www.jchr.org

JCHR (2024) 14(1), 2512-2515 | ISSN:2251-6727



Soft tissue augmentation of free gingival graft by cyanoacrylate adhesive in free mucosal graft surgery: a report of three cases

Dr.Sharmista Sen^{1*}, Dr. Ananya Pathak², Dr. Suman Kumari³, Dr.Arubarna Dasgupta⁴, Dr.Abhijit Chakraborty⁵, Dr..Himadri Chakrabarty⁶

^{1*}PGT, Department of Periodontics, Guru Nanak Institute of Dental Science and Research, Kolkata, India, Email iddrsharmistasenbora@gmail.com

²PGT, Department of Periodontics, Guru Nanak Institute of Dental Science and Research, Kolkata, India

³PGT, Department of Periodontics, Guru Nanak Institute of Dental Science and Research, Kolkata, India

⁴PGT, Department of Periodontics, Guru Nanak Institute of Dental Science and Research, Kolkata, India

⁵Professor and HOD, Department of Periodontics, Guru Nanak Institute of Dental Science and Research, Kolkata, India ⁶Professor, Department of Periodontics, Guru Nanak Institute of Dental Science and Research, Kolkata, India

*Corresponding Author-Dr.Sharmista Sen

*PGT, Department of Periodontics, Guru Nanak Institute of Dental Science and Research, Kolkata, India Email id- drsharmistasenbora@gmail.com, ph 8777513366, 9432284024

(Received: 05 November 2023	Revised: 12 December	Accented: 07 January
(Received: 05 November 2025	Revised. 12 December	Accepted: 07 January

KEYWORDS

Stabilisation, Cyanoacrylate based chemical adhesives, Sutures, Gingival recession, Free gingival graft. **ABSTRACT**: A free mucosal graft (FMG) technique is a periodontal surgical procedure that is commonly used for treating inadequate width of attached gingiva and gingival recession. Success of this procedure depends upon stabilization and minimum movement of graft that maintains proper vascularity during healing. Surgical sutures are conventionally used for stabilization of gingival graft but may have complications such as over strangulation of graft, trauma, dislodgement of graft, food accumulation, infection, bacterial contamination and delayed wound healing. Cyanoacrylate based chemical adhesives are very promising alternatives and used in a wide spectrum of surgery in medical and dental field. They have low toxicity and it is efficacious in reducing complications along with haemostatic and bacteriostatic property. They are easy to use, reduces operation time, post operative pain and inflammation and promotes superior tissue coverage by proper stabilization. A series of three cases are presented in this article where Cyanoacrylate based adhesives are used as stabilizing agent for graft in FMG surgery in patients presented with gingival recessions

INTRODUCTION

The free mucosal graft (FMG) technique is a periodontal plastic surgical procedure that is one of the oldest procedures for treating gingival recession [1]. The process helps to create vestibular depth and increase attached keratinized tissue zone [2]. Achieving success and predictable results with this procedure is dependent on many factors like harvested graft tissue dimensions (width, height and thickness), proper recipient site preparation and most importantly stability of the graft [1] [3]. Success of this procedure depends upon stabilization and minimum movement of graft that maintains proper blood supply during healing. Avoidance of strangulation and stretching of graft by over suturing is an important factor. Uniform distribution of pressure over graft is important for the successful procedure [4] [1]. Surgical sutures have been used conventionally for stabilization of gingival

2

graft and the wound closure by this process showed complications such as fistulation and granuloma. The suture materials have drawbacks like food accumulation, infection, bacterial contamination and delayed wound healing. As periodontal grafts are very fragile stabilization through suturing is also very technique sensitive [5][6]. To overcome these limitations a search for suitable alternatives to suture technique was there for long. Cyanoacrylate based chemical adhesives are very promising alternatives and used in a wide spectrum of surgery in medical and dental field. These adhesives presented with low toxicity and have shown to be simple and efficacious in reducing healing complications along with haemostatic, bacteriostatic and bactericidal effects [7]. They are easy to use, set quickly when applied and ultimately helps in attaching the tissues firmly [1]. A series of three cases are presented in this article where Cyanoacrylate based



adhesives are used as stabilizing agent for graft in FMG surgery in patients presented with gingival recessions.

CASE REPORT

Three adult patients [patient 1, 2 and 3] with Cairo type 3 gingival recession and loss of clinical attachment level were referred to Department of Periodontics. Thorough systemic check-up was done and medical history was non- contributory. A clinical decision of FMG with Cyanoacrylate glue as stabilizing agent for Free gingival graft was taken.

Preparation of the recipient site: The recipient surgical site was prepared in all the three cases under local anaesthesia (2% lignocaine with 1:80000 adrenaline) and the purpose of this step is to prepare connective tissue bed to receive the graft. The recipient is prepared by giving incision at the existing mucogingival junction with 15 C blade at desired depth, vertical incision is made from adjacent teeth on both the sides of recession, the overlying keratinized epithelial tissue were excised leaving the connective tissue bed, tissue tags were removed and bleeding at the recipient site was controlled using moderate pressure with sterile gauze dampened with saline for 5 minutes. A template was prepared to harvest graft from the donor site.

Obtaining the graft from donor site: The free gingival graft consists of epithelium and a thin layer of underlying connective tissue was collected from the donor site (palate). The template representing the recipient site was placed over the palate (donor site) and a shallow incision was made around with no.15 C blade . The blade was inserted to the desired thickness at one edge and lifted using a tissue forceps. The graft was separated using a blade till it was free from all sides. Tissue tags were removed and trimmed to required size. A prefabricated palatal acrylic plate was placed to protect the donor site.

Stabilization of the graft with cyanoacrylate glue: The free grafts were stabilized on the recipient bed with minimum amount of cyanoacrylate based adhesives (iso amyl 2- cyanoacrylate). Drop of the adhesive was used to seal the borders of the graft. Care was taken to avoid the introduction of the cyanoacrylate between the graft and surgical bed. Patients were evaluated at immediate postoperative, 7 days postoperative and 30 days post operative intervals [Figure 1, Figure 2, Figure 3].

It was noticed all the three patients had practically minimum pain after surgery [Table 1] and clinical attachment levels also improved for all the three patients [Table 2].

Table 1: Pain assessment as per numerical pain assessment scale of patient 1, patient 2 and patient 3 in immediate
postoperative , 7 days post operative and 30 days post operative period.

	Immediate post operative	7 days post operative	30 days post operative
Patient 1	2	0	0
Patient 2	3	1	0
Patient 3	5	2	0

Table 2: Clinical attachment levels of patient 1, patient 2 and patient 3 in preoperative and 30 days post operative period.

	Clinical attachment level preoperative (in mm)	Clinical attachment level 30 days postoperative (in mm)
Patient 1	5	0.5
Patient 2	6	1.5
Patient 3	6	1

DISCUSSION

Cyanoacrylate based adhesives are materials composed of synthesized monomers, cyanoacetate and formaldehyde mixed in the presence of catalysts to form adhesive film that forms by fast polymerization and is aggravated by hydroxyl groups to be glued [8]. Their chemical formula is CH2=C(CN)-COOR, (R is any alkyl group, that ranges from methyl to 2 of 4 decyl). Substituting alkyl chains with longer molecular chain can decrease tissue toxicity [9]. Cyanoacrylates are biocompatible and effective adhesive having bacteriostatic and hemostatic properties. They are easy to use, sets quickly and are not needed to be removed during follow-ups. [7][1]. They become hard in

Journal of Chemical Health Risks www.jchr.org JCHR (2024) 14(1), 2512-2515 | ISSN:2251-6727



presence of fluids like blood or saliva and have good biodegradability [10].

These materials give mechanical barrier that stops debris and food collection, thus decreasing healing time and fasten epithelial keratinization. Patients have improved satisfaction levels for Cyanoacrylates. [10] [11]. As they do not need needles for application, the risk of puncture accidents are eliminated [12]. Their application is pain free so ideal for anxious or fearful patients [10].

Some side effects are also reported, like irreversible retinal damage, so patients are given eye protection during the process [1]. Other disadvantages are relatively high cost [10] and reduced tensile strength [13].

According to a case report by *Rezende et.al.* [14] use of such adhesives show esthetic results after four years

of the grafting a resorbable membrane by cyanoacrylates in a vertical bone defect to allow guided tissue regeneration. *Perez M et.al.* [15] got good tolerance in 19 patients fixing mucogingival grafts with such adhesives. In the present case series, in all the three cases the patients showed satisfactory amount of tolarance and an increase of clinical attachment levels with better esthetic results.

CONCLUSION

To conclude it can be said that the cyanoacrylate adhesives are very promising alternative to conventional suture technique in periodontal surgery but more long term studies and clinical cases are needed to be performed to establish the claim.

FIGURES



Figure 1: Preoperative [A], Immediate postoperative [B], 7 days postoperative [C], 30 days postoperative [D] Clinical picture of patient 1



Figure 2: Preoperative [A], Immediate postoperative [B], 7 days postoperative [C], 30 days postoperative [D] Clinical picture of patient 2



Figure 3: Preoperative [A], Immediate postoperative [B], 7 days postoperative [C], 30 days postoperative [D] Clinical picture of patient 3

Journal of Chemical Health Risks

www.jchr.org

JCHR (2024) 14(1), 2512-2515 | ISSN:2251-6727



REFERENCES

- AlJasser RN, AlSarhan MA, AlOtaibi DH, AlOraini S, AlNuwaiser R, AlOtaibi A: Comparison of Polymeric Cyanoacrylate Adhesives with Suturing in Free Gingival Graft Stability: A Split Mouth Trial. Polymers (Basel).Sullivan, H.C.; Atkins, J.H: Free autogenous gingival grafts. I. Principles of successful grafting . Periodontics. 1968, 6:121-129.
- Grisdale, J: The use of cyanoacrylates in periodontal therapy. Can. Dent Assoc. 1998, 64:632-633.
- 3. Donoff, R.B: Biological basis for vestibuloplasty procedures. J. Oral Surg. 1976, 34:890-896.
- 4. Kumar MS, Natta S, Shankar G, Reddy SH, Visalakshi D, Seshiah GV: Comparison between Silk Sutures and
- Cyanoacrylate Adhesive in Human Mucosa- A Clinical and Histological Study. J Int Oral Health. 2013, 5:95-100.
- 6. Breault, L.G: The free gingival graft combined with the frenectomy: a clinical review . General Dentistry.1999, 47:514-518.
- Barbosa FI, Corrêa DS, Zenóbio EG, Costa FO, Shibli JA: Dimensional changes between free gingival grafts fixed with ethyl cyanoacrylate and silk sutures. J Int Acad Periodontol. 2009, Levin, M.P.; Cutright, D.E.; Bhaskar, S.N: Cyanoacrylate as a periodontal dressing. J. Oral Med . 1975, 30:40-43.
- 8. Brauer, G.M.; Jackson, J.A.; Termini, D.J: Bonding of acrylic resins to dentin with 2-

Cyanoacrylate esters . J. Dent. Res. 1979, 58:1900-1907.

- Borie E, Rosas E, Kuramochi G, Etcheberry S, Olate S, Weber B: Oral Applications of Cyanoacrylate Adhesives: A Literature Review. Biomed Res Int. 2019.
- M. Ghoreishian, R. Gheisari, and M. Fayazi: Tissue adhesive and suturing for closure of the surgical wound afer removal of impacted mandibular third molars: A comparative study,. Oral Surgery, Oral Medicine, Oral Pathology, Oral Radiology, and Endodontology, vol. 108, no. 1, pp. e14-e16. 2009,
- F A Al-Belasy and M. Z. Amer: Hemostatic efect of n-butyl2-cyanoacrylate (histoacryl) glue in warfarin treated patients undergoing oral surgery, Journal of Oral & Maxillofacial Surgery, vol. 61, no. 12, pp. 1405- 1409. 2003,
- P. Sagar, K. Prasad, R. M. Lalitha, and K: Ranganath, "Cyanoacrylate for intraoral wound closure: a possibility?". International Journal of Biomaterials, vol. 201516542862015.
- 13. M. L. R. D. Rezende, P. D. O. Cunha, C. A. Damante, A. C. P. Santana, S. L. A. Greghi, and M. S: R. Zangrando, "Cyanoacrylate adhesive as an alternative tool for membrane fxation in guided tissue regeneration,"Te Journal of Contemporary Dental Practice, vol. 16, no. 6. 512:518.
- Perez, I. Fernandez, D. Marquez, and R: M. Bretana, "Use of N-butyl-2-cyanoacrylate in oral surgery: biological and clinical evaluation," Artificial Organs, vol. 24, no. 3. 241:243.