EAS Journal of Dentistry and Oral Medicine
Abbreviated Key Title: EAS J Dent Oral Med
ISSN: 2663-1849 (Print) & ISSN: 2663-7324 (Online)
Published By East African Scholars Publisher, Kenya

OPEN ACCESS

Volume-7 | Issue-1 | Jan-Feb-2025 | DOI: https://doi.org/10.36349/easjdom.2025.v07i01.009

Review Article

An Appraisal of Current Evidence Based Studies on Mechanical and Chemical Methods of Gingival Retraction in Fixed Partial Denture Prosthodontic Treatments

Noopur Rathi[1*], Mansi Bansal[1], Tanuj Minocha[2]

[1]Department of Prosthodontics, Divya Jyoti College of Dental Sciences, ABVMU, Uttar Pradesh, India
[2]Department of Periodontics, Divya Jyoti College of Dental Sciences, ABVMU, Uttar Pradesh, India

Article History
Received: 22.12.2024
Accepted: 28.01.2025
Published: 24.02.2025

Journal homepage:
https://www.easpublisher.com

Quick Response Code

Abstract: Gingival health is crucial to the longevity of natural teeth and the surrounding periodontium, especially when the teeth are restored. Fixed partial dentures that replace missing tooth/teeth utilise natural abutment teeth to retain the prosthesis. During impression procedures, it's crucial to replicate the margin of the restoration, an important landmark. Over the last decade, digital dentistry has introduced a vast range of new materials to the field of dentistry. Many new materials for gingival retraction procedures have also been introduced that work on different principles than conventional retraction cords. This review was aimed at appraising the recent evidence for which the literature search between the years 2010 and present was performed. Many new materials and refinements of chemicals used along with retraction cords have been investigated, which have been more advantageous clinically while causing less harm to the gingiva.

Keywords: Gingival displacement, gingival retraction, retraction cord, adrenaline, aluminum chloride, gingitage.

INTRODUCTION

Rehabilitating patients who have partially missing teeth typically involves the use of fixed partial dentures (FPDs) in various forms and designs. It is common practice to restore damaged teeth using indirect restorations, such as bonded ceramic inlays and onlays, metal-ceramic crowns, partial veneer restorations, full crowns, and cast gold inlays and onlays [1]. Often, the restoration takes the shape of a single crown, which is considered mandatory to protect an endodontically treated tooth or teeth. The prosthodontist is responsible for the restoration's long-term durability and aesthetics, while endodontists are responsible for the clinical success of endodontic therapies [2]. To have an everlasting FPD treatment, one needs to pay close attention to its interactions with the surrounding and adjacent firm and soft tissues. While supragingival margins of the restorations are advantageous, many clinical scenarios necessitate subgingivally placed margins, as prosthesis rejection is more rapid than periodontal deterioration-induced failure [3, 4]. Problems with the contour, roughness, or margins of surfaces can irritate periodontal tissues, leading to unhealthy gums and bacterial plaque retention, thereby affecting oral hygiene procedures. Plaque biofilm building up in and around the tooth-gingiva junction, along with other risk factors, often causes an inflammatory immune response in the host, which can be harmful in some cases [5]. Improper contouring can impinge on gingival tissues, leading to ischaemia and tissue breakdown, worsening periodontal disease, and hindering aesthetic outcomes of restorations. In places where saliva has less of an impact, like deep gingival pockets, interproximal regions, or under removable appliances, the released byproducts of restorative materials also contribute, either directly or indirectly, to this inflammation [6, 7]. Periodontal health is crucial for the success of prosthodontic restorations, with full coverage restoration being the most influential [8]. Precision impressions are essential for creating precise dies, but clinicians often struggle to obtain sufficient cervical finish lines [9].

Gingival displacement procedures register the subgingival finish line and surrounding area. When making an impression with intracrevicular margins, the technique called gingival "displacement" rather than gingival "retraction" is employed [10]. During the procedure, the gingival tissues are reversibly displaced to the side in order to capture the marginal detail. Displacement of gingiva is performed while at the same

***Corresponding Author:** Noopur Rathi
Department of Prosthodontics, Divya Jyoti College of Dental Sciences, ABVMU, Uttar Pradesh, India

time a low-viscosity impression material is introduced into the widened sulcus to capture the preparation details [11]. To get the most accurate results and make the material tear stronger so it can be removed from the mouth without tearing, one needs a lot of impression material. Regarding this matter, it appears that the gingival sulcus width is around 0.2 mm [4, 9]. When the width of an impression is fewer than 0.2 mm, the impression material tears more easily, the marginal area has a higher incidence of voids, and the marginal accuracy is reduced [12, 13]. Making sure that some impression material flows over the prepared margin is absolutely necessary. As a result, the recovered die can be precisely trimmed. Gingival displacement procedures can be challenging for clinicians who lack expertise in soft tissue management or where the tooth anatomy or position is less ideal, for example, a malpositioned tooth or the presence of diastema [14]. One clinical symptom of midline diastema is a gap between two natural teeth in the midline of the jaw, which might be in the mandible or the maxilla. When there's less of it, it might enhance a person's facial beauty; when there's more, patients typically seek a way to make it go away [15]. Such conditions add to the complexity of FPD restoration design and gingival health maintenance. Making sure the gums are in physiological shape before making the impression is an important step in this direction. When the gingival tissues are inflamed, making an impression can be a challenging and aggressive process that can lead to recession of the gums [12]. The end product of these processes is a high-quality prosthesis with acceptable emergence profile, marginal fidelity, and easy instrumentation thanks to clear visualisation and positive impressions [12]. Among the most challenging procedures for a dentist to carry out is exposing the gingival margins of a preparation before making an impression. Different sulcular depths, gingival tissues' distendability, inflammation levels, margin placement, and tissue laceration levels all exacerbate this problem [2, 7, 9, 12].

A variety of clinical techniques, such as electrosurgery, displacement (mechanical, chemical), and rotary curettage, are accessible for effective gingival displacement [4, 10]. Gingival displacement techniques can be mechanical, chemical, surgical, or a hybrid of the three [4, 13, 16, 17]. Most practitioners use a hybrid approach, combining mechanical and chemical techniques using gingival retraction cords and specific haemostatic medications. Rotival gingival curettage and electrosurgery are supplementary procedures alongside mechanical-chemical techniques [18]. Retraction cords come in three styles: twisted, knitted, and braided [19]. Braided or knitted cords are preferred, and a large-diameter cord is essential for effective displacement. Inexperienced dentists often make the mistake of using small-diameter cords, which may not adequately displace gingival tissues laterally [16]. Many haemostatic medications have been suggested for retraction cords; a few of these medications have undergone substantial research [20, 21]. Four medications were identified in the literature as having sufficient fluid control and displacement properties and as being "safe" in the sense that they do not cause iatrogenic soft tissue damage when administered correctly. Epinephrine, aluminium chloride, aluminium sulphate, and potassium sulphate are all part of this medication class [21].

This literature review was thus intended to comprehensively evaluate the trends in gingival management for FPD restorations in recent times. The main objective is to update the knowledge that recent research has evidenced, which will help a clinician modify his general and speciality practice. PubMed, Scopus, MEDLINE, Google Scholar, and ProQuest were the six medical electronic databases searched for literature from 2010 to 2024. Relevant search terms included clinical trial, cross-sectional, randomised, placebo-controlled, qualitative or quantitative, empirical, survey, fixed partial denture, gingival sulcus, gingivitis, periodontitis, systemic diseases, mouthwash, oral hygiene maintenance, and failures associated with FPD. In order to find relevant papers, two separate reviewers used a piloted review form to go through the titles, abstracts, keywords, references, and full texts.

Historical context:

Loe H *et al*., [22] conducted a clinical histopathological study on the effects of two string packs inserted into the gingival sulcus. They found strings in supra-alveolar connective tissue, likely causing sulcus inflammatory reaction due to retraction procedures [22]. In 1970, a study on nine subjects with minimal gingival conditions found that oral prophylaxis and retraction cord impregnated with r-epinephrine did not significantly affect gingival conditions. Only two individuals showed sympathomimetic effects, and no correlation was found between these changes and r-epinephrine absorption [23]. The Nemetz H *et al*., [24] study outlines a procedure for managing gingival tissue and preparing teeth for ceramo-metal crowns, ensuring gum health and aesthetically acceptable placement. Donaldson D *et al*., [25] study on gingival recession revealed six factors: initial gingival margin location, history of receding gums and bone loss, degree of gingival trauma, depth of recession, copper ring penetration into gingival sulcus, and anatomically contoured temporary crowns. The recession of the gingival margin was directly correlated with the temporary crown's pressure level [25]. A clinical study by Tupac RG *et al*., [26] compared cord gingival displacement and gingitage methods in 15 adult dogs. The study used cuspid teeth and clinical and histologic measurements to compare tooth preparation and impression-making. The gingival tissues were monitored for health [26]. The 1982 study by De Gennaro *et al*., [27] investigated the impact of chemical agents on gingival inflammation in retraction cords. Results showed that sulcular epithelium remained unaffected,

but potassium aluminium sulphate caused minimal inflammation [27]. A survey in New Zealand found that 51% of respondents used dental methods for taking impressions of natural teeth and implants in fixed prosthodontics. Most performed veneer, crown, or bridge treatments, while 65% offered implant treatment. Gingival retraction was performed by 82% of dentists using surgical methods like electrosurgery, laser, rotary curettage, and cord. Only 18% used gingival retraction around implants. Most dentists in New Zealand perform fixed prosthodontic and implant work [28].

***Chemical agents*:**

In an in vitro investigation on dogs, Kopac I *et al*., [29] examined the inflammatory potential of four agents: 10% aluminium chloride, 25% aluminium chloride, 20% aluminium sulphate, and 0.05% tetrahydrozoline. Tetrahydrozoline had the lowest inflammatory potential, while 25% aluminium sulphate had the most. All chemical assays showed increased gingival connective tissue inflammatory infiltration. A study by Chaudhari *et al*., [30] evaluated the effectiveness of three retraction systems: expasyl, medicated retraction cords, and tetrahydrozoline. The study involved 30 subjects with irreversible hydrocolloid maxillary impressions. The results showed that tetrahydrozoline produced a greater amount of gingival retraction than aluminium chloride. Gupta *et al*., [31] studied the host tissue response to oral implants using G-Cuff and Traxodent systems. The study found that G-Cuff caused pain and discomfort in some cases, while Traxodent had less bleeding. The study also found that the mucosal index increased in both groups, and the chemical cordless retraction system demonstrated good haemostatic performance in short-term assessments.

***Retraction materials*:**

Phatale S *et al*., [32] examined the gingival sulcular epithelium's response to various retraction materials histopathologically. Impregnated retraction cord, Magic Foam Cord, and Expasyl were used. Retraction materials closely correlate with gingival sulcular epithelium. Impregnated retraction cord is technique-sensitive and requires precise tissue manipulation, although it has great potential. Histological evaluations showed that current retraction pastes like Expasyl or Magic Foam Cord outperformed cord. Rao *et al*., [33] compared gingival displacement with three retraction systems: Expasyl, Magic Foam Cord, and medicated retraction cord. Expasyl achieved the most retraction with minimal time spent, while medicated cords were skill-dependent. In 2012, Gupta D *et al*., [34] compared the lateral displacement of the Expasyl and Magic FoamCord retraction systems on ten subjects' unprepared central incisors. The study found that the Expasyl paste retraction method offered greater lateral displacement of gingiva compared to the Magic FoamCord system, indicating a potential improvement in dental hygiene. Gupta A *et al*., [35] examined three innovative gingival retraction systems—Expasyl, Magic Foam Cord, and Stay-put—on 30 volunteers to compare handling ease, placement time, haemorrhage control, and gingival retraction. Three gingival retraction methods were randomly applied to prepared abutments. Each retraction system's insertion time was recorded while measuring the vertical gingival retraction (before and after). To evaluate horizontal retraction, polyether impressions were made before and after. The magic foam cord retraction device prevents gingival recession best of the three examined. A study by Prasanna GSR, *et al*., [36] evaluated the clinical efficacy of three new retraction systems: expasyl, magic foam cord, and stay-put. Results showed the magic foam cord retraction system was most effective in preventing gingival recession, based on ease of handling, time taken, and haemorrhage control. In a study by Anupam P *et al*., [37] two retraction cords—Stay-Put and Ultrapak—were compared for lateral gingival displacement prevention. Stay-Put extracted more gingiva than Ultrapak, although the difference was not statistically significant. Shivasakthy M *et al*., [13] studied the comparison of conventional retraction cords and Merocel strips in dislodging gingival tissues, finding Merocel strips caused more displacement, indicating their superiority. Shamsuzzaman *et al*., [38] evaluated paste retraction systems and medicated retraction cords for ease of use, bleeding control, and vertical gingival retraction. Paste retraction system was easier, quicker, and more effective. Raghav *et al*., [39] studied three gingival retraction systems using expasyl paste, magic foam cord, and retraction cord impregnated with aluminium chloride. Results showed all three systems provided more retraction than fixed partial denture impressions. Magic foam cord and expasyl paste were easy, fast, and painless, reducing time spent at the chairside. The study also found that "Expasyl" worked better than braided cords and was just as effective in drawing back gums. Thimmappa *et al*., [11] investigated the clinical efficacy of a cord, paste system, and strip gingival retractile material in the retraction of gingiva. The study involved 30 patients who needed a fixed dental prosthesis for their mandibular first molar. Three different gingival retraction systems were used: Ultrapak cord, merocel strip, and magic foam cord. The results showed significant differences in vertical and lateral displacement, with Merocel strip, Ultrapak cord, and Magic Foam cord providing significantly different amounts of tissue displacement. Madaan R, *et al*., [12] evaluated the clinical efficacy of four gingival retraction systems: impregnated retraction cord, capsule, paste, and polyvinyl acetate strips. The study found that all experimental groups had higher gingival displacement than the control group. The displacement value was 541.65 μm for polyvinyl acetate strips, then 505.37 μm for impregnated retraction cord, 333.57 μm for retraction capsules, and 230.63 μm for retraction paste. The study concluded that all four systems exceeded the horizontal displacement requirements of 200 μm. Kesari ZI, *et al*., [17] compared the efficacy of ViscoStat clear, Vasozine, and Racegel in causing lateral gingival displacement.

The agents were used for gingival displacement on selected teeth. The results showed that Racegel with cord produced the largest mean displacement (0.2256 mm^2) and the lowest (0.1414) mm^2, with no significant statistical difference between the four agents. The study concluded that there was no significant difference in gingival displacement between the agents. Nain VJ, *et al*., [40] concluded that the Magic Foam Cord retraction system is quicker, easier, and has a better haemorrhage score than the medicated retraction cord due to its atraumatic nature to the peridontium. However, medicated retraction cords result in more vertical gingival retraction. Shill M. *et al*., [41] evaluated the effectiveness of five non-invasive gingival retraction systems: retraction cord, retraction capsule, Racegel, Comprecap, and Traxodent paste. Results showed Traxodent paste was the most effective, with a significantly higher mean score value than the other four systems. Comprecap was the least effective, indicating that the use of Traxodent paste is a more effective method for retraction. Kumar L *et al*., [19] compared the clinical performance and gingival sulcus width between cotton and polymer-based retraction cords. Results showed that polymer-based cords produced more sulcus width and better clinical performance. The rate of change in gingival sulcus width prior to and after retraction was likewise noticeably greater in cords made of polymer.

***Patient complaince to gingival management*:**

Irrespective of the technique, material, or chemical agent used during gingival retraction for FPD impression procedures, there is enough evidence that all induce some form of trauma to the sulcular epithelium. Proper management therefore entails that the patient be informed about it and educated about the importance of oral hygiene maintenance after the procedure. A normal, healthy gingiva will respond differently than an unhealthy gingiva in such cases; therefore, the diagnosis of existing periodontal condition becomes mandatory for procedures that involve gingiva and periodontium [42]. Patient education is a part and parcel of FPD treatment, and negligence by clinicians can result in poor compliance. Patients ability to retain information related to either medical or dental disease has been found to be extremely poor [43]. The ability to retain and follow treatment-related instructions has also been reported to be significantly different between genders and levels of education [44]. The maintenance instructions for FPD prostheses are varied and numerous, besides being complex and time-consuming [45]. Therefore, one needs to take these factors into account while managing gingiva-related treatment procedures.

***Gingival response to different treatment modalities, anatomical variations and restorative materials*:**

Based on tooth specificity, mucogingival complex, and bone morphotype, three distinct periodontal phenotypes have been proposed [46]. Slender triangular tooth crowns, little cervical convexity, interproximal contacts closer to the incisal border, a narrow zone of keratinised tissue (KT), thin gingiva, and relatively thin alveolar bone are all characteristics of the thin scalloped phenotype [47]. Square tooth crowns, a prominent cervical convexity, a big interproximal contact point situated more apically, a broad zone of KT, thick, resilient, fibrotic gingival tissues, and a comparatively thick alveolar bone plate are the hallmarks of the thick flat periodontal phenotype [47]. Thick scalloped periodontal phenotype features include a small zone of KT, thin teeth, thick fibrotic gingiva, and prominent gingival scalloping [47]. These gingival characteristics however, are bound to change in case teeth are not properly aligned, supraerupted or fused with other teeth [48]. Several clinical treatments for periodontal phenotypic modification have been developed in response to the clinical importance of periodontal tissues and the pursuit of various strategies to enhance their quality [49]. Striking a compromise between prosthesis design, abutment longevity, tooth and related structure conservation, stress distribution, and patient expectations is crucial in many partial edentulous cases [50]. Complex FPD restorations require proper planning not only in terms of designing the prosthesis but also to improve the longevity of the gingival health [51]. Lack of application of diagnostic data has been reported to be linked to poor selection of cases for all-ceramic restorations [52]. Generally, complex FPDs do not allow self-cleansing, which is an important feature of long-term maintenance, especially in posterior teeth.

CONCLUSION

A comprehensive appraisal of the recent research shows that many new materials and systems of gingival retraction procedures for fixed partial denture treatment have come with each having their respective advantages and disadvantages. Some of them being very convenient to the clinician while others being beneficial for the procedure conducted. Most studies do not report histopathological findings before and after retracting gingiva; therefore, evidence is inconclusive as to what effects take place within the gingival sulcus and how healing takes place after using these materials and procedures.

Acknowledgements: None

Conflict of interest: None

REFERENCES

1. Donovan, T. E., & Chee, W. W. (2004). Current concepts in gingival displacement. *Dental Clinics*, *48*(2), 433-444.
2. Mattoo, K. A., & Kumar, S. (2011). Multiple post core crowns – A clinical report. *Clinical Dentistry*, 5, 31-34.
3. Baba, N. Z., Goodacre, C. J., Jekki, R., & Won, J. (2014). Gingival displacement for impression making in fixed prosthodontics: contemporary

principles, materials, and techniques. *Dental Clinics*, *58*(1), 45-68.
4. Tabassum, S., Adnan, S., & Khan, F. R. (2017). Gingival retraction methods: a systematic review. *Journal of Prosthodontics*, *26*(8), 637-643.
5. Abullais, S. S., Patel, S. I., Asiri, E. A., Jathmi, A. A. A., Alkhayri, A. H., Mousa, Y. M., ... & Mattoo, K. A. (2022). Comparative evaluation of 3 commercial mouthwash formulations on clinical parameters of chronic gingivitis. *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research*, *28*, e937111-1.
6. Mattoo, K. A., Garg, R., Gupta, A., & Jain, N. (2012). Toxicology and biocompatibility of dental materials: A review. *Res J Pharmac Biol Chem Sci*, *3*(4), 1091-1099.
7. Huang, C., Somar, M., Li, K., & Mohadeb, J. V. N. (2017). Efficiency of cordless versus cord techniques of gingival retraction: a systematic review. *Journal of Prosthodontics*, *26*(3), 177-185.
8. Bennani, V., Ibrahim, H., Al-Harthi, L., & Lyons, K. M. (2017). The periodontal restorative interface: esthetic considerations. *Periodontology 2000*, *74*(1), 74-101.
9. Parai, P., Ojah, P., Jain, S., Khan, N., Gangwar, S., & Mattoo, K. (2020). A comparative evaluation of the efficacy of two gingival retraction systems: An in vivo study. *European Journal of Molecular and Clinical Medicine*, *7*(8), 4870-4880.
10. Safari, S., Ma, V. S., Mi, V. S., & Hamedi, M. (2016). Gingival retraction methods for fabrication of fixed partial denture: literature review. *Journal of dental biomaterials*, *3*(2), 205.
11. Thimmappa, M., Bhatia, M., Somani, P., & Kumar, D. R. V. (2018). Comparative evaluation of three noninvasive gingival displacement systems: An: in vivo: study. *The Journal of Indian Prosthodontic Society*, *18*(2), 122-130.
12. Madaan, R., Paliwal, J., Sharma, V., Meena, K. K., Dadarwal, A., & Kumar, R. (2022). Comparative evaluation of the clinical efficacy of four different gingival retraction systems: an in vivo study. *Cureus*, *14*(4).
13. Shivasakthy, M., & Ali, S. A. (2013). Comparative study on the efficacy of gingival retraction using polyvinyl acetate strips and conventional retraction cord–An in vivo study. *Journal of clinical and diagnostic research: JCDR*, *7*(10), 2368.
14. Yadav, L. A. K. S. H. Y. A., Mattoo, K. A., Kapoor, A. D. I. T. Y. A., & Shuja, S. A. N. A. W. A. R. (2015). Factors associated with post core correction of malpositioned teeth. *International Journal of Research in Medical Sciences and Technology*, *1*(2), 5-7.
15. Mattoo, K., Singh, M., & Goswami, R. (2014). Resin bonded loop connector fixed partial denture–A subtle solution to maintain midline diastema. *International Journal of Dental Sciences and Research*, *2*(6), 168-170.
16. Thomas, M. S., Joseph, R. M., & Parolia, A. (2011). Nonsurgical gingival displacement in restorative dentistry. *Compendium of Continuing Education in Dentistry (15488578)*, *32*(5).
17. Kesari, Z. I., Karani, J. T., Mistry, S. S., & Pai, A. R. (2019). A comparative evaluation of amount of gingival displacement produced by four different gingival displacement agents–An in vivo study. *The Journal of Indian Prosthodontic Society*, *19*(4), 313-323.
18. Darraj, A., Mattoo, K. A., & Nazish, M. (2017). Scheduling multiple surgical procedures in immunocompromised rheumatoid patient on immunosuppressant regimen. *Journal of Medical science and clinical research*, *5*(8), 26828-26833.
19. Kumar, L., Mattoo, K. A., Jain, S., Khalid, I., Kota, M. Z., Baig, F. A., ... & Kanji, M. A. (2023). A clinical study of 50 partially edentulous patients with fixed partial denture restorations to compare clinical parameters and changes in gingival sulcus width after displacement with 2 different gingival retraction cord materials (cotton and polymer). *Medical Science Monitor: International Medical Journal of Experimental and Clinical Research*, *29*, e940098-1.
20. Kumari, S., Singh, P., Parmar, U. G., & Patel, A. M. (2021). Evaluation of effectiveness of three new gingival retraction systems: a comparative study. *The Journal of Contemporary Dental Practice*, *22*(8), 922-927.
21. Nowakowska, D., Saczko, J., Kulbacka, J., & Wicckiewicz, W. (2017). Chemical Retraction Agents–in vivo and in vitro studies into their physico-chemical properties, biocompatibility with gingival margin tissues and compatibility with elastomer impression materials. *Mini Reviews in Medicinal Chemistry*, *17*(5), 435-444.
22. Odont, D., & Silness, J. (1963). Tissue reactions to string packs used in fixed prosthodontics. *J Prosthet Dent*, *13*(2), 318-323.
23. Houston, J. B., Appleby, R. C., DeCounter, L., Callaghan, N., & Funk, D. C. (1970). Effect of r-epinephrine-impregnated retraction cord on the cardiovascular system. *The Journal of Prosthetic Dentistry*, *24*(4), 373-376.
24. Nemetz, H. (1974). Tissue management in fixed prosthodontics. *The Journal of prosthetic dentistry*, *31*(6), 628-636.
25. Donaldson, D. (1974). The etiology of gingival recession associated with temporary crowns. *Journal of periodontology*, *45*(7), 468-471.
26. Tupac, R. G., & Neacy, K. (1981). A comparison of cord gingival displacement with the gingitage technique. *The Journal of Prosthetic Dentistry*, *46*(5), 509-515.
27. De Gennaro, G. G., Landesman, H. M., Calhoun, J. E., & Martinoff, J. T. (1982). A comparison of gingival inflammation related to retraction cords. *The Journal of prosthetic dentistry*, *47*(4), 384-386.

28. Al-Ani, A., Bennani, V., Chandler, N. P., Lyons, K. M., & Thomson, W. M. (2010). New Zealand dentists' use of gingival retraction techniques for fixed prosthodontics and implants. *NZ Dent J*, *106*(3), 92-96.
29. Kopač, I., Cvetko, E., & Marion, L. (2002). Gingival inflammatory response induced by chemical retraction agents in beagle dogs. *International Journal of Prosthodontics*, *15*(1), 14-19.
30. Chaudhari, J., Prajapati, P., Patel, J., Sethuraman, R., & Naveen, Y. G. (2015). Comparative evaluation of the amount of gingival displacement produced by three different gingival retraction systems: An: in vivo: study. *Contemporary clinical dentistry*, *6*(2), 189-195.
31. Gupta, S., Dhawan, P., Madhukar, P., Tandan, P., & Sachdeva, A. (2017). Clinical evaluation of the effect of two gingival retraction systems, gingival cuff and gingival retraction paste, on peri-implant soft tissue. *Journal of Interdisciplinary Dentistry*, *7*(2), 53-59.
32. Phatale, S., Marawar, P. P., Byakod, G., Lagdive, S. B., & Kalburge, J. V. (2010). Effect of retraction materials on gingival health: A histopathological study. *Journal of Indian Society of Periodontology*, *14*(1), 35-39.
33. Rao, B. D., Nayar, S., Rajyalakshmi, R., & Rajmohan, C. S. (2012). Comparative evaluation of gingival displacement using Expasyl, Magic foam cord and Medicated retraction cord-An in-vivo study. *Trends in Prosthodontics and Dental Implantology*, *3*(1), 8-11.
34. Gupta, D., Bhide, S., Gandhi, P., & Paliwal, J. (2012). Comparative evaluation of clinical efficacy of two different retraction systems- an in-vivo study. *Indian J Stomatol*, *3*(2), 7-13.
35. Gupta, A., Prithviraj, D. R., Gupta, D., & Shruti, D. P. (2013). Clinical evaluation of three new gingival retraction systems: A research report. *The Journal of Indian Prosthodontic Society*, *13*(1), 36-42.
36. Prasanna, G. R., Reddy, K., Kumar, R. N., & Shivaprakash, S. (2013). Evaluation of efficacy of different gingival displacement materials on gingival sulcus width. *The journal of contemporary dental practice*, *14*(2), 217-221.
37. Anupam, P., Namratha, N., Vibha, S., Anandakrishna, G. N., Shally, K., & Singh, A. (2013). Efficacy of two gingival retraction systems on lateral gingival displacement: A prospective clinical study. *Journal of oral biology and craniofacial research*, *3*(2), 68-72.
38. Shamsuzzaman, M., Quader, S. M. S., Fatema, S., Gofur, M. A., & Akter, K. (2013). Effect of gingival retraction cord and retraction paste on gingival tissue in fixed prosthodontics impression. *Update Dental College Journal*, *3*(2), 20-27.
39. Raghav, D., Singh, S., Kola, M. Z., Shah, A. H., Khalil, H. S., & Kumar, P. (2014). A comparative clinical and quantitative evaluation of the efficacy of conventional and recent gingival retraction systems: An in vitro study. *European Journal of Prosthodontics*, *2*(3), 76-81.
40. Nain, V. J., Beniwal, J., Tiwari, D., Dahiya, D., & Reshmi, R. V. (2020). Clinical Comparison of the Efficacy of Magic Foam Cord Retraction System and Medicated Retraction Cord impregnated in Ferric Sulphate on the basis of relative ease of working, Hemorrhage Control and amount of Vertical Gingival Retraction: An in vivo study. *Natl Res Denticon*, *9*(1), 1-13.
41. Shill, M., Gupta, R. K., Singh, K., Kumar, R., Anjum, N., & Gupta, A. (2022). Comparative clinical and quantitative evaluation of the efficiency of five different non-invasive gingival retraction systems: An in-vivo study. *Journal of Pharmaceutical Negative Results*, 189-194.
42. Rahman, S. U., & Mattoo, K. (2020). Role of periodontal evaluation in tooth supported overdenture. *Journal of Health Science Research*, *5*(1), 21-23.
43. Sindi, A. S., Mittal, R., Mattoo, K., Deep, A., Khateeb, S. U., Algarni, Y. A., ... & Hakami, A. M. (2022). Impact of an auditory mediated Patient Health Education (PHE) program on treatment compliance and satisfaction among patients seeking prosthodontic care during COVID pandemic–a prospective interventional study. *Patient preference and adherence*, 1247-1255.
44. Mittal, R., Kapoor, A., & Mattoo, K. A. (2018). Gender differences in terms of recalling treatment instructions–an in vivo study. *J Med Sci Clin Res*, *6*(7), 848-855.
45. Jindal, S., Mattoo, K. A., & Arora, P. (2013). *Post care instructions for dental prosthesis (Fixed)*. LAP LAMBERT Academic Publishing.
46. Kim, D. M., Bassir, S. H., & Nguyen, T. T. (2020). Effect of gingival phenotype on the maintenance of periodontal health: An American Academy of Periodontology best evidence review. *Journal of periodontology*, *91*(3), 311-338.
47. Cortellini, P., & Bissada, N. F. (2018). Mucogingival conditions in the natural dentition: Narrative review, case definitions, and diagnostic considerations. *Journal of periodontology*, *89*(51), S204-S213.
48. Ali, F. M., Alqahtani, A. S., Alenazi, A., Mattoo, K. A., Hassan, A. A. H. A. A., Mostafa, A., ... & Hagawi, M. H. A. (2024). Fusion between impacted distomolar and Third molar: A Rare case report with Review of Literature. *Journal of International Dental and Medical Research*, *17*(4), 1731-1739.
49. Barootchi, S., Tavelli, L., Zucchelli, G., Giannobile, W. V., & Wang, H. L. (2020). Gingival phenotype modification therapies on natural teeth: A network meta-analysis. *Journal of Periodontology*, *91*(11), 1386-1399.
50. Mattoo, K. A., & Jain, S. (2014). Managing a case of sensitive abutment situations through use of a Fixed Movable Prosthesis–A clinical

report. *Journal of Medical Science and Clinical Research*, *2*(7), 1858-1863.

51. Brar, A., Mattoo, K., & Jain, P. (2014). Designing cantilever prosthesis: A case study. *RRJoD*, *5*(3), 5-9.
52. Mattoo, K., Etoude, H. S., & Hothan, H. M. (2023). Failure of an all ceramic posterior fixed partial denture as a consequence of poor clinical application of diagnostic data. *Journal of Advanced Medical and Dental Sciences Research*, *11*(3), 44-48.

Cite This Article: Noopur Rathi, Mansi Bansal, Tanuj Minocha (2025). An Appraisal of Current Evidence Based Studies on Mechanical and Chemical Methods of Gingival Retraction in Fixed Partial Denture Prosthodontic Treatments. *EAS J Dent Oral Med, 7*(1), 61-67.