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# Submucosal Hydrocortisone versus Dexamethasone in Lower Third Molar Surgery

## A Randomized Double-Blind Clinical Trial

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## Abstract

A randomized, double-blind, controlled clinical trial was conducted in 30 patients undergoing impacted mandibular third molar surgery. The patients were split into three groups of 10 at random. Group A received a submucosal injection of hydrocortisone 50 mg in 1 mL, and following, the establishment of local anesthetic. Group B received a submucosal injection of dexamethasone 4 mg/mL. Group C (the placebo group) was given a submucosal injection of normal saline. Postoperative sequelae were assessed on the second and seventh days after surgery. Thirty patients were equally allocated to the hydrocortisone, dexamethasone, and placebo groups, comparable at baseline. Pain, facial swelling, and trismus improved significantly over time in all groups, but on days 2 and 7 outcomes were best with dexamethasone, intermediate with hydrocortisone, and worst with placebo ($P < 0.001$). Analgesic consumption was lowest with dexamethasone (50% required none) and highest with placebo ($P = 0.034$), and day 7 wound healing was significantly better with dexamethasone than with hydrocortisone or placebo ($P < 0.001$). Submucosal corticosteroids reduced postoperative pain, swelling, and trismus after impacted mandibular third molar surgery, with dexamethasone consistently more effective than hydrocortisone.

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### Introduction

The phenomenon of inflammation after the surgical removal of impacted mandibular third molars play a vital role in postoperative healing. Despite the prevalence of the procedure in dentistry, postoperative sequelae and complications are not uncommon. Common sequelae of mandibular third molar surgery include swelling, trismus, and pain. The extent and severity of postoperative inflammation are influenced by numerous factors, including an individual's physiological response to the surgical procedure, the degree of impaction, the duration of the surgery, and the extent of tissue trauma or manipulation during the procedure [1].

Methods have been described to reduce post-operative sequelae: pharmacologic (corticosteroids, hyaluronic acid, serropeptidase) or nonpharmacologic (cold packs, corrugated drains). Corticosteroids have been studied most extensively due to their efficacy in controlling inflammatory complications and There is a broad discussion about the best drug to minimize post-operative discomfort [1].

The body naturally produces hydrocortisone (cortisol). A typical adult produces 15 to 30 milligrams per day, but up to 300 milligrams can be produced when needed. Corticosteroids must be given at dosages greater than basal secretion to have an anti-inflammatory effect [2].

The selected corticosteroid should have good biological activity and few mineralocorticoid effects. Dexamethasone meets these requirements; it has no mineralocorticoid activity. Since 1965, oral surgeons have used it to reduce pain and trismus following surgery. Its half-life is 36 to 72 hours. Dexamethasone was chosen for the study because it is considered safe and acts for longer when time and dosages are strictly followed [3].

Hydrocortisone is a short-acting glucocorticoid with a pharmacologic profile closer to endogenous cortisol. Limited evidence suggests that it

may reduce early postoperative pain and swelling compared with placebo, but most studies have evaluated its use as an irrigation solution or systemic therapy. Higher doses are required to achieve comparable anti-inflammatory effects, raising questions regarding optimal dosage and clinical effectiveness [4].

Hydrocortisone was previously used to treat oral disorders and symptoms of inflammatory diseases. In a 6-blind study including third molar procedures, Ross & White established its superiority over a placebo. Since then, researchers have studied the use of corticosteroids during third molar surgery in various formulations, dosages, delivery routes, and locations [5].

A 2016 meta-analysis by Moraschini et al. examined the submucosal administration of dexamethasone following third molar surgeries. The analysis revealed a substantial reduction in swelling and pain in all studies, with no observed difference in trismus [6]. The present study corroborates the conclusions previously drawn that demonstrated the positive effects of dexamethasone when administered submucosally, as evidenced by a reduction in discomfort following surgery. It was noted that a subtherapeutic dose of 4 mg has nonsignificant systemic outcomes [3,6-8].

Afreen et al. [9] compared the effectiveness of a single dose of hydrocortisone given intravenously or via the submucosal route to prevent sequelae from impacted mandibular third molar surgery. The results support submucosal administration of corticosteroids like hydrocortisone in a single dose to reduce postoperative sequelae as much as other routes. The submucosal route also offers convenience for surgeons due to their familiarity with the surgical site.

Postoperative corticosteroid treatment has been demonstrated to effectively minimize pain following the extraction of impacted lower third molars [10].

The purpose of the present study is to assess the effectiveness of submucosal injections of hydrocortisone, dexamethasone, and normal saline in reducing trismus, swelling, and pain following the extraction of a third molar. The study will also assess the effects of these treatments on analgesic consumption, wound healing, and complication rates.

## Material and Methods

This study was a double-blind, randomized controlled trial carried out at the Oral and Maxillofacial Surgery Clinics of Martyre Nasser Specialized Center and Maysan Specialized Center in Najaf under the jurisdiction of the “Najaf Health Directorate” in Najaf Province, Iraq from September 2025 to February 2026. For this study, ethical approval was taken from the University of Anbar Ethical Approval Committee (Ref. 142 in 13/11/2025). Thirty patients, aged between 18 and 35 years, with a calculated average age of 26.8 years, with Class II or position B impacted third molar requiring surgical removal were included in the study. This study followed Consolidated Standards of Reporting Trials (CONSORT) guidelines with the flow diagram shown in Figure 1.

Patients eligible to participate in the study had a full history, clinical examination and radiographic examination. Routine laboratory investigations were carried out. Patients then randomly fell into three equal groups: group A (experimental) received a submucosal injection of hydrocortisone after a local anesthetic, and group B (dexamethasone) received a submucosal injection Group c (control) received a submucosal injection of normal saline.

The study was conducted in a double-blind manner. Syringes containing hydrocortisone, dexamethasone or normal saline were prepared and coded by an assistant not involved in patient care, surgery or analysis. Patients and outcome assessors were unaware of group allocation. The surgeon was blind to syringe contents.

Pre-operative pain, and distance measurements were recorded. These were repeated on the second and seventh days post- operative. Pain was assessed using a VAS with verbal descriptors, ranging from 0 to 10. Facial width was measured from tragus to corner of mouth, and outer canthus to gonion angle. Inter-incisal distance was measured of upper and lower central incisors using a metal ruler or tape.
Before surgery, patients were given instructions on how to rinse their mouths with a 2% chlorhexidine solution for one minute. They received local anesthesia including inferior alveolar, lingual, and buccal nerve blocks with 2% lidocaine and 1:80,000 adrenaline. In group A, a sub-mucosal hydrocortisone sodium succinate (50 mg in 1 ml) injection was given into the buccal vestibule next the surgical site. Group B received a submucosal dexamethasone (4 mg/mL) injection. Group C (placebo) received a sub-mucosal normal saline injection. To extract the mandibular third molar, a typical Terrance Ward incision was used. Tooth and tissue cutting was done with Nos. 6 or 8 round or 702 or 703 carbide burs. Following extraction, the socket was irrigated and closed with 3-0 silk sutures.500 mg paracetamol was recommended for discomfort relief. Postoperative instructions were given, including noting how many analgesic tablets were taken after surgery on the second and seventh days to complete a clinical parameter evaluation. clinical images of a subject are presented in Figures 2, 3, and 4.

**Evaluation of trismus:** The measurement of the maximum inter-incisal distance between the maxillary and mandibular incisors was undertaken using a stainless-steel scale. The reference points utilized in this study were the incisal edges of the teeth at the maximum comfortable mouth opening possible.
**Evaluation of swelling:** We used a measuring tape and metal ruler for two reasons: No published method satisfied all criteria for assessing facial swelling. The reference lines used were the tip of the tragus of the ear of the operated side to the corner of mouth and gonion to lateral canthus of eye of the operated side. The distance from the tragus to the corner of mouth was added to the distance between the gonion and lateral canthus of eye over maximum convexity of the soft tissues.
**Evaluation of pain:** All pain measurements were labelled with a subscript. Pain intensity was evaluated using a visual analogue scale (photo) with a horizontal line from 'no pain' (0 mm) to 'worst pain' (10 mm) [9].
**Evaluation of wound healing:** We evaluate the healing process of wounds using the Healing Index (HI). This is based on wound healing at day 7, with considerations including tissue color, bleeding, granulation tissue, epithelialization, and the presence of suppuration or infection. We adhere to criteria previously established [18].

Data were analyzed using IBM SPSS Statistics version 32, with significance set at $P < 0.05$. Categorical variables (sex, tooth number, analgesic consumption) were compared using Fisher's exact test. Pain and wound healing were analyzed with the Friedman and Kruskal–Wallis tests and Wilcoxon sum-rank post-hoc comparisons, while swelling and trismus were analyzed with repeated-measures and one-way ANOVA followed by Bonferroni post-hoc comparisons.

## Results

Thirty participants were enrolled and equally allocated to the three study groups.10 subjects for each, aged 18-35 with mean ± SD is 26.8±5.36, 12 males and 18 females, two teeth as 38 and 48 no.; 14 teeth for 38 and 16 teeth no. 48; all these results were not statistically different (Table 1).

The results demonstrated pain decreased from the first day until one week after the intervention in all groups, with significant changes. On the second and seventh days, dexamethasone produced the lowest pain levels, followed by hydrocortisone, with higher levels observed in the placebo group (Table 2). Significant differences were observed between and among groups using the Wilcoxon sum-rank test **(**Table 3).

The Friedman test revealed a significant reduction in pain over time within each group (hydrocortisone = 20, dexamethasone = 20, placebo = 18.2; all $P < 0.001$). The median pain score decreased from 3.00 on day 1 to 1.00 on day 7 in the hydrocortisone and dexamethasone groups, and from 2.90 to 1.00 in the placebo group.

The Kruskal–Wallis test showed no significant difference between groups on day 1 ($H = 1.736$, $P = 0.420$), confirming comparable baseline pain. However, highly significant differences were found on day 2 ($H = 24.123$, $P < 0.001$) and 7 ($H = 21.615$, $P < 0.001$) as shown in Table 2.

Pairwise post-hoc comparisons were significant for every pair on both days (Table 3). On day 2, pain was lower with dexamethasone than with hydrocortisone (test statistic = 11.100, $P = 0.004$) or placebo (-18.900, $P < 0.001$), and lower with hydrocortisone than with placebo (-7.800, $P = 0.044$). The same order was maintained on day 7 (dexamethasone vs. hydrocortisone = 9.200, $P = 0.015$; dexamethasone vs. placebo = -17.650, $P < 0.001$; hydrocortisone vs. placebo = -8.450, $P = 0.026$). Therefore, pain decreased significantly over time in all groups, with dexamethasone resulting in the lowest pain levels on days 2 and 7, followed by hydrocortisone and then placebo.

Swelling significantly decreased over time in all groups; Results show that the lower mean of swelling in the 2nd day is in dexamethasone followed by hydrocortisone then higher in placebo with significant difference in both 2nd day and after one week (Table 4 and Figure 5).

All comparisons between groups in 2nd day and 7th day were significant (Table 5).

The analysis demonstrated statistical differences in comparisons of each day with other, except in placebo, between the first day and after one week, which result was not significantly different (Table 6).

There was swelling is decrease with time increase with significant change, Results above show that the lower mean of swelling in the 2nd day is in dexamethasone followed by hydrocortisone then higher in placebo with significant difference in both 2nd day and after one week (Table 7).

Results show that when compared each day with other is significant in all groups, except in placebo, between the first day and 2nd day, its result is not significant (Table 8).

Findings showed all comparisons between 2nd and 7th day were significant (Table 9).

The results indicated maximal mouth opening (MMO) is increased with time increase in all groups with significant change, in the 2nd day and 7th day, the higher MMO is in dexamethasone followed by hydrocortisone and lower in placebo with significant difference (Table 10).

Findings show that in 2nd day and 7th day, most results are significant between groups except in the 2nd day, when compared hydrocortisone with dexamethasone and placebo, these results are not significant (Table 11).

Results show that when compared each time with other in all groups are significant except in Placebo when compared 2nd day with 7th day, this result was not significant different (Table 12).

Findings showed that wound healing is higher in dexamethasone then hydrocortisone and lower in placebo with significant result (Table 13).

All comparisons were significantly different except between placebo and hydrocortisone (Table 14).

Taking analgesic findings are summarized in Table 15.

## Discussion

The present randomized clinical trial evaluated the effectiveness of submucosal dexamethasone and hydrocortisone in reducing postoperative inflammatory sequelae following impacted mandibular third molar surgery. The findings indicated that both corticosteroids led to a substantial reduction in postoperative pain, swelling, and trismus when compared with the placebo. However, dexamethasone has been shown to yield superior clinical outcomes, including reduced pain scores, enhanced mouth opening, decreased facial swelling, reduced postoperative analgesic consumption, and accelerated wound healing.

Dexamethasone is more effective due to its pharmacological profile. It is a long-acting synthetic glucocorticoid with negligible mineralocorticoid activity and around 25 times greater anti-inflammatory potency than hydrocortisone. This allows it to suppress inflammatory mediators throughout the early postoperative period [3,19].

Postoperative pain improved in all groups over time, but dexamethasone patients had lower scores than the hydrocortisone and placebo groups on days 2 and 7. Hydrocortisone also reduced pain compared to placebo, but to a lesser extent.

These findings are in accordance with the conclusions of the systematic review by Miroshnychenko et al. (2023), which determined that submucosal corticosteroid administration significantly reduces postoperative pain following third molar surgery [20]. Similarly, Moraschini et al. (2015) and the recent meta-analysis by Aljohani (2024) demonstrated that dexamethasone consistently provides superior postoperative pain control compared with placebo [6,21]. The observed difference in results when contrasted with the findings of Afreen et al. (2024), who reported limited analgesic benefit with hydrocortisone, may be attributed to variations in corticosteroid dosage, the timing of administration, the complexity of surgery, and the methods employed for pain assessment [9].

Recovery of mouth opening followed a similar pattern. Although maximal mouth opening improved in all groups, dexamethasone was significantly better than hydrocortisone and placebo by day 7. Hydrocortisone was also better than placebo, showing a moderate beneficial effect.

These observations align with those of Boonsiriseth et al., Priyanga et al., and Giri et al. (2018), who showed that dexamethasone successfully reduces trismus after surgery by reducing swelling around the jaw muscles [21]. Miroshnychenko et al. (2023) also reported improvements in trismus after corticosteroid administration [20]. However, in contrast to these observations, Moraschini et al. (2015) reported less consistent effects on trismus, a finding which may be attributable to differences in corticosteroid dose, administration route, and assessment protocols [6].

The most significant variation between the study groups was observed in the manifestation of facial swelling. As can be seen from the data, both corticosteroids significantly reduced postoperative oedema in comparison with the placebo, while dexamethasone consistently achieved the greatest reduction during the first week after surgery.

The findings of the present study are corroborated by the meta-analysis by Markiewicz et al., which was summarized by Aljohani (2024). This meta-analysis demonstrated that corticosteroids, particularly dexamethasone, significantly reduce postoperative swelling after mandibular third molar surgery [21]. Similar findings were reported by Ramadan (2021), Boonsiriseth et al., and Gopinath et al., all of whom concluded that a single submucosal dose of dexamethasone effectively controls postoperative swelling [21]. Despite the favorable outcomes demonstrated by Cho et al. (2024) with hydrocortisone irrigation, the present study indicates that dexamethasone provides superior control of swelling, most likely due to its greater anti-inflammatory potency and longer biological half-life [2].

Postoperative analgesic consumption further corroborated these clinical findings. Patients administered dexamethasone demonstrated a lower requirement for additional rescue

analgesics, whereas the repeated administration of analgesics was most observed in the placebo group.

These results align with previous work that attributed the reduced analgesic requirement to suppressed inflammation and reduced tissue edema [5]. Similarly, Afreen et al. (2024) and Moraschini et al. (2015) concluded that corticosteroid administration decreases postoperative analgesic requirements by reducing inflammation rather than exerting a direct analgesic effect [6,9].

An additional finding of this study was the significantly improved wound healing observed in the dexamethasone group.

This observation is consistent with the findings reported by Bubalo et al. (2023) and Shah et al. (2018), who demonstrated that the local administration of long-acting corticosteroids results in effective inflammatory control without compromising normal tissue repair [15,16]. Moreover, Vivek et al. (2017) emphasized that submucosal administration achieves a high local drug concentration while minimizing systemic exposure and thus represents an effective and safe route for controlling postoperative inflammatory complications [19].

Overall, the present findings are consistent with the current evidence supporting the use of corticosteroids following impacted mandibular third molar surgery. While hydrocortisone demonstrated measurable clinical benefits in comparison with placebo, dexamethasone consistently produced superior outcomes across all evaluated parameters.

The findings support those reported by Boonsiriseth et al., Gopinath et al., Miroshnychenko et al., Moraschini et al., Ngeow and Lim, and Aljohani, indicating that submucosal dexamethasone is an effective, safe, and practical option for minimizing inflammation after impacted mandibular third molar surgery [5,6,20,21].

## Conclusion

This randomized controlled trial demonstrated that submucosal corticosteroid administration is an effective treatment for reducing postoperative inflammatory sequelae following impacted mandibular third molar surgery. Both dexamethasone and hydrocortisone improved outcomes compared with placebo, but dexamethasone was more effective in reducing pain, facial swelling and trismus, and it also reduced analgesic consumption and improved wound healing. These findings support the use of submucosal dexamethasone to enhance the efficacy of postoperative management, thereby promoting early recovery following impacted mandibular third molar surgery.

**Clinical Implications**

Submucosal injections of corticosteroids are clinically advantageous. It is a simple, minimally invasive and cost-effective technique that minimizes systemic exposure while providing targeted anti-inflammatory effects. The use of submucosal corticosteroids is practical for reducing postoperative morbidity after impacted third molar removal.

**Limitations**

The study's limitations include the small sample size, short follow-up period and subjective pain assessment using conventional methods. It also investigated only one postoperative submucosal corticosteroid regimen, which may limit the findings' generalizability.

## Conflicts of Interest

All authors declare that they have no conflicts of interest.

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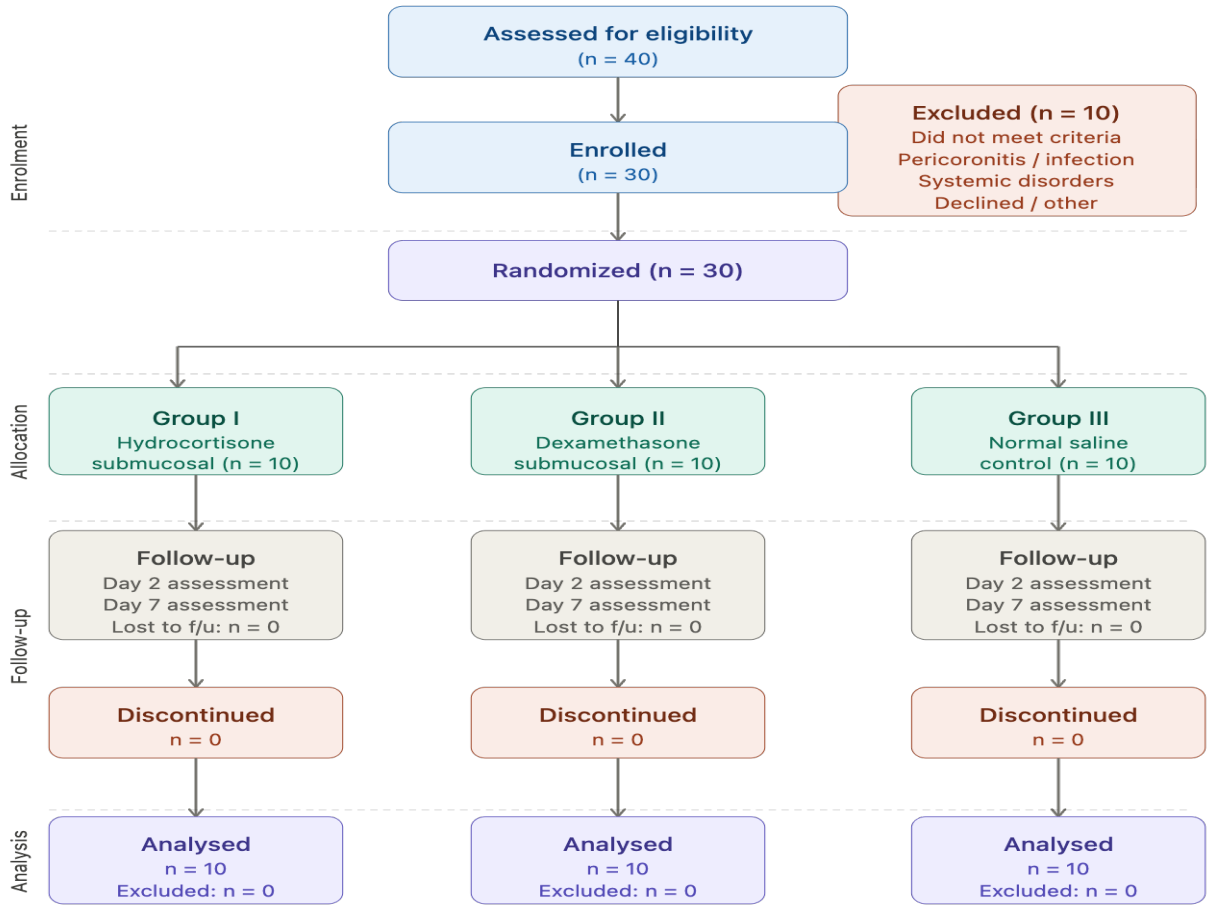


Figure 1. Flow diagram of the trial strategy.

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Figure 2. Clinical photographs illustrating submucosal hydrocortisone administration and postoperative healing at baseline, postoperative day 2, and postoperative day 7. (A) Preoperative frontal view. (B) preoperative profile view. (C) injection site. (D) postoperative day 2 frontal view. (E) postoperative day 2 profile view. (F) orthopantomogram. (G) postoperative day 7 frontal view. (H) postoperative day 7 profile view. (I) postoperative day 7 intraoral view.


Figure 3. Clinical photographs illustrating submucosal dexamethasone administration and postoperative healing at baseline, postoperative day 2, and postoperative day 7. (A) Preoperative frontal view, (B) preoperative profile view, (C) injection site, (D) postoperative day 2 frontal view, (E) postoperative day 2 profile view, (F) orthopantomogram, (G) postoperative day 7 frontal view, (H) postoperative day 7 profile view, (I) postoperative day 7 intraoral view.

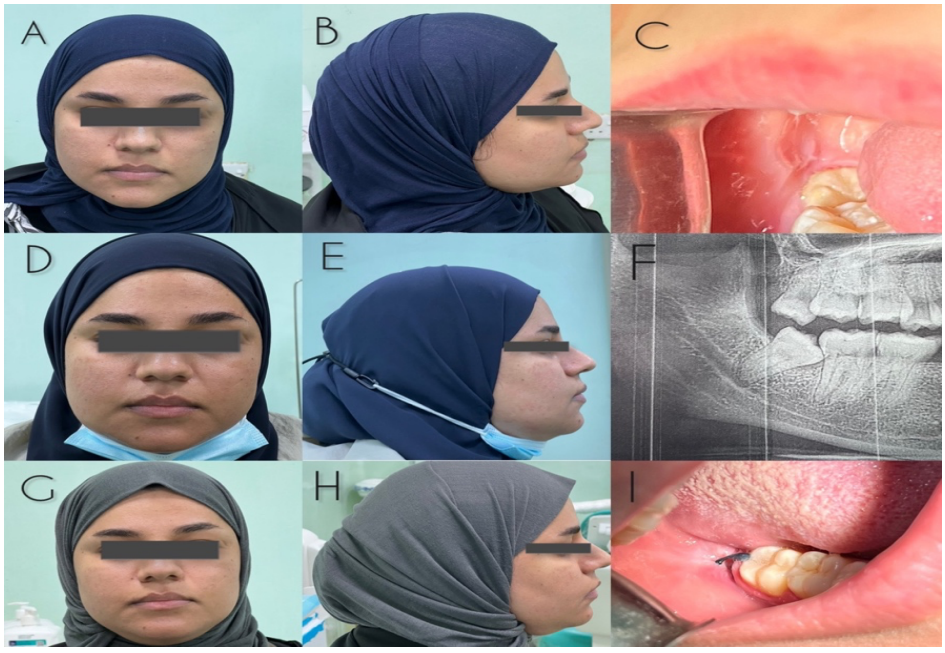


Figure 4. Submucosal normal saline injection (control group) and clinical follow-up. (A) Preoperative frontal view. (B) preoperative profile view. (C) injection site. (D) postoperative day 2 frontal view. (E) postoperative day 2 profile view. (F) orthopantomogram. (G) postoperative day 7 frontal view. (H) postoperative day 7 profile view. (I) postoperative day 7 intraoral view.

Table 1. Distribution of demographic data among groups.

| Variables | | Groups | | | | | | Fisher exact | P-value | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Hydrocortisone | | Dexamethasone | | Placebo | | | | | |
| | | N. | % | N. | % | N. | % | 0.89 | 0.89 | N. | % |
| Sex | M | 4 | 40 | 5 | 50 | 3 | 30 | | | 12 | 40 |
| | F | 6 | 60 | 5 | 50 | 7 | 70 | | | 18 | 60 |
| Tooth No. | 38 | 4 | 40 | 6 | 60 | 4 | 40 | 1.11 | 0.73 | 14 | 46.67 |
| | 48 | 6 | 60 | 4 | 40 | 6 | 60 | | | 16 | 53.33 |

Table 2. Pain among groups and time using Friedman and Kruskal Wallis.

| Groups | | Day 1 | Day 2 | Day 7 | Friedman | P-value |
|---|---|---|---|---|---|---|
| Hydrocortisone | Minimum | 6 | 4 | 1 | 20 | < 0.001 |
| | Maximum | 9 | 6 | 3 | | |
| | Median (MR[1]) | 3 | 2 | 1 | | |
| | MR[2] | 14.05 | 16.6 | 15.75 | | |
| Dexamethasone | Minimum | 6 | 2 | 0 | 20 | < 0.001 |
| | Maximum | 9 | 3 | 1 | | |
| | Median (MR[1]) | 3 | 2 | 1 | | |
| | MR[2] | 18.4 | 5.5 | 6.55 | | |
| Placebo | Minimum | 6 | 5 | 2 | 18.2 | < 0.001 |
| | Maximum | 9 | 8 | 4 | | |
| | Median (MR[1]) | 2.9 | 2.1 | 1 | | |
| | MR[2] | 14.05 | 24.4 | 24.2 | | |
| Kruskal-Wallis | | 1.736 | 24.123 | 21.615 | | |
| P-value | | 0.42 | < 0.001 | < 0.001 | | |

Table 3. Pain among and groups e using Wilcoxon sum rank.

| | Sample 1-Sample 2 | Test Statistic | p-value |
|---|---|---|---|
| Day 2 | Hydrocortisone-Dexamethasone | 11.1 | 0.004 |
| | Placebo-Dexamethasone | -18.9 | < 0.001 |
| | Placebo-Hydrocortisone | -7.8 | 0.044 |
| Day7 | Hydrocortisone-Dexamethasone | 9.2 | 0.015 |
| | Placebo-Dexamethasone | -17.65 | < 0.001 |
| | Placebo-Hydrocortisone | -8.45 | 0.026 |

Table 4. Swelling among groups and time using repeated measure One way ANOVA.

| Groups | | SW1TC | SW2TC | SW7TC | F | P-value |
|---|---|---|---|---|---|---|
| Hydrocortisone | Minimum | 100 | 102 | 100 | 39.421 | < 0.001 |
| | Maximum | 125 | 120 | 110 | | |
| | Mean | 115.8 | 110.3 | 104 | | |
| | ±SD | 7.569 | 6.201 | 3.887 | | |
| Dexamethasone | Minimum | 100 | 95 | 90 | 59.852 | < 0.001 |
| | Maximum | 120 | 110 | 100 | | |
| | Mean | 110.3 | 102.9 | 95.5 | | |
| | ±SD | 5.559 | 5.152 | 3.689 | | |
| Placebo | Minimum | 105 | 117 | 110 | 35.801 | < 0.001 |
| | Maximum | 125 | 132 | 127 | | |
| | Mean | 117 | 124.2 | 119.5 | | |
| | ±SD | 5.869 | 4.104 | 4.743 | | |
| F | | 3.122 | 42.865 | 86.73 | | |
| P-value | | 0.06 | < 0.001 | < 0.001 | | |

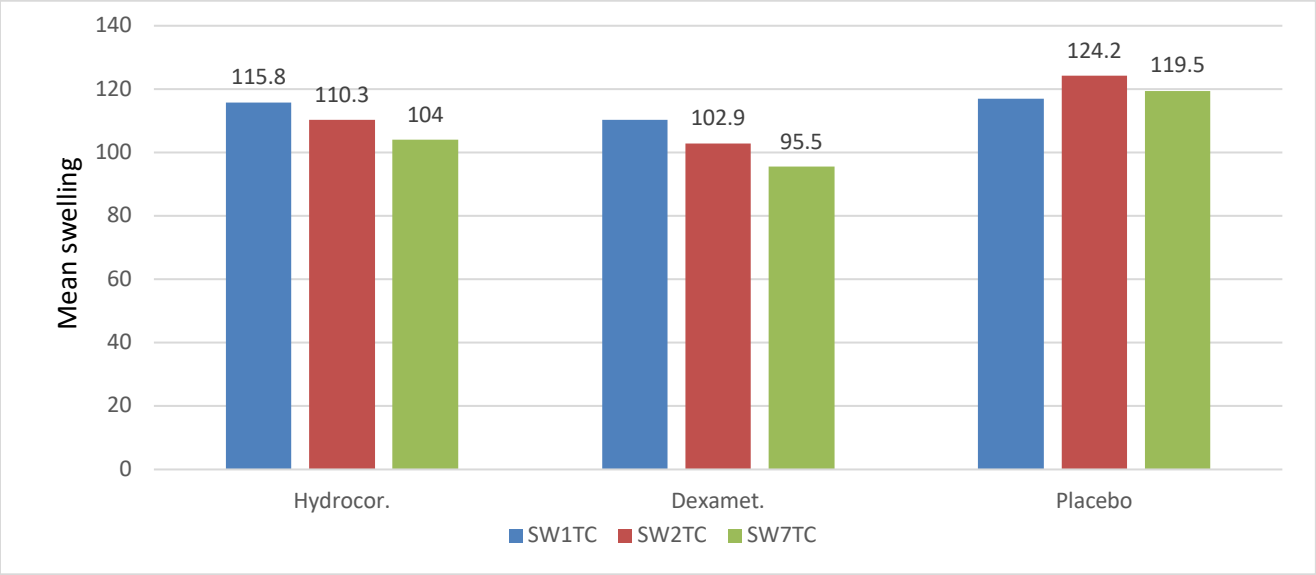


Figure 5. Comparison of swelling scores (Tragus–Corner Mouth, mm) between groups.

Table 5. Swelling among groups using Bonferroni.

| factor1 | (I) Groups | (J) Groups | Mean Difference (I-J) | P-value | 95% Confidence Interval for Difference | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| 2 day | Hydrocortisone | Dexamethasone | 7.4 | 0.011 | 1.438 | 13.362 |
| | | Placebo | -13.9 | < 0.001 | -19.862 | -7.938 |
| | Dexamethasone | Placebo | -21.3 | < 0.001 | -27.262 | -15.338 |
| 7 day | Hydrocortisone | Dexamethasone | 8.5 | < 0.001 | 3.783 | 13.217 |
| | | Placebo | -15.5 | < 0.001 | -20.217 | -10.783 |
| | Dexamethasone | Placebo | -24 | < 0.001 | -28.717 | -19.283 |

Table 6. Swelling between time points using Bonferroni.

| Groups | (I) factor1 | (J) factor1 | Mean Difference (I-J) | p-value | 95% Confidence Interval for Difference | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Hydrocortisone | 1-day | 2-day | 5.5 | < 0.001 | 2.745 | 8.255 |
| | | 7-day | 11.8 | < 0.001 | 8.314 | 15.286 |
| | 2 | 7-day | 6.3 | < 0.001 | 4.133 | 8.467 |
| Dexamethasone | 1-day | 2-day | 7.4 | < 0.001 | 4.645 | 10.155 |
| | | 7-day | 14.8 | < 0.001 | 11.314 | 18.286 |
| | 2 | 7-day | 7.4 | < 0.001 | 5.233 | 9.567 |
| Placebo | 1-day | 2-day | -7.2 | < 0.001 | -9.955 | -4.445 |
| | | 7-day | -2.5 | 0.235 | -5.986 | 0.986 |
| | 2 | 7-day | 4.7 | < 0.001 | 2.533 | 6.867 |

Table 7. Swelling (G) among groups and time using repeated measure One way ANOVA.

| Groups | | SW1GC | SW2GC | SW7GC | F | P-value |
|---|---|---|---|---|---|---|
| Hydrocortisone | Minimum | 100 | 95 | 91 | 17.992 | < 0.001 |
| | Maximum | 115 | 116 | 100 | | |
| | Mean | 108.9 | 102.5 | 97.8 | | |
| | ±SD | 6.082 | 6.468 | 3.12 | | |
| Dexamethasone | Minimum | 92 | 87 | 82 | 38.608 | < 0.001 |
| | Maximum | 115 | 100 | 98 | | |
| | Mean | 106.1 | 94.1 | 90.3 | | |
| | ±SD | 7.68 | 4.122 | 5.334 | | |
| Placebo | Minimum | 100 | 97 | 96 | 13.425 | < 0.001 |
| | Maximum | 125 | 121 | 118 | | |
| | Mean | 112 | 109.9 | 103.5 | | |
| | ±SD | 6.532 | 6.454 | 6.485 | | |
| F | | 1.885 | 18.659 | 16.386 | | |
| P value | | 0.171 | < 0.001 | < 0.001 | | |

Table 8. Swelling between time points using Bonferroni.

| Groups | (I) factor1 | (J) factor1 | Mean Difference (I-J) | p-value | 95% Confidence Interval for Difference | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Hydrocortisone | 1day | 2day | 6.4 | 0.002 | 2.251 | 10.549 |
| | | 7day | 11.1 | < 0.001 | 6.463 | 15.737 |
| | 2day | 7day | 4.7 | 0.008 | 1.083 | 8.317 |
| Dexamethasone | 1day | 2day | 12 | < 0.001 | 7.851 | 16.149 |
| | | 7day | 15.8 | < 0.001 | 11.163 | 20.437 |
| | 2day | 7day | 3.8 | 0.037 | 0.183 | 7.417 |
| Placebo | 1day | 2day | 2.1 | 0.622 | -2.049 | 6.249 |
| | | 7day | 8.5 | < 0.001 | 3.863 | 13.137 |
| | 2day | 7day | 6.4 | < 0.001 | 2.783 | 10.017 |

Table 9. Swelling among groups using Bonferroni.

| factor1 | (I) Groups | (J) Groups | Mean Difference (I-J) | p-value | 95% Confidence Interval for Difference | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| 2day | Hydrocortisone | Dexamethasone | 8.4 | 0.009 | 1.794 | 15.006 |
| | | Placebo | -7.4 | 0.024 | -14.006 | -0.794 |
| | Dexamethasone | Placebo | -15.8 | < 0.001 | -22.406 | -9.194 |
| 7day | Hydrocortisone | Dexamethasone | 7.5 | 0.009 | 1.596 | 13.404 |
| | | Placebo | -5.7 | 0.045 | -11.604 | 0.204 |
| | Dexamethasone | Placebo | -13.2 | < 0.001 | -19.104 | -7.296 |

Table 10. Trismus among groups using repeated measure One Way ANOVA.

| Groups | | TRd1 | TRd2 | TRd7 | F | P-value |
|---|---|---|---|---|---|---|
| Hydrocortisone | Minimum | 33 | 38 | 41 | 35.934 | < 0.001 |
| | Maximum | 45 | 48 | 50 | | |
| | Mean | 38.6 | 42 | 44.2 | | |
| | ±SD | 4.195 | 3.162 | 2.898 | | |
| Dexamethasone | Minimum | 37 | 40 | 45 | 72.837 | < 0.001 |
| | Maximum | 44 | 50 | 55 | | |
| | Mean | 39.9 | 43.7 | 48 | | |
| | ±SD | 1.969 | 2.869 | 3.432 | | |
| Placebo | Minimum | 35 | 37 | 40 | 8.065 | 0.002 |
| | Maximum | 40 | 42 | 42 | | |
| | Mean | 38.6 | 40.3 | 41.2 | | |
| | ±SD | 1.578 | 1.494 | 0.789 | | |
| F | | 0.705 | 4.236 | 16.75 | | |
| P-value | | 0.503 | 0.025 | < 0.001 | | |

Table 11. MMO among groups using Bonferroni.

| factor1 | (I) Groups | (J) Groups | Mean Difference (I-J) | p-value | 95% Confidence Interval for Difference | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| 2day | Hydrocortisone | Dexamethasone | -1.7 | 0.471 | -4.682 | 1.282 |
| | | Placebo | 1.700 | 0.471 | -1.282 | 4.682 |
| | Dexamethasone | Placebo | 3 | 0.021 | 0.418 | 6.382 |
| 7day | Hydrocortisone | Dexamethasone | -3.8 | 0.01 | -6.806 | -0.794 |
| | | Placebo | 3 | 0.049 | -0.006 | 6.006 |
| | Dexamethasone | Placebo | 6.8 | < 0.001 | 3.794 | 9.806 |

Table 12. Trismus between time points using Bonferroni.

| Groups | (I) factor1 | (J) factor1 | Mean Difference (I-J) | P-value | 95% Confidence Interval for Difference | |
|---|---|---|---|---|---|---|
| | | | | | Lower Bound | Upper Bound |
| Hydrocortisone | 1day | 2day | -3.4 | < 0.001 | -4.624 | -2.176 |
| | | 7th day | -5.6 | < 0.001 | -7.285 | -3.915 |
| | 2nd day | 7th day | -2.2 | < 0.001 | -3.409 | -0.991 |
| Dexamethasone | 1day | 2day | -3.8 | < 0.001 | -5.024 | -2.576 |
| | | 7th day | -8.1 | < 0.001 | -9.785 | -6.415 |
| | 2nd day | 7th day | -4.3 | < 0.001 | -5.509 | -3.091 |
| Placebo | 1day | 2day | -1.7 | 0.004 | -2.924 | -0.476 |
| | | 7th day | -2.6 | 0.002 | -4.285 | -0.915 |
| | 2nd day | 7th day | -0.9 | 0.205 | -2.109 | 0.309 |

Table 13. Wound healing among groups using Kruskal-Wallis.

| Groups | Minimum | Maximum | MR | Kruskal-Wallis | P-value |
|---|---|---|---|---|---|
| Hydrocortisone | 2 | 4 | 12.9 | 15.373 | < 0.001 |
| Dexamethasone | 4 | 5 | 23.7 | | |
| Placebo | 2 | 4 | 9.9 | | |

Table 14. Wound healing among groups using Multiple Wilcoxon Sum Rank Test.

| Sample 1-Sample 2 | Test Statistic | P-value |
|---|---|---|
| Placebo-Hydrocortisone | -3.0 | 0.418 |
| Placebo-Dexamethasone | -13.8 | < 0.001 |
| Hydrocortisone-Dexamethasone | -10.8 | 0.004 |

Table 15. Distribution of postoperative analgesic consumption among the study groups.

| Vars. | | Groups | | | | | | Fisher exact | P-value | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Hydrocortisone | | Dexamethasone | | Placebo | | | | | |
| | | N. | % | N. | % | N. | % | 0.89 | 0.89 | N. | % |
| Analgesic | 0 | 1 | 10 | 5 | 50 | 0 | 0 | 9.704 | 0.034 | 6 | 20 |
| | once | 6 | 60 | 4 | 40 | 4 | 40 | | | 14 | 46.67 |
| | twice | 3 | 30 | 1 | 10 | 6 | 60 | | | 10 | 33.33 |