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RESEARCH ARTICLE

COMPARATIVE EVALUATION OF DENTURE ADHESIVE ON THE EFFICIENCY OF COMPLETE DENTURE IN PATIENTS WITH DIFFERENT ALVEOLAR RIDGES AMONG KASHMIR POPULATION

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Abstract

Background: Denture adhesives are used to improve retention, stability, and efficiency of complete dentures. Proper use of denture adhesives has benefits for patients. Evaluating the effect of denture adhesives on efficiency of complete dentures in patients with different alveolar ridges among Kashmir population was the purpose of this study.

Materials and Methods: This randomized clinical trials study was conducted on 40 patients who were wearing well fitted complete dentures. The patients were categorized intothree groups based on clinical and radiographic situations of residual ridges. Group I with mildresorption, Group II with moderate resorption, and Group III with severe resorption. The patients who had recently received their dentures and the primary complications had been resolved wereasked to use denture adhesive according to the instructions. The patients answered two differentquestioners in 1 week and 2 months of using denture adhesive. The answers were analyzed bymeans of variance and Chi square tests ($P < 0.05$).

Results: Retention, chewing, talking, selfconfidence, and efficiency of dentures were improved in all patients. No statistical significant differences in these parameters were observed between thethree groups ($P > 0.05$). Increased retention and adaptation made 64.4% of these patients willing to continue using the adhesive after the study. Fortythree percent of patients reported moderatesatisfaction of using this adhesive.

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Conclusion: Using denture adhesive in well fitted complete dentures resulted in an improvement in retention, talking, chewing, ease of use, selfconfidence, and efficiency of dentures. The use of denture adhesive is, therefore, recommended to patients wearing dentures with some problems.

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Introduction:-

According to Zarb et al., the term "denture adhesive" refers to a commercially available, nontoxic, soluble material that is applied to the tissue surface of the denture to enhance retention, stability, and function.Denture adhesives are commercially available. They are non toxic and soluble (powder, cream, or liquid) materials which are applied on tissue side of dentures to improve the function of them.[1] Denture adhesive was introduced in the late 18th century. It was first invented in 1913 and developed through 1920s and 1930s.[2-5] These materials expand by absorbing water, fill up the spaces, and increase the surface tension between denture and alveolar ridge mucosa.[6,7] Although some benefits of these materials are stated by many of patients, dentists assume it as the proof of their incompetency.[2,8] Improvement of denture adaptation, talking, chewing, bite forces, maximum incisal force of maxillary denture, and selfconfidence are some of the benefits of these materials.[3,8-10] These materials are used in clinical steps of makingdentures such as study base fixation, bite registration, and improve the accuracy of denture try in.[9] Some disadvantages such as oral mucosal irritation, changes in occlusal relationships, increasing of verticaldimension, increasing of alveolar bone loss have been reported for denture adhesives, especially for insoluble ones although with no evidence[11]. Nolongitudinal studies on tissue response to denture adhesives have been reported.[1] However, there are several reports of bone marrow suppression and a complication of polyneuropathies associated with spinal cord injury due to the high absorption of zinc in denture adhesives.[1,11] Therefore, patients may avoid long‐term use of these products. Uysal *et al* [12] in 1988, evaluated the effect of four denture adhesives clinically on retention, duration of retention, chewing ability and other oral functions for 24 h, and also the ability of wiping off from the denture and oral tissues in patients whose mouth tissues were graded by Kapur index.[13] Psillakis *et al.*[14] in 2004,evaluated the function of maxillary dentures with and without denture adhesive in 194 patients. They used a simple gnathometer and evaluated the effect of denture adhesive on speech, chewing, fitness, and self‐confidence. Koronis *et al.*,[11] in 2004, evaluated the application of three types of denture adhesive in 30 edentulous patients whose supporting soft tissues were graded with Kapur index and their old dentures were replaced by new ones. In their study, some criteria such as retention, chewing efficiency, self‐confidence, denture movement, and conformity with Kapur index were evaluated. Munoz *et al.*,[15] in 2001, evaluated the effect of denture adhesives on 36 patients with well‐fitted complete dentures. Their results showed that denture adhesive significantly improved retention and stability, convenience, self‐confidence, and also decreased denture movement on chewing.

Purpose of study:-

The purposes of this study was to evaluate and compare the effect of denture adhesive on retention, chewing, speaking efficiency, ease of use, improving self‐confidence, and function in patients wearing well‐fitted prosthesis with three different conditions of alveolar ridge as well as evaluating the satisfaction of patients from these materials and willing of using again.

Materials and Methods:-

This clinical study was conducted on 40 patients with complete denture from those who had referred to the Department of Prosthodontics, Crown and Bridge, Government Dental College and Hospital, Srinagar, Jammu and Kashmir. The patients who had received their well fitted and perfect from any point of view dentures shortly before the trial (the last 6 monthsbefore starting research) were included in the study; and those with misfit dentures, xerostomia, neuro muscular disorders were excluded from the study. The sample size was calculated according to the sample size estimation formula, statistics expert and similar study.The patients were informed about the study and instructed how to apply denture adhesive based on manufacturer's instruction. (To apply denture adhesivecream: 1 – clean and dry dentures, 2 –apply adhesivesin thin strips as shown, and 3 – insert dentures andhold briefly in place) [Figure 1]. In this study, patients were reassured to participate and each patient was provided with the necessary explanations for theproduct, and they all participated fully in the study.The patients were asked to use the denture adhesive after resolving the post‐insertion complications of dentures. The patients

were then categorized into threegroups based on clinical and radiographic features of ridges according to Wical‑Swoope classification.[16]In panoramic radiography if you measure the space between the lower edge of the mandible and the lower edge of the mental foreman and then you multiply it by three, multiplication is a reliable estimate of the original height of the alveolar crest. Group 1 with a mild alveolar bone resorption up to 1/3 of original height andwith vertical walls. Group 2, with a moderate alveolar bone resorption more than 1/3 and <2/3 of original height. Group 3, flat ridge, with sever alveolar bone resorption for more than 2/3 of the original height.

After receiving the patient's satisfaction and examination, how to use dental adhesive was trained according to the manufacturer's instructions (once a day) [Figure 1]. The patients filled out twoattributed questioners in 1 week and 2 months of using denture adhesive. In the questionnaire, there was questions about the effect denture adhesive on retention, chewing comfort, speaking efficiency, ease of use, improving self‑confidence and function, easy cleaning adhesive, allergy, patients' desire to reuse.Data were analyzed using ANOVA and Chi‑square tests in SPSS software version 20 software (SPSSversion 20.0, SPSS Inc; Chicago, IL, USA) ($P < 0.05$).

Figure 1:-

Results:-

Effect				Groups					
	Mild resorption	Mild resorption	Mild resorption	Moderate resorption	Moderate resorption	Moderate resorption	Severe resorption	Severe resorption	Severe resorption
	Retention	Speaking	Chewing	Retention	Speaking	Chewing	Retention	Speaking	Chewing
No effect	20	30.3	26.3	6.7	22	15.3	15.3	40.3	19.7
Mild effect	33.3	33	20.3	13	31.3	28	30.3	21	30
Moderate effect	30.3	33.3	39	50.3	26.7	35.7	26.7	21	30.3
Severe effect	16.3	3.3	14.3	30	20	21	26.7	17.7	20
Total	100	100	100	100	100	100	100	100	100

Of the 40 participants, 22(55%) individuals were men and 18 (45%) were women. Table 1 shows85.5% of patients reported that denture adhesive enhanced the retention of their dentures. Chi‑squaretest showed no significant difference in enhanced retention between the 3 groups with different alveolar bone resorption.

Table 1 shows that 54.5% of patients reported a mild–to‑moderate improvement in their speaking.Chi‑square test revealed no significant differencein the level of improvement of speaking between groups.Table 1 shows that denture adhesive moderatelycomforted the process of chewing in 82.2% of patients and the difference between the 3 groups was not statistically significant, based on the Chi‑square test.By applying denture adhesive, 79.1% of patients reported comfort in using their dentures,8.27% reported decreased pain, 77.8% reported no change in taste, and 4.64% reported improvedself‑esteem. Only 2.2% reported allergy toadhesive, 4.24% difficulty in cleaning the denturesand oral mucosa. Nearly 64.4% of patients were keen to keep using the adhesive following 2 monthsof applying. Chi‑square test showed no significant difference in willing to use adhesive betweengroups. Increased retention and fitness was the most frequent reason (87.93%) for using the adhesive voluntarily.

Discussion:-

A successful complete denture treatment is theresult of combination of precise technique, properpatient education, and dentist's familiarity with allthe treatment techniques for maximum patients'satisfaction. Commercial denture adhesives are the products that have the capability to improve thetreatment outcomes and have benefits for the patients,when used properly[11,12,14].In this study, 85.5% of the patients reported increasingretention of their dentures. This finding is consistentwith previous studies.[4.11-15] Denture adhesive by increasing viscosity, maintaining the continuity andminimizing the thickness of saliva, as the intermediatematerial between denture and bed, increases fitness ofdenture.There were no statistical significant differences in improved retention between the three groups with different ridge conditions, while Koronis *et al*[11].reported that the effect of denture adhesive on retentionis more in patients with weakened supporting tissues.This difference can be related to the difference inpatients and the used adhesives.Mild-to-moderate improvement in talking wasreported by 67.8% of patients. Lack of sufficient retention, miss fitness, mobility, displacement, and also mediolateral movements may all be the reasons of speech disorder in patients.[14] Denture adhesivescan improve speech by limiting the movements through enhancing fitness and retention.[14]Increased chewing ability was reported by80% of patients. This finding is along with the previous studies[12,14,17-19]. In spite of this study,Nicolas *et al.*[20] did not observe statistical significantchanges in chewing parameters.The results of our study did not show significant differences in improvement of chewing between the three groups of patients with different alveolarridge conditions while Koronis *et al.*[11] in 2010and Fujimori *et al.*[10] in 2002 reported a significant enhancement in chewing ability, especially in caseswith weakened denture supporting tissues following applying denture adhesives. Regarding the hypermovement of dentures on decreased supporting tissues and consequently pain during eating, the higher rate of enhancement in chewing ability in these patients,compared to patients with good supporting tissues,can be attributed to the effectiveness of dentureadhesive in these patients.Increased comfort following applying denture adhesivewas reported by 71.9% of patients. This finding is consistent with Psillakis *et al.*[14] and Munoz *et al*.[15]Inefficiency of denture adhesive in reducing the pain induced by pressure was reported by 72.2% of patients. This feedback was expected regarding this fact that pain on pressure is related to the weakness of supporting tissues.Affected taste was reported by 22.2% of patients.Flavored denture adhesive was interesting for 35.55%of patients.Today flavored denture adhesives are available.[21]Self-confidence increased in 64.4% of patients whichis consistent with previous studies[11,14,18]. Psillakis*et al.*[14] reported almost the same frequency (63.9%) of self-confidence improvement in patients using denture adhesive. No difference in the level of self-confidence was detected between the three groupswith different ridge conditions.In this study, 24.4% of patients had difficulties in removing the adhesive. Increased viscosity by the manufacturer to improve the adhesive property might be the reason.Only two patients (2.2%) experienced allergy toadhesive. Today adhesives are benzene free, or have minimum amount of this material, benzene is potentially a carcinogen material.[1]The contentment level of the use of these materialsin this study was moderate and 68.3% of patients reported an overall improvement in efficacy of their dentures. Psillakis *et al.*[14] reported an improvementin denture function for 79.2%.

Conclusion:-

The results of this study showed that applying denture adhesive in well-fitted complete dentures caused improved retention, speaking, chewing, and efficacy; ease of use; increased self-confidence inpatients. There were no statistical differences in these parameters between the three groups with mild, moderate, and sever alveolar ridge resorptions.Contentment level of applying this material was moderate, and the patients were willing to use it again. It may be concluded, therefore, that denture adhesive can be prescribed for patients with different alveolar ridge conditions wearing well fitted, but with difficulties, completed dentures.

References:-

1. Zarb G, Hobkirk JA, Eckert SE, Jacob RF. Prosthodontic Treatment for Edentulous Patients: Complete Denture and Implant-Supported Prostheses. 13th ed. St. Louis: Elsevier; 2013. p. 155-8.
2. Ozcan M, Kulak Y, Arikan A, Silahtar E. The attitude of complete denture wearers towards denture adhesives in Istanbul. J OralRehabil 2004;31:131-4.
3. Hong G, Lian YM, Sadamori SH, Hamada T, Murata H. A questionnaire survey of dentists and dental students in China about denture adhesives. Int Chin J Dent 2008;8:33-7.
4. Fakhri H, Fayaz A, Faramarzi F, Javaheri HH. The knowledge and attitude of general dentists toward denture adhesives in Tehran. Indian J Dent Res 2009;20:164-8.

5. 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;16:e132‐6.
6. Chowdhry P, Phukela SS, Patil R, Yadav H. A study to evaluate the retentive ability of different denture adhesive materials: An *in vitro* study. J Indian Prosthodont Soc 2010;10:176‐81.
7. Kurt H, Karayazgan B, Tuncer N. Patient satisfaction with denture adhesives used in complete dentures. Turk J Geriatr 2011;14:440‐8.
8. Coates AJ. Usage of denture adhesives. J Dent 2000;28:137‐40.
9. Carolina A, Gustava A, Santana L, Perin A, Alonso A, Antonio M. Subjective assessment of adhesives usage by complete denture wearers in a Brazilian population. Rev Odontol UNESP 2012;41:38‐42.
10. Fujimori T, Hirano S, Hayakawa I. Effects of a denture adhesive on masticatory functions for complete denture wearers – Consideration for the condition of denture‐bearing tissues. J Med Dent Sci 2002;49:151‐6.
11. Koronis S, Pizatos E, Polyzois G, Lagouvardos P. Clinical evaluation of three denture cushion adhesives by complete denture wearers. Gerodontology 2012;29:e161‐9.
12. Uysal H, Altay OT, Alparslan N, Bilge A. Comparison of four different denture cushion adhesives – A subjective study. J Oral Rehabil 1998;25:209‐13.
13. Olshan AM, Ross NM, Mankodi S, Melita S. A modified Kapurscale for evaluating denture retention and stability: Methodologystudy. Am J Dent 1992;5:88‐90.
14. Psillakis JJ, Wright RF, Grbic JT, Lamster IB. In practice evaluation of a denture adhesive using a gnathometer. J Prosthodont 2004;13:244‐50.
15. Munoz CA, Gendreau L, Shanga G, Magnuszewski T, Fernandez P, Durocher J, *et al.* A clinical study to evaluate denture adhesive use in well‐fitting dentures. J Prosthodont 2012;21:123‐9.
16. Winkler S. Essentials of Complete Denture Prosthodontic. 3rd ed.India: AITBS Publishers; 2013.
17. Tarib NA, Baker MT, Murat MD, Ahmad M, Kamarudin KH.Masticatory efficacy and bite force in complete dentures: A studyof denture adhesive. Hong Kong Dent J 2010;7:67‐73.
18. Hasegawa S, Sekita T, Hayakawa I. Effect of denture adhesiveon stability of complete dentures and the masticatory function. J Med Dent Sci 2003;50:239‐47.
19. Rendell JK, Gay T, Grasso JE, Baker RA, Winston JL. The effectof denture adhesive on mandibular movement during chewing. J Am Dent Assoc 2000;131:981‐6.
20. Nicolas E, Veyrune JL, Lassauzay C. A six‐month assessment of oral health‐ related quality of life of complete denture wearers using denture adhesive: A pilot study. J Prosthodont 2010;19:4438.
21. Papadiochou S, Emmanouil I, Papadiochos I. Denture adhesives:A systematic review. J Prosthet Dent 2015;113:3917.e2.