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## Clinical Observation

# Comparative evaluation of efficacy of tissue glue and sutures after surgical removal of impacted mandibular third molars – A prospective controlled clinical study



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## ABSTRACT

**Objective:** To evaluate the efficacy, advantages, and disadvantages of cyanoacrylate glue (Iso Amyl 2-Cyanoacrylate) for sutureless wound closure after surgical removal of impacted mandibular third molars. **Materials and methods:** Fifty patients with bilaterally symmetrical impacted mandibular third molars were studied in this controlled clinical trial. On the control side closure after surgical removal of third molar was done with conventional sutures and with cyanoacrylate glue on the study side.

**Results:** The data analysis showed that the severity of postoperative pain with cyanoacrylate glue method was less significant than with suturing on the 1st, 2nd, and 7th day after surgery whereas postoperative bleeding and swelling with cyanoacrylate glue method were less significant than with suturing on the 1st postoperative day.

**Conclusion:** This study suggested that the efficacy of both, cyanoacrylate glue and suturing, was similar in wound healing, but the use of cyanoacrylate glue showed better hemostasis, decreased pain and swelling and was expeditious.

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## 1. Introduction

Removal of mandibular third molar is a routine procedure performed in the dental office. Most surgeons agree that surgical time, trauma, and difficulty are important factors in postoperative complications. The postoperative period following surgical removal of the third molars is frequently characterized by swelling, bleeding, and pain. After removal of the impacted mandibular third molars, the conventional method is to suture the surgical wound and let it heal by primary intention. Suturing in this area is not always easy, due to inaccessible area, time consumption, and requirement of good suturing skills. Resorbable sutures take time to get resorbed completely and can cause food lodgment and irritation to the patient which needs to be removed at times. Besides the

difficulties one faces during operative procedures with suturing methods, additional second visit is required for removal of suture. To overcome these disadvantages, an alternative to the sutures, plastic adhesives (cyanoacrylate) were discovered in 1949 by a German chemist and 10 years later Coover et al. reported their use in surgical procedures and submitted the report to the Food and Drug Administration (FDA) in 1964 [1–7].

Cyanoacrylate glue is an acrylic resin which consists of two separate liquids, one for pouring into the mold and another used sparingly as a hardener. In case of cyanoacrylate glue, the hardener is water. If cyanoacrylate glue is placed on a perfectly dry surface, it cannot form a bond with the surface. But if there is even the slightest amount of water present, including moisture from the air, the molecules of the glue have a chemical reaction and form into tight chains between the two surfaces being bonded. This reaction happens within seconds of the water and cyanoacrylate making contact. Traditional white glues rely on evaporation to form their bonds, but cyanoacrylate glue generates its own heat for faster curing. This heat may damage soft tissue and hamper its blood supply. To avoid this, manufacturers have incorporated long chains of methyl group due to which polymerization [8,9] process is elongated and the rate of heat generation prolongs. Because

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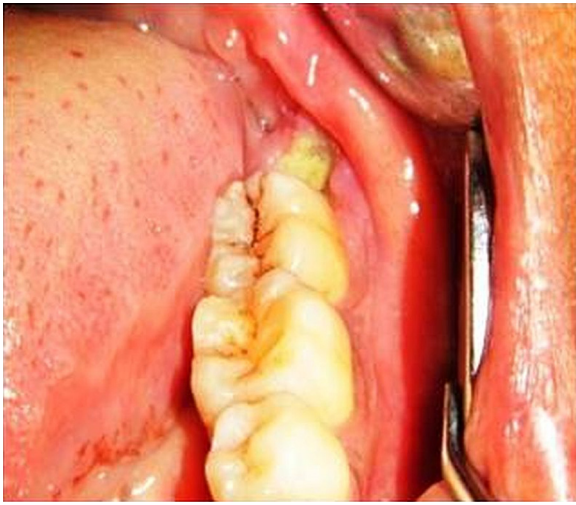


Fig. 1. Preoperative study side.



Fig. 2. Preoperative control side.

intraoral mucosa is naturally moist in the presence of saliva, the use of cyanoacrylate glue may find itself as an involuntary participant in the bonding process.

Polymerization of the cyanoacrylate occurs within 10–15 s. These are not absorbable and are sloughed from the surface of the skin and mucosa 7–10 days after adhesive application. In the maxillofacial field, it has been used for wound closure on extraction sockets [2,10–12], face, sinus perforation in sinus lift [2,12], gingivectomy, mucogingival flaps, biopsy, superficial oral ulcerations, recurrent multiple aphthous ulcers [2,11,13], other sites in general surgery like axilla, lungs [2,13], heart [2,14], and scalp wounds [1,2,15], circumcision [2,16], perineum, trocar sites [2,17], as a hemostatic means to control bleeding from skin graft [2,18], hair transplant donor sites, cleft lip repair [2,4,19], face lifts, blepharoplasty [1,2,20], brow lifts, and other cosmetic surgeries [1,2,14] and to do various anastomoses of intestine, arteries [2,14], and nerves [2,21].

This prospective study compares silk sutures with cyanoacrylate glue for wound closure after the removal of mandibular impacted third molars, evaluating the incidence of postoperative sequel of bleeding, wound healing, pain, and swelling.

## 2. Materials and methods

Fifty patients (20 males and 30 females) reporting to the Department of Oral and Maxillofacial Surgery, with bilaterally symmetrical impacted mandibular third molars (classified as per George Winter's classification), requiring surgical removal under local anesthesia were selected for the present controlled clinical study (Figs. 1 and 2). Orthopantomogram was obtained to assess the class and severity of third molar impaction (Fig. 3). Routine hemogram and urine analysis were done.

Inclusion criteria:

- 1) Patients between 18 and 35 years of age of both the sexes.
- 2) Healthy patients without any systemic disorders.
- 3) Nonsmokers.
- 4) Not allergic to the drugs or anesthetic agent used in the surgical protocol.

Institutional ethical committee approval and the informed written consent were obtained from all the patients. The surgical procedures were performed by a single operator to avoid bias. Inferior alveolar, long buccal, and lingual nerves were anesthetized with 2% lidocaine hydrochloride with epinephrine 1:200,000. A

full-thickness Ward's incision was placed and mucoperiosteal flap was reflected. After adequate bone removal, the tooth was removed followed by curettage and toileting of the socket. The flap was repositioned and closed with 3–0 silk suture (Mersilk 3–0, Johnson & Johnson Ltd., Aurangabad, India) in an interrupted fashion on the control side of all the patients (Fig. 4). The sutures were removed after 7 days. Similar procedure until the flap closure was done on the other side (study side). The flap was repositioned and isolated with sterile dry gauze. The 1st layer of cyanoacrylate glue [Amcrylate (Iso Amyl 2-Cyanoacrylate) – Concord Drugs Ltd., Hayathnagar, AP, India] was put on the incision line by droplet method, followed by another layer after 20 s (Figs. 5–9).

All the patients received postoperative instructions. Patients were advised to maintain the oral hygiene from the day after surgery using mouthwash (0.12% chlorhexidine) twice daily. All the patients were given similar postoperative antibiotics and analgesics (Cap. Amoxicillin 500 mg TID for 5 days and Tab. Diclofenac Sodium 50 mg + Paracetamol 400 mg TID for 3 days).

The pain, bleeding, postoperative edema, and wound healing recording forms were completed on the 1st, 2nd, and 7th day (Tables 1–3).

Evaluation of postoperative edema was done by measuring the distances between lateral corner of eye to gonion (EG), tragus to outer corner of the mouth (TM), and tragus to pogonion (TP) (Fig. 10). Inferences were drawn with the equation:  $EG + TM + TP = \dots \text{mm}/3$ .



Fig. 3. Preoperative OPG.

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