

Frequency Estimate and Assessment Of Risk Factors For Postoperative Morbidity After Third Molar Removal

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Abstract

Aim: This study aims to determine the relationship of pre-operative clinic radiographic variables, difficulty index and the complications after extraction of impacted mandibular third molar. **Material and Methods:** During the period of study 110 number of patient reported to the investigator. There were total 70 subjects who underwent surgical removal of impacted mandibular third molar. A standard wards incision was given to expose the tooth. The bone removal was done by buccal guttering technique. All the patients were given antibiotic and analgesic for equal number of postoperative days. The clinical status of all third molars was recorded as unerupted (not at all visible), partially erupted (occlusal surface partially visible), erupted (occlusal surface completely visible) or missing. Orthopantomograms were taken for all the entire subjects in order to read the level of eruption, angulation, third molar space, mesio-distal length of the impacted third molar. **Result & Conclusion:** The most common postoperative complication were Trismus 92%, Pain 91% and swelling 86% followed by dry socket 8.96% and Paresthesia in 2.99%

Keywords: Molar Teeth, Third Molar, Molar Extraction.

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Introduction

Third molars are the most frequently impacted teeth because of their particular topography, phylogeny and ontogeny. They are directly or indirectly associated with numerous disorders in the mouth, jaw and facial regions. Therefore, the extraction of third molars is one of the most common surgical procedure for Oral and Maxillofacial surgeons. Surgical removal of an impacted third molar (wisdom tooth) often involves pain, swelling, and dysfunction during the postoperative period the factors that contribute to determining this situation are many and complex, but they originate with the inflammatory process initiated by surgical trauma. Numerous studies in literature report the incidence of post extraction complications, but few have prospectively evaluated the variables that can affect postoperative recovery.⁽¹⁾

In addition to pain, swelling, and trismus, the removal of impacted third molars may result in other complications, which may be transitory or permanent. Among the more common potential complications are hemorrhage, alveolar osteitis, and inferior alveolar nerve injury. Other potential complications include infection, injury to adjacent teeth, fracture of the maxillary tuberosity or the mandible, oroantral communication and fistula, and periodontal pocket formation distal to adjacent teeth. The reported incidences of the various complications differ widely, as do the reported success rates for methods used to reduce the occurrence or severity of these complications.⁽²⁾

Material and Method:

This prospective study was conducted in department of oral and maxillofacial surgery, Peoples dental Academy, Bhopal from august 2011 till July 2013.

All patients who reported to the investigator for surgical management of impacted mandibular third molar were considered for inclusion in

our study based on pre-determined inclusion and exclusion criteria.

Inclusion Criteria

1. Third molar was considered impacted when it is not fully erupted to assume normal functional position in the occlusal plane.
2. Only those subjects, who reported to department oral and maxillofacial surgery and presenting for elective impacted mandibular third molar removal.
3. Patient who were willing to come for regular follow up.
4. Patients with no known systemic diseases or compromising medical condition.
5. Patients over 18 year of age
6. Patients with normal range of mouth opening

Exclusion Criteria

1. Presence of any osteolytic lesion/ osteoporosis or fracture of mandible.
2. Subjects with second molars missing.
3. The patients who were pregnant.
4. Patient who lost for follow up.

Evaluation

The clinical status of all third molars was recorded as unerupted (not at all visible), partially erupted (occlusal surface partially visible), erupted (occlusal surface completely visible) or missing.

Orthopantomograms were taken for all the entire subjects in order to read the level of eruption, angulation, third molar space, mesio-distal length of the impacted third molar.

The Pell and Gregory and winter classification were used to document the class, position and angulation of impacted mandibular third molar and for prediction of surgical difficulty using Pederson Difficulty Index

Scoring for Pederson Difficulty Index was done in the following manner:

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Difficulty Index	Classification	Value
A. Length axis relationship	Mesioangular	1
	Horizontal	2
	Vertical	3
	Distoangular	4
B. Depth	Position A	1
	Position B	2
	Position C	3
C. Space available	Class I	1
	Class II	2
	Class III	3

Difficulty Index-

Minimum difficult 3-4
 Moderate difficult 5-7
 Very difficult 7-10

Surgical Procedure

Radiograph were evaluated completely for position, type, and difficulty index. All procedures were performed by a same surgeon for Inter Operative Bias.

Local anesthesia using 2% Xylocaine (1: 200,000) adrenaline was employed in all cases. Surgical excess was obtained through standard Wards Incision.

The bone guttering was done starting from distal side running buccally upto mesial purchase point. The tooth was splited in every case from its long axis. After the extraction bone filing was done with bone filer to make the wall of boney socket smooth followed by the irrigation with normal saline. Wound was closed by interrupted sutures of 3-0 black braided silk on half circle needle.

Post operatively all patients received standard dose of antibiotics and analgesics for the period of 5 days. All patients were also instructed to do intermittent ice application for the first 24 hours.

The postoperative complication was assessed as:

- 1) Pain 3rd& 7th day postoperatively
- 2) Swelling 3rd& 7th day postoperatively
- 3) Trismus 3rd& 7th day postoperatively
- 4) Post-operative infection
- 5) Post-operative neuro sensory deficit

Swelling were carried out by measuring the distance from corner of mouth to ear lobe using a thread in the horizontal axis and outer canthus of the eye to the angle of mandible for vertical axis. The mean of these values obtained preoperatively were subtracted from those obtained post operatively on designated follow-up days.

Trismus was calculated as measurement between the upper and lower central incisor.

The amount of pain was assessed on 9 point Visual Analogue Scale (VAS).

Post operatively the presence or absence of lower lip neuro sensory deficit was recorded using subjective and objective criteria. The subjective criteria consisted of complain of lip numbness on the operated site while the objective determination was done using cotton wool for light touch and pin prick for pain.

Result and Analysis

The number of extracted mandibular third molar was 70. Out of 70 patients 61.9% were male and 38.81% were female. The distribution of impacted third molar in both the arches was bound to be almost equal as we noted that 52.24% impacted third molar were on left arch and 47.76% were on right arch. (Chart 1 & 2)

Chart 1: Distribution of male and female patient

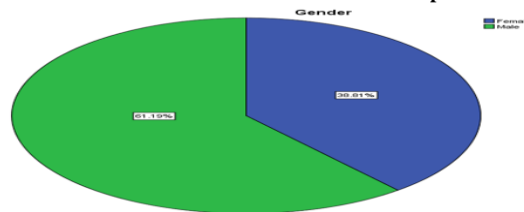
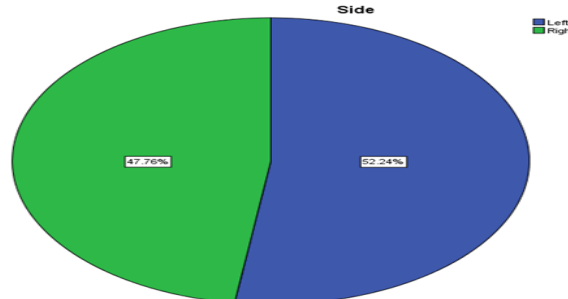


Chart 2: Distribution of arches



The 25.37% were class I, 52.24% were class II and 22.39% were class III impaction. Position A were 62.9%, Position B were 31.34% and

5.97% were Position C. (Chart 3 & 4)

Chart 3: Distribution of third molar relation with ramus

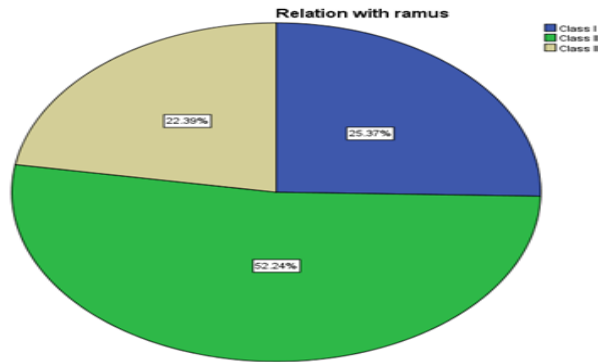
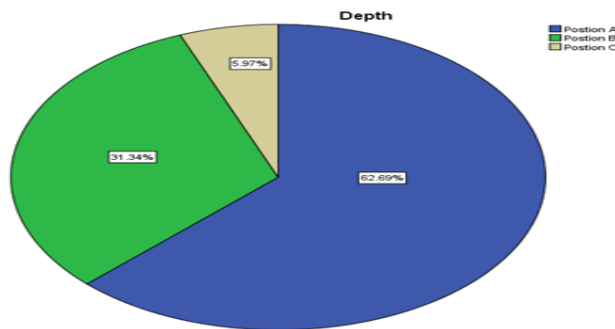


Chart 4: Distribution of third molar relation with second molar



38.81% were mesioangular, 20.90% were horizontal 34.33% were vertical and 5.97% were distoangular according to Winter's classification. The nerve relation of the root tips of the mandibular third molar with IDN were as 26.87% and were having no relation

and were separated from the nerve. 34.33% were adjacent to the nerve. 16.42% were having superimposition over the canal and 22.39% were notching of the canal. (Chart 5 & 6)

Chart 5: Distribution of third molar long axis with second molar long axis

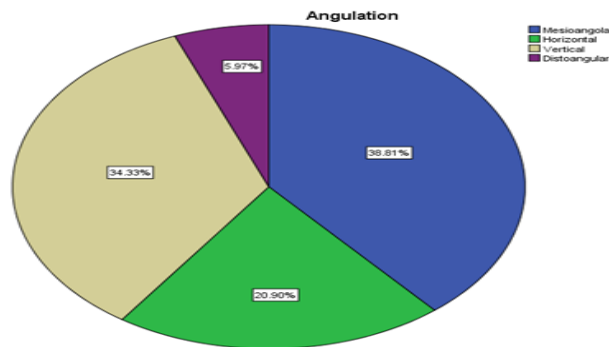
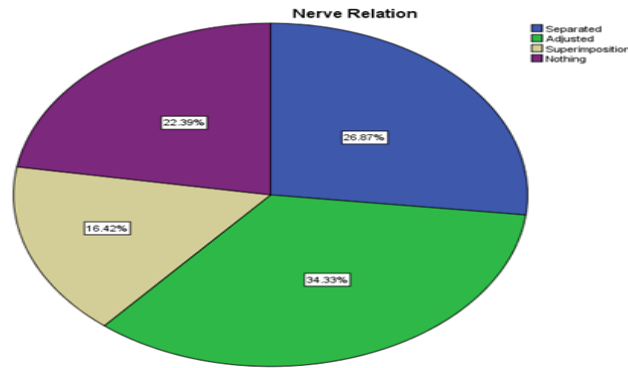


Chart 6: Distribution of according to nerve relation



According to Pederson, difficulty index of the impacted third molar was identified, as 22.39% were in easy criteria, 55.22% were of moderate and 22.39% were in difficult criteria. (Chart 7)

Chart 7: Distribution of third molar according to Pederson difficulty index

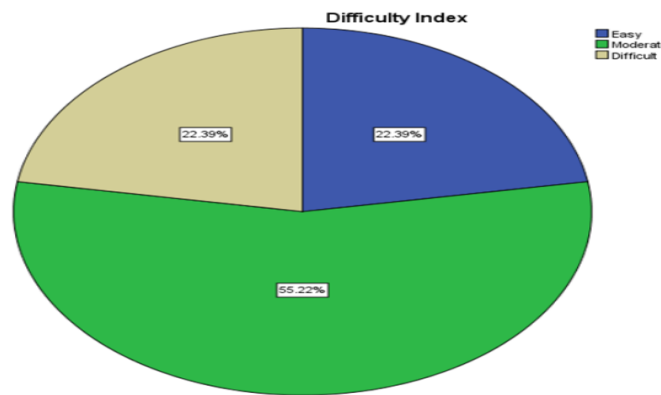


Table 1: Relation with ramus * Post-operative pain 3rd Day Cross tabulation

Relation with ramus		Post-operative pain 3rd Day			Total	Chi Sq	P Value
		Nil to Mild	Mild to Moderate	Severe			
Class I	Count	4	15	0	19	16.505	0.002
		21.05%	78.94%		100%		
Class II	Count	2	31	2	35		
		5.71%	88.37%	5.71%	100%		
Class III	Count	0	11	5	16		
			68.7%	31.25%	100%		
Total	Count	6	57	7	70		
		8.57%	81.42%	10%	100%		

Table 2: Relation with ramus * Post operative pain 7th Day

Relation with ramus	Post-operative pain 7th Day		Total	Chi sq	P value
	Nil to Mild	Mild to Moderate			
Class I	18 (94.7%)	1 (5.26%)	19 (100%)	2.986	0.225
Class II	34 (97.14%)	1 (2.85%)	35 (100%)		
Class III	13 (81.25%)	3 (1.75%)	16 (100%)		
Total	65 (92.85%)	5 (7.14%)	70 (100%)		

The pain was assessed with relation with ramus of the third molars. It was found that 5 out of 16 cases of Class III impaction (31.25%) reported with severe pain, 31 out of 35 cases of classII impaction (88.37%) reported of moderate pain. The relation of tooth to ramus with pain was found significant.(P Value= 0.002) (Table 1 & 2)

Table 3: Relation with ramus * Post-operative swelling 3rd Day Crosstabulation

Count		Post-operative swelling 3rd Day			Total	Chi sq	P value
		Nil to Mild	Mild to Moderate	Severe			
Relation with ramus	Class I	4 (21.05%)	12 (63.1%)	3 (15.79%)	19 (100%)	16.505	0.002

	Class II	4 (11.11%)	16 (44.44%)	16 (44.44%)	36 (100%)		
	Class III	1 (6.66%)	3 (20%)	11 (73.33%)	15 (100%)		
Total		9 (12.85%)	31 (44.25%)	30 (42.85%)	70 (100%)		

Table 4: Relation with ramus * Post-operative swelling 7th Day Crosstabulation

Count		Post-operative swelling 7th Day		Total	Chi sq	P value
		Nil to Mild	Severe			
Relation with ramus	Class I	18(94.75%)	1(5.26%)	19(100%)	4.551	0.103
	Class II	36(100%)	0	36(100%)		
	Class III	15(100%)	0	15(100%)		
Total		69(98.57%)	1(1.42%)	70(100%)		

When swelling was assessed with the relation of M3 with ramus on 3rd postoperative day, about 31 (44.25%) cases had moderate swelling and 30 (42.85%) cases had severe swelling out of 70 M3. In which class III had a higher number of severe swelling. It was found

that the relation of ramus of M3 with swelling was statistically significant (p value being 0.002). On the 7th postoperative day all the subjects had either no swelling or very mild and only of one case still came with the complaint of swelling. (Table 3 & 4)

Table 5: Relation with ramus * Trismus 3rd day Crosstabulation

Count		Trismus 3rd day		Total	Chi sq	P value
		Mild	Severe			
Relation with ramus	Class I	17 (89.47%)	2 (10.52%)	19 (100%)	0.138	0.934
	Class II	32 (88.88%)	4 (11.11%)	36 (100%)		
	Class III	14 (93.33%)	1 (6.66%)	15 (100%)		
Total		63 (90%)	7 (10%)	70 (100%)		

Table 6: Relation with ramus * Trismus 7th day Crosstabulation

Count		Trismus 7th day		Total	Chi sq	P value
		Normal	Mild			
Relation with ramus	Class I	16 (84.24%)	3 (15.78%)	19 (100%)	0.422	0.810
	Class II	29 (80.55%)	7 (19.44%)	36 (100%)		
	Class III	12 (80%)	3 (20%)	15 (100%)		
Total		57 (81.42%)	13 (18.53%)	70 (100%)		

Relation of trismus was assessed with ramus relation of M3 as only 7 out of 70 (10%) cases had severe restricted mouth opening. Out of which 4 were of class II. Relation of ramus with trismus on both 3rd

and 7th postoperative day was found to be insignificant statistically. (Table 5 & 6)

Table 7: Relation with ramus * Paresthesia Crosstabulation

Count		Paresthesia		Total	Chi sq	P value
		Absent	Present			
Relation with ramus	Class I	19 (100%)	0	19 (100%)	7.147	0.028
	Class II	36 (100%)	0	36 (100%)		
	Class III	13 (86.66%)	2 (13.33%)	15 (100%)		
Total		68 (97.14%)	2 (2.85%)	70 (100%)		

When paresthesia assessed with relation of M3 with ramus was found that both the subjects were having Class III impaction. Data was

statistically significant (P value=.028). (Table 7)

Table 8: Relation with ramus * Secondary Infection Crosstabulation

Count		Secondary Infection		Total	Chi sq	P value
		Absent	Present			
Relation with ramus	Class I	19 (100%)	0	19 (100%)	2.988	0.224
	Class II	30 (83.33%)	6 (16.66%)	36 (100%)		
	Class III	14 (93.33%)	1 (6.66%)	15 (100%)		
Total		63 (90%)	7 (10%)	70 (100%)		

A total of 7 (10%) of cases reported with secondary infection out of which 6 were of classII and 1 of classIII

which was conducted by *CH Bui et al*³ also found that the majority of patients were male. However few studies which were carried out by *Khan A. et al*⁴ in Pakistan, and *Obichina Al*⁵ in Nigeria reported a predominance in female gender.

Discussion

The failure of eruption of 3rd molar is a very common condition and the surgical removal of impacted 3rd molar is the most frequent surgical procedure carried out in any dental practice.

Very few patients were above the age of 30 years, which is in contrast to the study done by *CH Bui et al*³. This may be because of the surgical removal of mandibular third molar at an earlier age and increased awareness of health in general public.

The most frequent complication after surgical removal of impacted third molar are Alveolar Osteitis, Neurological damage, Swelling, Postoperative Pain and Trismus..

Our observation that 38.81% of the mandibular third molars were in a mesioangular position which is less in proportion to that noted by *Venta et al*⁶(71%), *Hattab et al*⁷ (50%) and *Sumeet Sandhu et al*⁸.

The frequency of Position A (62.69%), was more than that reported by *Sumeet Sandhu et al*⁸ (27%), *S.L. Quek et al*⁹ (5%) but almost near to *A.E. Obiechina*⁵ (54.5%), *Hattab et al*¹⁰ (58%).

The frequency of Position B (31.34%) which is less than that of *S.L. Quek*⁹ (80%), and of *Sumeet Sandhu et al*⁸ (39%) but similar with *A.E. Obiechina*⁵ (31.9%) and more than *Hattab et al*⁷ (16%).

The frequency of teeth noticed in Position C was 5.97%, which was less than that of *Hattab et al*⁷ (26%), *Sumeet Sandhu et al*⁸ (34%). Complication is related to the difficulty index persistently. Pain, Swelling, Trismus, Alveolar Osteitis, Nerve damage are frequent possible complications.²⁷

Similar results were reported in study conducted in *Obiechina AE et al*⁵ in Nigerian population in 2001.

In our study we referred to Pederson difficulty index to predict the surgical difficulty in extraction of impacted mandibular third molar and to correlate it with the postoperative complications.

In our study all the 70 subjects who had impacted lower third molar underwent surgical extraction. A standard wards incision was given to expose the tooth. The bone removal was done by buccal guttering technique. All the patients were given same antibiotic and analgesics postoperatively for same number of days.

The most common postoperative complications found in our study were Pain, Swelling, and Trismus. Similar results were reported by *Khan et al*⁴ and *Jaffer et al*¹¹.

The assessment of postoperative pain was done on 3rd and 7th postoperative day. The observations were showing that pain was evident in all cases. There were 80.60% of subjects who reported with complaint of severe pain, 10.45% complained of moderate pain & 8.96% complained of mild pain.

On the 7th postoperative day there were 92.54% of patients who reported with nil to mild pain & 7.46% patients who had mild pain. A similar study was conducted by *HiraAyazet al*¹² reported 21.7% subjects with severe pain, 20.5% with moderate pain, 37.7% with mild pain and 11.3% with no pain on the 3rd postoperative day. By the 7th postoperative day 43.4% had no pain, 39.6% with mild pain, 13.2% with moderate pain and 4% with severe pain.

Our study was in contrast with the study done by *HiraAyazet al*¹² on the 7th postoperative day.

Alveolar Osteitis came as the only secondary infection in our study. In our study the range of Alveolar Osteitis was 8.96%.

The reported range of Alveolar Osteitis in the literature was found to be between the range of 1% to 26%.^{1,21} Our findings were within the range of literature. Previous studies conducted by *HiraAyazet al*¹² had 3.8% subjects with Alveolar Osteitis. Similar studies conducted by *Allen L Sisk et al*² were in the range between 7.6% to 10%.

One of the short term complications of the third molar surgery in swelling. After a surgical procedure it is a normal physiologic response of the tissue that leads to the inflammatory swelling. On the 3rd postoperative day we found 43.28% of subjects who complained of severe swelling & 13.43% of subjects who had mild swelling.

In our study 16 mandibular third molar which were in difficult level according to Pederson's difficulty index 14(87.5%) subjects reported with severe swelling on 3rd postoperative day.

By the 7th postoperative day 98.51% of subjects who reported with complaint of nil to mild swelling. As swelling is one obvious postoperative complication, but it generally gets subsided by itself on the 7th postoperative day in majority of subjects. The earlier study conducted by *J.J Ten Bousch*¹³ was also consistent with our study. Relation of ramus and depth with the third molar does seem to have significant role with the postoperative swelling. Unlike our study, the study conducted by *Hidimichiyuas*¹⁴ had subjects who complained of severe swelling with extraction that were in easy criteria on difficulty index.

Study conducted by *HiraAyazet al*³ had 92.5% of subjects who reported with severe swelling on the 3rd postoperative day which regressed by the 4th postoperative day and completely resolved on the 7th postoperative day. This study was also in contrast with our study. Trismus or difficulty in opening the mouth is often the result of

surgical trauma and is secondary to masticatory muscle inflammation following lower third molar surgery. The postoperative patients may feel jaw stiffness with difficulty to eat normally. Trismus gradually resolves and the ability to open the mouth returns to normal by 7th to 10th day postoperatively.³

There were about 92.54% of subjects who reported with severe Trismus on 3rd postoperative day & 7.46% of subjects were having moderate difficulty in mouth opening.

By the 7th postoperative day the majority 83.58% regained their normal mouth opening where as 16.42% had mild Trismus.

In the study conducted by *HiraAyazet al*¹² they had 81.1% of subjects with Trismus on the 3rd postoperative day. In their study majority subjects regained their normal mouth opening by the 7th postoperative day. Our study was in contrast with this study.

In the study conducted by *J.J.Ten Bousch*¹⁵ concluded that the correlation between the Trismus and Swelling is the strongest. As the majority of subjects in our study had severe swelling along with Trismus which got subsided on the 7th postoperative day.

Extraction of an impacted third molar has the potential risk of causing temporary or permanent neurologic disturbances of the inferior alveolar nerve. The incidence of Inferior Alveolar nerve damage reported in literature ranges from 1.3% to 5.3%.³

In our study 2.99% of subjects reported with the complaint of Paresthesia of the lower lip. Previous study conducted by *F.A. Carmicheal*¹⁶ et al had 1339 third molar removed and the incidence of IAN damage was 3.9%. Another study conducted by *Zaid Malkawi et al*¹⁷ in 2010 reported 0.3% of IAN damage which was not in contrast with literature and is also not similar with the result of our study.

In the study conducted by *Francois blondearet al*¹⁸ reports 1.1% of Paresthesia of IAN which was similar to our study. Study conducted by *HiraAyazet al*¹² reported of 5.7% of IAN damage which was almost in contrast with our study.

Conclusion

Wisdom teeth are the third and the final set of molars that most people get late teens or early twenties. When impacted, these can cause variety of problem, from severe orofacial pain, acute dysphagia, and facial cellulitis to serious dental disorders. Surgical removal of the impacted third molar is one of the commonest outpatient, day care, minor oral osseous surgical procedure undertaken by maxillofacial surgeons.

The objective of this study was to evaluate the occurrence of postoperative complication after surgical removal of impacted third molar. 70 patients were included in this study from age varying between 18 to 35 years. Detailed history was taken for each patient. The patients were reevaluated on 3rd and 7th post-operative day for pain, swelling, trismus. Secondary infection, paresthesia.

Pre-operative evaluation was done by Pell and Gregory classification and winters classification. The degree of difficulty index was determined by Pederson's difficulty index. Mesioangular 38.81% & Vertical 34.33%, Class II 52.4%, position a 62.69% were the most common Pattern.

The most common postoperative complication were Trismus 92%, Pain 91% and swelling 86% followed by dry socket 8.96% and Paresthesia in 2.99%

The presence of symptomatic impacted third molar comprises the quality of life and early removal is recommended for quick recovery. The removal of the mandibular third molar results in many unwanted sequelae like Pain, Swelling and Trismus. While these are unfortunate for the patient, but they are perhaps not unexpected following minor oral surgery. A comprehensive preoperative counseling of the patient is generally required but a patient may however be dissatisfied if the surgery results in impaired sensation following nerve damage particularly in no prior warning has been given.

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