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<th><strong>Title</strong></th>
<th>Oral health problems with retained lower impacted wisdom teeth</th>
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</tbody>
</table>
Oral health problems with retained lower impacted wisdom teeth

Community Health Projects 2006
Oral health problems with retained lower impacted wisdom teeth

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# TABLE OF CONTENTS

1   ABSTRACT           1
2   INTRODUCTION        3
3   AIM AND OBJECTIVES  8
4   MATERIALS AND METHODS  9

Sample  
Exclusion criteria  
Questionnaire construction  
Review of PPDH clinical records  
Definition of the angulations of impacted third molars  
Training and Calibration  
Procedure of telephone survey  
5   RESULTS            13

Participants’ background  
Clinical status of the lower third molars of the participants at age 16-18  
Reported oral health problems associated with lower third molars  
Reason for not extracting the wisdom teeth  
The number of years of extraction and reason of extracting the wisdom teeth  
Reported complications after extraction  
6   DISCUSSION         23  

Response rate of the survey  
Extracting lower third molars  
Factors affecting participants not to extract lower wisdom teeth  
Reported oral health problems related with lower third molars.  
Dentist’s role on patient’s decision making  
Complications after wisdom tooth extraction and preventive measures  
7   CONCLUSION         28
8   RECOMMENDATIONS    29
9   ACKNOWLEDGEMENTS   30
10  REFERENCES         31
11  APPENDIX: Survey Questionnaire (Traditional Chinese and English versions)  34
1) Abstract

A structured questionnaire was constructed, after reviewing recent relevant literatures, to investigate the oral health problems related to impacted lower third molars. A telephone survey was conducted by using a sample of 336 participants, aged 24-26, 31-33 and 38-40 years old. 245 participants were successfully interviewed and complete the questionnaire through the telephone survey. The response rate was 72.9%. The panoramic x-ray taken at their age 16-18 years old was examined by 4 trained examiners. The angulations of impaction of each lower third molar was recorded. Results showed that 67% of participants had impacted lower third molar on both side, 13% had impacted lower third molar on one side only and 20% had no impacted lower third molars on both side. Among 245 participants, a total of 424 third molars were examined. 72.2% of the examined third molars were mesial angulated.

In general, the prevalence of reported oral health problems related to impacted third molars was low. The prevalence was highest in those participants with impacted third molars on both sides. The problems with highest prevalence for this group were ‘Difficult to maintain good oral hygiene’ (18.9%) and ‘Gum swelling’ (18.9%). Statistically significant difference were found in 3 oral health problems when comparing the prevalence among participants with a) impacted third molars on both sides, b) impacted third molars on one side only and c) no impacted third molars on both sides. The 3 oral health problems were ‘difficult to maintain good oral hygiene’, ‘gum swelling’ and ‘facial swelling’.

Among the 108 participants who were still having impacted third molars, 63.9% reported that they didn’t extract the third molar because they didn’t feel sign and symptom. While among the 116 participants, who had experienced third molars extraction, ‘pain’, ‘prevent further problems’ and ‘follow dentists advises’ were the main reasons of extraction. Among the group, more than 40% of the third molars were extracted before the age of 30. 44.8% reported that they had no major discomfort after surgery. 35.3% and 33.6% reported
that they have pain and swelling respectively. No one had experienced permanent damages like mandible fractures or the extraction of wrong teeth.
2) INTRODUCTION

There has been comprehensive elaboration from a vast literature that tooth impaction is a frequent phenomenon with great concerns.

A tooth is defined as impacted when it fails to erupt into dental arch within the expected time, possibly accompanied with obstruction on its path of eruption by an adjacent tooth, bone, or soft tissue (Contemporary Oral and Maxillofacial Surgery, 4th ed.: p.184-5). In the case of mandibular third molar, the last tooth to erupt in the lower arch, inadequate arch length and space pose increased risk of dental impaction. The obstacles are usually the second molar, ascending ramus and operculum. In addition, tumours and cysts may also prevent the third molar from eruption (Principles of Oral and Maxillofacial Surgery, 5th ed.: p.101). Third molars are described impacted when no signs of further physiological eruption, with the failure of appearance of the bulbous point of the clinical crowns beyond the gingival crest.

The angulations of impactions is measured using long axis of the impacted third molar compared to the long axis of the second molar (Schersten et al, 1989), and the classification of mesioangular, distoangular and vertical impactions, diagnosed through dental radiographs has long been implemented in consensus. The mesioangular impacted tooth is tilted toward the second molar in mesial direction. In the circumstance of horizontal positioned third molar, it is categorised under mesioangular impaction. In vertical impaction, the long axis of the impacted tooth runs in the same direction as the long axis of second molar. Finally, in distoangular impaction, the long axis of the tooth is distally or posteriorly angled away from the second molar (Contemporary Oral and Maxillofacial Surgery, 4th ed.: p.194-5).

The prevalence and distribution of impacted teeth are variable, accounting for 8.3-37.8% of the examined patients in different regions of the world (Chu et al. 2003). The conspicuous variation among those researches was attributed to the difference in age and associated timing of dental eruption among the selected groups. In addition, individual study
implemented different clinical and radiographic criteria for the assessment of dental development and impaction, which may contribute to different result.

Among all, third molars was ranked the most frequently impacted teeth of modern humans (Andreasen et al, 1997). The prevalence of impacted third molar was observed to be up to 66% among all the dental impaction (Morris et al, 1971). However, there was a recent radiographic study of the prevalence of impacted teeth among Chinese population, in which higher prevalence of impacted third molars was shown among the ethnic group, and impacted lower third molars accounted for 82.5% of all the impacted teeth (Chu et al, 2003).

Among the impacted lower third molars, those with mesio-angular and horizontal impaction were most frequently encountered, and the results ranged from 75% (Kramer and Williams, 1970) to 84.3% (Chu et al, 2003).

Reports have depicted that various pathologies are associated with impacted lower third molars, for example: pericoronitis and/or facial infection; dental caries; periodontitis and/or root resorption of second molar; cystic change; ameloblastoma and/or carcinoma formation; orthodontic complications; prosthetic difficulties; or even temporomandibular disorders and associated symptoms (National Institutes of Health, 1980, Knuttsson et al, 1996, Nemcovsky et al, 1995, Worrall et al, 1998).

There are approximately 30% of Chinese patients with dental impaction experienced history of symptoms (Chu et al, 2003). Most of the symptomatic impacted teeth are associated with pain and swelling, which are the consequence of pericoronitis, inflammation of the surrounding soft tissue around the partially erupted lower third molars. Fortunately, pathologies like pericoronitis and dento-alveolar infections usually resolve following removal of the culprit third molars (Worrall et al, 1998).

There is significant association of the angulation and exposure in oral cavity of an impacted third molar with the clinical manifestation of the problems in third molar and adjacent second molar region (Yamaoka et al, 1995). Mesio-angular and horizontal impacted
lower third molar decreases the amount of bone on the distal aspect of the second molar (Contemporary Oral and Maxillofacial Surgery, 4th ed.: p.185). Moreover, partial impacted third molar poses difficulties in maintaining satisfactory oral hygiene in surrounding region and higher risk of food traps. The occlusal surface of the impacted teeth and distal surface of second molars, being notorious sites of plaque accumulation, contribute to the clinically relevant pathologies, such as periodontal disease and caries.

The prevalence of periodontitis and caries in the distal surface of lower second molars was outlined to be 4.5% and 3% respectively (Stanley et al, 1988) and higher among Hong Kong Chinese adults, with 8.8% and 7.4% respectively (Chu et al, 2003). In addition, the caries rate in the impacted lower third molars was 2.5% in this Chinese group.

The attribution of the impacted third molar to root resorption of the second molar is yet in controversy at present. Several researches demonstrated that root resorption of the second molars occurred in 8% (Nitzan et al, 1981) and 9.5% of lower second molars, while another study did not discover any resorption case (Sewerin and von Wowern, 1990), and in another study, only one instance among 141 impacted lower third molars (Ahlqwist and Grandahl, 1991).

Follicular enlargement and changes surrounding the impacted teeth is another area of attention. Statistics depicting a total of 25 impacted lower third molars among 3178 (0.8%) of which developed cysts and carcinoma in related region in Hong Kong Chinese adults (Chu et al, 2003). Should such pathologies develop, albeit rare, clinical management becomes complicated and the subjects are prone to vigilant follow up.

On the other hand, surgical removal of teeth alone may not cure problems ultimately (Kugelberg et al, 1985). The report suggested that localized periodontal problems could evolve on the adjacent second molar associated with an impacted partially erupted lower third molar, and which may persist even following surgical extraction of the third molar.
Statistics regarding the incidence or prevalence of subjects with periodontal defects on the second molars related to the impacted third molars among Chinese population are lacking at present. Recently, similar researches were conducted among Hong Kong Chinese to identify the improvement of periodontal pockets through mechanical root debridement of second molars following surgical removal of impacted third molars (Kan et al, 2002, Leung et al, 2005). They concluded that periodontal defects subsequent to third molar extraction can be significantly reduced by implementation of a regimen of periodontal care following the oral surgery.

The commonest post-operative complaints from patients who have undergone surgical removal of lower third molars are persistent pain/discomfort and swelling (review article from Chu et al, 2003). Albeit striking, only a small proportion of adults (0.3%) who had surgical removal of impacted third molars 4-6 years beforehand expressed chronic discomfort associated with periodontal problems at the related second molars (Berge et al, 2003), indicating that residual periodontal problems could remain relatively asymptomatic and the pain/discomfort appeared not severe enough to catch the subjects attention.

Meanwhile, tooth extractions, regarded more invasive dental treatment, could arouse higher level of anxiety among patients, attributed to patient’s perceptions of pain induced during and after oral surgery and fear to pain (Fung, 1998). In respect, maneuvers to minimise pain throughout the procedures are the most effective means to alleviate patient’s apprehension. Moreover, various anxiety-relieving measures such as direct reassurance, friendly attitude, explanation before the procedures and discussion of the anticipated consequence after treatment are appreciated by parents. This not only alleviates patient’s anxiety but also helps them differentiate usual post-operative scenarios after tooth extraction from surgical complications.
Though removal of impacted third molars is the most common oral surgical procedure, controversy still exists over the necessity of removal for patients who are free of symptoms and pathologies.

At present, there is a lack of information regarding the oral health status of Hong Kong Chinese population in the lower third molars region, Thus this study aims at elucidating the oral health status and associated problems around impacted lower third molar region of Hong Kong Chinese population.
3) Aim and Objectives

Aim:

To study the oral health status of the lower third molar region, related to the retention of the impacted lower third molars, among 24-26, 31-33 and 38-40 age groups in Hong Kong Chinese population.

Objectives:

1. To review relevant literatures about oral health problems related to impacted lower third molars and the possible consequences of surgical extraction.

2. To construct a structured questionnaire to collect information about problems of retained lower third molars and consequences of surgical extraction.

3. To find the common oral health problems related to lower third molar region in the age groups 24-26 years old, 31-33 years old and 38-40 years old.

4. To compare the prevalence of oral health problems related to impacted lower third molar among 3 age groups and,

5. To find the possible factors affecting patient’s decisions in lower impacted third molars extractions.
4) Materials and Methods

4.1) Materials

Sample

The study population of this survey consisted of three age groups. They were 38-40 years old, 31-33 years old and 24-26 years old. The sampling frame includes the patients list from Prince Philip Dental Hospital (PPDH) who had made their first appointment in PPDH in years as follows.

<table>
<thead>
<tr>
<th>Age group</th>
<th>First appointment date in year</th>
</tr>
</thead>
<tbody>
<tr>
<td>24-26</td>
<td>1998</td>
</tr>
<tr>
<td>31-33</td>
<td>1991</td>
</tr>
<tr>
<td>38-40</td>
<td>1984</td>
</tr>
</tbody>
</table>

Thus the sampling frame would only contain those PPDH patients who make their first appointment at their age 16-18 years old. A random sample, with a quota of 400 participants in each age group, would be constructed.

Exclusion criteria

The exclusion criteria were as follows:

a) The ethnic group does not belong to Chinese.

b) Panoramic radiograph is not available in PPDH patient record at the year of first appointment.
**Questionnaire construction**

A structured questionnaire was developed following literature review. Data from the following dimensions were gathered. They were 1) general oral hygiene habit, 2) current oral health problems around lower third molar regions, 3) the reason of not having the lower third molar extraction and 4) the time and reason of extracting lower third molar and the post-operation complication happened. The questionnaire was written in both Colloquial Cantonese and English. The questionnaire was trial on dental students in PPDH to test for the ease of understanding and the designs of data collection. The questions were then modified accordingly.

**4.2) Methods**

*Review of PPDH clinical records*

The panoramic radiograph taken at the year of first appointment was examined. Since the sampling frame only contained participants, who make their first appointment in PPDH at their age 16-18 years old. Therefore the clinical conditions of their lower third molar at the age 16-18 years old were recorded retrospectively.
**Definition of the angulations of impacted third molars**

The angulations of impaction is measured using long axis of the impacted third molar compared to the long axis of the second molar. The definitions were as follows:

1) **Mesial impaction:** The impacted tooth is tilted toward the second molar in mesial direction. An angle is made between the long axes of two teeth. The horizontal positioned third molar is also categorised under mesial impaction.

2) **Vertical impaction:** the long axis of the impacted tooth runs parallel to the long axis of second molar. No angle is made between the long axes of two teeth.

3) **Distal impaction:** The impacted tooth is tilted away from the second molar in distal direction. An angle is made between the long axes of two teeth.

**Training and Calibration**

Four examiners were calibrated by a training session. Twenty panoramic radiographs were examined and discussed to achieve an agreement in the angulations of impacted third molars.

**Procedure of telephone survey**

The telephone numbers of the sample were listed. The list consisted of some old telephone numbers with six or seven digits, which had been changed to 8 digits already. Those numbers were updated through the telephone enquiry. The telephone number was
defined as invalid if 1) telephone number no longer existed, 2) nobody answered the phone in all trials, 3) the participant had moved away or deceased. The invalid telephone number would not be accounted in calculation the response rate of the survey.

All telephone number will be dialed to ask the named participant to pick up the call. In case the participant cannot be contacted, a maximum of 3 trials will be carried out in three different days in different time period. A total period of 2 weeks was spent for conducting the telephone survey.

**Data Analysis**

The data will be analysis by using SPSS v.13 computer software.
5) RESULTS

Participants’ background

The number of patients’ records fulfilling our inclusion criteria, by searching the computer database, in the 3 age groups were as follows: 282 in 24-26 years old group, 409 in 31-33 years old group and 367 in 38-40 years old group. Considering 2 out of 3 groups have the numbers smaller than sampling quota 400. The other group was just exceeding 400 slightly. All the patients satisfying our inclusion criteria were selected as our sample. No sampling procedures were carried out in this study. In total, 957 patients’ records were obtained. After verification, the telephone numbers of 621 records were found to be invalid, while 336 telephone numbers were valid. 245 participants completed the interview. The response rate of the survey was calculated as 72.9%.

The background information of 245 participants was summarized in Table 1. 150(61.2%) participants were females while 95(38.8%) were males. 111(45.3%) participants were 24 to 26 years old”. 83(33.9%) were 31 to 33 years old and 51(20.8%) were 38 to 40 years old. 104(42.8%) participants had attained their education up to secondary school level, which was the largest group. 87(35.5%) participants has attained university level or above. None of them had attained primary level or below as their highest educational level. 82(33.5%) participants were working in professional and management sector. 68(27.8%) participants were clerical workers. The smallest groups were housewife (2 participants, 0.8%)
and students (4 participants, 1.6%). 213 (86.9%) participants brush twice daily. However, only 61 (24.9%) flossed at least once daily. 109 (44.5%) participants did not floss at all.

Clinical status of the lower third molars of the participants at age 16-18

All the PPDH patients’ records were reviewed. The clinical status of participants’ lower third molar at their age 16-18 years old was recorded by examining their panoramic x-ray retrospectively. 48 (20%) participants had no lower third molars on both sides, 34 (13%) participants had one impacted lower third molar on either side, 163 (67%) participants had impacted lower third molars on both sides. A total number of 424 third molars were examined. 210 were lower left third molars and 214 were lower right third molars. The types of impaction were shown in Table 2. Similar trend in the distribution of angulations of impaction between left and right third molars were observed. In total, 306 (72.2%) third molars were mesially impacted, 17 (4.1%) third molars were distally impacted. 37 (8.7) third molars were vertically impacted. Only 64 (15.1%) third molars were fully erupted.
<table>
<thead>
<tr>
<th>Table 1: Background information</th>
<th>No of participants (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age ( years old)</strong></td>
<td></td>
</tr>
<tr>
<td>24 to 26</td>
<td>111 (45.3)</td>
</tr>
<tr>
<td>31 to 33</td>
<td>83 (33.9)</td>
</tr>
<tr>
<td>38 to 40</td>
<td>51 (20.8)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>95 (38.8)</td>
</tr>
<tr>
<td>Female</td>
<td>150 (61.2)</td>
</tr>
<tr>
<td><strong>Educational Level</strong></td>
<td></td>
</tr>
<tr>
<td>None or Kindergarten</td>
<td>0</td>
</tr>
<tr>
<td>Primary School</td>
<td>0</td>
</tr>
<tr>
<td>Secondary School</td>
<td>104 (42.8)</td>
</tr>
<tr>
<td>High Diploma Level</td>
<td>52 (21.2)</td>
</tr>
<tr>
<td>University Level or above</td>
<td>87 (35.5)</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
</tr>
<tr>
<td>Retired or Unemployed</td>
<td>14 (5.7)</td>
</tr>
<tr>
<td>Student</td>
<td>4 (1.6)</td>
</tr>
<tr>
<td>Professional and Management</td>
<td>82 (33.5)</td>
</tr>
<tr>
<td>Clerical</td>
<td>68 (27.8)</td>
</tr>
<tr>
<td>Sales</td>
<td>10 (4.1)</td>
</tr>
<tr>
<td>Service Sector</td>
<td>24 (9.8)</td>
</tr>
<tr>
<td>Industry, Drivers and Manual Labour</td>
<td>19 (7.8)</td>
</tr>
<tr>
<td>Housewife</td>
<td>2 (0.8)</td>
</tr>
<tr>
<td>Others</td>
<td>20 (8.2)</td>
</tr>
<tr>
<td><strong>Brushing Habit</strong></td>
<td></td>
</tr>
<tr>
<td>Once Daily</td>
<td>22 (9%)</td>
</tr>
<tr>
<td>Twice Daily</td>
<td>213 (87%)</td>
</tr>
<tr>
<td>More Than Twice Daily</td>
<td>10 (4%)</td>
</tr>
<tr>
<td><strong>Flossing Habit</strong></td>
<td></td>
</tr>
<tr>
<td>At Least Once Daily</td>
<td>61 (25%)</td>
</tr>
<tr>
<td>Several Times per Week</td>
<td>23 (9%)</td>
</tr>
<tr>
<td>Used When In-needed</td>
<td>52 (21%)</td>
</tr>
<tr>
<td>Never Used</td>
<td>109 (45%)</td>
</tr>
</tbody>
</table>
Table 2: The clinical status of lower third molars at the age of 16-18 years old

<table>
<thead>
<tr>
<th></th>
<th>Left</th>
<th>Right</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mesial Impaction</td>
<td>155 (36.6%)</td>
<td>151 (35.6%)</td>
<td>306 (72.2%)</td>
</tr>
<tr>
<td>Distal Impaction</td>
<td>10 (2.4%)</td>
<td>7 (1.7%)</td>
<td>17 (4.1%)</td>
</tr>
<tr>
<td>Vertical Impaction</td>
<td>17 (4.0%)</td>
<td>20 (4.7%)</td>
<td>37 (8.7%)</td>
</tr>
<tr>
<td>Subtotal for Impaction</td>
<td>182 (42.9%)</td>
<td>178 (42.0%)</td>
<td>360 (84.9%)</td>
</tr>
<tr>
<td>Fully Erupted</td>
<td>28 (6.6%)</td>
<td>36 (8.5%)</td>
<td>64 (15.1%)</td>
</tr>
<tr>
<td>Total</td>
<td>210 (49.5%)</td>
<td>214 (50.5%)</td>
<td>424 (100%)</td>
</tr>
</tbody>
</table>

Reported oral health problems associated with lower third molars

Six oral health problems were asked to the participants to assess the problems aroused by the impacted lower third molars. The prevalence of the reported problems was low. Participants possessed impacted lower third molars on both sides had highest prevalence in difficult to maintain good oral hygiene (18.9%) and gum swelling (18.9%), followed by food trapping (14.9%) and toothache (12.2%). The least common problems were gum bleeding (6.8%) and facial swelling (6.8%). Comparing the prevalence of reported problems among three groups of participants, which are 1) participants with impacted third molars on both sides, 2) participants with impacted third molars on one side only and 3) participants with no impacted third molars on both sides. Statistically significant differences were found in three reported problems by using Chi-Square Exact Test. The three reported problems were ‘difficult to maintain good oral hygiene’ (p=0.010), ‘gum swelling’ (p=0.014) and facial
swelling (p=0.020). The prevalence was highest among participants with impacted lower third molar on both sides. However the prevalence in participants with only one impacted lower third molar was similar to participants with no impacted lower third molar.

Table 3: Comparison of oral health problems among participants with lower third molars

<table>
<thead>
<tr>
<th>Problem</th>
<th>Non-impacted 38 and 48 (n=134)</th>
<th>Impacted 38 or 48 (n=37)</th>
<th>Impacted 38 and 48 (n=74)</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Difficult to maintain good oral hygiene</td>
<td>6.0%</td>
<td>5.4%</td>
<td>18.9%</td>
<td>0.010*</td>
</tr>
<tr>
<td>Food trapping</td>
<td>6.7%</td>
<td>13.5%</td>
<td>14.9%</td>
<td>0.112</td>
</tr>
<tr>
<td>Gum swelling</td>
<td>6.0%</td>
<td>8.1%</td>
<td>18.9%</td>
<td>0.014*</td>
</tr>
<tr>
<td>Gum bleeding</td>
<td>3.7%</td>
<td>2.7%</td>
<td>6.8%</td>
<td>0.572</td>
</tr>
<tr>
<td>Toothache</td>
<td>5.2%</td>
<td>8.1%</td>
<td>12.2%</td>
<td>0.185</td>
</tr>
<tr>
<td>Facial swelling</td>
<td>0.7%</td>
<td>0.0%</td>
<td>6.8%</td>
<td>0.020*</td>
</tr>
</tbody>
</table>

*p<0.05 Chi-Square Exact Test  38=lower left third molar, 48=lower right third molar

Reason for not extracting the wisdom teeth

There were 108 participants who possessed either one or two lower impacted third molars, reporting that they had never had any extraction of lower third molars before. The reasons of not extracting the lower third molars were asked. The result was summarized in Table 4. Among 108 participants, 69(63.9%) participants reported that they cannot feel any signs and symptoms. 19(17.6%) participants reported that they had never thought of making
the decision to extract it. The reported reasons like anxiety (4.6%), pain (3.7%), time conflict (5.6%) and economic problems (1%) were not common.

Table 4: The reasons of not extracting the lower impacted third molars

<table>
<thead>
<tr>
<th>Reasons of not extracting lower impacted third molars</th>
<th>No of participants (n=108)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td>5 (4.6%)</td>
</tr>
<tr>
<td>Pain</td>
<td>4 (3.7%)</td>
</tr>
<tr>
<td>Time Conflict</td>
<td>6 (5.6%)</td>
</tr>
<tr>
<td>Economic Problems</td>
<td>1 (0.9%)</td>
</tr>
<tr>
<td>Never thought of it</td>
<td>19 (17.6%)</td>
</tr>
<tr>
<td>No Sign and Symptom</td>
<td>69 (63.9%)</td>
</tr>
<tr>
<td>Dentist suggested not to extract</td>
<td>9 (8.3%)</td>
</tr>
<tr>
<td>Do not know having wisdom teeth</td>
<td>6 (5.6%)</td>
</tr>
<tr>
<td>Extract the teeth until further eruption</td>
<td>4 (3.7%)</td>
</tr>
<tr>
<td>Do not know that the teeth would cause problems</td>
<td>4 (3.7%)</td>
</tr>
</tbody>
</table>

The number of years of extraction and reason of extracting the wisdom teeth

There were 116 participants reported that they had experienced one or both lower third molars extraction. Among them 65(56%) participants had third molar extraction in PPDH. From the 424 third molars examined, 203 third molars were extracted. The distribution of third molars extraction along the time span was shown in Table 5. 102(49.7%) third molars were extracted from the group 24-26 years old. 58(42.3%) were extracted from the group 31-33 years old. 43(52.5%) were extracted from the group 38-40 years old. On the
whole, about 20% of the third molars were extracted before or around 20 years old and more than 40% of the third molars were extracted before 30 years old.

The reasons of 116 participants to extract the lower third molars were shown in Table 6. The most common reasons for extraction were 1) pain (32.8%), 2) prevent further problems (28.4%) and 3) follow dentist advise (20.7%). None of the participant reported that the reason of third molar extractions were due to root resorption of lower second molars or pathological changes in third molar region.

Reported complications after extraction

Participants were asked to remember and report the complications after extractions. Among 116 participants who had lower third molars extraction, 52 (44.8%) reported that they had no major discomfort after surgery. 41 (35.3%) participants reported that they have pain after surgery and 39 (33.6%) reported that they had swelling. None of the participants reported that they had permanent damages like mandible fractures or the extraction of wrong teeth. Only 1 (0.9%) participant experienced prolonged wound healing and also 1 (0.9%) participant experienced fractured of second molar or the molar’s restoration.
Table 5 Time of extracting the lower wisdom teeth among three age groups

<table>
<thead>
<tr>
<th>Age Group</th>
<th>No. of lower third molars</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total no. of third molars examined</td>
</tr>
<tr>
<td><strong>24 to 26 years-old</strong></td>
<td>Extraction less than 1 year</td>
</tr>
<tr>
<td></td>
<td>Extraction within 1 to 5 years</td>
</tr>
<tr>
<td></td>
<td>Extraction within 6 to 10 years</td>
</tr>
<tr>
<td></td>
<td>Total no. of teeth extracted</td>
</tr>
<tr>
<td><strong>31 to 33 years-old</strong></td>
<td>Extraction less than 1 year</td>
</tr>
<tr>
<td></td>
<td>Extraction within 1 to 5 years</td>
</tr>
<tr>
<td></td>
<td>Extraction within 6 to 10 years</td>
</tr>
<tr>
<td></td>
<td>Extraction within 11 to 15 years</td>
</tr>
<tr>
<td></td>
<td>Extraction more than 16 years</td>
</tr>
<tr>
<td></td>
<td>Total no. of teeth extracted</td>
</tr>
<tr>
<td><strong>38 to 40 years-old</strong></td>
<td>Extraction less than 1 year</td>
</tr>
<tr>
<td></td>
<td>Extraction within 1 to 5 years</td>
</tr>
<tr>
<td></td>
<td>Extraction within 6 to 10 years</td>
</tr>
<tr>
<td></td>
<td>Extraction within 11 to 15 years</td>
</tr>
<tr>
<td></td>
<td>Extraction more than 16 years</td>
</tr>
<tr>
<td></td>
<td>Total</td>
</tr>
</tbody>
</table>
Table 6: The reasons of extracting the lower wisdom teeth

<table>
<thead>
<tr>
<th>Reasons of extraction</th>
<th>No. of participants (n=116)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevent future problems</td>
<td>33 (28.4%)</td>
</tr>
<tr>
<td>Difficult to clean</td>
<td>8 (6.9%)</td>
</tr>
<tr>
<td>Food trapping</td>
<td>7 (6.0%)</td>
</tr>
<tr>
<td>Orthodontics treatment</td>
<td>9 (7.8%)</td>
</tr>
<tr>
<td>Gum swelling</td>
<td>17 (14.7%)</td>
</tr>
<tr>
<td>Gum bleeding</td>
<td>5 (4.3%)</td>
</tr>
<tr>
<td>Pain</td>
<td>38 (32.8%)</td>
</tr>
<tr>
<td>Tooth decay</td>
<td>20 (17.2%)</td>
</tr>
<tr>
<td>Treatment for the second molar</td>
<td>2 (1.7%)</td>
</tr>
<tr>
<td>Root resorption at second molar</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Facial swelling</td>
<td>6 (5.2%)</td>
</tr>
<tr>
<td>Pathological changes</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Follow dentist suggestion</td>
<td>24 (20.7%)</td>
</tr>
<tr>
<td>Not enough space for eruption</td>
<td>14 (12.1%)</td>
</tr>
<tr>
<td>Too near the nerve</td>
<td>5 (4.3%)</td>
</tr>
<tr>
<td>Extract with the upper wisdom teeth together</td>
<td>4 (3.5%)</td>
</tr>
<tr>
<td>Fever or infection</td>
<td>3 (2.6%)</td>
</tr>
<tr>
<td>Going to have surgery</td>
<td>2 (1.7%)</td>
</tr>
<tr>
<td>Causing the drifting of the second molar</td>
<td>1 (0.9%)</td>
</tr>
</tbody>
</table>
### Table 7: The reported complication after extracting the lower wisdom teeth

<table>
<thead>
<tr>
<th>Complications after lower third molars removal</th>
<th>No of participants (n=116)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prolonged bleeding</td>
<td>11 (9.5%)</td>
</tr>
<tr>
<td>Difficulty in mouth opening</td>
<td>15 (12.9%)</td>
</tr>
<tr>
<td>Bruising on face</td>
<td>11 (9.5%)</td>
</tr>
<tr>
<td>Prolong wound healing</td>
<td>1 (0.9%)</td>
</tr>
<tr>
<td>Wound infection</td>
<td>6 (5.2%)</td>
</tr>
<tr>
<td>Pain</td>
<td>41 (35.3%)</td>
</tr>
<tr>
<td>Trauma to lips or gingivae</td>
<td>4 (3.4%)</td>
</tr>
<tr>
<td>Fracture of the second molar or its restoration</td>
<td>1 (0.9%)</td>
</tr>
<tr>
<td>Extracted the wrong teeth</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Transient parathesia of lower lip and tongue</td>
<td>5 (4.3%)</td>
</tr>
<tr>
<td>Fracture of mandible</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>Swelling</td>
<td>39 (33.6%)</td>
</tr>
<tr>
<td>No discomfort</td>
<td>52 (44.8%)</td>
</tr>
</tbody>
</table>
6) DISCUSSION

Response rate of the survey

The success rate of this survey was over 70 %, indicating that a majority of participants who could be contacted were willing to participate in the telephone survey. The reason for such a high success rate could be attributed to the fact that all participants had received treatments in PPDH in the past. Since the patient had built up the ‘doctor-patient relationship’, the attitude of those participants would be more receptive to our students. They were also more willing to reveal their current oral health status and personal information.

Extracting lower third molars

As observed, relatively more third molars were extracted at the younger age of the participants. The number of third molar extraction was relatively smaller when the participant getting older. This may indicate that the younger generations were more aware of their oral health, and understood the potential problems imposed by the impacted third molars. As we also know that at the age around 20, most third molars are asymptomatic. Thus, the younger generation might probably accept the concept of prophylactic extraction and therefore extracted their asymptomatic third molars.
Factors affecting participants not to extract lower wisdom teeth

Traditionally dental professional believed that there were some common factors affecting the decision to extract lower impacted third molars. These factors were asked to those participants who had retained lower third molars.

Surprisingly, financial consideration was uncommon in the decision making process. One of the possible reasons was that PPDH can provide third molars extraction at a low cost. Some participants who concerned about the cost of third molar surgery might have extracted their wisdom teeth in PPDH already. Therefore the participants with retained third molars, when answering this question, could not reflect the real situation. Other reasons of not extracting lower wisdom teeth including anxiety, pain and time conflict only comprised a minority (13.9%) in total. This demonstrated that these factors were not the major concerns for most patients when they consider the extraction of lower wisdom teeth.

Reported oral health problems related with lower third molars.

From the result of this survey, the prevalence of reported oral health problems was low. However when referring the result of another third molar study, with similar study population, showed that about 30% of patients had clinical signs and symptoms in the lower third molar region only (Chu et al, 2003).

A possible explanation about the low prevalence could be the fact that impacted lower third molar could only imposed a limited effect on oral health around the area.
However a low prevalence in reported oral health problems could also be due to some other reasons. First, the participants didn’t realize that gingival swelling, bleeding and food trapping were the symptoms caused by their lower third molars. Second, patients might not understand the potential problems in the futures. Third, according to the Chinese traditional beliefs, most patients believed that gum bleeding, swelling, or pain were caused by ‘hot air’, and could be cured by Traditional Chinese Medicine. These three factors might all contribute to a low prevalence in reported oral health problems.

To prevent the public from misunderstanding of the adverse effect of impacted lower third molars, it’s important to increase the public awareness about the potential problems of the impacted third molars, through the mass media, or education in secondary schools and universities. Hong Kong Dental Association (HKDA) and Faculty of Dentistry of the University of Hong Kong can do more education through publications and medias.

**Dentist’s role on patient’s decision making**

Apart from pain in the lower third molar region, it was found that the other major reasons to motivate the participants to extract their impacted lower third molars were following dentist’s advice and prevention of further problems. Since the dentists’ role were important in patients’ decision making. It is important for dentists to educate the patients, focusing on preventing future problems, the importance of removing the impacted lower third molars. During clinical examinations, dentists should be aware of the soft tissue to
check any pathology as well, e.g. pericornitis, gingivitis, etc. Besides, the dental professionals could illustrate the problems of impacted third molars to patients through more comprehensive means, such as radiographs, verbal explanations, data from researches, and cases of other patients with similar scenarios. They can distribute education material such as pamphlet to their patients about impacted third molar, too.

Complications after wisdom tooth extraction and preventive measures

About 45% of participants did not remember any discomfort experiences after extraction of the lower third molars. As people would have a strong memory about pain if the extend of pain is severe. It demonstrated that the nearly half of the patients undergone a relatively smooth process during and after the third molar surgery. It might probably reflecting that the clinical skills of third molar extraction in PPDH and private dentists in Hong Kong were good and caused minimum discomfort only. This point had been further lightened by the fact that there were just a few cases of serious complications after the surgery.

The major post-operative complications were pain and swelling, which are sometimes unavoidable. Therefore patients must received enough information about the possible complications on both common one, like pain and swelling, and serious one like paraesthesia, This could help to prevent misunderstanding happened between the patients and dentist. Inform consent should be always ready before the surgery. On the other hand, dental
professional should always make best possible protection to the patients during the surgery to prevent any unnecessary damage happened.
7) Conclusion

1. During the age of 16 to 18 years old, 67% of the teenagers have impacted third molars on both side, 13% have impacted third molar on one side only. 20% have no impacted third molars on both sides.

2. The most common angulations of impaction of lower third molars are mesial angular impaction, it account for 72.2% of all third molars.

3. The most common oral health problems related to impacted lower third molars are gum swelling and difficult to maintain good oral hygiene, followed by food trapping. However the prevalence of reported oral health problems related to lower impacted third molar is low.

4. The main reasons of extracting wisdom teeth are ‘pain’, ‘follow dentist advise’ and ‘prevent further problems’. The dentists’ role in affecting the decision of extraction is important.

5. The main reasons of not extracting lower third molars are participants do not have signs and symptoms and participants have never thought of making the decision of extraction.

6. Half of the patient does not have serious post-operative discomfort. Post-operative complication is not serious in this study.
8) **Recommendations**

Based on the findings of our study, we have the following recommendations:

1. Increase the use of mass media to raise the public awareness of the potential problems of asymptomatic retained impacted lower third molar.

2. Pamphlet, brochure, leaflet should be distributed among dental profession to facilitate the discussion of issue of wisdom teeth.
9) Acknowledgements

We would like to express our sincere gratitude to our project advisors, Professor Edward C.M. Lo and Dr. Jerry K.S. Liu for their advice, guidance and support throughout the project. We also thank the staff of PPDH who had given assistance and all the participants who had been cooperative toward our telephone survey.
10) REFERENCES


Appendix 1

Dental Public Health Questionnaire

Questionnaire No: □□□□□□ □□□□□□ Date of the first visit to PPDH: ________________

Gender: □ Male □ Female Age:

Patient record No: □□□□□□ First OPG: 38: MI/ DI/ VI/ Missing
48: MI/ DI/ VI/ Missing

-Part A-

1) How often do you brush your teeth?
   □ None at all
   □ Once daily
   □ Twice daily
   □ More than 2 times a day

2) How often do you floss?
   □ Everyday
   □ Several times per week
   □ Use if necessary
   □ None at all

3) What kind of dental discomfort/problems are you having? (Choose the most appropriate option(s).)
   □ No problem at all

If yes, choose the most appropriate choices below

<table>
<thead>
<tr>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Difficulty in maintaining good oral hygiene</td>
<td>□ Difficulty in maintaining good oral hygiene</td>
</tr>
<tr>
<td>□ Food trapping</td>
<td>□ Food trapping</td>
</tr>
<tr>
<td>□ Swollen gums</td>
<td>□ Swollen gums</td>
</tr>
<tr>
<td>□ Bleeding gums</td>
<td>□ Bleeding gums</td>
</tr>
<tr>
<td>□ Tooth pain</td>
<td>□ Tooth pain</td>
</tr>
<tr>
<td>□ Facial swelling</td>
<td>□ Facial swelling</td>
</tr>
<tr>
<td>O Others</td>
<td>□ Others</td>
</tr>
</tbody>
</table>

4) Did you ever have lower 3rd molar(s) extracted?
   □ Yes---to Question 6
   □ No---If X 38 and X 48 in first OPG---Question 9 (congenital missing)
   If patient had 38 or 48 in first OPG---Question 5
5) Why didn’t you have the lower 3rd molar extracted? (This is an open question. Choices are not provided to the patient.)
☐ Dental fear
☐ Pain
☐ Time conflict
☐ Financial consideration
☐ Never think of it
☐ Asymptomatic
☐ Other reason:

End of part A
Move to Question 9

-Part B-

6) When did you have your lower 3rd molar(s) extracted?

<table>
<thead>
<tr>
<th>Left</th>
<th>Right</th>
</tr>
</thead>
<tbody>
<tr>
<td>☐ Less than 1 year ago</td>
<td>☐ Less than 1 year ago</td>
</tr>
<tr>
<td>☐ 1-5 years ago</td>
<td>☐ 1-5 years ago</td>
</tr>
<tr>
<td>☐ 6-10 years ago</td>
<td>☐ 6-10 years ago</td>
</tr>
<tr>
<td>☐ 11-15 years ago</td>
<td>☐ 11-15 years ago</td>
</tr>
<tr>
<td>☐ more than 16 years ago</td>
<td>☐ more than 16 years ago</td>
</tr>
</tbody>
</table>

7) Why did you have your lower 3rd molar(s) extracted? (This is an open question, no choices are provided to the patient)
☐ Prevent future dental problems
☐ Difficult to clean
☐ Food trapping
☐ Orthodontic treatment
☐ Swollen gum
☐ Bleeding gum
☐ Pain
☐ Tooth decay
☐ Facilitate treatments for 2nd molar
☐ Root resorption of 2nd molar
☐ Facial swelling
☐ Pathological changes in 3rd molar region (including cystic changes and tumours)
☐ Other reasons
8) What kind of complications did you perceive? (Open question, no choices provided to patient)
☐ Bleeding ☐ Fracture of the mandible
☐ Limited jaw opening (trismus) ☐ Fracture of adjacent tooth or its restoration
☐ Bruising of cheek (haematoma) ☐ Extraction of wrong tooth
☐ Delayed wound healing ☐ Numbness of tongue or lower lip
☐ Infection of the socket ☐ Laceration of soft tissues
☐ Pain
☐ None at all

End of part B
Move on to Question 9

9) Your education level is
☐ None or kindergarten
☐ Primary school
☐ Middle school
☐ High school
☐ Tertiary education or above

10) What is your occupation?
☐ Retired or unemployed
☐ Student
☐ Professional/ management
☐ Clerical
☐ Sales
☐ Service sector
☐ Industry, drivers, manual labor
☐ Housewife
☐ Others:

End of the questionnaire
公眾口腔健康調查問卷

問卷調查號碼：□□□□
性別：□男 □女
年齡：□□
第一次在菲臘牙科醫院睇症日期：
第一張 OPG：38：前阻生/後阻生/直立阻生/沒有 38
48：前阻生/後阻生/直立阻生/沒有 48
病人紀錄號碼：

-甲部份-

1. 幾耐刷一次牙？
□唔刷牙
□一日一次
□一日兩次
□一日兩次以上

2. 幾耐用一次牙線？
□每日都用
□一星期幾次
□有需要先用
□唔用牙線

3. 而家下顎智慧齒附近地方有咩問題呀？ (請選出最接近答案)
□冇問題
如果有，請 o 係下面選出適合答案
□好難清潔乾淨
□容易「攝」o 野食
□牙肉腫 o 左
□牙肉流血
□牙痛
□塊面腫 o 左
□其他

4. 之前有冇剷過下顎既智慧齒

- 37 -
5. 點解之前冇剝下顎既智慧齒 o 既？ (受訪者不會有答案選擇)

-驚
-痛
-時間問題
-經濟問題
-從未諗過
-冇任何症狀
-其他原因

-甲部份完-
  至問題 9

-乙部份-

6. 下顎智慧齒剝 o 左幾耐？

<table>
<thead>
<tr>
<th>左面</th>
<th>右面</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ 少過 1 年</td>
<td>□ 少過 1 年</td>
</tr>
<tr>
<td>□ 1-5 年</td>
<td>□ 1-5 年</td>
</tr>
<tr>
<td>□ 6-10 年</td>
<td>□ 6-10 年</td>
</tr>
<tr>
<td>□ 11-15 年</td>
<td>□ 11-15 年</td>
</tr>
<tr>
<td>□ 超過 16 年</td>
<td>□ 超過 16 年</td>
</tr>
</tbody>
</table>

7. 點解 o 個時會剝下顎既智慧齒 o 既？ *

- 預防第時智慧齒會帶 o 黎 o 既問題
- 好難清潔
- 容易「摘」o 野食
- 「箍」牙
- 牙肉腫左
- 牙肉流血
- 痛
- 蛀牙
- 要幫智慧齒前面隻大牙做治療
- 智慧齒前面隻牙牙腳萎縮
- 塊面腫 o 左
- 下顎智慧齒附近地方有冇病變 (好似水瘤、腫瘤等等)
- 其他原因

8. 剝牙之後冇冇出現不適？ (受訪者不會有答案選擇)
流血不止
擘唔大個口
塊面有瘀傷
好耐傷口都未埋口，未好番
傷口發炎
痛
嘴唇或者牙肉整傷、整損哂
整斷埋隔離隻牙或其補牙物料
剝錯牙
下唇同條利麻痹
下顎骨爆裂
冇

-乙部份完-
至問題 9

9. 教育程度
□ 沒有/幼稚園
□ 小學
□ 中學
□ 大學
□ 大學或以上

10. 職業
□ 退休/冇做 o 野
□ 學生
□ 專業人仕/管理人員
□ 文員
□ 售貨員
□ 服務行業
□ 工廠工人/體力勞動工作/司機
□ 家庭主婦
□ 其他：

-全卷完-