Stokes et al. 1992, Andersson et al. 2006, Biagi et al. 2010).
The majority of sports-related dental injuries are actually preventable. However, good oral health promotion programs are needed to prevent such injuries, especially in communities with high frequency and severity (Marcenes et al. 1999). The values of mouthguards in the prevention of oral-facial injuries are well established (Chapman 1985, Heinz 1986, McNutt et al. 1989, Chapman 1991, Johnsen and Winters 1991, Flanders and Bhat 1995). The mandatory use of mouthguards in high school and collegiate American football has greatly reduced the face and mouth injury rate (Heintz 1986, Padilla and Balikov 1993). However, there is a tendency for the general public to dismiss health and safety issues, as individuals tend to believe the risks are applicable only to others (Newsom 1985). Thus, there may be a widespread belief among athletes that although mouthguards are effective in preventing oral and facial injuries, it may not essentially be translated into mouthguard-wearing behavior (Newsome et al. 2010).

The aims of this study are:

(1) To investigate the prevalence of sports-related traumatic dental injuries among Taekwondo players, secondary basketball school team and secondary school students,

(2) To evaluate the knowledge of dental injuries management, and

(3) To investigate and promote the use of mouthguard in contact sports among secondary schools and Taekwondo training centres in Hong Kong.
Chapter 2 Objectives

The objectives of this study are:

1. to collect clinical data of traumatic dental injuries of the subjects through clinical oral examination

2. to collect information on traumatic dental injuries experience and knowledge on TDI management of the subjects via self-reported questionnaires

3. to deliver an oral health talk on TDI and the usage of mouthguard to the subjects
Chapter 3 Materials and Methods

3.1 Study Population

The target population in the study is local Hong Kong secondary school students aged from 12 to 18 years old. These students are among the adolescence when their activeness in sports is reaching the highest level. Three specific groups of students were selected. Form 2 and 5 students constructed one group, as they represented students from both junior high schools and senior high schools. The players in the corresponding secondary school basketball team composed the second group of students, while members of the aforementioned age group in International Taekwondo Association were selected as the third group.

All of the local secondary schools in Hong Kong were stratified according to their geographical district, Hong Kong Island, Kowloon Peninsula and the New Territories. Five schools in each district were randomly chosen according to the school list obtained from the Education and Manpower Bureau online. Total 15 schools were contacted by mail (Appendix I) to join the study and finally eight schools replied with interest, three in New Territories, three in Kowloon and two in Hong Kong Island. Further contact to these schools was performed through phone calls and finally the participation of five schools was confirmed while the other three turned down because of the time clash with their school schedule.

International Taekwondo Association, the largest taekwondo training center in Hong Kong, was contacted and they showed great interest in this project. The taekwondo players were randomly selected during their grade examination. A total number of 58 taekwondo players participated in the project.

3.2 Questionnaire Survey

In order to gather information on the participants’ knowledge and their history of dental trauma, a questionnaire survey was given to the participant to fill out prior to the clinical examination.

The questionnaire used in the survey was set in Chinese (Appendix III). Pilot testing of the draft questionnaire was performed by 10 students from The University of Hong Kong without dental background. Modifications to the questionnaire were made after the pilot test to clarify some of the wordings and a final questionnaire was then produced.

The self-completed questionnaires touched upon three main aspects. The first aspect was the background information of the participants, including the age, gender, sports participated, duration of practice, and any school sports team involvement. The second part included the history of previous oro-facial and dento-alveolar trauma experiences. This part also included a question regarding the knowledge of immediate management of
dento-alveolar accidents such as avulsion of permanent anterior tooth. The last part of the questionnaire was based on the participants’ experience and attitude towards the use of mouthguard during sports.

3.3 Clinical Examination

The dental examination was performed after the questionnaires were completed and collected. Informed consent (Appendix II) was obtained from the parents or the guardians of the subjects. Disposable mirrors connected with intra-oral light source were used. Three examiners, three chairside assistants and three co-ordinators were involved. All the findings were charted on the clinical examination form (Appendix IV).

Lip competency, temporomandibular joint (TMJ) condition, soft tissue trauma, and all the upper and lower anterior teeth were examined. Trauma-related soft tissue injuries were also recorded including laceration and ulceration.

As for the clinical examination, all the anterior teeth in both jaws with a total number of 12 teeth were examined. Conditions such as concussion, discoloration, mobility, enamel fracture, dentinal fracture, restoration, veneer, crown, clinically missing tooth and/or retained primary tooth were recorded on each tooth. The participants were consulted about the TDI history if any suspected evidence of TDI was found. A series of following questions were asked about the immediate management, the subsequent treatment and the number of dental treatments on the involved tooth, with the aim to clarify how severe the TDI was and whether root canal treatment was carried out by the dentist. Two teeth from different quadrants in the same arch were grouped together so that a total number of six types of permanent teeth were sorted out as follows, upper canines, upper lateral incisors, upper central incisors, lower canines, lower lateral incisors, and lower central incisors. Inter-examiner reproducibility was checked by performing a re-examination for every 10 participants.

Participants were given a report about the findings of dental trauma and recommendations for further treatment if required (Appendix V). A leaflet (Appendix VII) with abundant information about different types of mouthguard and the use of mouthguard in contact sports was distributed to each participant upon their completion of questionnaire and examination. A short explanation of the immediate management of avulsed tooth was made to the participants if their relevant knowledge is insufficient.

3.4 Sports-related Traumatic Dental Injuries

All subjects were asked whether he or she had experienced any dental injuries and the reasons of injury were explored. As a result, prevalence on self-reported sports-related injury was obtained. Clinical examination was only able to investigate whether there was any history of dental injury but unable to correlate the presence of dental injury was sports-related or not.
3.5 Education Talk

A 30-minute presentation was conducted to the participating school students and teachers. The presentation touched upon the basic structures in the oral cavity, the different categories of dental injuries, the prevention and immediate management of common dental injuries, and the advocacy of the use of mouthguard to prevent dental injuries. A question and answer session was followed and participants were encouraged to ask questions related to the topic and these were answered by the presenter (Appendix VI).

3.6 Data Analysis

All the data from the questionnaires and clinical examination were entered into a Google Online Questionnaire and converted into Microsoft Excel document automatically. The data analysis was performed with the SPSS software. Chi-square test was used to assess the statistical significance of the differences in the distribution of answers to the questionnaires and the prevalence of the TDI between the three groups of subjects. The level of significance used in this study was 0.05.
The schedule of this project is as follows:

<table>
<thead>
<tr>
<th>Date</th>
<th>Target Group</th>
<th>Event</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>26/11/2011</td>
<td>Project preparation work</td>
<td>Set project topic</td>
<td></td>
</tr>
<tr>
<td>20/12/2010</td>
<td>Taekwondo</td>
<td>Contacted <em>International TKD HK Association</em></td>
<td>Chairperson of <em>International TKD HK Association</em> agreed to join our project and detail would be discussed in 2011</td>
</tr>
<tr>
<td>11/02/2011</td>
<td>Secondary School</td>
<td>1. Contacted <em>PLK Tang Yuk Tien College</em> by phone</td>
<td>Both schools’ principal agreed to join our project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Contacted <em>Shun Lee Catholic Secondary School</em> by phone</td>
<td></td>
</tr>
<tr>
<td>16/02/2011</td>
<td>Secondary School</td>
<td>Contacted secondary schools in HK, KL, NT by mass email</td>
<td>Five schools were contacted</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Content sent included Letter to the principals (Appendix I)</td>
</tr>
<tr>
<td>19/02/2011</td>
<td>Project preparation work</td>
<td>1. Preparation of materials for site visit</td>
<td>Gathered instruments and documents</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. Finished and mass copied questionnaires, consent forms, charting sheet, report for parents</td>
<td></td>
</tr>
<tr>
<td>20/02/2011</td>
<td>Taekwondo</td>
<td>Visited a training center (Dojang) in Cheung Sha Wan</td>
<td></td>
</tr>
<tr>
<td>22/02/2011</td>
<td>Secondary School</td>
<td><em>King’s College</em> contacted us by phone</td>
<td>Principal agreed to join our project.</td>
</tr>
<tr>
<td>25/02/2011</td>
<td>Secondary School</td>
<td>1. <em>Caritas Fanling Chan Chun Ha Secondary School</em> contacted us by phone</td>
<td>Principals of both schools agreed to join our project.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.<em>Elegantia College</em> contacted us by phone</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Taekwondo</td>
<td>Visited Ho Man Tin Dojang</td>
<td>undergone examination and questionnaires collected</td>
</tr>
<tr>
<td>27/02/2011</td>
<td>Taekwondo</td>
<td>Visited Cheung Sha Wan Dojang</td>
<td>undergone examination and questionnaires collected</td>
</tr>
<tr>
<td>02/03/2011</td>
<td>Secondary School</td>
<td>First day of visited <em>PLK Tang Yuk Tien College</em> (In New Territories)</td>
<td>50 students undergone examination and questionnaires collected</td>
</tr>
<tr>
<td>03/03/2011</td>
<td>Secondary School</td>
<td>Second day of visit to</td>
<td>33 students undergone examination</td>
</tr>
<tr>
<td>Date</td>
<td>Event Description</td>
<td>Details</td>
<td></td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------------------------</td>
<td>-------------------------------------------------------------------------</td>
<td></td>
</tr>
<tr>
<td>06/03/2011</td>
<td>Project prep work</td>
<td>Finished Presentation powerpoint</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Appendix VI</td>
<td></td>
</tr>
<tr>
<td>07/03/2011</td>
<td>Secondary School</td>
<td>Visited to <em>King’s College</em> (On Hong Kong Island)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1. A 30 minute talk was delivered to [Number] students</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2. 99 students had oral examination and questionnaire done on-site</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3. [ Number ] questionnaires collected</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Taekwondo</td>
<td>Visited Lei Muk Shu Dojang</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>9 students undergone examination</td>
<td></td>
</tr>
<tr>
<td>08/03/2011</td>
<td>Secondary School</td>
<td>Visited <em>Elegantia College</em> (In New Territories)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>71 students undergone examination and questionnaires collected</td>
<td></td>
</tr>
<tr>
<td>17/03/2011</td>
<td>Secondary School</td>
<td>First day visited to <em>Shun Lee Catholic Secondary School</em> (In Kowloon)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>38 students undergone examination and questionnaires collected</td>
<td></td>
</tr>
<tr>
<td>29/03/2011</td>
<td>Secondary School</td>
<td>Visited <em>Caritas Fanling Chan Chun Ha Secondary School</em></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>123 students undergone examination</td>
<td></td>
</tr>
<tr>
<td>07/04/2011</td>
<td>Secondary School</td>
<td>Second day visit to <em>Shun Lee Catholic Secondary School</em> (In Kowloon)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>31 students undergone examination and questionnaires collected</td>
<td></td>
</tr>
<tr>
<td>12/04/2011</td>
<td>Project prep work</td>
<td>Data Entry completed</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>1214 questionnaires entered</td>
<td></td>
</tr>
</tbody>
</table>
Chapter 4. Results

4.1. The Number and demographics of the subjects

This study included a clinical examination and a self-reported questionnaire. There were different numbers of participants in these two parts as shown in Table 1. All those who received clinical examination completed the questionnaires. The clinical examination covered a total number of 481 students who were categorized into three groups including 58 taekwondo players (Group 1), 122 local secondary school basketball team members (Group 2) and 301 students from one Form Two and one Form Five class which were randomly picked up from all the participating five local secondary schools (Group 3).

For the self-reported questionnaire, a total of 1214 questionnaires were distributed. Among all the participants, three groups were formed. Group 1 includes 58 taekwondo players. Group 2 consists of 200 local secondary school basketball team members while the remaining 956 students from five local secondary schools made up Group 3 (Table 1). The mean ages of the participants of different groups are shown in Table 2 and there is no statistically significant difference between the three groups in terms of age (p>0.05, ANOVA). The minimal and maximal ages of all the participants are 12-year-old and 21-year-old respectively. The gender distribution is also displayed in Table 2. There is a general trend that more males joined the project than girls. Male participants account for 72% in Group 1, 82% in Group 2, and 55% in Group 3. There is significantly more male in group 1 and 2 than group 3 (p<0.05, Chi-square test). The overall male to female ratio is approximately 3:2.

Table 1. Number of subjects included in the clinical examination and self-reported questionnaire.

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Clinical examination</td>
<td>58</td>
<td>122</td>
<td>301</td>
<td>481</td>
</tr>
<tr>
<td>Self-reported questionnaires</td>
<td>58</td>
<td>200</td>
<td>956</td>
<td>1214</td>
</tr>
</tbody>
</table>

Table 2. Demographical information of the subject according to groups.

<table>
<thead>
<tr>
<th></th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>Sig.</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Subjects</td>
<td>58</td>
<td>200</td>
<td>956</td>
<td></td>
<td>1214</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>163</td>
<td>520</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td></td>
<td></td>
<td>P&lt;0.05</td>
<td></td>
</tr>
<tr>
<td></td>
<td>16</td>
<td>37</td>
<td>436</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean Age (SD)</td>
<td>14.6 (1.8)</td>
<td>15.2 (1.7)</td>
<td>15.1 (1.8)</td>
<td>P&gt;0.05</td>
<td></td>
</tr>
</tbody>
</table>
4.2 Clinical Examination

4.2.1 Lip competency, Temporo-mandibular Joint (TMJ) and Soft tissues

The clinical examination consisted of investigations on lip competency, TMJ condition, extra-oral and intra-oral soft tissue condition as well as a scrutiny on the maxillary and mandibular anterior teeth.

There is no significant difference detected among three groups, the participants with competent lips taking up more than 80%. With regard to the TMJ condition, the presence of clicking or pain on opening or closing was examined. As shown in Table 3, the majority of the participants have no abnormality found in all the three groups, while approximately 20% participants have clicking on either/both opening and closing of TMJ in all the groups. Only a minimal amount of participants were found to have pain on TMJ movement, two in Group 1 and one in Group 3. The Kappa Statistic which calculates the inter-reliability of this study is 0.82, 0.92 and 0.88 for the three clinical examiners.

Table 3. The extra oral status of the subjects according to groups, N (%)

<table>
<thead>
<tr>
<th></th>
<th>Incompetent Lips</th>
<th>TMJ Clicking</th>
<th>TMJ Pain</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Group 1</strong></td>
<td>11 (19)</td>
<td>12 (21)</td>
<td>2 (3)</td>
</tr>
<tr>
<td><strong>Group 2</strong></td>
<td>14 (11)</td>
<td>26 (21)</td>
<td>0 (0)</td>
</tr>
<tr>
<td><strong>Group 3</strong></td>
<td>36 (12)</td>
<td>56 (19)</td>
<td>1 (0)</td>
</tr>
</tbody>
</table>

No soft tissue trauma was found extra-orally while there was only a few number of ulcerations detected on the lips, the buccal cheeks and/or the lateral sides of the tongue. Due to the nature of occlusal trauma rather than TDI which was reported by all the involving participants, the findings were not recorded as evidence of TDI.

4.2.2 Tooth status related to TDI

Among all the 481 participants taking the clinical examination, the overall reported prevalence of TDI is 28%. For the subject based analysis, the prevalence of clinically examined TDI are 24% for the group 1 subjects, 26% for the group 2 subjects and 30% for the group 3 subjects, however, no statistical significant different are found between the groups (p>0.05, Chi-square test).

Table 4 shows the amount and percentage of no-abnormality-found (NAD) of all the six types of permanent teeth in different groups of participants. Generally, the prevalence of TDI in the anterior teeth of all the three groups of participants is lower than 10%, with the percentage of no-abnormality-detected (NAD) higher than 90% in each group. The average of NAD percentage of upper central incisors is lower than that of the other tooth types, indicating that upper central incisors are more susceptible to TDI no matter the students are taekwondo players, school basketball players or other secondary school students. Interestingly, the comparison among different groups of participants shows a diversity of TDI prevalence. Although no statistical significant was found, Group 1
shows a higher prevalence of TDI in upper canines than the other two groups, while Group 2 has a slight higher occurrence of TDI in upper lateral incisors. Group 3, possesses a greater percentage of TDI in both upper and lower central incisors. The incidence of TDI in lower canines is minimal.

Table 4 also presents different clinical presentations of TDI in different types of teeth. Generally and unsurprisingly, enamel fracture is the major clinical finding of TDI in all groups of participants and the average occurrence of enamel fracture in upper central incisors is as high as 7%, followed by restorations, dentinal fracture and concussion. No evidence of discoloration, increased mobility, veneer or crown was detected. No statistically significant difference was found regarding the types of tooth and types of trauma among the three groups.

Table 4. The distribution of tooth status according to tooth types (Canine, Lateral incisors and Central incisors) and locations (upper and lower)

<table>
<thead>
<tr>
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Fig. 1 shows different predisposition of specific teeth involved in TDI during the clinical examination. Generally upper anterior teeth are 1.5 times more prone to TDI than their lower counterparts (p<0.05, Chi-square test). Central incisors, lateral incisors and canines are arranged in a descending order in terms of TDI prevalence. When specific teeth are investigated, central incisors possess the highest prevalence of TDI of 38% (p<0.05, Chi-square test), followed by upper lateral incisors being 21%. In the mandibular arch, lateral incisors is slightly more prone to TDI than the central incisors, being 16% and 13% respectively. Lower canines (4%) are the least possible teeth to have TDI.
Figure 1. The distribution of clinical TDI according to upper and lower dentitions

![Specific Teeth Involved in TDI](image)

**4.3 Self-reported questionnaire**

4.3.1 Experience in Sports and Frequency of practices

Excluding basketball, badminton and cycling which were the most frequent sports played by 12% and 11% of the participants respectively. Of the most frequently played sports selected, around three-quarters of the participants have played the selected sports for more than one year (Fig.2). More than 75% participants take part in that sports between once to three times per week (Fig.3).
Figure 2. The experience of the most frequently joined sports among subjects

Figure 3. Number of times played weekly of the most participated sports among subjects
4.3.2 Dental Visits among subjects

With regard to the frequency of dental visits, only 30% of participants visit dentist once a year or more frequently. About two-thirds of the participants do not visit dentist at a regular interval (Fig.4).

Figure 4. Dental visits behaviour among subjects

![Frequency of Dental Visit](image)

4.3.3 Self-reported experience of TDI

The participants’ experience of TDI was investigated through three progressive questions; 1) about the location of the facial trauma, 2) the severity of TDI, as well as 3) when and how the accident happened. Figure 5 shows the location involved in injuries in the facial region. Only around 25% of the injuries were claimed to be directly impacted onto the teeth. With regard to the injuries to the teeth, such incidences as avulsion, luxation or subluxation and fracture were investigated, which is illustrated in Figure 6. Around 12% was avulsion. Reasons for TDI were also explored, as illustrated in Figure 7. Fall down and inappropriate usage of teeth are more reported reasons for TDI.

As shown in Figure 8, when three groups were compared regarding the self-reported TDI, Group 1 has a prevalence of 17%, Group 2 as high as 18% while Group 3 only 11%, and subjects in group 1 and 2 tend to have higher prevalence among the groups (p<0.05, Chi-square test). Among the participants who have experienced TDI, 63% of them seek help from their dentists. However, their timing to visit dental office was various. Only 53% of the subject went to dentist immediately, namely within the day of the accident whilst the rest visited the dentist on the next day or even later.
Figure 5. The distribution of facial injuries experience reported by subjects

![Figure 5: Injuries in the Face](image)

Figure 6. The distribution of types of TDI as reported by subjects

![Figure 6: TDI in Teeth](image)
Figure 7. The distribution of reasons for TDI as reported by subjects

Figure 8. The prevalence of self reported TDI according to groups
4.3.4 Knowledge on avulsion immediate management

The participants were tested on the immediate management of tooth avulsions with a multiple choice question. Around one fifth (20%) of them picked the correct answer, that is to put the avulsed tooth in milk or in the mouth (Table 5).

In Table 6, among those who answered correctly, 33% reported having obtained the knowledge from the mass media, followed by dentists (23%), school (19%), parents and friends (17%), and others (8%).

Table 7 shows that from the alternate perspective, when comparing amongst the different sources, 50.4% of answers claimed to receive advice from dentists were correct, followed by the mass media (50.3%), lessons (37%), and parents and friends (30%).

Table 5. Subjects response on immediate management of tooth avulsion

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Table 6. Sources from obtaining correct knowledge of the respondents

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<td>Dentists</td>
<td>58</td>
<td>23</td>
</tr>
<tr>
<td>Others</td>
<td>20</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>249</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 7. Percentage of correct answer obtained from different sources

<table>
<thead>
<tr>
<th>Sources</th>
<th>Correct</th>
<th>Total</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>School</td>
<td>55</td>
<td>150</td>
<td>37%</td>
</tr>
<tr>
<td>Media</td>
<td>88</td>
<td>175</td>
<td>50%</td>
</tr>
<tr>
<td>Parents &amp; friends</td>
<td>54</td>
<td>180</td>
<td>30%</td>
</tr>
<tr>
<td>Dentists</td>
<td>61</td>
<td>121</td>
<td>50%</td>
</tr>
</tbody>
</table>
4.3.5 Mouthguard usage and acceptance

With respect to mouthguard, the participants’ recognition of mouthguard is approximately 50-50 (Table 8), with those who have heard of mouthguard being slightly more than 50%. Around 73% of participants believed that putting on mouthguard is effective in protecting themselves from TDI in sports (Table 8).

Nevertheless, only 7% of all the participants have used mouthguard. Among this “minority group”, about half of them used the Stock mouthguard, one-third used “Boil-and-Bite” type and the remaining 19% had their own individualized mouthguard (Fig. 9).

Nonetheless for the remaining 93% who have never put on the mouthguard, the reasons for not using it were investigated. The most frequently quoted reason is that it is not necessary to wear mouthguard during sports activities, which takes up 49% of all the reasons. About 42% of the participants stated that they have never heard of mouthguard. Some 5% felt it might be uncomfortable to wear mouthguard, and 3% concerned about the cost of a mouthguard. Other reasons include aesthetic aspect, hygienic aspect, undergoing orthodontic treatment as well as having no idea where to purchase the mouthguard (Table 9).

Table 8. Response of the subjects’ perception on mouthguard

<table>
<thead>
<tr>
<th>Answer</th>
<th>Have you ever heard about mouthguard?</th>
<th>Do you believe that mouthguards protect your teeth?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>51%</td>
<td>73%</td>
</tr>
<tr>
<td>No</td>
<td>49%</td>
<td>27%</td>
</tr>
</tbody>
</table>

Figure 9. Types of mouthguard that the subjects use
Table 9. Responses on the reason for not using mouthguard when playing sports

<table>
<thead>
<tr>
<th>Reasons</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never heard of it before</td>
<td>479 (42)</td>
</tr>
<tr>
<td>No need</td>
<td>552 (49)</td>
</tr>
<tr>
<td>Uncomfortable</td>
<td>52 (5)</td>
</tr>
<tr>
<td>Expensive</td>
<td>39 (3)</td>
</tr>
<tr>
<td>Others</td>
<td>10 (1)</td>
</tr>
<tr>
<td>Total</td>
<td>1132 (100)</td>
</tr>
</tbody>
</table>

4.3.6 Association of self-reported TDI prevalence and frequency of Taekwondo and Basketball participation

For the Taekwondo players, it seems experience do not have any association with self-reported prevalence of sport-related TDI, as the beginner has the similar chance of having TDI as the experienced players (13% vs. 14%, p>0.05, Chi-square test) (Table 10). While those basketball team players, the more experienced players are more prone to have self-reported sports-related TDI (12% vs. 25%, p<0.05, Chi-square test) (Table 10).

In terms of frequency of practice, it is found that the more frequent they practice, the higher chance they have sports-related TDI in both Taekwondo and Basketball players. Those who practices three times or more are found the have the highest prevalence of TDI (25% and 23%) (Table 10)

Table 10. The experience and frequency of participating Taekwondo and basketball and self reported TDI prevalence

<table>
<thead>
<tr>
<th>Self reported TDI case number (%)</th>
<th>Taekwondo</th>
<th>Basketball</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1 year</td>
<td>1/8 (13)</td>
<td>2/17 (12)</td>
</tr>
<tr>
<td>1-3 years</td>
<td>4/20 (13)</td>
<td>12/83 (15)</td>
</tr>
<tr>
<td>More than 3 years</td>
<td>4/29 (14)</td>
<td>25/100(25)</td>
</tr>
<tr>
<td>Frequency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>once a week</td>
<td>1/18 (6)</td>
<td>2/24 (8)</td>
</tr>
<tr>
<td>twice</td>
<td>3/16 (19)</td>
<td>8/47 (17)</td>
</tr>
</tbody>
</table>
| Three times or more               | 6/24(25)  | 29/129 (23)
4.3.7 Association between dental visit regularity and TDI immediate management

Table 11 shows the comparison between the frequency of dental checkup and the time of seeking dental treatment after TDI. Among the 155 who reported to have previous TDI experience, their frequency of dental checkup and their immediate management of TDI are analyzed. It is interesting to find that those who visit dentist once or more than once a year tend to look for dental help within the same day of TDI. On the other hand, irregular attendees tend to delay their management of TDI or even did not go to see the dentist for TDI. Therefore, it can be concluded that there is a high tendency of frequent dental visitors will seek dental treatment earlier when they have incidence of TDI (40% vs. 18%, p<0.05, Chi-square test).

Table 11. Association between dental visit regularity and timing to seek dental treatment after TDI, N(%)

<table>
<thead>
<tr>
<th>Dental visit behaviour</th>
<th>Did not go to see any dentist</th>
<th>Immediate Management (Same Day)</th>
<th>Not the same day</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular (more than once per year)</td>
<td>26 (46%)</td>
<td>23 (40%)</td>
<td>8 (14%)</td>
<td>57 (100%)</td>
</tr>
<tr>
<td>Irregular</td>
<td>59 (60%)</td>
<td>18 (18%)</td>
<td>21 (21%)</td>
<td>98 (100%)</td>
</tr>
</tbody>
</table>
4.3.8 Self-reported TDI vs Sports participated

From the questionnaires collected, there are 155 self reported TDI cases out of 1213 questionnaires. Figure 10 illustrates the relationship between the kind of sports participated and the self-reported TDI prevalence. As clearly shown in the graph, basketball subsists the highest frequency of self-reported TDI, which has 70 TDI cases and accounts for 45% of all the TDI. The second most frequently played sports associated with TDI is cycling, which has 19 cases (12%). The third most frequent sport associated with TDI is shared by football and the category "others" which includes running, fencing and "free running", making up 16 cases (10%) for each category. The forth one is martial arts which has 9 cases (9%). The comparison is statistically significant (p=0.004, Chi-square test)

Figure 10. Distribution of self-reported sports-related TDI according to type of sports participated

![Prevalence of Self-reported TDI in Different Sports](image-url)
4.3.9. Self reported TDI vs. Clinically examined TDI

Fig 11 shows the difference between the prevalence of TDI of the participants’ reports and that of the clinical examination among all those who received the examination. Without an exception, the participants in all the groups tend to underrate or miss out their TDI experience, which is illustrated by a higher prevalence of TDI revealed by the clinical examination.

Figure 11. The prevalence of self-reported TDI and clinically examined TDI of each group
Chapter 5. Discussion

5.1 Target groups selection

According to Federation Dentaire International (FDI), organized sports are divided into two categories based on the risk of TDIs: High risk sports such as American Football, ice hockey, martial sports, rugby, skate-boarding and medium risk sports include basketball, soccer, handball, squash etc (FDI 1990). Therefore in this study one high risk sport (Taekwondo) and one medium risk sport (basketball) were investigated.

Group 1: Taekwondo

The taekwondo players who fall within the same range of age were recruited from International Taekwondo Association in Hong Kong, which is one of the largest clubs in the region. Taekwondo players are categorized into different colours of belts. Those players who wear white or yellow belts were excluded because they had not participated in real-life combat. This elimination guarantees that the players selected have possible chances of TDI due to the combat during practices or competitions.

Group 2: Basketball

Basketball, which can take as little as half a basketball court and one stand, requires much less space than other team sports such as soccer and is far more affordable for such a small and crowded city like Hong Kong. Basketball courts are standard equipment in the playground of most secondary schools. It is one of the most popular sports in the territory. Due to restricted space and its contact sports in nature, basketball is expected to involve higher prevalence of sports injuries and TDI.

Group 3: Secondary schools

The target group is set as the local secondary school students ranging mainly from 12 to 18 years old, who are expected to have a certain experience in sports activities. In 2010, Gong et al. stated that the highest frequency of dental trauma was found in schoolchildren 7-12 years of age (23%), followed by adolescents 13-18 years of age (15%) and young adults 19-24 years of age (15%) in Beijing, China. Secondary school students are selected because they are easily reachable and gathered, able to comprehend the questionnaire and available to receive clinical examinations. Students from Form 1, 2 and Form 5, being either junior or senior forms, were recruited in order to enhance the representativeness of the secondary school students. Moreover, students who are 12 years old or above are expected to have most, if not all, their deciduous teeth replaced by their successors by then.

Age and gender

The age distribution within different groups is similar, approximating 15 years old. Only one student from group 2 and three from group 3 exceed the vested range of age. There is a trend of accepting students from newly immigrated families in northern New Territories schools. The presence of those matured students reflects the current condition in many
other secondary schools in the northern New Territories, which is in close proximity geographically to the border of the Mainland China.

The gender distribution within different groups has a male-to-female ratio of 3:2, with male gender being more dominant. The reason why there is a slight imbalance in the male to female ratio is that, among the five secondary schools, one of them is a boy school. Boys are also more frequently involved in Taekwondo and Basketball school team groups.

5.2 The results

**Group 1 TDI discussion**

Players in taekwondo competitions are required to wear mouthguard; however, from the observation that not many players worn mouthguard during the regular practices due to a number of reasons, but mainly due to the discomfort. The ignorance of the usage of mouthguard might leave the players more prone to TDI. Moreover during taekwondo practice, beginners have to receive non-contact training first before proceeding to peer practice of combat skills. The time in between those two phases may vary but usually takes at least half a year. The cumulative effect could also be observed for those who practises Taekwondo over 5 years. The matured technique with great accuracy possessed by experienced players could also seriously injure the peer during practice if inadequate protective measurements are not taken with cautions, which accounts for the higher prevalence of TDI in experienced players.

**Group 2 TDI discussion**

Among various sports, basketball player are more prone to sport-related TDI within the subjects, with a chance as high as 32% which are the same finding from Cornwell’s study (2003). Basketball is a collective sport involving multi-individual participation, high-speed running, vigorous body-to-body collision and a hard ball flying around. All these factors may contribute to its high risk with regard to TDI. Around one-third (29%) participants who played basketball most often with more than 5 years experience claimed to have TDI experience. Although there are studies showing a decrease of injury rates over time in some sports such as football and ice hockey due to the requirement and improvement of protective gears, this does not apply to basketball players in this study. Since there is no compulsory requirement to equip any protective equipment in either practice or matches, with the longer time of participation and improvement of skills, the more likely to have experience sports-related TDI.

**Which areas are commonly involved in TDI?**

The occurrence of orofacial lesions resulting from contact sports activities has been widely reported (Chapman 1991, Flanders and Bhat 1995). Among the common lesions, dental trauma and tissue lacerations are the most prevalence (Chapman and Nasser 1996, Chan et al. 2011). However, in this study, only a very minimal quantity of ulcerations was observed on the lips, the buccal cheeks and/or the lateral sides of the tongue. Moreover, these lesions may not be sports-related but mainly due to occlusal trauma. Neither is there a strong relationship between TMJ abnormalities and TDI experience.
Soft tissues usually heal within two weeks after minor injuries, and therefore it is difficult to find clinical evidences of TDI on soft tissues if the TDI did not occur recently.

Regarding to dental trauma, the literature shows that the anterior maxillary region is the most affected with emphasis on the maxillary central incisors, and the predominant type of injury is tooth fracture (Borssen and Holm 1997, Glendor 2008) as the same conclusion can be drawn from this study. However, if the subject cannot recall the reason why there was sign of TDI, it was difficult to define whether the trauma caused due to sports or due to other reasons.

What are the main reasons of TDI reported by participants?

Present study shows that 27% of TDI is caused by sports participation but the most common reason is inappropriate use of teeth. It may be a possible explanation for this is that quite a few participants regard the exfoliation of primary teeth as TDI during chewing or functioning. After all, sports participation still remains a major causative factor for TDI, as contact sports predispose people to oral injuries. Dental and oral injuries, the commonest type of orofacial injuries, are often sustained in contact sports; indeed, TDI represents the most frequent type of sports injury. Involvement in sports activities contributes to 1.5% to 50% of orofacial injuries (Kumamoto et al. 2005).

How much do participants know about management of avulsion and where did they learn it from?

With regard to the participant’s knowledge on the management of avulsed tooth, the present study shows that only 20% of them picked the correct management method which is to put the avulsed tooth in milk or in the mouth. Looking for the dentist in the vicinity is also accepted as a correct answer. Out of these respondents most reported the mass media (33%) and dentists (23%) as the source of the knowledge. The Oral Health Education Unit of the Department of Health, HKSAR has been striving to raise the public awareness toward oral health issues through various channels in the media. Tooth Club is one of the projects on the Internet where common oral health topics, such as oral trauma and its management, are introduced. Meanwhile, the dental service system in Hong Kong is mainly provided by private practices with a more business-inclined setting. The limited time for appointments often results in neglected oral health education, in addition to relatively low frequency of dental visit elicited by the aforementioned data. These may explain the higher reported source from mass media than dentists. Therefore, mass media could play an important role in such oral health education and promotion, while dentists should be advocated to take a more active initiative. The accuracy of the sources was analysed. 50% and 50% of answers labeling dentists and the mass media respectively topped the chart. Given the low percentage of correct answers, 59% of respondents claimed that they do not know how to deal with tooth avulsions. This clearly shows there is an inadequate knowledge on the management of avulsed tooth among the subjects and more proactive education to promote the management of TDI, especially avulsed tooth, is highly recommended.

The comparison between the self-reported TDI and the TDI percentage revealed by clinical examination shows a general underestimation or lack of recognition of the TDI
experience among the participants. There is a particular difference in Group 3 who are leisure sports players, which indicates that they are less aware of the TDI and its consequences than those who active sports participants. Kumamoto et al. (2005) also mentioned the similar trend that the statistics of orofacial injuries may be lower than expected because the athletes affected may actually not report all of their injuries. Many participants were told about their TDI experience for the first time when they received examination, which is true with the general perception that people tend to overlook their experience of TDI until they seek professional help. Other than that, there is a possibility that those clinically observed TDI might not be sports-related as it is almost impossible to validate the reason of being traumatized as recall bias will have effect on this.

**How much do participants know about mouthguard?**

In this study, it was found that only a very little portion of the subjects had actually worn mouthguard. Fakhruddin et al. (2007) studied the use of mouthguard among 12- to 14-year-old schoolchildren, and reported that only 5.5% worn mouthguard for school sports. Biagi et al. (2010) also showed that only 5% of the children aged from 8 to 15 years old actually had ever used mouthguard. A small number of orthodontically treated participants of this study mistakenly thought their retainers were mouthguard. It is therefore essential to educate the public of the role of mouthguard in the prevention of oral injuries.

According to a study by Newsome (1998) on Hong Kong’s Rugby Community, the main reasons for not wearing a mouthguard in contact sports were due to the discomfort caused by mouthguard (95%) and they do not wear one when they never had an injury (29%), this finding is somewhat different from this study perhaps mouthguard was a more popular choice of protection in Rugby than Taekwondo and Basketball in Hong Kong.

**What can we do to promote the use of mouthguard?**

Given the high percentages of participants in this study who had never eard about mouthguard and those that thought it was not necessary to wear mouthguard during sports, it is essential to educate the public about mouthguard use and the risks of oral trauma in sports activities. Surveys showed that compliance with mouthguard regulations was not universal, and voluntary mouthguard use was low worldwide (Levin et al. 2003). In many cases, athletes do not wear mouthguard despite being aware of the injury risks and the widespread belief among athletes that mouthguard is effective in preventing oral injuries (Chapman 1991). There is a tendency for the general public to dismiss health and safety advice, individuals tend to believe the risks are only applicable to others (Newsom et al. 1985).

When discomfort is the main reason for not wearing a mouthguard, it can be easily dealt with through the introduction of custom-made mouthguards, which have improved design and fit, and problems in breathing and speaking with outhguards are also minimized, but he cost will be higher (Newsome et al.2001, Flanders 1993, DeYoung et al. 1994).

Given the related costs of dental trauma are both high and disproportionate to the number
of accidents (Glendor et al. 1998, Glendor et al. 2000, Borum and Andreasen 2001) and the well-established protective effect of mouthguards, it is advisable to promote the use of mouthguards to athletes, parents and coaches by means of raising the awareness of the high risk of oral injury when playing contact sports. Advocacy for mouthguard use should focus on coaches, coaches’ association and rule-making organization. Maestrello et al. (1999) found that many dentists do not think they are responsible for the distribution and fabrication of mouthguards. Thus, dentist should also be encouraged to play an active role in educating patients regarding the risks of oral injury in sports, fabricate properly fitted mouthguards, and provide appropriate guidance on mouthguard types and their protective properties, costs and benefits (ADA 2006).

**Limitation of the study**

Firstly, due to the constrains of time and resources, it was only able to examine five secondary schools and a comparatively small number of Taekwondo players in this study; perhaps the study sample will be more representative if more subjects were included. Secondly, recall bias has a very influential effect on the result of this study as the validity of TDI experience is totally relied on the subjects’ recall. The validity was checked and confirmed by the clinical findings. It would only be able to minimize the bias but cannot be avoided completely.
Chapter 6. Conclusions and Recommendations

The conclusions of the study are:

1) The prevalence of sports-related TDI among Taekwondo players and Basketball school team members are similar to other secondary school students in Hong Kong.

2) The subjects’ knowledge on management tooth avulsion was poor and most of them they did not know that the usage of mouthguard can prevent sports-related TDI.

3) Oral health talk on traumatic dental injury and usage of mouthguard are delivered to the subjects.

And the recommendations are:

Since TDI are common occurrence among the subjects and the knowledge on TDI prevention and management is found to be inadequate, there is a need for including oral health education regarding TDI into the curriculum of the secondary school teaching programme and also to Taekwondo training programme.
Chapter 7. Acknowledgement

Our public health project has received generous support from various aspects to whom we aspire to express our profound gratitude.

Faculty of Dentistry, the University of Hong Kong
Prof. Edward Lo
Dr. Harry Pang
Dr. Anthony Wong
King’s College
Elegantia College
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PLK Tang Yuk Tien College
Shun Lee Catholic Secondary School
International Taekwondo Association
Wu Shu Keung
Wu Jason Pak Lam
Oral B
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Chapter 9. Appendices

I. Introduction letter to school principals
II. Consent forms for parents
III. Questionnaires
IV. Dental charting form
V. Report to parents
VI. Powerpoint presentation in school talks
VII. Posters and leaflets
Appendix I: Introduction letter to school principals

10th December, 2010

Dear Principal,

Re: Invitation to participate in a Community Dental Health Project

We are writing to invite your school to participate in a community health project. We are a group of fourth year undergraduate dental students from the Faculty of Dentistry, University of Hong Kong. Community health projects have been conducted annually by fourth year dental students to increase the awareness of oral health among Hong Kong society in various aspects. The aim and objective of our group’s project is to focus on sport-related dental injuries. We will investigate the prevalence and current knowledge in the management of dental injuries, and advance the knowledge by means of education and promoting the use of mouth guard (see Appendix 1). Our target groups are basketball and/or taekwondo teams in local secondary schools. Questionnaires, clinical examinations of dental injuries, leaflets, school talks would be carried out accordingly in March, 2011. Free trial of mouth guard may also be provided.

We would like to invite your school’s basketball and/or taekwondo team members to participate in this project. For further inquiries, please do not hesitate to contact our group representative, Mr. Lee Chun Ming at 9361-9860 or via email at oralhealthproject2011@gmail.com. Thank you very much for your attention, and your participation would be highly appreciated. We are looking forward to hearing from you soon.

Yours faithfully,

Mr. Lee Chun Ming
Clinical group representative of 4.2
Faculty of Dentistry
The University of Hong Kong

Dr. Anthony H.H. Wong
Group supervisor
Faculty of Dentistry
The University of Hong Kong

Attachment:
Appendix 1
Appendix II: Consent forms for parents

Dear parent of secondary school student:

A Survey on Dental Trauma among Secondary School Children in Hong Kong

Trauma to teeth through accidents is a common dental problem of adolescents. In order to have a good understanding of this situation in Hong Kong, the Faculty of Dentistry of The University of Hong Kong is conducting a survey on dental trauma among secondary school children.

We are inviting you to let your child participate in this survey. With your consent, your child will receive a simple oral examination in school. The examination will be conducted by a dentist and dental students under teacher supervision. A mouth mirror, a dental probe, and an intra-oral light source will be used. No X-ray will be taken. Your child will be asked a few questions on the knowledge about prevention and management of dental trauma. After the examination, you child will be informed of whether there are signs of trauma to your child’s teeth and the need for treatment, if any.

Participation in this survey is free and completely voluntary. You can choose not to participate or to withdraw at any time, without giving any reason. In this circumstance, there will be no adverse consequences and your child’s right in the school will not be affected. The information collected in this study will be kept confidential and used by authorized research staff only. We respect the privacy of all study participants and will not release or publish any information that will reveal your child’s identity.

If you have any queries during this study, you can call the study investigators, Prof. Edward Lo (2859 0292) or Dr. Anthony Wong (2859 0291).

Yours sincerely,

Prof. Edward C.M. Lo
Faculty of Dentistry
The University of Hong Kong
親愛的家長/監護人，

關於香港中學生口腔創傷的調查

口腔創傷在青少年中十分普遍。為深入了解口腔創傷在香港青少年中的情況，香港大學牙醫學院正在開展一項有關香港中學生口腔創傷的調查。

我們邀請貴子女參與這項調查。經您同意，貴子女將於學校接受簡單的口腔檢查，該檢查將由一位牙科醫生及牙科學生在老師的監督下進行。我們不會進行X光檢查以及口腔治療。我們可能會拍攝一些口腔照片作研究用途。口腔檢查之後，我們會告知貴子女檢查結果以及是否有牙齒的需要。貴子女還將填寫一份有關口腔創傷的問卷。

貴子女的參與是完全免費並且自願的，貴子女可以選擇不參與或者在任何時間無條件退出，您們不需要承擔任何後果，貴子女在學校的權益也不會受到影響。調查所收集到的信息將被嚴格保密並且僅供此項調查所用。我們尊重每一位參與者的私隱，並承諾不會公開任何關於貴子女身份的信息。

如果您有任何疑問，請致電本項調查的負責人：盧展民教授（2859 0292）或黃浩行醫生（2859 0291）。

盧展民教授
香港大學牙醫學院
2011年1月28日

回條

1. 我已閱讀並了解上述調查內容並且有提出疑問的機會。
2. 我同意讓我的子女參與上述調查。
3. 我已了解我的子女參與上述調查是完全自願並且可以隨時無條件退出。

學生姓名：

家長/監護人姓名： 簽名：
家長/監護人聯絡電話： 日期：
Appendix III: Questionnaires

A Survey on Dental Trauma among Secondary School Children Hong Kong

Thank you for participating in our survey on dental injuries. It will take you a few minutes to complete this questionnaire, and please mark in the appropriate box.

➢ Background
1. Age: __________
2. Educational level: Form __________
3. Gender: □ Male; □ Female
4. What is the most frequently played sports? [Please choose only one item]
   □ 1. Basketball;
   □ 2. Soccer;
   □ 3. Volleyball;
   □ 4. Tennis;
   □ 5. Table Tennis;
   □ 6. Martial Arts, e.g. Taekwondo, Karate, Judo
   □ 7. Cycling
   □ 8. Others: __________
5. How long have you participated in the sports you selected in Question 4?
   □ 1. 6 months or shorter
   □ 2. 7 to 12 months
   □ 3. 1 to 3 years (13 to 36 months)
   □ 4. 4 to 5 years (37 to 60 months)
   □ 5. More than 5 years
6. How often do you participate in the sports you selected in Question 4?
   ______ times per week
7. Are you a member of any of ball teams of your school?
   □ 1. No □ 2. Yes, please specify __________
8. Are you a member of any sports clubs of your school?
   □ 1. No □ 2. Yes, please specify __________
9. How often do you visit a dentist?
   □ 1. More than once a year
   □ 2. Once a year
   □ 3. Once every two years
   □ 4. Irregularly
Trauma Experience

10. Have you ever had injuries in the face? □ Yes; □ No
   □ 1. Your teeth
   □ 2. Your lips, cheeks, or tongue
   □ 3. Bruising of the face
   □ 4. Concussion
   □ 5. Fractured jaw
   □ 6. Others: __________________

11. In case of dental injuries, did any of the following happen to your teeth?
   □ 1. Completely knocked out of jaw
   □ 2. Loosened, but still in place
   □ 3. Fractured
   □ 4. Others: __________________

12. When was the last incident? _________ years ago

12a. What caused the incident?
   □ 1. Fell down
   □ 2. Bicycle accident
   □ 3. Sports-related
   □ 4. Inappropriate use of teeth, e.g., bite on hard objects
   □ 5. Others: __________________

13. Did you seek dentist’s help after the injury? □ Yes; □ No

13a. If yes, when did you seek dentist’s help?
   □ 1. Immediately
   □ 2. Not immediately, but within one day
   □ 3. The next day
   □ 4. After 2 or more days

14. Do you know how to handle the tooth if it is knocked out?
   □ 1. No
   □ 2. Yes, put the tooth in distilled water
   □ 3. Yes, put the tooth in milk
   □ 4. Yes, put the tooth in the mouth
   □ 5. Yes, clean the whole tooth and put it in a bag
   □ 6. Yes, specify __________________
15. Through what channel have you learned about how to handle a knocked-out tooth?

- [ ] 1. Classes in school
- [ ] 2. Mass media, e.g. television, radio, internet, brochures
- [ ] 3. From parents or friends
- [ ] 4. From dentists
- [ ] 5. Others, specify ____________________________

➤ **About Mouthguard**

16. Have you ever heard about mouthguard?  [ ] 1. No  [ ] 2. Yes

17. Do you believe that Mouthguards protect your teeth?  [ ] Yes;  [ ] No

18. Have you ever used a mouthguard?  [ ] 1. No  [ ] 2. Yes

18a. If yes, In what occasion have you used a mouthguard?

18b. If yes, which type of mouthguard have you used?

- [ ] 1. Stock Mouthguard  [ ] 2. "Boil and Bite" Mouthguard  [ ] 3. Custom-made Mouthguard

18c. If no, what is the reason for not having worn a mouthguard?

- [ ] 1. Never heard of it
- [ ] 2. There is no need to wear it.
- [ ] 3. Uncomfortable when wearing
- [ ] 4. Too expensive
- [ ] 5. Others, specify ____________________________

**THANK YOU FOR TAKING THE TIME TO COMPLETE THIS QUESTIONNAIRE.**
關於香港中學生口腔創傷的調查

多謝閣下參與此關於牙齒創傷的調查。
請花數分鐘時間完成此問卷，並在適當的位置填上您的選擇。

➤ 背景問題

1. 歲數：
2. 年級：
3. 性別： □ 男  □ 女
4. 您經常參加哪種運動？ (只可選一項)
   □ 1. 籃球
   □ 2. 足球
   □ 3. 排球
   □ 4. 橄欖
   □ 5. 乒乓球
   □ 6. 武術，如跆拳道，空手道，柔道
   □ 7. 車牌
   □ 8. 其他，請註明：

5. 上題所選運動您參加了多久？
   □ 1. 6 個月以內
   □ 2. 7-12 個月
   □ 3. 1-3 年(13-36 個月)
   □ 4. 4-5 年(37-60 個月)
   □ 5. 5 年以上

6. 您平均多久做一次此運動？
   每星期次

7. 您是學校內球隊成員？
   □ 1. 否  □ 2. 是，請註明：

8. 您是否有參加任何校內體育會/球會？
   □ 1. 否  □ 2. 是，請註明：

9. 您平均多久看一次牙醫？
   □ 1. 每一年多次
   □ 2. 每一年一次
   □ 3. 每兩年一次
   □ 4. 不定期
牙齒受傷的經驗

10. 您曾經受過顏部受傷嗎？
   □ 有  □ 沒有
   □ 1. 牙齒
   □ 2. 嘴唇、面頰、舌頭
   □ 3. 頭部輕傷
   □ 4. 摔倒
   □ 5. 鼻骨斷裂
   □ 6. 其他，請註明：________________________

11. 您曾受過牙齒受傷嗎？
   □ 1. 單顆牙齒飛脫
   □ 2. 牙齒裂紋
   □ 3. 牙齒斷裂
   □ 4. 其他，請註明：________________________

12. 如有，是多久之前發生的？ _______年前

12a. 以上題，原因是什麼？ ______________________
   □ 1. 摔倒
   □ 2. 騎車車受傷
   □ 3. 運動時受傷
   □ 4. 不適當使用牙齒，例如：咀嚼硬物
   □ 5. 其他，請註明：________________________

13. 以上題，您受傷後有找牙醫治療嗎？
   □ 有  □ 沒有
   13a. 如有，您在什麼時候找牙醫治療？
   □ 1. 馬上
   □ 2. 不是馬上，一天以內
   □ 3. 第二天
   □ 4. 第三天或以後

14. 您知道牙齒整顆脫落後要怎麼處理嗎？
   □ 1. 不知道
   □ 2. 知道，把脫落牙齒浸入清爽水中
   □ 3. 知道，把脫落牙齒浸入牛奶中
   □ 4. 知道，把脫落牙齒放入口中
   □ 5. 知道，清洗整顆牙齒後放入袋中
   □ 6. 知道，請註明：__________________________
15. 您是通過什麼渠道得知以上處理方法？
   □ 1. 學校
   □ 2. 大家傳媒，例如，電視，電台，互聯網，小冊子
   □ 3. 家長或朋輩
   □ 4. 牙醫
   □ 5. 其他，請註明：

> 關於護口護

16. 您有聽說過護口護嗎？ □ 1. 沒有 □ 2. 有
17. 您相信護口護能保護您的牙齒嗎？ □ 1. 相信 □ 2. 不相信
18. 您有試過配戴護口護嗎？ □ 1. 沒有 □ 2. 有
18a. 如有，您在什麼時候配戴護口護？

18b. 您曾使用過以下哪一種護口護？

1. 現成的護口護
2. 熱水貼服護口護
3. 牙醫度身訂造的護口護

18c. 如沒有使用過，您選擇不配戴護口護的原因是：
   □ 1. 不認識護口護
   □ 2. 沒有任何理由要配戴
   □ 3. 配戴時感到不舒服
   □ 4. 價錢太高
   □ 5. 其他理由，請註明：

謝謝您的合作！

Appendix IV: Dental charting form
DENTAL TRAUMA HISTORY

Event: ____________________________________________

Location: ____________________________________________

Time: ____________________________________________

Immediate management: ________________________________

Visited dentist: Y / N

Treatments done: ________________________________________
Appendix V: Report to parents

Dear parent of secondary school student,

Re: A Survey on Dental Trauma among Secondary School Children in Hong Kong

Thank you so much for your child’s participation in our survey on dental trauma. After careful examination on your child, we would like to inform you of our findings.

☐ No evidence of dental trauma has been found.

☐ Dental trauma has been detected on ______________________

........................................................................................................

☐ Dental treatment for the reported trauma is recommended.

Date of the examination: ________________________________

Thank you for your cooperation!
親愛的家長：

謝謝貴子女參加本次關於牙齒創傷的調查。

以下是我們為__________檢查後的報告。

☐ 沒有牙齒創傷的證據。
☐ 發現以下牙齒或口腔有創傷：

________________________________________

________________________________________

☐ 建議以上牙齒需要治療。

謝謝您的合作！

Appendix VI: Powerpoint presentation in school talks
本港的口腔和顱面創傷成因

- 交通意外 (30%)
- 跌傷 (31%)
- 運動 (3%)
- 工傷 (12%)
- 暴力 (20%)
- 其他 (4%)


外國研究 - 有關運動的口腔和顱面創傷

- 最常發生於8-11歲的兒童
- 男生:女生比率 = 3:1
- 兒童口腔和顱面創傷有10%
- 39%是因為運動時受傷
- 8成的牙齒創傷會影響上頜門牙
- 有齲齒的兒童比沒有齲齒的兒童更易有牙齒創傷

Sources: The role of contact in prevention of sports-related and facial trauma, Dr. F. W. S. Newson, International dentistry SA, Vol 12, No 1}

口腔結構

牙齒的結構
常見的口腔和顱面創傷

軟組織外傷

唇舌外傷

- 須立即將病人轉向前傾，把嘴裡的血吐出來。
- 然後將舌脣的傷口用清潔的紗布壓迫止血。
- 如用壓迫法可以止住出血的話，觀察即可。
- 如果傷口過大，流血不止，應立即去醫院。

外物插入軟組織

- 軟組織外傷
- 牙齦或牙槽骨斷裂
- 牙齒移位
- 牙齒飛脫
牙齒或牙槽骨斷裂

牙齦完整

即時處理解法

斷裂位置不太接近牙齦
斷裂位置沒有流血

最好可以找到所有碎片，並帶同它們到牙醫處，查看和接受治療

牙醫的治療方法

牙色補牙物料
**牙齒受損 - 牙醫的考慮**

1. 斷裂部位的大小、牙根年齡、求診的時間皆影響其預後及治療方法

2. 若牙根尚未成熟的牙齒，應儘量保存牙髓組織，以使牙根能繼續生長

3. 牙根尖端已封閉之牙齒，若牙髓發炎，可能需要根管治療（杜牙根）

**即時處理方法**

最好可以找到所有碎片，並帶同它們到牙醫檢查和接受治療
牙齒飛脫

注意
如果飛出的牙齒被泥土弄髒，不建議插回齒槽內，應先交由牙醫清潔，以免受破傷風菌感染。

牙齒飛脫-即時處理方法
1. 小心拿住牙根部份(勿碰觸牙根)
2. 以冷水輕輕沖洗牙齒10秒鐘
3. 再將牙齒輕壓入齒槽內
4. 緩慢後續送求診

若不能放入齒槽內，則先將牙齒沖洗後放入生理鹽水或水牛奶保存。

牙齒飛脫-牙醫的考慮

即時處理飛出牙齒的方法

事發至抵達牙醫所需時間

牙根的年齡

護口脹

保護牙齒的儀器--護口脹
Appendix VII: Posters and leaflets
護口膠

意外多由缺乏保護而起
運動創傷可引致牙齒撞裂，神經創傷甚至飛脫。
利用適當的保護器能減輕對牙齒的傷害

安全至上
接觸運動如籃球、足球、搏擊等運動容易發生身體碰撞。配戴護口膠將牙齒套住，能有效減弱對牙齒撞擊力。

豐儉由人
市面上主要有三種護口膠，由簡單的現成護口膠，到較貼身的熱力貼服護口膠，以及專業的特製護口膠。價格由十數元至數百元不等，分別在於對牙齒的貼服度。貼服度越高，保護性越強。}

盡顯風格
專業特製護口膠可在製作過程中加入不同顏色、圖案標緻、花紋等。而因為它們是度身訂做，所以配戴比較舒適。

香港大學牙醫學院