

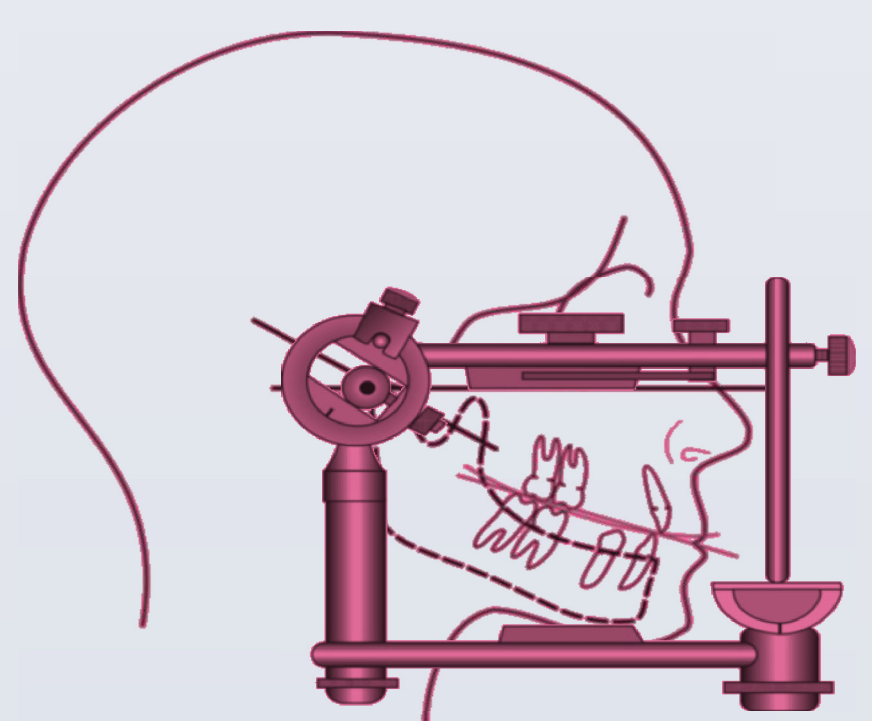
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### Introduction

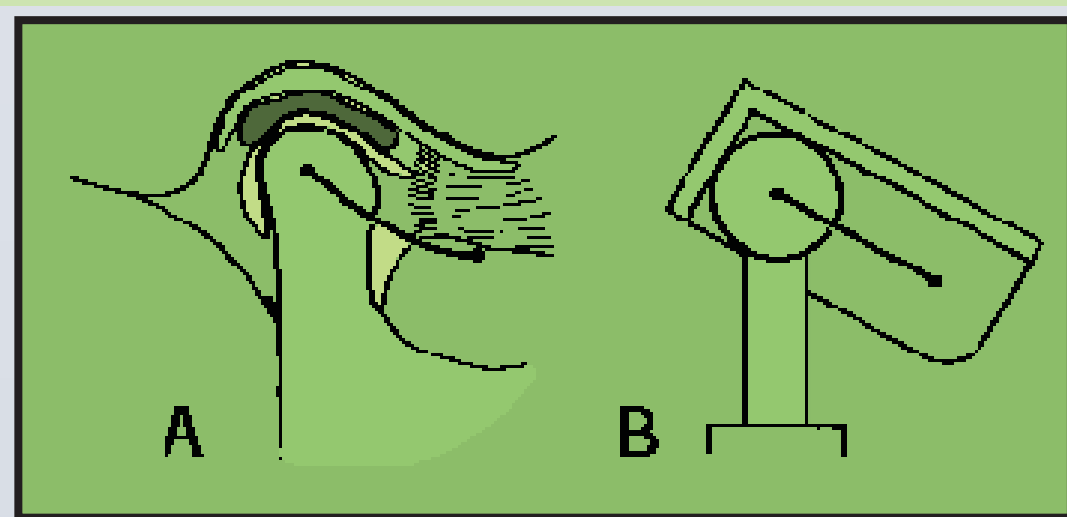
Understanding the various mandibular movements and simulating these movements in an articulator is necessary in order to achieve the harmony.

The principle employed in the use of articulators is the mechanical replication of the paths of movement of the posterior (condylar guidance) and anterior (Anterior guidance) determinants of mandibular movement.



What is condylar guidance?

**Mandibular guidance generated by the condyle and articular disc traversing the contour of the glenoid fossa<sup>1</sup>**



The mechanical form located in the upper posterior region of an articulator that controls the movements of its mobile members.

- The guidance inclination in semi adjustable articulators is set by various methods like wax protrusive records, pantographic tracings (electronic and mechanical), mandibular motion analyzers<sup>2</sup>, and imaging techniques<sup>3</sup>.
- Studies have shown unreliability of recording and reproducing the condylar guidance inclinations with any of the methods.

### Aim of the study

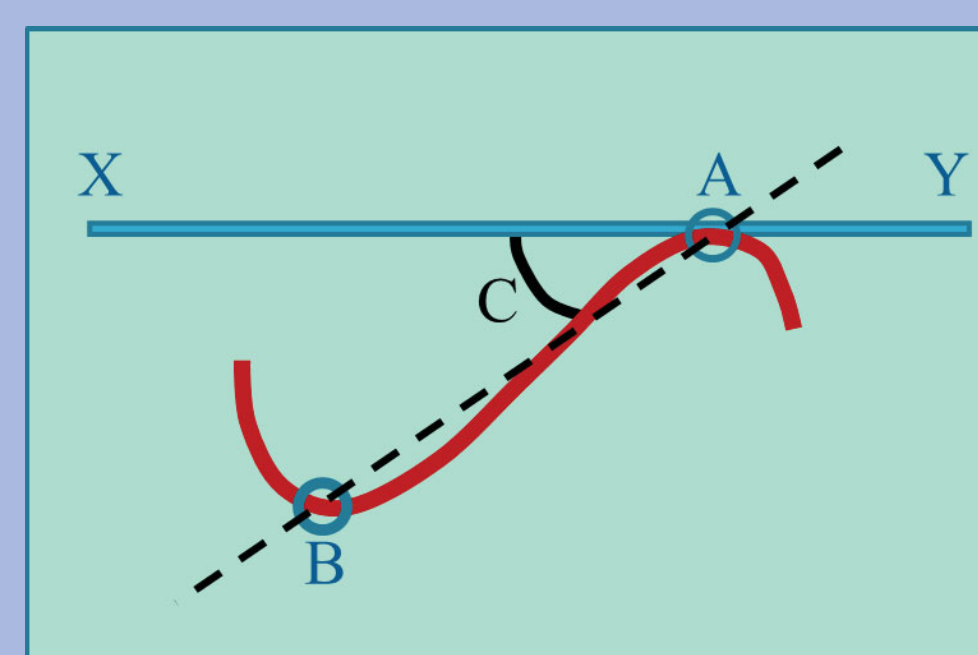
To compare the condylar guidance angulations obtained from protrusive records (PR), Ortho pantomographic tracings (OPG), to 3- dimensional computed tomographic angulations. (3-D CT) in edentulous patients.

### Objectives of the study

- To compare the condylar guidance angulations obtained from protrusive records & OPG
- To compare the condylar guidance angulations obtained from protrusive records and 3-D CT values.
- To compare the condylar guidance angulations obtained from OPG and 3-D CT values.
- To compare the condylar guidance angulations of the right and left sides obtained from protrusive records, OPG and 3-D CT values.

### Methodology

30 completely edentulous patients were selected using certain inclusion and exclusion criteria. The articular eminence angulation was measured using the guidelines given by Ilan Gilboa et al<sup>3</sup>



Tracing of line AB joining height of superior curvature A and inferior curvature B, representing inclination of articular eminence. XY is parallel to FHP. C is angle made by intersection of mean curvature line and horizontal reference line.

Based on the technique used to measure the condylar angulations, three groups were made.

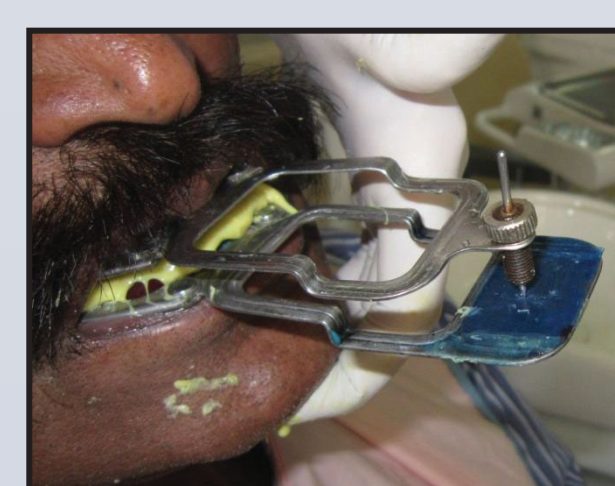
#### Group 1



Face bow transfer



Mounting on semi adjustable articulator

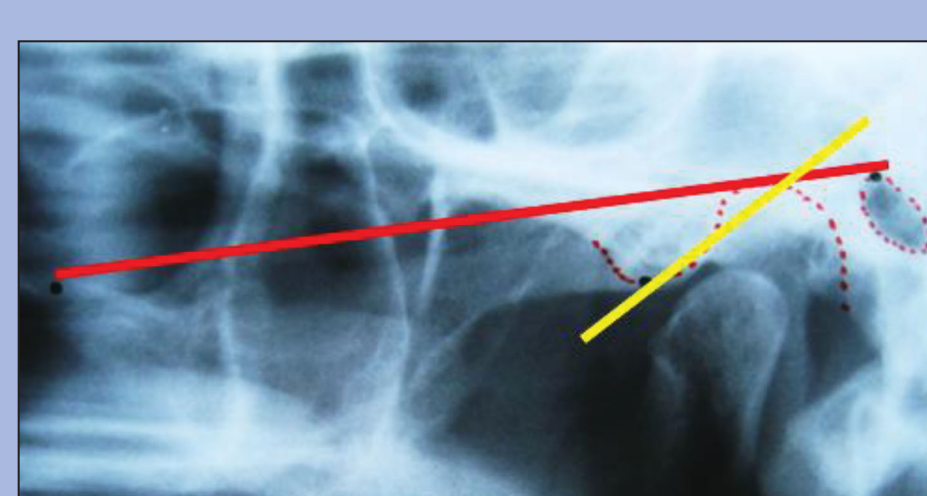


Protrusive records made using gothic arch tracing



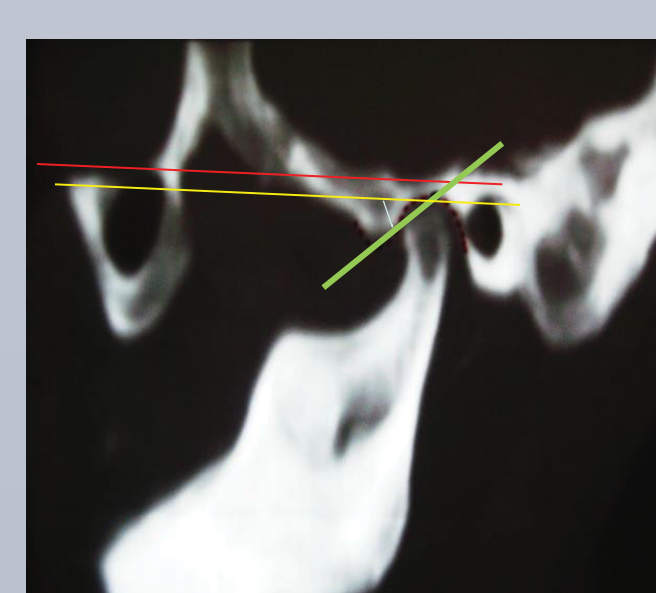
An average of three records is used to set the condylar guidance angulations on the articulator

#### Group 2



An OPG (Promax, Planmeca, Finland) was made for all the patients and the inclination was measured by tracing the landmarks.

#### Group 3



3-D CT (single slice spiral CT machine, 3D multi planar reformatting) was done for each patient. Inclination of the articular eminence was measured by tracing the landmarks

### Results

Statistical analysis was done using : Kruskal-Wallis test, Wilcoxon signed rank sum test, Mann-Whitney 'U' test

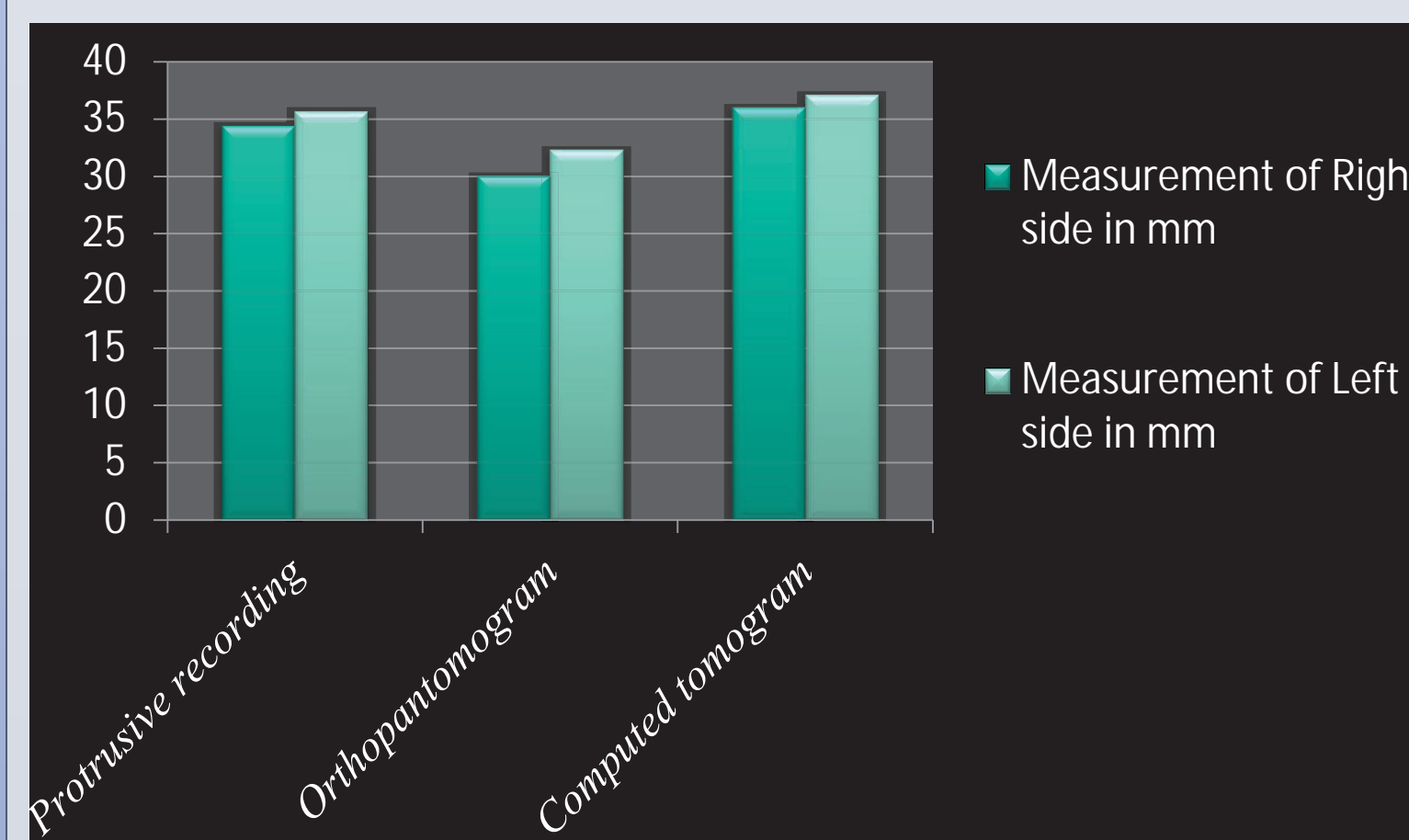
#### Result for the right side angulations

| Groups             | N  | Mean    | Std.Deviation | H    | P        |
|--------------------|----|---------|---------------|------|----------|
| Protrusive records | 10 | 34.3625 | 7.34068       | 2.39 | 0.302 ns |
| OPG Tracings       | 10 | 32.0000 | 6.32456       |      |          |
| CT Tracings        | 10 | 36.0000 | 8.10643       |      |          |

#### Result for the left side angulations

| Groups             | N  | Mean    | Std.Deviation | H    | P        |
|--------------------|----|---------|---------------|------|----------|
| Protrusive records | 10 | 35.6625 | 7.15521       | 3.31 | 0.191 ns |
| OPG Tracings       | 10 | 33.3500 | 4.71320       |      |          |
| CT Tracings        | 10 | 37.0625 | 5.64698       |      |          |

#### Comparison of right and left side angulations



### Discussion

Among the various techniques employed in recording the condylar guidance angulations, interocclusal records using the gothic arch tracing is commonly employed. However Studies by Zamacona et al, Lundeen and Wirth, Woelfel et al, Hobo and Mochizuki, Preti et al, and dos Santos et al found variations in condylar guidance angles ranging from 5 to 55° when this method was used. Looking at the variations in condylar guidance by the interocclusal record method, many clinicians use average condyle guide settings taken from mean published values. But, the mean setting of 30-40 degrees, when the true incline is either 0-10 degrees or steep with 70-80 degrees does not justify the use of average values.



Therefore, determining condylar guidance angle by panoramic radiographic image may be of value in programming the semi-adjustable articulator.

In the present study the values obtained by the CT which is considered a gold standard in imaging were compared with the OPG values and protrusive records, and the difference was found to be statistically insignificant.



### Merits & Demerits

**Advantages**  
 -Routinely used  
 -Easier than other known methods

**Disadvantages**  
 -Inaccuracies reported

Interocclusal records

**Advantages**  
 - Diagnostic tool  
 - Easy method to calculate angulation

**Disadvantages**  
 - Correct visualization of the eminence morphology in the OPG  
 - Exposure parameters

OPG

### Conclusion

Within the limitations of this pilot study OPG and Protrusive records are both reliable guides for recording condylar guidance inclinations

### Clinical implications

Interocclusal records for recording the condylar guidance in edentulous patients has many in-accuracies incorporated due to resiliency of the tissues and the denture bases resting on movable mucosa. Considering the inaccuracies of the interocclusal record technique with inherent errors of up to 30 degrees<sup>4</sup>, the radiographic articular eminence image may have clinical relevance. **Ortho pantomogram may be used to as a reliable guide in setting the condylar guidance in semi-adjustable articulators.**

### References

- The glossary of prosthodontic terms. J Prosthet Dent 2005; 94:26.
- Comparison of condylar control settings using three methods: a bench study. J Prosthet Dent. 1991; 66 (2):193-200
- Gilboa I, Cardash H S, Kaffe I, Gross M D Condylar guidance: Correlation between articular morphology and panoramic radiographic images in dry human skulls. J Prosthet Dent 2008; 99:477-482
- Dos Santos J Jr, Nelson S, Nowlin T. Comparison of condylar guidance setting obtained from a wax record versus an extraoral tracing: a pilot study. J Prosthet Dent 2003;89:5-9.