



“CLINICAL EVALUATION OF EFFICACY OF PROTEOLYTIC ENZYMES: TRYPSIN AND CHYMOTRYPSIN ON POST- OPERATIVE SEQUELAE FOLLOWING THE EXTRACTION OF IMPACTED MANDIBULAR THIRD MOLARS”

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ABSTRACT

Surgical removal of impacted third molars is one of the main procedures performed on young adults and adolescents. A randomised control trial consisting of 30 subjects in the age group of 18-50 years was undertaken to evaluate analgesic and anti-inflammatory efficacy of Proteolytic enzymes: Trypsin and Chymotrypsin on Swelling, Pain and Trismus after extraction of impacted mandibular third molars. Based on the present study, proteolytic enzymes: Trypsin and Chymotrypsin gave better results with respect to pain, swelling and trismus after removal of impacted mandibular third molars. They provide a safe and effective alternative to reduce the severity of postoperative discomfort after surgical removal of impacted mandibular third molars.

KEYWORDS : impacted mandibular third molars, proteolytic enzymes, trypsin, chymotrypsin

INTRODUCTION

Surgical removal of impacted third molars is one of the main procedures performed on young adults and adolescents, it is recommended when they present with certain symptoms, namely pain, food lodgement or with certain pathologic lesions. Sometimes prophylactic extraction of asymptomatic impacted third molars is also indicated by some professionals. Standard pharmacological therapy consists of use of antibiotics to prevent bacterial infections and analgesics to reduce pain. Commonly, Non-steroidal Anti-Inflammatory Drugs (NSAIDs) have often been prescribed to reduce inflammatory complications, especially pain, caused by third molar extraction.¹ However, the side-effects associated with the use of NSAIDs are numerous. Hence, a natural, effective, and safe remedy that lacks undesired side effects would offer a welcome alternative for treatment of sequelae after third molar surgery. Al-Sandook TA, 2014 cited that Proteolytic enzymes are administered to hasten the healing of damaged tissue and thus promote a complication free recovery.² According to Seymour, 1984 they reduce postoperative edema by their fibrinolytic effect which could increase tissue permeability by breaking down fibrin barriers.¹ Thus the following study was undertaken to evaluate the analgesic and anti-inflammatory efficacy of Proteolytic enzymes: Trypsin and Chymotrypsin on Swelling, Pain and Trismus after extraction of impacted mandibular third molars.

MATERIALS AND METHODS

A total of 30 subjects requiring extraction of impacted mandibular third molars in the age range of 18 to 50 years were selected and randomly divided into two groups. Patients selected had no pre-existing medical conditions or medications that would influence their ability to undergo surgery or alter their wound healing after surgery. Ethical Committee clearance was obtained for the study. A detailed case record was taken and written consent was obtained from each subject before surgery. The following medications were prescribed:

TEST GROUP: Prescription of Capsule Amoxicillin(500 mg)+ Tab Metronidazole (400 mg) + Tablet containing trypsin and chymotrypsin (in the ratio 6:1 with 1,00,000 a.u. of enzymatic activity)+Tab Paracetamol (500 mg) will be prescribed t.d.s. for three days post-operatively.

CONTROL GROUP: Prescription of Capsule Amoxicillin (500 mg) +Tab Metronidazole(400 mg)+Tab Paracetamol (500 mg) will be prescribed t.d.s. for three days post-operatively.

Evaluation Criteria:

1. Pain was evaluated pre-operatively and on first, third, fifth and seventh day

Post-operatively in both test and control groups using the VISUAL ANALOG SCALE (VAS).

2. Facial Swelling was recorded by a modification of a method described by Schultze-Mosgau et al, 1995³ by a flexible tape preoperatively and first, third, fifth and seventh day postoperatively. Measurements were taken by marking six fixed points (Fig-1) and five surgical base lines as described by Neupert EA et al, 1992⁴ in order to cover all possible directions of extension of swelling. The measurements were made in closed mouth position and linear distances were noted. The sum of all measurement was taken as the Facial Size.⁵

- S1: from the lateral canthus of the eye to the angle of the mandible.
- S2: from ala of the nose to the angle of the mandible.
- S3: from the corner of the mouth to the angle of the mandible.
- S4: from the soft tissue Menton to the angle of the mandible.
- S5: from the ala of the nose to the tragus of the ear.

Measurement of Facial Swelling using Modified Schultze-Mosgau et al Method



Fig 1-Six fixed points are marked: lateral canthus of eye, ala of nose, tragus of the ear, corner of the mouth, angle of the mandible and soft tissue menton.

3. Trismus was evaluated by measuring the distance between the mesial-incisal edges of the upper and lower right central incisors at maximum mouth opening in millimeters as described by Ustun et al, 2003⁶ at first, third, fifth and seventh post-operative days.

Surgical Procedure

Orthopantomogram (OPG) was taken for all subjects. Impactions were classified based on WINTER's classification of impaction and impacted mandibular teeth with similar difficulty index were selected for the study. A detailed case history was recorded and an informed consent was obtained prior to the surgery. Routine blood investigations were carried out.

Preoperatively, maximum mouth opening and facial size was recorded. Local Anaesthesia for all extraction procedures was obtained using 2% lignocaine hydrochloride with adrenaline [1:80000].

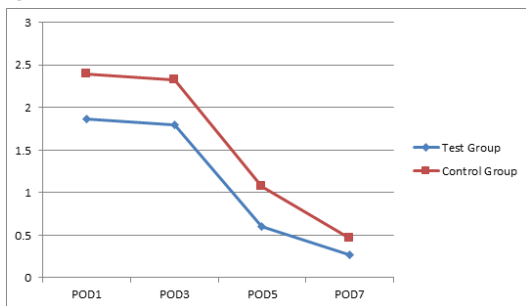
The subject was injected for an inferior alveolar nerve block and a long buccal nerve block. Ward's incision was taken and a full-thickness mucoperiosteal flap was reflected using a periosteal elevator and osteotomy around the crown of the impacted mandibular third molar was carried out along with odontectomy.

After all due procedures, the tooth was luxated using elevators and then extracted. Following removal of the impacted tooth, the surgical site was irrigated with sterile saline solution. Sharp bony edges were rounded off and the site was closed to achieve primary closure with 3-0 black-braided silk suture. All the subjects were given post-operative instructions and prescribed the above mentioned medications. Subjects were examined for pain, trismus (maximum mouth opening) and swelling (facial size) on the first, third, fifth and seventh day post-operatively.

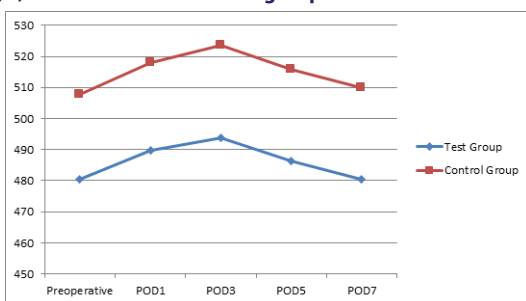
RESULTS (STATISTICAL ANALYSIS)

The software used for statistical analysis was SPSS software (Statistical Package of Social Sciences) Version 16. The samples were subjected to statistical analysis using Mann-Whitney U test, Kolmogorov – Smirnov test, Shapiro – Wilk test, Independent t- test for between groups. Level of significance was kept as 0.05.

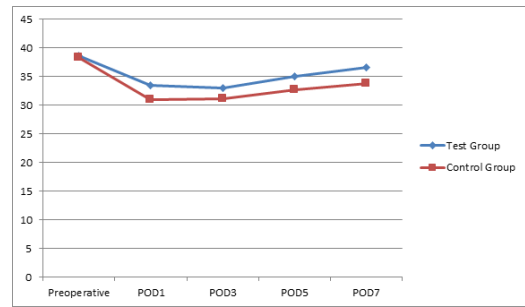
Comparison of Pain score:



GRAPH 1 – Mean wise comparison of pain on postoperative day – 1, 3, 5 and 7 in test and control groups



GRAPH 2 – Mean wise comparison of facial size pre-operatively and on postoperative day – 1, 3, 5 and 7 in test and control groups



GRAPH 3 – Mean wise comparison of trismus pre-operatively and on postoperative day – 1, 3, 5 and 7 in test and control groups

DISCUSSION

Strategy for managing the clinical symptoms after third molar removal is aimed at interfering with the inflammatory process in order to limit the intensity and shorten the duration of the clinical signs of inflammation: pain, edema, local hyperthermia, erythema, and loss of function.⁷ In maxillofacial surgery, various methods are used to decrease postoperative swelling, including pressure dressings, ice packs, and placement of drains. Excessive pressure in the lower third of face and neck result in severe discomfort and can compress the airway in some patients. Moreover, intraoral drains are usually not well tolerated by most patients.⁸ The use of ice bags to control edema after a maxillofacial procedure also has limited application.⁹ The use of enzymes like trypsin¹⁰, chymotrypsin¹¹, bromelain¹² as anti-inflammatory agents came into practice after it was observed during 1950s in USA.¹³ Enzymes are considered as extremely potent substances and the possibility of their therapeutic application is attractive.

Out of 30 patients, 15 were males and 15 were females. The mean age of the patients was 33.43 years.

While comparing pain scores, since p-value for the Mann-Whitney U test is less than 0.05 on POD 1(p=0.011), POD 3(p=0.005) and POD 5(p=0.034) indicates significance of difference between average pain score of test and control groups. But p-value is greater than of 0.05 (p=0.264) on POD 7 indicating that the difference between pain score of test and control groups is not significant.

In the comparison of facial size p-value less than that of 0.05 indicates significance of difference between the test and control on POD1, POD3, POD5 and POD7 using Independent t-test and the results were confirmed with Mann-Whitney U test.

As, p-value for the Independent t-test of POD1 (p=0.004), POD3 (p=0.031), POD5 (p=0.006) and POD7 (p=0.004) is less than that of 0.05 indicate significance of difference between trismus of test and control groups.

The short coming of this study, which could affect our ability to generalize the findings, was the method of measurement of the volume of facial soft tissue. Transfer of the contour is subject to errors inaccuracy and reproducibility, and is not as accurate as Computed Tomography (CT) or Magnetic Resonance Imaging (MRI) for making precise measurements. On the other hand, it is a non-invasive, simple, cost-effective, and time-saving.

SUMMARY AND CONCLUSION

Based on the present study, proteolytic enzymes: Trypsin and Chymotrypsin gave better results with respect to pain, swelling and trismus after removal of impacted mandibular third molars. They provide a safe and effective alternative to reduce the severity of postoperative discomfort after surgical removal of impacted mandibular third molars

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