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Case Report
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Endoscope-Assisted Intraoral Approach for Removal of Ectopic Third Molar to the Lower Border Mandible Using Long-Tip Ultrasonic Device

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Abstract

Removal of deeply impacted teeth surrounding the lingual space is difficult and various surgical approaches have been described to remove ectopic mandibular teeth. In this case report, we present an endoscopically assisted intraoral surgical technique that uses a long-tip ultrasonic bone cutting device. A 47-year-old female had an ectopic lower third molar to the lower border of the mandible in the lingual space. The patient underwent transoral endoscopic removal of the ectopic mandibular third molar using a long-tip ultrasonic device and general anesthesia.

This technique was advantageous because it minimized the risk of damaging the surrounding soft tissue and nerve.

Introduction

Removal of the mandibular third molar is one of the most common maxillofacial surgeries. However, this procedure may be difficult depending on the degree of angulation, the depth of impaction, the proximity of the molar roots to the mandibular canal, and the coverage of hard and soft tissue [1]. A lingual approach is uncommon for such surgeries because of the poor surgical views and the location of the lingual nerve. So the intraoperative complications associated with removal of sublingual displaced tooth fragments are common, because of the proximity of important structures such as the lingual and inferior alveolar nerve [2]. Thus, removal of deeply impacted teeth surrounding the lingual space is difficult. In this case report, we present an endoscopically assisted intraoral surgical technique that uses a long-tip ultrasonic bone cutting device to remove an ectopic lower third molar to the lower border of the mandible in the lingual space.

Case Presentation

A 47-year-old female was referred to Tohoku university hospital with pain in the lower left molar region. Panoramic X-rays revealed an obliquely and deeply impacted left third molar adjacent to the inferior alveolar nerve and above the mandibular angle (Figure 1). Additionally, the size of the follicular space associated with the crown of the tooth that was connected to the distal pocket of the lower second molar was increased. Computed Tomography (CT) scans also revealed a deeply impacted third molar at the lower border of the mandible that was dislocated lingually. The mandibular canal was also located laterally from the ectopic tooth (Figure 2).

The patient underwent transoral endoscopic removal of the ectopic mandibular third molar using a long-tip ultrasonic device and general anesthesia. After incising the gingival sulcus from the retromolar region to the canine, the mucoperiosteum was elevated to expose the lingual bone surface and the mylohyoid was detached from bone ridge to reveal the ectopic tooth. A 30-degree-angled, 4-mm-diameter endoscope (Karl Storz, Tuttlingen, Germany) and Xenon light were used during the surgery (Figure 3). The endoscope was introduced into the surgical area from the ipsilateral corner of the mouth using a retractor attachment. A mucous elevator was used to detach and identify the crown, and an ultrasonic bone-cutting device (Variosurg 3; NSK, Tochigi, Japan) was used to remove the surrounding bone (Figure 4). A 64 mm long tip (NSK) with a 3 mm cutting area was guided by the endoscope and used to make a groove in the overlying bone (Figure 5). The lingual root surface was then exposed and the reciprocating tip was used to widen the space surrounding the periodontal ligament (Figure 6). The tooth was luxated with an extraction elevator and removed (Figures 7-9). The cystic tissue was curetted and the mucoperiosteal closure was heavily irrigated. Postoperative recovery proceeded without complications and the cystic tissue underwent

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Figure 1a: Panoramic radiograph showing 38 wisdom teeth (arrow) located at inferior border of mandible.

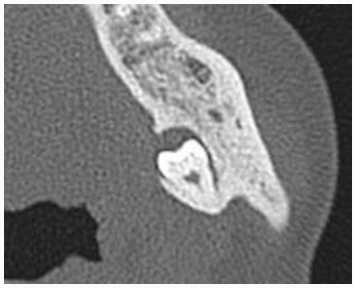

Figure 1b: CT image (sectional view) showing 38 wisdom teeth positioned medially from mandibular canal (arrow).

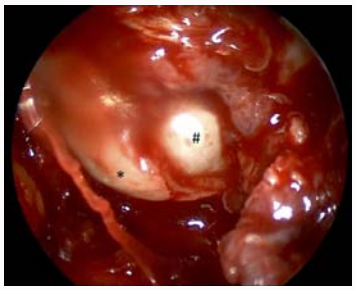

Figure 2: Endoscopic view of medial aspect of mandible. Crown part (#) was identified with overlying bone tissue (*).

Figure 3: Ultrasonic bone cutting device with long-chip was inserted with endoscopy from lingual side by marginal gingival incision.

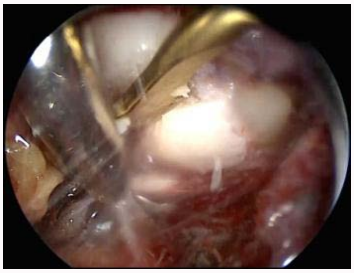

Figure 4: The long-chip was used to make a groove on the overlying bone following bone splitting.

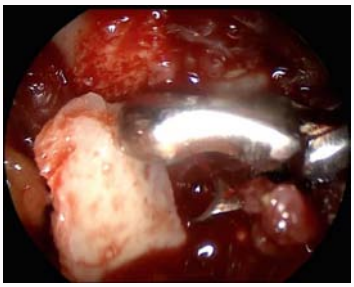

Figure 5: The bone fragment was removed by small forceps.

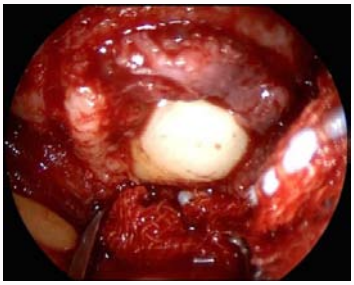

Figure 6: Medial aspect of the teeth could be seen by remove the overlying bone tissue.

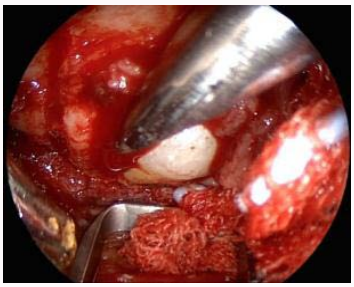

Figure 7: An extraction elevator was inserted to periodontal ligament space under endoscopy.

histopathological examination. No tumor or cystic transformation was observed.

Discussion

Ectopic mandibular third molars have been reported in the mandibular condyle, the sigmoid notch, and the posterior and inferior mandibular borders [3,4]. Most cases involving ectopic eruption are asymptomatic; however, they can require surgery when occurring with other pathological lesions, pain, or swelling. In such cases, the surgeon must determine the optimal approach for removing the tooth from the impacted position while managing the surrounding neurovascular and soft tissue.

The risk of damaging the inferior alveolar nerve still exists when surgery is performed using an extraoral approach and the molar is in a lingual position. Shenoy et al. reported a case using such an approach for a tooth in the same position as that observed in the current case

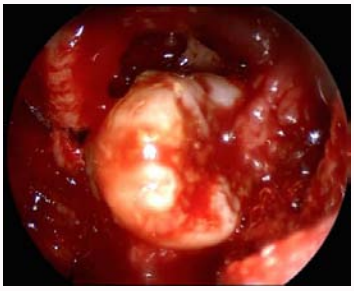

Figure 8: The wisdom teeth was luxated and moved out from the socket.

Figure 9: Extracted wisdom teeth with slight curved root.

and removed the neurovascular bundle from the canal [5]. When an intraoral approach is attempted, however, a sagittal split osteotomy is used to prevent excessive removal of the alveolar bone and afford adequate exposure of the surgical site [6,7]. In this case, however, the tooth was located lingually from the inferior alveolar nerve, preventing use of the splitting technique. In this case, the tooth was exposed from the lingual side by removing the overlying bone using an ultrasound bone-cutting device. This technique was advantageous because it minimized the risk of damaging the surrounding soft tissue and nerve. Endoscopies are typically used to examine body cavities, structures, or hollow organs; however, over the past decade, they have also been used to assess facial traumas, temporomandibular joint tumors, and salivary stones [8-10]. Endoscopic approaches have also been used for the removal of supernumerary teeth, [11] mandibular third molars, and residual roots, [12,13] rendering extraoral approaches unnecessary. Moreover, this methodological shift has reduced complications, including damage to the facial nerve and scarring [14]. Using endoscopy from lingual side, management of surrounding soft tissue is needed to acquire sufficient surgical field and prevent lingual nerve injury. After reflecting mucoperiosteal flap, the attachment of optical dissector was set with endoscopy, and then the reflected soft tissue was kept the position during surgery. Furthermore, instruments under endoscopic surgery need longer size compared with usual instruments for dentoalveolar surgery. This approach seems to have high potential to apply for removal of lost instruments such as fractured needle or bur and tooth fragment in the floor of the mouth. In a move toward minimally invasive procedures, the use of ultrasonic bone cutting devices has been introduced for oral and maxillofacial surgeries [15,16]. Compared to conventional rotating devices, ultrasonic bone cutting devices reduce the potential for damage to the adjacent soft tissue. However, such devices were designed for dento-alveolar surgeries and the length of the chip was insufficient for intraoral surgeries. Thus, a long tip device was developed. The tip was designed with a small head-similar to a reciprocating saw-to enable the surgeon to control the cutting line with an endoscopic view. Thus, widespread use of the methods described here will enable minimally invasive surgeries that are more effective and safer than conventional approaches. We recommend these methods as the preferred choice for removal of ectopic mandibular third molars.

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