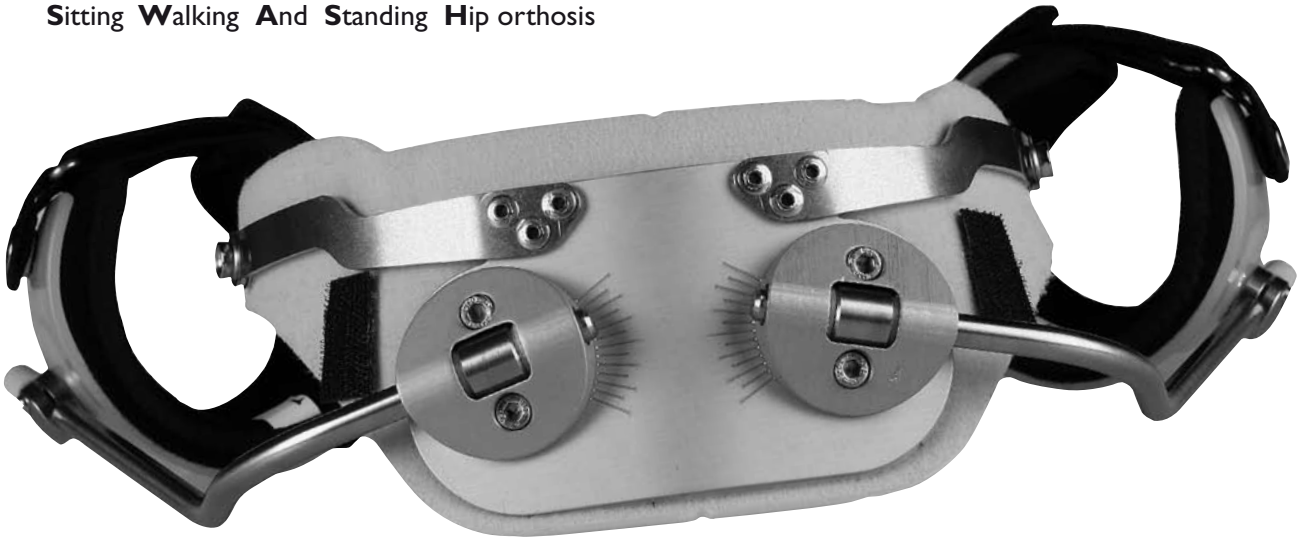
allard INT

S.W.A.S.H®

Sitting **W**alking **A**nd **S**tanding **H**ip orthosis





MANUAL

Fitting and Customization

TABLE OF CONTENTS

SWASH® Components	4-5
Product Selection	6-7
Product size & Upright selection	8
Assembly	9
Initial Application	10
Initial Adjustments	11
Inital Fitting	12
Check the fit	13
Initial Function, Evaluation & Customization	14-15
The Professional Finish	15

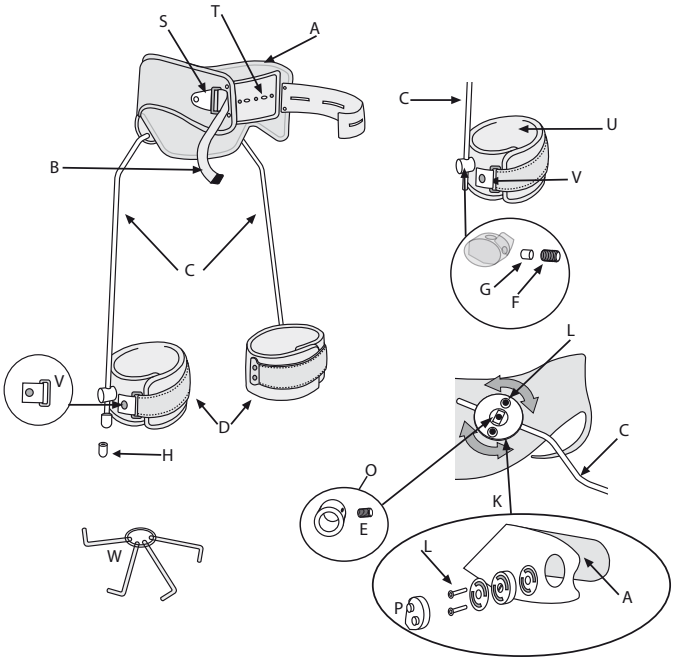
Prerequisite reading:
For a successful fitting, read the following sections included in the SWASH® Clinical Manual (available separately):
- Biomechanics of SWASH®
- Indications & Contraindications
- Candidate Selection
- Pre and Post Fitting Functional Evaluation
- Protocols and Proper Fit Guidelines

Primary development goals of the SWASH®
1. Increase abduction and stretch hip adductors to improve and maintain hip alignment
2. Prevent excessive adduction during sitting and walking
3. Optimize sitting and standing posture
4. Achieve the above goals with an automatic transition from neutral (walking, standing) to abduction (sitting)

SWASH® COMPONENTS

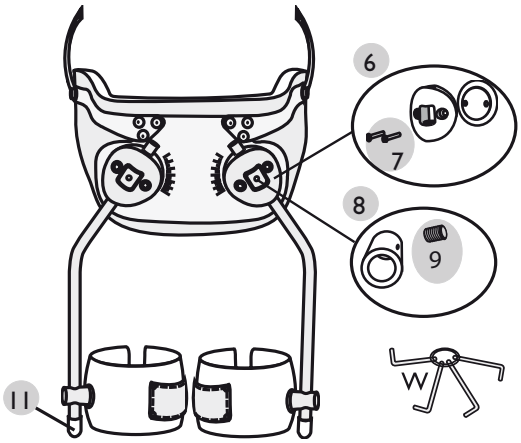
Classic

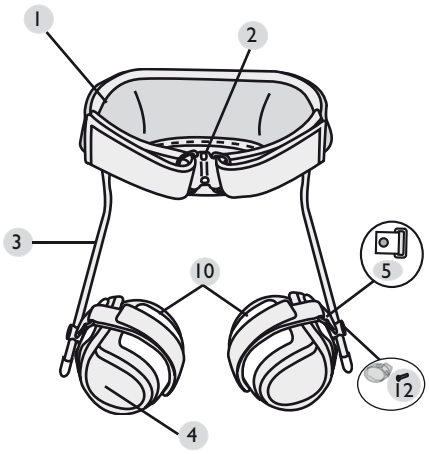
28801	Leg Bars 115º	C, H, O
28802	Leg Bars 123º	C, H, O
28803	Thigh Cuffs w/padding	D
28804	Pelvic Padding	A
28805	Joint Set (1)	K
28806	Boss Cover (2)	P
28807	Clamp Ring for Leg Bars (2)	O
28808	Screw set	E, F, G, L
28809	Brass Bushings for Thigh Cuff (10)	G
28810	Slide buckle for waistband	S
28811	Waistband screw set	T
28812	Waistband webbing with snap (1)	B
28813	Rubber Stoppers, Size 1 (set of 2) Size 2-4 (set of 10) IMPORTANT: Specify needed for Classic	H
28814	Thigh Cuff Padding (2)	U
28815	Buckle with snap for Thigh Cuff (1)	V
28820	Allen key, set of 4	W



Low Profile II

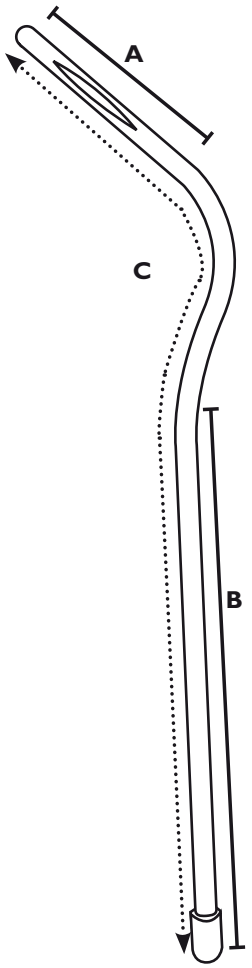
28836	Pelvic Padding with Abdominal Pad	1, 2
28840	Leg Bars 115º	3, 8, 11
28841	Leg Bars 123º	3, 8, 11
28842	Thigh Cuffs w/padding	10
28843	Thigh Cuff padding (2)	4
28844	Joint set (2)	6, 8
28845	Screw set	7, 9, 12
28846/47	Abdominal Pad	2
28848	Clamp Ring Set	8
28849	Buckle with snap for Thigh Cuff (2)	5
28813	Rubber stoppers (set of 10) IMPORTANT: Specify needed for Low Profile	11
28820	Allen Key, set of 4	W





This product should only be fitted by a certified professional.

SWASH® COMPONENTS

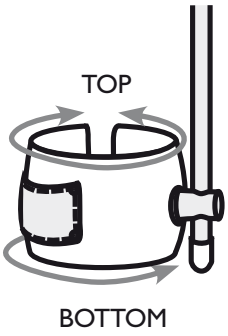


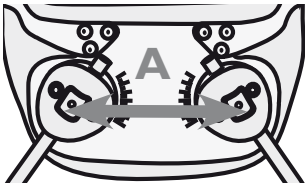
Upright lengths

Size	Proximal Length A		Distal Length B		Total Length C	
1	63mm	2 1/2in	175mm	7in	310mm	12 1/4in
2	80mm	3 1/4in	215mm	8 1/2in	375mm	14 3/4in
3	80mm	3 1/4in	280mm	11in	440mm	17 1/4in
4	80mm	3 1/4in	320mm	12 1/2in	480mm	19in
5	90mm	3 1/2in	370mm	14 1/2in	540mm	21 1/4in
6	100mm	4in	420mm	16 1/2in	600mm	23 1/2in

Plastic circumference

Size	Top		Bottom	
1	230mm	9in	210mm	8 1/4in
2	270mm	10 3/4in	250mm	9 3/4in
3	310mm	12 1/4in	290mm	11 1/2in
4	360mm	14in	340mm	13 1/2in
5	390mm	15 1/4in	370mm	14 1/2in
6	460mm	18in	420mm	16 1/2in





Pelvic Section - Distance Between Joint Centers

Size	Classic A		Low Profile II A	
1	82mm	3 1/4in	82mm	3 1/4in
2	90mm	3 1/2in	90mm	3 1/2in
3	105mm	4 1/4in	105mm	4 1/4in
4	120mm	4 3/4in	120mm	4 3/4in
5	N/A		130mm	5in
6	N/A		150mm	6in

Measurements are taken on flat plate before bending.

PRODUCT SELECTION

Before you begin

If it is not possible to meet with the rest of the "team" working with this patient, at least call the referral source, therapist, and caregiver to discuss primary and secondary goals for this orthosis. This will affect whether you select SWASH® Classic or SWASH® Low Profile II, 115 or 123 degree upright, plus the adjustment you make to the orthosis. The Pre-Fitting Evaluation (see SWASH® Clinical Manual) is key to success and, combined with the Post-Fitting (see SWASH® Clinical Manual) serves as a means for you to document outcomes.



Classic



Low Profile II

SWASH® Classic

The original design of SWASH® uses a plastic anterior overlap pelvic band to secure the orthosis around the waist and maintain its position, resting over the ASIS, just below the navel. In the back, the pelvic section extends from L2/L3 to the distal margin of the sacrum, providing maximum pelvic support. Children with low trunk tone and/or very limited trunk control strength may benefit from the increased posterior and lateral support this design offers. The thigh cuff closure is a double-lock strapping system to reduce chances of unwanted removal by children. Pelvic band and thigh cuff padding are removable for laundering.

The uprights are 6mm (size1) and 7mm (sizes 2-4) diameter. The smaller diameter uprights on the size 1 allow more "spring", permitting less restriction of movement. This is often desirable for the developing infant.

SWASH® Low Profile II

SWASH® LP II uses a metal pelvic band with padded iliac extensions that are to be shaped and positioned between the crest of the ilium and the ASIS. The double strap front closure allows for symmetrical application. In the back, the padded metal posterior frame extends from approximately L2/L3 to S1/S2. The metal offers positive non-slip contact for the abduction control joints, and includes clear markings to monitor abduction settings. The joints are tapered downward to accommodate most walker styles. The thigh cuff closure is a simple double Velcro fold-back closure for easy donning and doffing. The pelvic band cover and thigh cuff padding are removable for laundering. The uprights for all sizes are 8mm diameter. This increase in diameter offers added strength to manage very high tone, plus it allows cuffs to be completely interchangeable between all sizes.

Guidelines for Product Selection

The following are offered as general guidelines only. When possible, it is recommended to try each style on the patient to best assess which offers optimum function.

SWASH® Classic

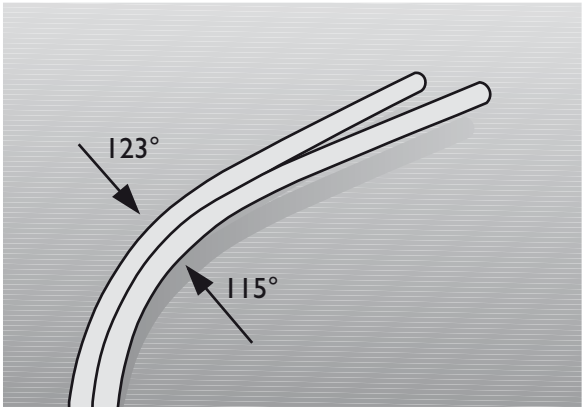
- When maximum trunk control is required, i.e., for the candidate who lacks muscle strength or upper body control to sit upright.
- When patient is primarily non-ambulatory (GMFCS IV-V).
- When a smaller diameter (6mm) uprights on the size 1 are desired to permit less restriction of movement.
- When the greater pelvic coverage area triggers more desirable neuro-sensory motor response.

SWASH® Low Profile II

- When the primary goal is to control scissoring gait and the posterior joints on the SWASH® Classic interfere with posterior walker, and a new walker is not an option.
- When wearer has limited space between the iliac crest and the rib cage.
- When maximum upright strength is required to manage adductor tone.
- When candidate and/or caregiver acceptance of "bracing" is an issue. The Low profile is more cosmetically acceptable to many.

115 or 123 Degree Uprights?

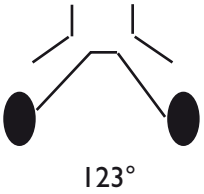
SWASH® is available with either 115° or 123° uprights. This refers only to the fixed angle of the most proximal visible curve in the uprights – it does NOT refer to the exact degree of abduction obtained while wearing the orthosis.



Standing and walking functions of both uprights are very similar. Generally the differences between the two are related to sitting function, with the 123° uprights creating greater amounts of abduction and the 115° uprights creating relatively smaller amounts of abduction.

NOTE: In sitting, the 123° uprights will have a greater influence towards posterior pelvic rotation, thereby increasing the flexion influence on the trunk.

The selection of the 115 or 123-degree uprights does have an affect on the postural outcome of the fitting. The following are offered as guidelines:

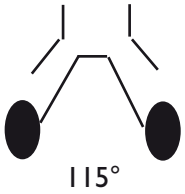


123 Degree - Wide Sitting Base

When the greatest amount of adductor muscle lengthening in the sitting position is desired.

When more trunk lumbar flexion influence is desired when sitting.

When more lumbar extension is desired during gait.



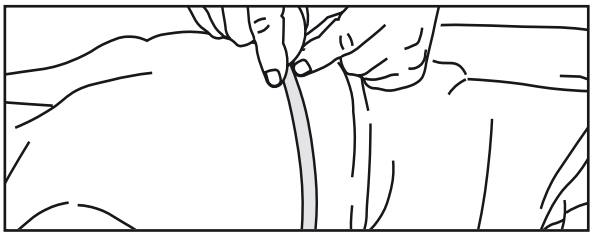
115 Degree - Narrow Sitting Base

The wearer is primarily chair mobile and the 123° uprights would be too wide in the sitting position for the child to fit in chair or car seat, and a new chair or car seat is not an option.

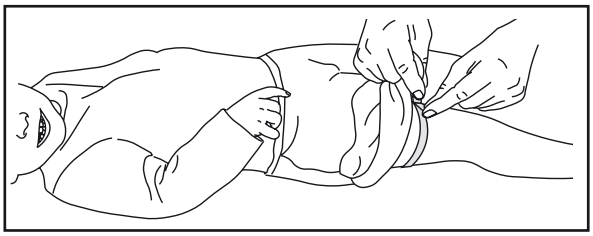
Adductors are too tight and the amount of abduction when sitting in the 123° uprights would be impossible or painful.

When less trunk flexion influence desired when sitting.

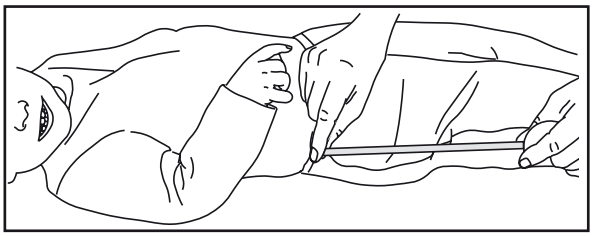
PRODUCT SIZE & UPRIGHT SELECTION



PELVIC SECTION CIRCUMFERENCE



THIGH CIRCUMFERENCE



UPRIGHT LENGTH

Pelvic section circumference
At level of the anterior superior iliac spine (ASIS).

Thigh circumference
Distal thigh, just proximal to the condyles. When fitted, the ends of the thigh cuffs should almost meet (to allow for growth).

Upright length
Distance from waist to mid-patella with knees extended.

Upright diameter
For SWASH® Classic only, size 1 uses 6mm diameter uprights and sizes 2, 3, and 4 use 7 mm uprights. All sizes SWASH® LP II use 8 mm diameter uprights. Level of function and tone (not just the size chart) should be evaluated when selecting the proper diameter upright.

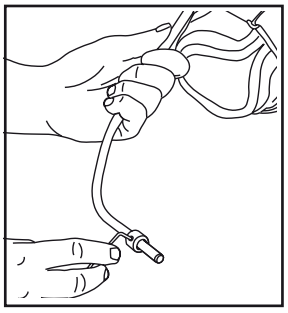
Sizing guide
Use the table below to select the largest size that will fit the child, based on the measurements, to allow optimum room for growth. Keep the following in mind:

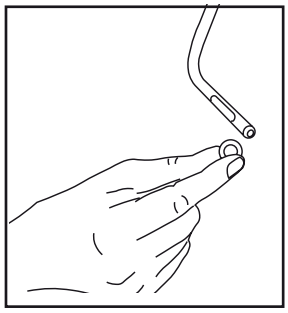
- The plastic on the cuffs and the pelvic band (SWASH® Classic only) may be trimmed, if necessary.
- The pelvic band on SWASH LP II may be shaped to fit slightly larger or smaller pelvic circumference.

Interchangeability of Components
- For SWASH® Classic: All components on sizes 2, 3, and 4 units are modular and interchangeable. A size 1 thigh cuff is available for a size 2 upright (size 1A).
- For SWASH® L.P II. : All components are interchangeable between sizes.
- SWASH Classic and LP II components cannot be combined.
- The uprights almost always require trimming (after final fitting approval) so that the distal tips are level with the bottom of the cuff padding.

SWASH® SIZING CHART

Dimensions in mm and inches.		Pelvic section Circumference		Thigh cuffs Circumference		UPRIGHTS Dia-meter	Overall Length		Proximal Width		Distal Length	
SWASH® CLASSIC	SIZE 1	400-465	15 3/4-18 1/4	210-250	8 1/4-9 3/4	6	310	12 1/4	63	2 1/2	175	7
	SIZE 1A			210-250	8 1/4-9 3/4							
	SIZE 2	460-550	18-21 3/4	250-290	9 3/4-11 1/2	7	375	14 3/4	80	3 1/4	215	8 1/2
	SIZE 3	540-630	21 1/4-24 3/4	290-330	11 1/2-13	7	440	17 1/4	80	3 1/4	280	11
	SIZE 4	620-720	24 1/2-28 1/4	330-380	13-15	7	480	19	80	3 1/4	320	12 1/2
SWASH® LOW PROFILE II	SIZE 1	400-465	15 3/4-18 1/4	210-250	8 1/4-9 3/4	8	310	12 1/4	63	2 1/2	175	7
	SIZE 2	460-550	18-21 3/4	250-290	9 3/4-11 1/2	8	375	14 3/4	80	3 1/4	215	8 1/2
	SIZE 3	540-630	21 1/4-24 3/4	290-330	11 1/2-13	8	440	17 1/4	80	3 1/4	280	11
	SIZE 4	620-720	24 1/2-28 1/4	330-380	13-15	8	480	19	80	3 1/4	320	12 1/2
	SIZE 5	710-810	28-32	380-440	15-17	8	540	21 1/4	90	3 1/2	370	14 1/2
	SIZE 6	800-900	31 1/2-35 1/2	440-500	17 1/4-19 1/2	8	600	23 1/2	100	4	420	16 1/2

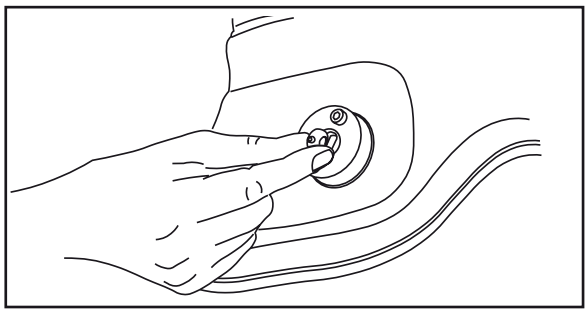




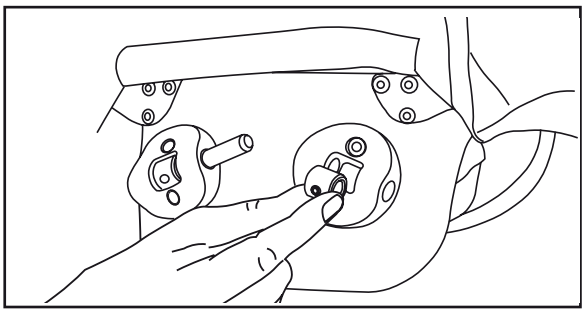
1. Remove retainer rings from the uprights
The uprights are labeled "Right" and "Left" to correspond to the extremity on which they are fit. To assemble the uprights to the pelvic band: Use the Allen Key to loosen the set screw and slide the retainer ring off from the upright.

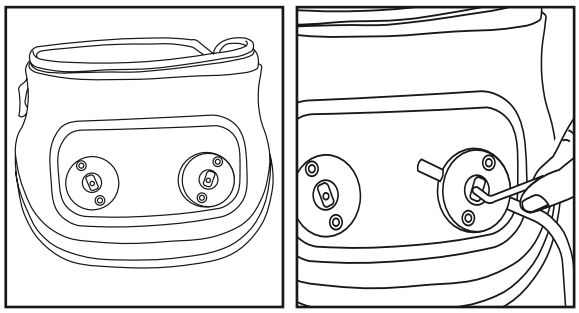
2. Insert retainer rings into joint assemblies
Insert the retainer rings into the center of the hip joint with the hex-screw pointing up.

SWASH® Classic



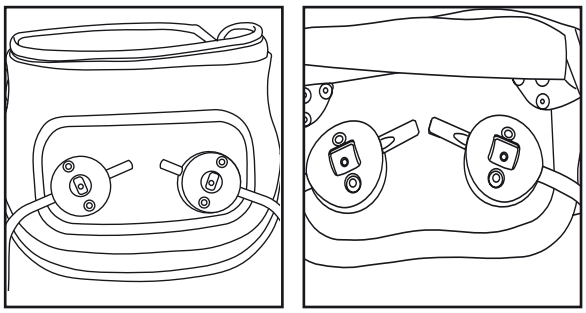
SWASH® Low Profile II





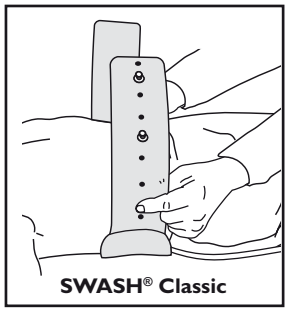
3. Insert and secure uprights into joint assemblies
Insert the uprights into the hip joint assembly and through the retainer ring.

Make certain the groove in the upright faces up and is aligned with the set screw in the retaining ring. Tighten the set screw until it is securely seated into the groove in the upright.

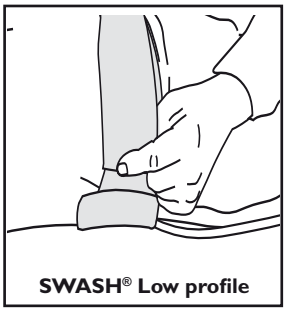


4. Symmetrical uprights
Repeat with the opposite side, making certain that both uprights are inserted equal distance through the joint assembly so they are symmetrical.

INITIAL APPLICATION



SWASH® Classic



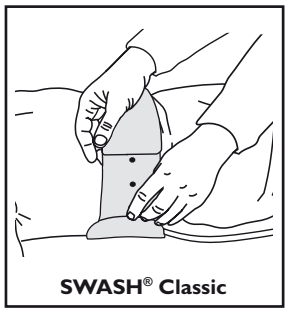
SWASH® Low profile

1. Position the orthosis on the patient (in supine position):

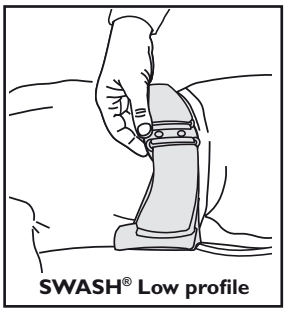
The pelvic section should encase the Anterior Superior Iliac Spine (ASIS), low enough that the navel is visible in the front.

Ideal is to fit the orthosis at mid-pelvic girdle to obtain firm grasp and control of the pelvis. Depending on anatomy, final fitting location may vary from just below the waist (navel) to mid-pelvic girdle

Check the ASIS relative to the posterior section of pelvic band on both sides to ensure symmetry in pelvic height and that the orthosis is not rotated on the patient.



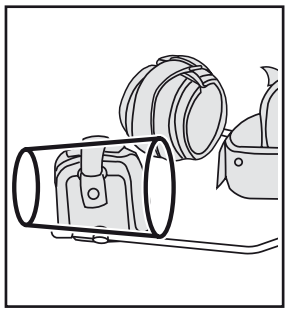
SWASH® Classic



SWASH® Low profile

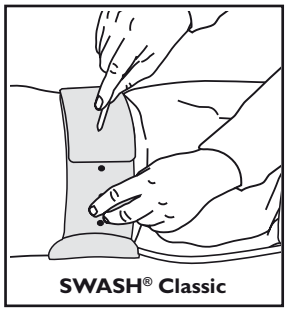
3. Check the fit of the pelvic band:

Slide the fingers of one hand between the padding and the patient's abdomen with hips alternately flexed and extended to ensure a snug yet comfortable fit.

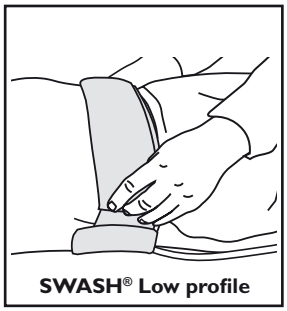


5. Mark location for thigh cuffs:

NOTE: The thigh cuff is a cone shape - greater circumference should be at the top. The straps close to the lateral side.



SWASH® Classic



SWASH® Low profile

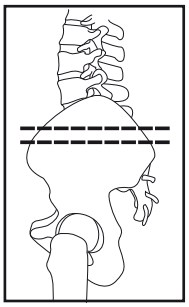
2. Adjust the orthosis to fit the patient:

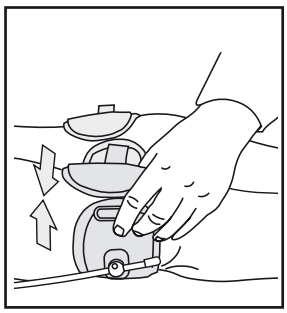
SWASH® Classic pelvic band

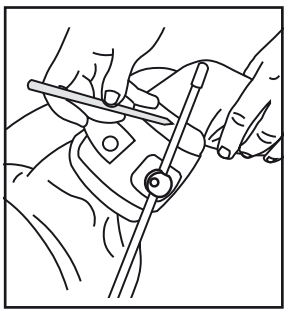
Mark appropriate holes for both truss studs in the waistband. The studs should fit in the center of the slots in the overlap tab. The dual stud design provides intrinsic stability to the pelvic band.

SWASH® Low Profile pelvic band

Position the pelvic band extensions between the crest of the ilium and the ASIS. The pelvic band should be shaped to the contour of the pelvis and extend no more than 5 cm (2 inches) toward anterior midline.







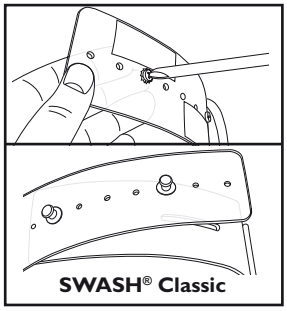
4. Thigh cuffs

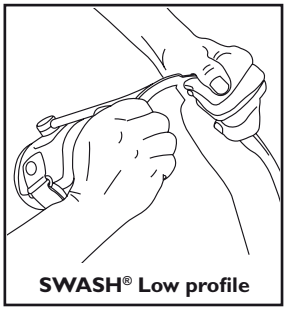
Initially, position the thigh cuffs as distal as possible without creating pressure in the popliteal area and without interfering with flexion. However, pressure on the thorax, excessive spinal flexion, or discomfort due to hamstring tightness, may be relieved by moving the cuffs up 1-3 inches. Mark on the uprights where the cuff should be secured. If the cuffs are too large, mark on the cuff where it should be trimmed for recommended fit (do not trim until after initial fitting as it is possible you will find it necessary to move the cuffs up higher on the thigh to resolve posture or comfort issues).

INITIAL ADJUSTMENTS

Remove the orthosis from the child. Make all necessary changes to the orthosis while it is off the child.

Pelvic band adjustments

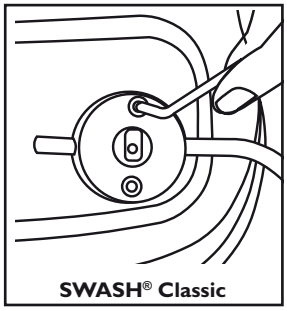

SWASH® Classic

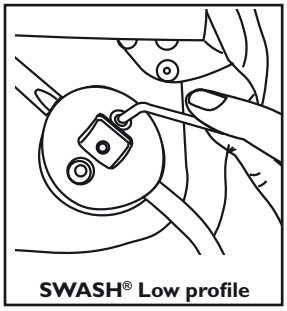

SWASH® Low profile

SWASH® Classic
Move pelvic band truss studs to marked holes.
Tighten with Phillips screwdriver.

SWASH® Low Profile
Remove the cloth cover. Based on your observations during inital fitting - hand shape the metal frame that forms the iliac extension - maintain symmetry.

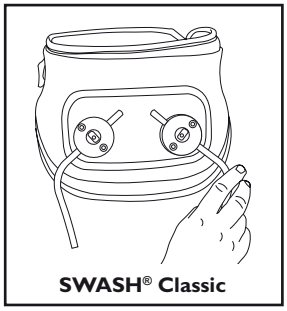
Abduction settings

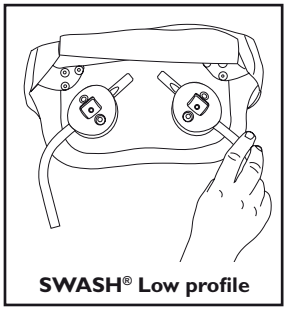

SWASH® Classic


SWASH® Low profile

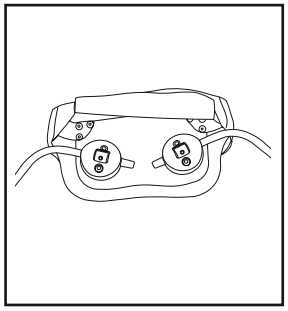
Loosen the large screws in the outer ring of the hip joint assemblies. Rotate the joints to set amount of abduction needed to improve sitting and standing posture, and/or prevent scissoring during standing and walking, or to meet post-operative protocols, and then tighten.

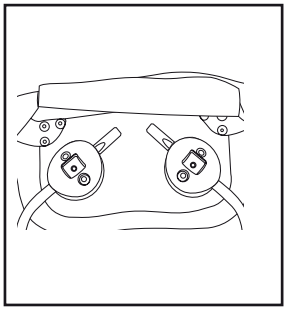
Adjust uprights for hip clearance


SWASH® Classic

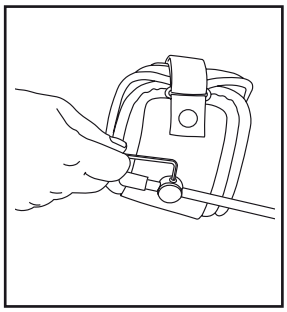

SWASH® Low profile

Adjust equally the distance that the upright passes through the hip joint assembly and tighten. This setting may need to be changed after the orthosis is tested on the patient.





More (left photo) or less (right photo) abduction may be needed depending on the child's hip alignment and functional performance.



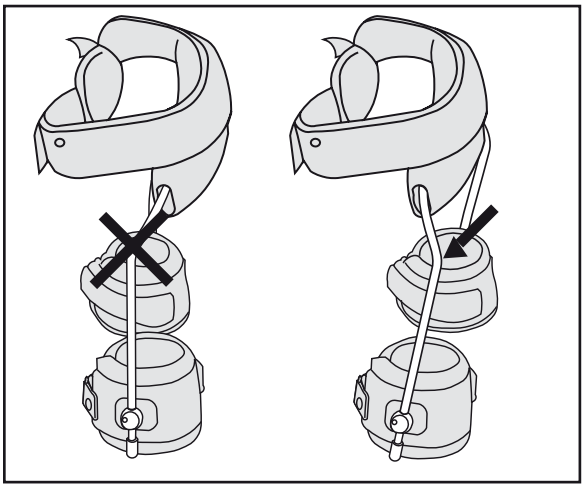
Move thigh cuff to the marked position on uprights, rotate slightly laterally and tighten. Move other thigh cuff to the same height and rotation.

Note: Loctite® or other adhesives are not generally necessary to maintain secure settings on the SWASH®.

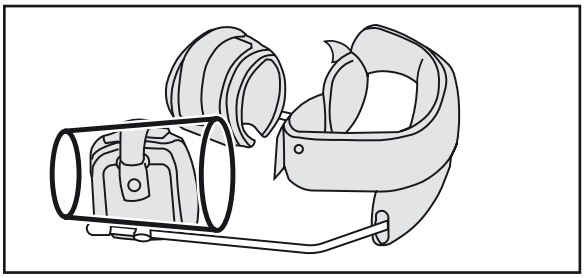
Maintain symmetry: The orthosis should be set up to be symmetrical in every aspect. Most children with cerebral palsy present with both postural and functional asymmetries. The SWASH® should be set up and used symmetrically for two to four weeks in an attempt to help the child become more symmetrical.

INITIAL FITTING

Final product check before fitting



Are the uprights in correct RIGHT and LEFT positions?
There is an engraving or blue label on the upright that identifies left and right. Another way to check is to be certain the long horizontal groove in the proximal end of the upright that slides through the joint assembly should always be facing up.



Are the cuffs on appropriate upright?
The cuffs are a cone shape and the large circumference should be on top and the straps should close to the lateral side. If this is not the case, remove the cuffs and switch to opposite uprights.

Are the thigh cuffs rotated to appropriate angle?
The retaining ring that connects the thigh cuff to the upright must not touch the sitting surface when the patient is sitting. Generally, rotating the cuff approximately 10° posterior from mid-line is sufficient.

Does the abduction angle prevent the cuffs from touching?
A good starting point is 1 to 2 inch (2.5 - 5 cm) gap between the cuffs when you glide the uprights to the standing position. This angle will generally need to be re-adjusted after the function fitting, depending on the primary goals of the orthotic intervention and the amount of tone during function. If the patient is ambulatory, one goal for final fitting is to have the cuffs barely touch each other as the patient walks.

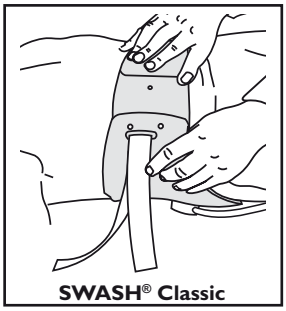
Are all settings symmetrical?
When at all possible, start with all settings symmetrical. Give the wearer a chance (2-4 weeks) to see if SWASH® will help the wearer adjust to more symmetrical posture.

Do the uprights move freely and easily?
The uprights should always move freely and easily in a full ellipse. If they don't, check that the Allen screw in the retaining ring in the joint center is properly seated into the groove in the upright.

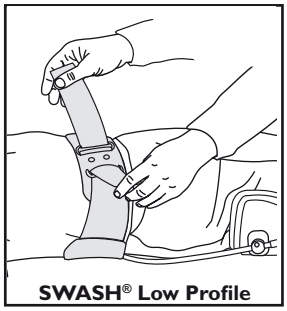
Fitting the patient

Open all closures on the orthosis. Reapply the orthosis to the patient.

Check for correct pelvic band height and that the orthosis is not rotated on the child.



SWASH® Classic



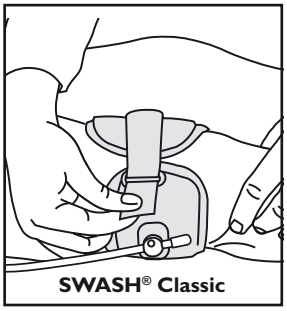
SWASH® Low Profile

SWASH® Classic

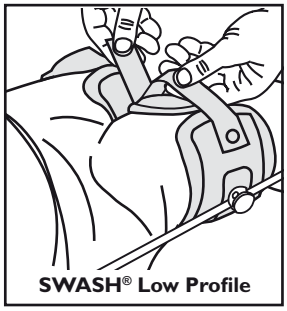
Secure the pelvic band studs into their slots and snap the circumference strap closed.

SWASH® Low Profile

Center the abdominal pad on the patient. Grasp each strap and pull simultaneously to assure symmetrical application.



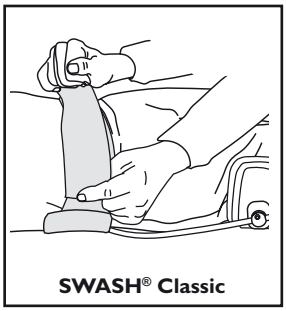
SWASH® Classic



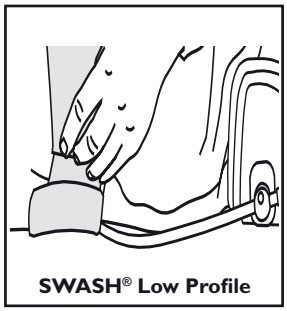
SWASH® Low Profile

Secure the thigh cuffs. Adjust the hook and pile closure and check for a snug but comfortable fit.

CHECKING THE FIT

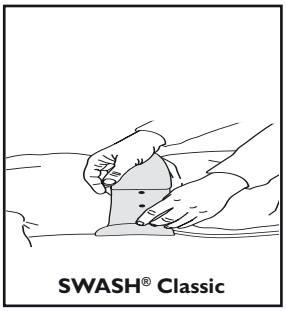


SWASH® Classic

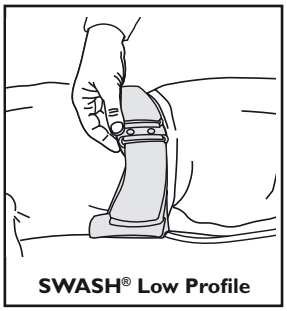


SWASH® Low Profile

1. Check the height and rotation of the orthosis on the child. Make sure that the pelvic section is located below the naval and encases the ASIS, and that the patient is not rotated in the orthosis.

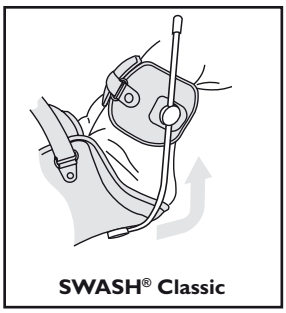


SWASH® Classic

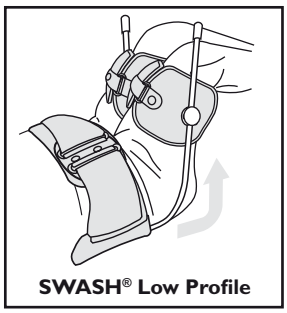


SWASH® Low Profile

2. Insert at least three fingers of one hand between the padding and the abdomen to assure a comfortably snug fit and the patient's comfort.

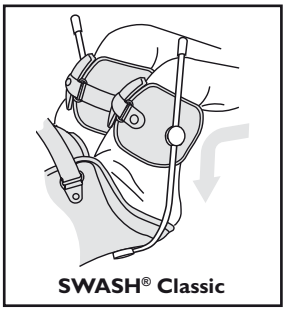


SWASH® Classic

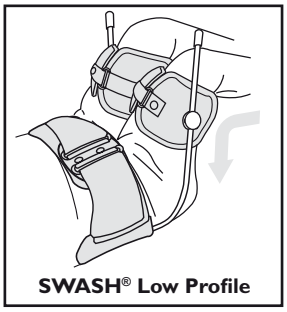


SWASH® Low Profile

3. Flex the hips to 90° to check the position of the uprights relative to the greater trochanters. The uprights should be as close as possible to the greater trochanters without impinging on them with the hips flexed. If there is impingement or if the distance is too great, remove the orthosis and adjust the distance of the uprights through the hip joint assemblies. Check to be certain that the desired abduction setting has not been altered. Re-apply the orthosis.

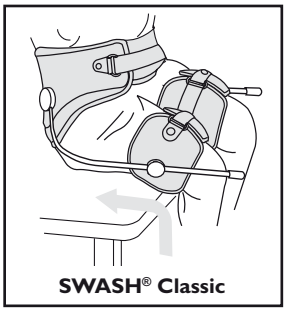


SWASH® Classic

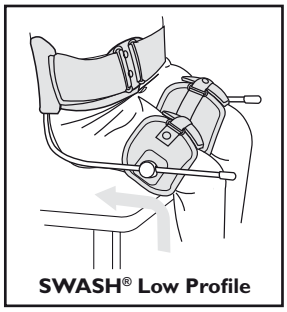


SWASH® Low Profile

4. Check both limbs with the knees at 90° that there is no impingement on the popliteus or the gastrocnemius. If the thigh cuffs are too high or if they are too low and causing impingement on the popliteus or the gastroc, mark a more appropriate height on the upright, remove the orthosis, and adjust the cuffs to the new position.



SWASH® Classic



SWASH® Low Profile

5. Have the patient sit on a bench. Check that the location of the retaining rings are symmetrical and are not hitting the sitting surface. Check waist band tightness while sitting.

INITIAL FUNCTION EVALUATION & CUSTOMIZATION





Sitting
Stability during sitting is usually a fairly immediate improvement with the SWASH®. Sometimes a few minutes of fun activities may be required to learn that now they do not have to touch balance to sit comfortably. More time will allow them the opportunity to improve reaching and other upper extremity functional capacities and a more erect posture.



Standing
Many children will demonstrate a more erect and stable standing posture. It may take some time to become acclimated to their new posture and elevation. Cervical hyperextension and spinal rotation should diminish as pelvic stability increases. Improvements in standing balance and stability may be demonstrated after a few hours or days.

Walker, Standing Frame, and/or Crutch Height
Evaluate the height of any external walking aids with the patient wearing the SWASH®. They will often need to be raised to accommodate to the new stance height.

Walking
In initially setting up the orthosis, it is difficult to judge the amount of abduction required to eliminate scissoring during gait. The goal is for the thigh cuffs to come as close together as possible, yet offer sufficient abduction to improve hip alignment, posture and gait control, and prevent scissoring.

Customization
Patient continues to scissor:
If scissoring is still hindering gait, remove the orthosis and increase the amount of abduction. For minor increases in abduction, the thigh cuffs may be externally rotated. In some cases of higher adductor tone, it may be appropriate to exaggerate the amount of abduction to provide a wider base during gait just for the first week or two.

Toeing out
Suggest the patient be evaluated for external tibial or femoral torsion. Sometimes internal hip rotation can disguise tibial torsion, so even though the patient's feet don't toe-out without SWASH®, with SWASH® on and internal rotation minimized, the tibial torsion becomes more apparent.

Residual Internal Rotation
Even with the SWASH® in use, there may be residual internal rotation of the lower extremities. Very often, unless there are internal tibial torsion or metatarsus adductus issues, the medial hamstrings have been seen to exert this internal rotary influence. A walking program along with specific medial hamstring stretching has been seen to minimize this residual internal rotation.

INITIAL FUNCTION EVALUATION & CUSTOMIZATION

Too much trunk flexion

When sitting in SWASH®, ADduction of the legs along with tight hamstrings may produce a posterior rotary influence on the pelvis, creating a flexion influence on the trunk. This is more pronounced with the use of 123 degree uprights and less pronounced with the 115 degree uprights.

If the condition persists, try one or a combination of the following:

a) Change position of thigh cuffs from distal femur to distal 2/3 femur.

b) Set the hip joints for less abduction.

c) Rotate the thigh cuffs laterally, increasing the 10° lateral rotation that is generally recommended.

d) Depending on the patient, additional anterior or posterior padding may stimulate a proprioceptive response to shift into more trunk extension:

1. Add a longer foam pad to the posterior aspect of the pelvic band or add a sitting wedge (thicker part under seat, narrow part under legs).
2. Insert a thin pillow or foam pad (slightly larger than the abdominal pad) between the abdominal pad and the abdomen.

Too much trunk extension:

a) Check the style (115 or 123 degree) of the uprights (find this engraved or on a blue label on the upright). The 123 degree will influence more flexion.

b) Recommend the child always sit in a chair with a back rest; if needed include a hip strap to avoid sliding forward.

c) Set the hip joints for slightly more ABduction. This will increase the flexion influence of the orthosis on the trunk.

Interference with Baclofen Pump or Feeding Tubes

This is not usually an issue with the Low Profile model since it has less abdominal coverage, but can be an issue with the SWASH® Classic. Upon approval from the referring physician, use a heat gun to "bubble out" the plastic, allowing space for the pump. Or, cut a hole large enough for relief of the pump and then use a heat gun to flare out the edges so they are not pressing on the tissue around the pump.

Pressure on the rib cage

This is usually due to thigh cuffs being fit too distally on the thigh. Move the cuffs up to approximately 2/3 distal on the thigh.

Cuffs are too large

There are two options: The cuffs can be trimmed and straps adjusted accordingly. Or, go to the next smaller size cuff. For SWASH® Classic, cuffs are interchangeable for sizes 2-4. In addition, there is a special size 1A cuff that will fit the 7 mm uprights on larger sized units.

Cuffs are too small

Fit the next larger sized cuff.

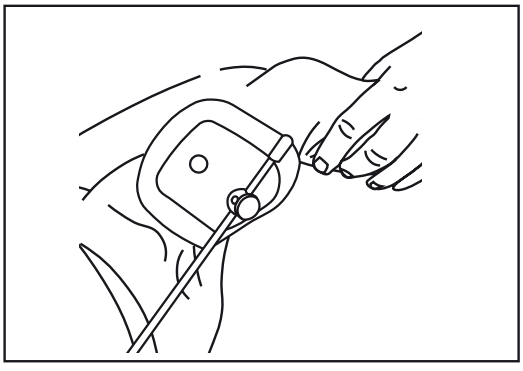
Posterior section of SWASH® Classic is too long

Verify correct sizing. If size is correct, trim posterior section with heavy duty shears.

THE PROFESSIONAL FINISH

Post-Fitting Evaluation

Congratulations! You are now ready for the Post-Fitting Evaluation (Refer to Clinical Manual). Be sure to document the Post-Fitting Evaluation so you have a record of functional improvement when compared to the Pre-Fitting Evaluation.



Cut the uprights to proper length

Once the team has approved the orthosis, the uprights should be trimmed so that the distal tips are at the same level as the bottom of the padding on the thigh cuffs. Ensure the ends are rounded and polished smooth. Push on the protective rubber tips.

Teach caregiver to apply

Demonstrate and then ask the caregiver to apply and remove the orthosis to help assure appropriate caregiver compliance.

Protocols and proper fit guidelines

You will find this in the Clinical Manual.

Benefits and outcomes

This is in the Clinical Manual and may help in the preparation of documents for submission for insurance.

Frequently asked questions

Also in the clinical manual, this contains many of the questions asked by both referral sources, therapists, patients, and caregivers.

SWASH® Referencelist

1 R. N. Boyd et al., The effect of botulinum toxin type A and a variable hip abduction orthosis on gross motor function: a randomized controlled trial. European Journal of Neurology 2001, 8 (Suppl.5): 109-119.

2 Dianne Russel et al., Canada Child Centre for Childhood Disability Research, Hamilton, Ontario, Canada, AACPDM Conference, Washington, DC, 1999

3 Danielle Truscelli, Philippe Toullet, Philippe Lancert, SWASH Preliminary report published on the French medical publication "la letter de medicine physique & de réadptation" December 1999

4 Report from "The 15th Scientific Meeting of the Japanese Society of Prosthetics and Orthotics", November 27 - 28, 1999, Hiroshima.

5 Dormans, J.P., Pellegrino, L., Caring for Children with Cerebral Palsy, A Team Approach. Baltimore: Paul H. Brookes Publishing Co., 1998.

6 Batshaw, Mark L., Children with Disabilities. Baltimore: Paul H. Brookes Publishing Co., 1997

7 R.N. Boyd, S.G. Manion, Effect of the Variable Hip Orthosis, Newcomen Centre, Guy´s Hospital, London, England, Interbor Conferece, Oslo, 1996

8 R.N. Boyd, New Horizons in Cerebral Palsy, ISPO Melvourne Australia 30-31 March 1995

9 Atyer-Acevedo, Jane, Physical Therapy for the Child with Cerebral Palsy. Pediatric...

10 Physical Therapy, Second Edition, Philadelphia: J.B. Lippincott Company, 1994

11 Scherzer, Alfred, Tscharnuter, Ingrid, Early Diagnosis and Therapy in Cerebral Palsy, New York: Marcel Dekker, Inc. 1990

12 Houkam et al., Treatment of Acquired Hip Subluxation in Children with Cerebral Palsy, Journal of Pediatric Orthopedics, Vol. 6, No. 3, New York: Raven Press, 1986

13 Folio R., Fewell R., Peabody Developmental Motor Scales and Activtiy Cards, Chicago: The Riverside Publishing Co., 1983

14 Paul A.R. Meyer, MRCP, A Variable Abduction Brace to Treat Hip Subluxation in Cerebral Palsy, Addenbrooke´s Hospital, Cambridge, England

15 Jan F.A. Smits, A New Approach for Dynamic Hip Orthotic Management of the Child with Cerebral Palsy

April 2009

CE

allard INT

www.allardint.com

ALLARD INTERNATIONAL
c/o Camp Scandinavia AB
Karbingatan 38
SE-254 67 Helsingborg SWEDEN
info@allardint.com

Tel +46 42 25 27 00
Fax +46 42 25 27 25