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RESEARCH ARTICLE

# COMPARATIVE OF PIEZOELECTRIC AND CONVENTIONAL OSTEOTOMY FOR LOWER THIRD MOLAR IMPACTION EXTRACTION WITH SUBMUCOSAL DEXAMETHASONE INJECTION

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## Abstract

**Background and aim**: The most common procedure performed in the outpatient setting in maxillofacial surgery practices is the extraction of impacted third molars. This technique often requires incision, flap reflection, and bone removal, which causes tissue stress and involves large amounts of connective tissue and blood vessels in the third molar area. The aim of this study was to examine decompression surgery and the rotary technique alone and to evaluate the combined effect of decompression surgery and conventional osteotomy with submucosal dexamethasone injection on the sequelae after surgical extraction of impacted mandibular third molars.

**Methodology:** With a sample of sixty individuals, a randomized controlled clinical trial was carried out. Four groups of fifteen participants each were created: Group 1 was for conventional rotatory therapy; Group 2 was for conventional rotatory therapy plus a 4 mg dose of dexamethasone following surgery; Group 3 was for piezosurgery; and Group 4 was for piezosurgery plus a 4 mg dose of dexamethasone following surgery. The surgical working time was determined in minutes, the maximum mouth opening was measured in millimeters at baseline and on the second, fifth, and seventh day using a Vernier Caliper, and the postoperative pain was quantified using a Visual Analog Scale (VAS) every day for the first week.

**Result:** A study involving 36 women and 24 men aged 21-32 years performed a procedure involving impacted lower third molars, with a 100% success rate. All patients showed soft tissue healing without serious events or infection. Pain levels were greater in group 3 (3.7 degrees) and lower in group 2 (2.6 degrees). No significant differences were found in pain levels of dexamethasone injection among the four groups.

**Conclusion:** The use of submucosal dexamethasone injection with conventional and electrosurgical osteotomy is beneficial for alleviating post operative complication after removal of impacted third molar surgery.

**Keywords:** Conventional osteotomy, dexamethasone, extraction, piezoelectric osteotomy, third molar impaction.

## INTRODUCTION

The most frequent outpatient operation performed in maxillofacial surgery practices is the extraction of impacted third molars. Incision, flap reflection, and bone removal are frequently required for this surgery, which might result in tissue trauma because the third molar region contains a large quantity of connective tissue and blood arteries. Trauma related to surgery sets off an inflammatory chain reaction that causes biological reactions in the tissues, including edema, trismus, and discomfort[1,2]. Following surgery, these post-operative sequelae cause discomfort for the patient, which lowers their quality of life[3]. Several treatment plans have been put forth in an effort to avoid or reduce third molar surgery-related post-operative complications. Among these, corticosteroids are regarded as a well-researched and generally acknowledged pharmaceutical adjunct therapy regimen for averting problems following third molar surgery.

Their mode of action relies on reducing edema, trismus, and post-operative discomfort while inhibiting inflammation[1,4]. Dextamethasone (dex), a synthetic analogue of prednisolone with strong anti-inflammatory properties 20–30 times stronger than natural corticosteroids, is the most widely utilized corticosteroid type in oral surgery[5,6]. Several literature studies have examined the delivery of dex using various techniques in third molar surgery, with positive results reported. Over the best clinical outcomes, there is still disagreement over the time, methods, and dosages of dex[3,7,8]. High-speed surgical hand parts are frequently utilized in third molar surgical operations since the procedure requires the removal of bone. Nevertheless, these tools invariably produce heat and uneven bone surfaces, which exacerbate post-operative discomfort[9]. Ultrasonic devices have surfaced as a substitute for traditional surgical instruments in order to address these drawbacks[10]. Micro vibration piezosurgery devices offer a less invasive, more accurate method of cutting bones while causing minimum bleeding and injury to the surrounding tissues. Therefore, if this approach was chosen as the surgical option, the likelihood of problems would be significantly decreased[9,11].

The topic of the current study has not been studied before in Yemen, but there have been studies on surgical site infection[12], mandibular canal anatomy and the location of its holes in a sample of Yemeni patients[13], the prevalence of temporomandibular joint disorders[14], dystonia of the mandibular musculature[15], interleukin-1 beta levels in the human gingival sulcus[16], the impact of dental implants on the colonization of aerobic bacteria in the oral cavity[17], deep bite malocclusion[18], resolving factors and the extraction pattern of permanent teeth in dental clinics[19], Porphyromonas gingivalis[20], and the antimicrobial activity of sodium hypochlorite, nanosilver, and chlorhexidine against monospecific biofilms of specific oral microorganisms[21].

The current retrospective clinical study aimed to compare the effectiveness of piezo surgery devices versus conventional surgical instruments in terms of post-operative discomfort and to examine the effects of sub-mucosal dex injections on post-operative discomfort among patients who had undergone mandibular third molar surgery.

## MATERIALS AND METHODS

**Study design:** It was a split-mouth, prospective, randomized research. Every patient was divided into four groups at random (1:1). The assignment of the interventions was hidden from the participants. The allocation concealment of the researcher delivering the interventions was not used because of the variations across the four approaches.

**Study Area:** The study was carried out in the oral and maxillofacial surgery clinic in the Faculty of dentistry Sana'a university.

**Study population :** Patients who met the inclusion and exclusion criteria and visited the dental clinic at the Faculty of Dentistry Sana'a University for surgical extraction of a bilateral lower third molar between 2023 and 2024 were eligible to participate. These patients were divided into four groups at random:

**Group 1 (Control):** Osteotomy performed surgically without the use of dexamethasone injection, with standard rotatory devices.

**Group 2:** Post-operative submucosal dexamethasone injection after surgical extraction utilizing traditional rotatory instruments to accomplish osteotomy.

**Group 3:** Piezosurgery-based surgical extraction performed without a dexamethasone injection.

**Group 4:** Post-surgery 4 mg submucosal dexamethasone injection after surgical extraction utilizing Piezosurgery technology; it was found that the sample needed a minimum of 30 individuals, 15 in each group.

**Sample size:** The sample size was 30 patients, calculated was similar to a previous study conducted by Arakji *et al.*[22].

**Inclusion criteria:1:** individuals in the age range of 20 to 35. 2: The existence in every participant of impacted lower third molars that are bilateral and symmetrically directed and require extraction for orthodontic or preventive purposes. 3: A minimum of one third molar, completely or partially impacted, requiring surgical extraction (or at the very least, requiring an osteotomy and flap incision); 2 mm. 4: The patient who consents to take part in the research. 5: Patients with decent oral hygiene.

**Exclusion criteria:** Patient with sever pericoronities, individual who is older than 40 years old, individual who has a sever periodontal diseases, individual with a medically compromised condition that makes surgery not an option, and smoker patients.

**Data collection**: Every patient had a clinical evaluation, and all data was gathered and entered into a data collection sheet, also known as a case sheet, which was intended to have a methodological recording. Before the procedure, the inter-incisal distance was measured using a caliper. From the first day of the procedure to the seventh, each patient was monitored. The inter-incisal distance was measured and the swelling was assessed on the second, fifth, and seventh day. From the first day of surgery until the seventh, each patient was asked to report the level of pain. Every side was removed at a separate visit.

**Surgical management:**

**Preoperative assessment:** The medical history was reviewed for previously undiscovered systemic issues. The operator measured the maximum mouth opening (mm) with a Vernier caliper as the distance between the upper and lower incisors.

**Surgical technique**: The same trained surgeon extracted the impacted mandibular third molar teeth from each patient, and the length of each procedure was also noted (from the point of incision to the final suture). In order to prepare the surgical site of the impacted third molar for the treatment, regular saline irrigation was applied. Under local anesthetic, the inferior alveolar, lingual, and buccal nerves were blocked using 1.8 ml cartridges containing 2% lidocaine and 1:100.000 epinephrine for the surgical procedure. The flap was created by making an incision

using a number 15 scalpel blade. Using a periosteal elevator, the full-thickness fap exposes the affected tooth and surrounding bone. With generous amounts of normal saline irrigation, bone was removed from the occlusal and buccal portions of the teeth for groups 1 and 2 using a straight handpiece with sufficient speed and torque. Extraction for groups three and four: OT7 inserts were utilized in conjunction with a piezosurgery instrument (PIEZOSURGERY® touch, MECTRON Medical Technology, Italy) to remove bone surrounding the impacted teeth. The micro-vibration amplitude was tuned between 35 and 55 μm/s, while the frequency was modified between 25 and 35 kHz. In order to remove the impacted tooth with the least amount of bone stress, the least amount of tooth separation and bone guttering was performed. A thorough debridement was completed following the extraction of impacted teeth. Any jagged edges of bone were smoothed with a bone file. Next, regular saline was used to clean the socket. After that, a 3-0 black silk interrupted suture was used to seal the flap. Seven days following surgery, the suture was removed. A disposable syringe was used to inject 4 mg of submucosal dexamethazone into groups 2 and 4.

**Variables of the study:**

**The inter-incisal distance:** Every patient checks for any limitations on their ability to open their mouths, but none of them have any. On the second, fourth, and seventh days following the procedure, the inter-incisal distance was measured and recorded in centimeters (cm).

**Pain level:** By responding to questions over the course of the seven postoperative days, the patient's level of discomfort was ascertained using a visual analog scale. Every response had one of the following numbers: 0 indicates no pain; 1=very little discomfort; 2=little discomfort during eating; 3=excruciating pain that keeps you from sleeping.

**Swelling:** Swelling was examined in the 2nd day, 5th day, and 7th day after the surgery, in which each category had a number as follows: 0=no swelling, 1= mild swelling, 2=moderate swelling, and 3=severe swelling.

**Statistical method:** Information provided with suitable descriptive statistics (P-value, mean, frequency, and standard deviation). Excel 2010 and the Statistical Package for Social Science (SPSS) version 26 were used for all statistical analysis of the data. wherein they were recorded and added to SPSS for analysis following data collection.

**Ethical Approval:** Ethical approval was obtained from the Medical Ethics Committee of the Faculty of Dentistry, Sana'a University, No.: 24-2023, dated 1-1-2023, and the confidentiality of all data, including the patient's identity, was maintained.

## RESULTS

The total sample included 36 women (60%) and 24 men (40%). The age of the study patients ranged from 21 to 32 years, with the mean age being 23.9±3.09 in group 1, 24.3±3.31 in group 2, 23.9±3.09 in group 3, and 24.3±3.31 in group 4 (Table 1). The duration of surgical operations ranged from 23 to 55 minutes, and the mean operating time was 27.5±2.36 minutes in group 1, 29.3±2.57 minutes in group 2, 35.2±5.92 minutes in group 3, and 36.2±7.38 minutes in group 4 (Table 3).

**Table 1: Age and gender distribution of patients participated on the study.**

| | Group 1 n=15 | Group 2 n=15 | Group 3 n=15 | Group 4 n=15 |
|---|---|---|---|---|
| Age (Mean±SD) | 23.9±3.09 | 24.3±3.31 | 23.9±3.09 | 24.3±3.31 |
| Gender n (%) | | | | |
| Male | 6 (40%) | 6 (40%) | 6 (40%) | 6 (40%) |
| Female | 9 (60%) | 9 (60%) | 9 (60%) | 9 (60%) |

**Table 2: Distribution of participated patients by type of impaction.**

| | Group 1 n=15 | Group 2 n=15 | Group 3 n=15 | Group 4 n=15 | *p* value |
|---|---|---|---|---|---|
| Type of impaction n (%) | | | | | |
| Mesioangular | 7 (46.7%) | 7 (46.7%) | 7 (46.7%) | 4 (26.7%) | |
| Horizontal | 6 (40.0%) | 7 (46.7%) | 5 (33.3%) | 6 (40.0%) | 0.597 |
| Vertical | 2 (13.3%) | 1 (6.7%) | 3 (20.0%) | 5 (33.3%) | |

**Table 3: Surgical working times by minute for the 4 different techniques.**

| | Group 1 n=15 | Group 2 n=15 | Group 3 n=15 | Group 4 n=15 | *p* value |
|---|---|---|---|---|---|
| Working time in minutes (Mean±SD) | 27.5±2.36 | 29.3±4.57 | 35.2±5.92 | 36.2±7.38 | 0.000* |

With the effective extraction of every affected lower third molar, the procedure's success rate was 100%. Between the first postoperative day and the seventh postoperative day, every patient underwent a thorough clinical evaluation. Every patient exhibited soft tissue healing without any significant complications or infections.

Differences in pain levels by group on different postoperative days (Figure 1). Pain levels were greater in group 3 than the other groups, with the mean pain levels in group 3 being (3.7 degrees). While pain levels were lower in group 2 with a mean of (2.6). There were statistically significant differences in pain levels on day 4 among the four groups, with a probability value (*p*)

of (0.001). Pain levels were greater in group 3 than the other groups, with the mean pain levels in group 3 being (2.7 degrees). Group 4's pain threshold was (1.6 degrees), however. For the approach on days 1, 2, 4, 5, 6, and 7, there were no statistically significant differences in pain levels across the four groups.

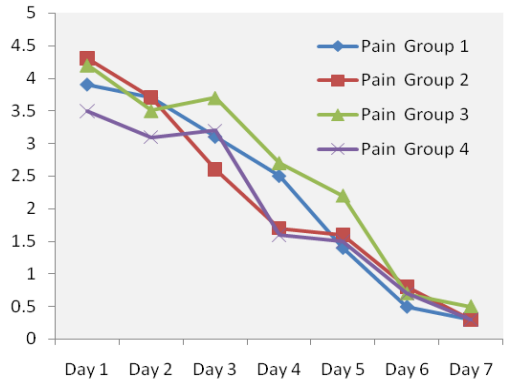


**Figure 1: The pain scores by groups.**

On day three, however, there were differences between the four groups that were statistically significant ($p$=0.008). Pain levels in the piezo surgery technique were significant (3.4 degrees). While pain levels in the conventional technique were lower with an average (2.8 degrees) (Figure 2).

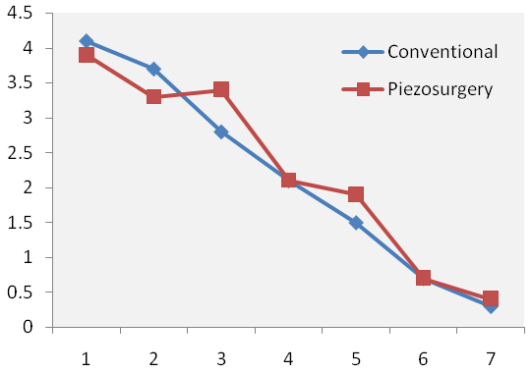


**Figure 2: The pain scores by technique.**

There were no statistically significant differences in the pain level of dexamethasone injection on day 1, day 2, day 5, day 6, and day 7 among the four groups, while there were statistically significant differences on day 3 among the four groups with a $p$ value of (0.049).

Pain levels without dexamethasone were greater (3.4 degrees), while pain levels with dexamethasone were lower on average (2.9 degrees). There were statistically significant differences in pain level of dexamethasone injection on day 4 among the four groups ($p$<0.0001). Pain levels without dexamethasone were greater (2.6 degrees), while pain levels with dexamethasone were lower on average (1.7 degrees) (Figure 3). The first group experienced a decrease in pain from (3.9 degrees) on the first day to (0.3 degrees) on the seventh day, with statistically significant differences in pain levels ($p$<0.0001). As the pain dropped from (4.3 degrees) on the first day to (0.3 degrees) on the seventh, there were statistically significant differences in the second group's pain level ($p$<0.0001).

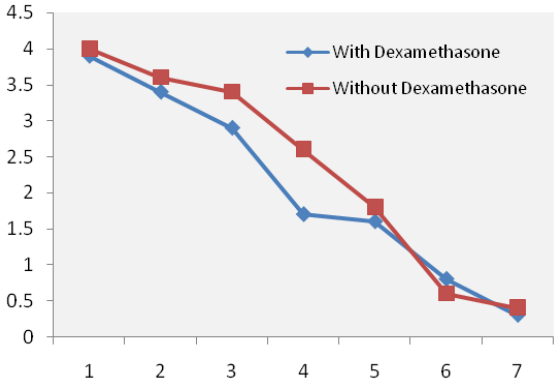


**Figure 3: The pain scores by dexamethasone injection.**

As the pain decreased from (4.2 degrees) on the first day to (0.5 degrees) on the seventh, there were statistically significant differences in the third group's pain level ($p$<0.0001) (Table 4). Pain decreased from (4.1) on day 1 to (0.3) on day 7 for the conventional technique ($p$<0.0001). There were statistically significant differences in pain level in the piezo surgery technique ($p$<0.0001). Pain decreased from (3.9) on day 1 to (0.4) on day 7 (Table 5). There were statistically significant differences in pain level with the use of dexamethasone ($p$<0.000), as pain decreased from (3.9) on the first day to (0.3) on the seventh day, and pain decreased in patients who did not use dexamethasone from (4.0) on the first day to (0.4) on the seventh day ($p$<0.0001).

**Table 4: The pain scores by groups at different post-operative days**

| Days | Pain scores by group | | | | |
|---|---|---|---|---|---|
| | Group 1 n=15 | Group 2 n=15 | Group 3 n=15 | Group 4 n=15 | *p* value[b] |
| Day 1 | 3.9 ±1.3 | 4.3±1.5 | 4.2±1.6 | 3.5±1.1 | 0.423 |
| Day 2 | 3.7±1.1 | 3.7±1.1 | 3.5±0.9 | 3.1±1.2 | 0.467 |
| Day 3 | 3.1±0.3 | 2.6±1.1 | 3.7±1.0 | 3.2±0.6 | 0.012* |
| Day 4 | 2.5±0.8 | 1.7±1.0 | 2.7±0.5 | 1.6±1.1 | 0.001* |
| Day 5 | 1.4±1.6 | 1.6±1.6 | 2.2±1.4 | 1.5±1.5 | 0.450 |
| Day 6 | 0.5±1.2 | 0.8±1.2 | 0.7±1.2 | 0.7 ±1.1 | 0.902 |
| Day 7 | 0.3±0.9 | 0.3±0.7 | 0.5±1.2 | 0.3±0.8 | 0.915 |
| *p* value [b] | < 0.001 | < 0.001 | < 0.001 | < 0.001 | |

[a] Mann-Whitney Test, [b] Kruskal Wallis test; $p$ value less than 0.05 was considered significant

**Table 5: The effect of techniques on the pain scores.**

| Days | Technique | | |
|---|---|---|---|
| | Conventional | Piezosurgery | *p* value[a] |
| Day 1 | 4.1±1.4 | 3.9±1.4 | 0.495 |
| Day 2 | 3.7±1.1 | 3.3±1.1 | 0.200 |
| Day 3 | 2.8±0.8 | 3.4±0.8 | 0.008* |
| Day 4 | 2.1±1.0 | 2.1±1.0 | 0.833 |
| Day 5 | 1.5±1.5 | 1.9±1.5 | 0.371 |
| Day 6 | 0.7±1.1 | 0.7±1.1 | 0.866 |
| Day 7 | 0.3±0.8 | 0.4±1.0 | 0.686 |
| *p* value[b] | < 0.001 | < 0.001 | |

[a] Mann-Whitney Test, [b] Kruskal Wallis test; *p* value less than 0.05 was considered significant

**Table 6: The effect of dexamethasone injection in pain score.**

| Days | Dexamethasone Injection | | *p* value[a] |
|---|---|---|---|
| | With Dexamethasone | Without Dexamethasone | |
| Day 1 | 3.9±1.3 | 4.0±1.5 | 0.780 |
| Day 2 | 3.4±1.2 | 3.6±1.0 | 0.465 |
| Day 3 | 2.9±0.8 | 3.4±0.8 | 0.049* |
| Day 4 | 1.7±1.0 | 2.6±0.7 | 0.000* |
| Day 5 | 1.6±1.5 | 1.8±1.5 | 0.506 |
| Day 6 | 0.8±1.1 | 0.6±1.1 | 0.507 |
| Day 7 | 0.3±0.7 | 0.4±1.0 | 0.642 |
| *p* value[b] | < 0.001 | < 0.001 | |

[a] Mann-Whitney Test, [b] Kruskal Wallis test; *p* value less than 0.05 was considered significant

Group 1 saw higher amounts of swelling than the other groups, with group 3 having the highest mean of (1.9). Group 4 had reduced swelling, with a mean of (1.3)
The *p*-value for the technique was above the significance level of 0.05, indicating that there were no changes in swelling levels between the four groups that were statistically significant on all days (Figure 4).

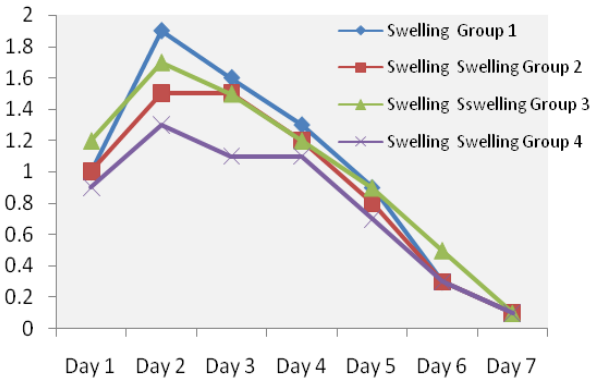


**Figure 4: The swelling scores by groups.**

On the first, third, fourth, fifth, sixth, and seventh days following a dexamethasone injection, there were no statistically significant differences between the four groups; however, on the second day, there were statistically significant differences between the four groups, with a probability value (*p*) of (0.004) (Figure 5). Swelling levels without dexamethasone were greater (1.8), while swelling levels with dexamethasone were lower on average (1.4) (Figure 6). Figure 7 shows the differences in muscle spasm levels (trismus) by group on different postoperative days. There were no statistically significant differences in muscle spasm levels on all days among the four groups ($p>0.05$).

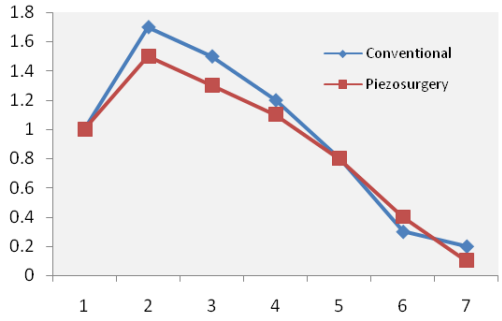


**Figure 5: The swelling scores by technique.**

There were no statistically significant differences in the level of humeral spasm for the technique on all days among the four groups ($p<0.05$) (Figure 8). There were no statistically significant differences in the level of muscle spasm after injection with dexamethasone compared to injection without dexamethasone on all days for the four groups ($p>0.05$), but there was a significant decrease in muscle spasm over the days (lowest level on day 7 for both techniques) (Figure 9).

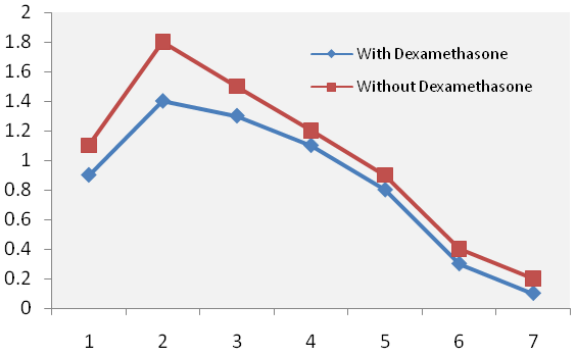


**Figure 6: The swelling scores by dexamethasone injection.**

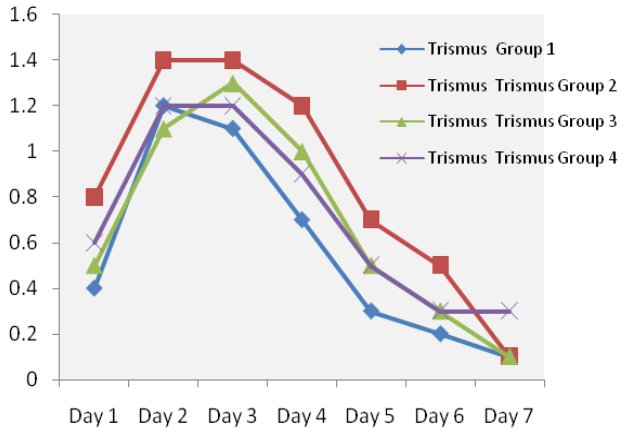


**Figure 7: The trismus scores by groups.**

## DISCUSSION

This topic was chosen due to the lack of previous research in Yemen on the application of piezo versus motor injections after lower third molar surgery, common complications in Yemeni society due to Qat chewing habits, and the high prevalence of impacted third molar surgery in dental clinics. In the current study, the mean time for piezo surgery was 35.7 min, while the mean time for conventional rotary surgery was 28.4 min ($p$<0.0001).

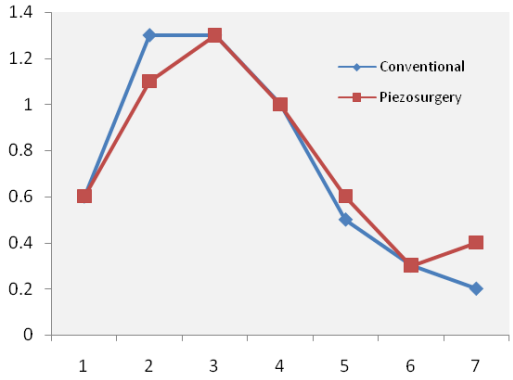


**Figure 8: The trismus scores by technique.**

These results are similar to those reported by Jiang *et al*., where the time was shorter with the conventional rotary method versus longer with piezo surgery[23]. The same results were also reported by Arakji *et al*., in 2016 (28.5±3.57 min for piezo surgery versus 17.6±2.95 min for the rotary group ($p$=0.0001)[24]. The greater time consumption of piezo surgery is due to the lower effectiveness of piezo in cutting the bone and the lower hand power and speed in cutting.

While there are statistically significant differences on day 3 ($p$=0.012) between the four groups, there are no statistically significant differences in pain levels between the groups on days 1, 2, 5, 6, and 7 of the current study. Group 2 (surgical extraction using conventional rotatory tools to perform osteotomy with 4 mg submucosal dexamethasone injection post surgery) had lower pain levels than the other groups, with a mean of 2.6 degrees. Group 3 (surgical extraction using the Piezosurgery technique without dexamethasone injection) had higher pain levels than the other groups, with a mean of 3.7 degrees. These findings are similar to the result of Nehme *et al*.[25]. while Nehme *et al*.[25], found the route of administration of dexamethasone was by muscular administration. Our results show the advantage of submucosal dexamethasone injection in reducing postoperative pain following third molar surgical extraction.

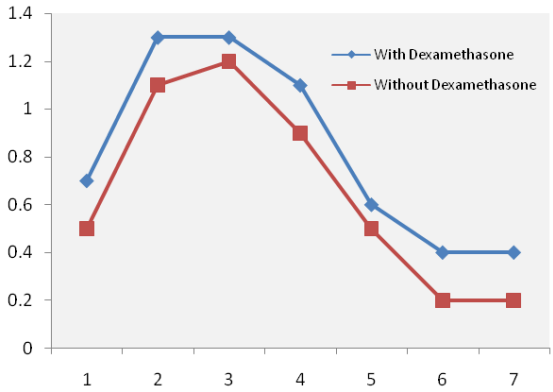


**Figure 9: The trismus scores by dexamethasone injection.**

There are no statistically significant differences in the level of pain for technique on day 1, day 2, day 4, day 5, day 6, and day 7 between the four groups. While statistically significant differences were found on day 3 between the four groups ($p$=0.008). The pain levels in piezosurgery technique were larger at 3.4 degrees, and this may be returning to the long duration of surgery, as reported by Rullo *et al*.[23]. Another clinical study published by Goyal *et al*.[26], suggested patients in the piezotome group had significantly less pain than those in the conventional group. Between the four groups, there are no statistically significant variations in the degree of pain experienced following a dexamethasone injection on days 1, 2, 5, 6, and 7. On day three, however, there were differences between the four groups that were statistically significant ($p$=0.049). Without dexamethasone, pain levels in the current trial were higher than those with it (3.4 degrees). This outcome is comparable to that of Mojsa *et al*.[27], s study, which found that patients who got dexamethasone following surgery felt much less pain overall compared to those who received the medication before to the procedure and those who were given a placebo. The variation of pains in the different studies might be explained by the fact that ways to measure pain are subjective because they are related to patient pain thresholds, tolerance levels, emotional states, and cultural backgrounds[28].

The degree of swelling on days 1, 3, 4, 5, 6, and 7 does not differ statistically significantly among the four groups in the present investigation. Day 2 revealed statistically significant differences ($p$=0.009) throughout the four groups. While Group 4 in the current study had a mean swelling level of 1.3, this result is similar to that reported previously, where the conventional technique resulted in more swelling, particularly on day[23]. This highlights the benefit of submucosal dexamethasone injection in reducing the

swelling postoperatively, as reported by Markovic and Todorovic[29] and Aurora *et al.*[30].

In the current study, there are no statistically significant differences in the level of swelling for the different techniques on all days between the four groups. This result is similar to that reported by Menziletoglu *et al.*, in which piezo surgery did not provide a superiority over conventional methods[31]. In the current study, there were statistically significant differences found on day 2 between the four groups in the level of swelling for dexamethasone injection ($p$=0.004). The swelling levels without dexamethasone were larger (1.8). While swelling levels with dexamethasone were less with a mean of 1.4. This result is similar to that of several studies[32-35]. This result emphasizes the benefit of submucosal dexamethasone injection on postoperative sequale, and all patients who received dexamethasone submucosally post-extraction feel more comfort than the other control group.

In the current study, there were no statistically significant differences in the level of muscle spasm of the technique on all days among the four groups. This is similar to the three findings of Piersanti *et al.*[36], Barone *et al.*[37], and Mantovani *et al.*[38], who evaluated mouth opening in both the conventional rotary instrument group and the compression surgery group at 1 week postoperatively, indicating that mouth opening was significantly better in the compression surgery group on the first postoperative day with no discrepancy and no statistically significant differences between the two groups at 5 and 7 days postoperatively. Similar to studies by Graziani *et al.*[39], and Grossi *et al.*[40], which both reported a significant reduction in edema in the immediate postoperative period compared to controls but only a limited effect on muscle spasm, the current study found no statistically significant differences in the level of muscle spasm following dexamethasone injection on all days between the four groups. It's possible that because dexamethasone was injected submucosally at the site of injury, there was no discernible decrease in muscle spasm as a result of this observation. Steroids, however, do not directly affect muscular contraction[41]. According to other research, submucosal injection of dexamethasone (4 mg) significantly reduced jaw spasm on the second postoperative day when compared to the control group, but no significant reduction was observed on the other postoperative days[35,42]. All studies showed a significant reduction in swelling and discomfort following third molar operations when submucosal dexamethasone was given, but no improvement in jaw spasm[43]. The anterior fibers of the temporalis muscle, which attach to the anterior border of the ramus and extend to the posterior molar region, may have been injured as a result of jaw spasm following third molar surgery.

**Limitation of the study**

The main limiting factors of this study were the small sample size and lack of details about the operations and post-operative complications. A digital swelling scale was not used, which might provide more accurate data.

## CONCLUSIONS

Longer piezo surgery time increases the degree of complications, and the use of submucosal dexamethasone with two techniques of conventional osteotomy and piezo surgery reduces postoperative complications for bilateral impacted lower third molar extraction. Further studies with larger sample size and more details are needed. Also, the use of a digital swelling scale could provide more accurate data.

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## AUTHOR'S CONTRIBUTION

**Senan SEDA:** writing original draft, methodology, investigation. **Al-Shamahy HA:** formal analysis, data curation, conceptualization. **Farhan AHT:** writing, review and editing, methodology. **Shareef AAM:** formal analysis, data curation, conceptualization. All authors reviewed the article and approved the final version of the article.

## DATA AVAILABILITY

The accompanying author can provide the empirical data that were utilized to support the study's conclusions upon request.

## CONFLICT OF INTEREST

There are no conflicts of interest in regard to this project.

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