Volume 07, Issue 04 (July-August 2024), PP 148-153 **www.ijmsdr.org**
ISSN: 2581-902X

International Journal of Medical Science and Dental Research

Morphometric analysis of Bonwill's Triangle and It's Dental Application

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ABSTRACT:-
The Bonwill's triangle, an imaginary equilateral triangle formed by **the** contact between the central incisors (A) and the right(B) and left mandibular condyles(C), serves as a fundamental concept in understanding the mechanics of jaw movements, including centric relation, lateral, and protrusive movements. This study aims to explore the articulation of the mandible, complete dentures, and dental occlusion concerning mandibular fractures based on both metric and non-metric parameters. Additionally, the analysis seeks to determine that the distance between the right and left condyles from the central incisors should be within 100mm for optimal dental function.

KEYWORD:
Bonwill's triangle, condyles

I. INTRODUCTION:-

One of the important aspects of craniofacial trauma is mandibular fractures. The Bon will's triangle was described by G BONWILL an American dentist in 1858 and it became Bonwill's theory of occlusion's Basis. He observed 6000 skulls and 4000 livingperson[1.2].Bonwill formulated this theory it is formed by joining the three points on the mandible that

a. **The distance between the right and left condyles of mandible.**
b. **The distance from the right condyle to the central incisor**
c. **The distance from left condyles to the centralincisor.**

Variations in the size of triangle have major effects on dental occlusion , complete denturesarticulation mandibular fractures , and angulation of the cusp . Contradictory to statement, Lenhossek, Izard, and Jovanovic showed that the triangular is almost equilateral, but the length of the triangular sides may vary, especially in female mandibles measuring less than 100mm[3]. The theory played a major role in developing the first anatomical articulator which has important role in fabricating complete dentures[4,5]. The present study was focused on evaluating whether Bonwill's triangle measurements are accurate, create error awareness while constructing mandibles post-fractures and dental procedures.

II. MATERIALS AND METHODS:-

The study was carried out in the Department of anatomy ,RVS DENTAL COLLEGE AND HOSPITALS.44 human dry mandibles were obtained with unknown gender out of that 34 mandibles having the alveolar ridge and rest is without alveolar ridge .The measurement were calculated from

- right condylar head
- left condylar head
- central incisor
- The distance between the left and right condylar process. A-B,
- The distance between the right condylar to the central incisor gives point A-C,
- The distance between the left condylar to central incisor gives point B-C.

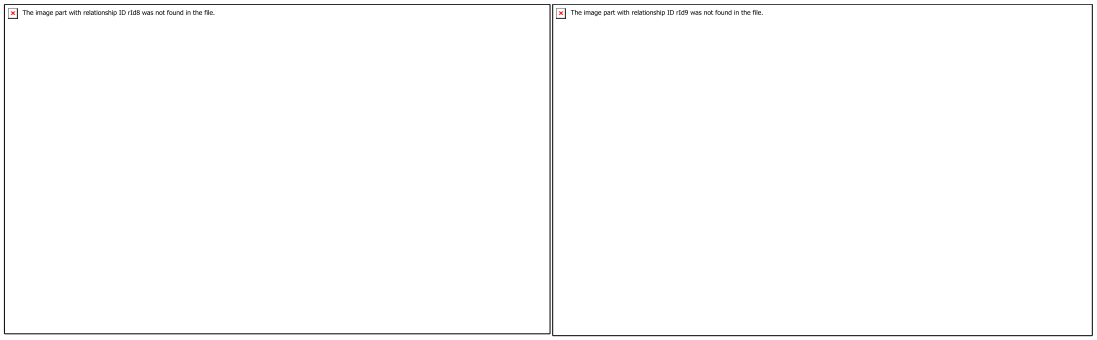
These distance are measured by using a divider and the distance is measured in centimetre scale[8,9].The obtained values are entered into Microsoft Excel sheet and plotted a graph and statistical analysis were done.

III. Results:-

The parameters were calculated for 44 mandibles included in the study irrespective of age and gender.

The distance between the right and left condylar head gives an average of 8.5 cm- 10.5 cm.The distance between the right condylar to central incisor gives an average of 9.6-11.5cm.

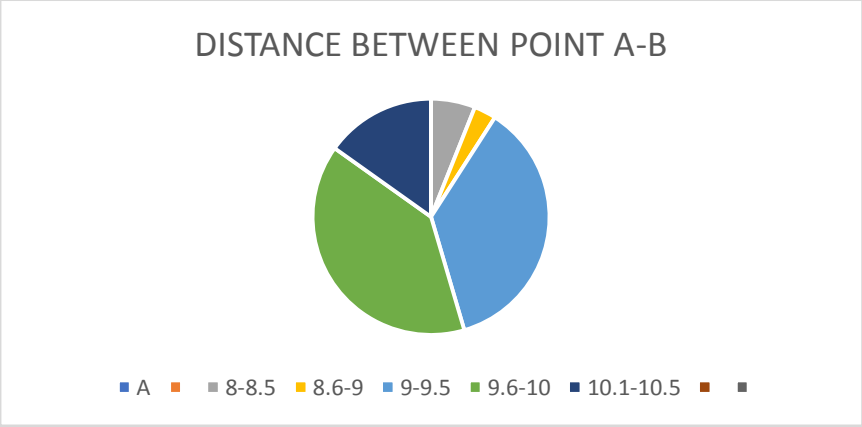
The distance between the left condylar to centralincisor gives average of 9.5- 11.5cm.



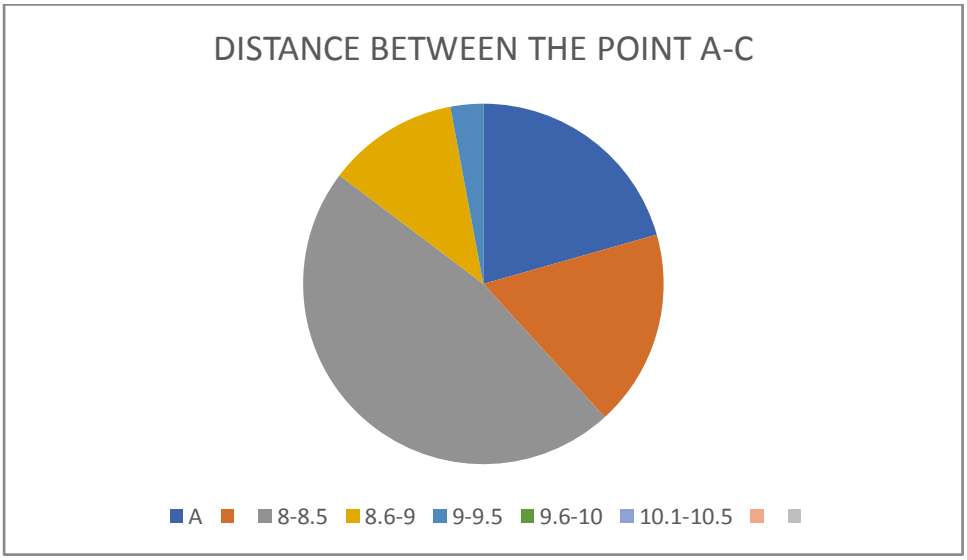
Non Erupted and erupted mandible

Measurement mandibles with alveolar ridges:-

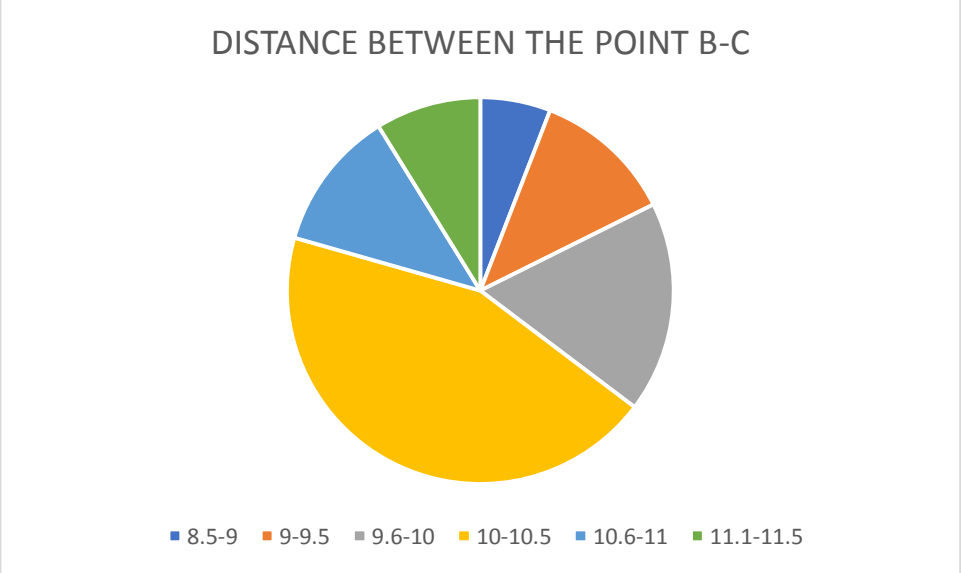
A. MEASUREMENT : distance between the right and left condylar head A-B



B. MEASUREMENT : distance between the right condylar to central incisor A-C



C. MEASUREMENT : The distance between the left condylar to central incisor B-C

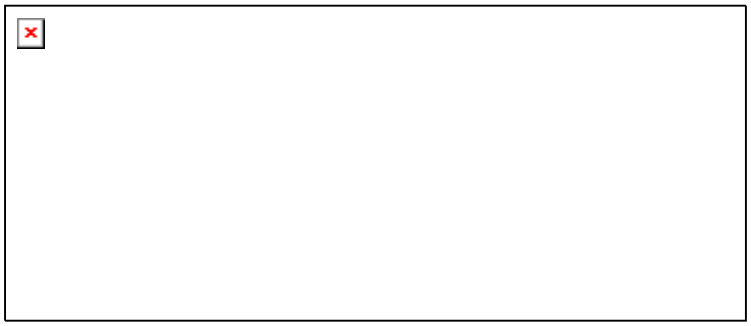


From the given values we can come to a conclusion that the mandibles with alveolar ridge is more or less an equilateral triangle which agrees with the results of theory of Bonwill's triangle.

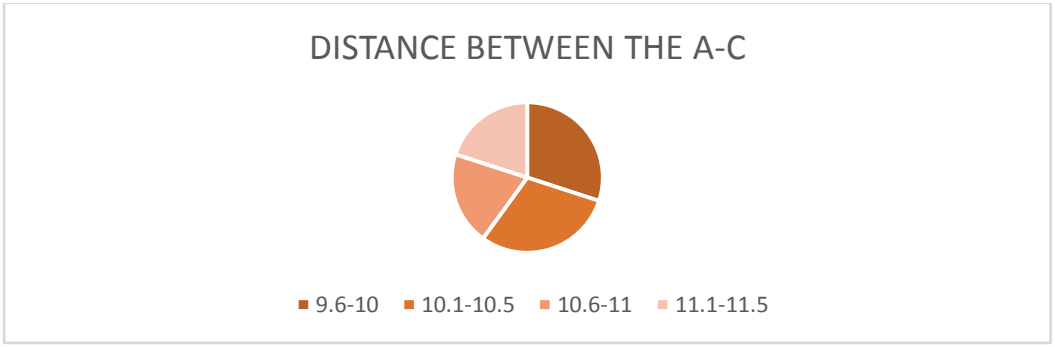
With alveolar ridges:

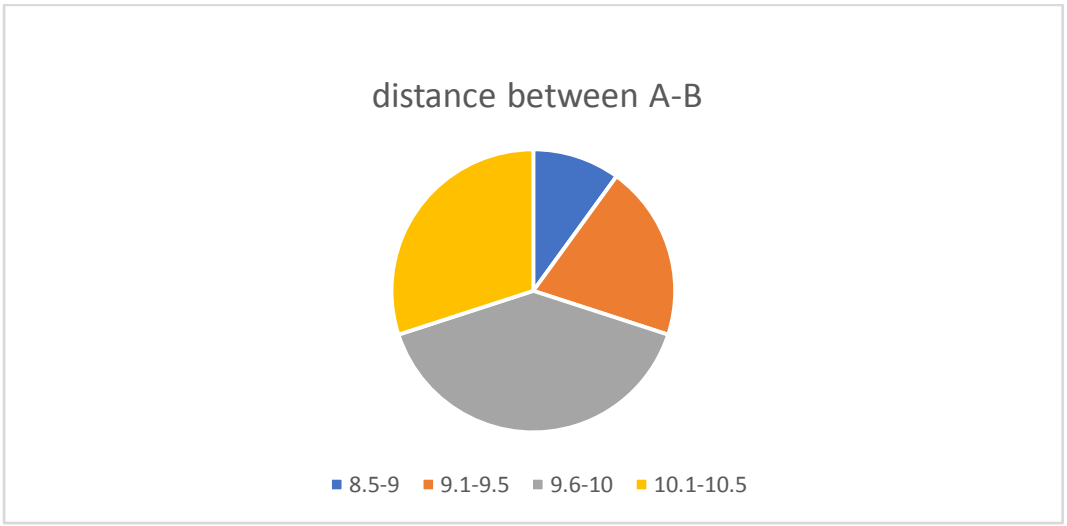
- The distance between the right and left condylar head gives an average of 8.5 cm- 10.5 cm.
- The distance between the right condylar to central incisor gives an average of 9.6-11.5cm.
- The distance between the left condylar to central incisor gives average of 9.5- 11.5cm

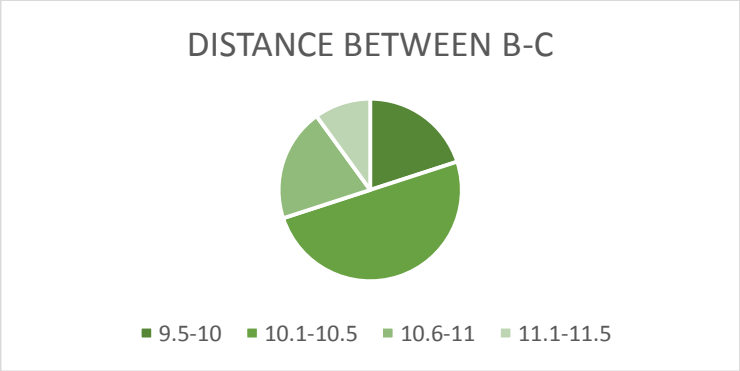
Measurement mandibles without alveolar ridges:-



- The distance between the point A-B:- 8.5-10.4 cm
- The distance between the point A-C:- 9.6-11.4cm
- The distance between the point B-C :- 9.9-11.5cm







The given chart depicts there is slight difference in the results as the given values doesn't gives the an equilateral triangle as these are results for resorbed mandibles were the resorption is caused by tooth loss,Periodontal disease,agingresorption of the alveolar ridge can lead to changes in the position and alignment of the teeth,[10,11] which may alter the proportions and symmetry of the smile. Dental professionals often consider alveolar ridge resorption when planning restorative or cosmetic treatments ensure with the help of the bonwill's triangle for proper alignments of teeth [13].

IV. DISCUSSION:-

These analysis will help to study articulation of mandible complete dentures and dental occlusion and can be related when treating mandibular fractures.it can be also used to determination of the male and female subjects, during forensics and occlusal analysis helps to evaluate the relationship between upper and lower teeth,when the jaw is in centric relation malocclusions and bite problems restorative dentistry, temporo-mandibular joint disorder. We concluded that the knowledge and awareness related to the triangle in the mandible and it's function was gained .this theory can keep it in the mind while treating mandibular fracture and occlusion treatment in good manner.

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