

# CYANOACRYLAE ADHESIVE IN ORAL SURGERY- A REVIEW

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## **ABSTRACT**

**Background:** Cyanoacrylate(CA) adhesives have a variety of application in medicine and dentistry as a tissue adhesive. CA saves time by more rapid closure and might serve as a suitable alternate to traditional suturing it however carries its own advantages and disadvantages. The aim of this paper is to evaluate the use of CA adhesives in various oral surgical procedures.

**Materials and methods:** A literature search was carried out in PubMed central and Medline Database with keywords oral surgery, tissue glue, cyanoacrylate, tissue adhesive.

## **1. INTRODUCTION**

Cyanoacrylate tissue adhesives are biocompatible glues that has been in study for the past few years as a replacement to traditional sutures in wound closure as it could significantly reduce the risk of transmission of infections and percutaneous injuries from the suture needle however factors like biocompatibility, stability and working time should also be considered<sup>1,2</sup>. Cyanoacrylates are available as methyl, ethyl, n-butyl, isoamyl, iso hexyl, and octyl cyanoacrylates depending upon the length of the polymeric chains and their complexity.<sup>3</sup> These cyanoacrylates are available as liquid monomer that rapidly undergoes exothermic polymerization in presence of -OH ions available in the tissue's moist environment<sup>4</sup>. cyanoacrylate adhesives finds its application in closure of surgical and trauma wounds<sup>5</sup>, embolotherapy for complex cerebral vascular anomalies<sup>6</sup> gynaecology, gastroenterology, neurosurgery, orthopaedics, plastic surgery, dermatology and urology<sup>7</sup>. This review article aims at providing a brief summary of the use of CA adhesive with regard to their advantages and disadvantages.

## 2. USES IN ORAL AND MAXILLOFACIAL SURGERY

Herod<sup>8</sup> was the first one to review the cyanoacrylate adhesive use in dentistry; Mehta et al was the first to conduct a study on the adhesive in oral surgery<sup>9</sup>. Butyl cyanoacrylate was used in osteosynthesis treatment of mandibular fractures and were followed up for the next 6 months. According to Enrico foresta et al N-Butyl-2-Cyanoacrylate can be used in the treatment of comminuted bone fractures involving the maxillofacial region . no adverse effects were detected. The Cyanoacrylate adhesive aids in the fracture alignment and osteosynthesis of the fractured fragments. Wiecko et al used the N-Butyl-2-Cyanoacrylate adhesive for 4 people with fracture of frontal sinus. Mehta et al used N-Buty

l-2-Cyanoacrylate adhesive for osteosynthesis of mandibular fracture after reduction. Kim et al suggested the use of N-Butyl-2-Cyanoacrylate adhesive for repair, alignment and osteosynthesis of small comminuted fracture fragments. Although benefits of using the adhesive overweighs the risk of development of allergy, infections and pseudo arthrosis. According to a study performed by salata et al<sup>10</sup> in animal models it was found that with the use of cyanoacrylate adhesive there was a much lesser inflammation and higher induced mineralized tissue volume compared to fixation using plates and screws. CA adhesives has also been widely experimented for use in alveoloplasty procedures, cleft lip and palate surgery and socket preservation.

According to choi et al<sup>11</sup> observed that there was a complete healing of the Schneiderian membrane following the use of CA adhesive for the maxillary antral perforation closure. studies have also demonstrated the use of cyanoacrylates for wound closure following intra oral incision and excision biopsies, fracture and also as a hemostatic agent following impaction removal<sup>12</sup>, and also in aesthetic surgical procedures like blepharoplasty , facelift, eyebrow lift.

## 3. INDICATIONS

Indications for the use of CA adhesives are as follows

- ✓ Oesophageal fistula closure
- ✓ Skin wound closure
- ✓ Mammoplasty
- ✓ Grafting of Bone and cartilage
- ✓ Occlusion of varicose vein
- ✓ Corneal surgery
- ✓ Maxillofacial trauma
  - Fracture of anterior wall of maxillary sinus
  - Orbital floor and roof
  - Anterior wall of frontal sinus

## 4. CONTRAINDICATIONS

Contraindications for the use of Cyanoacrylate adhesive are as follows

- ✓ Subjected areas of joint tension
- ✓ Subjected areas of friction
- ✓ infection and/or contaminated areas with exudate<sup>13</sup>
- ✓ conjunctival procedures
- ✓ patients having allergy to cyanoacrylate<sup>14</sup>.

## 5. ADVANTAGES AND DISADVANTAGES OF CYANOACRYLATE ADHESIVE

### 1. ADVANTAGES

- ✓ good biodegradability
- ✓ good hemostatic and bacteriostatic properties
- ✓ ease of application
- ✓ accelerated healing
- ✓ accelerated epithelial keratinization
- ✓ reduced time and discomfort
- ✓ pain free
- ✓ no potential for necrosis
- ✓ no dehiscence
- ✓ reduced inflammation
- ✓ significantly lesser erythema and sensitivity

### 2. DISADVANTAGES

- ✓ High cost
- ✓ Reduced tensile strength
- ✓ Allergic reactions

### 6. DISCUSSION

Local application of cyanoacrylate adhesive is a very effective and reliable procedure in bleeding disorder patients undergoing oral surgical procedures. Additionally, a significant reduction in blood loss during and after oral surgical procedures was observed aiding in facilitating multiple surgical procedures. With the use of CA adhesives there is a significant cost reduction in treatment and rapid haemorrhage control which in turn reduces the patient's anxiety. It is important to note that these cyanoacrylate resins serves its function well even in moist environment thus making it very suitable for intraoral surgical procedures, these adhesives form a polymer chain when it comes in contact with saliva and holds the wound margins together<sup>15</sup>. However, application of the adhesive in extremely moist surface poses a challenge since the material sets quickly. Moreover the tissue adhesives does not carry the risk of transmission of infections and also exhibit a very good bacteriostatic property.

### 7. CONCLUSION

Although tissue adhesives appear to have several advantages there is a serious disadvantage of exothermic heat production during the process of polymerization. Even though the current literature provides with convincing results on safety, ease of application of these cyanoacrylate adhesives additional research with larger patient populations and different study designs is necessary for further conclusions

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