ParaPod

SERVICE MANUAL

Fillauer LLC

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THE FILLAUER PARAPOD

The ParaPod comes in a kit form that can be sized and assembled easily for significantly less than conventional HKAFO's. The kit provides an exoskeleton worn over clothing that consists of shoe clamps, aluminum uprights, foam knee blocks, upper back and chest supports. The aluminum uprights are sized at the knee and hip and cut to length. Additional tubes can be cut to a longer length to accommodate growth.

SELECTION CRITERIA

1. When the child indicates a desire to stand up by pulling on furniture and other objects, or is developmentally mature enough to stand, a bracing program may commence.

2. The criteria used for ParaPod considerations are:

   (A) The child does not have sufficient muscle power in the lower extremities and trunk to ambulate and stand without crutches.

   (B) The child has either gone through the Standing Brace stage or is physically and mentally ready to move into the ParaPod directly.

   (C) The child is of such size that comfortable sitting can only be accomplished by flexing knees and hips.

3. Evaluate upper extremity coordination and strength to determine if the child can utilize crutches or walkers effectively.

4. Evaluate the condition of the feet and determine if there is room for custom shoes, special padding and plantar flexion wedges. Check the condition of the skin, bones and joints for good weight bearing capabilities. A physical therapy program may be required to prepare the child for weight bearing activities.

5. Evaluate for deformities and contractures to determine if device modification may be required. Check the legs, pelvis, and spine for severe deformities. Orthopedic surgery and physical therapy can be of great assistance.

6. Evaluate the skin condition while checking for sores and hypersensitive areas around the chest panels (front panel area), sacral area (buttock support) and patellar tendon and knees (knee pads).

7. Protruding myelomeningocele and spinal deformities should be evaluated to determine if there is enough clear area over the sacrum to have a good buttocks support panel and if a body jacket can be used if necessary.

Maximum Height to Axilla - 33 in / 83 cm

Maximum Chest Circumference - 26 in / 66 cm

Maximum Weight of Patient - 55 lb / 25 kg

Normal Age Range - 2 to 6 yrs

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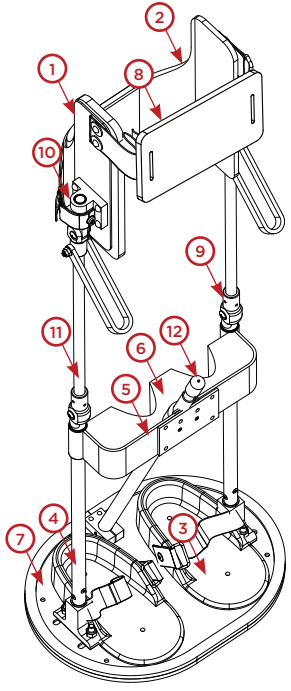
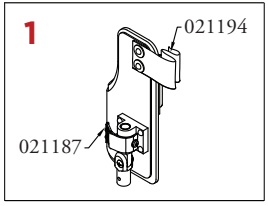
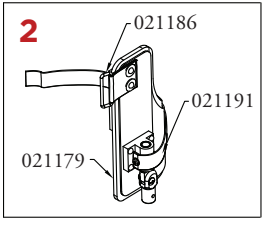


R.H. Back Panel - S/A
021120



L.H. Back Panel - S/A
021121



Shoe Plate - S/A
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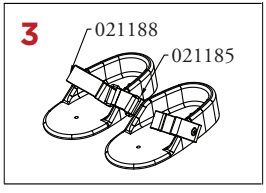
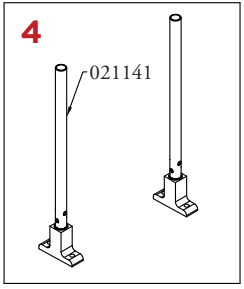


Lower Side - Strut S/A
021106



Knee - S/A
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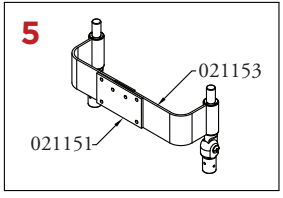
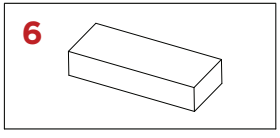


Knee Socket - Foam
021176



Foot Plate - S/A
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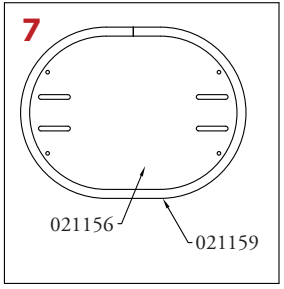
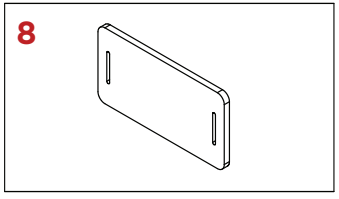
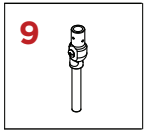


Front Panel
021138

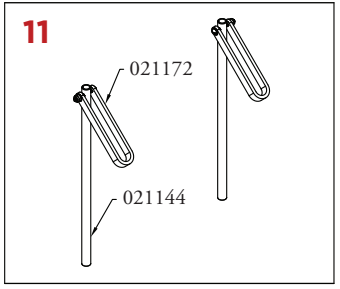


Knee Joint - S/A
021109

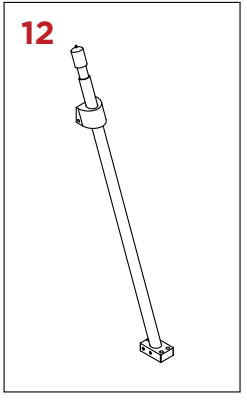


Hip Joint - S/A
021112

Upper Side Strut with Handles - S/A
021115



Knee Ext. Assist - Post S/A
(optional - purchased separately)
021129



PREPARATION

Material Preparation

1. The following tools are required to fit and assemble the ParaPod:

(a)	pipe cutter	(b)	pop riveter
(c)	contact cement	(d)	1/2” reamer
(e)	1/2” countersink	(f)	adjustable wrench
(g)	tape measure	(h)	knife
(i)	slotted screwdriver	(j)	pencil
(k)	felt pen	(l)	portable drill with 1/8” & 3/16” drill bits

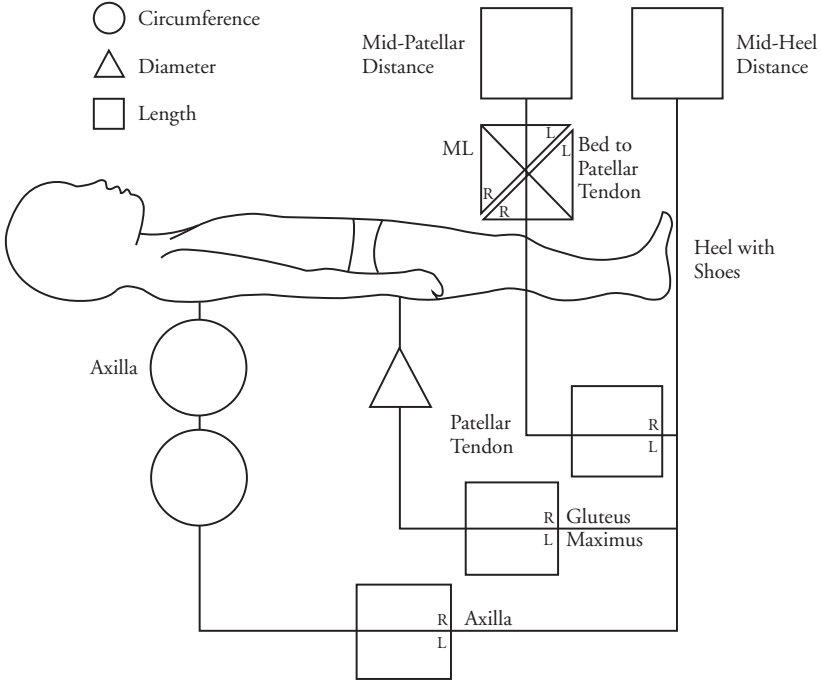
2. Ensure the child has adequate footwear and check for fit and comfort. Slightly loose shoes are recommended for best results.

3. The semi-assembled ParaPod kit, as it is supplied, is shown on the right. Width and height adjustments can be made during patient’s fitting.

4. Hardware Kit Includes
   - 16 x’s 1/8” pop rivets
   - 8 x’s 3/16” pop rivets
   - 4 x’s 3/16” solid rivets

Measurement Chart

Refer to this chart and complete all measurements. With the patient sitting the panels are over lapped and the width is marked posterior.



Date: _____

Patient: _____

Orthotist: _____

Therapist: _____

Hip Dislocation: _____

Hip Flexion Contracture: _____

Hip Abduction/Adduction: _____

Knee Flexion Contracture: _____

Knee Valgum/Varum: _____

Knee Hyperextension: _____

Ankle Valgus/Varus: _____

External Rotation: _____

Scoliosis: _____

LLD: _____

_____

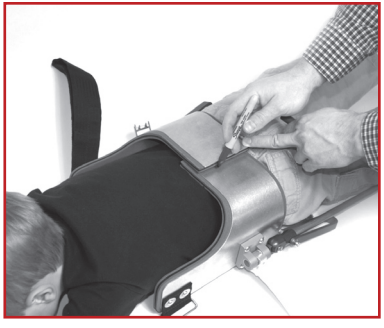
Comments: _____

_____

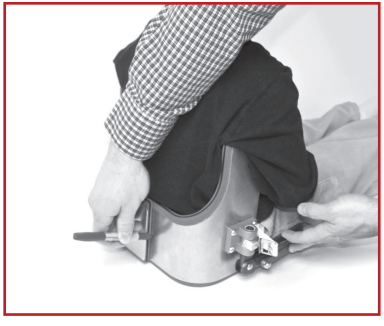
_____

ASSEMBLY

STAGE 1 - Back Panel



1. With the child lying face down, hold the two halves of the back panel together and mark the width.



2. With the child sitting – the back panel is again checked for width, a new mark is inscribed and the final width is determined half way between the two marks.

3. With the child sitting and the arms held as shown in the photo – the two halves of the back panel should be held at the above determined mark and the height on both sides should be checked. A distance of two fingers between the lower border of the axilla and the top of each side is usually adequate. Occasionally, the sides have to be adjusted by cutting off material or adding extensions.

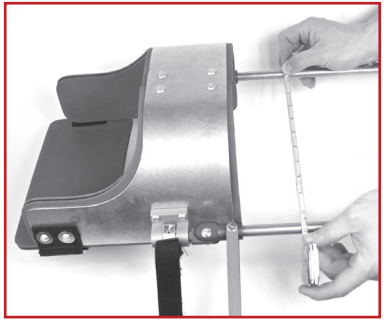
STAGE 1 - Back Panel (cont'd)

4. Remove the back panel from the child. Drill using a 3/16" drill bit for the rivet holes, while holding the two halves at the mark determined in step two. Deburr holes.

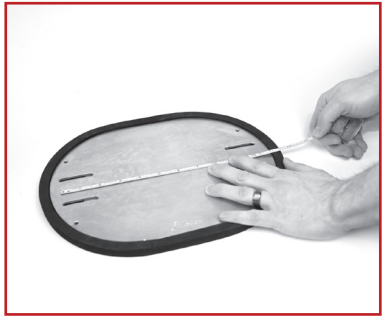
5. Rivet the back panels together using four 3/16" solid rivets.

6. Cut off any extra back panel lining and glue the lining in place using contact cement.

STAGE 2 - Foot Plate



7. Measure the center distance between the Upper Hip Joints with handles positioned laterally.

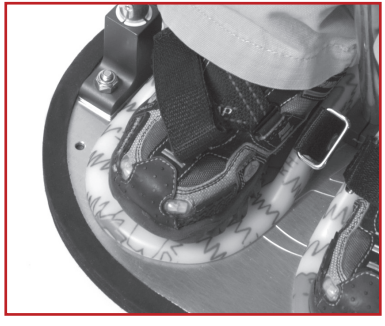


8. Using the measurement from Step 7 less 1/4", mark the footplate and place the carriage bolts in the plate. Make sure that the square shoulder on the bolts fit the slots in the plate.

9. Bolt the lower side struts in place (see Step 23 for more details)

STAGE 2 - Foot Plate (cont'd)

10. Check if shims will be required under the foot sockets to ensure proper load bearing.



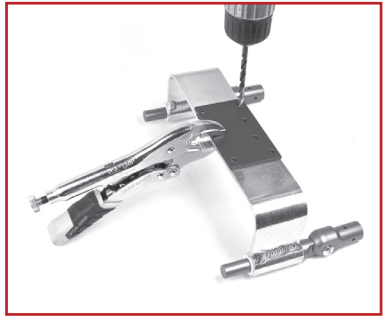
11. Put the plastic shoe retainers on the child with the shoe strap buckle on the medial side. Mark the length of the shoes plus 1/2" and trim off excess plastic. In case of extremely small shoes, the shoe strap buckle should be moved back.

12. With the plastic retainers on the child again, mark the feet position onto the footplate to establish the location, rotation and build-ups. Drill and rivet the retainers to the foot plate using 3/16" pop rivets.

STAGE 3 - Knee Panel

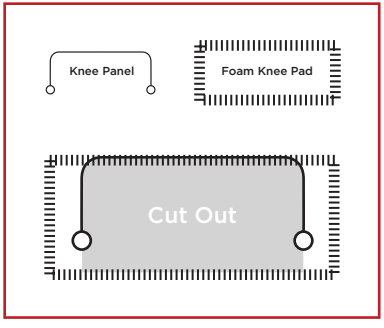
13. Holding the knee pad bar over the patella tendon, mark the length of the lower side struts.

14. With a pipe cutter, cut off the side struts to equal lengths. Sometimes it is necessary to ream out the side strut with a 1/2" reamer if the lower knee joint does not enter the side strut fully.



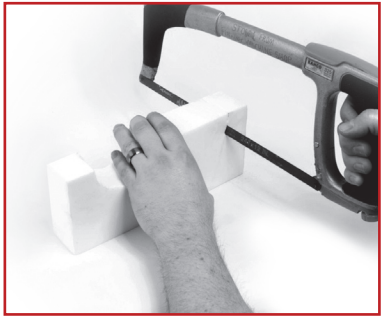
15. Holding two halves of the knee pad bars with a clamp, drill and rivet them together using the supplied plate and four 3/16" pop rivets in the outer holes. Deburr holes.

STAGE 3 - Knee Panel (cont'd)



16. Position and mark the foam knee pad. Cut it out to fit the inside of the knee plates.

17. With the child's feet strapped to the foot-plate and the foam pad in place, mark the location of the knee cut-outs. It is advisable to spread the knee laterally somewhat to ensure that knock-kneeing is not encouraged. It is very easy to ruin the knee pads by cutting too large or deep. Start with small cut-outs and adjust if necessary.



18. Cut out the foam as marked in Step 17. It is important that the angle of the cut is made to approximate the sloping of the patella and tendon.

STAGE 4 - Knee Panel Fitting & Additional Knee Extension Assist (sold separately)

19. Try the assembly on the child. If a leg discrepancy is encountered, the knee pad should be fitted to the lower patella tendon and build up added to the knee pad for the higher knee.

20. Establish and mark the length of upper side struts. Add 7/8” to marked length & cut off with pipe cutter.

21. Attach the knee extension post (if available) to the knee plates. Leave the attachment to the foot-plate until after the shims have been selected and installed in Step 23.

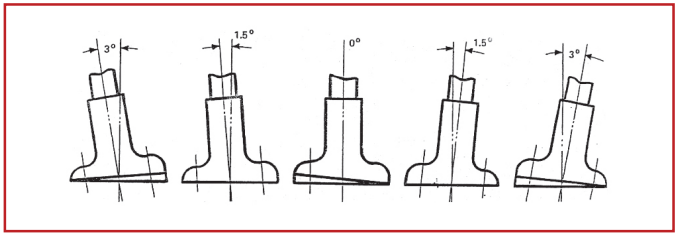
STAGE 5 - Alignment, Finishing and Inspection

22. With the nyliners in place, hold the knee pad/joint assembly together by hand and check in the standing and sitting positions. It may be necessary to readjust some parts of the assembly. Special attention should be paid to the fit of the knee pads, as well as the width and height of the back panel. **Note:** Excessive looseness of the knee joints may be caused by not drawing the knee joints together before riveting in Step 15. After final check, the Upper and Lower Side Struts must be riveted to the Knee Assembly. Eight Upper side strut holes are provided in Knee Joints. Drill through these holes with 1/8" drill bit into the Upper Side Struts and rivet. Eight Lower Side Strut and Lower Knee Joint holes must be drilled using 1/8" drill bit and rivets. Deburr holes. Make any needed final adjustments.

23. In order to provide a simple method for the Orthotist to change the position of the child's center of gravity relative to the base, please note the following feature in the Lower Strut Attachment Bracket.

(1) The lower surface of the bracket is machined with 1 1/2° taper.

(2) A loose shim is included which has a 1 1/2° taper. This allows the struts to be assembled in five different positions as shown in the following illustration.



Stand the child upright in the ParaPod and, by pushing backwards, determine if the child can lean backwards approximately 10° without falling. Now repeat this leaning forward. You can now adjust the shim as shown above to give the same amount of leaning forward and backwards. This will assist the child in achieving a better degree of balance and self-assurance while reducing the fear of falling.

THERAPY TREATMENT

The ParaPod from Fillauer is an important training tool in the overall rehabilitation goal of independent vertical standing and mobility. Used as a training aid, the ParaPod facilitates the transition from the seated position to upright stance and encourages the independent balance necessary for bimanular activities. The child can then practice hands-free balance control with the head and arms to work with and exploration necessary for normal cognitive development and participation with peers.

The Parapod uses multiple three-point pressure systems applied at the feet, knees, hips, upper torso to provide standing simulation with significantly less energy cost to the patient. The standing position offers the patient with an alternative position to sitting which offers numerous psychological and physiologic benefits. The child with lower extremity neuromotor dysfunction has better self-esteem because they are equal to their peers and can also begin upright balance and mobility training. Physiologically, a vertical position provides the combined benefits of alternative tissue loading, increased bone deposition, better bowel function, fewer urinary tract infections, and reduction hip and knee flexion contractures.

The ParaPod comes in a kit form that can be sized and assembled easily for significantly less than conventional HKAFO's. The kit provides an exoskeleton worn over clothing that consists of shoe clamps, aluminum uprights, foam knee blocks, upper back and chest supports. The aluminum uprights are sized at the knee and hip and cut to length. Additional tubes can be cut to a longer length to accommodate growth. The ParaPod is intended for upright standing and some swivel mobility, but does not have the structural stability for long-term dynamic swing-to or swing thru-gait. To unlock the hip and knee joints the child should extend the trunk and lean against the back plate. The side handles are pulled up and internally rotated to align the joints so they are free to flex. To move from the seated to standing position the child can utilize the telescoping pole as an aid to pull to a standing position. The standing pole has an elastic cord within it to retract when finished. The hip and knee joints will externally rotate with the proximal elastic band automatically pulling them outward. The child should be instructed to extend the trunk and make sure both handles move to the lateral position for standing safety.

The ParaPod is most successful when introduced early in development when the child becomes frustrated by the inability to pull to a standing position at approximately age two to three. Early parental involvement is crucial for encouragement and acceptance of the standing balance program. Initially donning and doffing of ParaPod may prove challenging and will only be successful if the parents are committed to its functional developmental goals without being overprotective. All functions of the ParaPod should be properly demonstrated to the parents to insure proper operation. As the child becomes more independent with the parapod, the parents should also be instructed how to inspect skin condition and all load bearing areas to avoid complications.

The ParaPod should be worn at first for short periods and the child should demonstrate satisfactory head and trunk control to maintain balance. The child should demonstrate motor ability in the prone and supine position using mat activities as well as demonstrate independent sitting balance. Skin tolerance and circulatory function should be observed and the knees, hips, and torso as well as shoe fitting during more active period such as playtime. The child should learn to play at a table then become confident standing away from a supportive object. Independent balance should be encouraged in a variety of programmed activities and positions so the child can learn to stabilize themselves with trunk positioning. Playing catch with a large ball is very instructive for sudden movements and positioning. As the child learns to stand they should learn to fall forward and catch themselves if they begin to fall. 2". 4", and 6" benches can be introduced to allow the child to learn to lower and rise to a standing position from various positions.

Developmentally a two year old can begin independence of action in donning. The earliest gait pattern is a pivot or swivel pattern using stable objects such as furniture. For parallel support walkers are introduced to allow movement from place to place and pivot pattern is encouraged at first. A two year old can usually master a swing to or swing through gait after establishing confidence with swivel walking. Children must rely on upper extremity strength for independence which must be developed early to increase optimal function. Push-ups from 2". 4", and 6" benches can be used for strengthening and to increase the ability to rise from the floor. As upper extremity strength improves the child should demonstrate independent locking and unlocking activities. Most children find that locking the device on the floor makes it easier to rise from the floor. As ability increases, the child can learn swing through gait and more outdoor activities can be encouraged on rough ground, curbs or stairs need for independence at school. The child should be developing the upper extremity strength and coordination with the trunk for gait training and symmetry for in preparation for RGO orthotic wear.

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