Efficacy of intraoperative intramuscular dexamethasone in oral surgery

Abstract

To analyze the impact of the effectiveness of intraoperative intramuscular dexamethasone in order to reduce the postsurgical inflammatory process in third molars. Corticosteroids began in 1885 when Thomas Addison in 1855 described the systemic behavior of melanoderma and its relationship with the adrenal glands. They were later used for various pathologies in the area of medicine and are currently used in dentistry to inhibit the post-surgical inflammatory process. A prospective, descriptive, cross-sectional study was carried out using dexamethasone and NSAIDs to inhibit the inflammatory process, being compared on the VAS scale in 16 patients. Resulting in a decrease in the inflammatory process with a discrepancy in the mouth opening of 0.1mm initially, at two weeks of 1.3mm and at 3 weeks of 1.1mm. A clinical case of a 16-year-old female patient who attended the Mexican Center for Stomatology Campus Morelia is presented. In order to undergo surgery to remove third molars and undergo intramuscular infiltration in the masseter muscle with dexamethasone 4mg/IM. Dexamethasone prevents the production of the inflammatory process when it is applied in a timely manner intramuscularly. Since the patients stated that they did not feel pain, they felt a faster recovery compared to patients who consumed NSAIDs.

Keywords: Dexamethasone, NSAIDs, Intramuscular, Oral Surgery

Introduction

The history of corticosteroids begins in 1885 when Thomas Addison in 1855 described the systemic behavior of melanoderma and its relationship with the adrenal glands. Later, Dr. Oscar Wintersteiner managed to isolate a few milligrams of the active compound from the adrenal glands, and it was not until 1949 that Kendall and Hench observed results from the use of cortisone in patients with rheumatoid arthritis. Currently, corticosteroids are used in various ways, among which the inhibition of the postoperative inflammatory process stands out[1-3].

Tineo-Salazar IR in 2021 demonstrated that the prophylactic administration of 4 mg of intramuscular dexamethasone controls the postsurgical inflammatory process compared to a control group. Douglas-Clayton SA, Et al, in 2023 established that the use of corticosteroids together with complex B or NSAIDs helps relieve pain with satisfactory results. For its part, Prieto I, et al in 2005 established that no matter the pharmacotherapy applied with NSAIDs or Corticosteroids administered, preoperative or postoperative, the inflammatory process appears immediately at the end of the surgical procedure, arguing that "Aggression to the "Oral and perioral soft tissues, flap detachment and bone trauma are responsible for the inflammation that, under normal conditions, intensifies, presenting a peak at 72 hours." [4-6].

Use in dentistry in surgery

The MSD[7] Manual mentions that corticosteroids should be used for the treatment of postoperative complications in oral surgery. This is because they eliminate the symptoms of inflammation and lockjaw. While NSAIDs are more effective as analgesics. López AV[8] in 2019 establishes that the way to measure mouth opening

should be by placing the upper edge of the ruler on the incisal edge of the upper central incisor, measuring vertically to the incisal edge of the opposing lower incisor and recording the measurement.

Materials and methods

Prospective, observational, descriptive, cross-sectional study. Developed in patients who attended surgical consultation at the Mexican Center for Stomatology Campus Morelia in the period 2023-2024. Inclusion criteria: Patients who attend third molar surgery and who agree to be part of the study. Exclusion criteria: Patients who come to the clinic for other surgical procedures. Elimination criteria: Patients who abandon the review consultation, systemic situations that make treatment impossible.

Clinical case

A 16-year-old female patient is presented accompanied by her legal guardian who authorizes the patient's participation in the study after signing the informed consent granted in the clinic of the Mexican Center for Stomatology Campus Morelia. Which manifests pain and limitation in mouth opening due to the eruption of the third molars. With no significant history for his current condition, physical examination revealed 30 dental organs in the oral cavity and the two lower third molars were only partially erupted. In the imaging studies, 4 third molars were present, two upper ones erupted and two partially erupted. Laboratory studies report that its values are normal and there is no risk that limits the procedure. Surgical time is scheduled for the removal of the 4 third molars. During the procedure, dexamethasone 4 mg/IM is infiltrated into the masseter muscle. After the approximation of the planes, postoperative instructions are given and the patient is scheduled for a week to measure the mouth opening, reporting an opening of 51.1 mm. After a week, the patient is reviewed again, measuring the mouth opening. of 48.4 and in the third week of 49.2mm. Figure 1, figure 2, figure 3.

Figure 1: photographs of the patient prior to surgery.

Figure 2: panoramic radiograph showing the dental organs 18 class I, position A, od. 28 position C, od. 48 class I position B, od 38 class II position B, in the classification of Pell and Gregory BII.

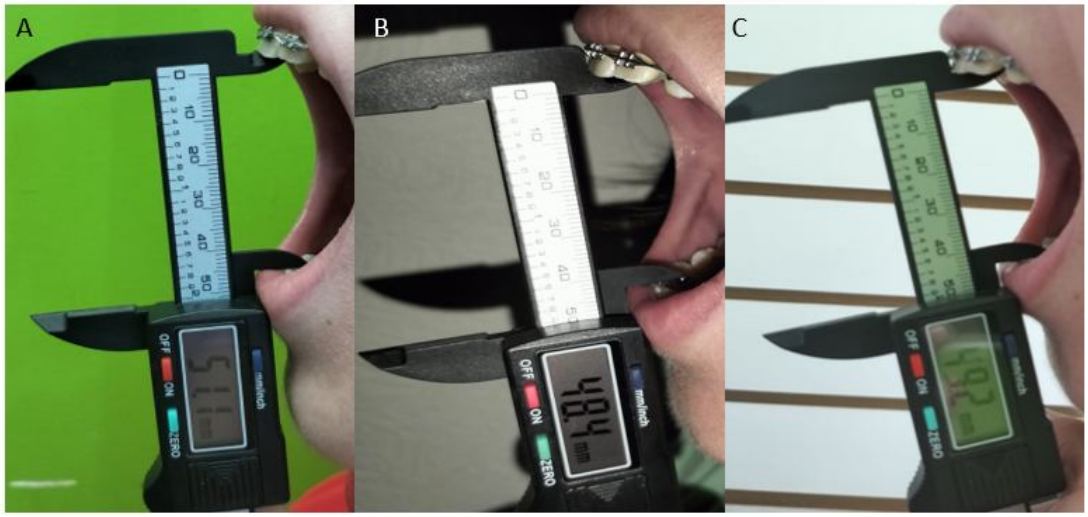
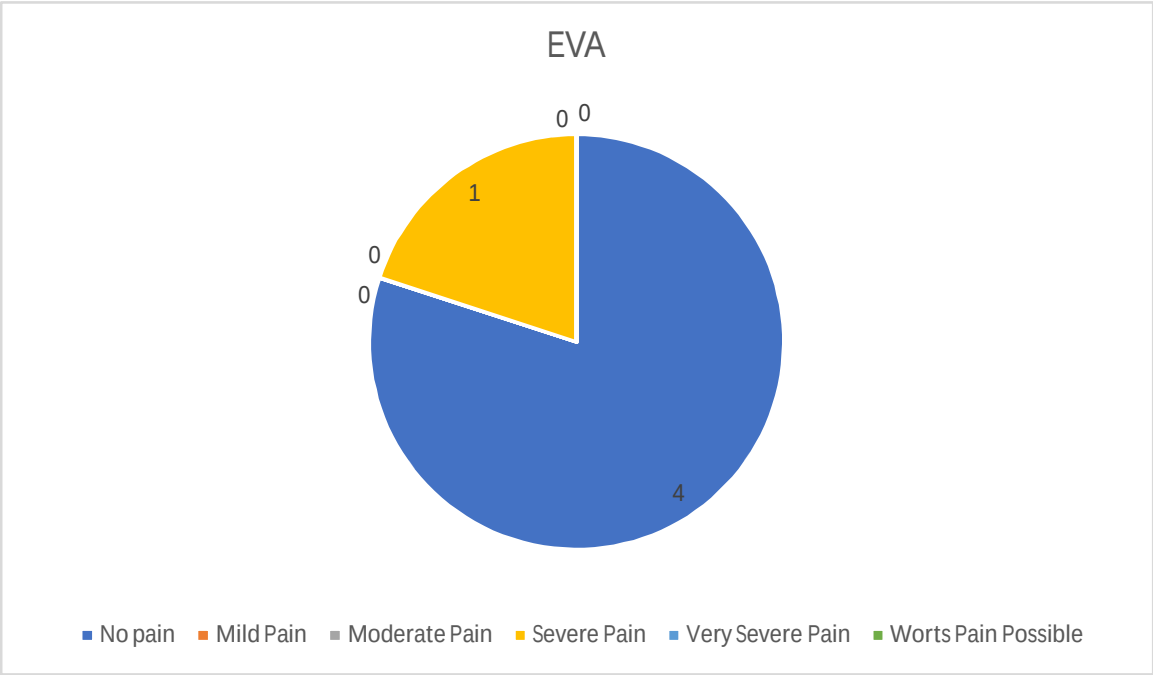


Figure 3: Measurement of maximum mouth opening, with A: 5.11mm initial prior to surgery, B: final measurement at the second week of 48.4mm of the surgical procedure C: measurement of 49.2mm final measurement three weeks after the surgical procedure after be infiltrated with dexamentasone 4mg/IM.

Results

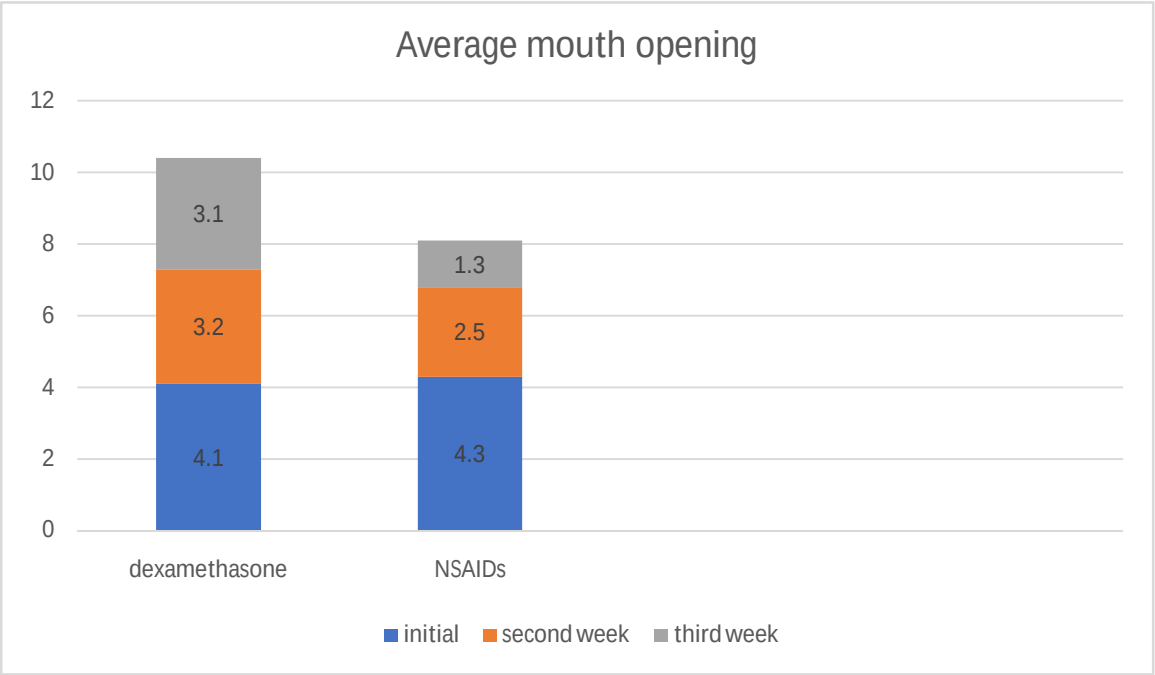
A total of 16 patients were counted who underwent third molar surgery at the Mexican Center for Stomatology Campus Morelia in the oral surgery clinic. Being divided into two groups. The first was applying dexamethasone 4mg/IM to the masseter muscle on the side undergoing the surgical procedure. And the second group underwent NSAIDs. Measuring in both groups the initial maximum mouth opening, the second week and the third week. Evaluating the sensory response to pain according to the VAS scale.

Reporting in the first group a total of 8 patients who underwent surgery, 5 being female and 3 being male. According to the VAS scale, it was reported that 4 patients had no pain and 1 had severe pain, 3 were excluded from the study because 2 had incomplete treatment by not attending their review appointments and 1 had an allergy to dexamethasone. The initial mouth opening was determined to be 4.3, 3.0, 5.1 and 5.3mm, giving a mean of 4.1mm with a standard deviation of 1.6mm. The discrepancy in mouth opening in the second week was 0.8, 1.0, 3.0 and 0.1mm, and in the third week an increase in opening of 1.2, 0.5, 2.4 and 0.0mm was observed. being a decrease in the average opening after 3 weeks of 1.3mm. Graph 1 and Graph 2.

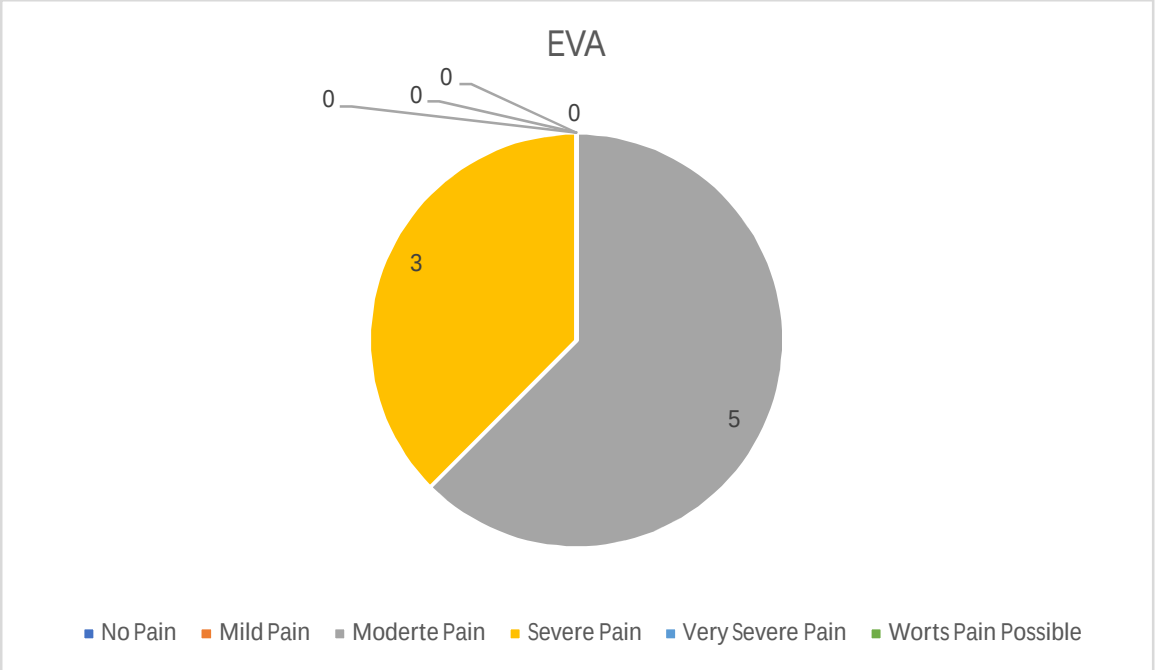


Graph 1: EVA scale for pain perception using dexamethasone.

Reporting in the second group a total of 8 patients, 5 women and 3 men being subjected. Randomly administering Ketorolac, ibuprofen and celecoxib. The following results were obtained on the VAS scale: moderate pain in 5 patients and severe pain in 3. The initial mouth opening was reported at 4.3, 4.5, 4.2, 4.6, 4.1, 4.0, 4.5 and 4.3mm with a mean of 4.3, with a standard deviation of 0.21mm. In the second week, a mouth opening of 2.7, 3.7, 3.6, 3.0, 2.7, 3.2, 3.8 and 3.6mm was reported. Being a decrease in the opening from 2.5 to 1.3mm. In the third week, a discrepancy of 0.2 to 1 mm was demonstrated. Graph 2 and Graph 3.



Graph 2: Comparison of means in mouth opening at initial, second week and third week. Applying dexamethasone IM and NSAIDs PO.



Graph 3: VAS scale for pain perception using NSAIDs.

Discussion

Tineo-Salazar IR. In 2021, it was determined that the effectiveness of prophylactic treatment with dexamethasone 4 mg/Vo for the postsurgical inflammatory response in third molars is favorable for reducing inflammation when administered between 2

to 11 mm with a median of 5.0 mm; while in the control group the inflammation was between 3 to 16 mm with a median of 10.0 mm. The postsurgical inflammatory response was lower when prophylactic treatment with Dexamethasone 4 mg/PO was administered compared to the group without prophylactic treatment[4].

Maduro-Jácome JE in 2017 studied the effects of dexamethasone in the postoperative period, because extraction of third molars is the most common surgical intervention in the mouth. Patients who undergo this surgical procedure may be affected in their mouth opening, being limited by lockjaw in the postoperative period. This may be related to the length of time the surgical intervention lasts, the position of the tooth and the maneuver used by the operator. Their study was based on 20 patients, who were divided into two groups of 10, the first was administered the corticosteroid "dexamethasone" intravenously, the other control group will be monitored for the evolution of the limitation of mouth opening, and their postoperative evolution was compared. The results were favorable for the group of people who were administered corticosteroids and it was found that dexamethasone inhibits the appearance of mandibular lockjaw, resulting in immediate recovery after having performed this surgical procedure[9].

Conclusion

Dexamethasone prevents the production of the inflammatory process when applied in a timely manner intramuscularly. If patients report feeling no pain, they will feel a faster recovery compared to patients who took NSAIDs. However, the presence of the suture in the mouth limits the patients' mouth opening due to fear of creating a tear or a painful sensation.

There is no conflict of interest.

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