

UPDATE IN THE TECHNIQUE OF THIRD MOLAR SURGERY

AE Obiechina, FMCDS, FWACS

Prof. A. E. Obiechina is a Professor of Oral and Maxillofacial Surgery, Faculty of Dentistry, University of Ibadan, Nigeria.

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ABSTRACT.

Third molar excision is the most common minor oral surgical procedure performed by oral surgeons. Factors predictive of difficulty include patient age, temperament, increased weight, dept of impaction, unfavourable roots, and proximity of inferior dental canal. Adequate assessment and use of appropriate surgical technique are essential for effective and efficient extraction.

INTRODUCTION

The problem of impacted third molar teeth is probably as old as Dentistry. Many theories have been advanced on the aetiology of impaction, and these include the Mendelian theory¹, the phylogenic theory², the orthodontic theory³, and the rotation of tooth buds⁴. Moreover, however, the cause of impaction of the third molar tooth is inadequate space to the accommodate the erupting tooth^{5,6,7}. The significance of impacted third molar tooth to the orthodontist, periodontologist, prosthodontist and oral surgeon is obvious. In dental practice, the third molar tooth is often regarded as a problem and can lead to serious disturbances in the harmony of the masticatory apparatus and the general state of health. It is often responsible for a host of

complication.

Excision of impacted third molar tooth is probably the most frequently performed minor oral surgical procedure, and accounts for 79% of such procedures at the dental centre of the University College Hospital, Ibadan. Efficient excision of impacted third molar depends on proper evaluation of the patient, pre-surgical assessment of the impacted tooth, good surgical technique and the surgeon's experience.

PRE-SURGICAL ASSESSMENT

The age of the patient, temperament and general medical condition are vital. It has been reported that under the age of 25 years, the bone was soft and resilient and cut easily so that the removal of the impacted teeth was accomplished with comparative ease^{8,9}. Temperament and medical history play essential part in deciding the type of anaesthesia best suited for patient^{10,11}. Among the medical condition that influence the choice of the surgeon in terms of timing, type of anaesthesia and surgical technique include cardiac, endocrine, respiratory and degenerative disorders.

For radiological assessment of impacted third molar tooth, oblique lateral and periapical radiographs have been recommended⁸. Tetsch and Wagner¹² however argue that intra oral photographs were often insufficient to clarify the situation and would only suffice in a few favourable cases that were without associated intrabony pathology. They therefore advocated panoramic radiographs. Obiechina¹³ however observed that 1.66% of impacted molars had

Correspondence to: Prof. A. E. Obiechina, Department of Orals and Maxillofacial Surgery, University College Hospital, P.M.B. 5116, Ibadan, Nigeria.

associated intrabony lesions.

Some authors⁸ however recommend intra oral periapical radiograph showing the whole third molar and its investing bone, the inferior dental canal, and the adjacent second molar without overlap of the cusps, as most suitable. Although these authors agreed on the need for oblique lateral or panoramic views, where intra-oral periapical radiographs were found inadequate, they cautioned on the inevitable distortion introduced when these views are used. Recent studies however, advocate conventional or digital panoramic system and these should be regarded as the radiograph of choice where available^{12,14}.

The type, position and depth of impactions are determined through radiographic assessment¹⁵. Winter¹⁶ classified the types of impacted third molar as mesioangular, vertical, distoangular transverse, horizontal, transverse buccoangular or linguoangular impactions. He also determined the position and dept of mandibular third molar impaction using three imaginary lines namely, "white" representing the occlusal plane, "amber" representing the level of the alveolar bone and "red" representing the depth of the impacted molar which was a perpendicular imaginary line from the alveolar bone to the amelocemental junction of the impacted tooth. It had been recommended that impaction with red line of over 4mm was difficult and should be removed under endotracheal anaesthesia^{17,18}. This is contrary to our finding and impaction with redline of over 5mm have been removed under local anaesthesia with comparative ease¹⁰.

For the purpose of preoperative assessment of impacted third molars, Pell and Gregory's classification were in two categories¹⁹. In the first category, the depth of impaction was related to the vertical position in the

mandible, thus:

Position A: the highest position of the impacted mandibular third molar is on a level with or above the occlusal plane.

Position B: the highest portion of the impacted third molar is below the occlusal place but above the cervical line of the second mandibular molar tooth.

Position C: the highest portion of the impacted third mandibular is below the cervical line of the second mandibular molar.

The second category related the impacted mandibular third molar tooth to the ascending ramus of the mandible and the second mandibular molars as follows:

Class 1:

There is sufficient amount of space between the ramus and second molar to accommodate the mesio-distal diameter of the crown of the third molar.

Class II:

The space between the ramus and the the distal aspect of the second molar is less than the mesiodistal diameter of the crown of the third molar

Class III:

All or most of the third molar is within the ramus.

While the first classification of Pell and Gregory¹⁹ was used to determine the depth of impaction, the second classification gave a guide to the distal crown available in relation to the ascending ramus of the mandible. Thus the more horizontal the ascending ramus tended to be, the larger the space to accommodate the crown of the impacted molar, hence giving an indication to the comparative ease of extraction. Both assessments have proved important in determining the amount of bone to be removed during extraction. However while the assessment of the dept impaction by Pell and Gregory¹⁹ is qualitative that of Winter¹⁶ using the red line is quantitative. The latter therefore is to

be preferred. Notwithstanding, the classification by these authors have stood the test of time.

The root pattern of the impacted molar is important in the preoperative assessment. Roots that are significantly curved, bulbous or divergent may necessitate sectioning of the tooth to effect delivery²⁰. The line of withdrawal of the tooth, the decision on the point of application of an elevator and sectioning of the root is influenced by the root pattern.

THE INFERIOR DENTAL CANAL.

The danger signs of a true relationship of the roots of the impacted third mandibular molar tooth to the inferior alveolar neurovascular bundle are as follows:

- i. A radioluscent band corresponding to the mandibular canal overlying the roots of the mandibular third molar tooth. This is an indication that the neurovascular bundle is higher than expected and could be damaged during bone removal which may cause anaesthesia/parasthesia of the lower lip and pronounced bleeding. Bone should therefore be removed with care.
- ii. Loss of white lines (lamina dura) of the mandibular canal corresponding to a break in the radio-dense borders. This indicates notching of the root by the neurovascular bundle. Tooth delivery must be carefully done to avoid or minimize damage to the neurovascular bundle. Sectioning of the root may be indicated.
- iii. Narrowing of the mandibular canal as it traverses the roots. This is often an indication that the neurovascular bundle has perforated the roof. The roots should be carefully split and delivered piecemeal if the neurovascular bundle is to be preserved. Recent studies suggest that volumetric computer tomography produced clearer image of the inferior dental canal than

conventional panoramic radiographs²¹.

When assessing the degree of mesioangular and horizontal impactions, if the arc formed by the radius created by the tip of the distal root and the tip of the mesial cusp of the impacted third molar cut through the second molar, then the impacted tooth has to be sectioned to effect delivery.

SURGICAL TECHNIQUES

The surgical removal of an impacted mandibular third molar involved raising a mucoperiosteal flap, bone removal, possible tooth sectioning and wound closure.

Different flap techniques have been described for the removal of impacted mandibular third molar tooth^{12,17,22,23}. Howe¹⁷ described a mucoperiosteal flap in which the anterior incision curved forward from the distobuccal corner of the crown of the second molar and ended alongside the mesiobuccal cusp of that tooth. The distal incision was then extended along the buccal gingival to the external oblique ridge. This flap provides good access and is frequently used. However, Ward²² recommended a larger but similar mucoperiosteal flap for improved access.

Killey and Kay⁸ and MacGregor²⁴ both advocated flaps starting along the gingival crevice of the second molar tooth. The healing of the gingival crevice from incisions has been unsatisfactory and is now rarely used.

In 1969, Henry²⁵ described the lateral trepanation technique for excision of developing mandibular third molar and was reported by Kaj and Klamfeldt²⁶ as having no late post operative complications. This technique is based on the assumption after evaluation, that the third molar would be impacted. This technique does not appear to be popular.

General two procedures are possible for the extraction of impacted third molar, namely bone reduction and additional sectioning of the tooth.

Bone removal may be with bur or with hammer and chisel. Sometimes a combination of both

methods would be appropriated as sectioning of the impacted tooth could be accomplished with a sharp osteotome or bur. The bur technique has been described by several authors. It involved the removal of buccal and distal bone. Any impacted tooth can be extracted if adequate bone is removed. Therefore, bone removal must be in contact with the impacted tooth and of adequate depth thus creating a gutter without compromising the substance of the bone to risk a fracture of the mandible. The bur technique is less traumatic and less bone is removed. Therefore, bone removal must be in contact with the impacted tooth and of adequate depth, thus creating a gutter without compromising the substance of the bone to risk a fracture of the mandible. The bur technique is less traumatic and less bone is removed. However, it is very important to irrigate with normal saline in order to maintain the vitality of the bone cells during this technique. The need to preserve the lingual plate during bone removal in order to avoid injury to the lingual nerve has been stressed.¹⁰

The split bone technique was evolved by sir William Kelsey fry in 1933 and published by Ward²² in 1956. In this technique, the lingual bone was fractured and the tooth delivered lingually. Although this technique necessitated more bone removal, it reduced dead space and clot formation and sectioning of the tooth before removal was not usually necessary. However, patients detest the use of mallet and chisel under local anaesthesia. This method is therefore better used under general anaesthesia. Studies show that patients treated with this technique tend to have more complication of the lingual nerve than the bur technique^{10,28,29,30}. Several modifications of this technique have been described^{31,32,33}. Yeh³³ claimed that this technique was simple, took less time and cause less tissue trauma than other accepted techniques, and that

complications were extremely low.

The assessment and extraction of impacted maxillary third molar tooth does differ significantly from that of the mandibular third molar. The maxillary third molar tooth does not get impacted as frequently as the mandibular third molar. It is often buccally displaced and symptoms associated with the impaction does not present too often. For radiographic investigation, digital or panoramic radiographs are preferred. When tolerated, periapical radiograph have been found useful. A buccal mucoperiosteal incision starting from the mesiobuccal root of the second molar, extending to the distobuccal gingival and carried distally over the maxillary tuberosity will often suffice. This incision is similar to that described by Howe¹⁷. Because of limited access, and the liability of the tuberosity to fracture, the bur technique is recommended.

Wound closure may be primary or secondary. Primary closure may be complete or partial. While it has been claimed that healing by secondary intention reduced pain, swelling and enhanced wound drainage, healing was delayed and wound irrigation prolonged. For this reason, some clinicians favor the use of drains^{12,34}.

Healing has been faster in primary wound closure and placement of two sutures, one immediately anterior to the second molar and the other over the centre of the distal incision has been found to be adequate. Suturing of the anterior buccal incision may be cumbersome and unnecessary since it would provide space for adequate drainage, thereby reducing pain and swelling.

A single suture placed loosely immediately anterior to the last standing teeth would suffice for small incisions. However, only the minimum number of sutures required to keep the flap in position is required.

In conclusion, excision of impacted third molar tooth requires proper patient evaluation,

appropriate radiographic assessment and sound surgical techniques.

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