

# The Effect of the Distance From the Contact Point to the Crest of Bone on the Presence or Absence of the Interproximal Dental Papilla

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THIS STUDY WAS DESIGNED to determine whether the distance from the base of the contact area to the crest of bone could be correlated with the presence or absence of the interproximal papilla in humans. A total of 288 sites in 30 patients were examined. If a space was visible apical to the contact point, then the papilla was deemed missing; if tissue filled the embrasure space, the papilla was considered to be present. The results showed that when the measurement from the contact point to the crest of bone was 5 mm or less, the papilla was present almost 100% of the time. When the distance was 6 mm, the papilla was present 56% of the time, and when the distance was 7 mm or more, the papilla was present 27% of the time or less. *J Periodontol* 1992; 63:995-996.

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The presence or absence of the interproximal papilla is of great concern to periodontists, restorative dentists, and to patients. The loss of the papilla can lead to cosmetic deformities, phonetic problems, and lateral food impaction.

If the papilla reforms after surgical treatment, there will be increased pocket depth which could create difficulties with oral hygiene. Additionally, if the papilla reforms the interproximal col, which is non-keratinized and more permeable to bacterial by-products, will also be present.

Since Cohen first described the col in 1959 as buccal and lingual peaks of keratinized tissue with a non-keratinized or parakeratinized interproximal area,<sup>1</sup> very little has been done to determine when the interproximal papilla with its col is present.

In 1961 Kohl and Zander stripped the interproximal tissue on monkeys to determine if the papilla and col would reform.<sup>2</sup> They found that the papilla reformed by the end of the eighth postsurgical week. In 1963 Matherson and Zander<sup>3</sup> also studied the interproximal papilla and the shape of the col. Their study showed that the col took the shape of the contact area of the adjacent teeth and not the underlying bone. In addition, Stahl<sup>4</sup> showed that use of interproximal stimulation can modify the degree of keratinization of the col area.

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All of these studies were designed to determine the shape of the col if it were present, or the degree of keratinization of the col. However, none determined when the papilla would, or would not, be present. The purpose of this study was to determine whether the distance between the contact point and the crest of bone correlated with the presence or absence of the interproximal papilla in humans.

## MATERIALS AND METHODS

A total of 288 interproximal sites, 99 anterior interproximal, 99 pre-molar interproximal, and 90 molar sites, in 30 patients were randomly selected for examination. All contact points were closed, and a standardized periodontal probe with Williams markings was used for measurements.

To reduce any edema and inflammation that might be present, all patients underwent thorough scaling and root planing 2 to 8 weeks before the measurements were recorded.

The presence or absence of the interproximal papilla was determined visually prior to probing. If there was no space visible apical to the contact point, the papilla was deemed to be present.

At the time of surgery, the patient was anesthetized and the probe was inserted vertically on the facial aspect of the contact point until the crest of bone was sounded. All measurements were rounded off to the nearest millimeter.

Additionally, the depths of the pocket of the teeth adjacent to the test sites were probed, and were found to be 4 mm or greater in a majority of the sites.

To verify these sounded measurements, 38 of the 288

Table 1. Presence/Absence of Papilla

	Distance in mm From Contact Point to Crest to Bone (N)							
	3 (2)	4 (11)	5 (73)	6 (112)	7 (63)	8 (21)	9 (4)	10 (2)
Papilla present	2	11	72	63	17	2	1	0
Papilla not present	0	0	1	49	46	19	3	2
% present	100	100	98	56	27	10	25	0
% not present	0	0	2	44	73	90	75	100

sites were remeasured when the gingiva was reflected at the time of surgery and were found to be accurate to the nearest millimeter.

### RESULTS

The results are summarized in Table 1. When the distance from the base of the contact point to the crest of bone was 3, 4, or 5 mm the papilla was present almost 100% of the time, but when the distance was 7, 8, 9, or 10 mm the papilla was missing most of the time. It is interesting to note that at 6 mm the papilla was present a little more than half of the time.

The results also demonstrate that the majority of areas examined were between 5 to 7 mm in distance.

### DISCUSSION

The purpose of this study was to evaluate whether the vertical distance between the contact point and the crest of bone was significant in determining the presence of the interproximal papilla. When the distance was 5 mm or less the papilla was almost always present and when the distance was 7 mm or more the papilla was usually missing.

Other variables, such as degree of inflammation, pocket depth of the adjacent teeth, fibrous or edematous nature of the tissue, anterior versus posterior teeth, history of previous non-surgical and surgical therapy, and the presence

of proximal restorations, may all contribute to the presence or absence of the papilla; however, this paper has examined one significant factor; i.e., the distance from the base of the contact area to the crest of bone in 288 sites.

A history of prior periodontal surgery might certainly play a part in the presence or absence of the papilla reforming. Examination of the sites that had previous surgery did not seem to show any definitive trend.

Additionally, 66 of the interproximal areas had adjacent proximal restorations, but their presence or absence also seemed to have no correlation with whether the papilla had formed or not. The vertical distance from the base of the contact area to the crest of the bone seemed to be the determining factor.

It is interesting to note that at 5 mm the papilla was present 98% of the time, while at 6 mm, only 1 mm more, it was present 56% of the time, and at 7 mm it was only present 27% of the time. While the answer as to why such a significant difference existed between these 3 measurements is unknown; future research is indicated to examine other variables such as the mesio-distal distance between the two teeth and total volume of the embrasure space to determine their contribution to the formation of the interproximal papilla.

### REFERENCES

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