

## Helping dentists make accurate denture through PAA articulator

**Abstract:** Introduction: An articulator is defined as a mechanical instrument that represents the temporomandibular joints and jaws, to which maxillary and mandibular casts may be attached to simulate some or all mandibular movement. There have been many major modifications and researches in this field of stomato-mechanics in order to facilitate the orientation of the jaws during static and functional movements. Objective: The main objective of the present research is to provide a novel machine which aids in simulating the temporo-mandibular joint and jaws by using with high accuracy tool for precise & easy mounting & compensatory curved plates for detailed teeth arrangement. Method: After the jaw relations procedure, casts should be placed on the wax studs to orient the casts for mounting. The occlusal plane should coincide with the occlusal plane orientor, lingual midline locator and the incisal pin (3- point guidance). This is a more accurate method compared to the arbitrary thread relation we use. Result: Accordingly the present research provides the gen-next articulator. Conclusion: This articulator aids in helping dentists make accurate dentures using a regularly used mean value articulator. It will not only improve the quality but also the efficiency of work among dental students and professionals.

**Keywords:** Articulator, machine, occlusal, dental, mechanical instrument

### 1. Introduction

This articulator has been made to simulate the stomatognathic system. This machine is to be used to mimic the articulating system of the oral cavity and helps in the personalized alignment of the teeth according to each patient. An articulator is defined as a mechanical instrument that represents the temporomandibular joints and jaws, to which maxillary and mandibular casts may be attached to simulate some or all mandibular movement [1-2]. There have been many major modifications and researches in this field of stomato-mechanics in order to facilitate the orientation of the jaws during static and functional movements. The drawbacks of existing methods of measuring wear is that the current mean value articulator is a simplistic design which is utilized by many undergraduates student and postgraduates students for mounting casts followed by various teeth arrangements.[3-5] The lack of a few tools may hamper the orientation of the casts before mounting and hold it in position. The inaccuracy of 'thread relation' for determining the occlusal plane is well known.[6-7] Teeth arrangement has been performed since decades according to the glass plate relation while working on the mean value articulator.[8-9]

#### Objective:

The main objective of the present research is to provide a novel machine which aids in simulating the temporo-mandibular joint and jaws by using with high accuracy tool for precise & easy mounting & compensatory curved plates for detailed teeth arrangement.

#### Method:

After recording the jaw relations procedure, casts should be placed on the wax studs to orient the casts for mounting. The occlusal plane should coincide with the occlusal plane orientor, lingual midline locator and the incisal pin (3- point guidance). This is a more accurate method compared to the arbitrary thread relation we used during mounting on a mean value articulator. After coinciding the occlusal plane orientors, proceed ahead with the mounting. The plaster should be mixed with the water powder ratio provided by the manufacturer. After skillful mixing, load the material on the casts and wait for it to set

accurately. After the setting of the material, teeth arrangement is commenced. Arrange the anterior teeth precisely after which the posterior teeth should be arranged according to the compensatory curved plates inserted into the lingual midline locator. The arrangement automatically sets in the direction of the desired compensatory curve of specific dimensions. The flat plates provided in the assembly help in the mounting of single complete dentures.

#### Result

Accordingly the present research provides the gen-next articulator which comprises:

- 1) The Compensatory Curve plates compensates for the curve of Wilson and Curve of Spee which together comprise the Curve of Monsoon.
- 2) Occlusal Plane Orientor helps in the placement and orientation of the casts during mounting. This establishes a horizontal guide in order to recognise any deviation from the original position.
- 3) Lingual midline indicator
- 4) A Pinrest to support all of the above,
- 5) The Upper and Lower members of an articulator.
- 6) The articulator also contains fixed condylar guidance.
- 7) The entire articulator is supported through the L-frame.

The Aluminium framework which is weighted to lend stability to the entire machine so as to prevent toppling and even due to its light weight. The upper and lower members contain the mounting plates which will help in the mounting of casts and retaining it. The L- frame helps in supporting the entire assembly. The Incisal Guide table rests the Incisal Rod and the Incisal. It is static and not customizable. The Incisal Rod supports the Incisal pin. The posterior rod is called the Pinrest which supports all the thumbscrews of the assembly. The right and left Occlusal Plane Orientor help in the precise orientation of the casts during mounting. The Lingual Midline Locator has a slit to slide in the compensatory curve plates. The condylar guidance simulates the temporomandibular joint. Hence, it opens and closes the articulator.

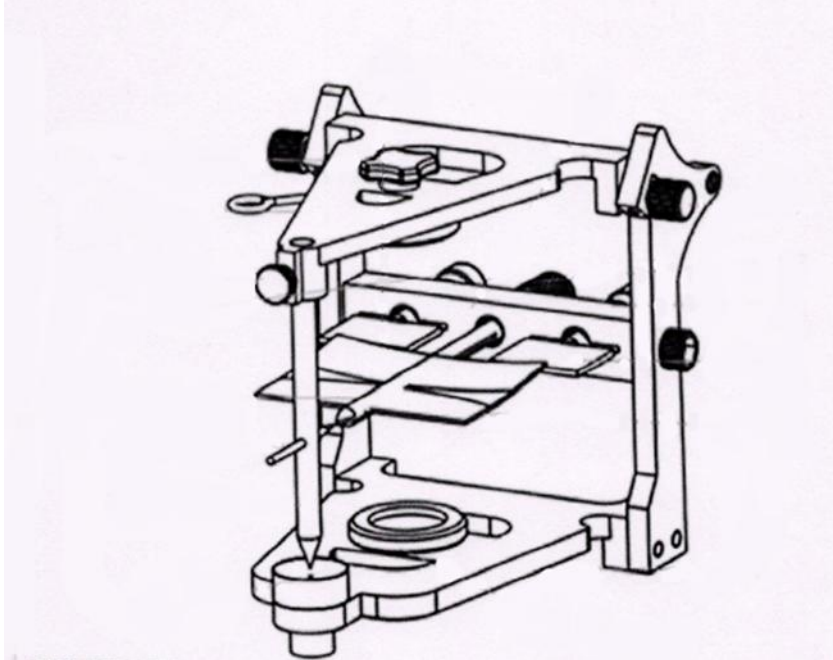


Figure1: schematic representation of the showing the isometric view of the PAA Articulator

#### Discussion

Functioning of PAA Articulator : The Aluminium framework which is weighted to lend

stability to the entire machine so as to prevent toppling and even due to its light weight. The upper and lower members contain the mounting plates which will help in the mounting of casts and retaining it. The L- frame helps in supporting the entire assembly. The Incisal Guide table rests the Incisal Rod and the Incisal Pin. It is static and not customizable. The Incisal Rod supports the Incisal pin. The posterior rod is called the Pinrest which supports all the thumbscrews of the assembly. The right and left occlusal Plane Orientor help in the precise orientation of the casts during mounting. The Lingual Midline Locator has a slit to slide in the compensatory curve plates. The condylar guidance simulates the temporomandibular joint. Hence, it opens and closes the articulator.

After the jaw relations procedure, casts should be placed on the wax studs to orient the casts for mounting. The occlusal plane should coincide with the occlusal plane orientor, lingual midline locator and the incisal pin (3- point guidance). This is a more accurate method compared to the arbitrary thread relation we use. After coinciding the occlusal plane orientors then proceed ahead with the mounting. The plaster should be mixed with the water powder ratio provided by the manufacturer. After skillful mixing, load the material on the casts and wait for it to set accurately.

After the setting of the material, teeth arrangement is commenced. Arrange the anterior teeth precisely after which the posterior teeth should be arranged according to the compensatory curved plates inserted into the lingual midline locator. The arrangement automatically sets in the direction of the desired compensatory curve of specific dimensions. The flat plates provided in the assembly help in the mounting of single complete dentures. The L- frame, helps in supporting the entire assembly. The Occlusal plane orientor, helps in cast orientation during mounting. The compensatory curved plates, are of all dimensions which help in the arrangement of teeth along the curve of Spee and curve of Wilson. Lingual Midline locator, are of all dimensions that helps in the location of midline. Pinrest holds all locators together. The flat plates, are of all dimensions that help in single arch mounting.

Novel features of the improvised articulator

1. Occlusal Plane Orientor.
2. Lingual Midline Indicator.
3. Compensatory curved plates.
4. A Pinrest.

Utility of the improvised articulator:

1. Occlusal plane orientor which helps in the orientation of the casts during mounting
2. Lingual midline indicator which will help in 2 point midline location along with the incisal pin.
3. Compensatory curved plates to provide the curve of Spee and Wilson on the artificial dentures.
4. A pinrest to provide space for the central screw and the two occlusal plane orientors.

Advantages:

1. Precise Mounting
2. Detailed teeth arrangement
3. Accurate midline positioning

4. Precise orientation of casts.
5. Easier and simplified technique.
6. Acknowledges any error in the mounting.

#### Conclusion:

This articulator aids in helping dentists make accurate dentures using a regularly used mean value articulator. It will not only improve the quality but also the efficiency of work among dental students and professionals. These additional features will help us accomplish patient's satisfaction. This aids in ascertaining the best prosthodontic care to patients. The aim of this research is to make an articulator that makes orientation and midline location accurate along with a precise occlusal plane provider and compensatory curve plate. The articulator using technical drawing software was initially performed. The material selected was aluminium due to its light weight and durability. Intricate Welding was performed for minor additions and corrections. The various features of the research have helped in easy and simplified mounting of the casts and providing the curve of Spee and Wilson which are usually difficult to inculcate in the dentures.

#### COMPETING INTERESTS DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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