

## Radiographic Assessment of the Distance of Contact Point to the Crest of Bone on the Presence or Absence of Interproximal Papilla

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**Abstract:** The purpose of this study was to examine whether the distance from the contact point to the bone crest on standardized periapical radiographs of the maxillary anterior teeth is related to the presence or absence of the interproximal papilla in adults. Determination of Existence of Interdental Papilla; The presence or absence of interproximal papilla was done visually. And Papillae were considered present when gingival tissue filled the embrasure space. Measurements were only performed on the sites that had close contacts. The presence or absence of papilla with respect to the BC-CP distance was found that the absence of papilla was directly related to the distance between the contact point and bone crest. When the papilla was present the mean value of the distance from contact point to crest of bone was 4.31 mm. When the papilla was missing the mean height values were 6.86 mm. The results of unpaired t- test are Highly Significant ( $P < 0.0001$ ). The distance from the contact point to the bone crest on standardized periapical radiographs of the maxillary anterior teeth is highly associated with the presence or absence of the interproximal papilla and is a useful guide for clinical evaluation.

**Keywords:** Radiographic, Crest, Bone, Interproximal Papilla & Contact Point.

### INTRODUCTION

The beautiful smile is a combination of teeth, gingiva and lips to create unity, harmony, and esthetics. Achieving excellent restorative results in the anterior dentition requires that interdental papilla and gingival embrasure form are managed appropriately [1].

The presence of the central papilla is a key esthetic factor in maxillary anterior teeth. So its presence or absence in the interdental area is of great concern to clinicians and patients. The loss of papilla can lead to cosmetic deformities (so-called “black triangle disease”), phonetic problems (space allows passage for the air or saliva), and lateral food impaction.

Often the loss of papilla is a consequence of periodontal disease leading to attachment loss and interproximal bone height resorption. Missing papillae can also result from periodontal surgical therapy, as the soft-tissues usually contract during the healing period [2,3].

### Aim & Objective

The purpose of this study was to examine whether the distance from the contact point to the bone crest on standardized periapical radiographs of the

maxillary anterior teeth is related to the presence or absence of the interproximal papilla in adults.

### MATERIALS & METHODS

#### Source of Data

The study was conducted in Peoples college of Dental sciences & Research centre, Bhopal. A structured performa was filled for each subject to ascertain the following details which included; Name, age, sex, address, Dental history, Medical history. All participants were informed about the study and a written consent was obtained.

This study comprised of 40 subjects (28 females and 12 males, in the age group of 20 yrs-35 yrs) all were having healthy gingiva and having no bleeding on probing and no evidence of active periodontal disease and with a probing pocket depth of not more than 3 mm.

**Exclusion Criteria**

- Systemically compromised subjects,
- Subjects on long term antibiotic therapy,
- Having history of orthodontic treatment, or undergoing same,
- Tilted teeth,
- Teeth having no attrition or abrasion,
- Not any artificial crown or restoration;
- Undergoing no periodontal treatment except prophylaxis.

- Smokers

**METHODS**

**Determination of existence of interdental papilla**

The presence or absence of interproximal papilla was done visually. And Papillae were considered present when gingival tissue filled the embrasure space. Measurements were only performed on the sites that had close contacts.



**Fig-01: Interdental papilla**

After clinical evaluation the patients underwent radiographic evaluation by paralleling

technique, using rinn XCP film holder, which was done by the same operator each time.



**Fig-02: Paralleling technique**

**RESULTS**

**Table-1: Presence or absence of papilla in a range of height measurements**

Height	Papilla Present		Papilla absent	
	n	%	n	%
3 mm	3	100	0	0
4 mm	16	95	1	5.8
5mm	10	90	1	10
6mm	1	33.3%	3	
7mm	0	0	5	100
Total	30	66.67	10	

This table shows the presence or absence of papilla with respect to the BC-CP distance was found that the absence of papilla was directly related to the distance between the contact point and bone crest i.e.

- As the distance Increased the probability of papilla to be present decreased.

**Table-2: Comparison of height measurements among present and absent interproximal papillae**

PAPILLA	Mean	SD	N	t Value	P- Value
PRESENT	4.31	0.74	26	7.9848	<0.0001
ABSENT	6.86	1.29	14		

When the papilla was present the mean value of the distance from contact point to crest of bone was 4.31 mm. When the papilla was missing the mean height values were 6.86 mm. The results of unpaired t-test are Highly Significant (P <0.0001).

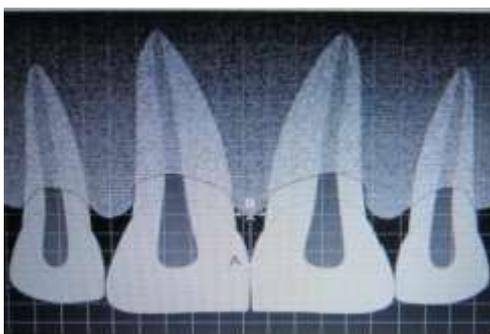
**DISCUSSION**

The results of the present study generally agreed with those obtained by Tarnow *et.al*, who found a significant influence of the distance from base of the contact area to the bone crest in determining the

presence or absence of interproximal gingival papillae [4,5].

In healthy periodontium with normal tooth alignment, the distance between CEJ to alveolar bone crest is approximately 1 to 2 mm and the distance between CEJ to contact point is approximately 2 to 3 mm [5].

Therefore, the distance between contact point to alveolar bone crest is about 4 to 5 mm. This may explain the usual presence of papilla in normally alignment teeth.



**Fig-03: The height of the papilla is determined by 3 things: the level of the interproximal bone, the biologic width, and the size and shape of the gingival embrasures**

When interproximal bone level moves coronally, as in passive tooth eruption, the papilla moves coronally. When the bone level moves apically, as in periodontal disease, the papilla has the potential to move apically [6].

The remaining two factors; the biologic width and the volume of gingival embrasure influence the actual distance the papilla stands above the bone for a given individual.

The concept of biologic width, which was first described by Garguilo *et al.* shows that the combined dimensions of the connective tissue attachment coronal to the alveolar bone crest plus the length of junctional epithelium, averages 2.04 mm [7].

- Sulcus depth varies while the combined width of the connective tissue and epithelial attachment is more consistent .A maximum depth of 3 mm of sulcus is clinically observed to maintain the health of periodontal status .Therefore, the biologic width

of 2.04 mm plus the sulcus depth of 3 mm approximately equals 5 mm.

- Hence a distance of 5 mm is more compatible to biological health and stability.
- Kurth and Kokich recently conducted a study on the occurrence rate and causes of interdental Black triangle in adults who received orthodontic therapy.
- The study showed that the occurrence rate was 38%.
- The related factors were the distance between the contact point and the crest of bone, the root angulation of adjacent teeth and volume of the embrasure space.

**CONCLUSION**

The distance from the contact point to the bone crest on standardized periapical radiographs of the maxillary anterior teeth is highly associated with the presence or absence of the interproximal papilla and is a useful guide for clinical evaluation.

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