



RECORDING CENTRIC RELATION: DEFINITION OF ARTICULATOR



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Here are some examples of MALOCCLUSIONS;



Dental
Crowding



Openbite



Protruded
Teeth



Deepbite

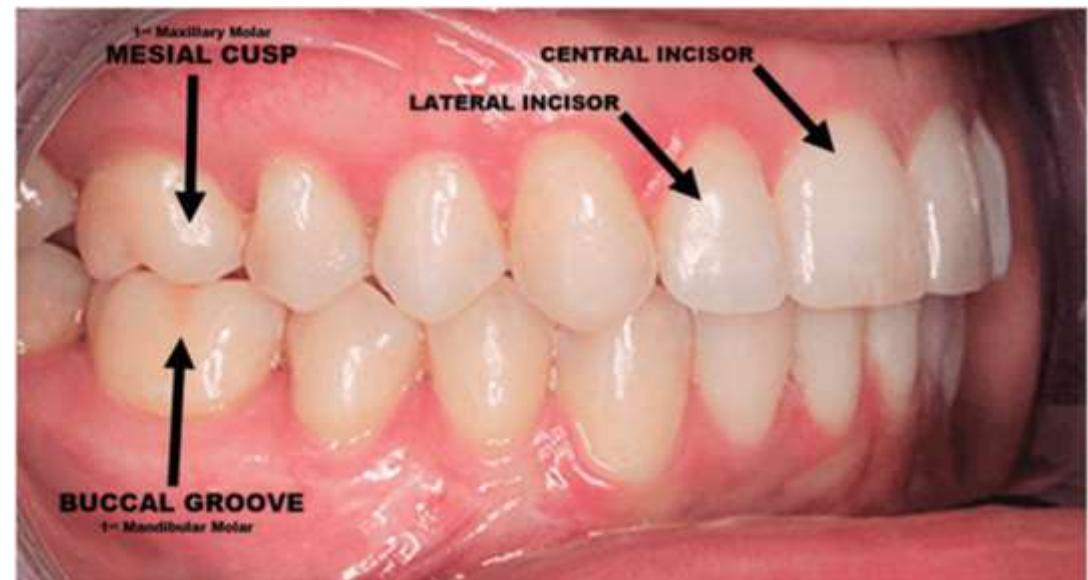


Protruded
Mandible



Maxillary
Constriction



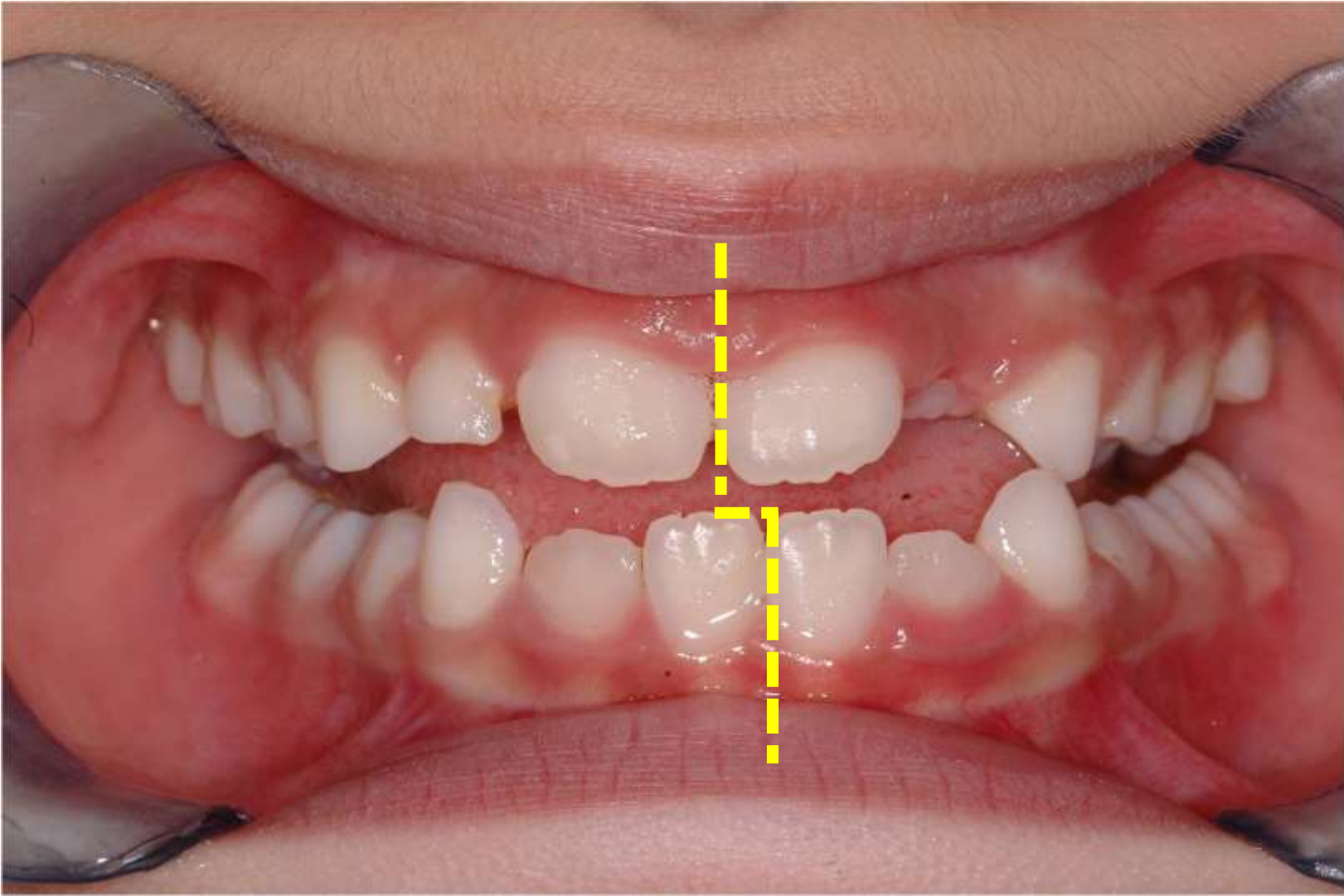




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CROSSBITE



What is centric occlusion?

Centric occlusion (CO) describes mandible's position when all your teeth come together when you take a bite.

It's the complete intercuspation (meshing together of the cusps) of the opposing teeth, also known as maximum intercuspation (MIP).

Centric occlusion is independent from the position of the temporomandibular joint.

Synonyms:

- intercuspal position (ICP)
- maximum intercuspitation (MIP)



What is centric relation?

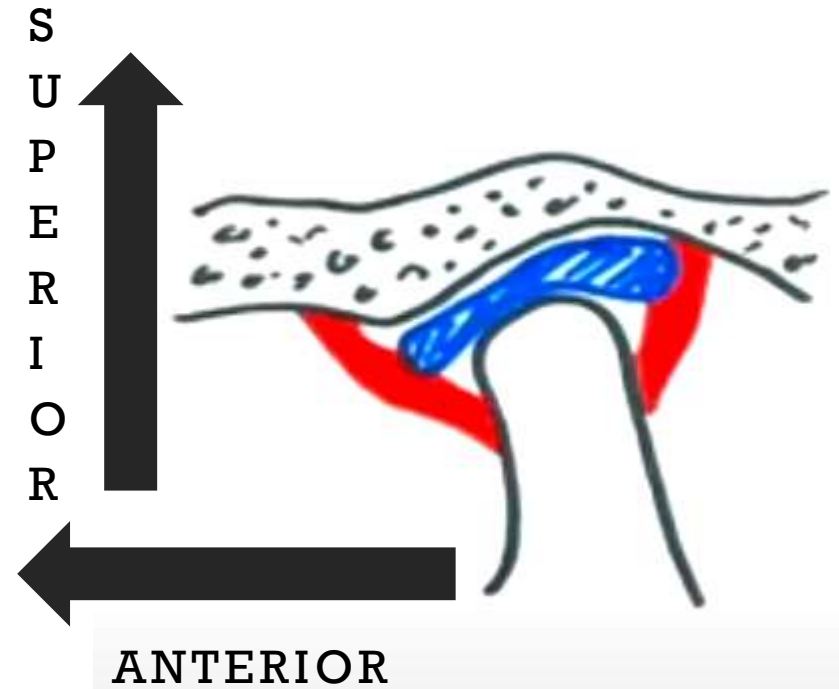
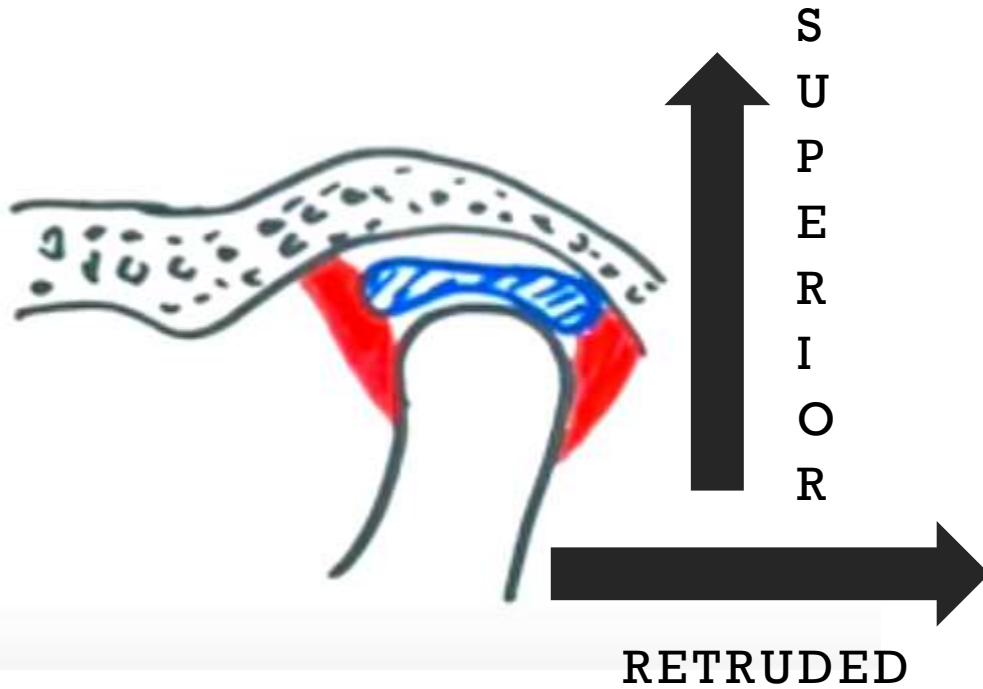
There are over 26 definitions for Centric Relation (CR) since the term was first developed as a starting point for making dentures.

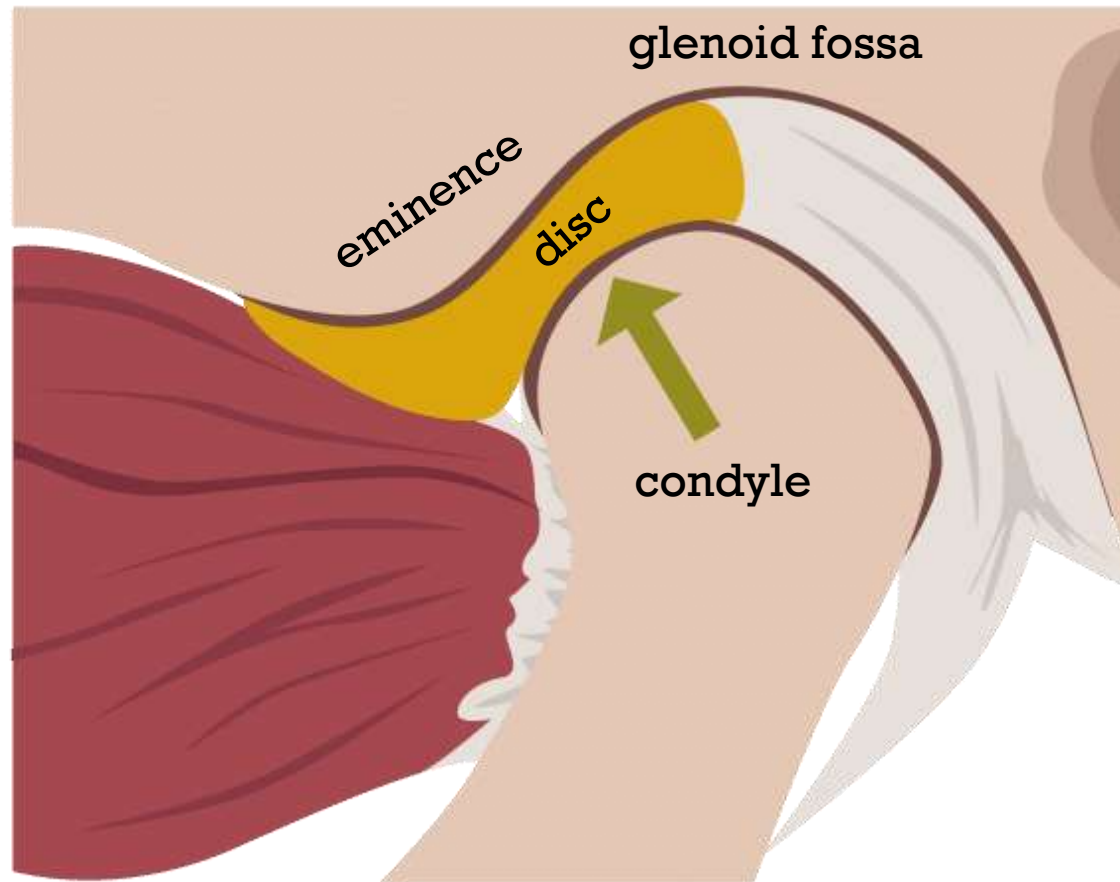
CR it has also been described as the most stable and comfortable position of the mandible in which the joints can be loaded without discomfort.

Synonyms:

- centric jaw relation
- terminal hinge (axis) relation
- retruded axis position



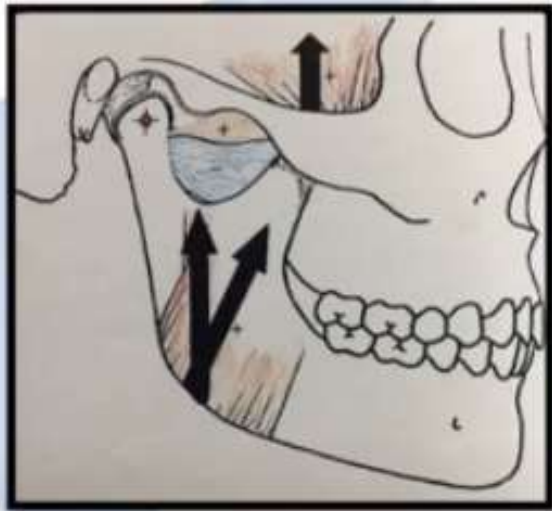




The condyle in its most anterior superior position in the glenoid fossa. The head of the condyle lies against the most superior part of the distal facing incline of the glenoid fossa.



Centric Relation



A maxillomandibular relationship, independent of tooth contact, in which the condyles articulate in the anterior-superior position against the posterior slopes of the articular eminences; in this position, the mandible is restricted to a purely rotary movement; from this unstrained, physiologic, maxillomandibular relationship, the patient can make vertical, lateral or protrusive movements; it is a clinically useful, repeatable reference position.

GPT9



CENTRIC RELATION is not related with your TEETH! It does not matter if you have teeth or not!

It is a bone-to-bone relationship (maxilla-to-mandible). It is a jaw relationship.

It is an orthopedically STABLE position and the patient can make vertical, lateral and protrusive movements without any resistance.

It is a REPEATABLE relationship.



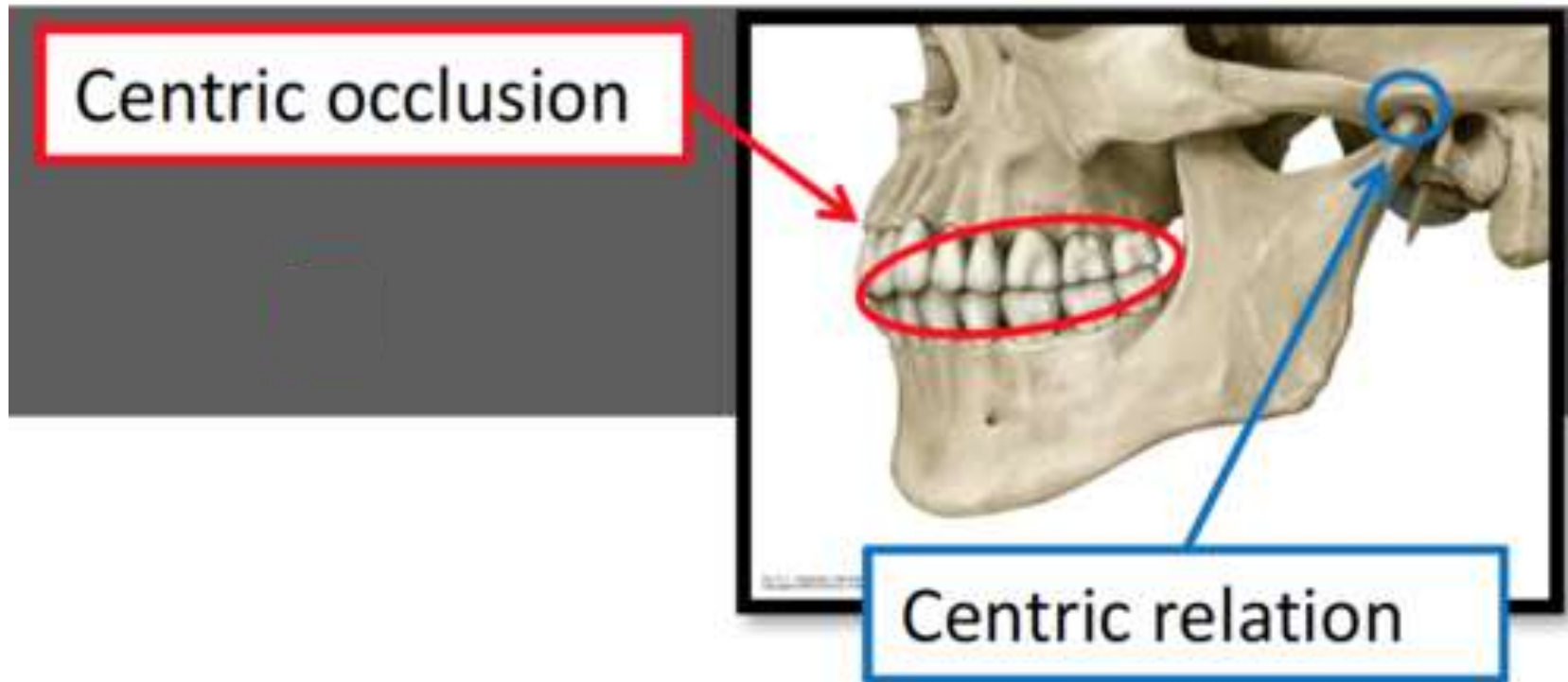
What is habitual occlusion?

Habitual occlusion is the BEST FIT of the teeth.

Habitual occlusion has nothing to do with your centric relation!!

The usual relationship between the teeth of the maxilla and mandible that represents the maximum contact. This occlusion varies from person to person and is seldom ideal or true centric occlusion.

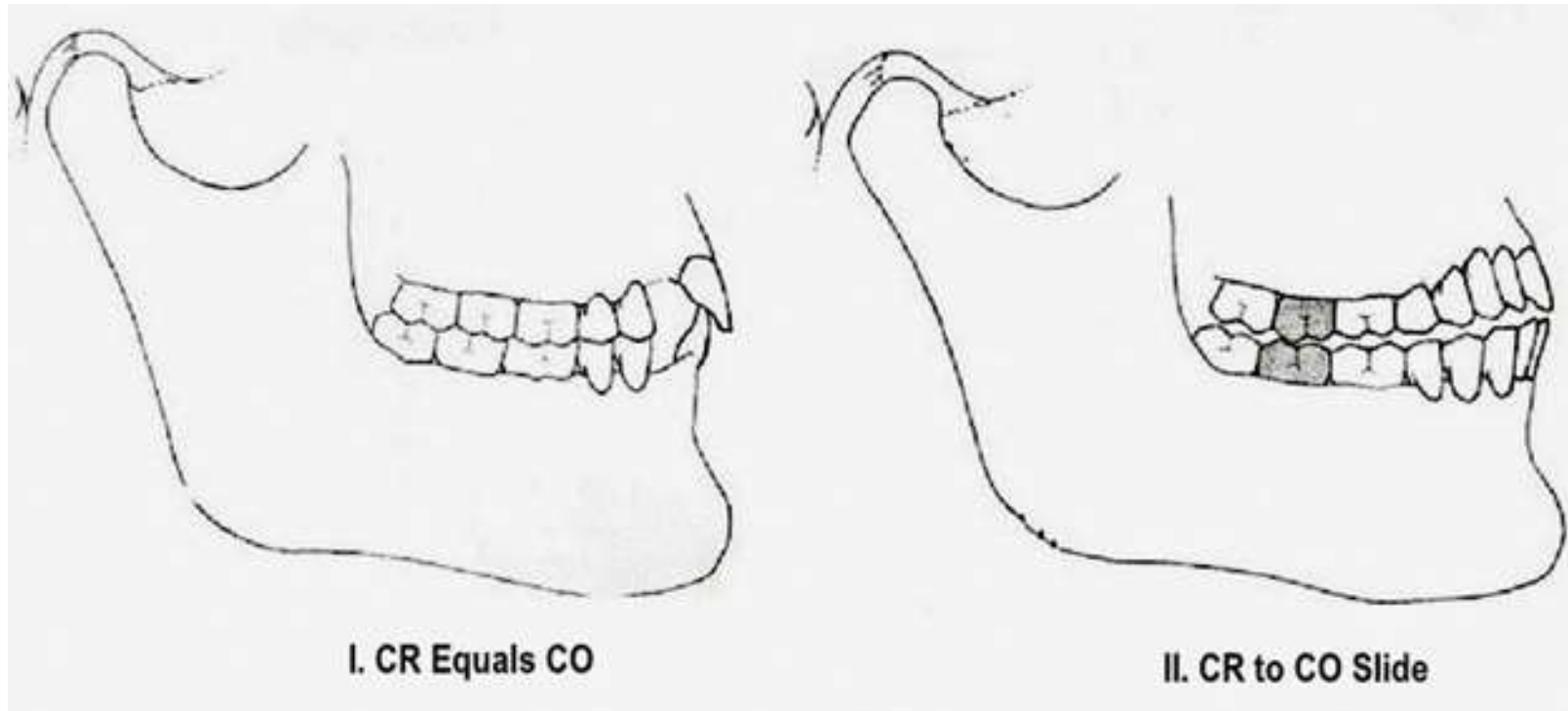




IF THE CENTRIC RELATION & CENTRIC OCCLUSION COINCIDES WITH EACH OTHER, THIS IS A WONDERFUL HARMONY.

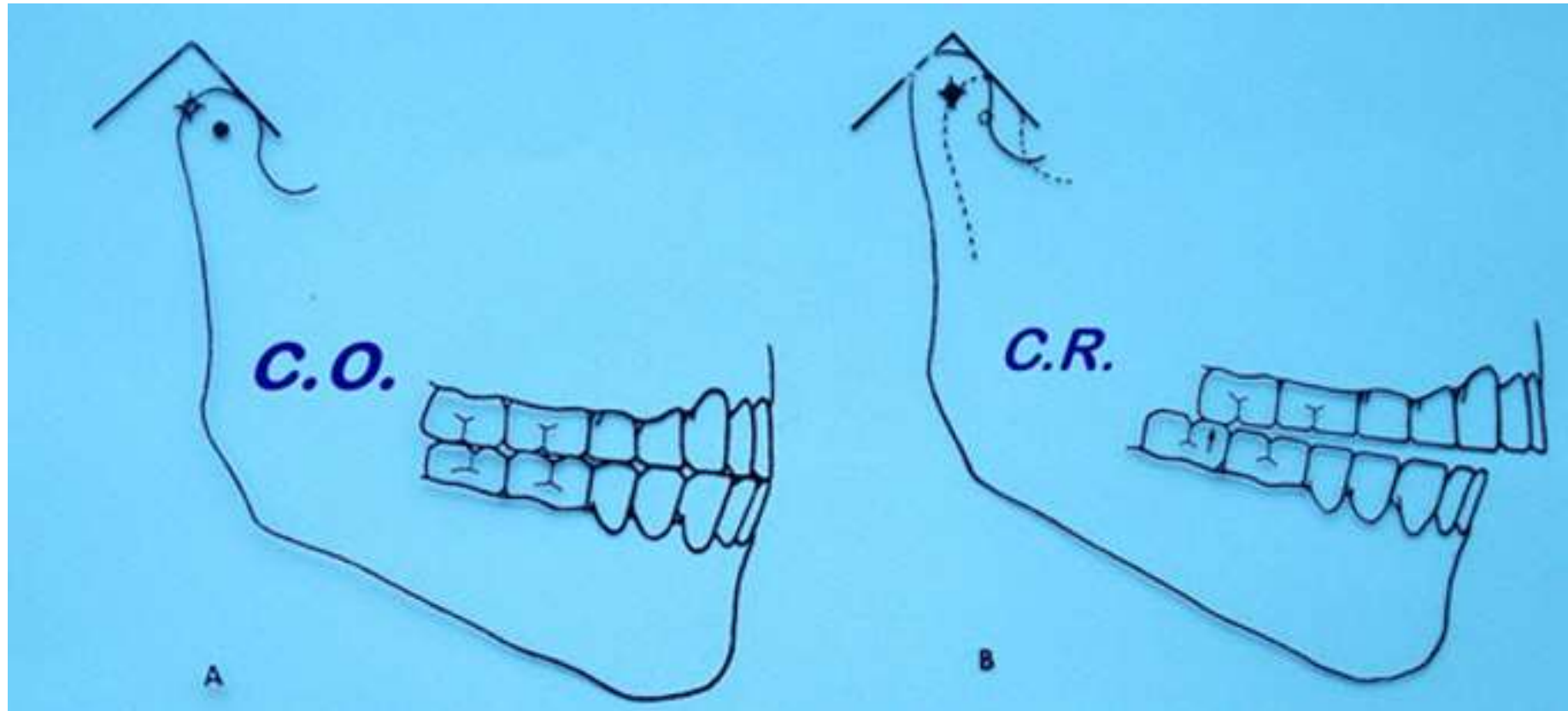
1-2 mm slide from CR to CO
is accepted to be normal.





CR and CO only coincide in about 10 percent of the population, leaving 90 percent of the population to have a slide. As a clinician, we must determine if CR is a functioning position and how the patient gets from CR to CO. Only then can you determine if the slide is pathological or physiological.





CENTRIC OCCLUSION

CENTRIC RELATION





CENTRIC RELATION



CENTRIC OCCLUSION





CENTRIC RELATION



CENTRIC OCCLUSION



- **Pseudo Class III**



CENTRIC RELATION

CENTRIC OCCLUSION



CENTRIC OCCLUSION



CENTRIC RELATION



Figure 6. (A) Right lateral view of models mounted in maximal intercuspation (MIC). (B) Right lateral view of models mounted in centric relation (CR) from the same patient.

Young Kim Weffort; Solange Mongelli de Fantini. *Condylar displacement between centric relation and maximum intercuspation in symptomatic and asymptomatic individuals.* Angle Orthod. 2010;80:835–842.



When the condyle is stable and in comfort, AND the teeth coincides with each other without any occlusal interferences, this is OCCLUSAL HARMONY

TMJ + MUSCLES + TEETH = HARMONY

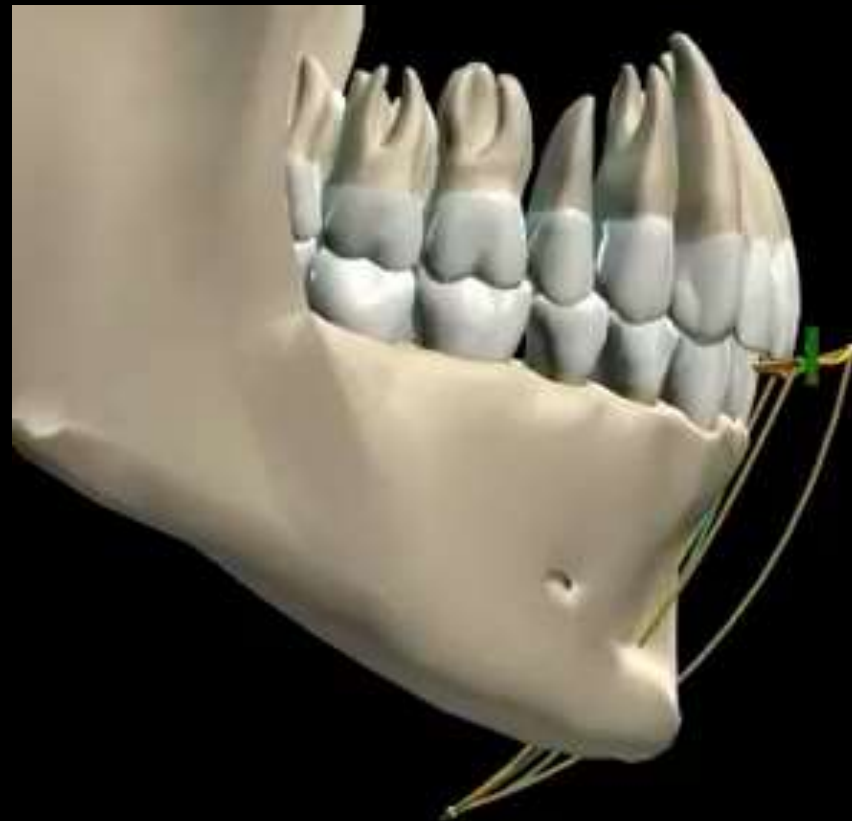
A mandibular position that determines occlusal, muscular, and articular balance is required to plan and execute oral rehabilitation, in concordance to the stomatognathic system.



The human maxilla is fixed and the movement of the mandible (and therefore the dentition) is dictated by the position and movements of the bilateral temporomandibular joints.

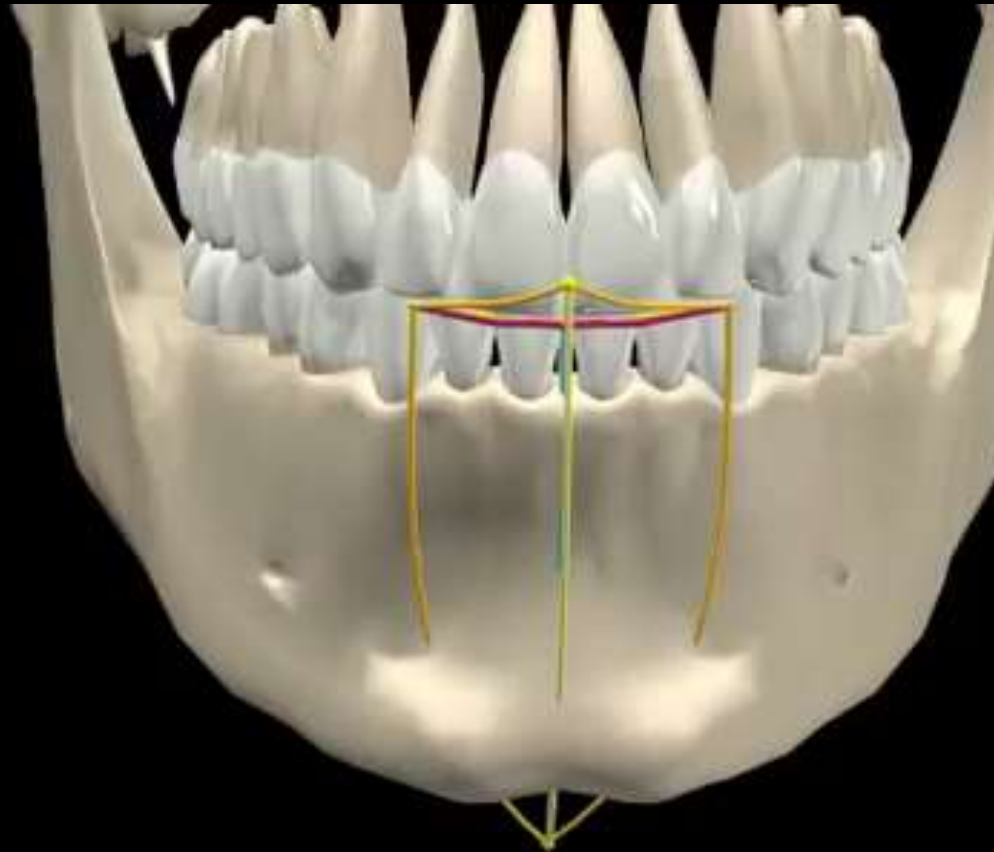
The temporomandibular joints are not a simple hinge but **ROTATE and **TRANSLATE** forward when the mouth is opened.**





BAUNDERS
ANATOMICAL MODELS



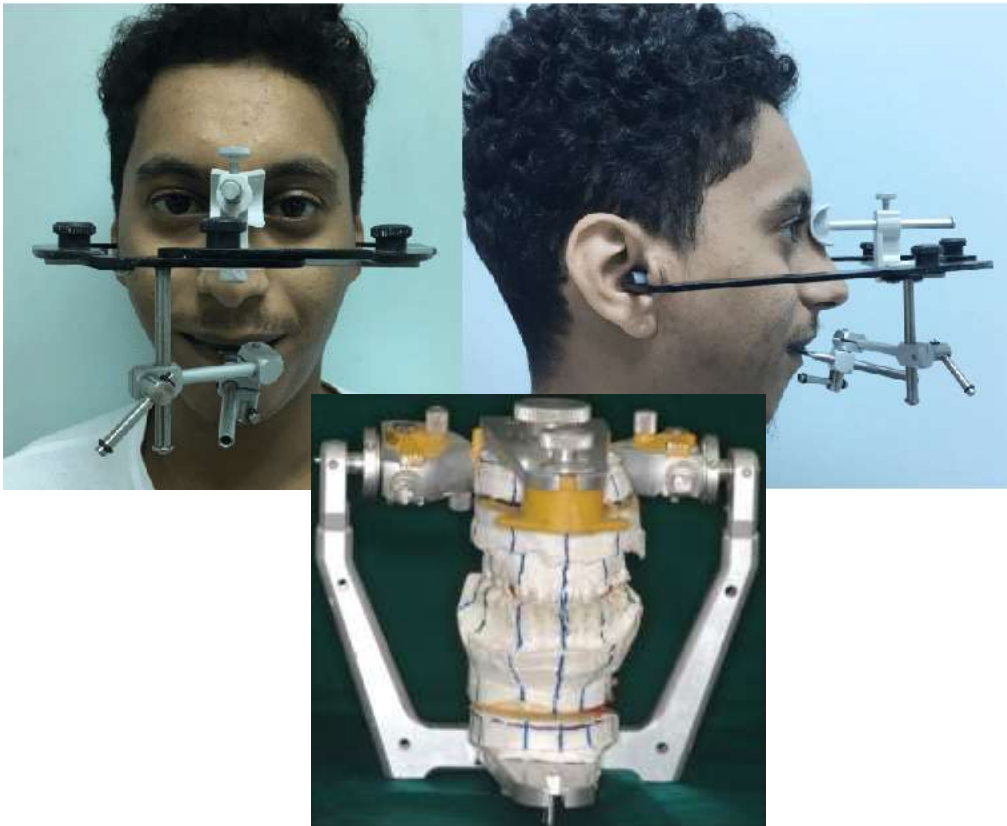


NAVIGATOR
A. J. BLOOMER OF 234115120000



So, how can we imitate the movements of the mandible in order to work on the occlusion when the patient is not present.

Orthodontics



Prosthodontics

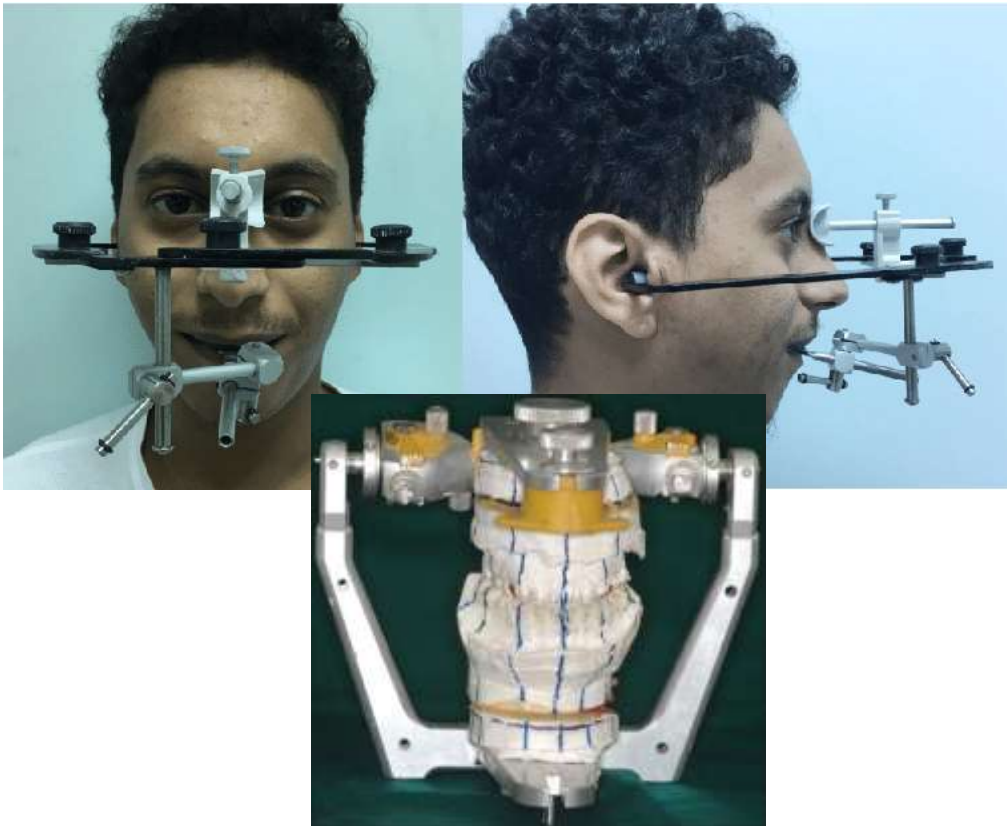


An articulator is defined as a “mechanical instrument that represents the temporomandibular joints (TMJs) and jaws, to which maxillary and mandibular casts may be attached to simulate some or all mandibular movements



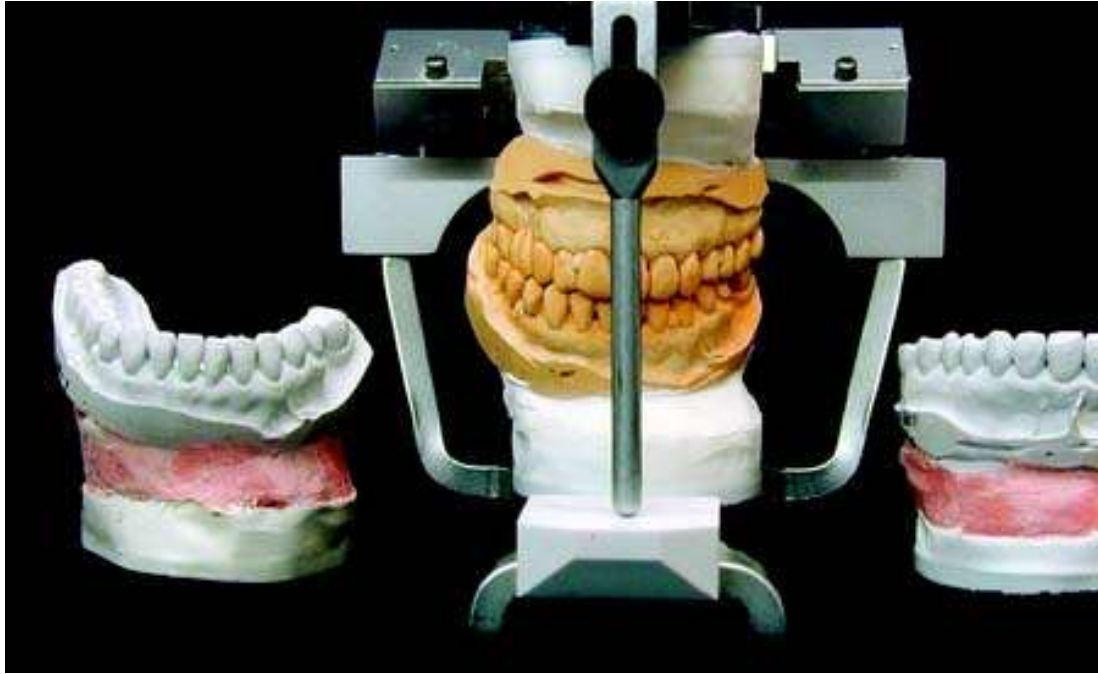
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Orthodontics



Prosthodontics





If the maxillary cast has been transferred with a facebow, a **centric relation (CR)** interocclusal record has been used for articulation of the mandibular cast, and the condylar elements have been appropriately set (such as with protrusive and/or excursive interocclusal records), reproducing the patient's movements with reasonable accuracy is possible.



There are 3 types of articulators present in the market;

1. Fixed/Hinge articulator

2. Semi-adjustable articulator

3. Fully-adjustable articulator



1. Fixed/Hinge articulator

Fixed articulators stimulate a simple hinge movement. They disregard all functional movements of the jaw. They are used commonly for single-unit crowns or where there is little or no lateral excursion in chewing.



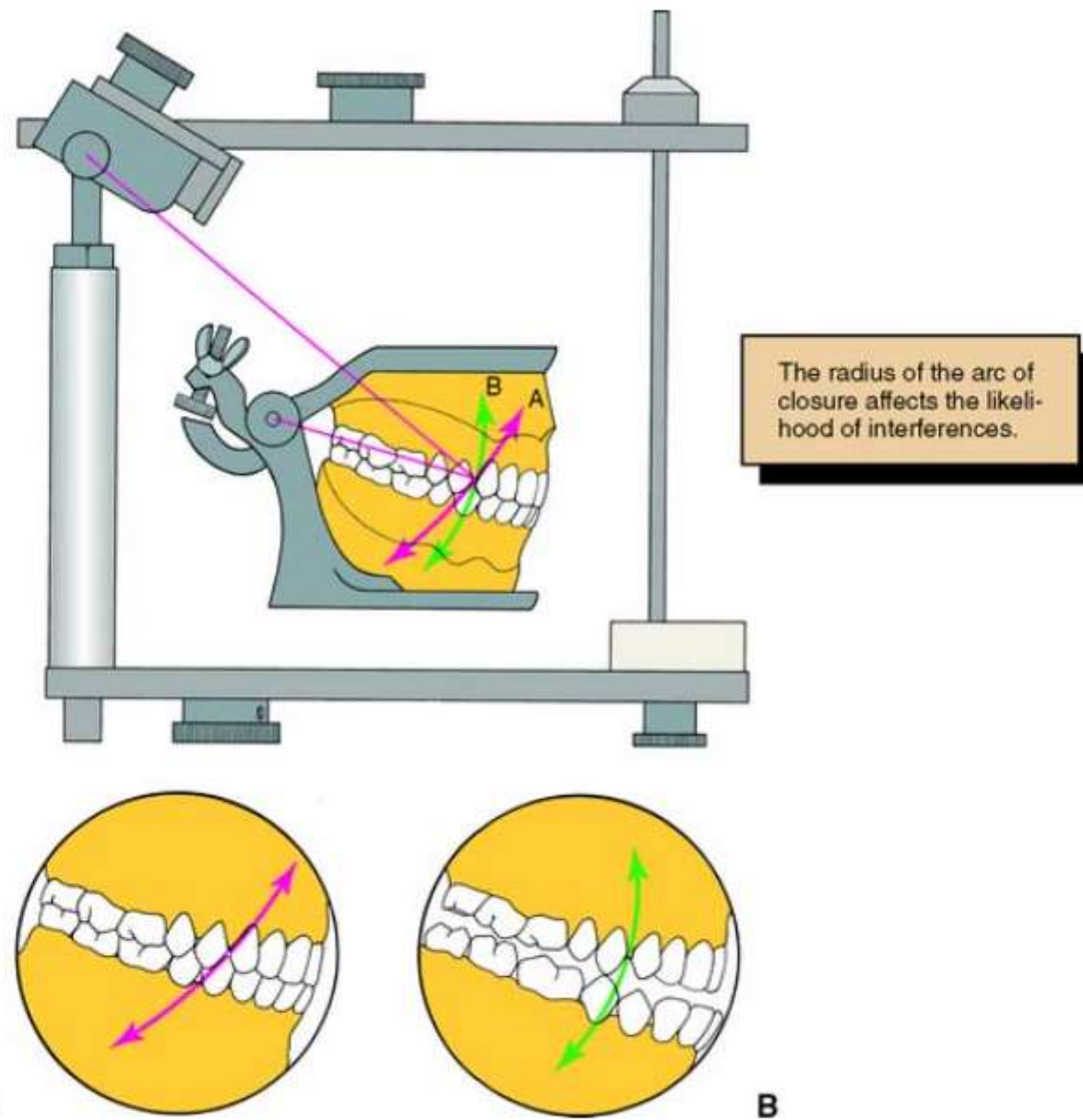


Fig. 2-6 Discrepancies in the path of closure when using a small nonadjustable articulator can lead to restorations with premature occlusal contacts. **A**, Path of closure of an anatomically accurate articulator. **B**, The small nonadjustable instrument has a smaller radius closure path, which results in premature contact at the clinical try-in between the premolars during hinge closure.

2. Semi-adjustable articulator

A semi-adjustable articulator uses some fixed values based on averages and is not therefore capable of reproducing any particular jaw relationship, or occlusions which are not close to the average. Values which may or may not be fixed include centric jaw relation, protrusion angle, centric shift, lateral and Bennett movements, immediate side-shift and retrusion. The advantage of a semi-adjustable articulator is that it may be adequate for most cases and is less costly.





Fig. 2-7 Semiadjustable arcon articulators. A, The Denar Anamark. B, The Whip Mix model 2240. C, The Hanau Wide-Vue.



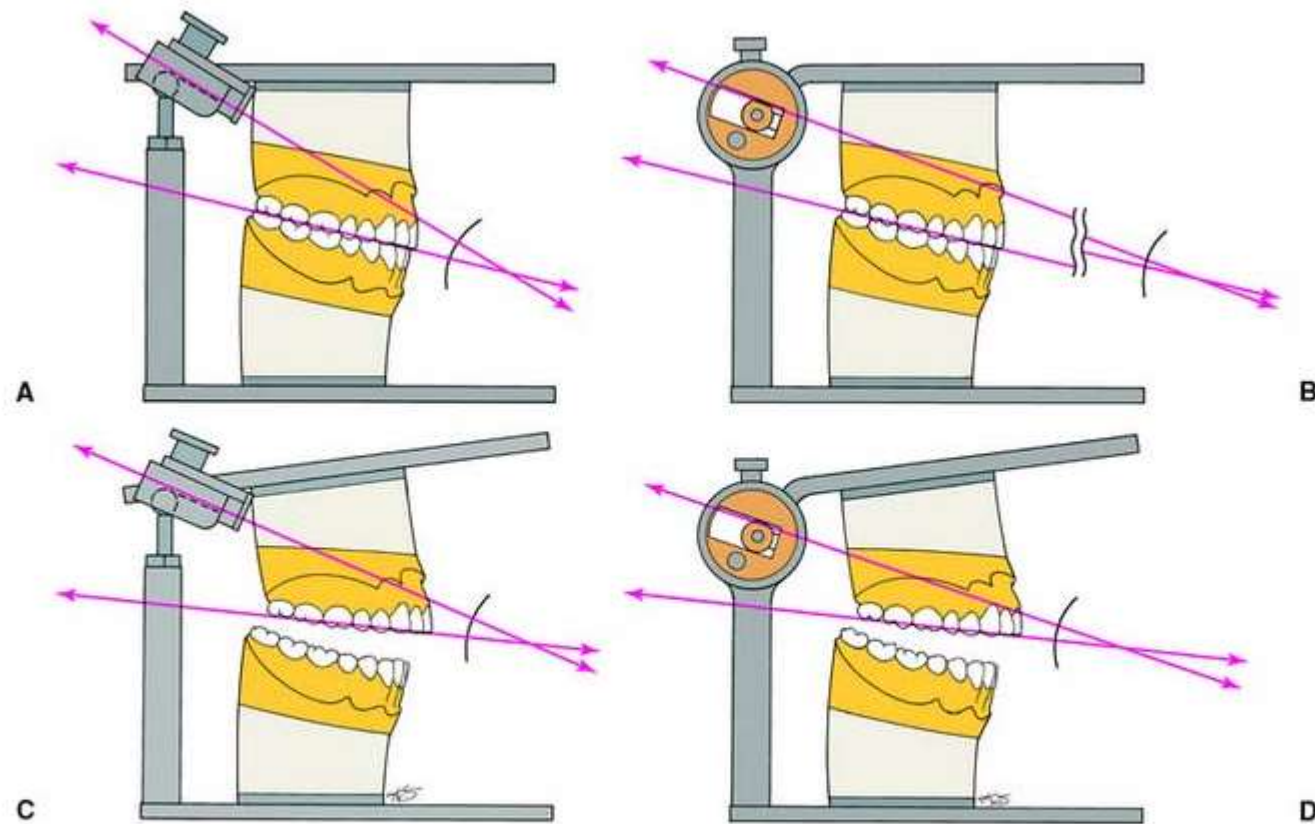


Fig. 2-8 Articulators. A and C show an arcon articulator; B and D show a nonarcon articulator. An advantage of the arcon design is that the condylar inclination of the mechanical fossae is at a fixed angle to the maxillary occlusal plane. With the nonarcon design, the angle changes as the articulator is opened, which can lead to errors when a protrusive record is being used to program the articulator.





The SAM 3 Articulator has all of the basic features of the SAM 2P and those of the SAM 2PX. Additionally, it has a unique and different high precision centric locking mechanism which functions independent of both Bennett Guidance and Condylar Pathway Inserts. An optional micro adjustable protrusion and retrusion screw is available.



3. Fully-adjustable articulator

A fully-adjustable articulator reproduces the movement of the temporomandibular joints in all possible dimensions and functional movements.

They are necessary for large or complex restorative cases where a correct occlusion is being substantively restored.

The relationship between the temporomandibular joints and the maxilla and the functional relationship of the jaws are transferred to the articulator by means of a separate facebow.





A

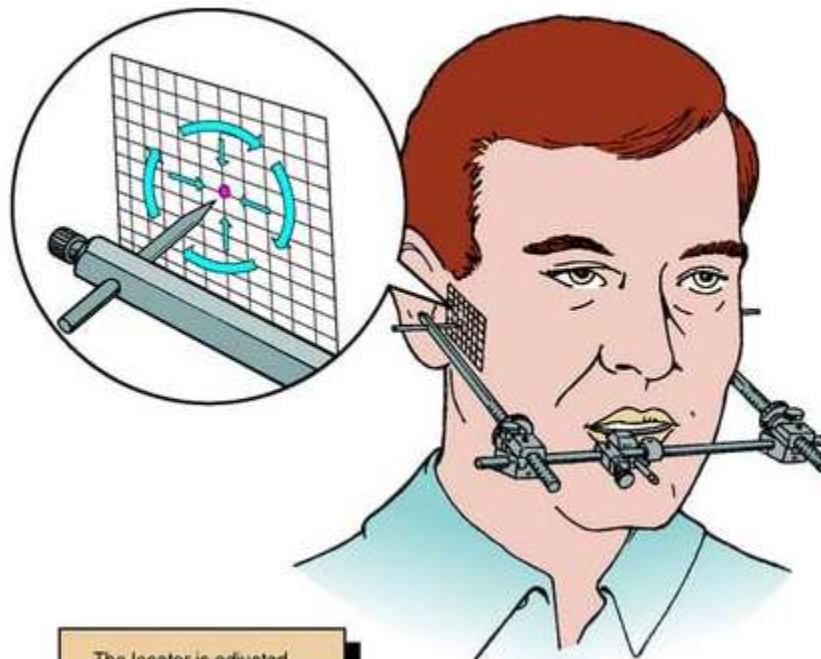


B



Fig. 2-9 Fully adjustable articulators. A, The Stuart. B, The Denar D5A.





The locator is adjusted properly when the pointer remains stationary during hinge movement.

A



B

C,D

Fig. 2-10 Hinge axis recording. A, Left and right styli are attached via a facebow to a clutch affixed to the mandibular teeth. When the mandible makes a strictly rotational movement, the stylus remains stationary if aligned with the actual axis of rotation. If the stylus is positioned forward or backward, above or below the actual axis, it travels one of the arcs indicated by the *arrows* when the mandible makes a rotational movement. Thus, the arc indicates in what direction an adjustment should be made to the stylus position. B, Hinge axis locator positioned. C, Set screws allow side arm adjustment. D, Adjustment continues until no arcing of the pointer is seen.



How can we record centric relation?

1. Facebow transfer to achieve maxilla's stable position.



2. Wax bite





Maximum intercuspation position

With the teeth in maximal occlusion the condyles may be displaced in any direction from their neutral centric position. For further diagnosis, the magnitude and direction of the condylar displacement is important. From another aspect, it is worthwhile to clarify whether the condyles are in an adapted or pathological position at this maximal occlusion.



Premature contact in centric

The position of the mandibular teeth when the condyles are in their centric or adapted position may disclose a considerable discrepancy in the occlusion. In this case there are centric premature contacts against the lingual surfaces of the maxillary central incisors.





CENTRIC REGISTRATION

The centric registration captures the relationship of the mandible to the maxilla at the centric or adapted condylar position. To prevent conditioned neuromuscular deflexive movements, the patient must avoid any conscious tooth contact. With natural teeth present, this requires that the recording material offer the least possible obstruction to the occlusion. When evaluating the significance of occlusal findings, the quality of the jaw relation record must be taken into consideration.



Centric relation record

A **centric relation record** (Fig. 2-15) provides the orientation of mandibular to maxillary teeth in CR in the terminal hinge position, in which opening and closing are purely rotational movements. *Centric relation* is defined as the maxillomandibular relationship in which the condyles articulate with the thinnest avascular portion of their respective disks with the condyle-disk complex in the anterosuperior position against the articular eminences. This position is independent of tooth contact.

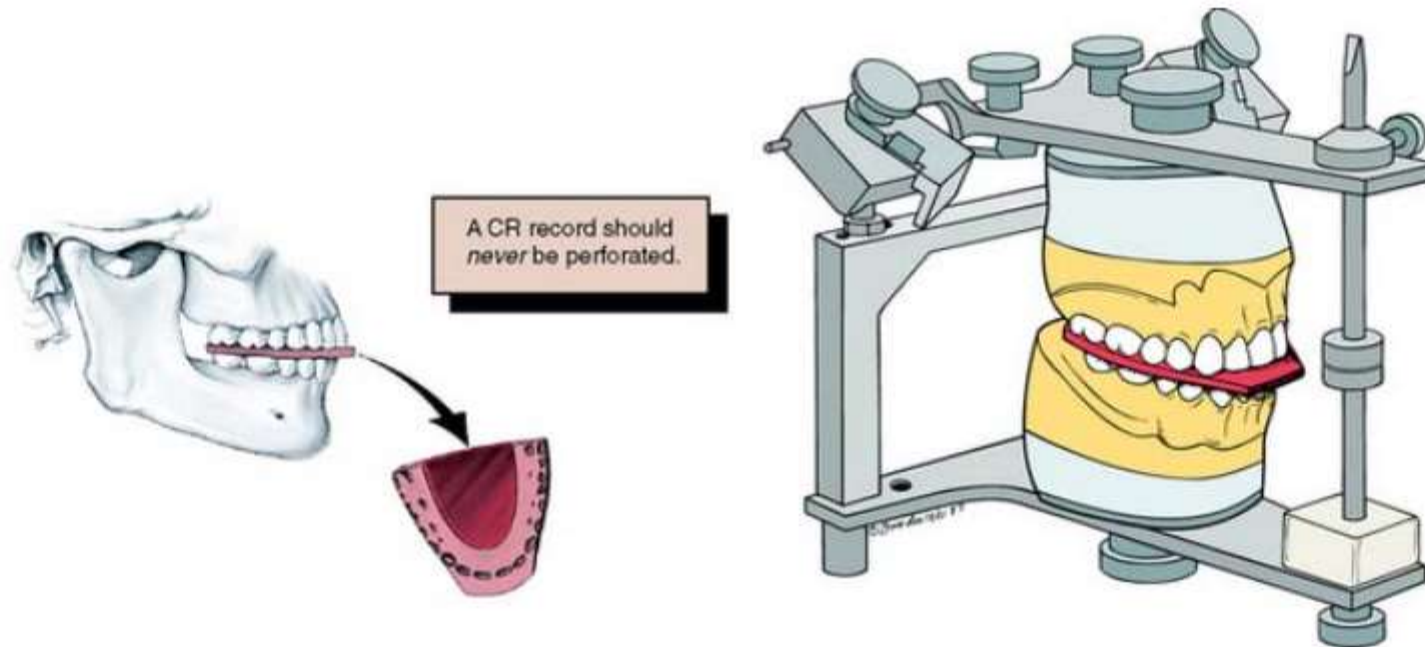


Fig. 2-15 A centric relation (CR) record transfers the tooth relationships at CR from the patient to the articulator.



CENTRIC RELATION RECORD

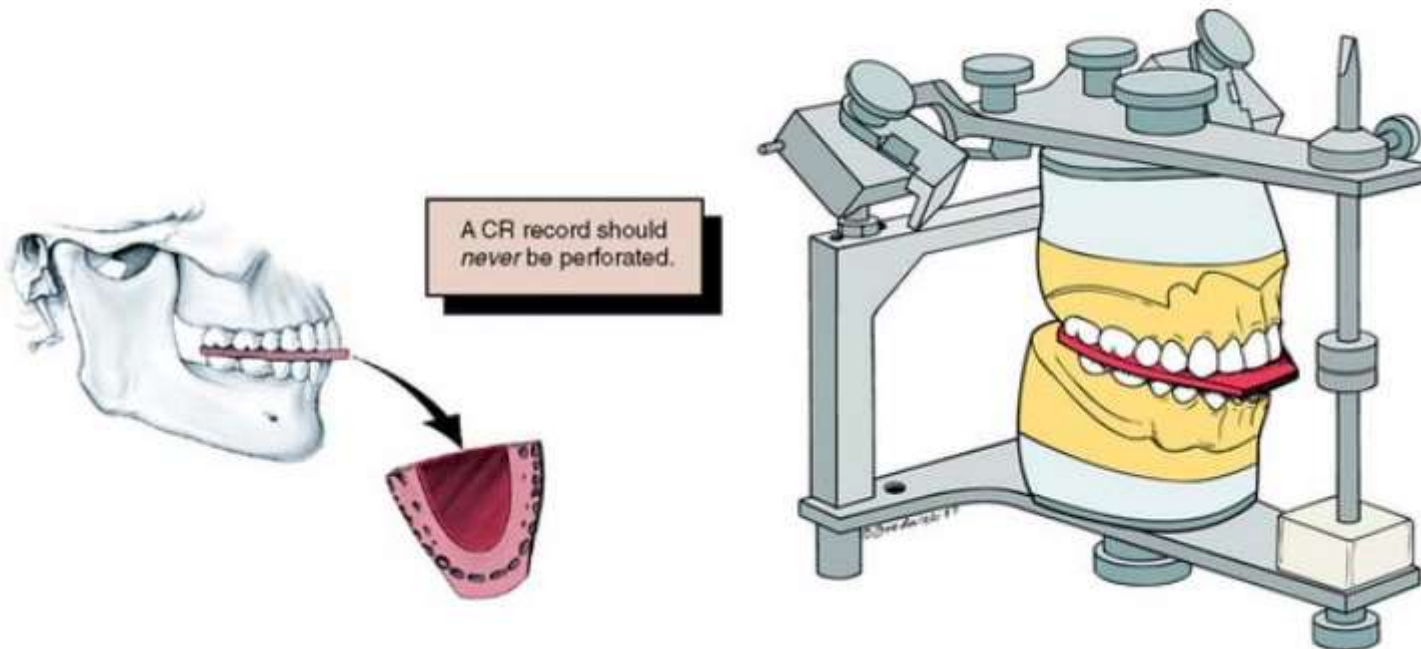
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***Centric relation* is defined as the maxillomandibular relationship in which the condyles articulate with the thinnest avascular portion of their respective disks with the condyle-disk complex in the anterosuperior position against the articular eminences. This position is independent of tooth contact.**



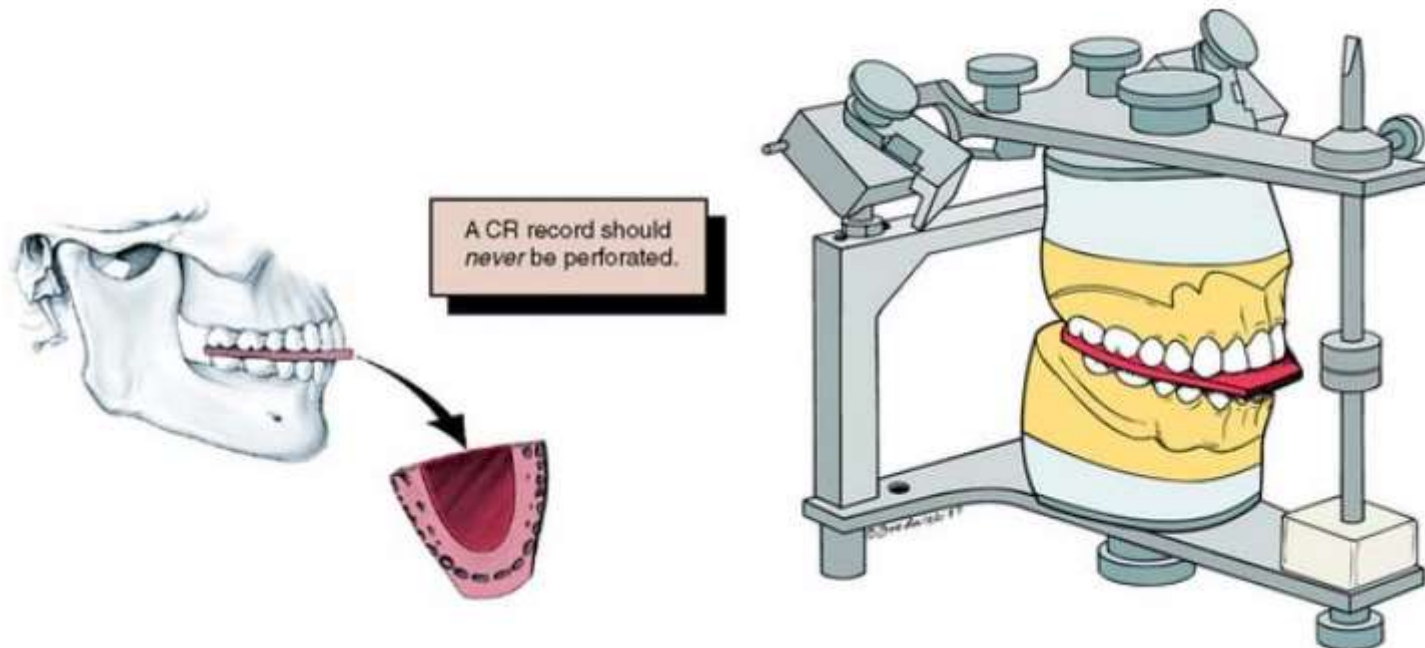
CENTRIC RELATION RECORD

CO may or may not be coincident with the **CR** position. The **CR** record (**WAX RECORDING**) is transferred to the maxillary cast on the articulator and is used to relate the mandibular cast to the maxillary cast.



Once the mandibular cast is attached to the articulator with mounting stone, the WAX RECORDING is removed. The casts then occlude in precisely the CR position as long as the maxillary cast is correctly related to the hinge axis with a facebow.

A CR/CO slide is readily reproducible on casts that have been articulated in CR. Thus, premature tooth contacts can be observed, and it can be determined whether an occlusal correction is necessary or appropriate.



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Have a healthy and pleasant day ☺

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