

CORONECTOMY: A TECHNIQUE TO PROTECT THE INFERIOR ALVEOLAR NERVE

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Abstract:-

Nerve damage has been noted to be a complication of third molar extractions, due to the proximity of the nerves to the extraction site. Coronectomy is a surgical process used to prevent damage to the alveolar nerves. This article reports a brief overview of the risks associated with lower third molar extractions & claims that Coronectomy may be useful as a treatment modality in managing some aspects of those risks.

Keywords:- Coronectomy ; intentional root retention ; Partial odontectomy; Third molars; wisdom teeth; inferior alveolar nerve.

Introduction:-

“Coronectomy is a medical Process used to prevent damage to the alveolar nerve during extraction of the wisdom teeth.” Also called intentional partial odontectomy of lower third molar Coronectomy was first described by Knutsson et al in 1989 as the performed on the tooth & also the elimination & the prime case of infection.

The process is used when removal of whole tooth would damage the nerves as sometimes the root & nerve are intervened & removing the tooth could cause temporary or permanent numbness to that side of the face, altered sensation to the lower lip, the skin over the chin, the teeth and gingiva on the injured side. Coronectomy is an optional surgical treatment in such type of cases. In Coronectomy, the clinical crown can often be removed leaving the root, thus preventing damage to associated nerve complex. (1) The degree & description of altered sensation is variable & include reduced sensation (hypo – aesthesia) abnormal sensation (paraesthesia) & unpleasant Painful sensation

(dysaesthesia) (1). In UK, Nationally accepted guidelines ensure surgery is undertaken only when necessary (2). & to most usual reason for extraction is to relieve symptoms of acute pericoronal infection. Coronectomy has been put forward as a valid treatment option to reduce the risk of IANI in carefully selected cases (3).

Inferior alveolar nerve injury:-

The inferior alveolar nerve is located within the mandible in an area called the mandibular canal. Inferior alveolar nerve injury is the most common nerve injury.

The incidence of temporary usually is four to six months & permanent nerve damage following the surgical removal of third molars varies in cases according to reports (1). Approximately 1-5% for temporary effects & 0-0.9% permanent deficit has been noted. Some authors quote higher figures with ‘high risk’ cases, that is teeth associated with risk as great as 20% (3). Risk of inferior alveolar nerve injury is dependent on the type of infection & radiographic proximity of the teeth to the inferior alveolar nerve. (4)

Radiography:-

The radiography signs of increased risk of inferior alveolar nerve injury have been classically described by Rood & Shehab (5). Now a days, management of third molar surgery has become easier with the help of panoramic radiography. However, the radiography may not always be easy to interpret risk. There is debate about the extent to which cone beam computed tomography (CBCT) should be used in the management of impacted mandibular third molars (4).

Indications:-

The main indication for performing a coronectomy is to prevent iatrogenic injury to the inferior alveolar nerve, when removing a third molar. The frequency of inferior alveolar nerve damage after extraction of a third molar ranges anywhere 0.4% to 8.4%. (6) Coronectomy surgery can be done in case of which, the root of mandibular third molar is extremely closer to the inferior alveolar nerve due to that the alveolar nerve might be injured at the time of extraction of tooth. Using this Coronectomy surgical technique we can prevent the injury of inferior alveolar nerve. (7)

Contraindications:-

The tooth which are having active caries in to the pulp, or demonstrating Periapical abnormality should not be indicated for Coronectomy. Horizontally impacted teeth and teeth which are associated with tumors or large cysts should not be considered for Coronectomy. In Coronectomy surgery should be avoided Systemic diseases like immunocompromised, chemotherapy, AIDS, radiation therapy in such patients. (6)

Advantages:-

A low incidence of infection has been reported post operatively compared to traditional methods. It is a safer option, as reported by many of the studies discussed. Coronectomy is an effective procedure for long- term (8) (9) (10) (11). Coronectomy is the method which prevents inferior alveolar nerve injury. In Coronectomy the retained

tooth will normally migrate away from the IAN, so facilitating safe secondary removal of any remaining roots without injury to the nerve. (8) (12) (13) Removing the entire tooth, via extraction, causes increased risk of injuring the IAN and a Coronectomy prevents potential neuropathy. (9) (14)

Disadvantages:-

Disadvantages of this procedure is that, in a small number of cases (5%) it can cause mobilization of the mandibular third molars, due to this mobilization of tooth, Coronectomy might fail. It is specially found in conical roots, where it is possible to mobilize the roots when transecting it; it means that the root is potentially vital and should be removed. Coronectomy can also result in follicle remnants forming deep periodontal pocket leading to infection, incidence up to 5% which is a weakness of the procedure (8).

Coronectomy:-

Coronectomy is a procedure designed to avoid Inferior alveolar nerve injury (IANI) by retaining the roots of symptomatic, vital, lower third molar teeth that are considered to be close to the inferior alveolar canal. Coronectomy involves removal of only the crown portion without removing the root of the tooth. The root of the impacted third molar is left undisturbed – thus avoiding direct or indirect damage to the IAN (15) as shown in figures 1 and 2.

Coronectomy is a relatively new procedure and the positive point about Coronectomy is that this procedure is not only gaining popularity but also reducing risk. But still the Coronectomy is not commonly practiced worldwide. Because some surgeons remain concerned about potential short and long – term complications (15). A number of authors have reported positive results, (10) (16) & a Cochrane collaboration concluded, ‘that in many patients where third molar roots were close to the IAN canal, it was likely that Coronectomy was associated with a reduction in nerve damage, with

no increase in alveolar osteitis' & also it was not going through any adverse effects for long time (1).

Although Coronectomy has demonstrated a reduction of IAN injury many clinicians are concerned about having a large section of root effectively retained in the mandible. Significant concern being that the retained root may develop a radicular cyst leading to further surgery & morbidity most of the surgical techniques. Successful Coronectomy requires careful, patient selection; careful operator technique & attention to detail to avoid the toiler of procedure to clinicians need to be aware. (17)

Discussion:-

Coronectomy is the surgical procedure done in order to avoid IANI. In this technique, the roots of mandibular third molar that are close to the IAN are retained when there is a chance of injuring IAN during extraction of the tooth. Coronectomy is the only technique which helps to reducing the IANI. The chance is injury is commonly identified by using radiographical imaging, which provides a two dimensional view of the area (18).

Preoperative radiographs that are considered useful to manage the removal of wisdom tooth by traditional method of extraction are Orthopantomographs (OPG). OPG provides a two dimensional image. But since all the features cannot be recorded, these days advanced radiographic techniques like CBCT are advised. Using CBCT all the details about the third molar tooth, along with the associated risk can be identified. (19)

Coronectomy has many advantages over extraction of wisdom tooth. With regards IAN damage, Coronectomy may be considered a safer option as reported by many of the studies discussed. Coronectomy not only reducing the risk at the time of extraction of wisdom tooth but also it has lower reports of incidence of infection postoperatively as compared to the traditional methods. Although, if Coronectomy is unsuccessful, then extraction is required to remove the remaining roots, which is a

disadvantage of the method however this is done only when the IAN perforates the tooth root. (19)

The current criterion used to decide to fade of mandibular third molars is applicable when imaging via panoramic radiographs. These criteria are used to evaluate whether a Coronectomy or an extraction is more suitable for the patients, by examining features such as d of the root, instruction of the radio, opaque line of the inferior dental nerve canal & division of the canal, thereby enabling surgeons to decide on the best method for removal (18).

Tomography is the recent image technology, it can be used prior to removal which has proven to be very beneficial (20) (21) (22). Computed tomography offers a three- dimensional view & this kind of imaging more suitable than two – dimensional view OPG). However, the matter of cost & radiate dose must be considered prior to usage of this technique.

The Coronectomy having not only benefits but also few complications, the studies featured that overall, the studies encourage Coronectomies in patients where there is a high risk of damage to the IAN especially as a useful alternative for the removal of mandibular third molar. All studies have found one common conclusion that the long – term complications of this procedure are unknown due to the follow up time being insufficient. Therefore a long period of study is required, with a follow- up around 10 years, to be able to evaluate the long – term benefits of Coronectomy thoroughly.

Conclusion:-

Coronectomy is helps to prevent the damage of IAN during the extraction of mandibular third molar. As with any procedure, there are many advantages & disadvantages that need to be considered to evaluate the effectiveness of the procedure. For the reducing the chances of failure of the procedure preoperative radiography should be done. However, computed tomography is considered as more comprehensive imaging

technique using its three – dimensional imaging. (23) According to Pogrel et al. the follow up period should be for 6 months after which the patient could be recalled only he becomes symptomatic. (9). A follow-up period of up to 2 years could be necessary to appraise the occurrence of nerve injuries. But in order to assess the incidence of late eruption a follow up period of up to 10 years might be needed after the initial surgery (24). So, the one common conclusion found on all studies was that to evaluate the long – term benefits of this procedure, the follow – up of around 10 years required. (25)

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Figure 1. Figure shows the roots of third molar in close association with the inferior alveolar nerve

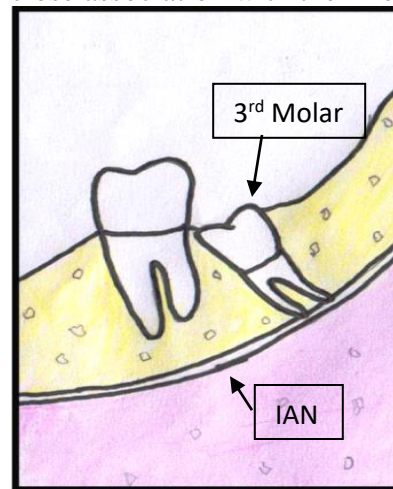
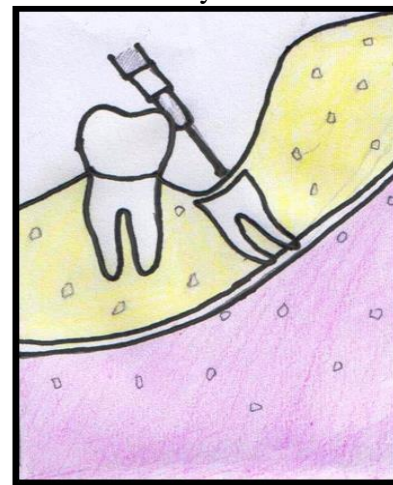


Figure 2 – Removal of the crown of the third molar in Coronectomy



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