

The Effect of Intravenous Dexamethasone on Post-operative Pain Following Periodontal Flap Surgery: A Randomized Controlled Investigation of Short-Term Patient Response

Purpose: The purpose of this randomized, controlled, split-mouth investigation was to determine if a single pre-operative intravenous dose of dexamethasone reduces post-operative pain, swelling and number of analgesic medications taken following periodontal flap surgery.

Methods and Materials: 36 patients planned for at least two similar periodontal flap surgeries under intravenous sedation were enrolled in the study. On the day of the first surgery, patients were randomized to receive either 2 mL dexamethasone (8 mg) or 2 mL of dextrose 5% (D5W) IV solution (placebo) immediately prior to administration of IV sedation and local anesthesia. The patient and surgical team were blinded to the contents administered. Following surgical treatment, the patient was given 600 mg ibuprofen and 500 mg acetaminophen to take orally prior to dismissal. Post-operative instructions required the patient to take 600 mg ibuprofen and 325 mg acetaminophen every six hours for the first forty-eight hours, and then every six hours as needed for oral pain. Post-operative pain, swelling, and pain medication usage were monitored by way of a smart phone application (app), Technology Applied for Capturing Outcomes (T.A.C.O.), which was downloaded to the patient's phone prior to treatment. The patient received phone notifications for questionnaires at 12, 24, 48, 72 hours, as well as one- and two-weeks following surgery. Two questionnaires were provided to record pain and swelling: a 21-point numerical rating scale (NRS-21), and a four-point verbal rating scale (VRS-4) with descriptors of no, mild, moderate, and severe. The phone app also included a field for the patient to list the number of tablets of ibuprofen and acetaminophen taken since the previous survey. A minimum of two weeks later, the patient returned for the second surgical procedure and received the opposite drug intervention, pre-operative dexamethasone or placebo, depending on what was administered prior to the first surgery. After responding to the same survey questions at the same time intervals, the patient completed enrollment in the study. NRS-21, VRS-4, and pain medication usage data following dexamethasone and placebo

surgeries was compared with matched pairs one-sided t-tests to determine differences between the two interventions.

Results: To date, 27 of an anticipated 36 patients have completed the study. For the 27 patients included in this part of the analysis, IV dexamethasone was associated with a significant reduction in pain at the 12, 24, and 72 hour time points ($p < 0.05$) and swelling at the 12, 24, 48 hour, and one week ($p < 0.05$) time points compared to placebo based on NRS-21 responses. VRS-4 data showed little variance between time points, with significant difference found only for reduction in perceived swelling at 12 hours ($p = 0.038$) with dexamethasone. No significant differences were found for the number of tablets of ibuprofen or acetaminophen taken between dexamethasone and placebo surgeries.

Discussion: Results to date suggest that intravenous dexamethasone administered prior to periodontal flap surgery minimizes pain up to 3 days and swelling up to 1 week post-operatively when compared to placebo. Previous reports in the dental literature have demonstrated the effectiveness of corticosteroids following third molar extractions (Neupert 1992, Ngeow 2016, Al-Dajani 2017). The effect of orally administered dexamethasone following periodontal surgery was examined by Pilatti et al (2006) and Steffens et al (2010). Both studies found that oral dexamethasone was associated with less pain following surgery when compared to placebo. To our knowledge, the current study is the first to examine intravenous dexamethasone and its effect on post-operative pain, swelling, and analgesic usage following periodontal flap surgery. This is also the first use of a phone application in the dental literature for recording patient data in real time that eliminates the need for a written pain diary.

Conclusions: Preliminary results suggest that pre-operative, intravenously administered dexamethasone reduces pain and swelling up to the first week following periodontal flap surgery. Given the ease of administration when intravenous access is established, dexamethasone should be considered a useful adjunct for periodontal therapy.