

# KERATINIZATION OF NORMAL, DISEASED AND TREATED GINGIVAE, ROLE OF MEDICATED MASSAGE – G32 AND JENOCIN

By

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## INTRODUCTION:

Keratinized structures like nails, hairs, horns, epidermis of skin and mucosa provide protection to the underlying structures. Like many other structures facial and lingual surfaces of the Gingivae are also keratinized structures. This keratin is produced by epithelial cells of the gingivae and are shed off continuously from the outer surface, and new keratin is regularly formed. Keratin layer protects the underlying tissues from the traumatic insults and external irritants and provides a barrier against the invasion of bacteria and their products. (Ziskin et al 1941)

The coral pink colour healthy gingivae becomes blueish red in inflamed conditions and this may be due to thinned outer most Keratin layer. It is the opinion of the several investigators that in the presence of inflammation keratinizing potential of gingivae is decreased.

Since the protective function is provided by the keratin layer to the underlying connective tissue, the periodontists cannot afford to ignore the factors which can stimulate the process of keratinisation. It is felt that constant and graded stimulation by any means like tooth brushing and finger massage with medicated gum paints like Jenocin and G32 may increase the degree to keratinization. Jenocin, a paint mainly consisting of Tannic Acid and **G32 contains 23 ayurvedic ingredients.**

Commonly observed inflammatory periodontal diseases are marginal gingivitis, periodontitis simplex and periodontitis complex. The thickness of Keratin layer is reduced in gingival inflammatory changes. After treatment the thickness of keratin layer is likely to increase, but whether gum paints like Jenocin and G32 can stimulate the epithelium to have thickened ketatinized layer remains to be seen.

Keratinizing potential of the Gingivae can be studied by various methods like exfoliative cytology, X'Ray diffracti on technique and histologic technique. The stains used far evaluating histological picture of keratinized tissue are heamatoxilyn and eosin and modified Mallory's skin. Histological techniques are more accurate and reliable.

Periodontal diseases are wide spread in India and hence it was thought to study the nature and thickness of keratin layer in different inflammatory conditions and also to study whether Gum Paints like G32 and Jenocin can stimulate process of keratinization after inflammatory conditions have been treated, by scalling or gingivectomy.

## REVIEW OF LITERATURE: GENERAL INFORMATION:

The epithelium of mucosa is stratified squamous epithelium and it develops from ectoderm. It is keratinized through out like skin, but certain structures of oral mucosa are non-keratinized. The structures of oral mucosa which are constantly subjected to mechanical forces are keratinized. These structures are epithelium of hard palate, the epithelium of the dorsum of the tongue and the gingivae.

In the skin epidermis, only orthokeratinization is found where as in the gingivae there are four types of keratinization observed. Weiss and Weinmann (1959) and Weinmann and Meyer (1959) found Ortho-keratinization para-keratinization and non keratinization and incomplete para-keratinization in the different parts of gingivae.

## KERATINIZATION OF HEALTHY GINGIVAE:

Orban (1957) Trott (1957) Weiss and Weinmann (1959) Weinmann and Meyer (1959) Cohen (1967) Owings (1969) and Cleanton (1973) studied the types of keratinization and thickness of keratinized epithelium by various techniques. Most of them used H & E stains. Weiss and Weinmann (1959) Weinmann and Meyer and Krishan Kapur (1962) used Mallory's technique for the study of keratinization.

Glickman (1965), Sorrin (1960), Goldmen (1973), Mackenzie (1972), (1973), have suggested that keratin layer protects the underlying connective tissue from external irritants and increases the resistance of gingivae.

Various investigators have worked on the Gingival keratinization to find out the incidence of the types of keratinization occuring in different parts of human gingivae as well as gingivae of experimental animals. Orthokeratinization and para-keratinization were of most frequent observation in attached gingivae. While non-keratinization was observed at crestal gingivae.

Since thickness of keratin layer in different parts of gangivae has been considered as the protection against trauma, bacterial invasion and toxin diffusion, various investigators have studied thickness of keratin layer. (Bechlem et al 1965, Krajewski 1964), Nikita et al (1971). Most of these studies were done with an adjustable ocular micrometer with a scale of 0 to 1000, so that measurement can be recorded in microns.

## KERATINIZATION OF DISEASED GINGIVAE:

Gingivae loose its normal colour, texture and consistency when they are inflammed. The colour becomes shiny red, which is due to increased vascularization and decreased keratinization.

Pinkus (1962) stated that inflammation interferes with normal keratinization and may lead to para-keratosis. Trott (1957) concluded that degree of keratinization is decreased in inflammed gingivae as compared with normal healthy gingivae. Weiss et al (1959) Weinmann and Meyer (1959) Krishan Kapur (1962) and other studied relation of gingivae inflammation and keratinization. These authors have concluded that inflammation and its severity have inverse relationship to the degree of keratinization.

## KERATINIZATION OF TREATED GINGIVAE:

It is necessary to consider the means available for hardening of the gum margins after necessary periodontal treatment, like scaling and simple gingivectomy. Stahl (1953) stated that it is common opinion of most of the dentists that gingival stimulation is helpful in maintaining optimum oral health. It is thought that massage of gingivae, stimulate circulation of connective tissue and aids in keratinization. Krajevicki et al (1961) Kobylanska (1970) also supported Stahl's view. Sorrin (1960) Fraleigh et al (1965) have reported the importance of Brush in increasing para-keratosis.

## GINGIVAL MESSAGE WITH GUM PAINT:

From the dawn of history man has sought to cure diseases with use of medicinal plants. Ayurveda is believed to have developed somewhere during the period 2800–500 B.C. In India, systematic work on scientific lines of herbal medicines was organised by Sir R.M. Chopra.

In the field of dentistry few herbal medicines have been showing encouraging results. Use of tannic acid have been advocated for the treatment of gingivitis. Use of neem as datun has been advised for freshening the mouth.

G32 is an ayurvedic preparation marketed by ALARSIN. G32 has been described as having antiseptic, anti-inflammatory, astringent, styptic, anodyne and other properties.

Shah (1978) studied the use of G32 in acute and Chronic Gingivitis, and observed that with G32 complete relief was obtained in 84% of patients within 8-30 days.

Rao and Ramaswamy (1978) observed reduction in inflammation of Gingivae after use of G32 twice a day for three weeks.

Rajeseckhar (1978) observed that G32 reduced Gingival inflammation, oedema, bleeding and resolves gingival health.

Bhasker (1978) studied histopathological sections after use of G32 and observed improvement in inflammation.

Jenocin is a paint which is also being used in India, for massaging the Gingivae. The action of Jenocin is reported to increase circulation, supplies more oxygen, removes waste metabolites, increases metabolic rates of tissues and stimulates keratin formation. Commonly available gum paints in the market usually contains tannic acid, potassium iodide, Thymol, Menthol, Camphor and Glycerine

G32 and Jenocin may help gingival epithelium to increase keratinization.

## AIMS AND OBJECTIVES:

- (1) To correlate the thickness of Keratin layer in clinically healthy arid diseased gingivae.
- (2) To note the thickness of keratin layer in various inflammatory conditions of gingivae like Gingivitis, Periodontitis simplex and periodontitis complex.
- (3) To note the effect of artificial stimulation either by Tooth brushing and Gum massages like G32 and Jenocin, on the thickness of keratin layer after scaling and gingivectomy.

## MATERIALS AND METHODS: SELECTION OF PATIENTS:

The sample was mainly drawn from the patients who attended Periodontia department of the Government Dental college and Hospital, Ahmedabad. Total number of 200 patients were selected at random. All the patients were of sound health and had no systemic disease.

Selected Patients were divided into following groups.

**Group I :** Healthy Gingivae.

**Group II :** Diseased Gingivae.

D-1 Marginal Gingivitis.

D-2 Periodontitis Simplex.

D-3 Periodontitis Complex.

**Group III :** Treated Gingivae.

T-1 Scaling and use of tooth brush.

T-2 Scaling, use of tooth brush and Jenocin message.

T-3 Scaling, use of tooth brush and G32 massage.

T-4 Gingivectomy, use of tooth brush.

T-5 Gingivectomy, use of tooth brush and Jenocin massage.

T-6 Gingivectomy, use of tooth brush and G32 massage.

## STANDARDISATION:

Tooth brushes used for the present study were standardised and the technique for the use of brush was also standardised. The use of Jenocin massage was in the same manner for all the patient. G32 was advised to be used twice a day.

## METHODOLOGY OF BIOPST TECHNIQUE-

For biopsy one interdental papillae was selected from 1st premolar to 1st premolar on either side. For taking biopsy, standard procedure was employed. All the biopsies, thus obtained were processed by standard methods and stained by H. & E. stains and also by Mallory's connective Tissue stains.

In all the sections the thickness of Keratin layer was measured at approximately the centre of the marginal and attached gingivae and the mean was recorded for each group. The types of keratinization were also recorded. The results were evaluated from 200 biopsies and 600 sections. (400 sections stained by H. & E. and 200 sections were stained by Mallory's Techniques.)

**TABLE I**

	Group	No	O	P	N	K
Group I (Normal Gingivae)	30					
Group II (Deseased Gingivae)	67					
		D-1	18	11.1	48.3	12
		D-2	29	8.7	72.4	16
		D-3	20	0.0	77.1	17.5
Group III (Treated Gingivae)	103					
		T-1	20	12.5	48.3	
		T-2	16	25.1	62.5	
		T-3	18	28.2	74.0	
		T-4	18	0	92.3	
		T-5	15	13.3	63.4	
		T-6	16	14.6	72.8	
<b>Total Subjects</b>	<b>200</b>					

## RESULTS AND DISCUSSION:

Gingival keratinization is functional adaptation to the tissues from external irritation. It has been well documented that the thickness of keratinized layer in epithelium is reduced, when there is inflammation in connective tissue of gingiva. Keratinization may be considered as a spectrum varying in small steps between extremes of orthokeratinization and non-keratinization.

Several investigations have been reported to observe the relation between degree of keratinization and connective tissue inflammation. Inflammation was found to depress the thickness of keratin layer (Weinman 1940, Trott 1957, Weinman and Meyer 1959). However none of these studies have attempted to show the relationship of keratin layer with different gingival conditions like marginal gingivitis, periodontitis simplex and periodontitis complex. In the present study, it was observed that thickness of keratin layer has been considerably reduced in patients having periodontitis complex (Average thickness 2.25 micron) when compared with Normal thickness of keratin from control patients. (Average thickness 4.50 micron). Analysing the results statistically it was observed that there is significant reduction of thickness when control patients are compared with patients having gingival inflammation.

Owings (1969) has observed that parakeratinization is most frequent in the attached gingiva and non-keratinization appears to be commonly associated with severe gingival inflammation. The present study confirms the above observation. (Table No. 3) The tendency towards ortho-keratinization.

Patients having marginal Gingivitis are usually treated by scaling. After removing local irritants gingiva is artificially simulated for increasing tissue resistance. This artificial massage by tooth brush and medicated preparation Jenocin and G32 appears to be useful.

Biopsies taken after 15 days of use of tooth brush, Jenocin and G32, revealed that thickness of keratin layer is increased. G32 appears to have better keratinizing potential as compared with Tooth brush and Jenocin Gum massage, as seen in Table No. 4.

Patients having periodontitis simplex, were treated by simple gingivectomy, complex epithelization is expected to take place after three weeks. Biopsies in such cases were taken after 3 weeks use of tooth brush, Jenocin and G32 gum massage. Here, too, gum massage appears to help increase in thickness of keratin layer. The results as seen in table No. 5, clearly show that there is improvement in resolution of gingival inflammation and in increased thickness of keratinized layer.

Further it is seen that there is increased tendency towards Ortho-keratinization, at all the levels of Gingiva.

This study appears be first of its type wherein importance of Ayurvedic medicines has been histologically evaluated and it has been correlated with types of Keratinization and thickness of keratin.

All these observations substantiate not only the importance of tooth brushing on gingival tissue but also point out the fact that when any form of artificial stimulation by G32 is provided keratinization of gingival tissue is enhanced.

**TABLE II**

Correlation of thickness of Keratin layer with Clinically healthy and diseased gingivae.								
Group	No	Minimum	Maximum	X	SD	SE	Calculated 't' Value	Table 't' Value
N	30	8.33	3.00	4.50	1.271	.24	-	-
D-1	18	6.62	2.00	3.77	1.341	.31	13.70+	2.69
D-2	29	8.75	2.33	4.18	1.471	.27	8.64+	2.68
D-3	20	5.66	0.66	2.25	1.612	.36	34.42+	2.68
+Significant								

**TABLE III**

Histological evaluation of thickness of Keratin layer in clinically healthy, diseased and post scaled gingivae.								
Group	No	Minimum	Maximum	X	SD	SE	Calculated 't' Value	Table 't' Value
N	30	8.33	3.00	4.50	1.271	.24	-	-
T-1	20	7.50	3.00	4.23	1.7	.26	1.15	2.03
T-2	16	9.00	2.83	4.95	1.61	.40	2.55++	2.03
T-3	18	10.33	3.20	4.95	1.68	.32	2.80++	2.03

**TABLE IV**

Histological evaluation of thickness of Keratin layer in clinically Healthy, diseased and surgically treated gingivae tissue.								
Group	No	Minimum	Maximum	X	SD	SE	Calculated 't' Value	Table 't' Value
N	30	8.33	3.00	4.50	1.271	.24	-	-
T-4	18	4.33	2.66	3.66	0.64	.27	1.33	2.02
T-5	15	5.00	2.16	3.86	0.64	.18	0.58	2.02
T-6	16	8.14	3.15	4.36	1.31	.29	2.54+	2.02
+Significant								

## SUMMARY:

The present study dealt with evaluation of thickness of keratinized layer and types of keratinization in healthy, diseased and treated gingivae and to study the effect of medicines like Jenocin and G32 on the ketatinization of Gingivae. In all 200 patients having healthy, diseased and treated gingivae were selected and biopsies from internal papillae of 1st premolar region, were collected and sections were histologically evaluated. The thickness of keratinised layer were measured by micrometre disc and types of keratinization were also recorded.

## CONCLUSIONS:

From the present study following conclusions were drawn. As the severity of inflammation of gingivae increased, there was progressive decrease in the thickness of keratinized layer

Tendency towards non-keratinization was found as the severity of the inflammation increased at the different levels of gingivae.

The use of tooth brush for stimulation of keratin formation is advocated.

The gingival massage with Jenocin and G32 gum paint is advocated as they greatly enhance keratin layer. G32 appeared to reduce connective tissue inflammation.

G32 appears to be slightly better than Jenocin.

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