

# TRIPLE ACTION®

Adult 2.0 Ankle Joint  
(19mm Systems)

## FABRICATION GUIDE



Adult Triple Action 2.0 ankle joint with Booster Spring

 **BECKER**



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EC REP

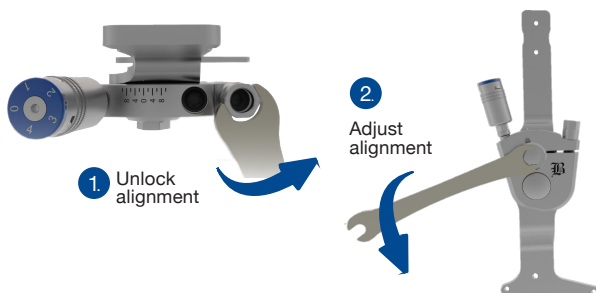
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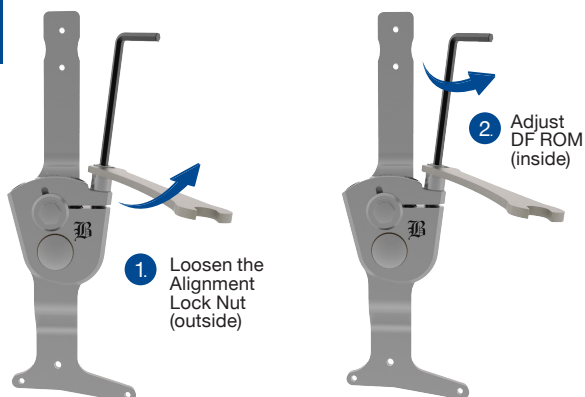


# Adjustment

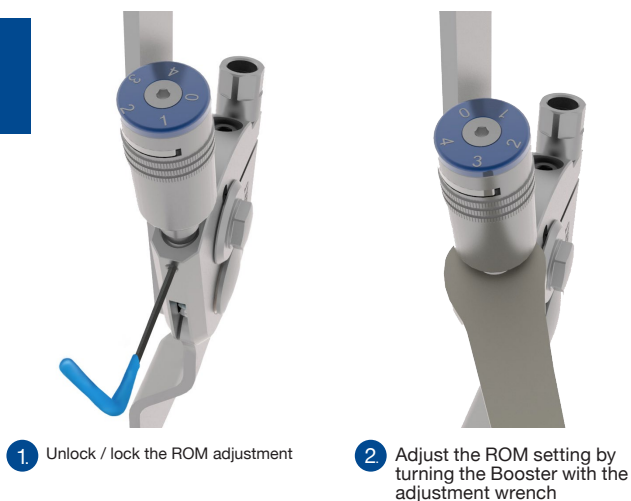
## Adjust Alignment



## Adjust Dorsiflexion ROM



## Adjust Plantarflexion ROM with optional Booster Spring



# Orthotic Design Considerations

Single upright AFOs without a companion joint should be laminated to achieve appropriate stiffness for Triple Action AFOs. For best results, the composite tibial section and footplate of Triple Action AFOs must possess Minimum Effective Stiffness\*. This stiffness may be achieved using the recommended layup shown in Table 1 (see page 5).

The Triple Action component may also be used in single, or double upright polymer AFOs. Polymer AFOs should be made of polypropylene homopolymer in a sheet thickness of 4.8mm (3/16 inches). If a single Triple Action component is used in a polymer AFO, a medial free motion companion joint with high torsional stiffness must be paired with the Triple Action. Becker Orthopedic recommends the Camber Axis Triple Action Companion Joint, Model 751-ATA, for use in single upright polymer AFOs using the Adult Triple Action ankle joint, Model 3A76.

Depending on spasticity, a single upright Triple Action AFO may be suitable for the management of patients up to 80 kg (180 lb). For heavier patients with high spasticity, two Triple Action components may be required. If two components are used, composite or thermoplastic materials may be used for Triple Action AFOs.

Anterior (ventral) AFO designs with full length footplates are recommended for the treatment of sub-acute stroke or TBI or where there is quadriceps or plantarflexor insufficiency. Posterior (dorsal) AFO designs with sulcus or full-length footplates are recommended where there is high plantarflexion spasticity or knee hyperextension in the early stance phase of gait, such as in extensor synergy in chronic stroke.

\*Using the standard fabrication method outlined in this guide.



Anterior (ventral) design.



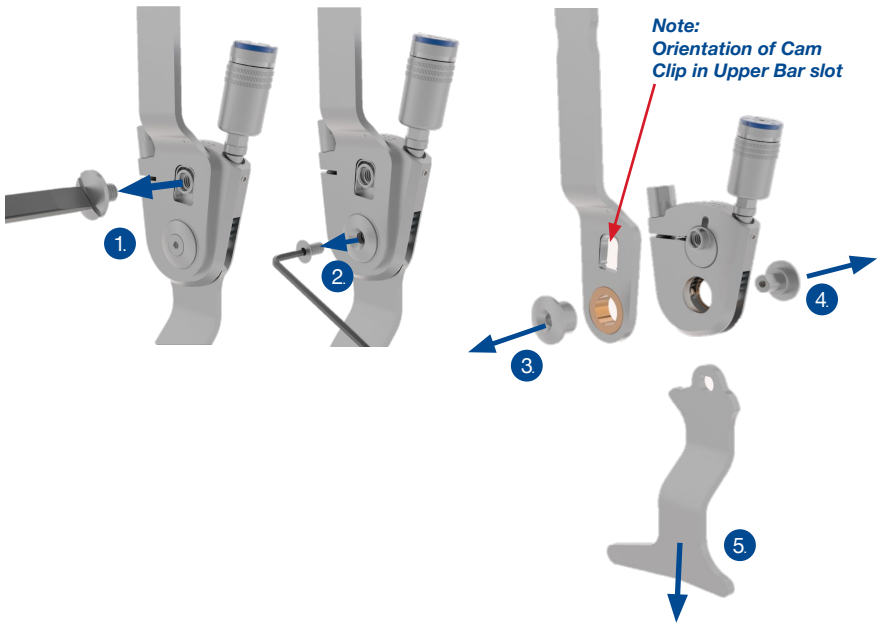
Posterior (dorsal) design.

# Fabrication

## Disassembly

Prior to assembly of the Alignment Tool, the Upper Bar and Stirrup must be removed from the Triple Action component body. Use the following procedure to disassemble the component:

1. Remove the alignment bushing screw using a large regular screwdriver.
2. Remove the pivot bushing screw using the T20 Torx wrench.
3. Remove the upper bar pivot bushing and upper bar.
4. Remove the front pivot bushing.
5. Remove the stirrup.



# Contouring and Lamination Tool

The Fabrication Tool Kit (3A00-FTK) includes all parts necessary to fabricate left, right or bilateral upright Triple Action AFOs. The kit includes:

- Alignment Axis (1)
- Alignment Bushing (2)
- Shoulder Bushing (2)
- Shoulder Bushing Screw (2)
- Right Alignment Dummy (1)
- Left Alignment Dummy (1)

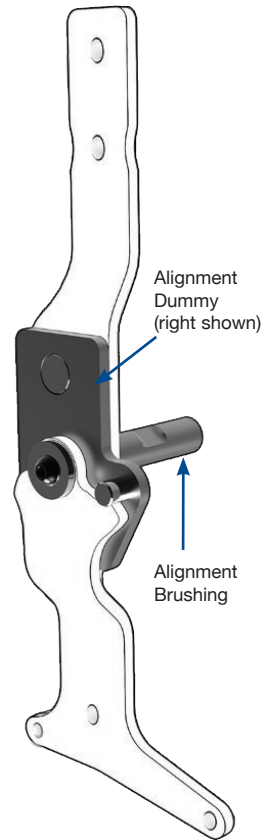
The Fabrication Tool holds the Upper Bar(s) and Stirrup(s) in alignment during lamination or thermoforming.

**IMPORTANT:** Correct the ankle angle of the cast to the clinical management angle prior to fabrication.

**CAUTION:** Do not contour or mar the Upper Bar or Stirrup where they contact the component body. Doing so will damage the component.

**CAUTION:** The Upper Bar Pivot Bearing is keyed and pressed into the Upper Bar and does not require removal for fabrication. However, use extreme caution to avoid damaging the Upper Bar Pivot Bearing during contouring and fabrication. Doing so will damage the component.

**IMPORTANT:** The Fabrication Tool is designed for open pocket lamination technique. Place the Tool against the anatomical mold, under the inner PVA bag, during lamination.



**Triple Action  
Alignment Tool**

The Shoulder Bushing may be attached to the Alignment Bushing during fabrication. The Alignment Bushing fits into the hole created in the anatomical mold by the Alignment Axis. The Shoulder Bushing may alternately be attached to a fabrication station (not included) using the M6 threaded stud.

# Fabrication Technique

The Fabrication Tool Kit (3A00-FTK) is designed for open pocket lamination technique, or thermoforming of Triple Action AFO's. Laminated double upright orthoses fabricated using the recommended composite layup in **Table 1** will typically achieve the appropriate stiffness for Triple Action AFO's. Open pocket design unilateral AFO's require Camber Axis Triple Action Companion Joint, or other free motion ankle joint. Encapsulated design unilateral AFO's do not require a companion joint.



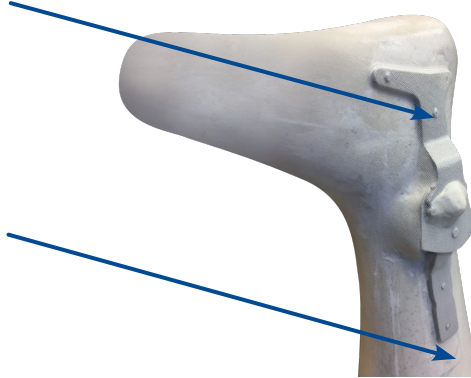
Open Pocket Lamination Technique

**Table 1. Recommended Composite Layup for Adult Triple Action (19mm Systems)**

#	SECTION	MATERIAL	DESCRIPTION
1		Plaster Mold/Lamination Tool	
2	All	Nylon	2-layers
3	All	PVA Bag	
4	All	Carbon Braid	1-layer 12k, Braided Sleeve
5	All	Nyglass	1-layer
6	Footplate only	CSP Braid (footplate reinforcement only)	1-layer 12k Braided Sleeve/NSP or CSP
7	Tibial section only	Carbon Plain Weave (upper bar reinforcement only)	2-layers 3K, Plain Weave
8	Tibial section only	Carbon Braid (welt stiffener tibial section only)	1-layer/25mm (1 inch) 12k, Braided Sleeve
9	All	Nyglass	1-layer
10	All	Carbon Braid	1-layer 12k, Braided Sleeve
11	All	Nylon	2-layers
	Restech™ Epoxy Laminating System	Refrigerate for 4 hrs prior to lamination at 2°C (35°F) Accelerate cure using heater after lamination	Mix per manufacturer's instructions

# Open Pocket Lamination Technique

#1-Lamination Tool



#3-PVA Bag

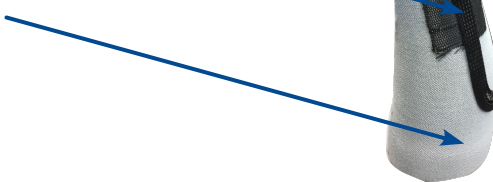


Alignment Tool upper bar and stirrup are shown under the PVA bag with foam or putty cutting over Component Dummy.

#7-3K  
Carbon Weave  
(2-layers)



#8-12K  
Carbon Braid



Reinforce the Upper Bar pocket using two layers of 3K Carbon Weave. Add a single 25mm (1 inch) 12K carbon braid sleeve over the Upper Bar and along the tibial section to stiffen the tibial section.

# Assembly

Re-Assemble the Adult Triple Action ankle joint after fabrication.

1. Reinstall the cam clip in the Upper Bar slot and lubricate it with SAE 30 oil.
2. Lubricate the bearing shoulder of the male pivot bushing with SAE 30 oil. Insert the Stirrup in the clevis and then push the D-shaped mandrel of the pivot bushing into the stirrup D-hole.
3. Lubricate the shoulder of the female pivot bushing and the outer shoulder of the Upper Bar Pivot Bearing with SAE 30 oil. Insert the Upper Bar into the component body and then install the female Pivot Bushing.
4. Apply medium strength thread locker to the Pivot Screw, install and torque the Pivot Screw to 4Nm using a Torx T20 wrench.
5. Apply medium strength thread locker to the cam screw, install and tighten.

*Note: The bar attachment screws (not included) should be coated with thread locking adhesive prior to final assembly.*

