

PADDERSON DIFFICULTY INDEX, A PREDICTIVE TOOL FOR PREDICTION OF POST OPERATIVE COMPLICATION AFTER MANDIBULAR THIRD MOLAR EXTRACTION

Oral & Maxillofacial Surgery

Accepted on : March 2016

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Abstract:

Introduction: Like any other surgical procedure third molar extractions are also not devoid of post operative complications. Although most of the complications are easily manageable, their occurrence affects the repo of patient doctor relationship. Prediction of complications is very important for dental surgeon not only for patient sake but also for better treatment planning. In this paper authors tried to correlate padderson difficulty index with post operative complication like dry socket, trismus, post extraction inferior alveolar nerve paresthesia post operative pain and post extraction infections.

Material and methods: A total of 120 patient needs to go for third molar extraction were selected randomly prom the patient population. All patient included in this study were non smokers not taking any medication at the time of study and asymptomatic. Surgical extraction of mandibular third molar was performed in all included patients by slandered protocol outcome were looked for like dry socket, trismus, post extraction inferior alveolar nerve paresthesia post operative pain and post extraction infections.

Statistical analysis: All the collected data was transferred to SPSS 21 software for analysis. A pearson product moment correlation coefficient was calculated to assess if there were any relationship between these variables (Padderson difficulty index, dry socket 3rd day of surgery, post operative trismus one day after surgery, post operative paresthesia of inferior dental nerve, post operative infections and pain 6 hours post operatively).

Results: In this study there were significant correlations found between padderson difficulty index and dry socket, trismus, as well as inferior alveolar nerve paresthesia but this index failed to predict post operative pain and infections.

Conclusion: Padderson difficulty index can be a good predictor of occurrence of post operative dry socket trismus and inferior alveolar nerve paresthesia but reliability of this index for predicting post operative pain or occurrence of post operative infections is questionable.

Keywords: Padderson difficulty index, predictive tool, mandibular third molar extraction.

Introduction

The extraction of mandibular third molar is one of the most common surgical event¹ that is routinely performed in dental clinics. Often, like every surgical procedure it is associated with some unwanted post operative complications like nerve injury, development of dry socket, post operative pain and trismus.² These unwanted complications not only create problem to the patient but also affect the repo of the surgeon. Several factors like morphology and anatomy of the tooth that needs to be extracted, its relationship with surrounding vital structures plays an important role in occurrences of these complications. Difficulty of the extraction procedure is a key factor for occurrence of complications and for this many efforts and classifications were suggested to grade the difficulty of extraction of mandibular third molar. MC Gragor can be considered to set first milestone in this field of categorization of variables.³ The other few prominent classifications/grading to assess difficulty of third molar extraction were Winter's Pell and Gregory, Pederson⁴ and WHARFE (winters classification, height of mandible, angulation of second molar, root shape, follicle and exit path).⁵ In these early systems quantitative scores were provided for each parameter and difficulty was estimated on the basis of total score. Assessing difficulty of extraction is important because according to some research papers difficulty of extraction of third molar is directly proportional to the occurrence rate of post operative complications.

Although there are still some jeopardy about reliability^{6,7,8} of Padderson difficulty index proposed by Padderson but it is perhaps most widely used, easy to apply scoring system to assess difficulty of extraction of mandibular third molar in dental practice.

The sensitivity of this scale is often questionable by some authors because it does not cover all the aspects regarding extraction of mandibular third molar but it provides a better imaginary view to the operator about the surgical procedure and treatment outcome.

The purpose of this paper is to assess if Padderson difficulty index can give some idea to the operator about occurrence of post operative complications after extraction of mandibular third molar. If so, by calculating simple radiographic variables, operator can better design his treatment plan to minimize possible post operative complications and to better prepare the patient about the later events.

Material and methods

In this prospective study 120 consecutive patients presented for third molar extraction were included. Patient's brief history and examination details were recorded in a specially designed perform for this purpose

Patients with thyroid disorders pregnant ladies, women on oral contraceptives ⁹uncontrolled diabetics, uncontrolled hypertensive, cardiac patients and patients with chronic renal disease were not included in the study because alteration in post op drug regimen can cause bias. Patients included in the study were advised not to smoke (if they were smokers) at least from three days before surgery to one week after surgery All the patients taken for study were medically fit and with a valid reason for extraction of third molar.

Before extraction all patients were asymptomatic or made asymptomatic by the use of standard antibiotic and analgesics protocol. Surgical procedure was performed by the same surgeon under inferior alveolar and long buccal nerve block by using 1.8 ml 2% lignocain with 1;200000 adrenalin added to it. After taking inter incisal length at maximum mouth opening extraction was done either by close method or by surgical removal according to the need.

Extraction wound was closed by the use of 3'0 silk suture. Standard post operative antibiotic and analgesic regime followed for five days postoperatively.

Pain was measured at 6 hour post operatively on VAS scale on which 0 denote no pain and 10 denote maximum pain.

Patients were recalled after three days for evaluation of dry socket trismus (by measuring inter incisal distance at maximum mouth opening) and any paresthesia (by two pin prick method) or anesthesia of inferior alveolar nerve. Patient was again recalled 6th day to evaluate occurrence of any wound infection.

Results

The collected data was analyzed by using SPSS 21 software. Total number of subjects studied were 120 (N=120). A Pearson product moment correlation coefficient was calculated to assess if there were any relationship between these variables (Padderson difficulty index, dry socket

3rd day of surgery, post operative trismus one day after surgery, post operative paresthesia of inferior dental nerve, post operative infections and pain 6 hours postoperatively) by analyzing there were significant correlations found between Padderson difficulty index and dry socket 3rd day of surgery ($r=.216, n=120, p=.018$), between Padderson difficulty index and trismus one day postoperatively ($r=.250, n=120, p=.006$), between Padderson difficulty index and post operative paresthesia of inferior dental nerve ($r=.289, n=120, p=.001$). However this study shows no statically significant relationship between Padderson difficulty index and pain 6 hour post operatively ($r=.176, N =120, p=.055$), between Padderson difficulty index and post operative infections($r=.205, n=120, p=.117$).

Table:1- Results

	Number Of Subjects	Pearson Co relation	Significance (2-Tailed)
Pain	120	.176	.055
Trismus	120	.250	.006
Post Opnfctions	120	.205	-.117
Dry Socket	120	.216	.001
Post Op Paresthesia	120	.289	.018

Discussion

Padderson difficulty index is being used for many years to assess the potential difficulty for removal of mandibular third molar. Although its reliability is questionable by many authors time to time^{9,10} and many authors proposed some more sophisticated classification involving pervasive variables yet it is routinely practiced by dental practitioner as well as dental students due to its simplicity and ease of application.

Complications are not very much uncommon after third molar surgery. Clauser B¹¹ listed alveolar ostitis, infections, neurological damage as the most common complications after third molar surgery.

Incidence of alveolar ostitis is more common following the extraction of mandibular third molar.^{12,13,14} Eshghpour M¹⁵ found in his study of 256 surgeries the incidence rate

of dry socket was as high as 19.4% where as Bowe DC¹⁶ suggested occurrence rate of dry socket ranges from 3 to 30%. In other words these figure shows that every third to fifth person undergoing mandibular third molar surgery is at risk of developing dry socket. Dry socket is a very uncomfortable and painful condition to the patient and needs medical attention as soon as diagnosed. Etiologies from dislodgement of clot to microbial inferction¹⁷ are suggested by many authors. Brin^{18,19,20} in his classic series of articles published between 1963 and 1977 suggested that increased local fibrinolysis causes disintegration of clot and all these events resulting in development of dry socket. In this study the motive was if one can prospect the chance of development of dry socket by just calculating the Padderson index. In this study the occurrence rate of dry socket is 6.67% which is well under the proposed limit, and statistical analysis shows its significant relationship with Padderson difficulty index

The reason behind this may be as the Padderson difficulty index moves towards the difficult side, level of elevation of tooth, bone coverage of tooth increases so wider exposure and aggressive bone cutting needed to extract comparatively difficult teeth i.e. more traumatic will be the extraction .Many authors also proved time to time in the literature that traumatic extraction is responsible for development of dry socket.^{18,21-26}

Trismus from the Greek word ‘trismos’ that is defined as prolonged titanic spasm of the jaw muscles by which normal opening of the mouth is restricted. Trismus is considered as subjective finding of local inflammatory tissue reaction.^{27,28} According to views of various authors injury to the local soft tissues caused by third molar surgery initiates release of various inflammatory mediators like histamine, serotonin, bradykinin, and prostaglandins,^{29,30} overall effect of these events reflects in form of trismus.

In this study the incidence of trismus found to be 10.83% and all the patients, with trismus were successfully cured within 15 days with the help of medication physiotherapy or combination of both. A significant relationship is being found between occurrence of trismus and Padderson difficulty index. The reason behind direct may be difficult surgical approach, extensive retraction at the time of surgery, more bone cutting and extensive elevation of flap for proper access in difficult extractions. The effect of all these events reflect in form of trismus

Injury to the inferior alveolar nerve that percept in the form of complete sensory loss or paresthesia is also very un delightful condition for the patient as well as the operator. In different studies many radiological variables are suggested that are indicative of close relationship of inferior alveolar nerve to the third molar roots and a “would be “cause of inferior alveolar nerve injury during surgical process. Our study suggests that Padderson difficulty index is also a good variable to predict post surgical deficit the nerve and found a significant co relationship between difficulty index and post operative paresthesia.

Rafel Serikav³¹ in his study found degree of tissue destruction and radiological relationship of nerve to the roots of third molar is a significant predictive factor of post op nerve injury

A significant relationship between post operative pain and surgical difficulty is shown by many studies.^{32,33} However our study didn't found any surgical relationship between surgical difficulty and post op pain. Osunde OD in his study also found difficulty and post operative pain as two independent variables not related significantly with each other.

In this study out of 120 subjects total 10 patients were reported with infected wounds. The number was not found statistically significant to establish any kind of relationship of infection with Padderson difficulty index. Proper sterilization is key factor to avoid post op infection. Another thing which authors has been noted that properly following post operative instruction reduces the chances of post op wound infection to minimum. On proper history taking we found that in most of the cases with infected socket, there was associated patient ignorance of following post op orders. This breach in sterilization protocol and patient ignorance may be an explanation why infected socket could not be predicted by Padderson difficulty index in this study.

Conclusion

Times to time several studies were performed to quantify different difficulty indexes, and everyone has its own criteria of evaluation. In this study Padderson difficulty index is checked to predict the possible post operative complications after third molar surgery. We found that Padderson difficulty index can be a good predictor of

occurrence of post operative dry socket trismus and inferior alveolar nerve paresthesia but reliability of this index for predicting post operative pain or occurrence of post operative infections is questionable.

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