

TRIPLE ACTION[®]

Small Adult Ankle Joint
(16mm Systems)

FABRICATION GUIDE

2ND EDITION



Small Adult Triple Action ankle joint

Small Adult Triple Action ankle joint
with Booster Spring

 **BECKER**

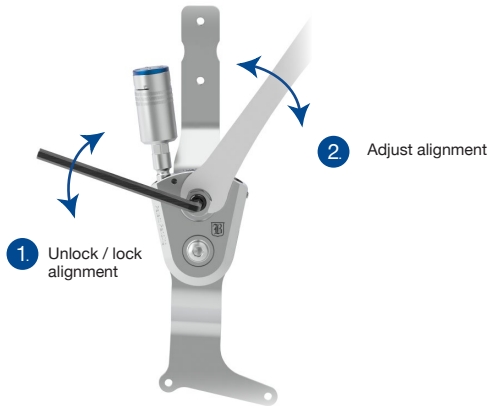
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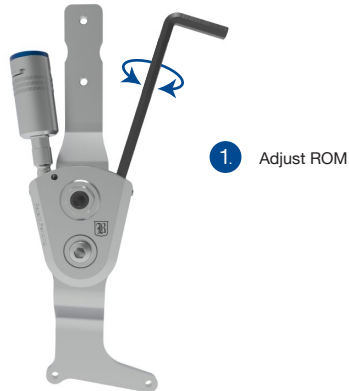
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Adjustment

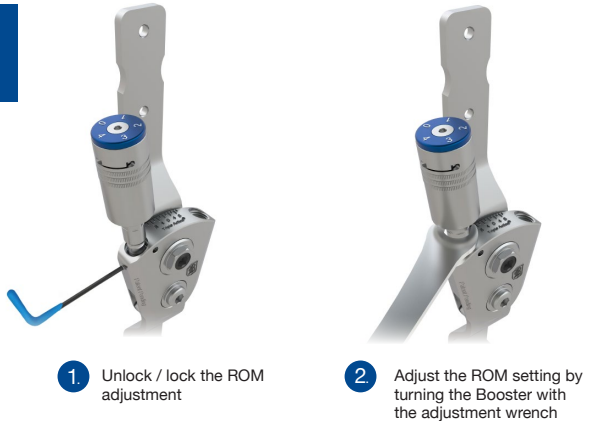
Adjust Alignment



Adjusting ROM



Adjusting 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-BTA, for use in single upright polymer AFOs using the Small Adult Triple Action ankle joint, Model 3B76.

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.



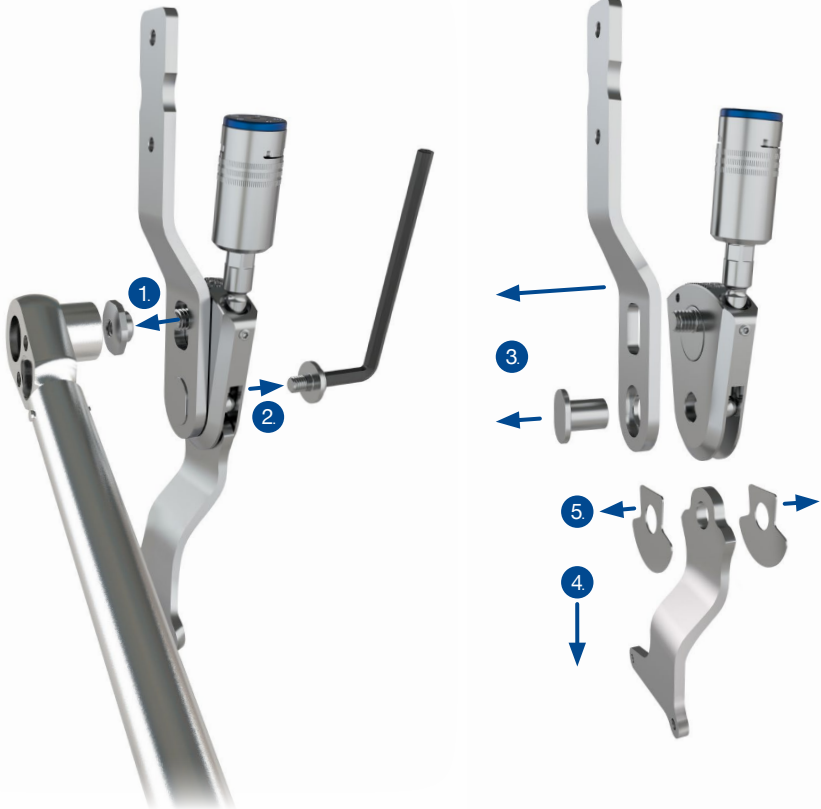
Posterior (dorsal) design.

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 cam nut using a 15mm socket wrench.
2. Remove the pivot bushing screw using the M4 hex wrench.
3. Remove the pivot bushing and upper bar.
4. Remove the stirrup.
5. Remove the wear plates from the stirrup.



Contouring and Lamination Tool

The Fabrication Tool Kit (3B00-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)

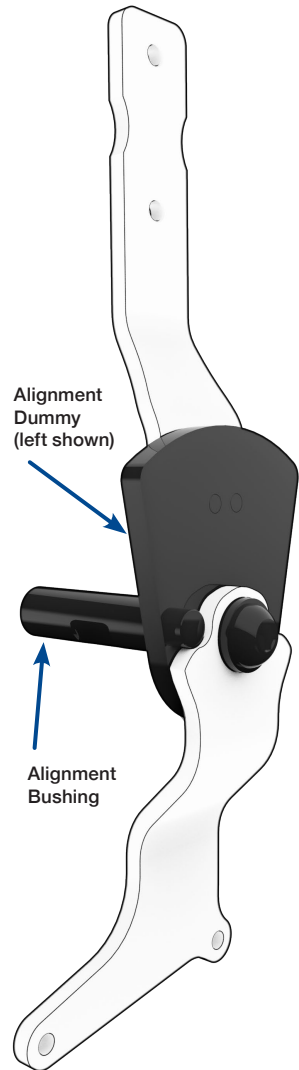
The Fabrication Tool holds the Upper Bar and Stirrup in alignment during lamination or thermoforming.

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.

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.

The Fabrication Kit 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.



**Triple Action
Alignment Tool**

Fabrication Technique

The Fabrication Tool Kit (3B00-FTK) is designed for open pocket lamination technique, or thermoforming of Triple Action AFO's. Laminated single upright orthoses fabricated using the recommended composite layup in **Table 1** will typically achieve the appropriate stiffness for Triple Action AFO's. Thermoplastic AFO's must use a companion joint.



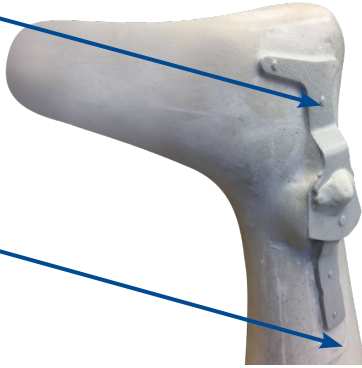
Open Pocket Lamination Technique

Table 1. Recommended Composite Layup for Adult Triple Action (16mm 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)



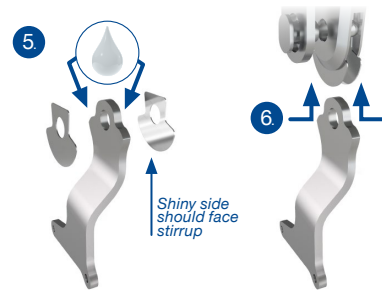
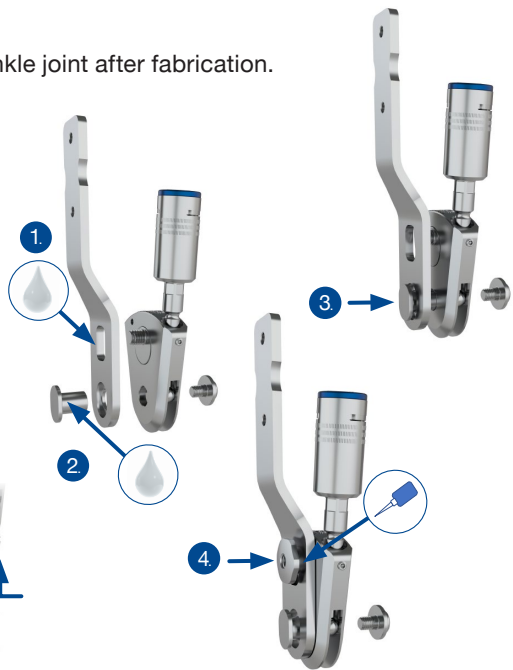
#8-12K
Carbon Braid

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

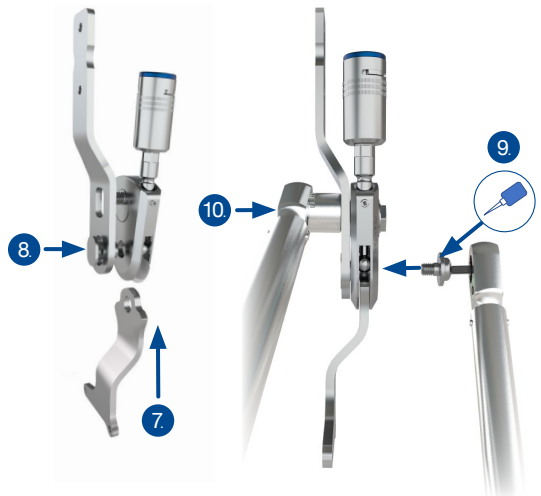
Re-assemble the Triple Action ankle joint after fabrication.

1. Lubricate the cam slot in the upper bar with Teflon grease (included).
2. Lubricate the pivot bushing with Teflon grease.
3. Insert the pivot bushing through the hole in the upper bar and part way into the component body.
4. Apply medium strength thread locker to the cam nut and loosely install.



5. Grease both sides of the head of the stirrup with Teflon grease.
6. Insert wear plates into clevis with the shiny sides toward the stirrup head. Ensure wear plates are correctly oriented as shown.

7. Insert stirrup between the wear plates into clevis.
8. Push pivot bushing through wear plates and stirrup and ensure the head of the bushing is fully seated in upper bar.
9. Apply medium strength thread locker to pivot screw, install and torque to 10Nm using a torque wrench.
10. Tighten cam nut to 10Nm using a 15mm socket and torque wrench.



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