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# KNOWLEDGE AND AWARENESS OF DENTURE LINING MATERIALS AMONG UNDERGRADUATE DENTAL STUDENTS - A SURVEY

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## ABSTRACT

Soft liners are a layer of soft, pliable material that is fitted between the surface of a denture and the oral tissues. Soft denture liners are used in complete and partial removable dentures to distribute functional loads homogeneously on the denture-bearing tissues. These materials are recommended in cases of irregular bone resorption, bony undercuts, thin atrophic mucosa, immediate prosthesis, healing after implant placement, and for patients with bruxism and xerostomia. The aim of this present study is to find about the knowledge and awareness of the usage of denture liners and also about its properties among undergraduate dental students. Total number of participants who participated in this survey were 200. The data was collected and entered and verified by using a standard computer software. The data was represented in the form of pie charts and bar graphs, data analysis was done with the help of SPSS software. Within the limitations of the study, it can be concluded that the students had adequate level of knowledge and awareness about the denture lining materials. They lacked awareness in certain

aspects of advantages and disadvantages of various denture lining materials. In future, scientific knowledge about the various denture relining materials and procedures should be enhanced through means of CDE program and workshops.

**Keywords: Soft liners, denture liners, acrylic resin, silicone, tissue conditioning materials**

## 1. INTRODUCTION

A soft liner is a large soft pliable material that is fitted between the surface of a denture and your oral tissues. It absorbs shock between the hard base of the denture and gingiva. Soft liners can be used when creating new dentures or retrofitted into the existing dentures **[1]**. Processed soft liners provide comfort and relief for individuals with existing dentures. Processed soft liners provide comfort and relief for individuals with receded and flattened gingival tissues and don't respond well to the stress of dentures **[2]**. They may also be a suitable solution for patients with chronically sore gingival tissues or with sharp bony areas.

Soft relines are divided into semi permanent or permanent, silicone polymer rubbers or plasticized acrylics and may be either auto-heat or visible light polymerized **[3]**. Resilient lining materials are categorised as plasticized acrylic resins or silicone polymer elastomers. The plasticized acrylic resin includes a powder consisting of acrylic polymers and copolymers and a liquid containing an acrylic monomer. The plasticisers are useful in maintaining the softness of the material **[3, 4]**. The silicone elastomers, consisting of dimethylsiloxane polymers, with a chemical composition similar to that of the silicone impression materials, are not dependent on leachable plasticisers and, therefore, have ability to retain the elastic properties for long periods **[3–5]**.

Soft liners are used to absorb some of the energy produced by masticatory impact and act as a 'shock absorber'. Some patients suffer from chronic pain, soreness or discomfort due to prolonged contact between the rigid denture base materials and the underlying tissues; usually in patients with sharp, thin, or heavily resorbed ridges or those with severe undercuts. The soft lining materials include: plasticized acrylics, silicone rubber, plasticized vinyl polymers and copolymers, hydrophilic polymers, polyphosphazene fluoropolymers, fluoroethylene and polyvinyl siloxane addition silicones. The most commonly used soft liners are plasticized acrylics and silicone rubber which are heat- or chemically-activated **[6]**.

Advantages of soft liners may include - more comfortable to use, all patients respond well to soft liner materials and also easier chewing **[7]**. Apart from this, soft liners have certain disadvantages also like, bond strength and porosity and colour stability **[8]**. With proper application and care, soft denture liners last a minimum of three months. It is adhering properly, comfortable, fitting well and free from bacteria, liners can stay in the denture. The main aim of this study is to analyse knowledge and awareness among UG dental students about the use and properties of denture lining materials.

## 2. MATERIALS AND METHODS

The present study is a survey based study. All the participants were from different private dental colleges in Chennai. Questionnaires were prepared, sample size was 200. Sampling method used was stratified random sampling. Once the questionnaire was made it was shared to all the participants of a private dental college in Chennai. Data was collected, was entered and was verified with the help of standard computer software. Data manipulation was done in excel spreadsheet. Double entry method was used to enter the collected data. Total number of questions were 11 and were represented using pie charts and bar graphs. Statistical analysis was done with the help of SPSS software. Statistical test used was Chi square. Finally the whole data was entered in the form of table and percentage was added to it. Independent variable includes name, age, gender and dependent variable includes soft lining materials.

## 3. RESULTS AND DISCUSSION

Soft liners are a layer of soft and pliable material fitted between surfaces of a denture and also oral tissues. This absorbs shock between hard base, dentures and gums. Soft liners are used for creating new dentures which are retrofitted into the existing dentures [9]. Soft liners reduce tension and forces of mastication and form a fitting surface of a denture.[10] In this present study, there are a total 10 questions and the total population was 200.

Among the total population, 84% of the participants were aware of the soft lining material and 16% of the participants **(Figure 1)**. According to Akhil Rathi, 50% of the practitioners were unaware of the correct relining step by step procedure and were also not sure about the antimicrobial properties of the relining material available in the market. 54% of the participants agreed to mucosa being inflamed due to ill fitting dentures, 23.5% of the participants agree with mandibular tori being present, 17.5% of the participants agree with tissue symptoms are

related to diabetes and 5% of the participants agree with large maxillary tori being present **(Figure 2)**. Other studies suggest that one major indication for soft liners is to reduce problems arising from the effects of age changes in the denture bearing tissues. The use of a soft liner can improve both masticatory efficiency and oral comfort for patients presenting a reduced thickness of the oral mucoperiosteum **[11]**. 42% of the participants agree that bond strength with a denture has increased, 40.5% of the participants agree that they remain resilient for a short time, 12% of the participants agree that they do not support fungal growth and 5.5% of the participants agree that tissue adaptation is better **(Figure 3)**. According to Khanna A, Silicone materials have fine mechanical properties, good chemical stability and flame retardancy, and superior resistance to heat and cold **[12]**. 34.5% of the participants agree for up upto 1 year about the longevity of denture liner materials , 29.5% of the participants agree for 2 years, 26.5% of the participants agree for more than 2 years and 9.5% of the participants are not aware of it (Figure 4) . According to Kreve S, the lack of bonding leads to debonding of denture liner material leading to diminished procedure longevity for about 1 to 1.5 years **[13]**. 37.5% of the participants when questioned about the factors that determines the durability of denture liners agree that it is a failure in adhesion, 32.5% of the participants agree that it is rough , 22% of the participants agree that it is changes in surfaces and 8% of the participants agree to all the options **(Figure 5)**. From other studies, factors that determine the durability of denture liners is mainly due to failure in adhesion properties. Among the total population, responses about the most commonly used soft liner materials are 49.5% of the participants agree for acrylic resin, 38% of the participants agree for silicone and 12.5% of the participants are not aware of it **(Figure 6)**. In the previous studies, more than 70% of the participants agree that acrylic resins are most commonly used soft liners and the remaining participants agree with silicone **[14]**. 76% of the participants agree with this fact that acrylic based liners are more efficient than silicone based liners and 24% of the participants disagree with the fact that acrylic based liners are more efficient than silicone based liners **(Figure 7)**. In the previous studies, 75% of the participants agree that acrylic based liners are more efficient than silicone based liners and 25% of the participants disagree to this fact [15].

Among the total population when questioned about advantages of denture liners, 34% of the participants agree for long term resiliency, 32% of the participants agree for easier chewing, 15% of the participants agree that it acts as a shock absorbing cushion and 19% of the participants agree for all the options **(Figure 8)**. Other studies show that denture liners lead to slow gum shrinkage by compressing and conforming to the changing jaw bone structure **[16]**. 61.5% of the participants agree with this fact that soft liners can be used for obturators, 22% of the participants do not agree with this fact that soft liners can be used for obturators and 16.5% of the participants are not aware of this fact **(Figure 9)**. Studies demonstrate that a simple technique to overcome difficulties is by the use of soft lining materials in the delayed surgical obturator **[17]**. Previously our team had conducted numerous clinical trials [18–24] and lab animal studies **[9, 25-28]** and in- vitro students **[29–31]** over the past 5 years. Now we are focussing on surveys. The idea for this survey stemmed from the current interest in our community.

The following are the results obtained from Chi square test to obtain the association bar graphs. Female students of 49% were more aware about the denture lining materials than male students **(Figure 10)**. Chi square test done, p value- 0.913 ($p > 0.05$) Hence, not statistically significant. In the previous studies, 80% of the participants were aware of soft lining materials and 20% of the participants were unaware of soft lining materials. Among the total population, responses for advantages of denture lining materials is 32% of the participants agree for easier chewing , 15% of the participants agree that it acts as a shock absorbing cushion and 19% of the participants agree for all the options **(Figure 11)**. Level of knowledge about the advantages of denture lining materials was similar among male and female students. (11% and 8%) Chi square test done, p value- 0.015 ($p < 0.05$) Hence, statistically significant. Other studies suggest that advantages of denture lining material include stabilizing the bite by adding support to the jaw bone **[32]**. The limitations of the study was less sample size.

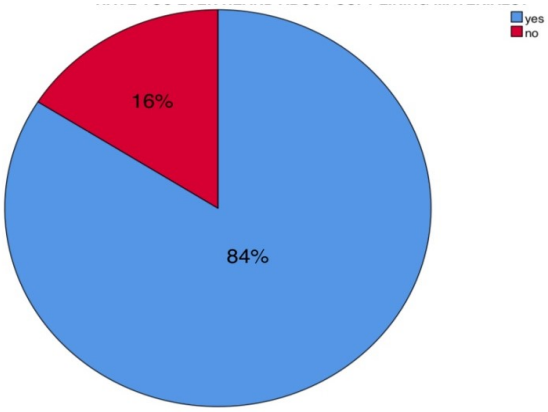


**Figure 1: Among the total population, 84% of the participants are aware of the soft lining materials (blue colour) and 16% of the participants unaware of the soft lining materials (red colour).**

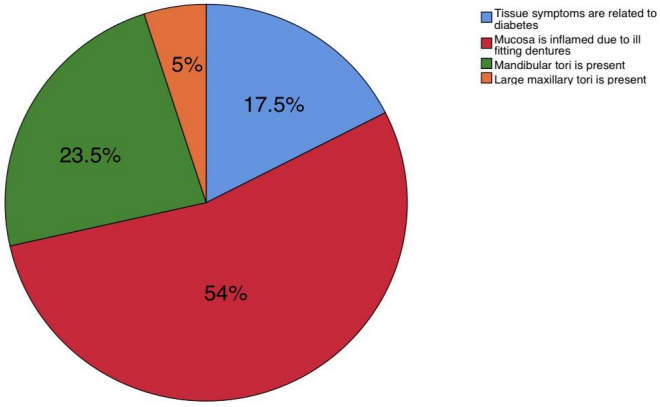


**Figure 2: The pie chart showing the responses for indications of soft lining materials. Among the total population, 54% of the participants agree to mucosa is inflamed due to ill fitting dentures (red colour), 23.5% of the participants agree with mandibular tori is present (green colour) , 17.5% of the participants agree with tissue symptoms are related to diabetes (blue colour) and 5% of the participants agree with large maxillary tori is present (orange colour).**

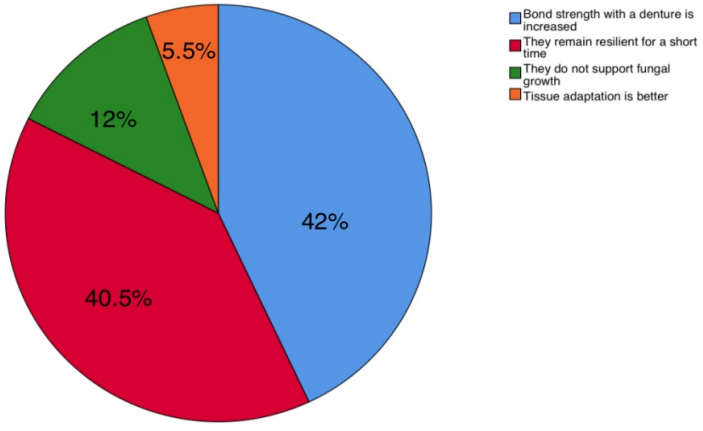


**Figure 3: The pie chart showing the responses about superior properties of silicone materials when compared to plasticized acrylic resin. Among the total population, 42% of the participants agree that bond strength with a denture has increased (blue colour), 40.5% of the participants agree that they remain resilient for a short time (red colour) , 12% of the participants agree that they do not support fungal growth (green colour) and 5.5% of the participants agree that tissue adaptation is better (orange colour).**

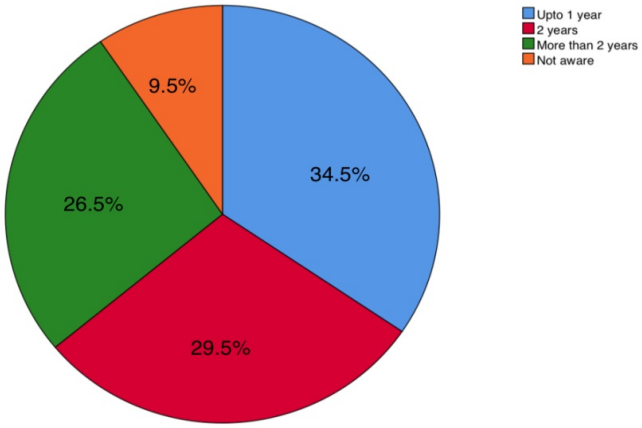


**Figure 4: The pie chart showing the responses about the longevity of denture liner materials. Among the total population, 34.5% of the participants agree for up upto 1 year (blue colour), 29.5% of the participants agree for 2 years (red colour) , 26.5% of the participants agree for more than 2 years (green colour) and 9.5% of the participants are not aware of it (orange colour).**

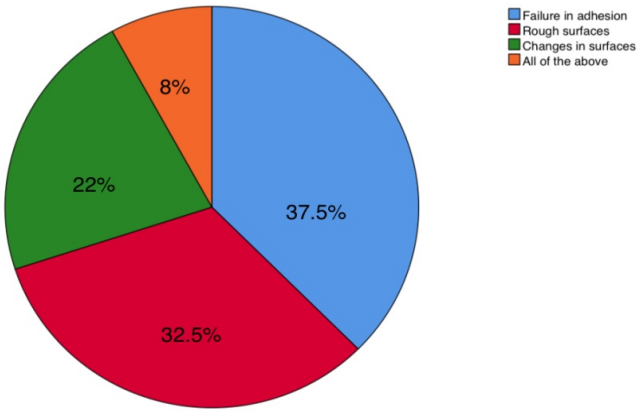


**Figure 5: The pie chart showing the responses for the factors that determines the durability of denture liners. Among the total population, 37.5% of the participants agree that it is a failure in adhesion (blue colour) , 32.5% of the participants agree that it is rough (red colour) , 22% of the participants agree that it is changes in surfaces (green colour) and 8% of the participants agree to all the options (orange colour).**

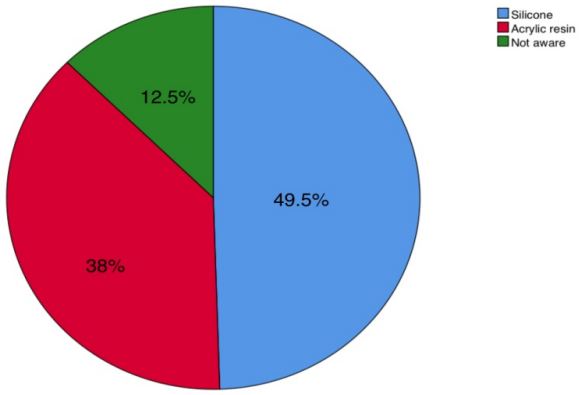


**Figure 6: The pie chart showing the responses about the most commonly used soft liner materials. Among the total population, 49.5% of the participants agree for acrylic resin (blue colour), 38% of the participants agree for silicone (red colour) and 12.5% of the participants are not aware of it (green colour).**

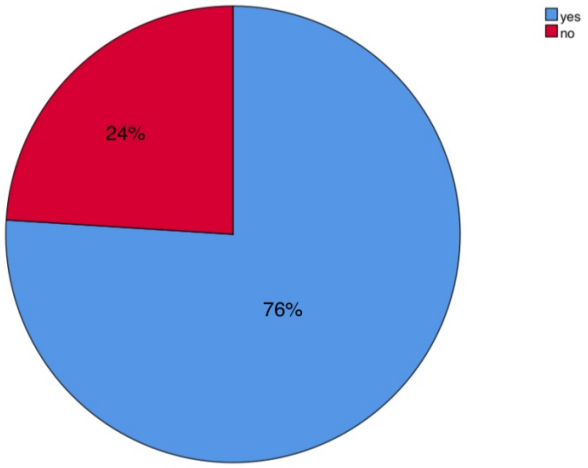


**Figure 7: Among the total population, 76% of the participants agree with this fact that acrylic based liners are more efficient than silicone based liners (blue colour) and 24% of the participants disagree with the fact that acrylic based liners are more efficient than silicone based liners (red colour).**

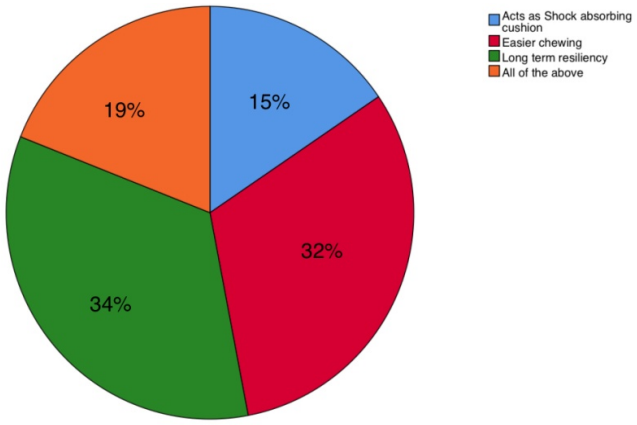


**Figure 8: The pie chart showing the responses for the advantages of denture liners. Among the total population, 34% of the participants agree for long term resiliency (green colour) , 32% of the participants agree for easier chewing (red colour) , 15% of the participants agree that it acts as a shock absorbing cushion (blue colour) and 19% of the participants agree for all the options (orange colour).**

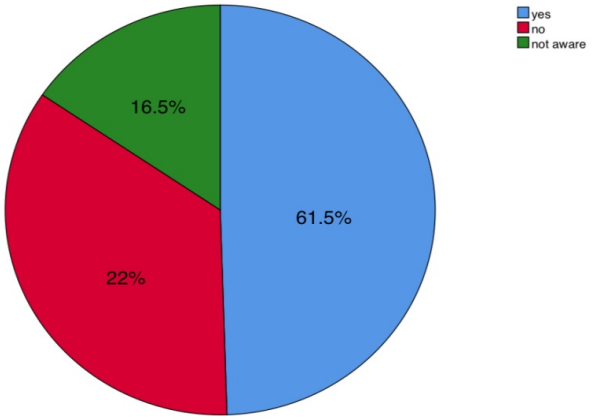


**Figure 9: Among the total population, 61.5% of the participants agree with this fact that soft liners can be used for obturators (blue colour), 22% of the participants do not agree with this fact that soft liners can be used for obturators (red colour) ,and 16.5% of the participants are not aware of this fact (green colour).**

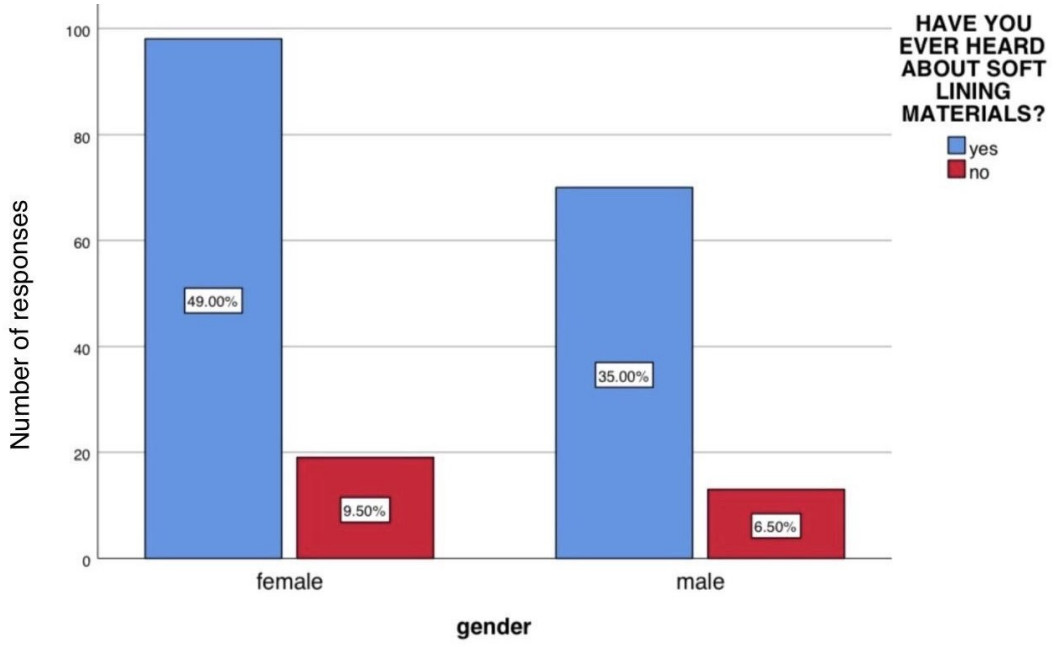


**Figure 10: Bar chart depicting the association between gender and the awareness about denture lining materials. X axis represents Gender and Y axis represents the No. of responses. Female students (49%) (blue) were more aware about the denture lining materials than male students. Chi square test done, p value- 0.913 (p> 0.05) Hence, not statistically significant**

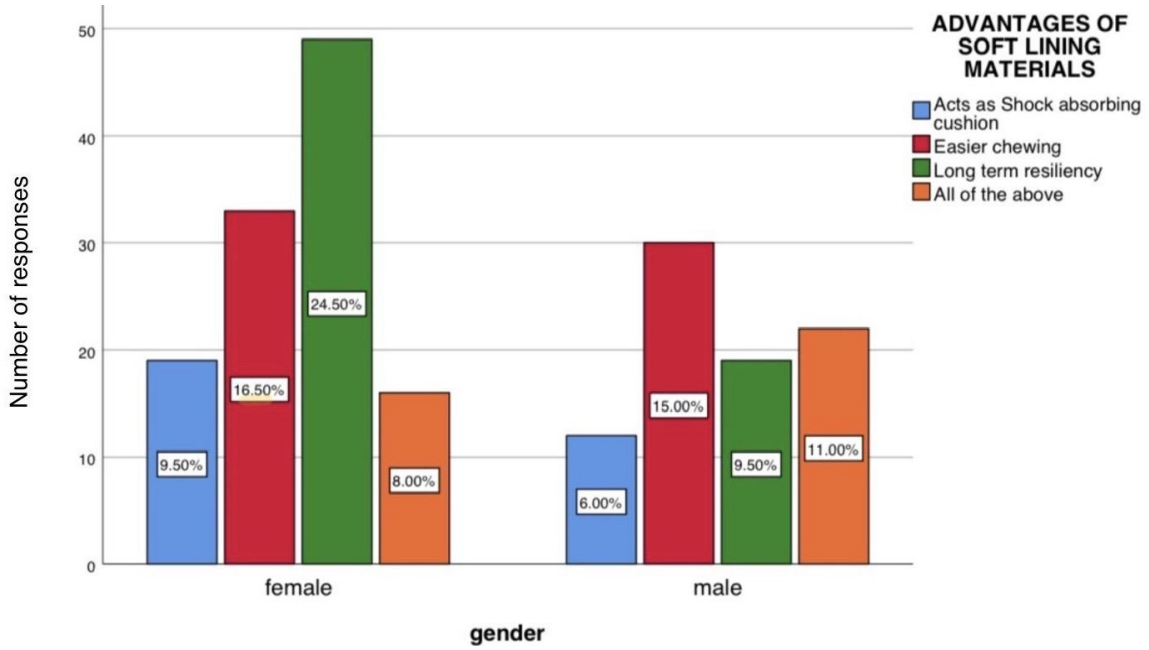


**Figure 11: Bar chart depicting the association between the gender and knowledge about the advantages of denture lining materials. X axis represents Gender and Y axis represents the Participants' responses. Level of knowledge about the advantages of denture lining materials was similar among male and female students. (11% and 8%) (orange) Chi square test done, p value- 0.015 (p< 0.05) Hence, statistically significant**

## CONCLUSION

Within the limitations of the study, it can be concluded that the students had adequate levels of knowledge and awareness about the denture lining materials. They lacked awareness in certain aspects of advantages and disadvantages of various denture lining materials. In future, scientific knowledge about the various denture relining materials and procedures should be enhanced through means of CDE program and workshops.

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## REFERENCES

[1] Hristov I, Department of Prosthetic Dentistry, Faculty of Dental Medicine, Medical University-Plovdiv, Bulgaria., Slavchev D, *et al*. Visco-Elastic Properties Of Soft Relining Materials – Review [Internet]. Vol. 23, Journal of IMAB - Annual Proceeding (Scientific Papers). 2017. p. 1571–4. Available from: http://dx.doi.org/10.5272/jimab.2017232.1571

[2] Nikawa H, Iwanaga H, Kameda M, Hamada T. In vitro evaluation of Candida albicans adherence to soft denture-lining materials [Internet]. Vol. 68, The Journal of Prosthetic Dentistry. 1992. p. 804–8. Available from: http://dx.doi.org/10.1016/0022-3913(92)90206-p

[3] Ergun G, Nagas IC. Color Stability of Silicone or Acrylic Denture Liners: An in Vitro Investigation [Internet]. Vol. 01, European Journal of Dentistry. 2007. p. 144–51. Available from: http://dx.doi.org/10.1055/s-0039-1698330

[4] Gronet PM, Driscoll CF, Hondrum SO. Resiliency of surface-sealed temporary soft denture liners [Internet]. Vol. 77, The Journal of Prosthetic Dentistry. 1997. p. 370–4. Available from: http://dx.doi.org/10.1016/s0022-3913(97)70161-6

[5] McCABE JF. Soft lining materials: composition and structure [Internet]. Vol. 3, Journal of Oral Rehabilitation. 1976. p. 273–8. Available from: http://dx.doi.org/10.1111/j.1365-2842.1976.tb00952.x

[6] Zarb GA. Prosthodontic Treatment for Edentulous Patients: Complete Dentures and Implant-supported Prostheses. Mosby; 2013. 452 p.

[7] Rathi A, Banerjee R, Radke U, Lahoti S, Sahni S. Knowledge and attitude about relining of complete dentures in clinical practice: A cross-sectional study. J Indian Prosthodont Soc. 2018 Apr;18(2):174–80.

[8] Rathi A, Banerjee R, Radke U, Lahoti S, Sahni S. Knowledge and attitude about relining of complete dentures in clinical practice: A cross-sectional study [Internet]. Vol. 18, The Journal of Indian Prosthodontic Society. 2018. p. 174. Available from: http://dx.doi.org/10.4103/jips.jips_302_17

[9] Ashok V, Suvitha S. Awareness of all ceramic restoration in rural population [Internet]. Vol. 9, Research Journal of Pharmacy and Technology. 2016. p. 1691. Available from: http://dx.doi.org/10.5958/0974-360x.2016.00340.1

[10] Mutluay MM, Murat Mutluay M, Tezvergil-Mutluay A. The influence of cyclic stress on surface properties of soft liners [Internet]. Vol. 105, Odontology. 2017. p. 214–21. Available from: http://dx.doi.org/10.1007/s10266-016-0260-7

[11] Kydd WL, Daly CH, Nansen D. Variation in the response to mechanical stress of human soft tissues as related to age [Internet]. Vol. 32, The Journal of Prosthetic Dentistry. 1974. p. 493–500. Available from: http://dx.doi.org/10.1016/0022-3913(74)90003-1

[12] Khanna A. A Comparative Evaluation of Shear Bond Strength Between Two Commercially Available Heat Cured Resilient Liners and Denture Base Resin with Different Surface Treatments [Internet]. Journal Of Clinical And Diagnostic Research. 2015. Available from: http://dx.doi.org/10.7860/jcdr/2015/11504.5892

[13] Kreve S, Dos Reis AC. Denture Liners: A Systematic Review Relative to Adhesion and Mechanical Properties. ScientificWorldJournal. 2019 Mar 3;2019:6913080.

[14] Maeda T, Hong G, Sadamori S, Hamada T, Akagawa Y. Durability of peel bond of resilient denture liners to acrylic denture base resin. J Prosthodont Res. 2012 Apr;56(2):136–41.

[15] Więckiewicz W, Kasperski J, Więckiewicz M, Miernik M, Król W. The Adhesion of Modern Soft Relining Materials to Acrylic Dentures* [Internet]. Vol. 23, Advances in Clinical

and Experimental Medicine. 2014. p. 621–5. Available from: http://dx.doi.org/10.17219/acem/37242

[16] Palla ES, Karaoglani E, Naka O, Anastassiadou V. Soft denture liners' effect on the masticatory function in patients wearing complete dentures: A systematic review [Internet]. Vol. 43, Journal of Dentistry. 2015. p. 1403–10. Available from: http://dx.doi.org/10.1016/j.jdent.2015.09.005

[17] Domingues JM, Corrêa G, Filho RBF, Hosni ES. Palatal obturator prosthesis: case series [Internet]. Vol. 64, RGO - Revista Gaúcha de Odontologia. 2016. p. 477–83. Available from: http://dx.doi.org/10.1590/1981-86372016000300000183177

[18] Ariga P, Nallaswamy D, Jain AR, Ganapathy DM. Determination of Correlation of Width of Maxillary Anterior Teeth using Extraoral and Intraoral Factors in Indian Population: A Systematic Review [Internet]. Vol. 9, World Journal of Dentistry. 2018. p. 68–75. Available from: http://dx.doi.org/10.5005/jp-journals-10015-1509

[19] Jyothi S, Robin PK, Ganapathy D, Anandiselvaraj. Periodontal Health Status of Three Different Groups Wearing Temporary Partial Denture [Internet]. Vol. 10, Research Journal of Pharmacy and Technology. 2017. p. 4339. Available from: http://dx.doi.org/10.5958/0974-360x.2017.00795.8

[20] Duraisamy R, Krishnan CS, Ramasubramanian H, Sampathkumar J, Mariappan S, Navarasampatti Sivaprakasam A. Compatibility of Nonoriginal Abutments With Implants: Evaluation of Microgap at the Implant-Abutment Interface, With Original and Nonoriginal Abutments. Implant Dent. 2019 Jun;28(3):289–95.

[21] Selvan SR, Ganapathy D. Efficacy of fifth generation cephalosporins against methicillin-resistant Staphylococcus aureus-A review [Internet]. Vol. 9, Research Journal of Pharmacy and Technology. 2016. p. 1815. Available from: http://dx.doi.org/10.5958/0974-360x.2016.00369.3

[22] Ganapathy D. Effect of Resin Bonded Luting Agents Influencing Marginal Discrepancy in All Ceramic Complete Veneer Crowns [Internet]. JOURNAL OF CLINICAL AND DIAGNOSTIC RESEARCH. 2016. Available from: http://dx.doi.org/10.7860/jcdr/2016/214

47.9028

[23] Subasree S, Murthykumar K, Dhanraj. Effect of Aloe Vera in Oral Health-A Review [Internet]. Vol. 9, Research Journal of Pharmacy and Technology. 2016. p. 609. Available from: http://dx.doi.org/10.5958/0974-360x.2016.00116.5

[24] Jain A, Ranganathan H, Ganapathy D. Cervical and incisal marginal discrepancy in ceramic laminate veneering materials: A SEM analysis [Internet]. Vol. 8, Contemporary Clinical Dentistry. 2017. p. 272. Available from: http://dx.doi.org/10.4103/ccd.ccd_156_17

[25] Vijayalakshmi B, Ganapathy D. Medical management of cellulitis [Internet]. Vol. 9, Research Journal of Pharmacy and Technology. 2016. p. 2067. Available from: http://dx.doi.org/10.5958/0974-360x.2016.00422.4

[26] Ganapathy DM, Kannan A, Venugopalan S. Effect of Coated Surfaces influencing Screw Loosening in Implants: A Systematic Review and Meta-analysis [Internet]. Vol. 8, World Journal of Dentistry. 2017. p. 496–502. Available from: http://dx.doi.org/10.5005/jp-journals-10015-1493

[27] Ashok V, Nallaswamy D, Benazir Begum S, Nesappan T. Lip Bumper Prosthesis for an Acromegaly Patient: A Clinical Report [Internet]. Vol. 14, The Journal of Indian Prosthodontic Society. 2014. p. 279–82. Available from: http://dx.doi.org/10.1007/s13191-013-0339-6

[28] Venugopalan S, Ariga P, Aggarwal P, Viswanath A. Magnetically retained silicone facial prosthesis. Niger J Clin Pract. 2014 Mar;17(2):260–4.

[29] Kannan A, Venugopalan S. A systematic review on the effect of use of impregnated retraction cords on gingiva [Internet]. Vol. 11, Research Journal of Pharmacy and Technology. 2018. p. 2121. Available from: http://dx.doi.org/10.5958/0974-360x.2018.00393.1

[30] Basha FYS, Ganapathy D, Venugopalan S. Oral Hygiene Status among Pregnant Women [Internet]. Vol. 11, Research Journal of Pharmacy and Technology. 2018. p. 3099. Available from: http://dx.doi.org/10.5958/0974-360x.2018.00569.3

[31] Ajay R, Suma K, Ali S, Sivakumar JK, Rakshagan V, Devaki V, et al. Effect of

surface modifications on the retention of cement-retained implant crowns under fatigue loads: An In vitro study [Internet]. Vol. 9, Journal of Pharmacy And Bioallied Sciences. 2017. p. 154. Available from: http://dx.doi.org/10.4103/jpbs.jpbs_146_17

[32] Petković DL, Krunić NS, Kostić MM, Petrović DM, Radenković GM. Strength testing of the relation between plate dentures and materials for making soft liners [Internet]. Vol. 28, Acta stomatologica Naissi. 2012. p. 1171–9. Available from: http://dx.doi.org/10.5937/asn1266171p