ACKNOWLEDGEMENTS

It is now easier than ever before to duplicate clinically significant movements of the patient with the Denar® Combi II articulator system. New features include adjustable condyles, retaining springs, and recline devices.

Special acknowledgment goes to Peter E. Dawson, DDS for writing the clinical application for the instruction manual, and for assisting in the development of the design criteria for the Combi II articulator. We also thank Dr. John Cranham for his technical insight and support during the design phase. Additionally, we received advice and support from many current users of Denar instrumentation enabling us to develop an articulation system based on simplicity, versatility, and cost effectiveness.
**TABLE OF CONTENTS**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgement</td>
<td>1</td>
</tr>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>Features</td>
<td>3</td>
</tr>
<tr>
<td>Rationale for Simplicity</td>
<td>4</td>
</tr>
<tr>
<td>Programming the Combi II</td>
<td>7</td>
</tr>
<tr>
<td>Accessories</td>
<td>10</td>
</tr>
<tr>
<td>Care and Maintenance</td>
<td>12</td>
</tr>
<tr>
<td>References</td>
<td>12</td>
</tr>
<tr>
<td>Warranty</td>
<td>12</td>
</tr>
</tbody>
</table>
The New Denar® Combi II Articulator:
This instrument has been designed for simplicity and efficiency. The lateral pathway or progressive side shift is fixed at 15 degrees thus eliminating any chance of balancing side occlusal contact. It is contoured to produce slightly more side shift than can occur in a patient. Thus following this path in lateral excursions guarantees posterior disclusion of all balancing side inclines. The only adjustment required for condylar path on the Combi II is the protrusive path or condylar inclination. This can easily be achieved with a simple straight protrusive bite records.

The New Combi II Features:
• Progressive side shift fixed at 15 degrees
• Condylar inclination adjustable 0–60 degrees
• Retaining springs hold upper and lower members together and assist in smooth operation of lateral excursions
• Ability to tilt the instrument back at a 45 degree angle
• Durable black anodized finish
• Field inspection Gage permits transferability of casts due to three dimensional calibration
• Positive centric latch allows the upper and lower bows to be separated or positively locked together in centric relation in both open and closed positions
• Rigid, sturdy, and lightweight design
• Stable and level in the inverted position
• Simple to use
• Economical
• Arcon construction
THE RATIONALE FOR SIMPLICITY

The Denar Combi II Articulator
Finally, a cost effective, top quality articulator that satisfies every requirement for accuracy while eliminating unnecessary complexity. The Denar Combi II articulator is the perfect choice for analysis, treatment planning, and completion of even the most complex occlusal treatment. And it does all this with a time-saving simplicity that is unmatched in articulators costing much more.

The Basis for Combi II Simplicity
The reason for complexity in high-end articulators is based on early gnathological premises that have since been invalidated. The three premises that complicated articulator design are:

1. Immediate side shift of the condyles required a complex mechanical adjustment to record a lateral, horizontal shift of the mandible. This requirement became obsolete when it was determined that an immediate side shift cannot happen from properly seated condyles in centric relation. (Figure 1)

![Figure 1: The condyles are braced medially in centric relation. The orbiting condyle must move down to permit any lateral movement of either condyle. A purely horizontal side shift before any condylar rotation takes place is not possible. Thus a horizontal side shift adjustment on an articulator has no logical purpose. Note how the balancing side condyle must move down before any horizontal shift of either condyle can occur.]

2. The need for precise recording of progressive side shift. Precise recording of the progressive side shift requires a complex mechanical configuration built into the articulator’s condylar paths. This has traditionally been accomplished through use of pantographic tracings or bite records taken in lateral excursions. The practice resulted from an early gnathologic goal of bilateral balance of posterior teeth in lateral excursions, an acceptable goal for complete dentures, but contra indicated for natural dentitions. Since research has shown that posterior contact in lateral excursions is a frequent cause of muscle hyperac-
tivity, posterior disclusion of all balancing side contact has become the desired goal. Posterior disclusion can be routinely achieved by a simple process that eliminates the need for complex recordings and costly mechanical paths on the articulator.

**The Simplified Combi II Solution.** Two studies involving more than 1000 patients showed the maximum horizontal path incline to be 10°. By setting the lateral pathway at 15° any chance of balancing side occlusal contact can be eliminated. Since there is never a time when balancing side contact is desired on dentulous patients, separation of all balancing side contact in lateral excursions is always the goal. There is never a need to change the progressive side shift on the Combi II articulator.

Figure 2. The progressive side shift path is built into the condylar path on the Combi II. It is contoured to produce slightly more side shift than can occur in a patient. Thus following this path in lateral excursions guarantees posterior disclusion of all balancing side inclines. It has no negative effect on any other aspect of occlusal harmony.

Figure 3. The arrow shows the maximum medial movement possible by the balancing side condyle in the patient. The path shown on the condylar path of the articulator shows the medial movement that occurs during the restorative process. This insures posterior disclusion.

**3. The need for a precise protrusive path.** The requirements for articulator design changed dramatically when research studies and clinical experience determined that posterior teeth should ideally be discluded the moment the mandible moves forward of centric relation (Figure 4). This information combined with studies showing the flattest protrusive condylar path is 25° resulted in a major simplification in the restorative process. Since protrusive contact on posterior teeth is never a desired result, disclusion can be achieved by setting the condylar path on a flatter angle than the patient’s forward path. There are no negative repercussions from an arbitrarily flattened condylar path on the articulator as long as posterior disclusion can be achieved by the anterior guidance in the patient.
The ideal functional relationship is immediate separation of all posterior teeth the moment the mandible moves forward from centric relation. Extensive studies have shown that this results in shutting off most of the elevator muscle contraction to reduce loading forces on the TMJs and the anterior teeth. Setting the condylar path flatter on the articulator will result in faster separation of the posterior teeth if the condyles travel a steeper path forward in the patient. This has no adverse effect on function, comfort, esthetics, or stability.

When recording, the protrusive condylar path is important. There is never a problem with condylar guidance if the anterior guidance can disclude the posterior teeth in all excursions. But if posterior disclusion cannot be achieved, it may be necessary to rely more on the condylar path to help separate the posterior teeth. In such cases it is important to determine the protrusive path. This is the only adjustment required for condylar path on the Combi II. It can be easily achieved with a simple straight protrusive bit record to set the protrusive angle.
PROGRAMMING THE COMBI II

In addition to a facebow recording (Figure 5) the only records needed for complete programming of the Combi II are:

1. a centric relation bite record
2. a protrusive bite record.

If anterior teeth are to be restored a customized anterior guidance is fabricated to precisely copy the desired guidance.

Figure 5. Slidematic earbow to record condylar axis.

Figure 6. The upper cast is related to the condylar axis. The index for the earbow fork corrects the position of the cast to relate it to the condylar axis instead of the ear holes. This is an automatic correction.

Figure 7. A centric relation bite record is made.

Figure 8. The lower cast is related to the upper cast by alignment into the centric relation record.
Figure 9. The completed mounting permits closure of the casts to contact in centric relation.

Figure 10. A protrusive bite record is made with the mandible advanced 5-10 mm. Indentations of all upper and lower teeth should be definite.

Figure 11. Release the retaining springs and centric latch. Position the upper cast firmly into position in the protrusive bite record. Set the condylar path at 0˚.

Figure 12. When casts are positioned in the protrusive bite record the condyle balls will be down and forward in space.

Figure 13. Release the thumb screw and rotate the condylar path down until it touches the condyle ball on both sides.
Figure 14. Tighten the thumb screw to lock the condylar path angle in place. Remove the protrusive bite record. The condylar path setting is completed.

To guarantee complete posterior disclusion in all excursions release the thumbscrew and flatten the protrusive path by 5°. The progressive side shift is automatically set to disclude the balancing side occlusion. Restorations that are made to disclude on this articulator will not interfere in any excursion. That is the goal of every finished occlusion.
THE PERFECT SYSTEM

The Denar Combi II is compatible and interchangeable with accessories that fulfill every requirement for occlusal perfection. No other system can match its simplicity, versatility, or cost effectiveness.

ACCESSORIES

Denar® Centri-Check System
The simplest of all systems for verifying centric relation or documenting comparative condylar positions on reusable patient inserts. The condyle balls on the Combi II are pre-drilled to guide a needle point recorder.

By simply squeezing the casts together, the amount of horizontal and vertical displacement of the condyle can be accurately measured for use in monitoring splint therapy and analyzing cephalometric recordings.

Denar® Slidematic Facebow
The time-saving design of this device eliminates the need for transferring the entire facebow to the articulator. It is a fast, easy and accurate means of transferring the proper maxillary relationships. Transfer only the transfer jig assembly to the articulator thus freeing the measuring bow to be used for the next patient.
ACCESSORIES

**Simplified Occlusal Plane Analyzer**
Designed for analyzing the Curve of Spee and the Curve of Wilson.

**Dawson Fossae-Guide Pin**
Used to simplify carving of occlusal fossae of lower posterior teeth. Provides for fossae wall angles shallower than the incisal guidance. Used with a custom (flat) incisal table.

**Occlusa-Check®**
Used for the detection of occlusal interferences of restorations while they are still on the articulator. When the pin locks into the slot, the restoration is the correct height. If the restoration is built too high, the pin will not go into the slot.

**Magnetic Mounting System**
Provides magnetic retention without adding steps to the process, casts are mounted in one quick step. Compatible with all Denar® and Hanau™ articulators.
CARE AND MAINTENANCE

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 a very soft 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 handpiece type oil. Wipe off excess oil to prevent accumulations 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 medicaments. 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.

REFERENCES


Dawson, Peter E.: Functional Occlusion: From TMJ to Smile Design; August 2006


WARRANTY

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 Corporation will, at its option, either repair, replace or issue credit for such defects.

Because Whip Mix Corporation is continually advancing the design of its products and manufacturing method, 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.