



## Preference of technique for measurement of width of attached gingiva in abutment teeth for fixed dental prosthesis - A retrospective study

Neppala Gowtham<sup>\*1</sup>, Nabeel Ahmed<sup>2</sup>

<sup>1</sup>Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077, Tamil Nadu, India

<sup>2</sup>Department of Prosthodontics and Implantology, Saveetha Dental College and Hospitals, Saveetha Institute of Medical and Technical Sciences, Saveetha University, Chennai-600077, Tamil Nadu, India

### Article History:

Received on: 10 Aug 2020

Revised on: 12 Sep 2020

Accepted on: 16 Sep 2020

### Keywords:

Attached Gingiva,  
Iodine,  
Roll technique,  
Anesthesia

### ABSTRACT

Attached gingiva is the distance between the mucogingival junction to a projection of the external surface of the sulcus or the periodontal pocket. There are mainly 3 methods for evaluating attached gingiva functional method (roll technique), the visual method with or without histochemical staining, anesthesia method. This retrospective cross-sectional study was conducted to identify the most commonly used technique for measuring the width of attached gingiva among patients. The study group consists of Adult patients who attended the outpatient Department of Prosthodontics from June 2019-March 2020. 86,000 case sheets were reviewed and sampling was done using simple random sampling. A chi-square test was done to evaluate the correlation between age, gender and Profession with Technique for measurement of Attached gingiva. From the study, we can see that most of the students used Roll technique to find Attached gingiva and some used Balloon technique to find attached gingiva. However, there is no significant correlation between age, gender and Profession with Technique of width of attached gingiva.



### \*Corresponding Author

Name: Neppala Gowtham

Phone: 8466061455

Email: 151909001.sdc@saveetha.com

ISSN: 0975-7538

DOI: <https://doi.org/10.26452/ijrps.v11iSPL3.3038>

Production and Hosted by

IJRPS | <https://ijrps.com>

© 2020 | All rights reserved.

pocket (Newman *et al.*, 2012).

Functions of Attached Gingiva is it gives support to marginal gingiva. To help understanding the ability to withstand the functional stresses of mastication (Ariga *et al.*, 2018) & tooth brushing (Subasree *et al.*, 2016) and provide attachment or a solid base for the movable alveolar mucosa for the action of the cheeks, lips, and tongue (Jain *et al.*, 2017; Ajay *et al.*, 2017). Factors affecting the width of attached gingiva are high frenum attachment, recurrent inflammation (Selvan and Ganapathy, 2016), Malpositioned teeth and Osseous dehiscence.

### INTRODUCTION

Orban first described attached gingiva as a part of the gingiva which is firmly attached to underlying tooth and bone and is stippled on the surface. The width of attached gingiva is the distance between the mucogingival junction to projection of the external surface of the sulcus or the periodontal

The methods to locate and measure the mucogingival junction are the functional method (Goldman, 1960; Newman *et al.*, 2012), the visual method with or without histochemical staining, Anesthesia method (Sato, 2000). Lugol's iodine solution is used to demarcate mucogingival junction based on the difference in the glycogen content. The alveolar mucosa differs from keratinized gingiva in its

glycogen content, acid phosphatase and nonspecific esterase content and an increased amount of elastic fiber content resulting in an iodo-positive reaction. The Attached gingiva, which is keratinized, has no glycogen in the most superficial layer and gives an iodo-negative reaction (Bhatia *et al.*, 2015).

Gingiva thickness is generally determined and associated with tooth form (Ganapathy *et al.*, 2016). Therefore surrounding soft tissue should carefully be considered when tooth form or size has to be altered. A study says that periodontal health is altered by wearing temporary partial denture (Jyothi *et al.*, 2017). The successful clinical outcome depends on the thickness of attached gingiva covering it. There are numerous studies that assess the different width of Attached gingiva. There are few studies regarding the assessment of Attached gingiva in Abutment selection.

Many studies which involved case reports (Ashok *et al.*, 2014), surveys (Ashok and Suvitha, 2016), systematic reviews (Ganapathy *et al.*, 2017; Ariga *et al.*, 2018; Kannan and Venugopalan, 2018), literature reviews (Venugopalan *et al.*, 2014; Subasree *et al.*, 2016; Vijayalakshmi and Ganapathy, 2016), In Vivo studies, (Jyothi *et al.*, 2017; Jain *et al.*, 2017; Duraisamy *et al.*, 2019). In vitro studies (Ganapathy *et al.*, 2016; Ajay *et al.*, 2017) and retrospective studies (Basha *et al.*, 2018) were carried out by our team previously. We are currently focusing on epidemiological studies. This study aims to assess Preference of technique for the measuring width of Attached gingiva in Abutment Teeth for Fixed dental prosthesis.

## MATERIALS AND METHODS

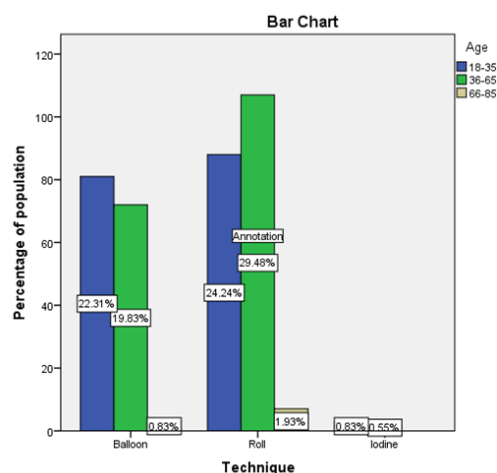
This retrospective study was done in a university setup in the Chennai, Southern part of India. Ethical clearance was given from Institutional Human Ethical Committee, Saveetha Dental College and Hospital, SIMATS Chennai. A Database of 86,000 Patients undergoing dental treatment from June 2019 to March 2020 was reviewed out of this 784 reports are taken and patients with no relevant data for 421 reports are omitted because of irrelevant data and 363 samples are taken into consideration and accessed for Preference of technique for measurement of width of attached gingiva in abutment teeth for fixed prosthodontics.

Cross verification of data for errors and measures are taken to minimise sampling bias while double blinding the Analyser and Reviewer. The internal and external validity of the sample selected and all the samples are selected based on a simple random sample. Descriptive statistics were used to evaluate

technique for width of attached gingiva. The correlation between age, gender and technique were evaluated and statistics were carried out using SPSS Software version 2 by IBM. The statistical test used is Chi-Square and Crosstabs data is evaluated.

## RESULTS AND DISCUSSION

A total of 363 reports are assessed and in the present study 43% of them preferred the balloon test to see attached gingiva and 55.6% of them preferred the roll test and 5% of them preferred the iodine histo-chemical test Table 1. In the correlation of age and use of technique for measuring width of attached gingiva the results showed that Roll technique is most commonly used in the 36 - 65 age group Figure 1. In the correlation of profession and use of technique for measuring width of attached gingiva the results showed that Roll technique is most commonly used by Undergraduates Figure 2. The results also showed that, in the correlation of sex and use of technique for measuring width of attached gingiva the results showed that Roll technique is mostly done in female patients Figure 3. The p-value obtained while Correlation of Age, Sex and Profession with the technique .874, .269, .511 thus making them insignificant statistically Table 2.



**Figure 1: Bar graph depicting the association between different techniques for finding attached gingiva and different age groups**

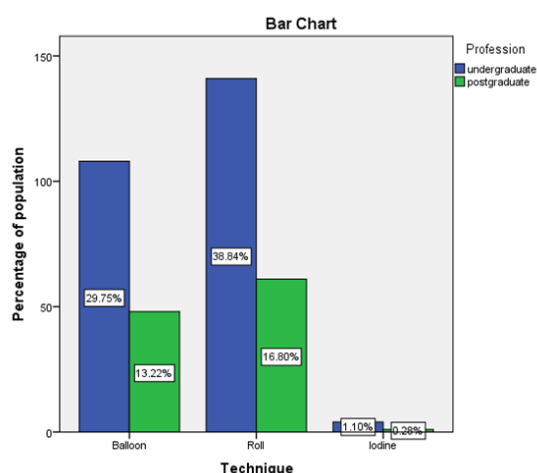
In Figure 1, X axis represents type of technique used for detecting attached gingiva and Y axis represents count of population. The graph depicts that Roll technique is most commonly used in the 36-65 age group. However, in the 18-35 age group the balloon test was more used. Iodine test was minimally used in any of the age groups. Chi-Square test represents no statistical association between technique and age group having p-value - 0.511 (p value>0.05) statisti-

**Table 1: Frequency distribution % percent of technique to measure attached gingiva shows that roll technique is used in 55.6% followed by balloon technique at 43% and the least used technique was iodine test**

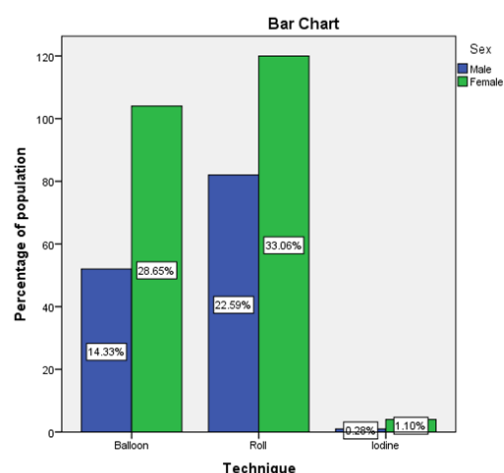
Technique	Percentage	Frequency
Balloon	43%	156
Roll	55.6%	202
Iodine	1.4%	5
Total	100%	363

**Table 2: Pearson Chi-square Tests showing that p-value obtained while Correlation of Age, Sex and Profession with the technique are .874, .269, .511 respectively, thus making them insignificant statistically**

	Chi-square value	Technique	
		df	P-value
Profession	0.268	2	.874
Sex	2.628	2	.269
Age	3.287	4	.511



**Figure 2: Bar graph depicting the association between different techniques for finding attached gingiva and different level of study**



**Figure 3: Bar graph depicting the association between different techniques for finding attached gingiva and sex**

cally insignificant.

In Figure 2, X axis represents type of technique used for detecting attached gingiva and Y axis represents count of population. Correlation of level of study with a technique for attached gingiva measurement. The graph shows most of Undergraduates and post-graduates used the roll technique followed by the balloon technique. Chi-Square test represents no statistical association between technique and age group having p-value - 0.874 (p value>0.05) statistically insignificant.

In Figure 3, X axis represents type of technique used for detecting attached gingiva and Y axis represents count of population. Correlation of sex with

technique for attached gingiva measurement. The graph shows roll technique is most commonly used in females followed by balloon technique. Iodine test was minimally used in any of the groups. Chi-Square test represents no statistical association between technique and sex having p-value - 0.269 (p value>0.05) statistically insignificant.

From the above study, we can see that most of the students preferred Roll test to detect attached gingiva and 156 students preferred balloon test and Iodine test was used by very few members, this could be attributed to the reason that it is time taking and very uncomfortable to the patient. On the other hand Roll test is done in most of the population

because it is easy to perform and it is a functional test and assessed by running the probe horizontally positioned from the vestibule towards the gingival surface using light force and gives more comfort to patient than other methods. Assessment of the width of attached gingiva is vital in assessing the risk of periodontium. In the assessment of width of the gingiva, the mucogingival junction serves as an important anatomical landmark, which can be demarcated by various methods. As suggested by Fasske and Morgenroth the precise location of this junction can be visualized after staining with stains like Lugol's iodine that aid in determining the exact point at which the keratinization ends (Bhatia *et al.*, 2015).

The width of gingiva increases with age as suggested by authors like Ainamo and Talari (1976); Bokadia *et al.* (2018); Vincent *et al.* (1976). The width of attached gingiva varies in different areas of mouth and have been given a range of 1-9mm, 1-4mm, and 0-5mm (Bhatia *et al.*, 2015). Variations seen in Bower's study, the widest zone of attached gingiva was found in the incisors and the least in the premolar region irrespective of the method used in the assessment. The assessment of width of attached gingiva in different age groups by VM revealed that the width of gingiva increases with age as suggested by authors like Ainamo and Talari and Vincent *et al.*

In this study, we can evaluate the preference of technique for evaluating the width of attached gingiva and helps to improve esthetic outcome and pink Esthetics while fabricating the Fixed dental prosthesis. Attached gingiva helps to maintain patient comfort and resistance to mechanical trauma (Vijayalakshmi and Ganapathy, 2016) during oral hygiene procedures and also restores gingival health in the tooth which is to be restored. While restoring crown dentists should be aware of the biology of keratinized Gingiva and methods for increasing the attached gingiva for a successful treatment Outcome (Jain and Dhanraj, 2016). Within the limitations of the study there are modern methods to determine the attached gingiva which are also not included

#### Limitations

More studies are needed to assess which is the ideal method for detecting width of attached gingiva.

#### CONCLUSION

Within the limitation of this study it can be inferred that most of the students used roll technique to demarcate attached gingiva followed by balloon technique. Very few have used iodine for detection of attached gingiva. There was no difference in the

preference of level of education and the technique used to demarcate the muco-gingival junction. Also there was no preference in the type of test among the different age groups.

#### Conflict of Interest

The authors declare that there is no conflict of interest for this study.

#### Funding Support

The authors declare that there is no funding support for this study.

#### REFERENCES

- Ainamo, J., Talari, A. 1976. The increase with age of the width of attached gingiva. *Journal of Periodontal Research*, 11(4):182-188.
- Ajay, R., Suma, K., Ali, S., Sivakumar, J. K., Rakshagan, V., Devaki, V., Divya, K. 2017. Effect of surface modifications on the retention of cement-retained implant crowns under fatigue loads: An In vitro study. *Journal of Pharmacy and Bioallied Sciences*, 9(5):154.
- Ariga, P., Nallaswamy, D., Jain, A. R., Ganapathy, D. M. 2018. Determination of Correlation of Width of Maxillary Anterior Teeth using Extraoral and Intraoral Factors in Indian Population: A Systematic Review. *World Journal of Dentistry*, 9(1):68-75.
- Ashok, V., Nallaswamy, D., Begum, S. B., Nesappan, T. 2014. Lip Bumper Prosthesis for an Acromegaly Patient: A Clinical Report. *The Journal of Indian Prosthodontic Society*, 14(S1):279-282.
- Ashok, V., Suvitha, S. 2016. Awareness of all ceramic restoration in rural population. *Research Journal of Pharmacy and Technology*, 9(10):1691.
- Basha, F. Y. S., Ganapathy, D., Venugopalan, S. 2018. Oral Hygiene Status among Pregnant Women. *Research Journal of Pharmacy and Technology*, 11(7):3099.
- Bhatia, G., Kumar, A., Khatri, M., Bansal, M., Saxena, S. 2015. Assessment of the width of attached gingiva using different methods in various age groups: A clinical study. *Journal of Indian Society of Periodontology*, 19(2):199.
- Bokadia, G. S., Brundha, M. P., Ariga, P. 2018. Current knowledge about lung cancer among middle aged non medical males a questionnaire based survey. *Research Journal of Pharmacy and Technology*, 11(6):2565.
- Duraisamy, R., Krishnan, C. S., Ramasubramanian, H., Sampathkumar, J., Mariappan, S., Sivaprakasam, A. N. 2019. Compatibility of

- Nonoriginal Abutments With Implants. *Implant Dentistry*, 28(3):289–295.
- Ganapathy, D., Sathyamoorthy, A., Ranganathan, H., Murthykumar, K. 2016. Effect of resin bonded luting agents influencing marginal discrepancy in all ceramic complete veneer crowns. *Journal of Clinical and Diagnostic Research*, 10(12):67–70.
- Ganapathy, D. M., Kannan, A., Venugopalan, S. 2017. Effect of Coated Surfaces influencing Screw Loosening in Implants: A Systematic Review and Meta-analysis. *World Journal of Dentistry*, 8(6):496–502.
- Goldman, H. M. 1960. A review of current technics in periodontal therapy as practised in the United States. *International dental journal*, 10:287–309.
- Jain, A. R., Dhanraj, M. 2016. A Clinical Review of Spacer Design for Conventional Complete Denture. *Biology and Medicine*, 8(5).
- Jain, A. R., Ranganathan, H., Ganapathy, D. M. 2017. Cervical and incisal marginal discrepancy in ceramic laminate veneering materials: A SEM analysis. *Contemporary Clinical Dentistry*, 8(2):272.
- Jyothi, S., Robin, P. K., Ganapathy, D., Anandiselvaraj 2017. Periodontal Health Status of Three Different Groups Wearing Temporary Partial Denture. *Research Journal of Pharmacy and Technology*, 10(12):4339.
- Kannan, A., Venugopalan, S. 2018. A systematic review on the effect of use of impregnated retraction cords on gingiva. *Research Journal of Pharmacy and Technology*, 11(5):2121.
- Newman, M. G., Takei, H. H., Klokkevold, P. R., Carranza, F. A. 2012. Preface. In Carranza's Clinical Periodontology (p. xvi). Elsevier. Elsevier. ISBN: 9781437704167.
- Sato, N. 2000. Periodontal Surgery: A Clinical Atlas. Quintessence Publishing Company. ISBN: 978-0-86715-377-4.
- Selvan, S. R., Ganapathy, D. 2016. Efficacy of fifth generation cephalosporins against methicillin-resistant Staphylococcus aureus-A review. *Research Journal of Pharmacy and Technology*, 9(10):1815.
- Subasree, S., Murthykumar, K., Dhanraj 2016. Effect of Aloe Vera in Oral Health-A Review. *Research Journal of Pharmacy and Technology*, 9(5):609.
- Venugopalan, S., Ariga, P., Aggarwal, P., Viswanath, A. 2014. Magnetically retained silicone facial prosthesis. *Nigerian Journal of Clinical Practice*, 17(2):260.
- Vijayalakshmi, B., Ganapathy, D. 2016. Medical management of cellulitis. *Research Journal of Pharmacy and Technology*, 9(11):2067.
- Vincent, J. W., Machen, J. B., Levin, M. P. 1976. Assessment of Attached Gingiva Using the Tension Test and Clinical Measurements. *Journal of Periodontology*, 47(7):412–414.