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Case Report

Joining Tissues with no Strings Attached- Using Cyanoacrylate as an Alternate to Suturing - A Case Report

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Introduction

Cyanoacrylates have been used for more than 50 years in surgery. They were initially used as surgical glue [1-3]. Cyanoacrylates are bio adhesives that were first used for surgery by Coover., *et al*. [4,5] in 1959. The use of cyanoacrylate has been extended recently to include maxillofacial procedures like repair of sinus membrane perforation [10], dressing for alveolopalatal wounds after alveolar bone grafting [11], all with high success rate. According to a report by Bhaskar., *et al*. [13], the absence of seepage under the covering formed by cyanoacrylate may be responsible for the reduced postoperative pain with cyanoacrylate when compared with the conventional dressings. They also observed that this material inhibits Staphylococcus aureus and Escherichia coli growth, thus minimizing infective sequelae [13]. The original implant surgical protocol proposed by Branemark., *et al*. [15] involves open flap access, sequential osteotomy of the bony ridge, and implant placement followed by good primary closure. Primary wound closure helps achieve a higher tensile strength of the wound in the early healing phases, which prevents wound disruption [19]. In this Case Report we have utilized iso- amyl 2- cyanoacrylate solution and 3-0 silk sutures so as to evaluate the efficacy of each and the advantage of one over another.

Case presentation

A 45-year-old female patient reported to the Department of Prosthodontics and Implantology with the chief complain of missing teeth and she requested for replacement of the same. On examination, the patient presents with completely edentulous upper and lower arches with a resorbed mandibular ridge (Order IV) with flabby tissue (Figure 1 and 2). The treatment options were explained to the patient after which the patient opted for an upper complete denture with a lower implant supported over denture. Post medical investigations, the patient was found to be medically fit to undergo the implant surgery.

4 single piece ball attachment implants (Osstem MS SA) were planned to improve the retention of the lower denture.

An informed consent was obtained from the patient about the use of the iso- amyl 2 - cyanoacrylate solution having the following specification- medicated tissue adhesive - Iso Amyl 2 - Cynoacrylate, Manufactured by Concord Drugs Ltd, dispensed in ampules of 0.25, 0.50 and 1 ml; and surgery along with a patient information sheet explaining the procedure.

Figure 1: Edentulous Maxillary Arch.

Figure 2: Edentulous Mandibular Arch.

Bilateral Ward's incisions were given in the region of 33 - 35 and 43 - 45 for a full-thickness flap to be reflected using a Molt 9 periosteal elevator. The implants were placed. A split mouth technique where the flap was repositioned and closed with 3-0 silk sutures in an interrupted fashion with 4 sutures in the region of 43 - 45 was used. The contralateral side (33 - 35) was isolated with a sterile gauze and a layer of iso-amyl 2-cyanoacrylate was put on the incision line by droplet method followed by another layer after 20s (Figure 3). This ensured that the heat generation does not damage the bone or implant. The iso- amyl 2- cyanoacrylate solution was kept slightly shy of the implant.

Figure 3: Sutures and Cyanoacrylate application to achieve closure.

The patient was given postoperative instructions and advised to maintain oral hygiene using a mouthwash with 0.12% chlorhexidine twice daily. Antibiotics and analgesic (Cap. Amoxicillin 500 mg BD for 5 days and Tab. Diclofenac Sodium 50 mg BD for 3 days) were adviced. The patient was kept on a 15 day follow up.

Evaluation and comparison:

1. The time taken for the approximation of the flaps was evaluated.
2. Immediate post-operative bleeding
3. Pain evaluated using VAS scale* after 1 day, 7 days and 15 days post operatively
4. Post-operative healing after 1 day (Figure 4), 7 days (Figure 5) and 15 days (Figure 6) was assessed using a Gingival healing Index# by Landry., *et al.* (1988) [20,21].

Figure 4: 1 Day Post- operative healing.

Figure 5: 7 Day Post- operative healing.

Figure 6: 15 Day Post- operative healing.

#Gingival healing Index:

+1 = very poor: without epithelium at the incisional edges, pus and infection, bleeding in palpation, more than 50% of gingival tissue is red

+2 = poor: granulation tissue formation at incisional edge, bleeding in palpation, connective tissue exposure without covering epithelium, more than 50% of gingival tissue is red

+3 = good: without bleeding in palpation, granulation tissue, and connective tissue exposure, 50% of gingival tissue is red

+4 = very good: without bleeding in palpation, granulation tissue, and connective tissue exposure, 25% of gingival tissue is red

+5 = excellent; pinkish gingiva, without bleeding in palpation, granulation tissue, and connective tissue exposure.

The findings were compiled and concluded that the time taken to achieve flap closure was lesser, the bleeding was lesser and the pain was lesser as well in the site approximated using cyanoacrylate.

The healing at the cyanoacrylate site was better 1 day after and 7 days after closure.

Discussion

The time taken to achieve approximation by the iso- amyl 2- cyanoacrylate solution was significantly lesser due to the ease of application when directly compared to suturing.

There was no immediate post operative bleeding on the site of the iso- amyl 2- cyanoacrylate solution when compared to the suture site.

Amcrylate prevents food accumulation around the site hereby reducing the bacteria load and inflammation around a site which promotes better healing.

The severity of pain and bleeding are indicators of a patient's comfort during the postoperative period post implant placement. The results of the assessment showed a significant difference in pain for both the groups on the 1st and 7th day, where the severity was found to be maximum on the sutured site. On the 15th day, there was no significant difference between both the sites.

In the given case scenario, iso- amyl 2- cyanoacrylate solution proved to be a viable, if not better option to suturing.

Conclusion

The use of cyanoacrylate could be a viable alternative to suturing.

Advantages

1. Minimal post- operative pain or discomfort.
2. Reduces any post-operative bleeding.
3. Reduces wound dehiscence.
4. Permits uneventful healing of the gingiva.
5. Lesser chairside time.
6. More hygienic as it does not facilitate plaque accumulation.
7. Saves the patient an extra appointment for suture removal.

Disadvantages

It is expensive when compared to sutures.

The main potential problem of cyanoacrylate is the heat production during polymerisation. We tried to avoid this by careful drop by drop application with protection of the surrounding tissues with gauze and ointment

Consent

Written informed consent was obtained from the patient for publication of the case report and accompanying images.

Data availability

All data generated or analysed during this study are included in this published article (and its supplementary information files).

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