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Coronectomy Of Mandibular Third Molars. Evaluation Of Cases With Clinical And Radiological Follow Up.

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ABSTRACT

Injury to the inferior alveolar nerve (IAN) is a significant complication in lower third molar surgery. It results in an IAN deficit presenting as hypoesthesia, hyperesthesia, or, worst of all, dysesthesia of the lower lip and mental region on the affected side. Coronectomy was developed as a relatively new preventive method to decrease the prevalence of IAN injury compared with the conventional total removal of the lower third molar. This review study was designed to answer the clinical question of whether coronectomy of the lower third molar is safe in the long term.

Keywords- Coronectomy, third molars, IAN injury

INTRODUCTION

Injury to the inferior alveolar nerve (IAN) is a significant complication in lower third molar surgery. It results in an IAN deficit presenting as hypoesthesia, hyperesthesia, or, worst of all, dysesthesia of the lower lip and mental region on the affected side. A proportion of these

cases do not fully recover, and these patients are permanently affected (1). The surgical repair of the IAN is technically challenging, and the outcome of the repair is variable.

Coronectomy was developed as a relatively new preventive method to decrease the prevalence of IAN injury compared with the conventional total removal of the lower third molar. The crown of the impacted lower third molar is often the cause of the food impaction, dental caries, or pericoronitisthat troubles the patients.(2) By removing the crown and leaving the root(s) behind, the problems are solved and the risk of an IAN deficit is decreased. Institutes from different parts of the world have reported success in drastically decreasing, if not eliminating, the risk of a postoperative IAN deficit by coronectomy. A randomized controlled clinical trial published in 2009 by the authors' center has proved that coronectomy can significantly decrease the risk of an IAN deficit in high-risk cases and is safe in terms of pain, infection rate, and dry socket, at least for the short term. Another randomized clinical trial and two prospective case-control trials also have shown the IAN-protective role of the technique.(3,4) Another common finding has been that the retained roots tend to migrate to some extent. However, the migration of the roots and the extent they would be expected to migrate have not been well reported. In the era of evidence-based medicine/surgery, coronectomy has gained an increasing reputation of its effectiveness in decreasing the IAN deficit for lower third molar surgery in close proximity to the IAN. However, continuing debate on the long-term fate of the retained roots exists, and many clinicians are understandably reluctant to offer the technique as a treatment option to their patients without sufficient scientific evidence on the long-term safety of the technique.

OBJECTIVE

This study was designed to answer the clinical question of whether coronectomy of the lower third molar is safe in the long term. The aim of this study were to investigate the long term

morbidity of coronectomy of the lower third molars in the published studies and to monitor the behavior and migration pattern of the retained roots after coronectomy.

MATERIALS AND METHOD

This study has been approved by the ethical committee of riyadh elm university research center with registration number "FRP/2022/493/893".

An electronic search of the English literature from January 2000 to April 2022 will be performed in PubMed/MEDLINE, Web of science and Scopus databases using the following keywords endo perio lesions, diagnosis, management. PRISMA 2020 guidelines was used to describe the selection process of searched article.

DISCUSSION

The majority of nerve injuries in the oral surgery involve branches of the trigeminal nerve. The nerve injuries can be produced by pathological conditions, traumatic injury, surgical access, orthognathic surgery, dental implantology surgery or occasionally following local anesthetic administration. In all the aetiology of nerve injuries, the extraction of third molar was the cause of nerve damage in 52.1% of oral surgical cases.(5) Fieldman has reported the incidence nerve injury following third molar impaction surgery as “silent epidemic of iatrogenic trigeminal nerve injury”.(6)

Mandibular third molars are frequently removed prophylactically to prevent the potential pathological complications associated with the tooth. However, since the newly published recommendations of British National Institute of Clinical Excellence (NICE), regular prophylactic extraction of impacted third molars has reduced in United Kingdom. The guideline given by NICE specifically opposes prophylactic removal of mandibular third molars and listed specific clinical indications for the surgery.(7,8) Initially, this guideline was

also followed in USA with conservative approaches to third molar management, but now it has been accepted that prophylactic removal is a standard procedure and is no longer a controversial treatment option as presented in the Third Molar Multidisciplinary Conference in American Association of Oral and Maxillofacial Surgeons (AAOMS) ParCare 2012.(8)

The first dictum of Medicine and Surgery is – 'Primum Non Curaram' means – First Do No Harm. Neurosensory damage is the commonest cause of litigation following impacted third molar surgery.(8) Lydiatt claims that the patients often forget the information given to them prior to the procedure and only 30% to 50% of the information given to them was recalled after seven days of the surgery and stresses the significance of informed consent.(9) Pogrel MA has reported that only 20% of cases had good improvement, 30% had moderate improvement and the remaining 50% had no improvement in sensation following micro neurosurgery.(10) Therefore, prevention is better than cure to prevent patient dissatisfaction following the procedure. Conservative and minimally invasive procedure that is required for the management of disease is always the preferred treatment.(8)

Most pathological conditions arising from the third molar are related to the crown and peri-follicular structures. The follicle acts as deep periodontal pocket which is the frequent site for infection. It gives rise to pericoronitis, periodontal problems, decayed tooth and follicle related odontogenic cysts and tumours. Thus, the crown along with the follicular tissue should be removed to relieve from any further infections.(11) Coronectomy or Prejudiced Odontectomy (American Dental Association-D7251) is a technique by means of which the crown is sectioned and the roots that are closer to the IAN canal on diagnostic radiographic imaging are left in situ.(8) Retention of root for coronectomy is based on the idea that broken fragments of vital teeth generally heal without complications. This procedure attracted special attention in the last decade, because of the reported benefits and success rate of this

technique, in contrast to the contemporary belief that the roots left behind will be the source of problem.(8-12)

The radiological appearance of the tooth root and the IAN were compared to whether or not the nerve was visible in the socket at the time of operation, produced predictor signs for possible damage to the nerve which, if present, the incidence of labial nerve impairment was recorded as 35.64%. A comparative study showed radiological signs to actual incidence of damage to the IAN and found that three radiological signs (darkening of the root, interruption of lamina dura, and diversion of the canal) posed statistically significant as predictors of trauma to the IAN and stated when one of those signs if present, the nerve was affected in 30% cases. Along with these signs, other factors includes the severe angulation of the root apices at the canal, hypercementosis of the root or root apex and any forceful manipulation with the bur or other instruments near the nerve would cause damage eventually.(8)

Dental Computerized Tomography (CT) would be very helpful and would probably be the best choice for evaluating the relationship of the IAN and impacted tooth. But it is also more expensive, higher radiation exposure and not easily accessible to many patients. (13) Khan et al., compared the panoramic signs (root darkening, channel narrowing, radiolucency between root and channel, cortical channel interruption, channel diversion) with CT findings and found 30% to 50% correlation.(14)

Landi L et al., recommends coronectomy to be done, 2mm-3mm from the occlusal surface without involving the pulp after considering the pulpal anatomy of the impacted third molar tooth and the distance between the third molar crown and the second molar.(9) In case of accidental pulpal exposure pulpal dressing or pulpotomy was advised. Few studies sectioned the crown at the cemento enamel junction level and the remaining enamel if anything wass

grinded off to the level 2-3 mm below the alveolar crest.(8) It was described that enamel is inert and soft tissue cannot attach to its surface so the socket does not heal. The enamel acts as foreign body, so chances of infection of the unhealed socket is high. Root fragment at least 3 mm inferior to the crest of bone seems appropriate and appears to encourage bone formation over the retained root fragment.(8) Histological evaluation of the retrieved lower third molar roots stated that symptoms after coronectomy do not result from the loss of pulp vitality or subsequent periradicular inflammation.(9) It was refined that these pulpal tissues blend with overlying connective tissue when the mucosa heals successfully and the opening of the canal heals with osteo-cementum. Interestingly, it was described that pulpal treatment of the retained root has resulted in high rate of infection and the subsequent need for removal.(8-16)

Female patients with conical roots have higher risk for failure of coronectomy. Incidence of nerve injury was greater in female patients, possibly because the bucco-lingual cortical bone is thinner, making the apical area of the mandibular third molar closer to the IAN.(8)

Many authors are not advocating coronectomy procedure for the horizontally impacted third molar because of the difficulty in conceptualizing the third molar three dimensionally during sectioning and for the potential risk to IAN injury during sectioning the crown.(8) In contrast to this concept, the crown was sectioned bit by bit as advocated by Philips et al., claims that 26% to 35% of unerupted third molars retain eruption potential and change their position over time, depending on the angle of impaction and migrate towards occlusal plane.(17) Migration of root has been noted in every article published on this subject and appears to occur in between 14% to 81%, depending on the length of the follow-up. A literature revealed that more than half of the roots migrated at a higher rate for 3 months post-operatively and then gradually stopped between 12 and 24 months. (8)

CONCLUSION

Coronectomy is indicated when the third mandibular molar is in contact with the inferior alveolar nerve, and where complete removal may cause injury to the nerve. Within its limitations the present review concluded that coronectomy results in a significantly lesser incidence of both sensitivity loss of the inferior alveolar nerve and dry socket.

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