

### Management of pericoronitis for partial eruption of second permanent molar in a pediatric patient

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#### ABSTRACT

**Background:** This article discussed the management of pericoronitis for partial eruption of molar on pediatric patients. **Purpose:** This case report was to discuss how to manage a pediatric patient with a partially erupted second molar by using an electrosurgery method as the last alternative; also, it assessed whether or not the treatment facilitates spontaneous tooth eruption in respect to incomplete treatments. **Case:** A 9-years-old girl visited the Kuching Armed Forces Dental Clinic with her parents and complained of recurrent swelling on her lower right jaw in the last six months and noticed a tooth-like white lump under it. After a deliberate examination, the dentists came up with a diagnosis of pericoronitis because of a partially erupted second molar. **Case Management:** In managing a pediatric patient, a systematic desensitization was performed whereby the first visit was more of non-invasive treatment such as oral health instructions, a proper tooth brushing technique, and local scaling and debridement. Operculectomy using the electrosurgery had been carried out in the fourth visit and reviewed after one-week treatment that shows uneventful healing. **Conclusion:** To prevent and treat oral problems, it is imperative to develop child's interest and willingness in using dental services. Hence, an early diagnosis is critical, especially as parents seek for the best treatment duration and treatment methods with the least number of consequences. The food impaction and the recurrent swelling because of pericoronitis have a major impact on the patient; therefore, treatment is provided regardless of patient's age.

**Keywords:** electrosurgery; operculectomy; pericoronitis; pediatric; second molar

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#### INTRODUCTION

Pericoronitis is an inflammatory condition that affects the soft tissues surrounding a newly erupted tooth. The inflammation is quickly progressive and commonly acute in nature in addition to being subacute or chronic if it lasts for a long time or recurs.<sup>1</sup> Pericoronitis is diagnosed mostly through clinical examination with three distinct diagnostic categories: acute pericoronitis, subacute pericoronitis, and chronic pericoronitis. These classifications depend on the way individual cases fall under the three major clinical groups arbitrarily.<sup>2</sup> Pericoronitis is frequently associated with tooth impaction, and it is more common in impacted third molars because of tooth tissue discrepancy.<sup>3</sup>

There have been very few reports on the prevalence of pericoronitis in first and second permanent molars compared to third molars.<sup>2</sup> Pericoronitis may be linked to an unimpacted third molar. Yamalik and Bozkaya<sup>4</sup> researched and verified non-third molar related pericoronitis among Nigerian children, whereby none of the teeth involved in the study was impacted, but partially erupted with soft-tissue coverage.<sup>2,4</sup>

The failure of permanent molar eruption is a rather uncommon occurrence. Interference with physiological tooth development could be the reason. According to Baccetti<sup>5</sup>, about 0.03% to 0.58% of mandibular molars and 0.04% to 0.08% of maxillary molars have their second permanent molars retained. Second permanent molar

impaction is a rare case. According to Bondemark and Tsiopa<sup>6</sup> and Fu et al.<sup>7</sup>, it generally occurs in the mandibular arch at 0.06% to 0.3% of occurrence. According to Abate et al.<sup>8</sup>, the failure of eruption is classified into three clinical conditions: impaction, the halting of the eruption process because of a physical obstruction that can be detected radiographically or clinically; primary retention, a disturbance in the eruption process before the tooth has surfaced in the oral cavity; and secondary retention when the eruption process has already begun, and the tooth has already breached the gingiva without any physical obstruction.<sup>8,9</sup>

The aetiologies of maxillary and mandibular molar eruption problems are considered to be associated with the several conditions such as mechanical obstructions (tumors, hyperdontia, mesial eruption, cysts, and subsequent impaction into the distal part of a neighboring tooth); dentoalveolar disparity; increased space between the first and second molars<sup>10</sup> aberrant from the eruption path<sup>9</sup>; location of third molar germ that limits the second permanent molar eruption pathway<sup>11</sup>; a viral infection that affects the physiological eruption process by altering local innervation<sup>6,7</sup>; and genetic predisposition.<sup>9,12</sup>

The risk of resorption of adjoining teeth, periodontal problems, and caries, malocclusion, follicular cysts, issues addressing deep bite, peri-coronal infections, and pain are all indications for treating impacted and retained second permanent molars.<sup>13</sup> According to Proffit<sup>14</sup>, second permanent molars commonly erupt around twelve years of age. Hence, the best age to treat disturbances in second permanent molar eruption is between 11 and 14 years of age because the roots are still under development, and the third molars are usually germs.<sup>15</sup>

An unerupted second permanent molar often needs a multidisciplinary treatment approach. Surgical approaches, orthodontic solutions, and surgical and orthodontic treatment altogether are some other choices apart from the multidisciplinary treatments.<sup>16</sup> Surgical exposure of the second permanent molar and extraction of the third molar are two of the most typical treatment options mentioned.<sup>16</sup> taking into consideration, the diagnosis and position of the

second permanent molars are some recommendations for the treatment.<sup>17</sup>

An operculectomy is a minimally invasive surgery that exposes the second permanent molar by removing the operculum or tissue flap over a partially erupted tooth.<sup>18</sup> This surgery leaves an easy-to-clean region, which prevents plaque formation and inflammation.<sup>18</sup> Operculectomy can be performed with a surgical scalpel, electrosurgery, laser, or traditional caustic substances, e.g., trichloroacetic acid.<sup>18</sup> An electrosurgical equipment can be used to perform an operculectomy as it can ensure tissue hemostasis and appropriate contouring.<sup>19</sup> The use of electrosurgery also allows for a simple tissue incision with a significant hemostatic result.<sup>20</sup> It is, however, not recommended for patients who have a cardiac pacemaker.<sup>20</sup> Any contact with cementum or bone must be avoided at all costs as irreversible damage will follow.<sup>20</sup> For enlarged tissue removal, a needle electrode is used, while diamond or ovoid-shaped electrodes are used for shaping and festooning.<sup>19,20</sup> During the cutting phase, the electrode is energized in a brief shaving motion, making short contact with the tissues.<sup>20</sup> The controlled passage of high-frequency waveforms or currents into the body tissues to generate a controllable surgical impact is known as electrosurgery.<sup>20</sup>

For children, a dental visit is a unique behavioral and psychological experience, which may scare them and pose a difficulty for the dentist to provide treatment.<sup>21</sup> Besides, from a professional standpoint, the primary goal of dental therapy is to promote community oral and dental health by encouraging the development of healthy dental attitudes.<sup>22</sup> With these goals, dental practitioners must achieve specific standards to deliver successful treatment. Therefore, knowledge of childhood's behavioral, physical, and psychological demands is essential; nevertheless, the existence of contemporary and emerging technology, particularly electrosurgery, cannot be overseen. Hence, the purpose of this case study was to show how pericoronitis was managed when it came to a pediatric patient treatment through electrosurgery after successful systemic desensitization.



**Figure 1.** Orthopantomograph on the first visit showing an vertically angulated lower right second permanent molar covered by thick-soft tissue.

**CASE**

A 9-years-old female child visited the Kuching Armed Forces Dental Clinic and complained of recurrent gum swelling on her lower right posterior region for the past week. The patient claimed that she could not eat or chew on the right side. To relieve the pain, she had to take an analgesic. Although she had cleaned the side with a toothbrush, her tooth constantly was painful. In this site, she often had food stuck, and the tooth was sometimes bleeding when she accidentally bit the area.

After a clinical examination was performed, an edematous operculum was found covering the partially erupted lower right second permanent molar. The operculum was hyperemic, swollen, and bleeding spontaneously upon probing. Its antagonist, the upper right second permanent molar was clinically unerupted. However, it was in contact with the right upper first permanent molar and the operculum when the patient occluded. The patient had good oral hygiene, and she was cooperative towards dental treatment.

The patient was diagnosed with pericoronitis on the partially erupted lower right second permanent molar exacerbated by secondary trauma during mastication as well as food impaction. Orthopantomograph (OPG) (Figure 1) taken showed the partially erupted vertically angulated lower right second permanent molar covered by thick, soft tissue on the distal part of its crown.

**CASE MANAGEMENT**

Systemic desensitization has been applied, while oral hygiene instruction and treatment options were given to the patient and parents on the first visit. Proper method, time, frequency, and duration of tooth brushing were also explained. Brushing the area thoroughly and using chlorhexidine mouthwash as an anti-bacterial agent were recommended for the patient to accomplish. Full mouth scaling and polishing were performed to eliminate food impaction in the area. No medication was given as the physician prescribed antibiotics and analgesics before she visited the clinic. A review was done after one-week treatment showed the absence of inflammation and swelling. Thereafter, the patient felt better and maintained her oral hygiene.

However, a year later, she came back with the same complaint. The same treatment was performed with full mouth scaling and debridement, oral hygiene enforcement, and analgesic. Subsequently, the patient was given an appointment for the removal of the operculum during the next visit if signs and symptoms were still present.

Operculectomy was carried out using the electrosurgery on the fourth visit or two months after the third visit since the initial non-invasive treatments were not successful. Clinically, the swelling had subsided, and lesser inflammation was noted (Figure 2). The surgical area was cleaned using povidone-iodine at concentration of 10%.



**Figure 2.** Edematous operculum partially erupted lower right second permanent molar during the second visit.



**Figure 4.** Operculum of lower right second permanent molar one week after operculectomy.



**Figure 3.** Haemostasis achieved post operculectomy using electrosurgery.



**Figure 5.** Second review post-operculectomy of lower right second permanent molar.

Topical anesthesia was applied to the gingiva, followed by infiltration and intraligamentary injection using lidocaine HCl 2% with epinephrine 1:100,000.

Scaling was done after anesthesia, and excision was performed using a loop electrode. Subsequently, with a straight electrode, gingivoplasty was carried out to contour the soft tissue, while a ball electrode was utilized to achieve hemostasis (Figure 3). These electrodes were inserted carefully to avoid contact with the bone as this would result in irreversible damage. Saline and povidone-iodine at 10% of concentrations were used to irrigate the surgical area.

A post-operative instruction was then given to the patient that had to go on a soft diet for three days and vigorous toothbrushing on the surgical site. Ibuprofen 250 mg thrice a day was prescribed together with a hyaluronic acid gel that was applied to the surgical site to aid the healing process.

After a week of treatment, the review was done again. It turned out that the patient did not feel any pain. As Figure 4 shows, the operculum on the lower right second permanent molar was no longer swollen and inflamed. Only distal cusps were partially covered. Localized scaling was then performed to improve the hygiene of the site. The patient was instructed to chew solid food on the right side to give more pressure which then hastened the eruption of 47.

Five months later, the second review was completed to monitor the eruption of the lower right second permanent molar. The patient had no complaint of her tooth as the lower right second permanent molar had fully erupted (Figure 5).

## DISCUSSION

Operculectomy performed with an electrosurgery is one of the pericoronitis treatment of partially erupted second permanent molar in a pediatric patient. To respond to such common cases, in 2005 the Council on Clinical Affairs developed some treatment alternatives for pediatric oral surgery and oral pathology.<sup>23</sup> Supervising children's hygiene behavior during the surgical and perioperative periods is difficult. To reduce anxiety, methods other than nitrous oxide/oxygen inhalation and local anesthetic benefit many children.<sup>24,25</sup> Before surgery, the social, emotional, and psychological condition, as well as the cognitive level of the juvenile patient should be carefully assessed.<sup>25</sup> In this report, systemic desensitization was used to shape positive attitudes, and the patient were only treated with the electrosurgery on the fourth visit after having some unsuccessful conservative treatments. Untreated odontogenic infections may result in pain, difficulty in eating or drinking, cellulitis, airway compromise, abscess, septicemia, and life-threatening infections.<sup>26</sup>

Another review was conducted when the lower right second permanent molar was not well-aligned due to the distal half being tilted buccally. According to Proffit<sup>14</sup>, on average the second permanent molar will begin erupting

in 11-13 years of age. This current case is exceptional. Although the patient was 9 years old, she had already had her second permanent molar erupting. However, a thick operculum covered the tooth and thus hindered its eruption by mechanical obstruction. According to the American Association of Paediatric Dentistry (AAPD), the early orthodontic intervention of the affected teeth should be avoided.<sup>27,28</sup> Additional considerations could be either maintaining space, repositioning adjacent teeth that have tipped into the sites, preventing overeruption in the opposite arch, or changing lateral tongue push habits.<sup>27,28</sup> To provide functional occlusion, multidisciplinary treatment options such as selective extractions followed by implants, single tooth, or segmental osteotomies with rapid traction can be considered once the molar growth is complete.<sup>29</sup>

Pericoronitis treatment mainly focuses on the elimination of the acute phase, followed by the chronic phase.<sup>30</sup> Full mouth scaling and polishing were done to improve the oral hygiene at the site and act as part of the systemic desensitization. Systematic desensitization is a psychological approach that is possibly utilized in the dentistry environment to change the behaviors of nervous patients.<sup>31</sup> Anxiety over several appointments usually occurs when patients are gradually exposed to aspects of the dentist appointment.<sup>32</sup>

Operculectomy with the electrosurgery was planned on the subsequent visits after the patient was more comfortable. Electrosurgery was chosen for several advantages. Coagulation and plugging of micro diameter blood vessels are advantages of electrocautery, creating a surgical field that is free of blood and minimal of postoperative oedema.<sup>33</sup> The obliteration of the sealing of free nerve endings and dendrites also results in less postoperative discomfort.<sup>33</sup> Collectively, the electrosurgery can also push rapid and stable hemostasis, self-disinfecting tip, lesser postoperative pain, reduced oedema, and lesser scarring.<sup>33</sup>

In addition to this finding, a study carried out by Bhatsange et al.<sup>33</sup> found that electrosurgery has the lowest post-operative pain intensity compared to mucosal incision using a scalpel and laser. Such electrosurgery is ideal in pediatric patients as it may be less painful. However, electrocautery has several drawbacks, including heat dissipation that causes lateral thermal tissue injury, delayed healing, an inescapable burning-flesh odor, a lack of tactile sensitivity, and incompatibility for insertion near bones which may lead to bone necrosis.<sup>34</sup> Hence, laser treatment is recommended to avoid such a side effect, considering its function for better wound healing.<sup>33</sup> The patient was advised to practice good oral hygiene, and thus she could receive full restoration of periodontal support. Both postoperative complications and periodontal problems were not detected on the treated tooth or the adjacent first permanent molar.

At the time of writing, rarely treatment guidelines were found for eruptive disturbances of partially erupted or retained second permanent molar. The only possible treatment is through surgical exposure which is a minimal invasive, reliable procedure for soft tissue impaction

treatment of permanent molars. Electrosurgery is more commonly utilized compared to other surgical techniques since it can achieve good homeostasis and less painful. Even though new electrosurgery applications, equipment features, difficulties, and solutions come into practice, the use of electrosurgery in dentistry has relatively remained constant. Regular professional oral prophylaxis and patient compliance are required for a good outcomes. To get a predictable result, oral hygiene instructions along with positive motivation should be early treatment in pediatric patients.

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