

Comparative Study on Micromotor Assisted and Piezoelectric Device Assisted Surgical Removal of Impacted Mandibular Third Molars

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Abstract **Background:** To compare piezosurgery and micromotor assisted method for surgical removal of impacted mandibular third molar

Methods: Patients who visited RUHS College of Dental Sciences, Jaipur, Oral and Maxillofacial Surgery Department for surgical removal of impacted mandibular third molar were included in this study. The duration of the study took over from Jan 2019– Dec. 2020. Out of 100 patients 50 patients in each group were included in the study. All data were analyzed by Epi-info software.

Results: VAS score was significantly less in piezosurgery as compare to micromotor assisted at day 1,7 & 30 days after operation and mouth opening was significantly more in piezosurgery as compared to micromotor assisted.

Conclusion: Piezosurgery was found to be a good technique as compared to micromotor assisted. In piezosurgery pain and swelling were less as compared to micromotor assisted.

Keywords: Piezosurgery, Micromotor, VAS, Mouth opening.

INTRODUCTION

Dental caries is the most common oral disease followed by periodontal disease, where etiology is the microorganisms but in case of impaction the host itself is the causative factor. Studies in the past by Kramer et al¹ states that maxillary third molar is commonly impacted (62.57%) than the mandibular third molar (47.44%). Impaction of mandibular third molar is more symptomatic and disturbs an individual's routine. Third molars are the teeth that are often congenitally missing which could be attributed to the evolutionary changes affecting the jaw and teeth size and also changes in the dietary habits.^{2,3}

Surgical removal of the impacted lower third molar requires a good dental surgeon with adequate skill. In the past, chisel, osteotome, and mallet were used to split bone and tooth. This was time-consuming with indiscriminate malleting of bone leading to disastrous consequences, and hence surgeons now prefer rotatory cutting instruments. Electricity driven drills at a speed of 35000-40000 rpm was a fast way to remove adequate bone, easy to learn, and provide a reasonable amount of control over the amount of bone removed. Over time, further studies on this technique showed that irregular bony surfaces and marginal osteonecrosis occurred

due to the high temperature produced during bone drilling.⁴

Piezosurgery as an alternative technique for bone guttering (or ostectomy) was first developed by Tomaso Vercellotti (1988), to overcome the drawbacks of the rotatory cutting instrument.⁵ This technique modified and improved upon the conventional ultrasonic method and proved to have better-wound healing capacity and bone formation in histological and histomorphometric studies⁶

A meta-analysis on the comparison between these two methods of ostectomy showed that the focus of the studies was primarily on postoperative sequel and complications. However, the piezosurgical unit offers benefits to the surgical assistant as well, apart from the surgeon and the patient. With an attached irrigation system and an illumination at the tip of the instrument, visualization is improved.⁷

MATERIAL AND METHODS

Patients who visited RUHS College of Dental Sciences, Jaipur, Oral and Maxillofacial Surgery

Department for surgical removal of impacted mandibular third molar was included in this study.

The duration of the study took over from Jan 2019–Dec. 2020. Out of 100 patients 50 patients in each group were included in the study.

INCLUSION CRITERIA

Impacted teeth with full root formation, persistent pericoronitis.

Patient's age between 18 to 60 years.

EXCLUSION CRITERIA

Poor motivation to return for follow up visit

Patients with any systemic diseases like uncontrolled diabetes and blood disorders

Smokers

Alcoholics

Drug abusers

Patients with acute pericoronitis, abscess

Oral submucous fibrosis

Patient on immunosuppressive drugs

Patient who underwent Radiation therapy

Pregnancy



Figure:1 Piezosurgical Unit with Handpiece (DTE by Woodpecker)

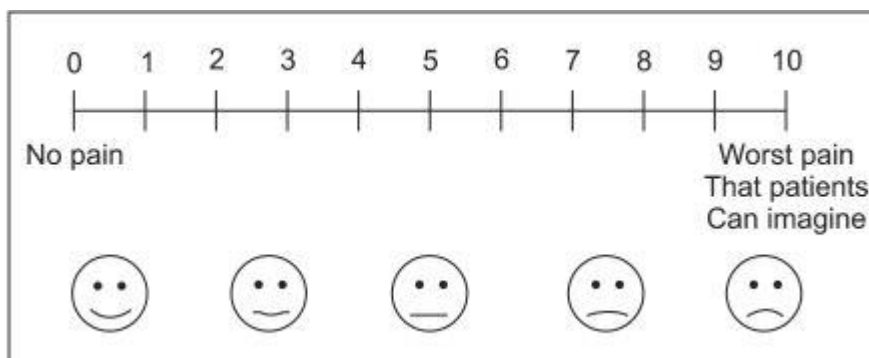


Figure:2 VAS SCALE

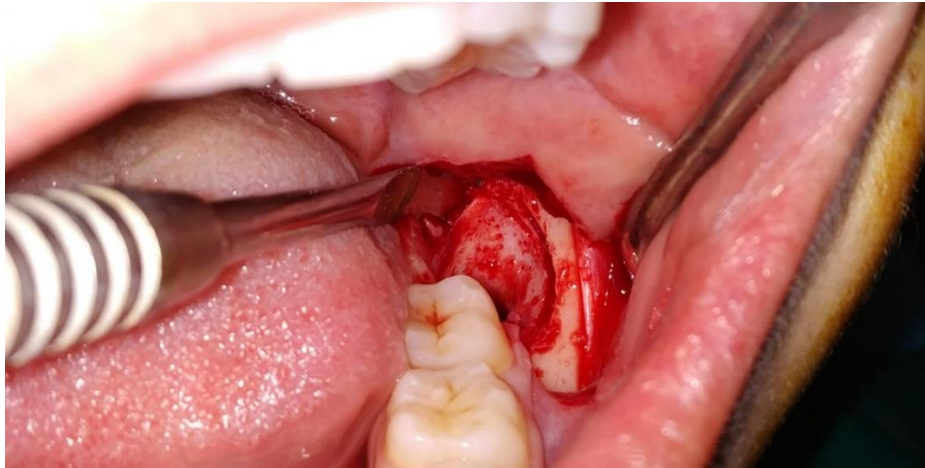
DATA COLLECTION

Pre-procedure mouth opening, was measured and noted. Time taken for the procedure, from time of the first incision to placing the last suture was

noted. Soft tissues adjacent to the surgical site were evaluated for intraoperative damage such as bleeding from tissue edges, mucosal burns/abrasions, exposure of inferior alveolar canal

(nerve / vessel) / lingual nerve. Soft tissue status post-operatively was evaluated such as minimal, moderate and severe. Evaluation for the dry socket or wound breakdown was done from postoperative day 3. Postoperatively, patients were reviewed on

postoperative day 1, 7 and 30 as per department protocol. Sutures were removed on day 7. Pain and mouth opening were reviewed in each follow-up visit of patients.



DATA ANALYSIS

All the analysis was done using Epi-info Software. A p-value of <0.05 was considered statistically significant.

RESULTS

The socio-demographic variable in both groups were comparable.

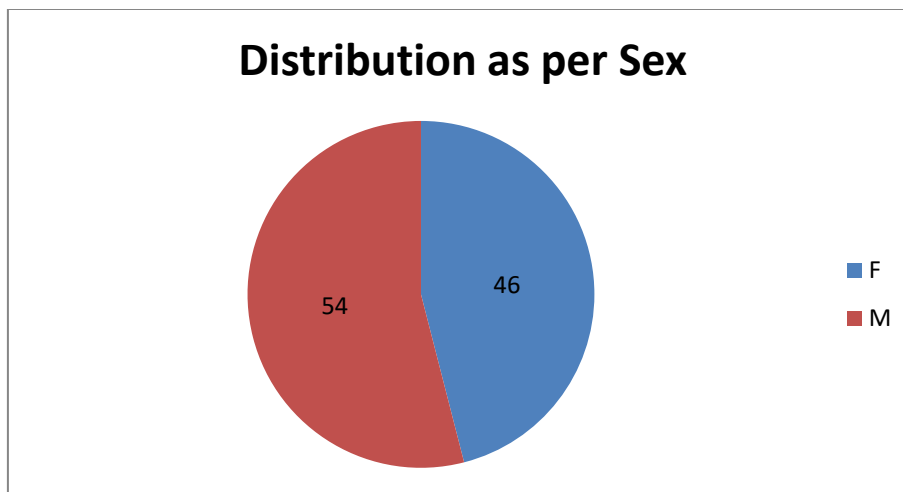


Table 1 Comparison of mean VAS scores between Piezosurgery and micro-motor assisted groups.

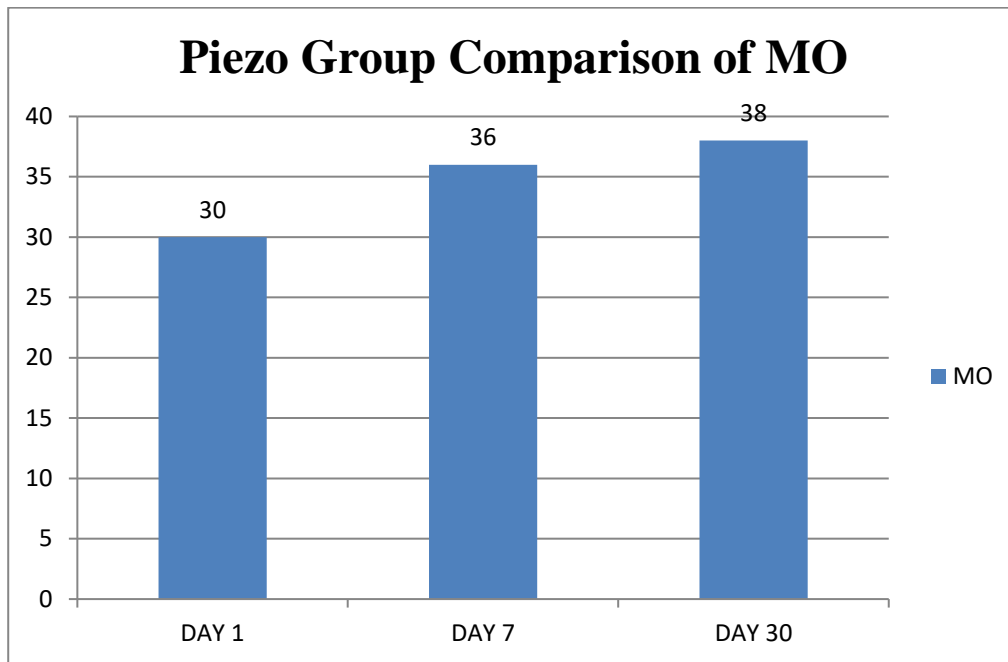
VAS score at	Piezosurgery	Micromotor assisted	p-value
Day 1	3.02±0.91	5.02±1.37	0.01
Day 7	1.84±0.54	3.70±1.23	0.01
Day 30	1.16±0.37	1.54±0.61	0.01

In present we found that VAS score was significantly less in piezosurgery as compare to micromotor assisted.

Table 2 Comparison of mouth opening between Piezosurgery and micro-motor assisted groups.

Mouth opening	Piezosurgery	Micromotor assisted	p-value
Day 1	30.46±2.67	27.48±2.60	0.01
Day 7	36.16±2.81	31.26±2.79	0.01
Day 30	38.64±2.53	36.2±2.35	0.01

In present we found that mouth opening was significantly more in piezosurgery as compare to micromotor assisted.



DISCUSSION

Piezosurgery is a safe and promising modality for ostectomy and osteotomies. The technology, although discussed decades ago, was not actively perused for bone cutting purpose. In the year 2000, some authors helped renew interest in this method, and since then, clinicians had used the piezosurgical unit for varied purposes, especially when soft tissue preservation and minimal bone cutting was required.⁸

This study we compare the use of a micromotor assisted with piezosurgery for surgical extraction of lower third molars.

Post - operative outcome is better in the piezosurgery group than the micromotor assisted group following impaction. Low bone injury with haemostasis is the character of piezosurgery that reduces the edema. Decreased post - operative sequelae like reduced pain, swelling and edema reported in the piezosurgery group after third molar removal which improves the post-operative outcome. Swelling is reported more in the bur technique. The number of analgesics taken is also reduced in the piezosurgery group. It improves the

cellular reactivity in the traumatized mineralized tissue and favours bone healing.⁹

There is increased cut precision with intra operative control. With preservation of the soft tissue piezosurgery cuts only the mineralized tissue. It also allows the surgeon to work in direct contact with the schneiderian membrane. Removal of impacted third molar should maintain the integrity of the adjacent tooth. It should not cause root exposure or pulpal necrosis of second molar. For that, a precise technique should be used which is used to remove the teeth but without hampering the adjacent tooth.¹⁰

Within the limitations of this study, piezosurgery had lower unfavorable post-operative sequelae. A more extensive study with larger sample size, and with increased difficulty of the surgical procedure will help us validate the findings of this study and establish if one technique is truly superior to the other.

CONCLUSION

Piezosurgery was found to be a good technique as compared to micromotor assisted with lesser surgical time. In piezosurgery postoperative pain was less as compared to micromotor assisted.

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