

Keratinized Tissue – Whether A Boon or Bane for the Longevity of Implant Survival. A Cbct Analysis.

Neha¹, Sindhuja²

¹(Department of periodontics, Pulla Reddy Dental college and Hospital, India)

²(Department, of periodontics, Pulla Reddy Dental college and Hospital, India)

Abstract:

Background: The soft tissue extension is usually referred to as the biologic width around implants, and it serves as a protective mechanism for the underlying bone, if a minimal dimension of gingival tissues is not available, bone loss may occur to ensure the proper development of biologic width. The long term success of implants is determined by factors such as the bone quality, type of prosthesis, occlusal loading, oral hygiene, overlying soft tissue, and regularity of recall visits.

Materials and Methods: 10 implants were placed in 10 subjects, out of which 5 subjects were having a soft tissue thickness greater than 2mm (thick biotype group) and other 5 subjects were having soft tissue thickness less than 2mm (thin biotype group). CBCT analysis was done for estimation of soft tissue thickness at the implant site before implant placement. The amount of crestal bone loss occurred after 6 months of implant placement was evaluated in both groups using CBCT analysis.

Results: The amount of crestal bone loss was more in thin biotype group compared to thick biotype group.

Conclusion: It can be concluded that thick biotype keratinized tissue is a boon for implant survival.

Key Word: implant, keratinized tissue, biotype

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I. Introduction

The survival and success of dental implants have been found to be influenced by various factors.

The long-term success of implants is determined by factors such as the bone quality, type of prosthesis, occlusal loading, oral hygiene, overlying soft tissue, and regularity of recall visits.¹

This soft tissue extension is usually referred to as the *biologic width* around implants, and it serves as a protective mechanism for the underlying bone.

Authors have suggested that if a minimal dimension of gingival tissues is not available, bone loss may occur to ensure the proper development of biologic width.²

AIM OF THE STUDY

This study was conducted to evaluate that whether the soft tissue thickness around the dental implants affect the marginal bone levels over a 6- months period.

Material And Methods

This prospective study was conducted in the Department of Periodontology & Implantology, G.Pulla Reddy Dental College & Hospital, Kurnool.

- 1) 10 Implants have been placed in two groups A and B
- 2) All patients were Females
- 3) Average age: 30.8yrs (20yrs -40yrs)

Soft tissue thickness (Keratinized tissue)

Group A	Group B
Thick biotype	Thin biotype
≥ 2mm	≤2mm

Inclusion criteria:

- Systemically healthy
- Posterior teeth replacement
- Informed written consent

Exclusion criteria:

- On any medication
- pregnant
- Any Adverse habits.

Procedure methodology

After written informed consent was obtained, a well-designed questionnaire was used to collect the data of the recruited patients retrospectively. The questionnaire included socio-demographic characteristics such as age, gender, lifestyle habits like smoking and alcohol.

All the implants were placed after 3 months of tooth extraction.

- A CBCT was advised before implant placement for calculating the soft tissue width.
- A two stage implant placement was followed and the prosthesis was placed after 2 months of implant placement.

The major parameters were:

- 1) Soft tissue thickness
- 2) Marginal bone loss after 6 months

Measurement of the mucosal thickness

- A pre operative CBCT of edentulous site was used to assess soft tissue thickness.
- Sites with a mucosal thickness of 2.0 mm or more at the baseline, that is, at implant placement were categorized as a thick biotype group (A) and those <2.0 mm were categorized as the thin biotype group (B).
- Post operative CBCT was advised after 6 months after implant placement.
- The amount of crestal bone loss at all the four sites was calculated.
- The implant abutment junction was taken as reference point for the measurement of crestal bone loss.

II. Result

GROUP A parameters of patients before treatment.

S.No	Age	Site	K T T
1.	21 yrs	36	2.2mm
2.	35 yrs	37	2.3mm
3.	36 yrs	36	2.3mm
4.	26 yrs	47	2.5mm
5.	36 yrs	36	2.3mm

The mean soft tissue thickness of Group A is **2.32 ± 0.10**.

GROUP B parameters of patients before treatment.

S.No	Age	Site	K T T
1.	32 yrs	36	1.2mm
2.	20 yrs	37	1.2mm
3.	36 yrs	45	1.5mm
4.	35 yrs	36	1.3mm
5.	35 yrs	37	1.3mm

The mean soft tissue thickness of Group B is **1.3 ± 0.12**.

GROUP A Crestal Bone loss after 6 months

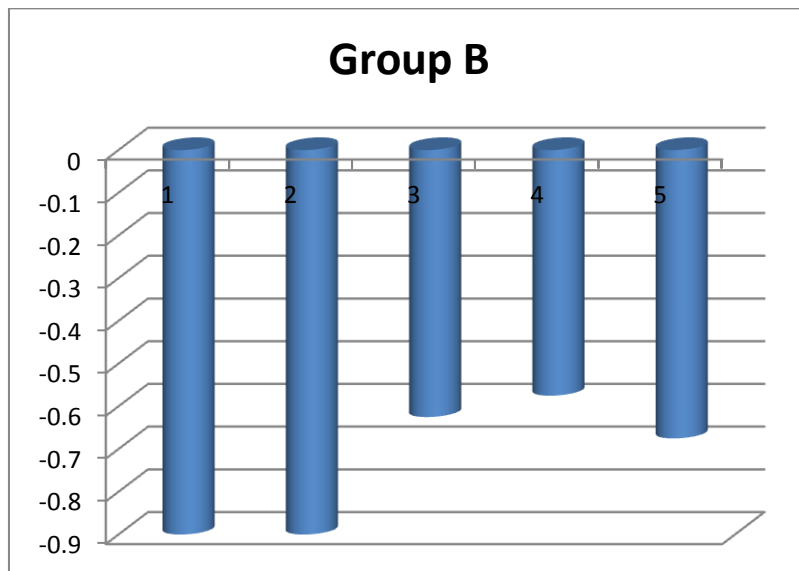
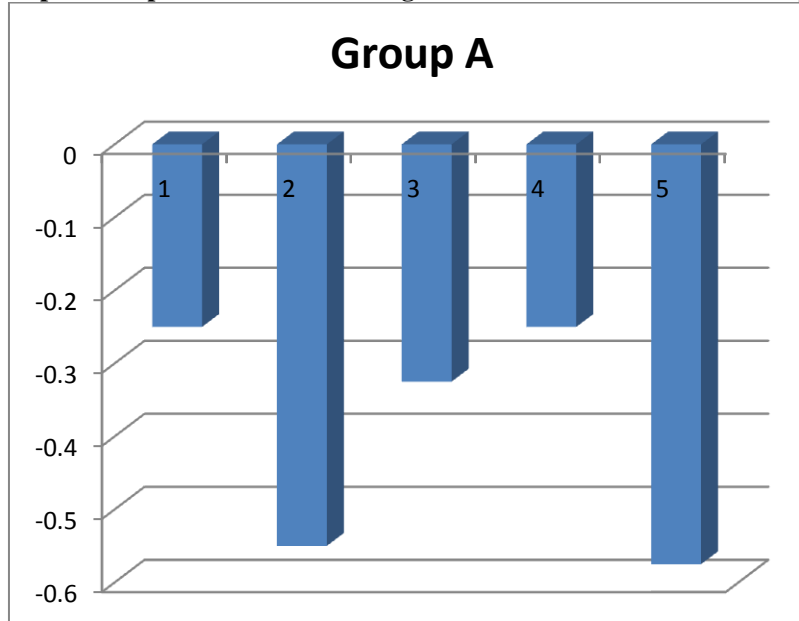
S.No.	Crestal Bone loss after 6 months				Average bone loss
	Buccal	Lingual	Mesial	Distal	
1.	-0.2	0.1	-0.7	-0.2	-0.25
2.	-1	-0.7	-0.7	0.2	-0.55
3.	-0.2	-0.2	-0.3	-0.6	-0.325
4.	-0.2	0.2	-.07	-0.1	-0.25
5.	-0.8	-0.7	-0.3	-0.5	-0.575

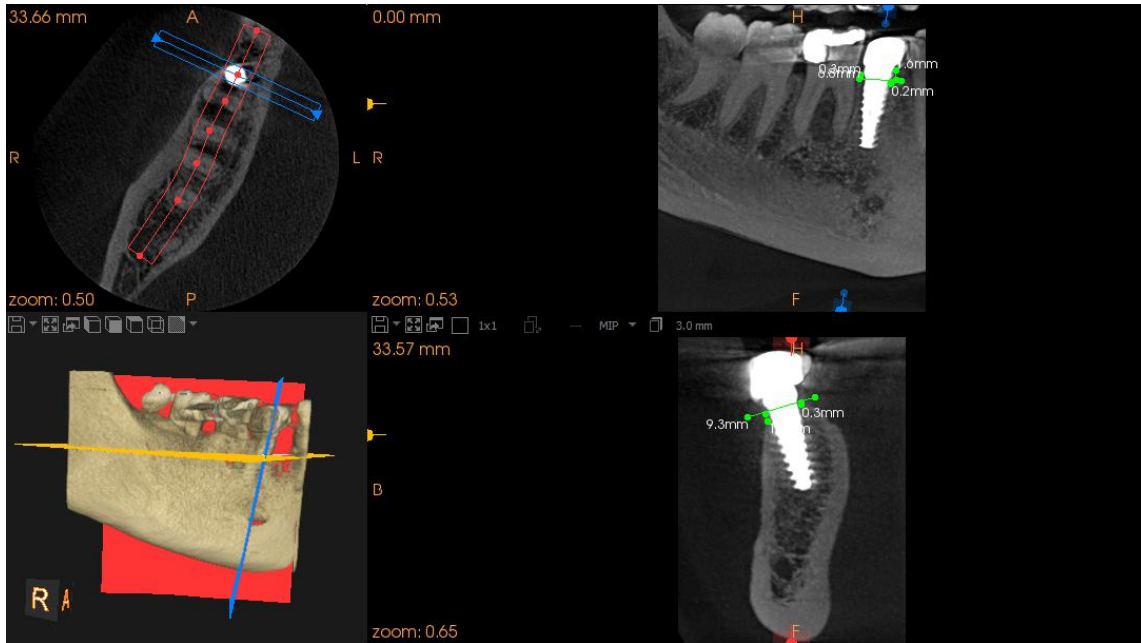
GROUP B Crestal Bone loss after 6 months

S.No.	Crestal Bone loss after 6 months				Average bone loss
	Buccal	Lingual	Mesial	Distal	
1.	-1	-0.8	-0.9	-0.9	-0.9
2.	-1	-0.9	-0.9	-0.8	-0.9
3.	-0.9	-0.7	-0.6	-0.3	-0.625
4.	-0.8	-0.7	-0.3	-0.5	-0.575
5.	-0.9	-0.8	-0.5	-0.5	-0.675

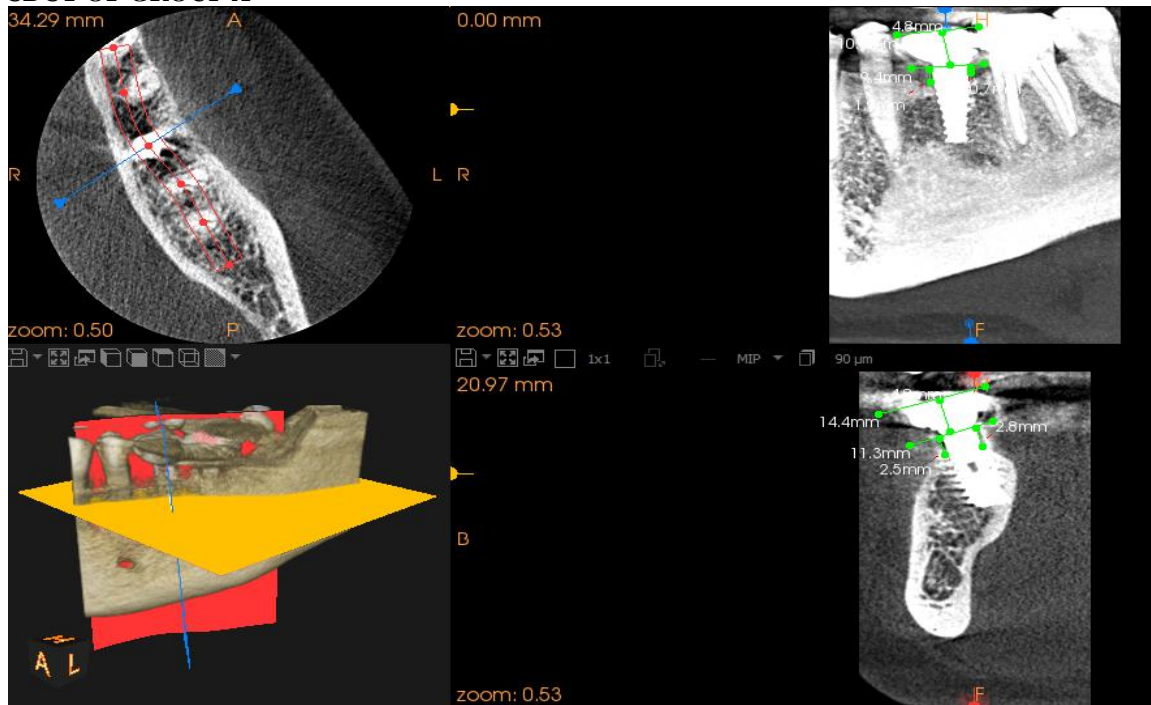
At 6 months it was noted that the average crestal bone loss in thick biotype group was 0.39 ± 0.16 (statistically significant $p < 0.05$) and in thin biotype group the average crestal bone loss was 0.735 ± 0.15 (statistically significant $p < 0.05$)

Graphical Representation Of Average Crestal Bone Loss In Both Groups

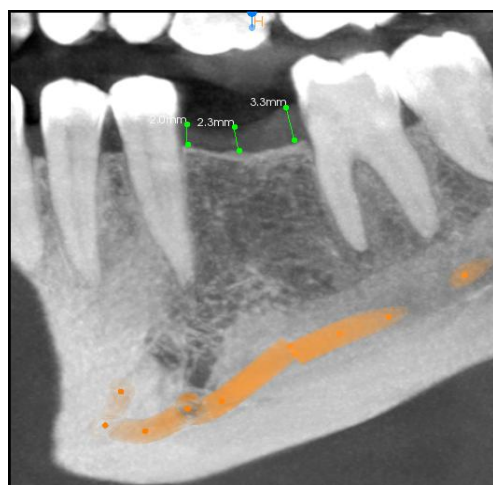




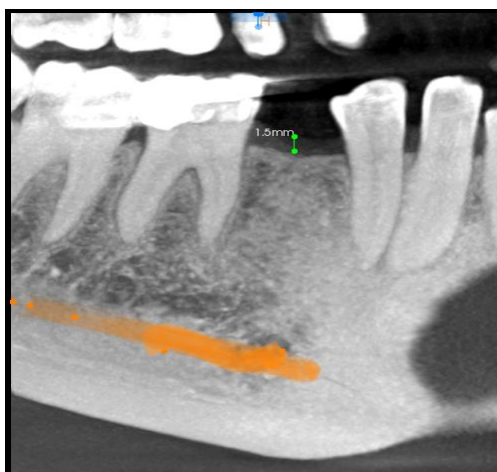
CBCT OF GROUP A



CBCT OF GROUP B



Group A



Group B

III. Discussion

The soft tissue in an edentulous site undergoes multiple surgical assaults, from the time of implant placement till restorations has been fitted.

The current study was conducted to evaluate the soft tissue thickness affect on crestal bone loss.

A value of 2 mm of soft tissue thickness at the time of implant placement was used as the benchmark to group the patients into thick and thin biotype cases.

In a study done by Sharma *et al.* he found that soft tissue thickness around natural teeth ranged from 0.56 mm to 1.02 mm. As the edentulous ridges were evaluated in the study, mucosal thickness measured was thicker than around natural teeth.⁴

In the present study the mean crestal bone loss around thick biotype group (A) was around 0.39 ± 0.16 mm and mean crestal bone loss around thin biotype group is 0.735 ± 0.15 mm.

The present study was accordance with one conducted Pragathi Raghavendra Bhat *et.al.*⁵

At the end of 1-year, a mean bone loss of **0.61 mm \pm 0.36 mm** in the thick group (Group A)

and mean bone loss of **1.70 mm \pm 0.36 mm** was noted in the thin biotype group (Group B).

In a study conducted by Tomas Linkevicius, after 1-year follow-up, bone loss was 1.17 mm in thin biotype group. Implants in Group 2 (thick tissue) showed bone loss of 0.21 mm after 1-year follow-up.⁶

In other study by Tomas Linkevicius, Mean bone loss around the test implants in group A (thin mucosa) was 1.61 ± 0.24 mm (SE; range, 0.9 to 3.3 mm) on the mesial and 1.28 ± 0.167 mm (range, 0.8 to 2.1 mm) on the distal. Mean bone loss in test group B (thick mucosa) implants was 0.26 ± 0.08 mm (range, 0.2 to 0.9 mm) on the mesial aspect and 0.09 ± 0.05 mm (range, 0.2 to 0.6 mm) on the distal aspect.⁷

Cardaropoli *et al* estimated gingival thickness before implant placement and calculated bone loss after 1 year of follow-up.⁸

The results of this clinical study are consistent with those of an animal study which showed the potential for thin tissues to cause crestal bone loss during the process of biologic width formation. Berglundh T.⁹

Kan *et al* evaluated the difference between thick and thin biotypes of peri-implant mucosa by probing around restored implants in anterior arches. However, the primary width of the mucosa before implant placement was not recorded.¹⁰

IV. Conclusion

Initial gingival tissue thickness at the crest may be considered as a significant influence on marginal bone stability around implants.

It can be concluded that thick biotype keratinized tissue is a boon for implant survival.

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