Sensory nerve injury following impacted mandibular third molar extraction: the Lagos University Teaching Hospital experience.

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Abstract

Objective: To investigate the prevalence and pattern of sensory nerve injuries after surgical removal of impacted mandibular third molars.
Methods: A study of patients who required surgical extraction of impacted mandibular third molars between October 2005 and May 2006 at the Lagos University Teaching Hospital (LUTH) was carried out. Data collected from each patient included age, sex and the indication for extraction. Also collected were the angulation of the tooth and surgical difficulty as measured by the total time of surgery. All extractions were performed under local anaesthesia and the buccal guttering technique was used for all extractions. Postoperatively, any occurrences of sensory nerve injuries and the time it took for the patients to recover from it were recorded.
Results: A total of 340 impacted third molars were removed from 335 patients. There were 156 (46.5%) males and 179 (53.4%) females with a male female ratio of 1:1.2. The age ranged from 17 to 55 years with a mean of 26.63 ± 7.39 years. Fifty extractions (14.7%) of the 340 extractions had postoperative complications, of these 2.6% (9 patients) had sensory nerve defects postoperatively. There were five females (0.3% of total female populations) and four males (0.3% of male population). All cases of sensory nerve defects involved the inferior dental nerve. The incidence of inferior alveolar nerve paraesthesia was highest in the under 25 age group, the relationship to the age of patients was however not statistically significant (p = 0.87). Five (55.5%) of the cases with inferior alveolar nerve damage occurred with teeth in horizontal impactions (p = 0.018). The total time of surgery was also statistically significantly associated with the occurrence of sensory nerve injury (p = 0.001).
Conclusion: Sensory nerve injury was significantly associated with both surgical difficulty and horizontal pattern of impactions.

Key words: Sensory nerve damage, impacted mandibular third molars, inferior alveolar nerve.

Introduction

The extraction of impacted mandibular third molars is a common procedure in oral and maxillofacial surgery[1]. The reasons for extracting these teeth include acute or chronic pericoronitis, presence of cysts or a tumour, periodontal problems and presence of a carious lesion on the second or third mandibular molar[1,2]. These teeth are also sometimes extracted although debatably for prophylactic reasons[3]. The removal of impacted mandibular third molars can however also result in various postoperative complications [2,4-5]. The most severe complication after removal of mandibular third molars is injury to the inferior alveolar nerve or the lingual nerve[6]. Although these complications are rather uncommon and most of them transient, they are generally very unpleasant for the patient[6,7].
Patients should be informed of the potential risks of nerve damage prior to the operation. This is more so in elective cases so that patients can make informed consent for the surgery having compared the risk of surgery against the risks of non removal.
Reported risk factors for sensory nerve damage are patients of older age, ostectomy of the bone distal to the third molar and a close radiographical relationship between the roots of the third molar and the inferior dental canal [1,8-11]. Others include anatomical factors such as angulation of the third molar, surgical procedures such as retraction of the lingual flap and vertical tooth sectioning. The surgeons' inexperience has also been reported to increase the risk of sensory nerve damage[1,8-11].
This study was aimed at evaluating the frequency of occurrence and factors influencing sensory nerve injury after the removal of impacted mandibular third molars under local anaesthesia.

Materials and Method

This was a prospective study carried out amongst patients who presented for surgical extraction of impacted mandibular third molars at the Lagos University Teaching Hospital (LUTH) between October 2003 and May 2006. Approval for the study was obtained from the local ethics committee and informed consent was obtained from all participating patients.

The operators performing the extractions were all third year registrars in the hospital. All teeth were removed through buccal guttering technique. Retraction of the lingual mucosa around the socket was avoided in each surgery. The total duration for the extractions were taken from incision to closure of flap using a stop watch. The extractions were divided into surgical difficulty groups using the total time of surgery as follows:

- Easy extractions: Extractions < 20 minutes
- Difficult extractions: Extractions $\geqslant$ 20minutes.

Data recorded from patients included name, age, sex of the patient, indication for extraction, angulation of the tooth, and the occurrence of lingual and or inferior alveolar nerve paraesthesia or anaesthesia.

All the patients were reviewed on the first day postoperatively and one week after surgery, patients with altered sensations or numbness of the lip or tongue were followed up weekly for as long as the sensation persisted.

Direct questioning of the patient concerning any tingling or numbness of the tongue or lip was used to determined impairment at each examination period.

The data collected were evaluated using the SPSS Inc Chicago, Il version 11.0.

The Chi square and the Fischer's exact test were used to determine statistical significance and values with P $\leqslant$ 0.05 was considered statistically significant.

Result

A total of 340 impacted mandibular third molar were extracted from 335 patients within the period of the study. One hundred and fifty six (45.6%) of the 335 patients were males and 179 were females, with a male:female ratio of 1:1.2. The ages of the patients ranged from 17 to 55 years (mean 26.63 ± 7.39 years). Patients between the ages of 17 and24 years were the most prevalent in the study (194, 57.9%) and the most common indication for extraction was recurrent pericoronitis (212, 62.4%). Only one mandibular third molar was extracted due to the presence of an Odontogenic cyst.

Table 1. The relationship between the angulation of teeth and sensory nerve damage

Angulation	Inferior alveolar nerve damage	No damage to Inferior alveolar	Total N (%)
Vertical	1	49	50 (14.7)
Mesioangular	1	183	184 (54.1)
Distoangular	2	45	47 (13.8)
Horizontal	5	54	59 (17.4)
Total	**9**	**331**	**340 (100)**

Pearson's X^2 = 11.488
P = 0.018.

Table 2. The relationship between patient's age and sensory nerve damage

Age (years)	Inferior alveolar n. damage	No damage to Inferior alveolar n.	Total
17-25	5	192	197
26-35	3	117	120
35<	1	22	23
Total	**9**	**331**	**340**

Pearson's X^2 = 0.2773
p = 0.871

Table 3. The relationship between the surgical difficulty of extraction and sensory nerve damage.

Intraoperative difficulty	Inferioralveolar nerve damage	No damage to Inferior alveolar	Total
Easy	3	276	279
Difficult	6	55	61
Total	**9**	**331**	**340**

2-sided Fischer's exact test
p = 0.001

The radiographic analysis of the types of impactions showed that mesioangular impaction constituted 54.7% of the cases followed by horizontal impaction 17.4% **(Table 1)**. Fifty extractions (14.7%) of the 340 extractions had postoperative complications, post operative inferior alveolar anaesthesia/paraesthesia occurred in 9 patients (2.6%). Five (0.3% of total female populations) of those with postoperative nerve defects were females while 4 (0.3% of male population) were males There was no postoperative lingual nerve anaesthesia/paraesthesia in this study.

Table 2 showed the relationship between the ages of patients and the occurrence of sensory nerve damage. Of the 9 patients with sensory nerve damage 5 occurred in patient within age range 17-24 years. The relationship between the two variable was however not statistically significant (p =0.87). There was inferior nerve dysaesthesia in 5 (8.4%) of the extractions in horizontal impactions as seen in **Table 1** (p = 0.018). Difficult extractions were also statistically significantly related to sensory nerve injury **(Table 3)** with 9.8% of difficult extractions having sensory nerve injury as compared to only 1.1% of easy extractions. Sensory impairment was transient in all cases and resolved over varying period from 1 week to 2 months.

Discussion

One of the most severe complication after removal of mandibular third molar is injury to the inferior alveolar nerve or the lingual nerve[12]. Former investigators found the incidence of sensory loss ranged from 0.4% - 8.4% for the inferior alveolar nerve and 0.06% - 11.5% for the lingual nerve[1]. In the present study the incidence of sensory loss was 2.9% and 0% for the inferior alveolar and lingual nerves respectively. The reason for the difference between the

result of this study and others reported in literature with regard to lingual nerve sensory loss the may be due to the operative technique used in the study (bur guttering technique). Other authors using this technique had also reported nil to very low lingual nerve sensory loss after the surgery[1,13]. A higher incidence of lingual nerve damage with the use of lingual flap retractor has been reported[8,14]. Robinson et al[15] reported better results with avoidance of lingual retraction and a lower incidence of nerve injury in a group of dental students when the use of lingual retractors was discontinued. The use of lingual retractors was avoided in this series. Alterations in the sensitivity of the inferior dental nerve is generally reported to persist not longer than 6 months, with those persisting for longer period commonly considered to be permanent[12]. All the cases of nerve defects in this study recovered within 2 months. This is at variance with the rate of 0.5% -1% of cases having permanent nerve damage that is reported in the literature [12]. The reasons for this difference is however not clear.

The gender of patients in this study was not a predictor of inferior dental nerve damage in this study. This is in contrast to the study by Blondaeu et al[1] where the female patient was more prone to inferior dental nerve parasthesia after surgery. It was however is in agreement with other studies which found no difference between the gender of patients and the occurrence of inferior alveolar nerve damage[12,14].

The influence of the age of patients on the incidence of injury to the inferior dental nerve is controversial in the literature. Some authors demonstrate a correlation between these two factors, using increased bone density as the main reason for the difference[16,17], others did not[8]. In this study, increasing age of the patient was not a statistically significant risk factor for the development of inferior alveolar nerve damage. Although it was noted in this study that with increasing age the percentage of patients with nerve injury increased from 2.6% in patients below 24 years to 4.3% in patients above 35 years. Increasing age therefore could have been more significant in this study if a larger sample was used.

Peterson et al[18] reported mesioangular impactions as the most common of all impacted teeth (43%) and that they have the highest incidence of postoperative nerve defect (3.6%) associated with their removal. The second most frequent type of impactions cited in their study was the distoangular impactions. In the present study although mesioangular impactions were the most common form of impaction (184; 54.1%) and only 0.5% of them had sensory nerve impairment. The highest incidence of inferior alveolar nerve paraesthesia in this study was seen in horizontally impacted teeth (1.5%). This is in agreement with the study by Carmichael and Mc Gowan[11] and Kipp et al[13].

Surgical difficulty, of extractions is a well documented cause of postoperative complications after removal of impacted mandibular third molars[6,8]. In the present study surgical difficulty was also a statistically significant risk variable in predicting inferior alveolar nerve damage. This finding is comparative to several others reported in the literature. Brann et al[6] even postulated that the degree of surgical force used was greater under general anaesthesia than in a conscious patient and gave this as the reason why there were more reported cases of nerve damage in extractions done under general anaesthesia than local anaesthesia. However Hill et al[19] in a recent study did not report a difference in the rate of sensory nerve damage between local and general anaesthesia.

Conclusion

The rate and pattern of sensory nerve damage is comparable to previous studies with this technique. The sensory nerve injury had a statistically significant relationship to both surgical difficulty and horizontal pattern of impactions ($p < 0.05$). There was however no statistically significant relationship between sensory nerve defect and gender or increasing age of patients.

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