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Original Article

Assessment of Maxillary Incisors and Canine Teeth Position by Incisive Papilla as a Guide

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ABSTRACT

The aim of the present study was to evaluate the incisive papilla as a guide to the maxillary central incisors and canine teeth position. The distance from the midpoint of the incisive papilla to the labial surface of the maxillary central incisors and the distance from the imaginary canine tip to canine tip line were measured using a thread, caliper, scale and a divider. Apart from that, the position of the incisive papilla from the canine tip line was noted. The results showed that the mean distance from the labial surface of the central incisor to the midpoint of the incisive papilla was 10.3 ± 1.0mm. In relation to the canine, the mean distance from the teeth of the canine and by using the middle portion of the incisive papilla as an imaginary line was 1.93 mm (± anteriorly or posteriorly). The clinical relevance of this study lies in its application of the incisive papilla as a starting point in the preliminary location of the maxillary incisor and canine during the construction of dentures as both can serve as a significant factor in tooth selection.

Key words: Incisive Papilla, Canine Line, Labial Support, Tooth Position.

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INTRODUCTION

Loss of teeth not only affects facial appearance but also creates psychosocial trauma to the individuals, hence it is essential that an aesthetically pleasing and functionally comfortable replacement of the missing teeth should be provided. In complete denture patients, the selection of artificial teeth depends on the dentist's ability to provide adequate support to the upper lip by maintaining an undistorted philtrum and nasolabial grooves and ensure proper contact of the upper and lower lips at the vermillion border. Restoring or preserving a natural appearance is a vital part of the treatment of every edentulous patient.[1, 2]

Tooth position plays an important role in restoring the appearance in the edentulous state. According to Frush and Fisher, pleasing lip support for edentulous patients is achieved by the correct placement of the anterior teeth and their matrix, with the burden being placed on the central incisors[3].

In the construction of complete dentures, the estimation of the combined width of maxillary six anterior teeth is an important clinical procedure when pre-extraction records are not available.

The incisive papilla is an anatomic landmark that can be used as an aid for anterior tooth positioning in completely edentulous patients in absence of pre extraction records. The incisive papilla is reported to be a reliable anatomic landmark in the arrangement of anterior teeth.[4]

The horizontal relationship between the maxillary central incisors and the position of the incisive papilla is reasonably constant. The conventional biometric guideline is 10 mm, with a range between 7 mm and 12-13 mm. In addition, a line connecting the tips of the maxillary canines was found to fall approximately 1 mm anterior or posterior to the center of the incisive papilla.[5, 6]

AIM & OBJECTIVES

1. To determine the relationship of central incisors to the midpoint of the incisive papilla.
2. To determine the canine position in relation to incisive papilla.
3. Establishing a guide to the antero-posterior arrangement of the anterior teeth in relation to the incisive papilla which is a reliable and relatively stable anatomic land mark.

MATERIALS AND METHODOLOGY

A Total of 50 Subjects were identified with age group ranged from 20-40 years. Maxillary alginate impression was made for each individual after careful stock tray selection. The impression was disinfected with 5% sodium hypochlorite solution for 5 minutes. Within 10 minutes, the type III dental stone was poured into the impression and the cast was fabricated. The casts were inspected and the incisive papilla was marked using a red marker to denote the position of it on the cast. After that, the distance from the midpoint of the incisive papilla to:

a) The labial surface of the maxillary central incisors and;
b) The distance from the imaginary canine tip to canine tip line was measured using the thread, caliper scale and divider (fig 1).

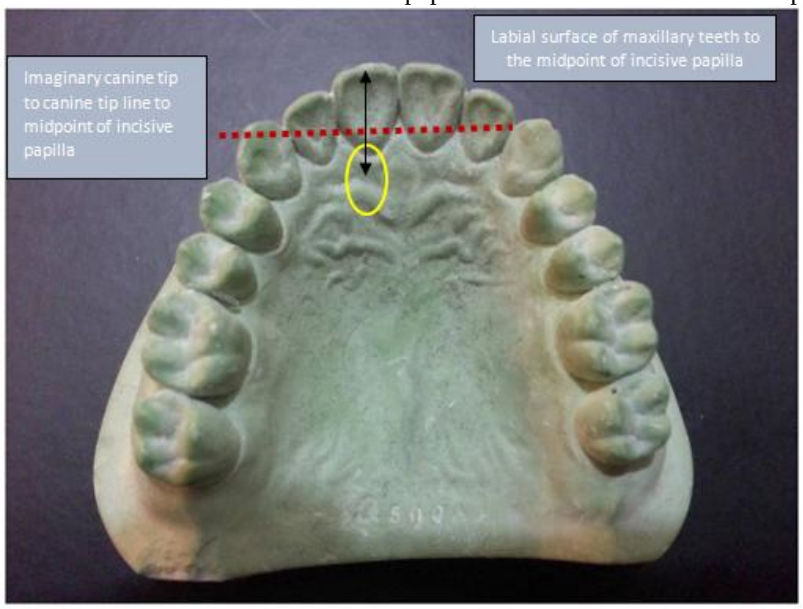
In addition, the position of the incisive papilla from the canine tip line was marked (fig 1).

RESULTS & OBSERVATIONS:

Based on this study of 50 subjects of random sample, the results are tabulated (Table 1) and the mean distance from the labial surface of the central incisor to the midpoint of the incisive papilla is 10.3 ± 1.0mm (Graph 1).

In relation to the canine, the mean distance from imaginary canine tip to canine tip line to the middle of the incisive papilla as an imaginary line was 1.93 mm (± anteriorly or posteriorly) (Graph 1).

Figure 1: Represent measurement of distance from incisive papilla to central incisor and canine position



Graph 1: Represent mean distance between incisive papilla to maxillary incisors &Canine position

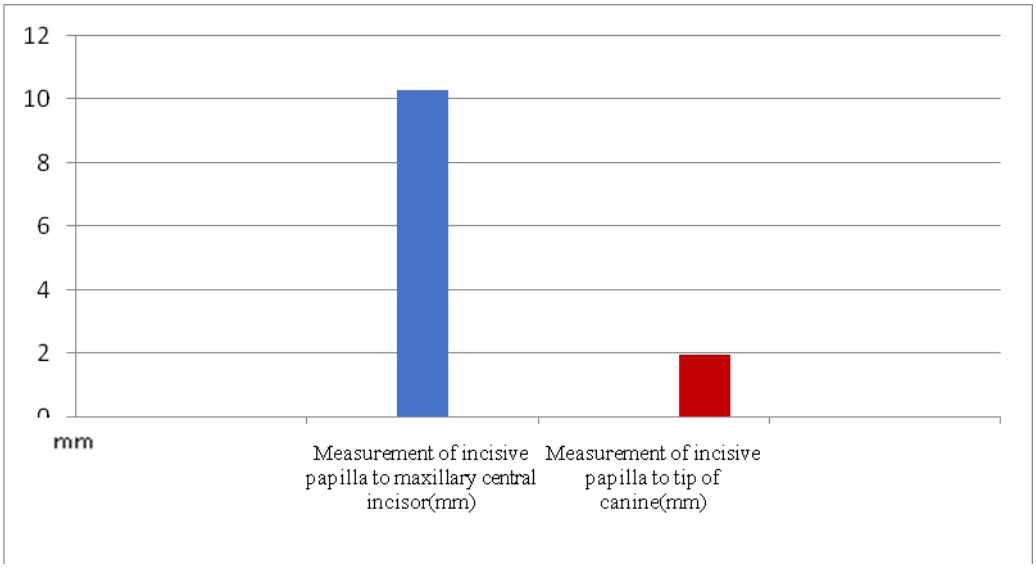


Table 1: Represent measurement of distance between incisive papilla to maxillary incisors & canine

Sample serial no	Measurement of incisive papilla to maxillary central incisor(mm)	Measurement of incisive papilla to tip of canine(mm)
1	10.0	+1.5
2	11.5	+1.5
3	10.0	+3.5
4	11.0	-1.0
5	12.0	-1.5
6	9.0	+2.5
7	11.0	+1.0
8	10.0	+2.0
9	11.0	+1.5
10	12.0	+2.5
11	11.0	-2.0
12	10.5	-2.5
13	11.0	+4.0
14	9.5	+1.5
15	9.0	+3.0
16	11.0	0
17	12.0	0
18	11.0	+4.0
19	9.0	+3.0
20	10.0	+2.0
21	10.5	+3.0
22	9.0	+2.5
23	11.0	-1.0
24	11.5	0
25	9.0	+1.5
26	9.0	+2.5
27	11.5	0
28	10.5	+2.0
29	10.0	+2.5
30	10.0	0
31	9.0	+5.5
32	11.0	+2.5
33	10.5	+1.0
34	10.5	+2.0
35	10.0	+1.5
36	11.0	0
37	10.0	+2.0
38	10.0	+3.5
39	10.0	+4.0
40	11.0	+1.0
41	9.0	+2.0
42	9.5	+1.0
43	9.0	+4.5
44	10.0	+2.0
45	10.5	+1.0
46	10.0	+4.0
47	9.0	+3.5
48	9.0	+2.0
49	11.5	0
50	11.0	0
Mean Value	10.3	1.97

DISCUSSION

Incisive papilla is a projection on the palate at the anterior end of the raphe of palate. Incisive papilla is a distinct landmark that is present in both dentulous and edentulous maxilla. It can be a guide to determine the midline, labiopalatal position of the artificial incisor and canine, as a starting point for occlusal rim fabrication at the center incisor region and for the determination of parallelism of occlusal plane when used in conjunction with hamular notch.[7,8]

Based on this fact, the middle portion of the incisive papilla is used as a reference point, with the assumption that the plane formed by this point would be closely parallel to the plane formed by the corresponding portion of the edentulous alveolar ridge crest. This may not be true in a given clinical situation, but in most instances it is believed that some correlation of the plane will exist in a normal statistical distribution.

When using a contemporary measurement method, such as drawing an imaginary line and using a specific landmark on the cast as a reference, care should be taken that each of these characteristic is duplicated correctly throughout the other sample cast. The same scale, divider, and thread should be used constantly throughout the study. This is to ensure that the result is valid, uniform and can be applied when artificial teeth is set on a complete denture basis[9].

In this study, the mean distance from the labial surface of the central incisor to the midpoint of the incisive papilla is 10.3 ± 1.0mm. This finding is within the range noted in earlier studies, depending on whether the midpoint or distal surface of the incisive papilla was used for the measurement. In relation to the canine, the mean distance from imaginary canine tip to canine tip line to the middle of the incisive papilla as an imaginary line was 1.93 mm (± anteriorly or posteriorly).

Care should be taken when using a thread as an imaginary line from one canine tip to another canine tip, the tautness of the thread must be maintained to ensure accurate measurement from the imaginary line to the middle of the incisive papilla.

Based on this result, when attempting to place artificial teeth as close as possible to the position previously occupied by natural teeth, the incisive papilla is a stable anatomical landmark. However the positioning of the artificial maxillary anterior teeth will be determined predominantly during jaw relation.

Change in the oral musculature due to aging and post extraction can alter the accuracy of using the incisive papilla as a stationary point of reference. Therefore, clinical observation and experience of the dentist and consideration of the patient's wishes must be taken into consideration. The method used in this study is a simple and quick procedure that allows clinician to measure the position of the central incisor relative to the incisive papilla in complete denture wearers. In addition when building occlusal rims this allows dental technician to use the incisive papilla as a guide in patients with no existing denture. Obviously if an improvement is required by the dentist, additions to the wax occlusal rim may be made and this can be verified at the jaw relation stage when constructing the complete denture.

Within the limitations of this study, we concluded that the sample consisted of patients with complete natural dentition. Changes to the incisive papilla due to irregular dental arches, history of orthodontic treatment and post extraction conditions were not taken into consideration. Accuracy of the measurement can also be enhanced by the use of standardized digital photography along with image analysing software which was used in earlier studies.

CONCLUSION

In conclusion, this result suggests that there is a relationship between the maxillary central incisor, canines and incisive papilla aiding in their antero-posterior position. The clinical relevance of this study lies in application of incisive papilla as a starting point in the preliminary location of the maxillary incisor and canine during the construction of dentures. Both can serve as a useful additional factor in tooth position. The clinical relevance of this study lies in its application of the incisive papilla as a starting point in the preliminary location of the maxillary incisor and canine during the construction of dentures as both can serve as a significant factor in tooth selection.

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