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Contents

Original Articles

EXTRACTION OF MESIOANGULARLY IMPACTED THIRD MOLAR: DENTAL DRILL VERSUS CRANE PICK ELEVATOR ON TREATMENT OUTCOME.

Charles E. Anyanechi

Department of Oral and Maxillofacial Surgery, University of Calabar
University of Calabar Teaching Hospital, Calabar, Nigeria.

ABSTRACT

BACKGROUND: The use of dental drill during extraction of impacted mandibular third molars lead to production of aerosol, fear in some patients and this necessitates the need for an alternative instrument.

OBJECTIVE: To compare the treatment outcome in two cohorts of patients after surgical extraction of symptomatic mesio-angularly impacted mandibular third molars.

PATIENTS AND METHODS: Apparently healthy subjects who presented to the oral and maxillofacial surgery clinic of our institution, with an indication for surgical extraction of symptomatic mesio-angularly impacted mandibular third molar were assessed. Those classified as Pell and Gregory class 2 ramus relationship, class A and B depth, with favourable root morphology were uniformly randomized into dental drill and Crane pick elevator groups. Information on demographics, reasons for extraction, trismus, swelling, pain and complaints during follow-up were obtained and statistically analyzed.

RESULTS: Overall 86 subjects, evenly distributed between the two groups were studied. Post-operative mean for trismus, swelling and pain were lower on the 3rd day in those treated with Crane pick elevator than dental drill. However, by the 7th day, the results were the same as the trismus, swelling and pain resolved clinically, without complication.

CONCLUSION: Crane pick dental elevator could serve as a useful substitute to dental drill in the extraction of mild mesio-angularly impacted mandibular third molars.

KEYWORDS: Crane pick elevator, dental drill, mesio-angular impaction, osteotomy.

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INTRODUCTION

Impacted teeth may be involved in pathological processes, and their surgical removal is frequently done in dental surgery or oral and maxillo-facial surgery setting. [1, 2] The bone surrounding this mal-positioned tooth contributes to the difficulty encountered during removal.[3, 4] As a result, osteotomy of the surrounding bone is done to ease the surgical procedure. [5-7] Third molar is one of the most frequently impacted teeth. The type of third molar impaction and the procedure for extraction is associated with post-operative morbidities and complications. Generally, the more difficult and time-consuming the surgical procedure, the more difficult and prolonged the post-operative recovery period. [8-10]

The equipments and instruments used for the osteotomy have evolved in contemporary practice, changing from the use of mallet and chisel to dental drill. [10-13] The use of dental drill for osteotomy in the extraction of impacted mandibular third molars results in the production of aerosol, in addition to fear and psychological trauma as a result of the continuous sound of the drill, particularly when the procedure is done under local anaesthesia. [8, 9, 14] From the author's surgical experience, Crane pick dental elevator alone, without a dental drill, can be utilized for the extraction of mesio-angularly impacted mandibular third molar categorized as Pell and Gregory 13 Class 2 ramus relationship, Class A and B depth, with a favourable root

Correspondence to: Dr. Charles E. Anyanechi
Department of Oral and Maxillofacial Surgery,
University of Calabar Teaching Hospital, Calabar, Nigeria.
E-mail: ceanyanchi@gmail.com
Tel: +234 8100 257 825

morphology (conically shaped and convergent).

According to the Pell and Gregory classification of the degree of the difficulty of an impacted mandibular third molar, the amount of bone removed varies according to the angulations of the teeth, depth of the impactions and morphology of the roots. [13]

Consequently, the extraction of impacted third molar can either be relatively easy, or extremely difficult irrespective of the surgeons' experience or the equipment/instruments used for the procedure. Mesio-angularly impacted tooth is generally considered the least difficult to extract. [8, 13] It is also the commonest form of impaction, comprising 43% of all impacted mandibular third molars. [14, 15] Using dental drill (control) and Crane pick dental elevator (experimental) for osteotomy, this study compares the treatment outcome in two cohorts of patients after surgical extractions of mesio-angularly impacted mandibular third molars categorized as Pell and Gregory Class 2 ramus relationship, Class A and B depth, with favourable root morphology (conically shaped and convergent).

PATIENTS AND METHODS

This was a randomized single-blinded clinical study conducted at the oral and maxillofacial surgery clinic of the institution. Patients who required surgical extractions of mesio-angularly impacted mandibular third molars classified as Pell and Gregory Class 2 ramus relationship, Class A and B depth, and with a favourable root morphology (conically shaped and convergent) were studied. The study was done over a two-year period, from November 2014 to October 2016. The study was explained to each patient and written consent obtained. The study was conducted in accordance with ethical principles, including the World Medical Association Declaration of Helsinki (version 2008); also, it was approved by the Regional Research and Ethics Committee of the institution. Inclusion criteria were completion of surgical extractions within 20 minutes. Smokers, patients on steroid therapy, with systemic disease(s) known to interfere with healing, pregnant and lactating females were excluded. In addition, mesio-angularly impacted mandibular third molars associated with lesions, facial cellulites or in contact with inferior alveolar canal were excluded. Also, patients that require more than one extraction or had radiotherapy to the head and neck region were excluded.

Before treatment, the oral hygiene status of patients was graded using Gross Plaque Scoring method (+ = Good, + + = Fair, + + + = Poor). The surgical extractions were done by the same oral surgeon and dental surgery assistant in the same dental surgery environment. Local anaesthesia was achieved with 2% lidocaine with 1: 80, 000 adrenalines. The patients were consecutively randomized into two treatment groups based on the equipment or instrument used for the osteotomy: dental drill (control) and Crane pick dental elevator (experimental). A full-thickness incision was made to develop a 3-sided muco-periosteal flap with the anterior relieving incision reaching as far forward as the distal one-third of the buccal surface of the second molar and the distal relieving incision from the distal part of the third molar across external oblique ridge into the buccal mucosa. The flap was elevated with periosteal elevator. The buccal flap was retracted with periosteal elevator, and bones were removed using the buccal and distal guttering osteotomy technique to expose the crown of tooth to the cervical line. With gentle downward force in the case of Crane pick dental elevator, using the blade of the elevator (figure 1), or dental drill, osseous tissues were removed under constant irrigation with 0.9% normal saline solution. The buccal trough created was deepened until it was made in cancellous bone. This procedure was continued on the buccal and the distal parts of the bone surrounding the impacted tooth

until the cervical line of the tooth was exposed, and the tooth subsequently elevated and delivered from their sockets. For the experimental group, the impacted teeth were extracted from their sockets with the same Crane pick dental elevator whereas coupland elevator was used to deliver the teeth in the control group. Debridement of the sockets was done, haemostasis was achieved and the flaps sutured back with 3/0 vicryl sutures.
The duration of surgery, from the incision to the placement of the last suture was recorded in minutes. The patients in both study groups were given the same postoperative instructions, and prescription; oral non-steroidal anti-inflammatory analgesics (naproxen sodium 550mg 12 hourly for 5 days) and broad-spectrum antibiotics (amoxicillin 500mg 8 hourly for 5 days), and metronidazole (400mg 8 hourly for 5 days).

The subjects were reviewed postoperatively on the third and the seventh day by a blinded observer. Further reviews were done after two; four and eight weeks. The clinical variables recorded in a pro forma were age, gender, side of mandible affected by the impaction and reason(s) for the extraction, degree of trismus, swelling and pain after treatment and complaints during the follow-up.

The subjects were evaluated for trismus, swelling and pain in a blinded manner by one examiner on the post-operative 3rd and 7th days. Using calibrated caliper, mouth opening and trismus were determined by measuring the distance between the incisal edges of the lower and upper central incisors at the maximum mouth opening in millimeter pre-operatively and post-operatively. Also, the facial width and swelling (centimeter) were evaluated by measuring the distance from the commissure of the mouth to the attachment of the earlobe following the bulge of the cheek, and the distance from the outer canthus of the eye to the mandibular angle of the side affected. 9 The mean of the two measurements was assumed to be the baseline. The difference between the post-operative measurement on the 3rd and 7th days and the baseline became the facial swelling for the day. Pain intensity was evaluated with a 10-cm level visual analogue scale (VAS) with the subject placing a mark on the scale to show an intensity range from no pain (0) to severe/unbearable pain (10). Complications were diagnosed based on patients' complaints and clinical evaluation during follow-up.

The data obtained were analyzed using EPI INFO 7, 0.2.0, 2012 version software (CDC, Atlanta, GA, USA). Chi square ($\chi 2$) test was used to compare the proportion of descriptive variables between the two study groups, while student's t-test compared the means of continuous variables between the two groups at 95% confidence interval. P value <0.05 was considered significant.

RESULTS

Overall 86 subjects, evenly distributed between the two groups were studied. The distribution of demographics, reasons for the surgical extraction and baseline clinical characteristics was equitably comparable between both groups (Table 1). The age of patients ranged from 18 to 57 years. Post-operative mean for trismus, swelling and pain were slightly higher on the 3rd day in the dental drill group than Crane pick elevator but this difference was not statistically significant (Table 2). However, by the 7th day, the results were the same in both study groups as the trismus, swelling and pain resolved clinically. Also, the oral hygiene status of the patients in both groups was graded as being fair or poor.

All the patients complied with the follow-up schedule. There was no record of complication or adverse reaction during the follow-up that was related to the dental drill, Crane pick elevator, surgical procedures or wound healing.

Table 1: Distribution of demographic, reasons for surgical extractions and baseline clinical characteristics.

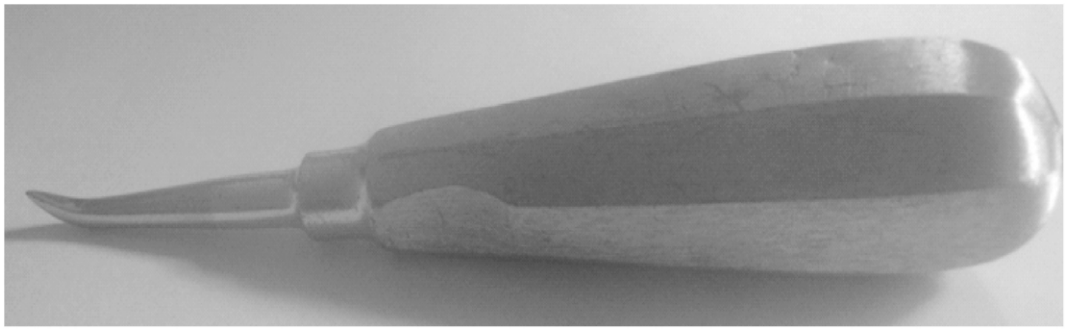
Variables	Dental drill (n=43)	Crane pick elevator (n=43)	df	Test	P-value
Gender					
Male	23	22	1	χ^2=0.124	0.597
Female	20	21			
Side					
Left	19	25	1	χ^2=0.386	0.513
Right	24	18			
Reasons for extraction					
Acute apical periodontitis	18	16		χ^2=2.461	0.852
Recurrent pericoronitis	14	14			
Chronic irreversible pulpitis	11	13			
Age (years)					
Mean (SD)	33.1 (4.6)	32.9(3.1)		t=0.314	0.784
Facial width (cm)					
Mean (SD)	10.3 (0.28)	10.2 (0.34)		t=1.603	0.07
Mouth opening (mm)					
Mean (SD)	45.9 (0.52)	46.2 (0.31)		t=1.276	0.162

Pre-operatively, visual analogue scale score for pain was zero in the 86 patients studied; consequently test of significance was not done. M (SD) = Mean (standard deviation), mm=millimeter, cm=centimeter.

Table 2: Distribution of post-operative trismus, swelling and pain.

Variables/days	Dental drill M (SD)	Crane pick elevator M (SD)	df	t	P-value
Trismus (mm)					
3	4.4 (0.2)	4.3 (0.18)	2	1.622	0.083
7	0.0 (0.0)	0.0 (0.0)			
Swelling (mm)					
3	3.0 (0.1)	2.9 (0.2)	2	1.746	0.087
7	0.0 (0.0)	0.0 (0.0)			
Pain (mm)					
3	30.2 (0.41)	30.1 (0.37)	2	1.779	0.092
7	0.0 (0.0)	0.0 (0.0)			

Figure 1: The Crane pick dental elevator.



DISCUSSION

This study compared the treatment outcome in two cohorts of patients after surgical extractions of mild mesio-angularly impacted mandibular third molars, and it showed that post-operative trismus, swelling, pain and outcome were equitably comparable, favourable and good. This will suggest that the inflammatory response to the trauma caused by the dental drill or Crane pick elevator during osteotomy was closely similar. The minimal trismus, swelling, pain, and absence of complications may be related also to the criteria used to the select patients' studied, type of impaction treated, surgeon's good surgical skill, and patients' compliance to post-operative treatment regimen.

Because of its efficacy in cutting bone, dental drill is the choice for extraction of impacted mandibular third molars. [1,6,7] On the contrary, dental elevators are used in dental surgery practice to luxate teeth from the surrounding bone, expand alveolar bone, remove broken or surgically sectioned roots from their sockets and as a result make difficult extractions easier. [16,17] The Crane pick elevator is the heavy version of the pick type dental elevator and in clinical dental surgery practice is used as a lever to elevate and extract a broken root, whole root or teeth from their sockets.[18] In addition, as this study shows, it can be used to remove osseous tissues impeding the extraction of mild mesio-angularly impacted mandibular third molars because of its sharp, pointed and strong blade causing minimal post-operative morbidity. The advantages of using this instrument include absence of aerosol unlike the dental drill; because most mesio-angularly impacted teeth are extracted under local anesthesia, the fear and psychological trauma which some patients undergo during the procedure, caused by the sound of the drill is eliminated. It can be argued that more force was applied while using the Crane elevator as opposed to the drill and this could result in psychological trauma as well and a negative dental experience, but none of our patients complained during or after the procedure. The Crane pick elevator can also be useful in low resource setting where equipment and instruments may be unavailable for use of the drill. Furthermore, the age range of the patients in this study suggests that this instrument can be used for all patients irrespective of bone maturity. The disadvantage of using the instrument include blade of the elevator can become blunt over time after use, slowing down the speed of osteotomy, and this may necessitate sharpening the blade or replacement of the elevator. Similarly, the drill can also break down, require repair or replacement, and the bur mounted on the dental drill can also get blunt necessitating replacement.

The duration of the entire surgical procedure was shorter compared with other earlier studies, [19, 20] because the present study was restricted to patients with mild mesio-angular impaction. The density of the bone surrounding mesio-angularly impacted mandibular third molar plays a role in determining the difficulty index and indirectly the duration of the surgical extraction. [8] Several authors, [6, 21-23] agree that the mesio-angularly impacted tooth is the easiest of the impactions to extract which probably accounted for the shorter duration of the procedures and the minimal morbidity and complication recorded. This will suggest that the patients were able to return to their working and social life within a short period after treatment.

The reasons for the extractions are in agreement with earlier reports [10] where acute apical periodontitis, recurrent pericoronitis and chronic irreversible pulpitis were predominant causes, thus confirming the assertion that the anatomical relationship between the mesio-angularly impacted tooth and adjacent second molar tooth create stagnation area for the accumulation of food debris and formation of plaque which initiate the pathological processes.

Pell and Gregory classification [13] of impacted mandibular third molar is based on the amount of impacted tooth covered with bone of the mandibular ramus, and the depth of the impacted tooth compared with the height of the adjacent second molar tooth.

The class 1 relationship is when the mesio-distal diameter of the crown is completely anterior to the anterior border of the ramus while in class 2 the distal part of the tooth is covered with bone. However, the class 3 relationship presents when the tooth is completely embedded in the mandibular ramus. In class A impaction, the occlusal surface of the impacted tooth is level or nearly level with the occlusal plane of the second molar, while in class B the impacted tooth has its occlusal surface between the occlusal plane and cervical line of the second molar. In class C, the occlusal surface of impacted tooth is below the cervical line of the second molar. The degree of the difficulty of extraction increases as the thickness of the overlying bone and the depth of impaction increases. This classification has its short comings in clinical practice, although no single classification method is ideal in this regard. [8,9,18]

CONCLUSION

This study has shown that Crane pick dental elevator could serve as a useful substitute to dental drill for osteotomy in the extraction of mild mesio-angularly impacted mandibular third molars. The instrument is readily available, cheap, and can be useful in resource limited centres where availability of drill may be a problem.

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REFERENCES

1. Bouloux GF, Steed MB, Perciaccante VJ. Complications of third molar surgery. Oral Maxillofac Surg Clin North Am 2007; 19: 117-128.
2. Anyanechi CE. Management of alveolar osteitis: a comparative study of two-treatment techniques. J Contemp Dent 2013; 3: 11-14.
3. Tsai HH. Factors associated with mandibular third molar eruption and impaction. J Clin Pediatr Dent 2005;30: 109-113.
4. Jaffar RO, Tin-Oo MM. Impacted mandibular third molars among patients attending Hospital Universiti Sains Malaysia. Arch Orofac Sci 2009; 4: 7-12.
5. Osborn TP, Frederickson G, Small IA, Torgerson TS. A prospective study of complications related to mandibular third molar surgery. J Oral Maxillofac Surg 1985; 43: 767–769.
6. Msagati F, Simon EN, Owibingire S. Pattern of occurrence and treatment of impacted teeth at the Muhimbili National Hospital, Dar es Salaam, Tanzania. BMC Oral Health 2013; 13: 37-42.
7. Rakhshan V. Common risk factors for post-operative pain following the extraction of wisdom teeth. J Korean Assoc Oral Maxillofac Surg 2015; 41: 59-65.
8. Pederson GW. Oral surgery. Philadelphia: WB Saunder; 1988. (Quoted by Yuasa H, Kawai T, Sugiura M. Classification of surgical difficulty in extracting impacted third molars. Br J Oral Maxillofac Surg 2002:40: 26-31).
9. Freudlsperger C, Deiss T, Bodem J, Engel M, Hoffman J. Influence of lower third molar anatomic position on post-operative inflammatory complications. J Oral Maxillofac Surg 2012; 70: 1280-1285.
10. Azaz B, Teacher' S. Indications for removal of the mandibular impacted third molars. J Can Dent Assoc 1982; 48: 731-734.
11. Umar G, Obisesan O, Bryant C, Rood JP. Elimination of permanent injuries to the inferior alveolar nerve following surgical intervention of the "high risk" third molar. Br J Oral Maxillofac Surg 2013; 51:353-357.
12. Sanmarti-Garcia G, Valmaseda-CastellÓn E, Gay-Escoda C. Does computed tomography prevent inferior alveolar nerve injuries caused by lower third molar removal? J Oral Maxillofac Surg 2012; 70: 5-11.
13. Pell GJ, Gregory GT. Report on a ten-year study of a tooth division technique for the removal of impacted teeth. Am J Orthod Oral Surg 1942; 28: 660-669.

14. Contar CMM, Oliveira P, Kanegusuku K, Berticelli RS, Azevedo-Alanis LR, Machado MAN. Complications in third molar removal: A retrospective study of 588 patients. Med Oral Patol Oral Cir Bucal 2010; 15: e74-78.
15. Anyanechi CE, Saheeb BD. Nerve morbidity after mandibular third molar surgery: A prospective study of two cohorts of patients. J Neurol Neurosci 2015; 6: 43(1-5).
16. Findlay IA. The classification of dental elevators. Br Dent J 1960; 109: 219-223.
17. Kandler HJ. The design and construction of dental elevators. J Dent 1982; 10: 317-321.
18. Peterson RJ. Armamentarium for basic oral surgery. In: Peterson RJ, Ellis 111 E, Hupp JR, Tucker MR, ed.: Contemporary oral and maxillofacial surgery, St Louis: Mosby, 1993: 87-131.
19. Osborn TP, Frederickson G, Small IA, Torgerson TS. A prospective study of complications related to mandibular third molar surgery. J Oral MaxillofacSurg 1985; 43: 767–769.
20. Sigron GR, Pourmand PP, Mache B, Stadlinger B, Locher MC. The most common complications after wisdom-tooth removal: part 1: a retrospective study of 1,199 cases in the mandible. Swiss Dent J 2014; 124: 1042-1046.
21. Bui CH, Seldin EB, Dodson TB. Types, frequencies, and risk factors for complications after third molar extractions. J Oral Maxillofac Surg 2003:61: 1379-1389.
22. Blondeau F, Daniel NG. Extraction of impacted mandibular third molars: postoperative complications and their risk factors. J Can Dent Assoc 2007; 73: 325-329.
23. Conrad SM, Blakey GH, Shugars DA, Marciani RD, Phillips C, White RP. Patients' perception of recovery after third molar surgery. J Oral Maxillofac Surg 1999; 57:1288–1294.