

# COMBI ARTICULATOR SYSTEM

## INSTRUCTION MANUAL





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# I. RATIONALE FOR DEVELOPMENT

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## THE DENAR® COMBI ARTICULATOR

The Combi Articulator was developed to provide the simplicity of a set path instrument while having the capacity for additional adjustment when needed. This practical combination can be found in this precisely machined instrument that fulfills both requirements. The Combi provides the option of either set path or additional adjustment through the use of machined inserts for condylar guidance, and a simplified method for intraoral recording of condylar paths when needed. The Combi Articulator is a valuable instrument during orthodontic finishing treatment and positioner fabrication.

Because of its interchangeability, the Combi can be used with set path condylar inserts as a standard for most restorative needs. But when changes in condylar paths are necessary, the condylar path inserts can be changed to accept an actual border path recording. (Or, the casts can also be transferred to a Denar® Mark II Articulator.)

Intraoral condylar recording techniques have an advantage in the use of three dimensional recordings. The border pathways can be programmed into the condylar guidance, including both protrusive, lateral and all pathways in between. The instrument can also accept customized anterior guidance procedures.

The intraoral condylar recording technique is excellent for denture fabrication as the bases can be stabilized against the ridges by the central bearing point. All recordings are made intraorally within the central area of the bases. By following this procedure, the width of the external appendages will not tilt the denture base.

## II. BENEFITS AND FEATURES

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An instrument system that reproduces the TMJ for restorative and orthodontic treatment.

### **BENEFITS**

- ✓ Extremely accurate.
- ✓ Superior results in the analysis and restoration of occlusion.
- ✓ Superior orthodontic finishing treatment.
- ✓ Simple to use.
- ✓ Economical.
- ✓ Requires minimum chair time.
- ✓ Minimizes orthodontic positioner fabrication time.
- ✓ Permanent patient records: helpful for medical/legal purposes.
- ✓ Simulates true anatomical structure.
- ✓ Allows quick and easy mounting of the mandibular cast.
- ✓ Allows easy viewing and access to casts from the rear of the articulator.
- ✓ Provides years of trouble free use. Easy to handle. Low maintenance, easy to clean.
- ✓ Permits transferability of casts due to three dimensional calibration.
- ✓ Upper and lower bows can be separated or positively locked together in centric relation in both open and closed positions.

### **FEATURES**

- ✓ Intraoral recordings of the TMJ are transferred directly to the articulator.
- ✓ Anatomic joint is accurately reproduced through an intraoral condylar recording.
- ✓ Condylar path inserts duplicate patient's anatomic joint.
- ✓ All recordings are made directly in patient's mouth eliminating interpolation and averaging.
- ✓ Low cost system and patient procedure.
- ✓ Custom acrylic tracing is done in one simple intraoral procedure.
- ✓ Patient's custom fossae are mounted on articulator for convenient positioner construction.
- ✓ Low cost custom condylar fossae inserts.
- ✓ Arcon construction.
- ✓ Stable and level in the inverted position.
- ✓ Excellent binocular visibility.
- ✓ Rigid, sturdy and lightweight design.
- ✓ Field inspection gage aligns articulator.
- ✓ Positive centric latch.

# THE COMBI ARTICULATOR

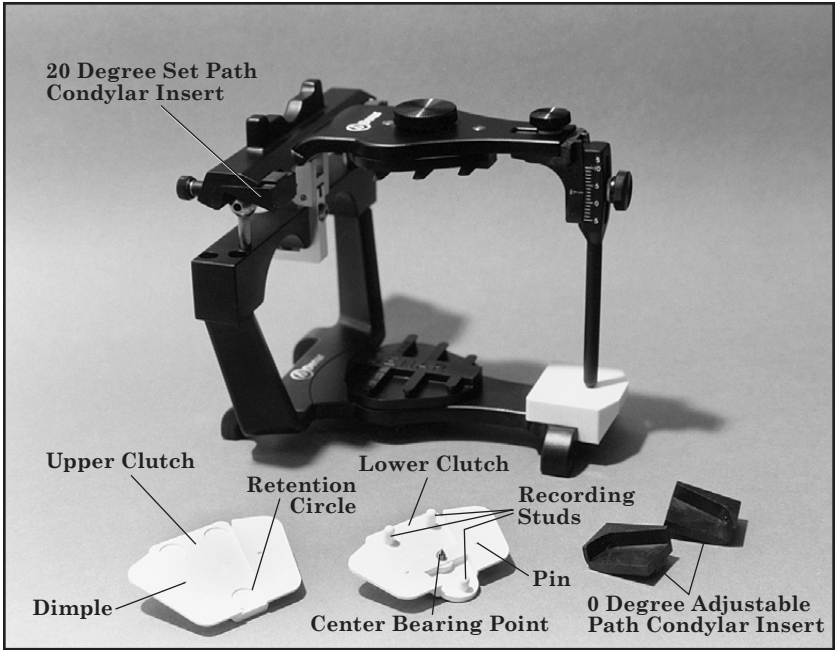


Figure 1

### III. SET PATH CONDYLAR INSERT

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The set path insert has a horizontal inclination of 20 degrees which makes it flatter than the minimal angulation found in healthy articulations. The lateral path is curved to a more medially directed path than the most severe progressive side shift. Use of this insert permits direct fabrication of posterior restorations that will automatically be discluded by all but the most abnormally contoured condylar pathways as long as the correct anterior guidance is recorded.

For restoration procedures, there are no contraindications for using the 20 degree set path inserts if the following is determined:

- A. 1. If the patient's anterior teeth maintain contact in protrusive and lateral excursions, *and*
  2. The anterior teeth on the casts maintain contact in protrusive and lateral excursions when the set path 20 degree inserts are in place.
- B. If the posterior teeth are to be restored, and the posterior disclusion can be achieved with minimal adjustment, the 20 degree set path is acceptable.
- C. If the posterior disclusion can be achieved with the set path inserts by correcting an unacceptable occlusal plane that requires restoration anyway, the 20 degree set path can be used. In short, the set path insert can be used on almost any mounting which permits anterior guidance without unnecessary reduction of posterior teeth.

### IV. ADJUSTABLE PATH CONDYLAR INSERT

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The 0 degree condylar insert is to be used whenever precise duplication of condylar paths is needed for occlusal analysis. When the anterior teeth are discluded by the posterior teeth either on the patient or on the articulator, it may be necessary to record the path and duplicate it on the articulator. The following conditions indicate the need for non-arbitrary path analysis:

1. Protrusive disclusion of anterior teeth when posterior teeth do not require restoration.

A major purpose of occlusal analysis is to determine the best way to achieve posterior disclusion. To accomplish that with a minimum amount of tooth reduction, it is important to take full advantage of the disclusive effect of the condyles. The steeper the condyles move downward, the more they can help to separate the posterior teeth when the jaw protrudes. Therefore, the less reduc-

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tion of tooth structure will be needed. To know the actual condylar paths is the best way to pre-determine the amount of occlusal alteration required to achieve posterior disclusion.

When posterior disclusion is lacking, it can be achieved by flattening fossae walls, by lowering the occlusal plane at the posterior teeth or by steepening the anterior guidance, or a combination of the above. If disclusion is achieved by steepening the anterior guidance, it is possible to create a damaging restriction of functional pathways. The determination of how much change is needed for the anterior guidance is dependent on how much disclusive help is possible for the condylar path, and how much reduction is permitted for the posterior teeth without destroying too much enamel.

The condylar path should be recorded and transferred to the 0 degree condylar insert on the Combi whenever formulation of a conservative treatment plan depends on a pre-treatment determination of the precise amount of posterior tooth reduction required to achieve posterior disclusion.

2. Restorative cases which would require severe change to establish an 'ideal' arbitrary occlusal plane.

Some occlusal plane problems are too severe to be corrected to an ideal curve without excessive reduction of the teeth. Even if the posterior teeth are to be restored, the condylar path should be recorded and transferred to the 0 degree condylar insert whenever it appears that an ideal arbitrary curve will require excessive tooth reduction.

3. Severely worn dentitions, particularly when the upper lingual cusps have been worn flat.

When there is severe wear of the upper lingual cusps, there is a probability that both the condyles and the eminentiae have been worn flat also. In these cases, the condylar path may actually be flatter than the 20 degree set path insert. This is also found with a flat anterior guidance and may require special attention to both the anterior guidance and condylar guidance. In the restoration of severely worn dentitions, the 0 degree adjustable path condylar insert should be used on the Combi Articulator in combination with an intraoral condylar recording so the condylar paths can be reproduced with accuracy.



## V. HOW TO USE THE ADJUSTABLE PATH CONDYLAR INSERT

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Recording and transferring the precise condylar guidance does not need to be done until after the diagnostic casts are mounted on the Combi Articulator. The mounting is usually completed with the 20 degree set path inserts in place as the standard, but since changing the inserts does not alter the centric relation position, either insert may be used for mounting. The 0 degree insert should be used whenever a customized condylar path is to be fabricated.

Fabricating the customized condylar path is accomplished in two stages. First, the clinical stage requires making an intraoral condylar recording (a recording of all border movements in three dimensions) utilizing a set of intraoral clutches. Secondly, the laboratory stage requires the generation of condylar pathways in acrylic as programmed from the intraoral recording. The clinical and laboratory stages may be completed at any point during diagnosis or treatment including at the time of tooth preparation.

## VI. COMBI RECORDING PROCEDURE

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For a successful intraoral condylar recording, three things are required:

1. **STABLE CLUTCHES.** There must be no displacement of either clutch during the recording, so clutches must be adapted accurately with a material that is hard enough to resist any shifting or rocking during jaw movements.
2. **NON-INTERFERENCE WITH CENTRIC RELATION.** The intraoral condylar recording must start at centric relation and should encounter no interference through protrusive and lateral pathways that are continuous from centric relation. If the intraoral condylar recording does not include unimpeded access to centric relation, it will not be possible to transfer the recording to centrically mounted casts.
3. **CLUTCH PLACEMENT AT THE MOST CLOSED VERTICAL POSSIBLE.** If the clutches are too thick or require too much jaw opening to position them, condyles can be forced into a protrusive translation which prohibits access to centric relation. The Combi clutches are designed for recording at the closest possible jaw to jaw relationship consistent with separation of all tooth contact. The central bearing point holds the clutches firmly against the teeth while it separates all contact except the gothic arch pathways it makes against the plastic plate.

## ADAPTING THE CLUTCHES

There are two ways to adapt the clutches for an intraoral condylar recording: 1) from mounted diagnostic casts, or 2) directly in the mouth. Adaption on the casts is easily accomplished. It is the recommended method of choice. Using the cast method, the clutches can be aligned at centric relation and can be ready for the recording. The casts must provide adequate lingual clearance so the centric latch can be closed with the clutches in place. The intraoral condylar recording can then be completed in approximately 4 to 5 minutes of chair time.

A facebow (Slidematic) must be taken for the proper mounting of the casts. (Figure 3).



Figure 3

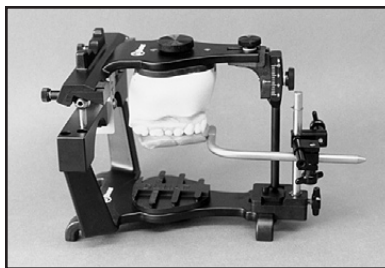


Figure 4A

## INDIRECT METHOD FOR ADAPTING CLUTCHES

Mount the casts on the Combi Articulator with a Slidematic Facebow transfer jig (upper cast) and centric bite record (lower cast). (Figure 4A and B) The incisal pin sits on the moveable piece in the center of the index. See Slidematic instruction manual for mounting detail. The mounting is completed with the 20 degree set path insert.

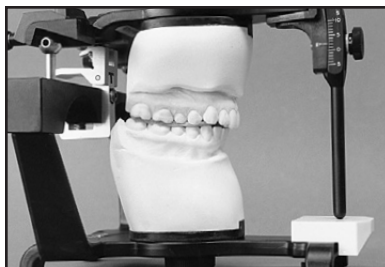


Figure 4B

The Denar® Combi clutches can be adapted to the casts by applying Denar's self-curing acrylic (Figure 5). Before the acrylic comes in contact with the casts, paint the casts with a tin foil substitute so the acrylic does not stick. Also, wax out all undercuts to assure that the casts will remain intact. Impress the clutches between the two casts while the articulator is locked in centric.

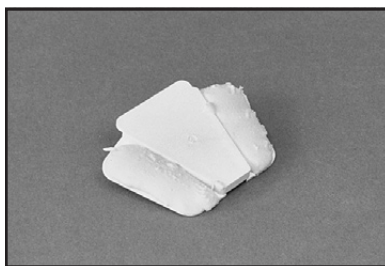
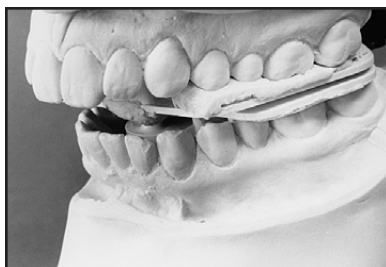


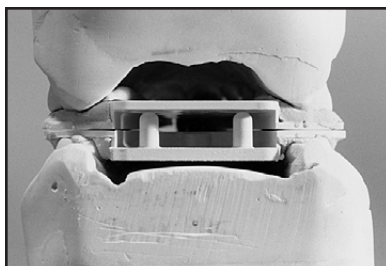
Figure 5



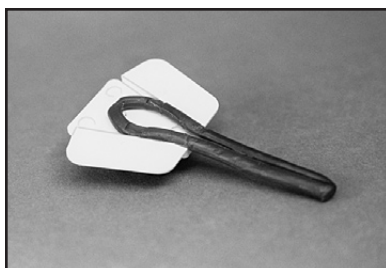
**Figure 6**



**Figure 7**



**Figure 8**



**Figure 9**

The clutches should be flat against each other when the articulator is closed as far as possible into the acrylic. (Figure 6) The central bearing pin is then raised enough to separate all contact except for the central bearing point itself. (Figure 7)

During imprintation of the acrylic, the back edges of the clutches should be aligned so the recording studs are positioned directly under the retention circles in the upper clutch. (Figure 8)

The clutches are removed from the casts and the excess acrylic is trimmed away. They are then ready for the intraoral condylar recording.

## **DIRECT METHOD OF ADAPTING CLUTCHES**

1. Using red utility wax (rope wax), form a handle in the upper clutch. (Figure 9) This handle allows easy insertion and removal of the clutch assembly from the patient's mouth.
2. The self-curing acrylic is applied to each clutch. (Figure 10)
3. Note the following points prior to inserting clutches into the patient's mouth.
  - ✓ The posterior margin of the upper clutch should be pressed as close as possible to the occlusal surfaces especially at the back. Indentations into the acrylic should be deep enough to stabilize the clutches against lateral displacement.

✓ Make sure the central bearing screw on the lower clutch is screwed down so it does not prevent the clutch from being placed flat against the upper clutch surface.

✓ The two pins on the wings of the lower clutch must be matched with the dimples on the wings of the upper clutch to help anchor and orientate one clutch to the other.

4. Insert the clutch assembly with acrylic into the mouth using the wax handle. (Figure 11) Guide the jaw into centric relation at the opened position. Have the patient close gently into the acrylic. Closure should be as close to centric relation as possible.

5. The patient must indent the acrylic to the most closed position possible. Remove the clutches from the patient's mouth. Take off the wax handle.

6. *Trim off the excess acrylic.*

7. Raise the central bearing screw so the clutches are separated at least 1mm. (Figure 12)

8. Replace the clutches in the mouth to confirm that excursions can be made in all directions with complete separation of all clutch contact except the central bearing point. If clutch contact occurs in any jaw position, raise the central bearing point until it is separated.

9. Clutches are ready for the intra-oral recording.

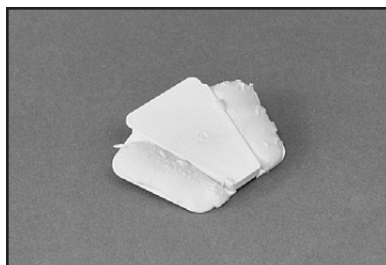


Figure 10

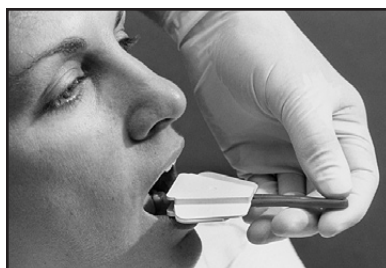


Figure 11

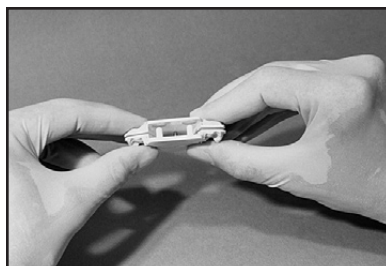


Figure 12

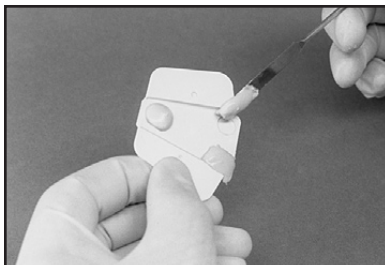


Figure 13

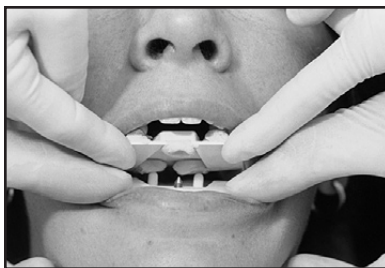


Figure 14



Figure 15

## MAKING THE INTRAORAL CONDYLAR RECORDING

1. Seat the clutches and test to see if the jaw can move freely to centric relation. Test jaw movements for all excursions to and from centric relation. Remove the clutches from the patient's mouth.
2. Mix self-curing acrylic and flow a small amount into each round retention area on the upper arch. Add more acrylic to form a mound that extends slightly past the height of the clutch offset. (Figure 13) Be sure each mound is wide enough to record the excursions of the recorder studs. Wait until the acrylic reaches a non-sticky, doughy stage and insert the upper clutch.
3. While an assistant holds the upper clutch in place from behind the patient, seat the lower clutch (which has been lubricated with petroleum jelly on the recording studs for ease of movement through the acrylic) into position against the opened lower arch, and stabilize it while the patient closes to contact the central bearing point. (Figure 14)
4. Using the bilateral manipulation to verify complete seating of the condyles, maintain firm upward pressure through the condyles as the patient moves the jaw forward and back, left and right. (Figure 15)
5. Continue moving the jaw through all excursions until a test sample of the acrylic indicates it has hardened enough to be removed without distortion.

6. Remove the clutches and check to see if all excursions have been recorded in the acrylic. (Figure 16)

7. **Note:** the following points regarding the gothic arch tracing.

✓ Verification of a complete border path recording can be made using an indicator spray (Occlude) in the central area of the upper clutch and observing the gothic arch scribed by the central bearing point. A definite point indicates the centric relation is included in the pathways recorded. (Figure 17)

✓ Inserting the clutches in the patient's mouth for two or three minutes before the intraoral condylar recording is an excellent muscle deprogrammer.



Figure 16



Figure 17

## VII. TRANSFERRING THE INTRAORAL CONDYLAR RECORDING TO THE COMBI ARTICULATOR

1. Casts should be mounted with a Slidematic transfer jig (upper cast) and centric bite record (lower cast) on the Combi. (Figure 18A & B) The mounting is completed with the 20 degree set path insert.

2. If the 20 degree inserts were used for mounting, remove them and insert the 0 degree adjustable path inserts. **Note:** Before tightening, slide fossa inserts into upper bow and close (lock) latch. Tighten insert screws.

3. With the casts in place, position the clutches between the casts and match the impressions. (Figure 19)

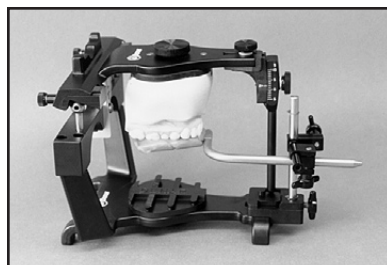


Figure 18A



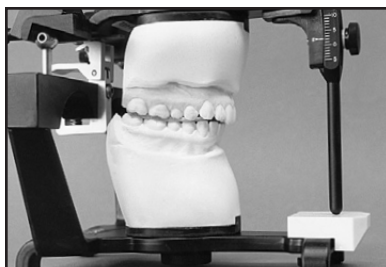


Figure 18B

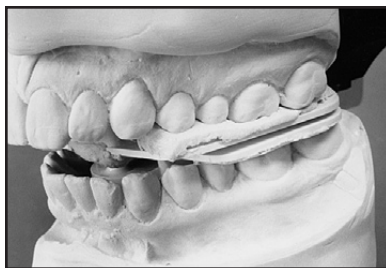


Figure 19



Figure 20

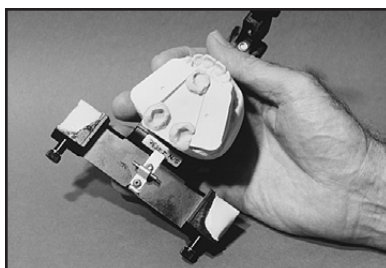


Figure 21

4. Close the casts with the clutches in place and *make sure there are no interferences to centric relation*. It **MUST** be possible to lock the centric latch without displacing the clutches. (Figure 20) **Note:** *It is necessary to grind off the excess on the posterior border of each intraoral condylar record so the studs can arc into the record without deviation.*
5. Unlock centric latch and move the casts through all border movements. Maintain continuous simultaneous contact of the central bearing pin and all three recording studs against the upper pathways. **Note:** Test the pathways to make sure there are no obstructions. Relieve the medial wall of the condylar path plastic insert if it interferes with any path.
6. Lift off the upper bow and place a mix of self-curing acrylic into the 0 degree fossae. Do not overfill. (Figure 21)
7. After the acrylic reaches a non-sticky, doughy stage, run cold water on it and place the upper bow back on the condyle balls which have been lubricated with petroleum jelly. Test for complete seating by locking the centric latch. If it seats completely, unlock the latch and immediately proceed with moving the upper bow through all the border movements. It is essential to *maintain simultaneous contact of all three points on the intraoral condylar clutches* while moving the upper bow forward and backward, left and right. Keep firm downward pressure on the

upper bow. (Figure 22) *Do not rock.* Continue to check access to centric relation. Repeat the pathways until the acrylic is firm enough to be certain of no distortion. Grind off excess acrylic on the outside edge of the fossae if necessary for complete seating of the condyle balls.

The condylar ball should penetrate the acrylic at three points in centric relation: at the top of the ball, medial and posterior wall. (Figure 23) If the acrylic is wiped away for an extended flat surface on the top wall, this indicates an error in recording. (Figure 24) Figure 25 shows the upper bow with condylar paths in acrylic and the intraoral condylar recording in place.

The intraoral condylar recording is made in the mouth by the paths of the condyles. The procedure on the articulator is simply reversed so the paths of the recording dictate the mechanical equivalent of condyle movement by generating the condylar paths in acrylic on the articulator.

**NOTE:** When the Combi Articulator is calibrated with the Denar® Field Inspection Gage, the fossae inserts are interchangeable. Therefore, when both the doctor and laboratory have instruments that are calibrated, the doctor can send the fossae inserts to the laboratory so the instrument is free for the next case.

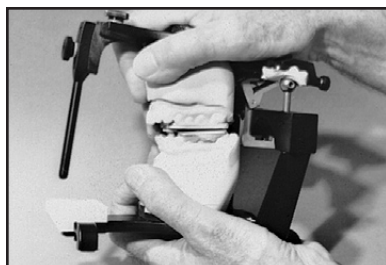


Figure 22

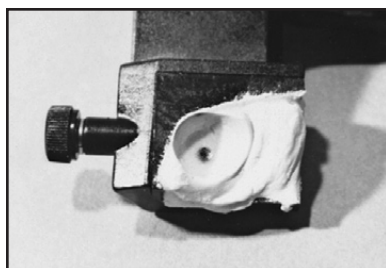


Figure 23

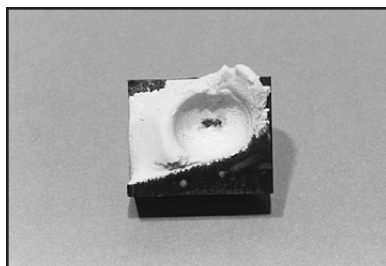


Figure 24

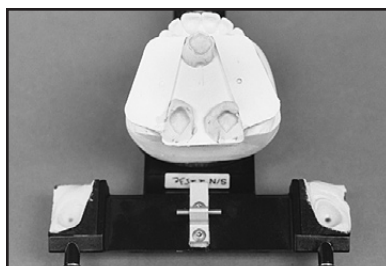


Figure 25



## VIII. ADJUSTMENT CAPABILITIES

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Uses disposable fossae inserts:

Set path (20 degree top wall)

15 degree medial wall

Adjustable path (0 degree top wall)

15 degree plus concave medial wall

Intercondylar distance:

Fixed at 110mm (55mm from mid-sagittal plane)

## IX. COMBI ACCESSORIES

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The Combi may be used with most Whip Mix mounting plates (magnetic, plastic, or standard metal). In addition, it may be used with any Denar® incisal pins and tables (mechanical or custom).

To further enhance its adaptability, the Combi is compatible with the Denar® Slidematic and the D31AB Facebow/Earbow.

When used with a Denar® Field Inspection Gage to insure accuracy, the Combi is interchangeable with other Denar® Articulators.

## X. REORDERING

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### **Combi 0 Degree Fossae Inserts**

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Part No. 112008-10	10 Pair
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### **Combi Clutches**

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Part No. 112041-10	10 Pair
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## XI. CARE AND MAINTENANCE

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Your Whip Mix articulator is a precision instrument and requires care and maintenance. Periodic cleaning and lubricating as described below will assure prolonged life and dependable service from the instrument. Failure to follow these instructions will void your warranty.

### CLEANING

Use a mild soap and water solution with the aid of a brush to dissolve accumulations of wax and to wash away carborundum grit. Then air dry and lubricate. **DO NOT** use strong detergents, alkalies, gasoline or naphtha as cleaning agents.

### LUBRICATION

Lubricate the working and bearing components with a **thin film** of sewing machine or high speed hand-piece type oil. Wipe off excess oil to prevent accumulation of dust or grit. A thin coating of petroleum jelly must be applied to all articulator surfaces that will be contacted by the gypsum mounting material.

### STORAGE

Store the articulator in a clean, dry atmosphere free of plaster and carborundum dust; away from acids, alkalies or corrosive medications. **Wait a full day after mounting casts before storing the articulator in a carrying case or corrugated carton.** Moisture dissipation from the stone in an enclosed area causes alkalinity of the stone mixture which can damage the articulator surface.

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## XII. BIBLIOGRAPHY

---

Dawson, P.E.: Evaluation, Diagnosis and Treatment of Occlusal Problems, St. Louis, 1988, The C.V. Mosby Company.

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## XIII. WARRANTY

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Whip Mix Corporation warrants the articulator system to be free from defects in material and/or workmanship for a period of one year. In the event of a defect, please notify the factory in writing of the defect prior to returning the instrument. Whip Mix will, at its option, either repair, replace, or issue credit for such defects.

Because Whip Mix is continually advancing the design of its products and manufacturing methods, it reserves the right to improve, modify or discontinue products at any time, or to change specifications or prices without notice and without incurring obligations.





RESTORATIVE ORAL HEALTH

Whip Mix Corporation - West  
1730 East Prospect Rd., Suite 101  
Fort Collins, CO 80525  
Toll-Free: 800-201-7286  
Fax: 970-472-1793  
[www.whipmix.com](http://www.whipmix.com)



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