A comparison of the retentive ability of various denture adhesives on different denture base materials: an in vitro study.

Chiranjeev Gogoi[1], Manesh Lahori [2], Rahul Nagrath[3], Siddharth Sisodiya[3], Prerna Kaushik[4], Shikha Shahi[1].

[1]Post graduate student, Department of Prosthodontics, K. D. Dental College and Hospital, Mathura, Uttar Pradesh, India.
[2]Dean and Head, Department of Prosthodontics, K. D. Dental College and Hospital, Mathura, Uttar Pradesh, India.
[3]Professor, Department of Prosthodontics, K. D. Dental College and Hospital, Mathura, Uttar Pradesh, India.
[4]Reader, Department of Prosthodontics, K. D. Dental College and Hospital, Mathura, Uttar Pradesh, India.

Abstract

Statement of Problem: Given the variety of denture adhesives and base resins available, it is critical that dentists suggest the right ones to their patients.

Purpose: In addition to subjectively assessing and contrasting the retentive qualities of various denture adhesives, this study aims to explore the subtleties of how they interact with various denture base materials.

Material and Methods: Three denture base materials—DPI, Lucitone, and Trevalon—were used to evaluate Polident, Fixon, Fixon Super Grip, and Secure. The control was artificial saliva. By assessing the adhesion and cohesion that formed between a glass surface and an acrylic resin disc surface after adhesives were applied between them, the retentive capacity of the denture adhesives was evaluated. Tukey's post hoc test and one-way ANOVA were used to assess the significance of the mean results.

Results: The highest retention recorded for denture base resins in their decreasing order: DPI with Polident + Saliva (Mean=854.390 gms), Trevalon with Polident + Saliva (Mean=821.890 gms) & Lucitone with Secure + Saliva (Mean=711.890).

Conclusions: Polident with Saliva and DPI denture base resin showed the highest retention. The mean retention of denture adhesives was higher when they were tested along with artificial saliva rather than alone. The adhesives with cream consistency showed higher mean retention than the powder consistency.

Keywords- Denture adhesives, Denture Base, Fixon, Polident, Retention.

Address of correspondence: Dr. Chiranjeev Gogoi, Near A.S.E.B. Colony, Niz-Kadamani, Dibrugarh, Assam, Pin: 786001.
Email address: - chiranjeevgogoi@gmail.com **Phone no:** 8638257360. **DOI:** 10.5281/zenodo.14545608
Submitted: 14-Oct-2024 **Revised**: 10-Nov-2024 **Accepted:** 22-Nov-2024 **Published:** 25-Dec-2024
Bibliographic details: Journal of Orofacial Rehabilitation Vol. 4(3), Dec 2024, pp. 3-15.

Introduction

In the realm of complete denture treatment, the attainment of sufficient retention is not only a clinical necessity but also a pivotal factor in determining the overall success and satisfaction of patients. The dynamics of denture retention are multifaceted, encompassing the intricate interplay between the physical forces exerted on the denture base and the underlying mucosal surface. Understanding these forces is essential for dental practitioners to tailor their clinical approaches effectively. [1-4]

One of the key physical factors influencing denture retention is adhesion and cohesion. The ability of the denture base to adhere to the mucosal surface and maintain cohesion within its structure is crucial for stability during various oral functions. Achieving this delicate balance is a challenge, especially considering the dynamic environment of the oral cavity.[1-5]

The creation of negative atmospheric pressure beneath the denture represents another fascinating aspect of denture retention. This phenomenon, often referred to as suction, contributes significantly to the stability of the

denture during activities such as speaking and eating. Clinical procedures aimed at impression making play a pivotal role in optimizing this suction effect by ensuring proper tissue coverage and intimate contact between the denture and the mucosa. [1-5]

Capillary attraction and the viscosity of saliva further contribute to the intricate tapestry of forces influencing denture retention. The capillary forces at the interface between the denture base and the mucosa can enhance the overall adherence, while the viscosity of saliva can either aid or impede the stability of the denture, depending on its nature and amount. [1-5]

Despite meticulous clinical procedures, achieving the desired level of retention may be challenging in certain clinical scenarios. Patients with severely resorbed alveolar ridges, for instance, often encounter difficulties in obtaining satisfactory denture retention. In such cases, denture adhesives emerge as valuable adjuncts, offering a practical solution to enhance retention, stability, and functionality. [6-10]

The use of denture adhesives is not merely a recourse for physical enhancement; it extends into the realm of psychological support for patients. Beyond the tangible benefits of improved denture stability, adhesives provide a sense of confidence and reassurance to denture wearers, making the prosthetic solution more acceptable in their daily lives. [8,11-13]

In particular, individuals facing challenges with ill-fitting dentures find solace in the application of denture adhesives. These adhesives mitigate issues such as mucosal inflammation, pressure ulcers, and uneven pressure distribution. The relief provided by adhesives is especially noteworthy for those with sensitive oral mucosa, as they contribute to a more comfortable and sustainable denture-wearing experience. [14,15]

Moreover, the application of denture adhesives has demonstrated efficacy in addressing functional concerns. They play a significant role in reducing food entrapment beneath the prosthesis, thus minimizing the risk of microbial presence and associated oral health issues. The balanced distribution of occlusal forces achieved through the use of adhesives enhances masticatory efficiency and reduces localized pressure points on the supporting tissues. [14,16]

While denture adhesives undoubtedly offer a plethora of advantages, it is crucial to acknowledge potential drawbacks. Prolonged usage, especially with ill-fitting dentures, may contribute to residual ridge resorption, posing a long-term challenge. Additionally, some individuals may experience adverse reactions to the components of denture adhesives, leading to conditions such as papillary hyperplasia and an increased vertical dimension at occlusion. [17,18]

In the pursuit of advancing dental care, this study aims to contribute valuable insights into the impact of recently developed denture adhesives on enhancing denture retention. By systematically analyzing variations in retention across different adhesive compositions and their interaction with various denture base materials, the research aims to identify the most effective combinations. This includes assessing the influence of saliva on the retentive efficacy of these adhesives, adding a layer of complexity to the investigation.

The study addresses a critical gap in the existing literature by evaluating the retentive capabilities of recently developed denture adhesives. The dental field has witnessed advancements in adhesive formulations, and this study seeks to unravel the specific contributions of these innovations to denture stability. By doing so, it not only adds to the current body of knowledge but also positions itself at the forefront of contemporary dental research.

In essence, the objective of this study is not only to qualitatively measure and compare the

retentive capabilities of diverse denture adhesives but also to delve into the nuances of their interactions with different denture base materials.

Perhaps one of the most significant outcomes is the translation of research findings into practical recommendations for dental practitioners. By offering evidence-based insights into the most effective denture adhesives and their optimal combinations with specific denture base materials, the study aims to empower clinicians in enhancing the overall quality of complete denture treatment. This outcome aligns with the broader goal of improving patient outcomes and satisfaction.

The quest for optimal denture retention goes beyond the conventional realm of clinical procedures. It involves a deep understanding of the intricate physical forces at play and the innovative integration of denture adhesives as valuable tools in the armamentarium of dental practitioners. This study aspires to contribute to the ongoing dialogue in dental research, paving the way for improved patient outcomes and satisfaction in the realm of complete denture treatment.

MATERIAL & METHOD:

Fabrication of Die

A stainless steel ring with an aperture on one side and an internal diameter of 4 cm is made into a standard metal die, and a bronze insert is made to precisely match the internal diameter of the stainless steel ring.

The height of the bronze insert is 2 mm less than the height of the ring on the opened side. A hole (3mm x 3mm) is incorporated at the center of the upper surface of the bronze insert. A bronze disk 5 cm in diameter is used to cover the opened side of stainless steel ring. A screw in incorporated at the closed side of the stainless steel ring to aid in removal of the specimens.

Preparation of samples

8 specimens from each acrylic denture base resin: DPI heat cure (DPI), Lucitone heat cure (Dentsply) and Trevalon heat cure (Dentsply) are made with 4 cm in diameter and 2 cm in thickness [Fig. 1, 2, 3].

Initially, a brush is used to apply separating material to the upper surface of the bronze insert and the inside walls of the stainless steel ring. The bronze disc cover and heat-cured acrylic resin are put straight into the metal die. The metal flask press holds the entire device together under pressure. The curing unit contains the flask press assembly. For every heat-cured acrylic resin substance, the curing process is carried out in accordance with the manufacturer's instructions. A bur is used to drill a hole on the elevation that is located in the middle of each specimen.

Testing the samples for retention

Denture adhesive (1cm in length) is applied on the specimen then held against a clean glass slab [Fig. 5 and 9]. A load of 3 kg is applied onto the specimen-adhesive-glass slab assembly for 1 minute [Fig. 10]. The specimen-adhesive-glass slab is placed above a metallic stand (height = 30 cm) [Fig. 11]. A hook with a thread made from stainless steel wire is attached to the hole at the lower surface of the specimen. A bucket is attached to the other end of the thread with help of a hook [Fig. 12]. A load is applied by the addition of water into the bucket from a measuring beaker [Fig. 13]. Density, which quantifies how much mass can fit in a given volume, is the connection between mass and volume. One litre of water has precisely one kilograms of mass because water has a density of one kilograms per litre. Retention is expressed in terms of force necessary i.e., minimum amount of water poured into the bucket to separate the specimen from the glass when a thin film of adhesive or artificial saliva is interposed [Fig. 14].

Retention is tested with following materials interposed between the specimen and glass slab:
(a) Artificial saliva: 0.05 gm [Fig. 4]
(b) Denture adhesive cream: 1 cm in length [Fig. 5]
(c) Denture adhesive power: 0.30 gm, a wetted glass surface was used in case of powders. [Fig. 6]
(d) Denture adhesive cream + Saliva [Fig. 7]
(e) Denture adhesive powder + Saliva [Fig. 8]
Using a new disc sample each time, each process is carried out eight times. After every test, the resin sample and the glass surface are meticulously cleaned.
The testing is done under following groups:
Group A: DPI (DPI)
Group B: Lucitone (Dentsply)
Group C: Trevalon (Dentsply)
The above groups are further subdivided with: Artificial Saliva, Polident cream + Artificial Saliva, Fixon Supergrip powder + Artificial Saliva, Fixon cream + Artificial Saliva, Secure cream + Artificial Saliva, Polident cream, Fixon Supergrip powder, Fixon cream & Secure cream.
The weight of the hook-thread-bucket assembly is 116.89 gms. As the same hook-thread-bucket assembly was used for testing all the samples, 116.89 gms was added in the results with the weight of the water poured into the bucket to separate the specimen.

Results:

The collected data underwent coding, tabulation, and analysis employing diverse statistical methods. Statistical tests were employed to know the relationship between variables across different study groups. The tests used were: One-way ANOVA & Tukey's post hoc.

DPI:
The test demonstrated that there was a significant difference in the mean Retention observed between different adhesives when used with Lucitone acrylic material and the difference was statistically significant at $p<0.001$. [Refer Graph no. 10]
With the exception of Polident + Saliva, Fixon Cream + Saliva, and Fixon Powder, Secure + Saliva demonstrated considerably higher mean retention when compared to other adhesives, according to a multiple comparison of mean differences across groups. The mean differences were statistically significant at $p\leq0.001$. Fixon Powder adhesive came next, with a much greater mean retention than the other adhesives; the mean differences were statistically significant at $p<0.05$, with the exception of Polident + saliva, Fixon Cream + saliva, and Secure + saliva. Then came Fixon Cream + saliva, which had a statistically significant mean retention difference at $p\leq0.01$ when compared to the other adhesives, with the exception of Polident + saliva and Secure + saliva. Following this, Polident + saliva demonstrated noticeably better retention than the other adhesives, with mean differences that were statistically significant at $p\leq0.001$. Then came Secure Adhesive, which had a statistically significant mean retention difference ($p\leq0.01$) and a considerably greater mean retention than the other adhesives. Furthermore, there were no discernible variations in the mean retention between Fixon Cream alone, Fixon powder + saliva, Polident, and fake saliva. This suggests that Secure + saliva had the significantly highest mean retention of Lucitone with various adhesives, followed by Fixon powder, Fixon Cream + saliva, Polident + Saliva, and Secure. Additionally, there were no discernible differences between Fixon Powder + saliva, Polident, artificial saliva, and Fixon Cream. [Refer Graph no. 11]

LUCITONE:
The test revealed that the mean retention of several adhesives differed considerably when applied to Lucitone acrylic material; this

variation was statistically significant at $p<0.001$. [Refer Graph no. 12]

With the exception of Polident + Saliva, Fixon Cream + Saliva, and Fixon Powder, Secure + Saliva demonstrated considerably higher mean retention when compared to other adhesives, according to a multiple comparison of mean differences across groups. The mean differences were statistically significant at $p\leq0.001$. Fixon Powder adhesive came next, with a much greater mean retention than the other adhesives; the mean differences were statistically significant at $p<0.05$, with the exception of Polident + saliva, Fixon Cream + saliva, and Secure + saliva. Then came Fixon Cream + saliva, which had a statistically significant mean retention difference at $p\leq0.01$ when compared to the other adhesives, with the exception of Polident + saliva and Secure + saliva. Following this, Polident + saliva demonstrated noticeably better retention than the other adhesives, with mean differences that were statistically significant at $p\leq0.001$. Then came Secure Adhesive, which had a statistically significant mean retention difference ($p\leq0.01$) and a considerably greater mean retention than the other adhesives. Furthermore, there were no discernible variations in the mean retention between Fixon Cream alone, Fixon powder + saliva, Polident, and fake saliva. This suggests that Secure + saliva had the significantly highest mean retention of Lucitone with various adhesives, followed by Fixon powder, Fixon Cream + saliva, Polident + Saliva, and Secure. Additionally, there were no discernible differences between Fixon Powder + saliva, Polident, artificial saliva, and Fixon Cream. [Refer Graph no. 13]

TREVALON:

The test showed that, when applied on Trevalon acrylic material, the mean retention of several adhesives varied significantly; this difference was statistically significant at $p<0.001$. [Refer Graph no. 14]

With the exception of Fixon Cream + Saliva and Secure + Saliva & Fixon Powder, Polident + Saliva demonstrated considerably greater mean retention when compared to other adhesives, according to a multiple comparison of mean differences between groups. The mean differences were statistically significant at $p<0.001$. With the exception of Fixon Cream + Saliva & Fixon Powder, Secure + Saliva demonstrated much greater mean retention than the other adhesives. The mean differences were statistically significant at $p<0.001$. Next came Fixon Powder, which with the exception of Fixon Cream + saliva, demonstrated much greater mean retention than the other adhesives. The mean differences were statistically significant at $p<0.001$.

Next came Fixon Cream + saliva, which demonstrated noticeably better retention than the other adhesives. The mean differences were statistically significant at $p<0.001$. Secure Adhesive came next, demonstrating a statistically significant mean retention difference at $p<0.05$ and a considerably greater mean retention than the other adhesives. Furthermore, there were no discernible variations in the mean retention between Fixon Cream alone, Fixon powder + saliva, Polident, and fake saliva. This suggests that Polident + saliva had the significantly highest mean retention of Trevalon with various adhesives, followed by Secure + Saliva, Fixon Powder, Fixon Cream + saliva, and Secure. Additionally, there were no discernible differences between Fixon Powder + saliva, Polident, artificial saliva, and Fixon Cream. [Refer Graph no. 15]

Conclusion Remarks for Intergroup comparisons:

For Artificial Saliva & Fixon Cream Alone Adhesive, Trevalon showed significantly lesser mean retention as compared to DPI & Lucitone acrylic. With Fixon Powder + saliva, Fixon Powder & Secure + Saliva, DPI acrylic

showed signicantly higher mean retention as compared to Lucitone & Trevalon acrylic. With Polident + saliva, Lucitone shows signicantly lesser mean retention as compared to DPI & Trevalon. However, no significant differences were found between 3 acrylic materials when used with Fixon Cream + Saliva, Secure and Polident adhesive alone.

Discussion:

The success of complete denture therapy relies on technical precision during prosthesis fabrication and efficient post-placement patient management. Meeting patient expectations for optimal retention and stability can be challenging, even for skilled practitioners. Incorporating the prudent use of denture adhesives in discussions may enhance treatment outcomes and patient satisfaction. [5-9,10,20]

Denture adhesives, also known as fixatives, are widely acknowledged by denture wearers for improving retention, stability, and functionality. [5,8,11-13] They also boost patient confidence and satisfaction but must be used under dental guidance. Dentists should provide clear instructions for proper application and warn against misuse, as part of post-delivery care. [8,11-13,20]

Ideal denture adhesives are available in powder, gel, or cream forms and feature non-toxic, biocompatible, odorless, and taste-neutral properties, as well as easy application and resistance to microbial growth. Their retentive qualities should last 12–16 hours. [18-20] The main components include adhesive materials (Group 1), antimicrobial agents (Group 2), and additives/plasticizers (Group 3). Soluble adhesives like creams and pastes utilize Carboxymethyl cellulose (CMC) and Polyvinylether methyl methacrylate (PVM-MA). CMC provides strong initial hold but dissolves quickly, while PVM-MA ensures longer-lasting retention. Insoluble adhesives use pads or wafers that expand upon hydration for enhanced retention. [20,21]

Modern adhesives leverage bioadhesive and cohesive materials, often incorporating carboxyl groups, forming strong electrovalent bonds upon hydration. These improve stability, retention, bite force, and functionality, but their misuse may mask ill-fitting dentures, potentially causing stomatitis, candidiasis, or oral flora imbalance. [8,12,20]

Indications for denture adhesives include scenarios like xerostomia, orofacial dyskinesia, post-surgical challenges, sensitive oral mucosa, and extensive maxillofacial defects. Public speakers and executives may also use adhesives for psychological reassurance. Contraindications include ill-fitting dentures, open sores, poor oral hygiene, and allergies. [20]

Research confirms that denture adhesives significantly improve retention compared to saliva alone. Adhesive pastes are generally more effective than powders, offering twice the retention in some studies. [8,9,17,21,22] For instance, the highest retention values for denture bases were: DPI with Polident + Saliva (Mean = 854.390 gms), Trevalon with Polident + Saliva (Mean = 821.890 gms), and Lucitone with Secure + Saliva (Mean = 711.890 gms). [8] These findings align with studies by C.L. Chew and Joseph E. Grasso, which demonstrated improved retention during chewing, swallowing, and speaking. [8,17] Panagiotouni et al. also highlighted enhanced adhesive performance in combination with saliva. [5]

McKevitt (1951) and Stafford (1970) identified additional adhesive applications, including aiding large prostheses like obturators and as a medium for drug delivery. They also noted benefits for cleft-palate patients and those experiencing discomfort after denture insertion. [8]

Effective denture retention depends on adequate saliva and a well-fitted denture. Denture adhesives enhance retention only when the denture base fits correctly. Poorly fitting dentures, even with adhesives, can

harm oral structures and compromise health. [5]

In conclusion, denture adhesives are valuable for enhancing retention and stability when used with proper guidance and well-fitted dentures. Their misuse or reliance on ill-fitting dentures should be avoided to ensure optimal oral health.

Conclusion:

Within the limitation of this in vitro study, the following conclusions can be drawn:

1. For DPI Acrylic Resin the mean retention was significantly highest in Polident & saliva, followed by Fixon Cream & saliva, Fixon Powder & saliva, Secure and then with Fixon Powder alone, and further no significant differences were observed between Fixon Cream, Secure & saliva adhesive and Polident and artificial saliva.
2. The mean retention of Lucitone with different adhesives was significantly highest in Secure + saliva, followed by Fixon powder, Fixon Cream + saliva, Polident + Saliva and Secure and further no significant differences were observed between Fixon Powder + saliva, Polident, artificial saliva & Fixon Cream.
3. The mean retention of Trevalon with different adhesives was significantly highest in Polident + saliva, followed by Secure + Saliva, Fixon Powder, Fixon Cream + saliva & Secure and further no significant differences were observed between Fixon Powder + saliva, Polident, artificial saliva & Fixon Cream.
4. Polident with Saliva showed the highest retention.
5. We found out that the combination of Polident with Saliva and DPI denture base resin has the highest retention.
6. We can suggest that for complete dentures fabricated with DPI Acrylic Resins the most appropriate denture adhesive with highest retention can be Polident with Saliva. Secure with Saliva and Polident with Saliva for Lucitone and Trevalon respectively.
7. The mean retention of denture adhesives was higher when they were tested along with artificial saliva rather than alone.
8. The adhesives with cream consistency showed higher mean retention than the powder consistency.
9. We found out that saliva amplifies the actions of Denture Adhesives. Denture Adhesives with cream consistency can be preferred more provided patients are well educated regarding the cleaning protocols of Denture adhesives from the Prosthesis.

Clinical Significance:

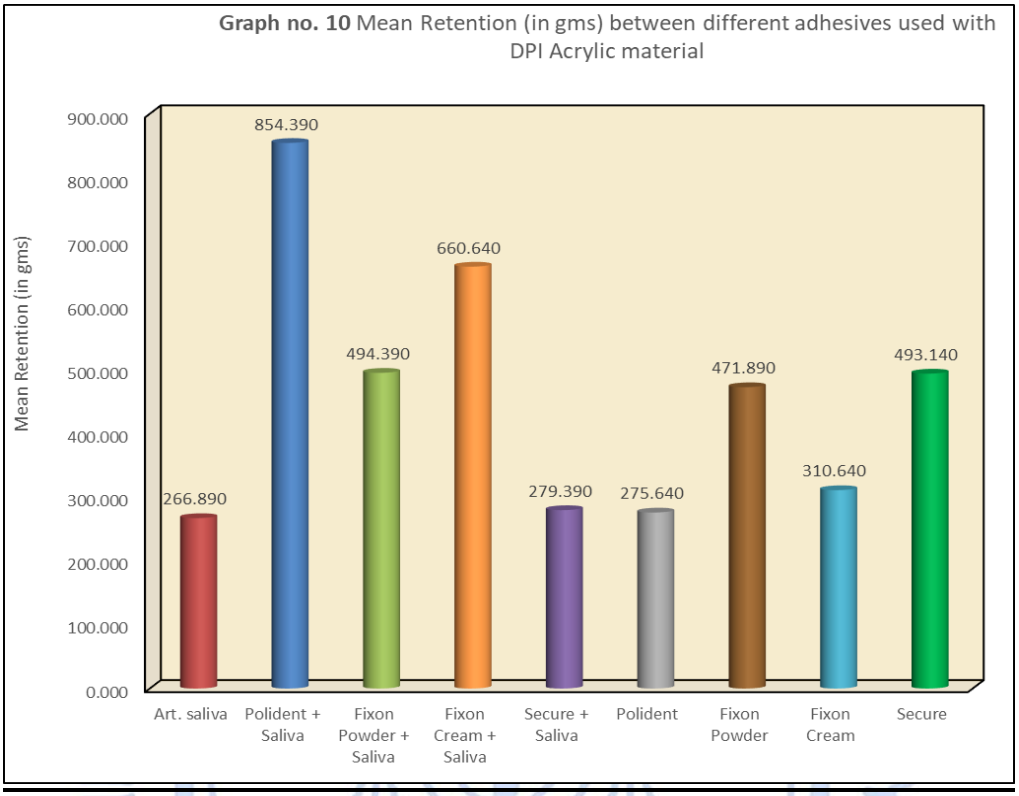
Denture adhesives have the potential to improve the effectiveness of complete dentures. It's essential for dental professionals to advise patients on how to properly apply denture adhesives. These adhesives notably boost retention and are recommended when extra retention is required. Dentists should prescribe the most suitable adhesive and denture base combination to ensure the best denture performance. Creamy-textured denture adhesives may be favored, especially if patients are well-informed about the proper cleaning procedures to remove adhesive residue from their prostheses.

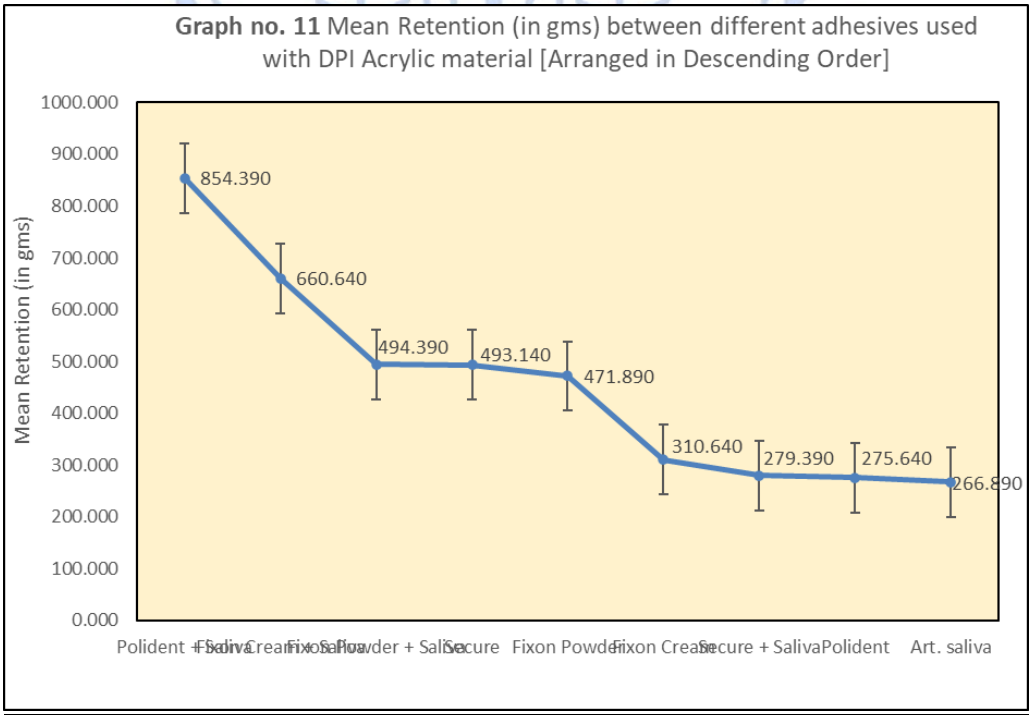
Reference:

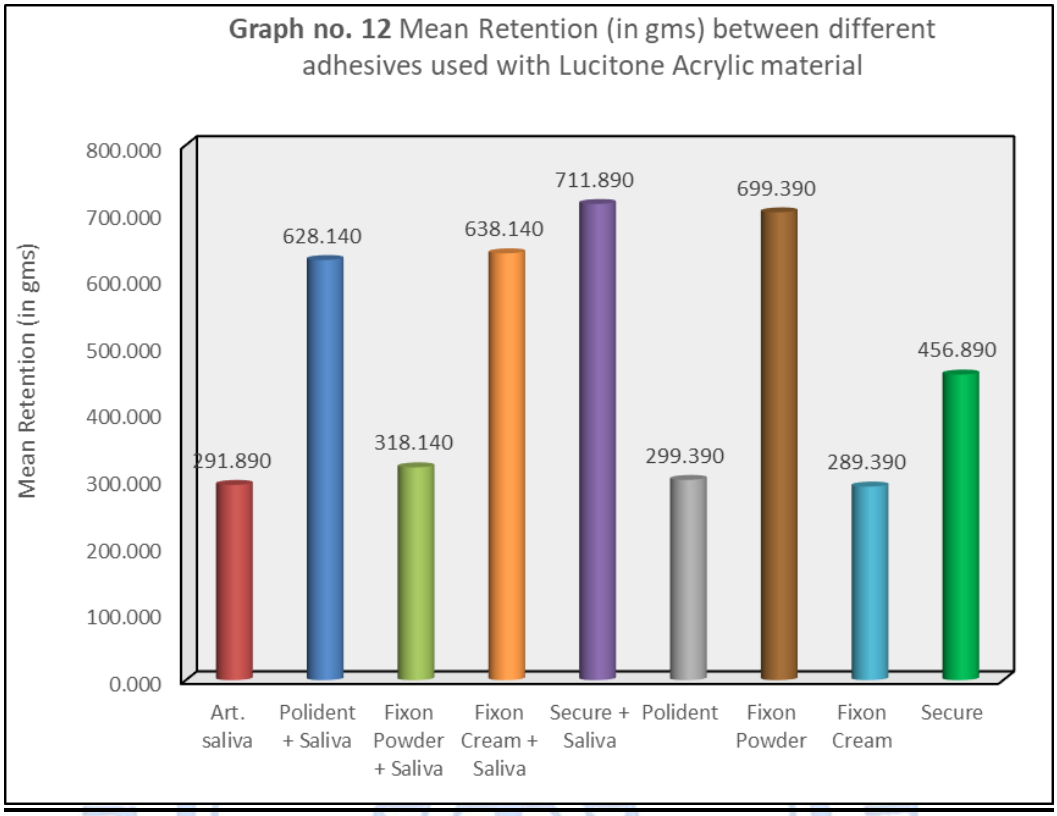
1. Craig RG, Berry GC, Peyton FA. Physical factors related to denture retention. J Prosthet Dent. 1960;10:459-67.
2. Barbenel JC. Physical retention of complete dentures. J Prosthet Dent 1971;26:592-600.
3. Avant WE. A study of some factors associated with denture retention. J Prosthet Dent. 1973;29:383-9.
4. Lindstrom RE, Pawelchak J, Heyd A, Tarbet WJ. Physical-chemical aspects of denture retention and stability: a review of

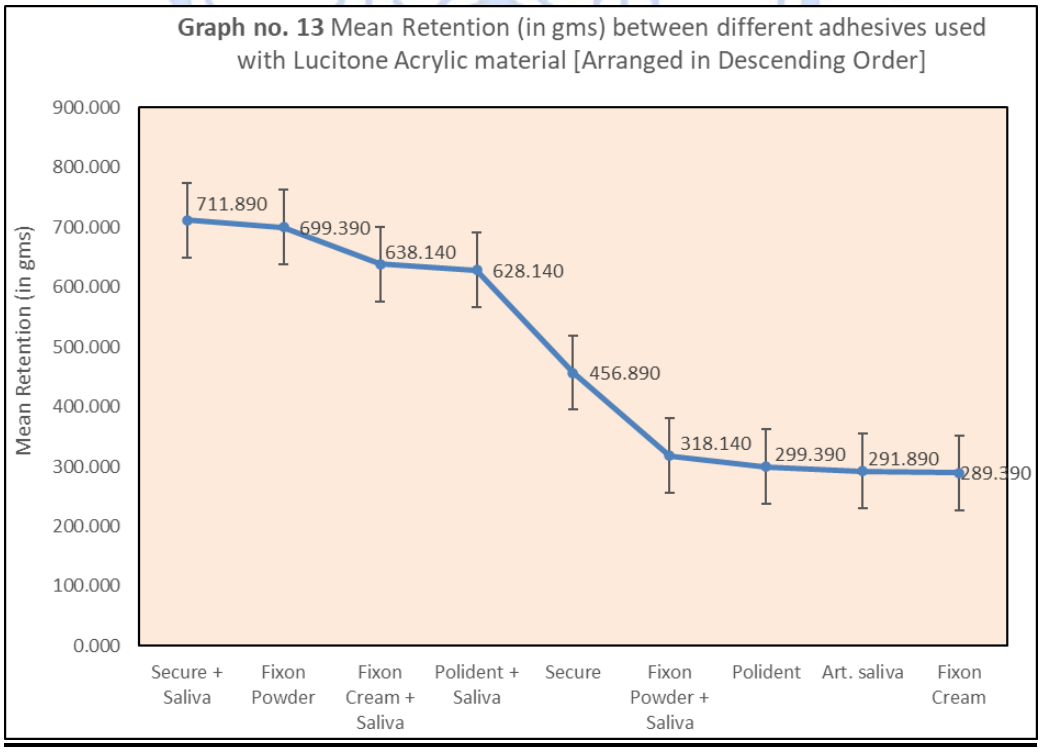
the literature. J Prosthet Dent. 1979;42:371-5.
5. Panagiotouni E, Pissiotis A, Kapari D, Kaloyannides A. Retentive ability of various denture adhesive materials: an in vitro study. J Prosthet Dent. 1995;73(6):578-85.
6. Ow RK, Bearn EM. A method of studying the effect of adhesives on denture retention. J Prosthet Dent. 1983;10:332-7.
7. Kapur KK. A clinical evaluation of denture adhesives. J Prosthet Dent 1967;18:550-8.
8. Chew CL, Boone ME, Swartz ML, Phillips RW. Denture adhesives: their effects on denture retention and stability. J Dent. 1985;13:152-9.
9. Chew CL. Retention of denture adhesives: an in vitro study. J Oral Rehabil. 1990;17:425-34.
10. Swartz ML, Norman RD, Phillips RW. A method for measuring retention of denture adherents: an in vivo study. J Prosthet Dent. 1967;17:456-63.
11. Herlands RE, Kutcher AH, Lucca JJ, Zegarelli EV, Mercadante JL, Roland L. Clinical observations on a new denture adhesive. J Prosthet Dent. 1960;10:278-83.
12. Tarbet WJ, Boone M, Schmidt NF. Effect of a denture adhesive on complete denture dislodgment during mastication. J Prosthet Dent. 1980;44:374-8.
13. Feller RP, Saunders MJ, Kohut BE. Effect of a new form of adhesive on retention and stability of complete maxillary dentures. Spec Care Dent. 1986;6:87-9.
14. Adisman IK. The use of denture adhesives as an aid to denture treatment. J Prosthet Dent. 1989;62:711.
15. Grasso JE. Denture adhesives: changing attitudes. J Am Dent Assoc. 1996;127(1):90-96.
16. Ekstrand K, Hensten-Pettersen A, Kullmann A. Denture adhesives: cytotoxicity, microbial contamination, and formaldehyde content. J Prosthet Dent. 1993;69(3):314-7.
17. Grasso JE, Rendell J, Gay T. Effect of denture adhesive on the retention and stability of maxillary dentures. J Prosthet Dent. 1994;72(4):399-405.
18. DeVengencie J, Ng MC, Ford P, Iacopino AM. In vitro evaluation of denture adhesives: possible efficacy of complex carbohydrates. Int J Prosthodont. 1997;10(1):61-72.
19. Grasso JE. Denture adhesives. Dent Clin North Am. 2004;48(3):721-33.
20. Y.R. Shankar. Denture adhesives for complete denture: a literature review. Indian J. Dent. Sci. 2010;1 23–28.
21. Mañes JF, Selva EJ, De-Barutell A, Bouazza K. Comparison of the retention strengths of three complete denture adhesives: an in vivo study. Med Oral Patol Oral Cir Bucal. 2011 Jan 1;16(1):e132-6.
22. Kumar MS, Thombare RU. A comparative analysis of the effect of various denture adhesives available in market on the retentive ability of the maxillary denture: an in vivo study. J Indian Prosthodont Soc. 2011 Jun;11(2):82-8.

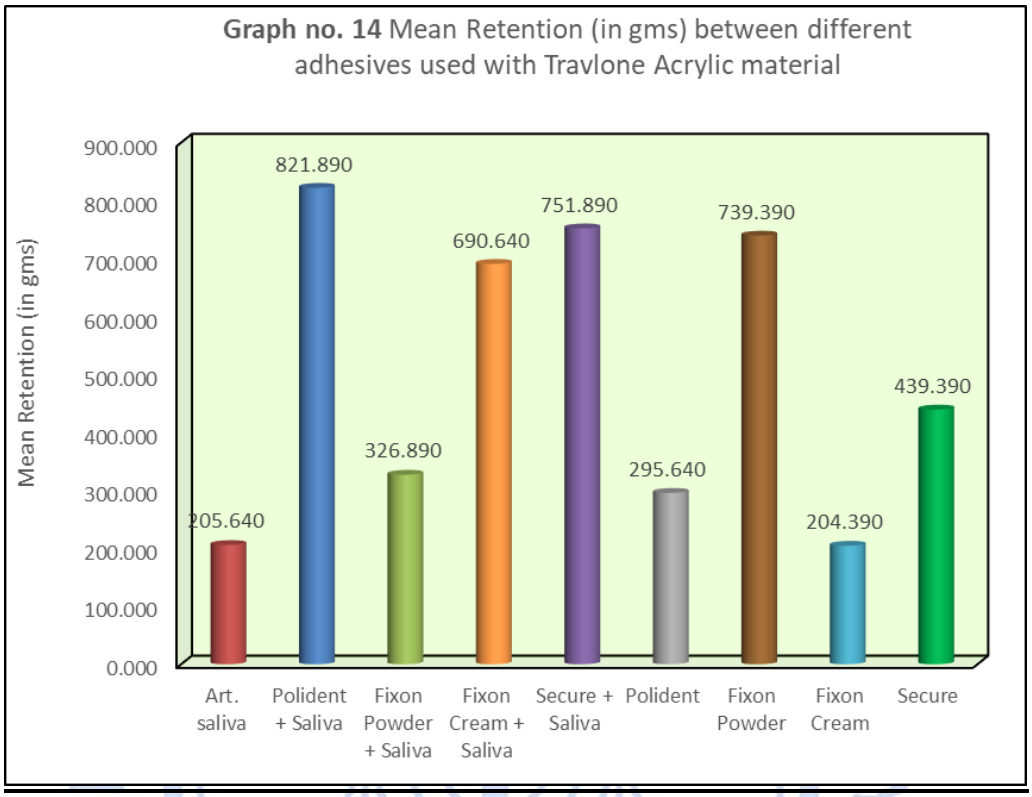
TABLES

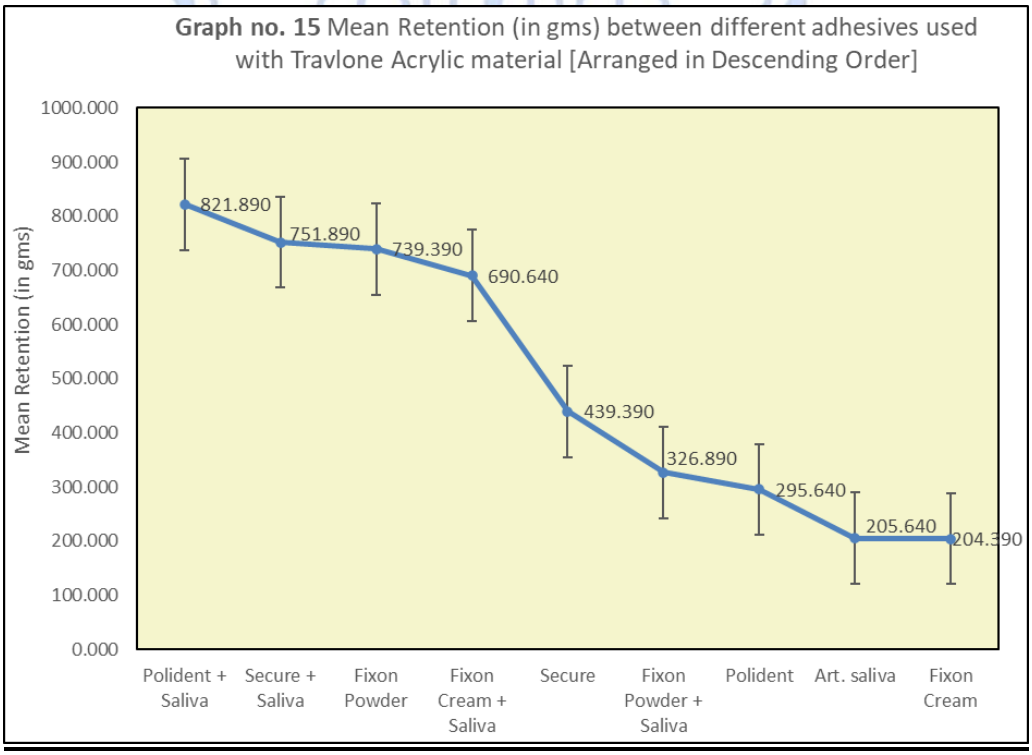

Graph no. 10 Mean Retention (in gms) between different adhesives used with DPI Acrylic material
Mean Retention (in gms)
900.000
800.000
700.000
600.000
500.000
400.000
300.000
200.000
100.000
0.000
266.890
854.390
494.390
660.640
279.390
275.640
471.890
310.640
493.140
Art. saliva
Polident + Saliva
Fixon Powder + Saliva
Fixon Cream + Saliva
Secure + Saliva
Polident
Fixon Powder
Fixon Cream
Secure


Graph no. 11 Mean Retention (in gms) between different adhesives used with DPI Acrylic material [Arranged in Descending Order]
Mean Retention (in gms)
1000.000
900.000
800.000
700.000
600.000
500.000
400.000
300.000
200.000
100.000
0.000
854.390
660.640
494.390
493.140
471.890
310.640
279.390
275.640
266.890
Secure
Fixon Powder
Fixon Cream
Secure + Saliva
Polident
Art. saliva


Graph no. 12 Mean Retention (in gms) between different adhesives used with Lucitone Acrylic material
Mean Retention (in gms)
800.000
700.000
600.000
500.000
400.000
300.000
200.000
100.000
0.000
291.890
628.140
318.140
638.140
711.890
299.390
699.390
289.390
456.890
Art. saliva
Polident + Saliva
Fixon Powder + Saliva
Fixon Cream + Saliva
Secure + Saliva
Polident
Fixon Powder
Fixon Cream
Secure


Graph no. 13 Mean Retention (in gms) between different adhesives used with Lucitone Acrylic material [Arranged in Descending Order]
Mean Retention (in gms)
900.000
800.000
700.000
600.000
500.000
400.000
300.000
200.000
100.000
0.000
711.890
699.390
638.140
628.140
456.890
318.140
299.390
291.890
289.390
Secure + Saliva
Fixon Powder
Fixon Cream + Saliva
Polident + Saliva
Secure
Fixon Powder + Saliva
Polident
Art. saliva
Fixon Cream


Graph no. 14 Mean Retention (in gms) between different adhesives used with Travlone Acrylic material
Mean Retention (in gms)
900.000
800.000
700.000
600.000
500.000
400.000
300.000
200.000
100.000
0.000
205.640
821.890
326.890
690.640
751.890
295.640
739.390
204.390
439.390
Art. saliva
Polident + Saliva
Fixon Powder + Saliva
Fixon Cream + Saliva
Secure + Saliva
Polident
Fixon Powder
Fixon Cream
Secure


Graph no. 15 Mean Retention (in gms) between different adhesives used with Travlone Acrylic material [Arranged in Descending Order]
Mean Retention (in gms)
1000.000
900.000
800.000
700.000
600.000
500.000
400.000
300.000
200.000
100.000
0.000
821.890
751.890
739.390
690.640
439.390
326.890
295.640
205.640
204.390
Polident + Saliva
Secure + Saliva
Fixon Powder
Fixon Cream + Saliva
Secure
Fixon Powder + Saliva
Polident
Art. saliva
Fixon Cream

FIGURES

Figure 1

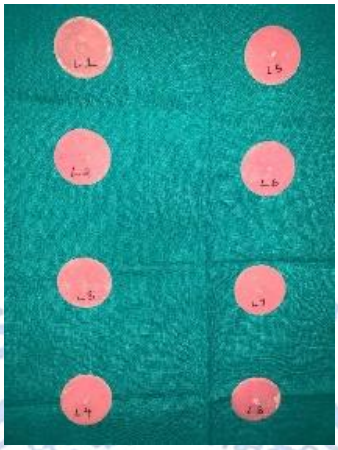


Figure 2

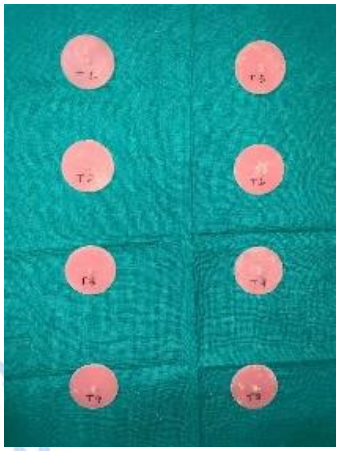


Figure 3

Figure 4

Figure 5

Figure 6

Figure 7

Figure 8

Figure 9

Figure 10

Figure 11

Figure 12

Figure 13

Figure 14