

SWASH® “STEADY” AND “GO” CERTIFICATION EXAM

Documents to Read

Table of Contents

SWASH® Brochure	Pg 2
SWASH® Fitting Manual	Pg 6
SWASH® Clinical Manual	Pg 21
NDTA SWASH® Article	Pg 39
SWASH® Sizing Chart & Spare Parts List	Pg 44

READY STEADY GO!

A fresh new look for the world's only
VARIABLE abduction hip alignment orthosis!



Hip alignment and controlled
mobility with maximum torso
and pelvic support



Hip alignment and controlled
mobility with low profile
pelvic support

SWASH[®] - **S**itting • **W**alking • **A**nd • **S**tanding • **H**ip orthosis
Only FUNCTIONAL Hip Orthosis that does not block ROM

2 MODELS to meet specific needs of your patients!



SWASH STEADY *(Replaces previous SWASH Classic)*

Has a polyethylene pelvic section that extends from L2/L3 to distal margin of the sacrum, providing maximum thoracic and pelvic support. Patients with low trunk tone and/or very limited trunk control strength may benefit from the increased posterior and lateral support this design offers.

GUIDELINES FOR SELECTION:

- When maximum trunk control is required, i.e., candidates who lack muscle strength or upper body control to sit upright.
- When patient is primarily non-ambulatory (GMFCS IV - V)
- When the greater pelvic coverage triggers more desirable neuro-sensory motor response.

SWASH GO *(Replaces previous SWASH Low Profile)*

Has an aluminum posterior frame that extends from approximately L2/L3 to S1/S2, with an iliac extension.

GUIDELINES FOR SELECTION:

- When primary goal is to control scissoring gait.
- When patient has limited space between the iliac crest and the rib cage.



NEW FEATURES & BENEFITS

Improved Patient Compliance

Soft attractive and durable fabric covers for pelvic section and thigh cuffs.

Easier and Faster Donning & Doffing Low profile quick-release buckles



Manage heavy adductor tone

Heavy duty 8 mm uprights on both models

Reduced Inventory

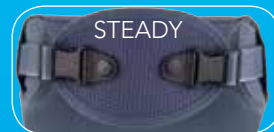
Uprights & Cuffs are interchangeable for all sizes SWASH STEADY & GO*.

Less Interference with Posterior Walkers

Both models have angled low profile hip joints*

Symmetrical Pelvic Section Closure

Both models have abdominal pads with cinch closure for easy symmetrical application.



*Except STEADY Size 1, which has 6 mm uprights and thigh cuff retaining rings.

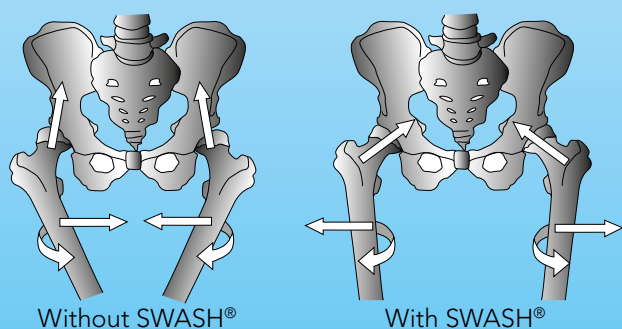
INCREASE YOUR REFERRALS FOR SWASH

(which often also results in increased referrals for AFOs)

Share with your therapist...

Functional benefits of SWASH

- Dynamic Function - no blocked function.
- Transfers adductor tone from its negative muscle recruitment affects to directing the muscles to achieve more positive postural positioning.
- Proper alignment encourages tri-planar function for proper closed chain muscle function.
- Controls amount of adduction for improved sitting, standing, and if ambulatory, walking functions.
- Encourages greater trunk extension for improved postural positioning.



Rehab Program Benefits

(often serves as "extra hands" for the therapists)

Posture Assistant

High adductor tone affects posture of the entire body, often resulting in slouched posture. SWASH moves the center of gravity from posterior to mid-trunk alignment. For the right candidates, this is a significant improvement in cervical and thoracic posture.

Training Assistant

Often used in a clinic setting to train patients to sit, stand, and walk with good body mechanics. Improved thoracic and head position often "opens the airways" to assist with speech training.

Exercise Assistant

For Pediatrics: The orthosis serves as "extra hands that grasp the hips" to assist with the rehabilitation program, i.e., sit-to-stand exercises and if ambulatory, lower extremity strengthening exercises. For Adults: Variable abduction allows more natural anatomical adduction "bicycle" pattern movements without need for cumbersome wedge pillows.

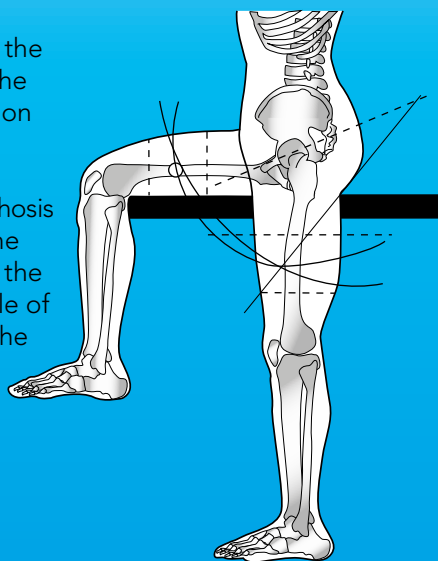
Gait Assistant

If ambulatory, the orthosis provides just enough abduction to prevent scissoring and medial femoral rotation so they can walk further and longer distances without their feet tangling.

HOW SWASH HELPS ACHIEVE AND MAINTAIN PROPER HIP ALIGNMENT

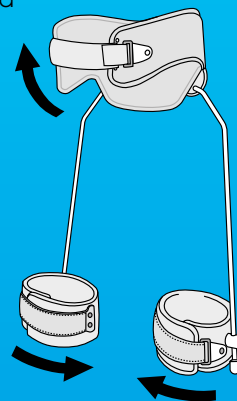
The pathways of motion of the SWASH thigh cuffs mimic the "normal" pathways of motion of the femurs.

This is designed into the orthosis through combinations of the angle of the pelvic band in the sagittal plane, and the angle of the hip joint assemblies in the transverse plane.



Exerts an external rotary influence on the lower limbs, influencing the knees toward extension and the trunk becomes more erect.

As SWASH reaches its limit for adduction, it transfers adductor force proximally to assist anterior rotation of the pelvis to help achieve a more erect postural position.



S.W.A.S.H.[®] STEADY & GO SIZING GUIDE

PELVIC SECTION

Measure:

SWASH[®] STEADY - At level of the natural waist for maximum trunk stability.

SWASH[®] GO – At the level of the ASIS. Ideal is to fit the orthosis at mid-pelvic girdle to obtain good pelvic stability.

Size	Sizes Available		Circumference	
	STEADY	GO	Adjustment Range	
1	✓	✓	400-465mm	15 ¾-18 ¼in
2	✓	✓	460-550mm	18-21 ¾in
3	✓	✓	540-630mm	21 ¼-24 ¾in
4	✓	✓	620-720mm	24 ½-28 ¼in
5	N/A	✓	710-810mm	28-32in
6	N/A	✓	800-900mm	31 ½-35 ½in

THIGH CUFFS

Measure at distal thigh, just proximal to the condyles. Ideal is to fit the cuffs as distal as possible without creating pressure or interference in the popliteal area. 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.

Size	Sizes Available		Circumference	
	STEADY	GO	Adjustment Range	
1	✓	✓	210-250mm	8 ¼-9 ¾in
2	✓	✓	250-290mm	9 ¾-11 ½in
3	✓	✓	290-330mm	11 ½-13in
4	✓	✓	330-380mm	13-15in
5	✓	✓	380-440mm	15-17 ¼in
6	✓	✓	440-500mm	17 ¼-19 ½in

UPRIGHTS

Measure waist to mid-patella. At final fitting, should be shortened to level of distal thigh cuff padding.

115° = narrow sitting base

123° = wide sitting base

Size	Upright Diameter		Waist to Mid-Patella	
	STEADY	GO		
1	6mm	8mm	310mm	12 ¼in
2	8mm	8mm	375mm	14 ¾in
3	8mm	8mm	440mm	17 ¼in
4	8mm	8mm	480mm	19in
5	8mm	8mm	540mm	21 ¼in
6	8mm	8mm	600mm	23 ½in

Size	Model	PELVIC STEADY	PELVIC GO	THIGH CUFFS	UPRIGHTS 115 Deg.	UPRIGHTS 123 Deg.
1	STEADY	288520001		288540601	288550601	288560601
1	GO		288530001	288540801	288550801	288560801
2	STEADY & GO	288520002	288530002	288540802	288550802	288560802
3	STEADY & GO	288520003	288530003	288540803	288550803	288560803
4	STEADY & GO	288520004	288530004	288540804	288550804	288560804
5	STEADY & GO	N/A	288530005	288540805	288550805	288560805
6	STEADY & GO	N/A	288530006	288540806	288550806	288560806

NOTE: Color Coding indicates interchangeable components.

Now Available: SWASH[®] Classic & Low Profile Item Number conversion table:

E-mail info@allardusa.com or call 888-678-6548 if you would like to receive a table to assist in converting current Classic and Low Profile item numbers to new STEADY & GO item numbers.

allard^{USA}



↑ steady
SWASH®

↶ go
SWASH®



MANUAL

Fitting and Customization

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

TABLE OF CONTENTS

SWASH® components	4-5
Product selection	6-7
Product size & upright selection	8
Assembly	9
Initial application	10
Initial adjustments	11
Initial fitting	12
Check the fit	13
Initial function, evaluation & customization	14-15
The professional finish	15

- Prescription Required
- Single Patient Use Only.
- The product must be fitted by or under the supervision of a Certified Orthotist Prosthetist, Certified Orthotist or equivalent medical professional.

Prerequisite reading:

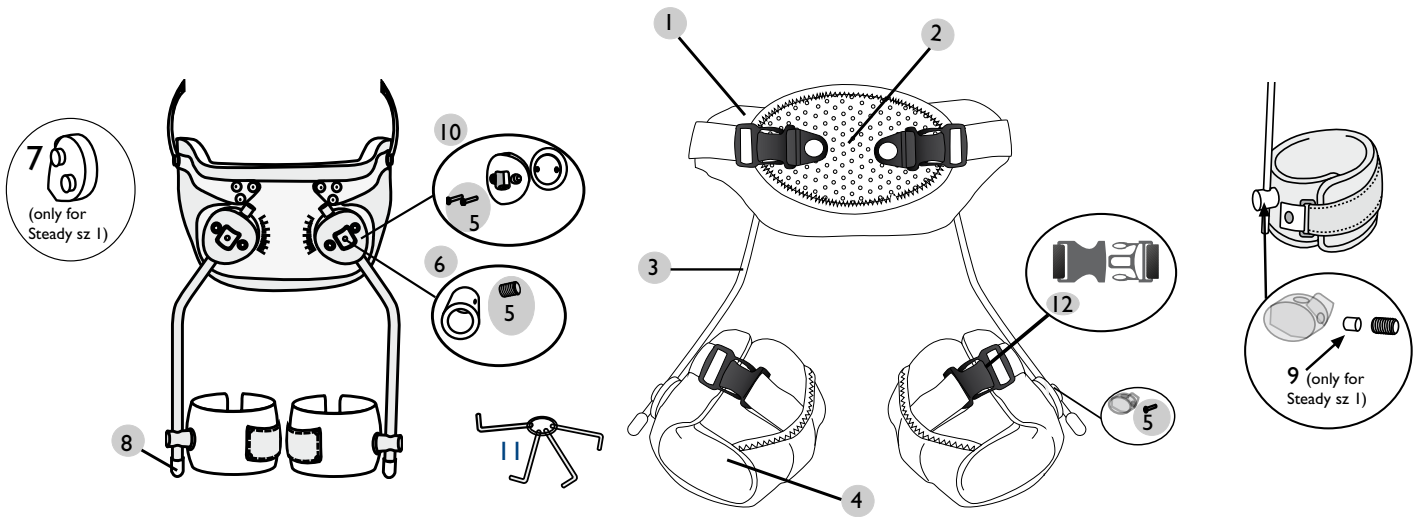
For a successful fitting, read the following sections included in the SWASH® Clinical Manual (available separately):

- 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. Overcome excessive hip adduction to better align the femoral head in the acetabulum to help prevent hip displacement and facilitate more normal development.
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)

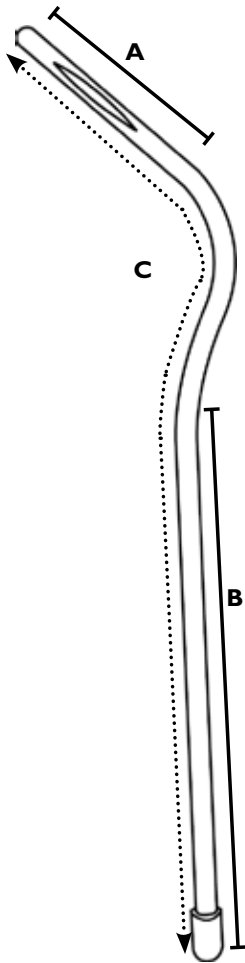
SWASH[®] COMPONENTS



No.	Description	Unit	STEADY	GO
1	Pelvic Padding with Abdominal Pad	1 set	28857	28858
2	Abdominal Pad	1 pcs	28860	28860
3	Upright 6 mm 115°, size 1 only	Pair	28855-06	
3	Upright 8 mm 115°	Pair	28855-08	28855-08
3	Upright 6 mm 123°, size 1 only	Pair	28856-06	
3	Upright 8 mm 123°	Pair	28856-08	28856-08
4	Thigh Cuffs Padding	Pair	28859	28859
5	Screw Kit, size 1		28861-06	
5	Screw Kit, size 2 - 6		28861-08	28861-08
6	Clamp Ring Set, size 1	2 pcs	28862-06	
6	Clamp Ring Set, size 2 - 6	2 pcs	28862-08	28862-08
7	Boss Cover, size 1	2 pcs	28863-06	
8	Upright End Cover, size 1	2 pcs	28864-06	
8	Upright End Cover, size 2 - 6	10 pcs	28864-08	28864-08
9	Brass Bushing, size 1	10 pcs	28865	
10	Hip Joint Set, size 1	2 pcs	28866-06	
10	Hip Joint Set, size 2 - 6	2 pcs	28866-08	28867-08
11	Allen Wrench Key Set	1 set	28868	28868
12	Buckles 25 mm, for size 1 - 3	2 pcs	28869-25	28869-25
12	Buckles 38 mm, for size 4 - 6	2 pcs	28869-38	28869-38

This product should only be fitted by a certified professional.

SWASH® COMPONENTS

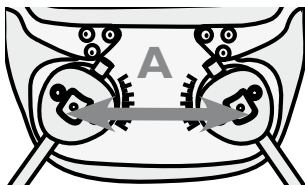
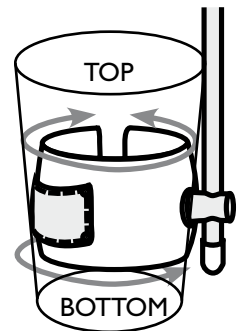


Upright lengths

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	STEADY A		GO 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 at all possible, meet with the physician, physical therapist and caregiver to determine the primary and secondary goals for using a SWASH. If this is not possible, try calling them to make sure their expectations are understood. This will affect whether you select SWASH® STEADY or SWASH® GO, 115 or 123 degree upright, plus the abduction adjustment you make to the orthosis. The Pre-Fitting Evaluation (see SWASH® Clinical Manual) is key to success and, combined with the Post-Fitting Evaluation (see SWASH® Clinical Manual) serves as a means for you to document outcomes.



SWASH® STEADY

SWASH® STEADY Pelvic Section is available in sizes 1-4. SWASH® STEADY size 1 is designed for infants or very small children. The STEADY size 1 uprights are 6mm diameter. The smaller diameter uprights on size 1 allow more “spring”, permitting less restriction of movement. This is often desirable for the developing infant. To accommodate these smaller diameter uprights the retaining rings in the pelvic section and cuffs are also 6mm diameter. The STEADY size 1 pelvic section, cuffs, and uprights are not interchangeable with other sizes.

Sizes 2-6 uprights are 8mm diameter and retaining rings in the pelvic section (sizes 2-4) and cuffs (sizes 2-6) are also 8mm diameter so they are interchangeable.

SWASH® GO

SWASH® GO uses a padded iliac extension that can be positioned in one of two places: It can be fit immediately above the iliac crest between the crest and the inferior angle of the costal margin, or it can be fit at the level of the ASIS between the iliac crest and the greater trochanter. The latter is used to minimize any influence towards lumbar flexion when sitting.

SWASH® GO Pelvic Sections, Cuffs, and Uprights are available in sizes 1-6. 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® STEADY

- 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® GO

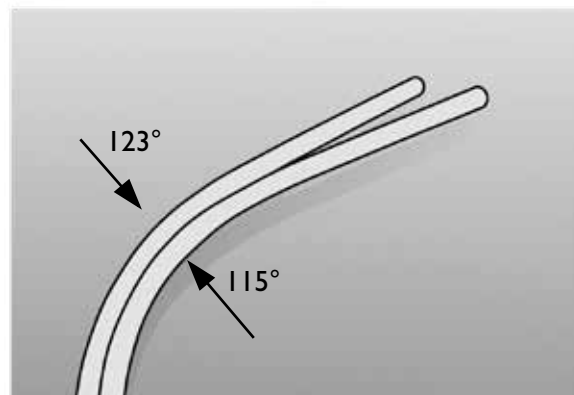
- When the primary goal is to control scissoring gait.
- When wearer has limited space between the iliac crest and the rib cage.
- When the lower profile height is better anatomically tolerated by the patient.
- When the lower profile design is cosmetically more acceptable for the patient or caregiver.

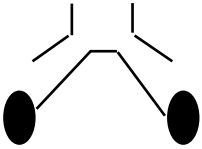
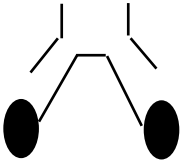
*All uprights are 8mm diameter except Steady size 1.

115 or 123 Degree Uprights?

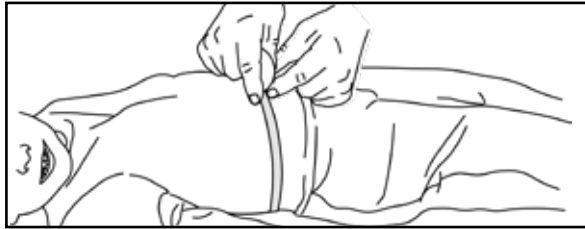
SWASH® is available with either 115° or 123° uprights. This refers only to the fixed angle of the most proximal visible curve in the uprights – it does NOT refer to the exact degree of abduction obtained while wearing the orthosis.

Standing and walking functions of both uprights are very similar. Generally the difference between the two are related to abduction in sitting, with the 123° uprights creating greater amount of abduction.

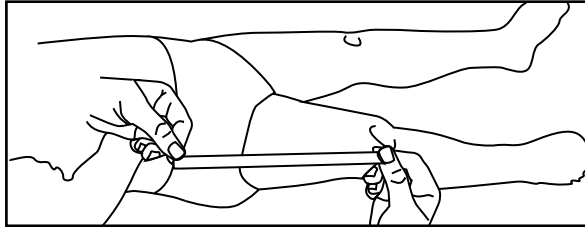


 <p>123°</p>	<p>123 Degree - Wide Sitting Base</p> <p>When the greatest amount of adductor muscle lengthening in the sitting position is desired.</p> <p>When more trunk lumbar flexion influence is desired when sitting.</p> <p>When more lumbar extension is desired during gait.</p>
 <p>115°</p>	<p>115 Degree - Narrow Sitting Base</p> <p>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.</p> <p>Adductors are too tight and the amount of abduction when sitting in the 123° uprights would be impossible or painful.</p> <p>When less trunk flexion influence is desired when sitting.</p>

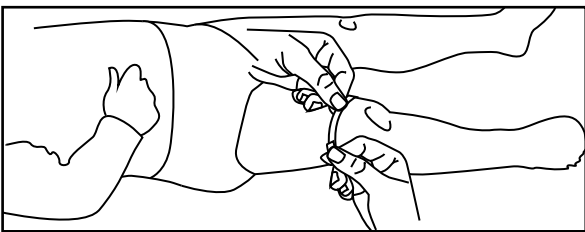
PRODUCT SIZE & UPRIGHT SELECTION



PELVIC SECTION CIRCUMFERENCE



UPRIGHT LENGTH



THIGH CIRCUMFERENCE

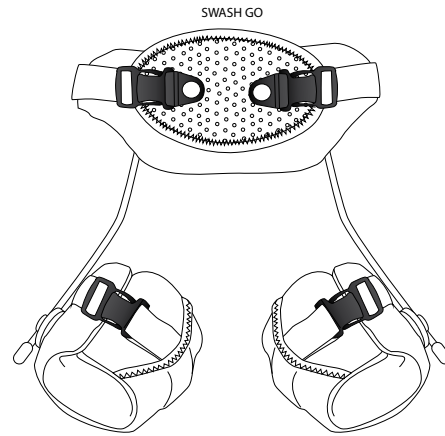
Pelvic section circumference

Measure

SWASH® STEADY - At level of the natural waist for maximum trunk stability. SWASH® GO - At the level of the ASIS. Ideal is to fit the orthosis at mid-pelvic girdle to obtain good pelvic stability.

Thigh circumference

Measure at distal thigh, just proximal to the condyles. Ideal is to fit the cuffs as distal as possible without creating pressure or interference in the popliteal area. 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.



Upright length

Measure waist to mid-patella. At final fitting, should be shortened to level of distal thigh cuff padding.

115 = narrow sitting base

123 = wide sitting base

Upright diameter

All uprights are 8mm diameter except SWASH® STEADY size 1 which are 6mm diameter.

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 may be trimmed if necessary.
- The waist band on SWASH® GO may be shaped to fit slightly larger or smaller waist circumferences.

Interchangeability of Components

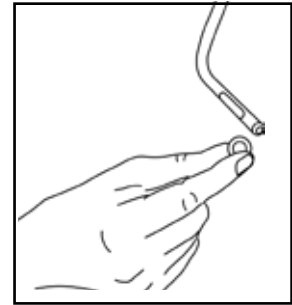
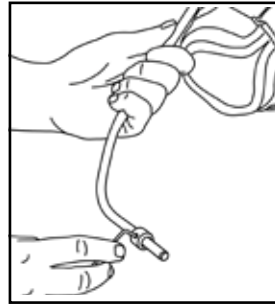
- The sizes for all Pelvic Sections, Uprights, and Cuffs are interchangeable EXCEPT SWASH® STEADY Size 1.
- The uprights almost always require trimming (after final fitting approval) so that the distal tips are level with the bottom of the cuff padding.

SWASH® SIZING CHART

Dimensions in mm and inches.	Pelvic section Circumference		Thigh cuffs Circumference		UPRIGHTS						
					Diameter	Overall Length		Proximal Width		Distal Length	
Size 1	400 - 465	15 ¾ - 18 ¼	210 - 250	8 ¼ - 9 ¾	STEADY = 6 GO = 8	310	12 ¼	63	2 ½	175	7
Size 2	460 - 550	18 - 21 ¾	250 - 290	9 ¾ - 11 ½	8	375	14 ¾	80	3 ¼	215	8 ½
Size 3	540 - 630	21 ¼ - 24 ¾	290 - 330	11 ½ - 13	8	440	17 ¼	80	3 ¼	280	11
Size 4	620 - 720	24 ½ - 28 ¼	330 - 380	13 - 15	8	480	19	80	3 ¼	320	12 ½
Size 5	710 - 810	28 - 32	380 - 440	15 - 17 ¼	8	540	21 ¼	90	3 ½	370	14 ½
Size 6	800 - 900	31 ½ - 35 ½	440 - 500	17 ¼ - 19 ½	8	600	23 ½	100	4	420	16 ½

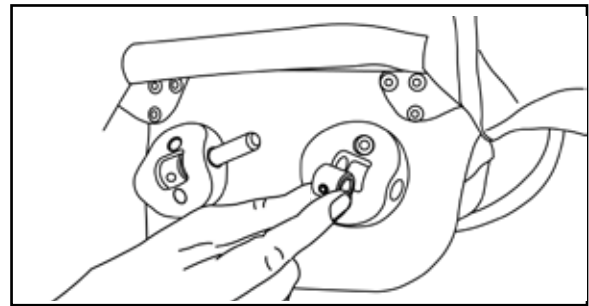
1. Remove retainer rings from the uprights

The uprights are labeled "R (right)" and "L (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

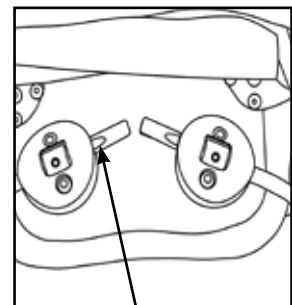
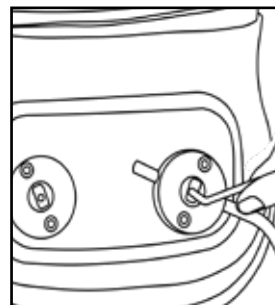
Insert the retainer rings into the center of the hip joint with the hex-screw pointing up.



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.



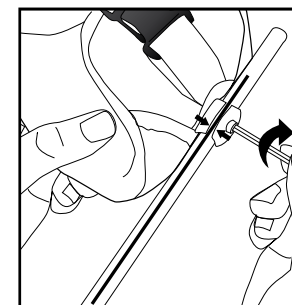
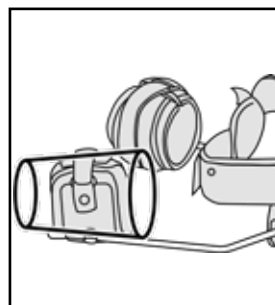
Groove must face up.

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.

5. Apply thigh cuffs

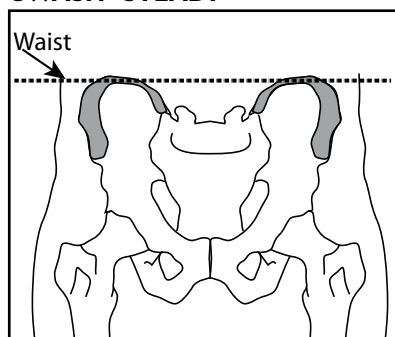
Remove rubber tips from bottom of uprights. Slide the thigh cuffs onto the uprights, making sure right cuff is on right upright and left cuff is on left upright (cuffs are cone shaped - greater circumference should be at the top and straps should close to lateral side). For initial placement, the vertical line on the upright should be visible in the closure opening in the retaining ring. Use Allen key to secure in position. Replace rubber tips to ends of uprights.



INITIAL APPLICATION

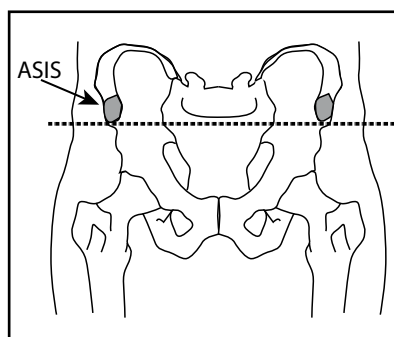
I. Position the orthosis on the patient in supine position

SWASH® STEADY



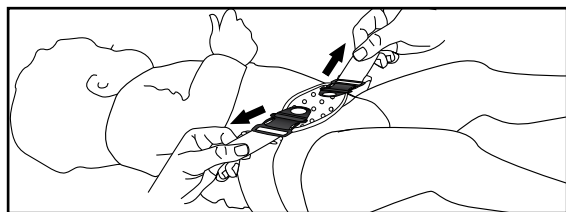
For maximum trunk stability, the indentations on the lateral sides of the pelvic section should be at the level of the waist line so that the bottom half of the pelvic section covers the iliac crest. Check that pelvic section is at same height on both sides and not rotated on the patient.

SWASH® GO



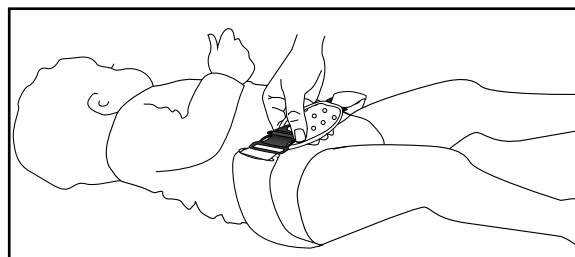
For maximum pelvic stability, position at level of the ASIS between the crest of ilium and the greater trochanter. Ideal is to fit the orthosis at mid-pelvic girdle to provide comfortable control of the pelvis.

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.



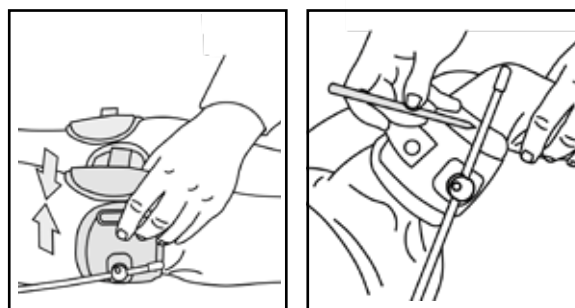
2. Size the orthosis to fit the patient:

Center the abdominal pad on the abdomen. Feed the straps on the pelvic section through the D-Rings on the buckles and symmetrically pull the straps until the abdominal pad is comfortably snug. Feed the loose end of the straps into the opening in the pelvic section padding and secure by pressing into the Velcro.



3. Check the fit of the abdominal pad:

With hips alternately flexed and extended, slide the fingers of one hand between the abdominal pad and the abdomen to ensure a snug yet comfortable fit.



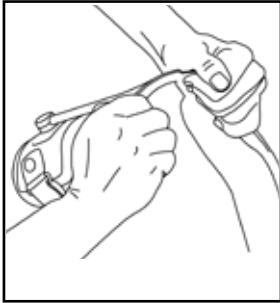
4. Thigh cuffs

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. When making cuff height adjustments, check that the vertical line on the upright is visible through the opening on the retaining ring. 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

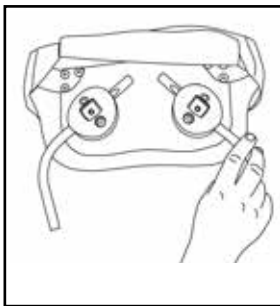
Remove the orthosis from the patient. Make all necessary changes to the orthosis while it is off the patient.

Pelvic band adjustments

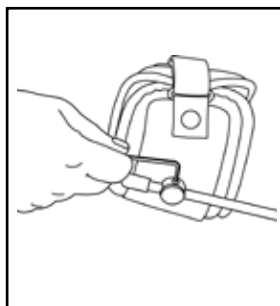


SWASH® GO: If based on your observations you need a closer fit of the metal frame, remove the cloth cover and hand shape the frame that forms the iliac extension. Be sure to maintain symmetry.

Adjust uprights for hip clearance

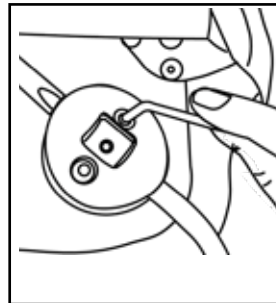


Adjust equally the distance that the upright passes through the hip joint assembly and tighten. This setting may need to be changed after the orthosis is tested on the patient.

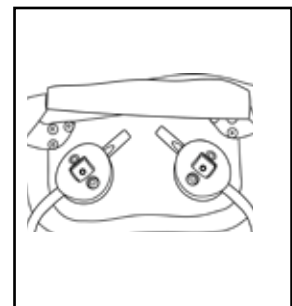
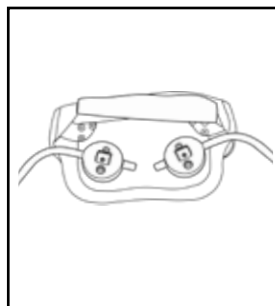


Move thigh cuff to the marked position on uprights, rotate slightly laterally and tighten. Move other thigh cuff to the same height and rotation.

Abduction settings



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.



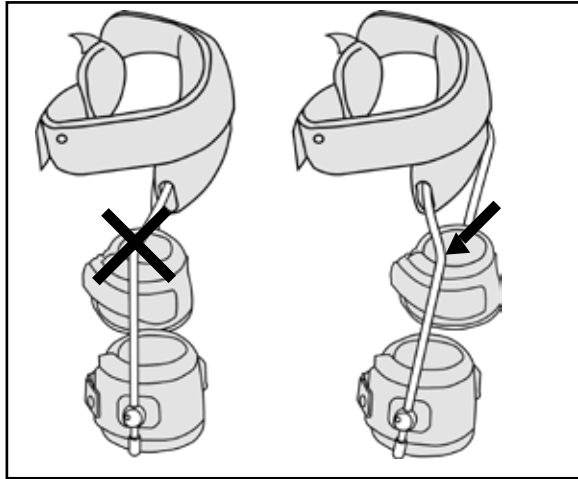
More (left photo) or less (right photo) abduction may be needed depending on the child's hip alignment and functional performance.

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 patients 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.

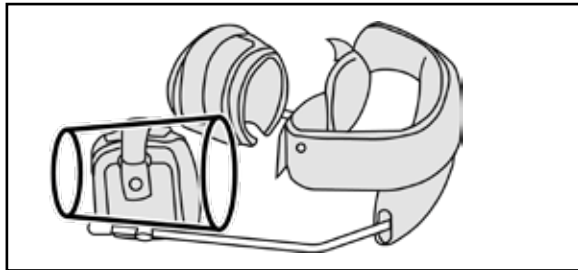
INITIAL FITTING

Final product check before fitting



Are the uprights in correct **RIGHT** and **LEFT** positions?

There is an engraving or black 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.

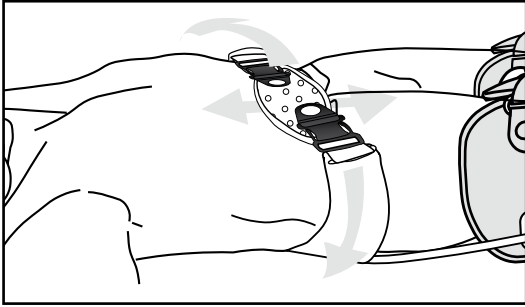
Are all settings symmetrical?

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.

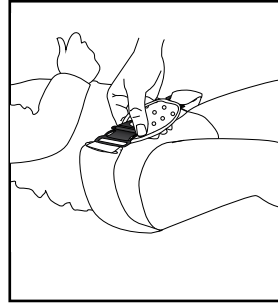
Do the uprights move freely and easily?

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.

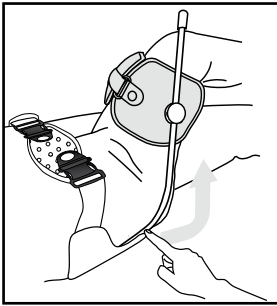
CHECKING THE FIT



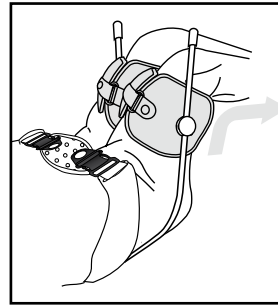
1. Check the height and rotation of the orthosis on the patient, making certain everything is symmetrical.



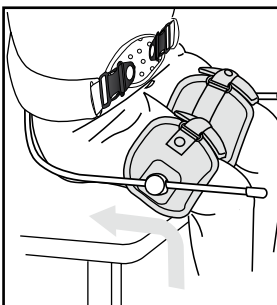
2. Slide the fingers of one hand between the abdominal pad and the abdomen to assure a comfortably snug fit and the patient's comfort.



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.



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.



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 abdominal band tightness and comfort 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.

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.

Does abduction angle offer optimum function?

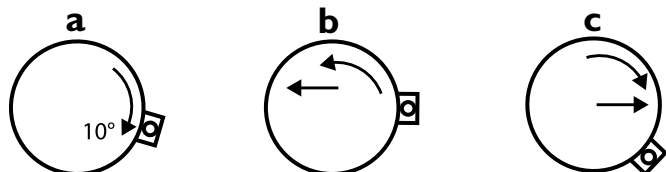
Significant Abduction Angle Adjustments

If scissoring continues to hinder gait, remove the orthosis and increase the amount of abduction angle by rotating the hip joint assemblies. (see page 9 of this manual).

Fine Tuning Abduction Adjustments

To "tweak" the abduction angle to offer a tiny bit more abduction or adduction to (1) optimize gait or (2) prevent the retaining ring on the cuff from touching the sitting surface of the chair:

Note: all below illustrations are left side lateral view.



a) Start with 10° external rotation. This is considered the neutral position

b) To reduce Abduction (increase ADduction), internally rotate cuffs on uprights

c) To increase ABduction, externally rotate cuffs on uprights

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:

- Change position of thigh cuffs from distal femur to distal 2/3 femur.
- Set the hip joints for less abduction.
- Rotate the thigh cuffs laterally, increasing the 10° lateral rotation that is generally recommended.
- Depending on the patient, additional anterior or posterior padding may stimulate a proprioceptive response to shift into more trunk extension:
 - 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).
 - Insert a thin pillow or foam pad (slightly larger than the abdominal pad) between the abdominal pad and the abdomen.

Too much trunk extension:

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

Move to next smaller size abdominal pad.

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: (1) Verify it is correct size. If size is correct, cuffs can be trimmed and straps adjusted accordingly. (2) Go to next smaller size cuff. Cuffs are interchangeable for all SWASH® STEADY and GO components EXCEPT SWASH® STEADY size 1 Pelvic Section, Uprights, and Cuffs. SWASH GO size 1 Cuffs will fit on SWASH® STEADY size 2 Pelvic Section and Uprights.

Cuffs are too small

Go to the next larger size cuff. All cuffs are interchangeable EXCEPT SWASH® STEADY size 1.

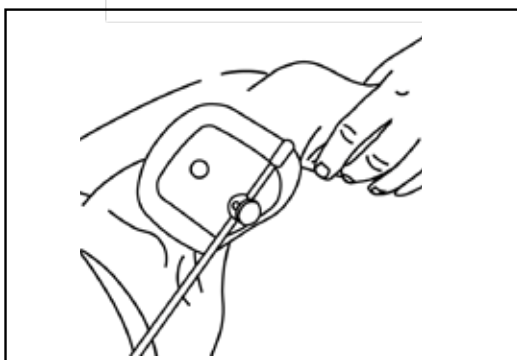
Posterior section of SWASH® STEADY is too long

If size is correct, remove cover and 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.



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S.W.A.S.H.[®]

Sitting Walking And Standing Hip orthosis

- Prescription Required
- Single Patient Use Only.
- The product must be fitted by or under the supervision of a Certified Orthotist-Prosthetist, Certified Orthotist or equivalent medical professional.



MANUAL

Clinical

TABLE OF CONTENTS

History of Development	4
Biomechanics of SWASH®	5
Hip Stabilization	6
Functional Influence	7-8
Indications & Contraindications	9
Candidate Selection	10
Product Selection	11-12
Pre- and Post-fitting functional evaluations	13
Protocols and Proper fit guidelines	14-15
Benefits and Outcomes	16
Frequently asked questions	17
Fitting Assessment Chart	18
References	20

Acknowledgements

To Dr. Paul Meyer of Cambridge, England who took the time and the effort to design a way to help his daughter, Rebecca, and children everywhere with cerebral palsy.

To Bertil Allard, Past President and CEO of Camp Scandinavia AB, whose vision, commitment and perseverance have made the SWASH® available around the world.

And especially to the children with physical disabilities, whose love, enthusiasm and enduring spirit are an inspiration to all of us.

HISTORY OF DEVELOPMENT

In 1984, a four-year old girl with dystonic cerebral palsy developed subluxation of her left hip. She had been able to sit, stand and walk with support (albeit with scissoring). A fixed abduction brace was recommended to stabilize her hip, but her father was concerned about the negative side effects such a device could impart on "normal" function.

He researched medical literature published on use of hip orthotic devices, and concluded the "ideal" brace for his daughter must permit:

- Independent hip flexion
- Maximum abduction during hip flexion
- Minimum abduction - just enough to prevent scissoring during hip extension and weight-bearing
- Normal anatomical movement as the orthosis moves from minimum abduction with hip extension to maximum abduction with hip flexion

Based on the findings in available literature, the father concluded a device was required that:

- Would allow the child to pursue a more normal range of activities with reduced risk of hip dislocation
- Would further enhance acetabular modeling and development of the hip joint complex.

With this in mind, he set about to design his daughter a brace that uses the rotation of leg bars about an inclined pivot to achieve abduction which was continuously variable according to the degree of hip flexion. The result of this effort is the SWASH[®] (Sitting, Walking And Standing Hip) Orthosis.

The first commercial use of the SWASH[®] began in 1992. Since then, thousands of children and some adults worldwide with varying degrees of disabilities have been able to realize the functional and psychological benefits offered by the assistance of this innovative orthotic intervention.

Primary development goals of the SWASH[®]

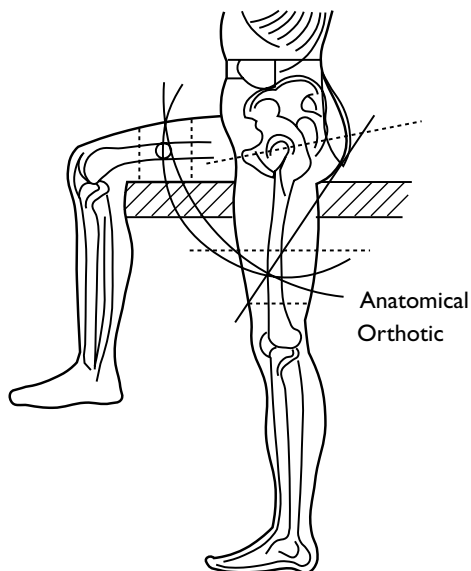
1. Increase abduction and stretch hip adductors to improve hip alignment
2. Prevent excessive adduction during sitting, standing and walking
3. Optimize sitting and standing posture
4. Achieve the above goals with an automatic transition from neutral (walking, standing) to abduction (sitting)

A Major Biomechanical Engineering Accomplishment

The SWASH® appears to be a relatively simple device, but looks can be deceiving. From the distal tip of one upright to the distal tip of the other, there are a combination of twenty-one (21) joints and angles in the SWASH®. Changing one angle affects the function of the other twenty.

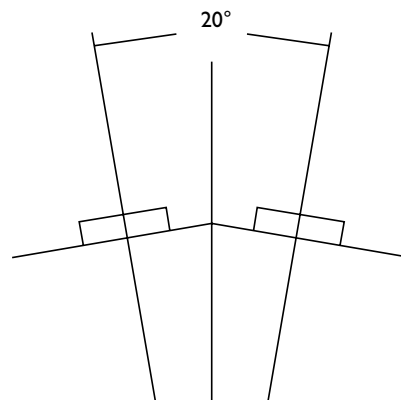
Anatomic vs. Orthotic Pathways of Motion

At first glance, it appears that the orthosis should cause significant "pistoning" of the thigh cuffs on the thighs, as the wearer moves from standing to sitting. The orthotic hip joints do not approximate the location of the anatomical hip joints. The orthotic joints are actually positioned closer to the sacroiliac joints than they are to the hip joints.



But in fact, the pathways of motion of the SWASH® thigh cuffs do mimic the pathways of motion of the femurs. This is designed into the orthosis through a combination of the angle of the pelvic band in the sagittal plane, and the angle of the hip joint assemblies in the transverse plane. Also contributing are the angles of the uprights through the hip joints, and the planes on which the angles on the uprights themselves are shaped.

The result of this tri-plane engineering is that "pistoning" of the cuff on the thigh is minimized.



Center of Gravity

Upon seeing the SWASH® orthosis, one would expect that the center of gravity would be posterior to the trunk. The joints are posterior, leading to the expectation that the center of gravity would also be posterior.

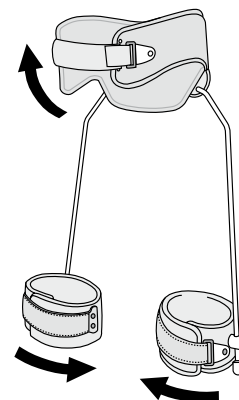
In fact, however, the tri-plane engineering again utilizes all the angles described previously to bring the center of gravity just anterior to L2, through the center of the trunk. Of most significance is the 20° angle in the transverse plane designed into the posterior section of the pelvic band. This angle moves the center of gravity from posterior to mid-trunk alignment.

Proximal Transfer of Adductor Tone

High adductor tone affects posture of the entire body. It drives the feet into pronation, internally rotates the lower limbs, and has a flexion influence on both the knees and the hips. This lower extremity reaction to adductor tone influences the trunk into a slouched posture.

It is theorized that as SWASH® overcomes adductor tone, two things happen. First, the biomechanical effect of the tone is reversed.

It exerts an external rotary influence on the lower limbs (without twister cables), the knees and hips are influenced more towards extension, and the trunk stands more erect. Second, as the SWASH® reaches its limit for adduction, it transfers adductor force proximally, assisting anterior rotation of the pelvis to help achieve a more erect postural position.



NOTE: Preliminary results of a 10- patient study reports there is no increase in adductor tone associated with the use of a SWASH®.

HIP STABILIZATION

The most visible benefits of the SWASH® are improvements in sitting and standing posture and stability, and for the ambulatory user, improvement in gait. The benefits can be immediate and are often dramatic. Continued improvements may be seen after the wearer has become acclimatized to the orthosis.

Given the visible benefits, perhaps the most important benefit the SWASH® offers is its influence on hip stability. The very nature of high adductor tone places dislocating forces on the hips. The internal rotation and adduction forces leave hips at risk. Data shows that ambulatory children with CP have a 30% incidence, and non-ambulatory children have a 60% incidence of hip subluxation requiring medical intervention.

Excessive adduction with internal rotation causes a posterior dislocating force, which is opposed by the SWASH® variable abduction brace. Although this may be expected to reduce the risk of hip dislocation, ongoing studies to document this benefit have not yet been completed.



ADduction
Internal Rotation
Unstable Alignment



ABduction
External Rotation
Better Alignment

This case example offers some insight into the effects of SWASH® to help prevent hip displacement over an extended period of time.



In this before fitting x-ray, pelvic obliquity and (R) hip subluxation are readily evident. The acetabulum is shallow and does not cover the femoral head.



At year two post fitting shows further improvement of the femoral head within the acetabulum.



One year post fitting shows improvement in pelvic angle and hip subluxation. Approximately 80% of the femoral head is now covered.



Three years post fitting shows normal pelvic angles and closer to normal hip development.

FUNCTIONAL INFLUENCE



Sitting Posture & Stability

Many individuals with neuromuscular disorders are very unstable during sitting due to spastic adduction leading to a narrow base of support. This is demonstrated by a typical slouched posture during sitting, along with the need for external assistance or the use of hands for "touch balance". While it is common to refer to one's "envelope of function", this type of sitting instability might be described as limiting one to a "cocoon of function", as hands are functionally tied down to the sitting surface.

When in the sitting position, SWASH® abducts the hips to create a wider tripod base for sitting stability. This wider base of support, combined with the spinal and pelvic support of the pelvic band, often provides sufficient postural assistance to open a whole new world for the user who otherwise is unable to sit without external assistance. Harnesses, wedges, and bolsters may often be considerably reduced if not eliminated.

The less involved child, who may be able to sit without external assist but requires use of the upper extremities for touch balance, may be able to sit independently when wearing the SWASH® - freeing the hands for eating, interacting with others, for more active participation in therapy programs, and for playing.

From the mild to the severely involved, the stable base for sitting will result in a more upright sitting posture - certainly

a significant benefit for hip and spine alignment. The opportunity for enhanced upper extremity function may also improve trunk strength and control.

Standing Posture & Stability

With a successful fitting, SWASH® may offer significant improvements in standing posture. Non-ambulatory wearers will often be better able to stand more upright in their standing frames with reduced external assistance. For the ambulatory wearer, there will often be improvements in trunk posture, reduced scissoring and a wider base of support for standing.

As a result of overcoming adductor tone and its biomechanical consequences, standing frames or walkers will generally need to be adjusted higher to accommodate the more erect posture.

Proprioceptive Implications

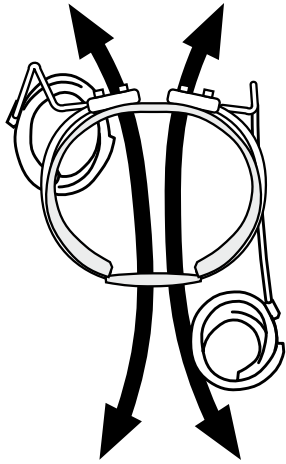
While the biomechanical aspects of the SWASH® may be relatively well understood, it is more difficult to understand the proprioceptive implications. In almost every instance, fitting the SWASH® will result in a decrease in spasticity and improved reach targeting of the upper extremities. The mechanism for this common outcome is not entirely understood.

FUNCTIONAL INFLUENCE

Gait Dynamics

SWASH® is the only hip orthosis that is designed to offer variable hip abduction - requiring no "unlocking" or other adjustments by the wearer or the caregiver.

For the ambulatory patient, this can offer significant functional benefits. With a successful fitting SWASH® can provide enough abduction to prevent scissoring during standing and gait. As the hips are flexed to the sitting position, the SWASH® uprights guide the femurs to further abduct the hips to create a tripod base for sitting stability and to stretch the hip adductors.



Control of scissoring gait, more upright posture, and ability to shift from standing to sitting and sitting to standing with minimal, if any, external assistance can offer numerous benefits for ambulatory candidate:

- They may ambulate with greater independence. Many children who have never taken more than a few steps without someone having to untangle their feet can now walk to the limits of their endurance without scissoring.
- SWASH® may help conserve energy. Without the energy consumed in attempting to stabilize the trunk and untangle scissoring feet, the child is often able to walk more fluidly for greater distances.
- With the ability to walk better and more independently, they will want to walk more, and their distance/walking may improve. Walking now becomes a means of getting from here to there instead of an exercise to be endured during supervised therapy sessions. With better gait biomechanics and greater gait capacity, they will be better able to participate in physical therapy protocols to increase muscle length and reduce tone in the hamstrings and calf group.



Respiratory and Speech Functions

The improved posture reduces the compromising of breathing capacity which can be a side affect of slouched posture. Many therapists have reported this improved posture can also have a positive impact on speech as a result of the improved breathing control and since the user can now bring the head and neck (less constriction of the vocal cords) into a more upright position.

INDICATIONS & CONTRAINDICATIONS

Indications

- Spastic Hemiplegia
- Spastic Diplegia
- Spastic Quadriplegia
- Risk of hip displacement (both ambulatory and non-ambulatory)
- Low trunk tone (may require customized combination with spinal jacket).
- Post-Botulinum Toxin A (Focal spasticity management)
A three year, randomized multi-centre trial with concealed allocation to either BTX-A and bracing and/or observation concluded: "Injections of BTX-A combined with SWASH® bracing reduces the rate of hip displacement and delays the need for orthopaedic surgery".
- Post-operative - For stabilization when abduction in both flexion and extension is required.
- Night Splint - This application can be especially useful if the child spends the first two or three hours of the day overcoming muscle shortening that occurred during sleep. It is recommended to first allow the child to become accustomed to wearing the brace during the day.

Contraindications

- Dislocated hips
- Fixed hip flexion contracture greater than 20°. There are no finite guidelines for use with non-fixed flexion contracture - this generally is dependent on wearer tolerance.
- Adductors so strong they overpower the SWASH® uprights (SWASH® Low Profile has larger diameter and therefore stronger uprights.)
- Adductor length so short it causes discomfort with SWASH® use in the sitting position
- If ambulatory, excessive tibial torsion or foot involvement, without physician assessment of impact SWASH® impacts on these conditions.

Precautions

- In patients with shortening of hamstrings, psoas, adductors, or Achilles tendon, great care should be taken when planning the orthotic and therapy program.
- SWASH® is not a treatment for hamstring tightness. If current therapy protocols include exercises to relieve hamstring tightness, it is important these exercises be continued as hamstrings will not be stretched in the SWASH®. Hamstring tightness should be monitored on a regular basis. Any signs of increased tightness should be specifically addressed.
- SWASH® does not eliminate the need for AFOs. Particularly for the ambulatory wearer, it is important to re-evaluate the AFO design as the needs may change as a result of the new stance and gait patterns that will result from wearing the SWASH®.
- SWASH® does not replace rehabilitation or the therapist. It does help overcome some of the major consequences of high adductor tone and therefore allows more specific and functional rehabilitation.
- Patients with spinal asymmetry or deformity may be unable to wear the SWASH®, or may require that the orthosis be incorporated into a custom body jacket.
- With time, for some wearers, spasticity of the adductors may reduce either due to wearing the orthosis or Botulinum Toxin A (BTX-A) injections. It is important on a regular basis to review the amount of abduction correction needed to maximize hip alignment and functional goals.

Limitations

- The SWASH® is not a cure-all for all postural problems. New movement and postural motor control patterns will have to be learned and gained. The SWASH® is seen as a device to facilitate these gains.
- If patients cannot walk at all without the SWASH®, it is highly unlikely they will be able to walk with the SWASH®.
- 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. An aggressive stretching program of the medial hamstrings has been seen to minimize this residual internal rotation.

CANDIDATE SELECTION

Since its introduction, physicians have prescribed thousands of SWASH® for patients from infants to adults, ambulatory and non-ambulatory, from mild to severe involvement - to protect hip alignment, improve the ability to sit independently or at least with reduced external assistance, improve sitting and standing posture, and for improvement of stepping for patients with scissoring postures.

The following are guidelines presented by subject area.

Age

The following age discussions are intended as a guide only, based on fitting experiences. However, it is important to remember every candidate and level of development varies at different ages, so there will definitely be exceptions in each age category:

Early Intervention (9 months - 2 years):

Both SWASH® and SWASH® Low profile will fit an infant as young as 9-10 months. SWASH® has been widely prescribed for infants at risk for spastic hip displacement. When properly fitted, SWASH® will not interfere with crawling. For the child that may be able to learn to walk, SWASH® can often help them to better stabilize as they pull themselves up on furniture. For the child who may only be able to sit, the wide abduction base may help them achieve a more stable position.

2 - 6 years

This age group will generally adapt to the SWASH® very quickly. They tend to accept quite readily the correction it offers and, with guidance from the physical therapist and caregiver, develop new skills. They usually accept the sitting stability it offers and quite freely start using their upper extremities for function instead of for sitting balance.

6 - 12 years

Around this age the child can be slower to adapt. By the time a child reaches 9 or 10, there may also be muscle length issues (contracture), muscle strength issues, and long-standing neuromotor patterns that can be very difficult to overcome. For the child in this age group with strong adductor tone, the SWASH® Low Profile is generally recommended as the uprights in this model are stronger.

13 - Adult

The pelvic band of the Classic SWASH® will fit a waist circumference up to 72 cm (28 1/4 inches). SWASH® has been successfully fitted on small adults who fit within this range. Again, due to the increased strength of the uprights, the SWASH® Low Profile may be required to control the adductor tone. A larger size SWASH® Low Profile with longer uprights and larger cuffs is now available.

Acclimatization Time

Age, cooperation, and the degree of functional involvement all affect the length of time for the wearer to become accustomed to the orthosis. As a general rule, the younger the candidate, the quicker they accommodate to the orthosis. Even those that acclimate quickly, will continue to improve in function as they continue to wear the orthosis. If immediate results are not seen, it is encouraged to allow the candidate to continue to wear the orthosis at least an additional 30 minutes to one hour as it has been observed that given time to relax in the orthosis - they start to realize how they can use its support to sit, stand, or walk better. If no improvement is seen after one hour, it is unlikely SWASH® will be of benefit.

Sometimes improved posture is evident immediately upon application, but then he or she tends to return to the original slouched posture. This is usually indicative that the orthosis will work, but physical therapy and re-training may be required to establish new movement patterns.

Especially children who have always had to use their hands for balance, are scared to "let go" for fear they will topple over. A little "diversion therapy", such as trying to get them to clap their hands or reach for a ball will help them overcome the fear.

PRODUCT SELECTION



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 the chances of unwanted removal by children. Pelvic band and thigh cuff padding are removable for laundering.

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

SWASH® Low Profile II

SWASH® LP uses a padded iliac extension that can be positioned in one of two places: it can be fit immediately above the iliac crest between the crest and the inferior angle of the costal flail, or it can be fit between the ASIS and the greater trochanter. The latter is used to minimize any influence towards lumbar flexion when sitting. 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 I are desired to permit less restriction of movement.
- When the greater pelvic coverage area triggers more desirable neuro-sensory motor response.

SWASH® Low Profile

- 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 some.

PRODUCT SELECTION

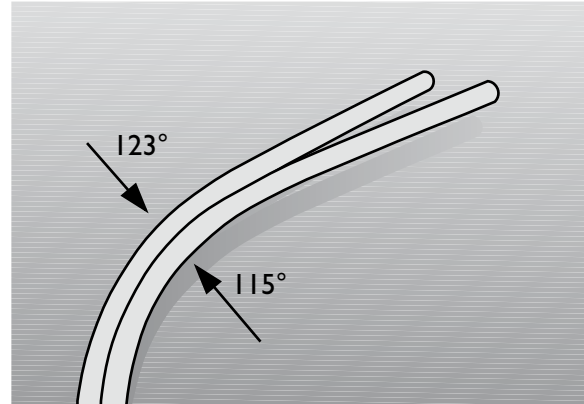
115 or 123 Degree Uprights?

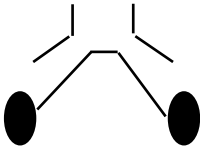
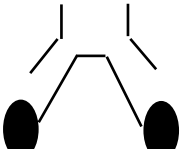
SWASH® is available with either 115° or 123° uprights. This refers only to the fixed angle of the most proximal visible curve in the uprights – it does NOT refer to the exact degree of abduction obtained while wearing the orthosis.

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 effect on the postural outcome of the fitting. The following are offered as guidelines:



 <p>123 Degree - Wide Sitting Base</p> <p>When the greatest amount of adductor muscle lengthening in the sitting position is desired.</p> <p>When more trunk lumbar flexion influence is desired when sitting.</p> <p>When more lumbar extension is desired during gait.</p>	 <p>115 Degree - Narrow Sitting Base</p> <p>The wearer is primarily chair mobile and the 123° uprights would be too wide in the sitting position for the child to fit in the chair or car seat is not an option.</p> <p>Adductors are too tight and the amount of abduction when sitting in the 123° uprights would be impossible or painful.</p> <p>When less trunk flexion influence is desired when sitting.</p>
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PRE AND POST-FITTING FUNCTIONAL EVALUATIONS

Pre-Fitting Functional Evaluations

A pre-fitting assessment should be done and documented with a team consisting of at least a physical therapist and the orthotist. It is also desirable to have the primary caregiver present during this assessment. Each person brings to the evaluation their own areas of expertise and observational skills. Don't be surprised if the primary caregiver sees more than the rest of the medical team! Their observations and comments can be surprisingly insightful.

The assessments should be oriented toward assessing the hip stability/displacement and overall function as opposed to individual components of function. Carefully observe function or limitations of the adductors, hamstring, and hip flexors. Be aware of and document symmetries found during the evaluation. Some facilities are using videotape as one of the ways to document the before and after effects of the SWASH®. Clinically proven assessment methods such as Gross Motor Function Measure (GMFM), or the Peabody Developmental Motor Scales (PDMS), among other tests will add validity and proven repeatability to the assessment process.

Below is a guide of areas to assess posture and function PRIOR to SWASH® fitting:

SITTING (90/90 position)

- Overall sitting height from sitting surface
- Time no touch sitting
- Reaching distance capacity
- Ball catch capacity
- Sit to stand functional performance
- General stability and posture
- Hip adduction
- Pelvic tilt posture due to hamstring tightness

STANDING

- Overall stance height
- Foot position and alignment
- Reaching capacity with extrinsic support
- Reaching capacity without extrinsic support
- Stand to squat functional performance
- General posture
- Femoral alignment

WALKING

(with normal ambulatory aid and with normal AFOs if used)

- Incidence of scissoring and scissoring posture
- Transverse plane alignment both sides (one limb rotated more than the other?)
- Stride length
- Stride base width
- Heel to toe utilization during gait
- Speed
- Distance capacity

Primary & Secondary Goals

Based on above assessment, establish primary and secondary goals for the orthotic intervention. For example: Hip alignment? Stretch adductors? Increase walking capacity? Improve sitting posture? Appropriate product selection (Classic or Low Profile, 115° or 123° uprights) and proper fit are highly dependent on knowing these goals.

Post-Fitting Functional Evaluations

During this process, simply repeat the evaluations accomplished in the pre-fitting evaluation. Note any changes in functional capacity that are measured or observed.

Please consider the following:

Age

The younger wearer typically adapts to the orthosis and shows more immediate improvements than the older wearer.

Acclimatization Time

While some differences are usually apparent immediately after fitting, many more changes will become apparent after days, weeks, or months in the SWASH®. It may take some time for the wearer to acclimatize to and to trust the orthosis. Many children will demonstrate a more erect and stable standing posture. It may take some time to become acclimatized to this 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, Crutch Adjustment

Be certain that the height of any standing or walking assistance device is evaluated with the child wearing the SWASH®. It will often need to be raised to accommodate to the new stance height of the child.

Abduction Adjustment

In initially setting up the orthosis, it is difficult to judge the amount of abduction required to provide optimum hip stability and achieve established goals. If ambulatory and scissoring is still hindering gait, abduction angles will need to be re-adjusted by the fitter.

PROTOCOLS AND PROPER FIT GUIDELINES

Protocols

Wearing time

The number of hours the orthosis is to be worn should be determined by the physician. This time will vary depending on the degree of involvement of the pathology, the goals of the rehabilitation program, and the tolerance of the wearer. While up to 24 hour use may be indicated, the recommended wearing time is at least six hours per day, usually during periods of highest activity (sitting, standing, and stepping). The SWASH® may also be prescribed to be worn at night to control night time scissoring.

Fitting over / under clothing

The orthosis should ideally be fitted under clothing to optimize the control it has over hip alignment. This also facilitates the child who is managing their own toilet.

Liner care instructions

The liner in the SWASH® Classic and the cover of the SWASH® Low Profile are removable. Both may be removed, hand washed in cool water with mild detergent, and dried flat. Replacement liners and covers are available through your orthotist.

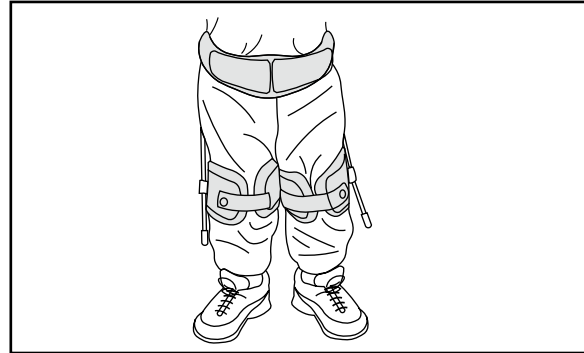
Skin care

Red marks that appear as a result of wearing the orthosis should disappear within 30 minutes of removing the orthosis. The most persistent red marks are usually on the inside part of the thigh under the thigh cuff. Consult your orthotist if the red marks do not disappear within 30 minutes after removing the orthosis.

Orthotist Follow-Up

A one-to-two week post-fitting check-up is recommended to assure the integrity of the orthosis and caregiver fitting technique. The primary purpose of this follow-up is to check for the need to adjust hip abduction to assure proper hip alignment.

Proper Fit Guidelines



Pelvic Band

Location:

SWASH® Classic - Immediately over the ASIS.

SWASH® L.P. - The waist band should rest comfortably on the ASIS. It should be contoured to the shape of the waistline and extend no more than 2 inches / 5 cm toward anterior midline.

Symmetry

For both orthoses, make certain the orthosis is applied as symmetrically as possible. The orthosis should NOT be rotated on the wearer as this can result in loss of control of hip alignment.

Tightness

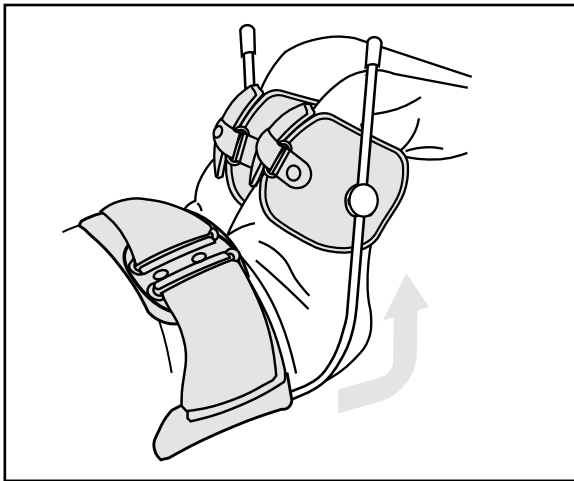
You should be able to insert the fingers of one hand between the padding and the abdomen.

Amount of abduction

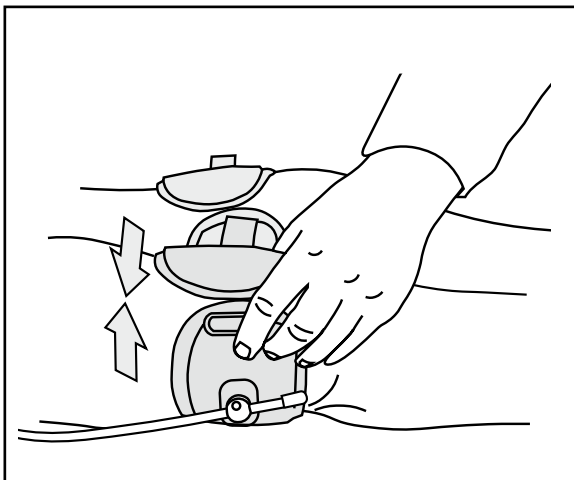
The abduction setting varies considerably from patient to patient, depending on primary and secondary goals for the orthosis. For both non-ambulatory and ambulatory wearers, the "ideal" is to adjust abduction to provide appropriate hip containment and knee clearance.

PROTOCOLS AND PROPER FIT GUIDELINES

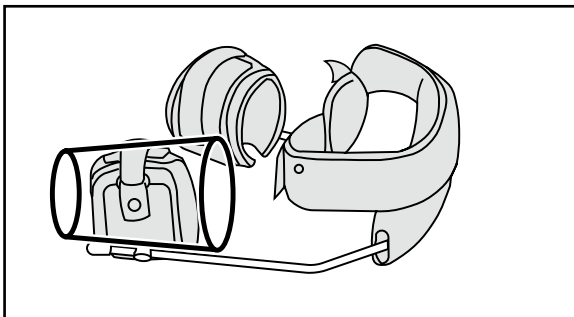
Cuffs



Location - Usually as distal as possible without interfering with popliteus, but may be located up to distal 2/3 of femur if flexion influence is present.

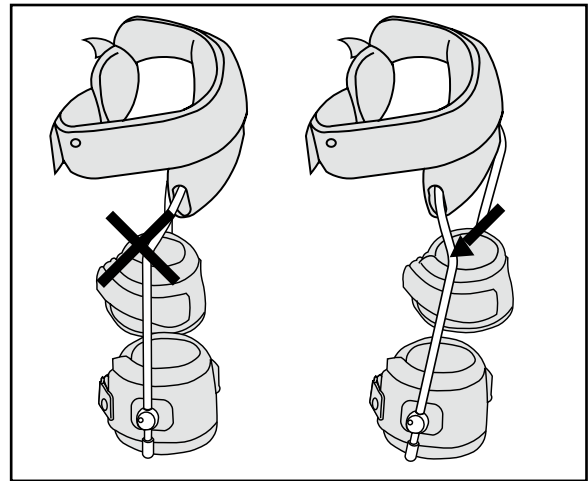


Closure Gap - There should be no more than 2 inches / 5 cm gap between the medial and lateral sides of the plastic. Tightness - Comfortably snug - never so tight as to cause red marks or compromise circulation.

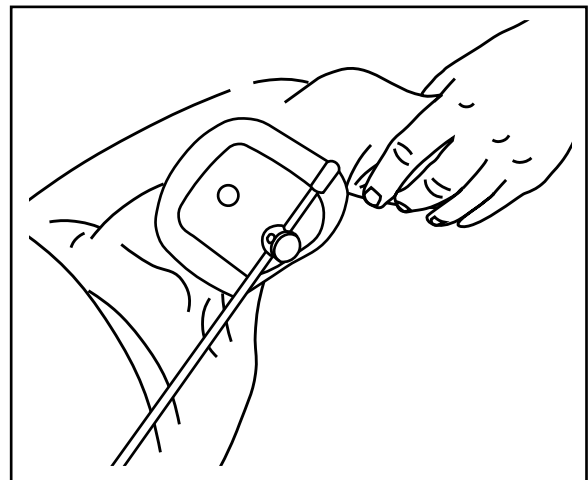


The cuffs are conical shape. They should be fitted so the greater circumference is proximal.

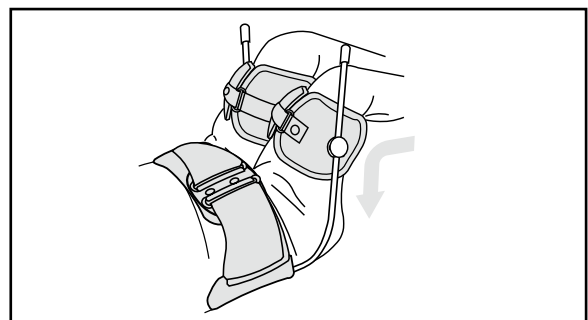
Uprights



Left and Right - There is a left and right for the uprights. When standing the 1st curve from the distal end should angle to the posterior. If it doesn't, it is on the wrong side.



Length - The distal end of the upright should be in line with the distal end of the cuff padding.



Hip Clearance - The uprights should be as close as possible to the greater trochanters without impinging on them when the hips are flexed.

BENEFITS AND OUTCOMES

Benefits

- Limits or controls adduction when sitting, standing and walking to prevent scissoring
- Provides additional abduction for muscle lengthening and sitting stability
- Provides support throughout the day
- Limits adduction during the night
- May reduce hip displacement caused by strong adductors
- Improves hip alignment
- Can prolong effects of other treatment modalities
- Maintains muscle length
- May delay the progression to surgery

Outcomes

- Improved ambulation when wearing the orthosis. "Gait scores showed improved pelvic symmetry, better knee clearance, and progression in functional walking scales in most cases"
- Longer walking distances using less energy is reported by some parents
- Vertical positions and dynamic walking are associated with improved respiratory, bladder and kidney functions
- Improved trunk control facilitates upper body function for enhanced stretching and other exercises to improve muscle control and coordination skills
- Improved sitting balance means the possibility of using both hands to perform tasks such as eating, playing, manipulating objects, and interacting with others instead of holding the sitting surface for touch balance
- Neutralizing the dislocating forces secondary to high adductor tone may arrest or reduce hip displacement
- Clinically observable impact on the function of the proprioceptive response. This can generally be seen in the
 - a) Reduced tone of the adductors
 - b) Improved posture of the trunk and
 - c) Enhanced coordination of the upper extremities resulting in better reach targeting
- Often helps the wearer overcome pathological movement patterns
- Early mobilization may also reduce subluxation and dislocation of the hips
- Improved respiratory function as a result of the more upright posture

FREQUENTLY ASKED QUESTIONS ABOUT SWASH®

Is the SWASH® usually worn over or under clothing?

The SWASH® is generally fitted under clothing to optimize the control the device has in enhancing hip alignment.

What about toileting?

Generally SWASH® must be removed for toileting because the orthosis interferes with easy donning and doffing of underwear and diapers.

Will using SWASH® strengthen adductors?

The opposite is true because the SWASH® serves to stretch the adductors and cause them to clinically present with lower tone.

When will patients progress to not needing the SWASH®?

The SWASH® helps manage the consequences of high adductor tone. While there may be some carryover in lessened adductor tone after use of the SWASH, it is not known if it will return if SWASH® use is totally discontinued.

Will AFOs still be necessary?

The SWASH® does not alter the need for AFOs. It may, however, change the design criteria for some patients. Because the SWASH® has a significant influence over transverse plane rotation of the lower extremities, AFOs will generally need to be set up in relatively neutral position relative to rotation.

How long should the patient wear the SWASH® each day?

The SWASH® is generally worn at least six hours each day. It can also be very appropriate for use as a night splint.

Are there any side effects to using the SWASH®?

Pressure marks may be evident on inside thigh where the SWASH® overcomes the forces of abnormal adductor tone. These marks should disappear within 30 minutes of removing the SWASH®.

The patient still seems to sit in too much spinal flexion. Can anything be done about that?

115° uprights tend to minimize this problem. Adding a sitting wedge (thicker part under seat, narrow part under legs) can also help to minimize the negative postural effects of tight hamstrings. If the problem persists, return to the orthotist for further adjustments.

How long before a child will "outgrow" his or her SWASH®?

SWASH® will usually fit a child for 2-3 years. Components are sold separately, so it is possible for the orthotist to adjust up to a larger cuff or longer uprights should that be necessary.

INITIAL FITTING ASSESSMENT

Patient ID# _____ Date _____

Physical Therapist _____ Ortotist _____

Physician _____

	WITHOUT SWASH	WEARING SWASH
SITTING (90/90 position)		
Hip adduction		
Pelvic tilt posture due to tight hamstrings		
Sitting height from sitting surface		
Time no touch sitting		
Reaching distance capacity		
Ball catch capacity		
Sit to stand functional performance		
General stability and posture		
STANDING		
Femoral alignment		
Overall stance height		
Foot position and alignment		
Reaching capacity w/extrinsic support		
Reaching capacity w/o extrinsic support		
Stand to squat functional performance		
General Posture		
WALKING		
Incidence of scissoring		
Transverse plane alignment both sides (one limb rotated more than the other?)		
Stride Length		
Stride Base Width		
Heel to toe utilization during gait		
Speed		
Neuromuscular control (jerky? fluid? balance issues?)		
Distance capacity		

SWASH® Referencelist

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► HYDROTHERAPY

Time for

NE

By K

N

At Danbury Hospital in Danbury,

Connecticut, neonatal hydrotherapy is

provided to promote neonatal movement

for those infants who demonstrate a

paucity of spontaneous generalized

movements and who also demonstrate

poor primary movement repertoires,

such as reciprocal leg kicking and hand

to mouth. These findings have been corre-

lated with abnormal development.

It has also been found that this

treatment often promotes improved state

control and state regulation, especially for

infants diagnosed with neonatal abstin-

ence syndrome.¹² Neonatal abstinence

syndrome consists of a wide variety of

central nervous system signs of irritability,

(jitteriness, increased tone), gastroin-

testinal problems (hyperphagia, diarrhea),

respiratory symptoms (tachypnea) and

autonomic dysfunction.¹²

Sweeney has reported that there is

improved feeding proficiency in preterm

neonates following hydrotherapy in the

NICU setting.¹⁰ Feeding proficiency was

measured by duration off feeding which

was decreased and (continued on page 8)

Matric Orthopedics Part IIIa:

PLANE ISSUES AND ACHIEVEMENTS

PT, MS, COF/BOC

In Part 1 of this series [Network March/April 2006], we reviewed the influences of normal, strain-inducing, mechanical loads on developing bone geometry and joints. In Part II [Network July/August 2006], we examined the connective and muscle tissues in similar contexts, with a discussion of the relationship between the history of muscle recruitment and clinical evidence of muscle imbalances and soft tissue transformation. Suffice to say that our understanding of the transformation process is still evolving.

In the final three installments, I'll discuss musculoskeletal changes in the spine and lower extremities as they emerge in each cardinal plane, beginning in the sagittal plane in this piece, and progressing into the frontal and transverse planes.¹

Self-organized movement skills develop in the

presence of a system of body segments that are normally linked by soft tissue constraints (Table 1). The intrauterine, flexed-limb position is the most common prenatal position. Full-term healthy neonates, therefore, typically exhibit "physiologic flexion," a remarkably strong, active-and-passive resistance to passive limb joint extension.¹ The shortened state of the muscles, connective tissues, blood vessels, nerves, and skin—all located on the concave side of the flexed joints—follows the final two months of marked body-size increase in utero. By limiting the degrees of freedom in developing movements, the neonatal soft-tissue constraints mechanically guide the course of musculoskeletal as well as neuromotor development.^{2,3} (continued on page 10)

TABLE 1

TORSO	HIP JOINTS	KNEE JOINTS	ANKLE JOINTS
<p>Muscles:</p> <ul style="list-style-type: none"> Pectorals Rectus Abdominus Oblique Abdominals Transverse Abdominus 	<p>Muscles:</p> <ul style="list-style-type: none"> Iliopsoas Proximal Rectus Femoris Piriformis Superior & inferior gemellae 	<p>Muscles:</p> <ul style="list-style-type: none"> All distal hamstrings Distal Gracilis Distal Sartorius Popliteus 	<p>Muscles:</p> <ul style="list-style-type: none"> Tibialis Anterior Extensor Digitorum Longus
<p>Ligaments:</p> <ul style="list-style-type: none"> Anterior intervertebrals Anterior aponeurosis Inguinal 	<p>Ligaments:</p> <ul style="list-style-type: none"> Iliofemoral Anterior capsule 	<p>Ligaments:</p> <ul style="list-style-type: none"> Posterior/medial capsule Anterior cruciate Posterior medial collateral 	<p>Ligaments:</p> <ul style="list-style-type: none"> Anterior joint capsule Anterior talofibular Anterior deltoid fibers
<p>Associated nerves, blood vessels, and skin</p>	<p>Associated nerves, blood vessels, and skin</p>	<p>Associated nerves, blood vessels, and skin</p>	<p>Associated nerves, blood vessels, and skin</p>

Protecting Hips at Risk

THE ROLE OF A VARIABLE HIP ABDUCTION ORTHOSIS TO IMPROVE POSTURE AND FUNCTION

BY JAN F.A. SMITS, C.P.O.

In the U.S., there are over a half million adults and children with symptoms of cerebral palsy. The overall prevalence of cerebral palsy was 3.6 per 1,000 in 1996 and 3.1 per 1,000 in 2000 (Bhasin et al). Cerebral palsy is a challenging condition in which patients have to fight “high muscle tone” most of the time and in which coordinated movement is difficult to achieve. This large group of patients is in constant need for our devoted attention.

It is common sense to bring these children to an upright position as early as possible, not only to improve kidney and bladder function, but also to prevent damage at the hip joints. Most commonly, posterior dislocation results from inadequate opposition of adduction and internal rotation of the femur. Spasticity, abnormal muscle coordination, and abnormal synergies compounded by delayed or absent weight bearing result in abnormal development of the acetabulum and the femoral head, and stretching of the joint ligaments. Approximately 60% of children who were not walking by five years of age were likely to develop subluxation of the hip, with the greatest risk in those with severe neurological involvement (Gordon, Simkiss 2006). This statistic strongly supports starting treatment as young as possible; sometimes even before the child can stand or walk.

Traditional hip bracing may cause negative effects, such as a lack of movement and weight bearing; motor functions may be lost in that process. A more appropriate brace would enable the child to have a normal range of motion while maintaining the hip in good alignment to help prevent subluxation or dislocation. If a brace can accomplish these tasks successfully, it may be possible to delay or even prevent surgical intervention.

Such a brace must be able to create a “new balance,” even when performing independent flexion or extension. During flexion or sitting, a maximal abduction is required,

while during walking a minimal adduction is needed—just enough to prevent scissoring. An “ideal” brace would self-adjust to permit this change from one extreme into the other without having to make manual adjustments.

This “ideal” brace could also be beneficial post-surgically. Post-surgical complications, such as deterioration of the non-operated hip, avascular necrosis of the femoral head, osteoporotic hip fractures, and nerve palsies have been reported following adductor tenotomy. It is proposed these results could be improved with post-operative bracing

Orthoses like the Atlanta or Newington brace were designed to achieve a 90° abduction angulation of the femur and are used primarily for treatment of Perthes disease. The Scottish Rite orthosis allows free flexion and extension, a functional advantage for management of Perthes, but the abduction degree is fixed during both hip flexion and hip extension. This fixed angle is beneficial for Perthes, but restricts normal anatomical movement of the hip, a risk for the patients with cerebral palsy not inclusive of Perthes disease. Perthes is normally treated at the age of six or seven,

Fig. 1

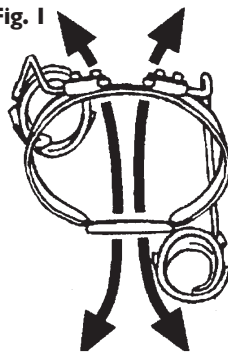


Fig. 2



Fig. 3



that would appropriately position the femoral head in the acetabular socket while still allowing function.

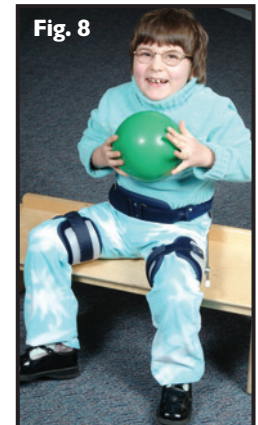
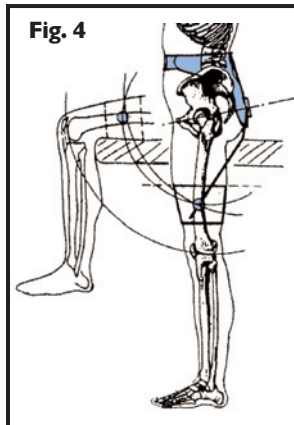
Such a device is available. Called SWASH, an acronym for “Sitting, Walking and Standing Hip Orthosis,” it is generically referred to as a Variable Abduction Hip Orthosis (VAHO). SWASH offers independent hip flexion, maximal abduction during hip flexion, minimum abduction during hip extension and weight-bearing, and continuous variation of abduction between these extremes. As simple as it looks, the SWASH hip orthosis has comprehensive biomechanical functions. It prevents adduction while standing and walking, and only gets into abduction during sitting mode, thus reducing contractures and creating a stable sitting base.

while patients with CP benefit most when we can help them manage the adductor tone, ideally from a very early stage and on.

The indications for a VAHO are subluxation, scissoring gait, and unstable sitting. Scissoring can often be observed during the resting period. In that case the brace is also indicated during the night. The users can be children with spastic diplegic or spastic quadriplegic, even children with spina bifida with their hips at risk may benefit from this VAHO. Optimum results are best realized when the child can be fitted at the youngest age possible, ideally one to four years of age. In these children, this VAHO may help to manage dystonia, hip migration, scissoring gait interfering with ambulation, and hip adduction, which limits independent sitting.

Dislocated hips and hip flexion contractures of more than (continued on page 22)

(Protecting Hips at Risk continued from page 21)



20° are contraindications for the use of a VAHO. Excessive tibial torsion might cause problems for “normal” walking. Tibial torsion cannot be solved by this brace. Internal rotation of the leg can normally be influenced in a positive way.

Although the hip joints of the orthosis are placed dorsally to the natural joints, the mechanics of the joints are designed to compensate for this mal-placement. Moving the hip joint from extension into flexion will not cause any migration or chafing of the thigh cuffs or the pelvic band.

The axes of the hip joints are oblique angled and although they describe a circle in space, the projection of this circle on the floor shows an oval, which results in the typical movement of the thigh cuffs, hardly any abduction when standing and walking, and a maximum abduction when going into flexion. If we look from cranial, the joint housings are under a 20° angulation, which places the neutral balance within reach of the gravity line.

For normal walking and standing, a virtual straight path is used, while the cuffs reach their neutral point at the gravity line of the body. Adductor tone and movement fixes the pelvic band in an extended position, thus stabilizing the trunk. When moving from standing into sitting the cuffs reach the narrow end of the oval, resulting in maximum abduction, thus creating a wide base for stable sitting and prevention of contractures. (Fig. 1 & Fig. 2)

The hip joint assemblies will allow for two different adjustments: the degree of abduction

and the width of the uprights. For these adjustments, the axis finds its bearing in a nylon housing, which is fixed on the pelvic band. The nylon housing can be rotated to influence the amount of abduction. The appropriate width over the greater trochanters can be adjusted by sliding the axis in or out. (Fig. 3)

The thigh cuffs will guide the legs throughout the whole range of motion. The pathways of motion of the thigh cuffs mimic the pathways of motion of the femurs. (Fig. 4) The pressure on the inside of the leg can be high, so a long leverage will decrease the amount of pressure. The control and the effect are best when the cuffs are close to the condyles as long as they don't prohibit normal sitting, kneeling or squatting.

The thigh cuffs can also be rotated around the upright for achieving the proper location of the retaining rings, which should be free from the sitting surface. This adjustment may be done when wearing the brace.

Every adjustment must be verified for symmetry, which is of the utmost importance for proper function and appropriate result. The forces are passing 21 joints and angulations when we follow the route from the right inside leg to the left inside leg. Some of the angulations can be critical for the right balance created by this brace. Differences in leverage or angulation will also create imbalance in muscle function, because the brace is the counter force for all muscle activity around the hips and legs. For this reason, it is important that the orthotist continually check to assure symmetry with all adjustments.

CASE STUDY #1

In Fig. 5 we see a seven-year-old boy with severe scissoring. He is very persistent in his attempts to walk, but after only three or four steps his feet tangle up and he has to start all over again. Notice the improvement (Fig. 6) in his posture and the position of the feet when fitted with the VAHO. A little fine-tuning by the orthotist accommodated for the varus position and the inner rotation of especially the left leg. Normally the cuffs are kept just free from each other. In this particular case a little more abduction was needed, because of the varus position of the legs, to make sure that the feet can pass.

The weaning time for the SWASH brace can be four or five days, depending on the child. A wearing time of approximately six hours during daytime is normally enough to keep contractures under control. If scissoring occurs during the night, it is advisable to use the brace also during the night.

CASE STUDY #2

Fig. 7 shows a child who demonstrates the sitting instability frequently seen in children with C.P. They always keep one or even two hands on the chair to protect themselves from falling down. Fig. 8 shows the wide base created by the SWASH offers a solid base for sitting. When the child experiences this, he will lift his arms higher and higher. The child will gradually discover his hands are no longer needed at the chair for safety reasons and he will be freer to use his hands for other tasks—to sit at table to play, for example. Having a (continued on page 23)

(Protecting Hips at Risk continued from page 22)



SWASH user confident enough in the brace to perform more advanced task means also that you added quality of life.

CASE STUDY #3

The eight-year old in Fig. 9 has spastic diplegia and has already had dislocated hip surgery. She demonstrates the hard task of walking with just her walker. Her face shows the effort she must make for each step. After being fitted with SWASH (Fig. 10), she was able to walk more relaxed, could coordinate her feet very well and could walk longer distances.

CASE STUDY #4

Fig. 11 shows a young lady who readily demonstrates how adductor tone can put the hips at risk for subluxation or dislocation. In Fig. 12, with the orthosis fitted, you can readily see the improved posture and reduced stress on the hips.

CASE STUDY #5

High adductor tone is one of the most common and obvious symptoms of spastic cerebral palsy. This tone affects posture of the entire body. It drives the feet into pronation, internally rotates the lower limbs, and has a flexion influence on both the knees and hips. This lower extremity posture influences the trunk into a slouched posture as demonstrated in this 14 year old in Fig. 13. The VAHO shown in Fig. 14 exerts an external rotary influence on the lower limbs (without twister cables), the knees and hips are influ-

enced more towards extension, and the trunk stands more erect. The biomechanical effect of the tone is thereby reversed. It exerts an external rotary influence on the lower limbs (without twister cables), the knees and hips are influenced more towards extension, and the trunk stands more erect.

CASE STUDY #6

Fig. 15 shows a 2½-year old with neuromigrational defect and tethered spinal cord release. With any attempt at sitting, she would fling herself backwards. With SWASH, shown in Fig. 16, she was able to find a good position of balance so she was able to sit for long periods of time.

In the "ideal" world, the therapist and orthotist jointly review the biomechanical function. The following is an assessment form that we encourage therapists to complete before and after fitting. Unfortunately, I don't think it is often used. Most prescriptions from physicians are written based on recommendation from the ther-

apist. However, there certainly are incidences where a physician will write a prescription and the patient goes directly to the orthotist. The latter is very unfortunate because the therapist is key to helping the wearer achieve maximum benefits from the orthosis. ■

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(continued on page 24)

(Protecting Hips at Risk continued from page 23)

SWASH®

Initial Fitting Assessment

Patient ID# _____

Dx _____ Age: _____

WITHOUT SWASH**WEARING SWASH****SITTING**

Hip adduction		
Sitting height from sitting surface		
Time no touch sitting		
General stability and posture		
Sit to stand functional performance		

STANDING

Femoral alignment		
Foot position and alignment		
Distance between feet		
Overall stance height		
General Posture		

WALKING

Neuromuscular control (jerky? fluid? balance issues?)		
Incidence of scissoring		
Transverse plane alignment both sides (one limb rotated more than the other?)		
Stride Length		
Heel to toe utilization during gait		
Speed		

Primary Goal: _____

Secondary Goal: _____

Waist: _____ Waist to Knee _____ Thigh _____ Walking Aid? _____

FITTED WITH: ☐ CLASSIC ☐ LP SIZE: Pelvic _____ Cuffs _____ Uprights _____

S.W.A.S.H.[®] STEADY & GO SIZING GUIDE

PELVIC SECTION Measure: SWASH [®] STEADY - At level of the natural waist for maximum trunk stability. SWASH [®] GO – At the level of the ASIS. Ideal is to fit the orthosis at mid-pelvic girdle to obtain good pelvic stability.	Size	Sizes Available		Circumference	
		STEADY	GO	Adjustment Range	
	1	✓	✓	400-465mm	15 ¾-18 ¼in
	2	✓	✓	460-550mm	18-21 ¾in
	3	✓	✓	540-630mm	21 ¼-24 ¾in
	4	✓	✓	620-720mm	24 ½-28 ¼in
	5	N/A	✓	710-810mm	28-32in
	6	N/A	✓	800-900mm	31 ½-35 ½in

THIGH CUFFS Measure at distal thigh, just proximal to the condyles. Ideal is to fit the cuffs as distal as possible without creating pressure or interference in the popliteal area. 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.	Size	Sizes Available		Circumference	
		STEADY	GO	Adjustment Range	
	1	✓	✓	210-250mm	8 ¼-9 ¾in
	2	✓	✓	250-290mm	9 ¾-11 ½in
	3	✓	✓	290-330mm	11 ½-13in
	4	✓	✓	330-380mm	13-15in
	5	✓	✓	380-440mm	15-17 ¼in
	6	✓	✓	440-500mm	17 ¼-19 ½in

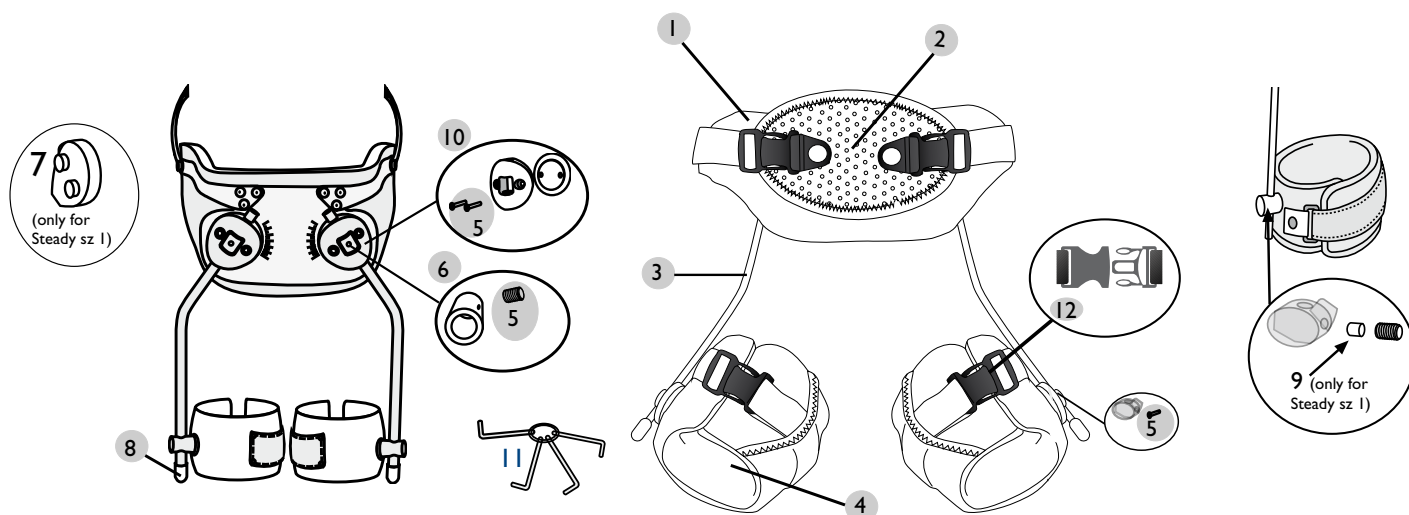
UPRIGHTS Measure waist to mid-patella. At final fitting, should be shortened to level of distal thigh cuff padding. 115° = narrow sitting base 123° = wide sitting base	Size	Upright Diameter		Waist to Mid-Patella	
		STEADY	GO		
	1	6mm	8mm	310mm	12 ¼in
	2	8mm	8mm	375mm	14 ¾in
	3	8mm	8mm	440mm	17 ¼in
	4	8mm	8mm	480mm	19in
	5	8mm	8mm	540mm	21 ¼in
	6	8mm	8mm	600mm	23 ½in

Size		PELVIC STEADY	PELVIC GO	CUFFS	UPRIGHTS 115 Deg.	UPRIGHTS 123 Deg.
1	STEADY	288520001		288540601	288550601	288560601
1	GO		288530001	288540801	288550801	288560801
2	STEADY & GO	288520002	288530002	288540802	288550802	288560802
3	STEADY & GO	288520003	288530003	288540803	288550803	288560803
4	STEADY & GO	288520004	288530004	288540804	288550804	288560804
5	STEADY & GO	N/A	288530005	288540805	288550805	288560805
6	STEADY & GO	N/A	288530006	288540806	288550806	288560806

NOTE: Color Coding indicates interchangeable components.

S.W.A.S.H.[®]

STEADY & GO Components



No.	Description	Unit	STEADY	GO
1	Pelvic Padding with Abdominal Pad	1 set	28857	28858
2	Abdominal Pad	1 pcs	28860	28860
3	Upright 6 mm 115°, size 1 only	Pair	28855-06	
3	Upright 8 mm 115°	Pair	28855-08	28855-08
3	Upright 6 mm 123°, size 1 only	Pair	28856-06	
3	Upright 8 mm 123°	Pair	28856-08	28856-08
4	Thigh Cuffs Padding	Pair	28859	28859
5	Screw Kit, size 1		28861-06	
5	Screw Kit, size 2 - 6		28861-08	28861-08
6	Clamp Ring Set, size 1	2 pcs	28862-06	
6	Clamp Ring Set, size 2 - 6	2 pcs	28862-08	28862-08
7	Boss Cover, size 1	2 pcs	28863-06	
8	Upright End Cover, size 1	2 pcs	28864-06	
8	Upright End Cover, size 2 - 6	10 pcs	28864-08	28864-08
9	Brass Bushing, size 1	10 pcs	28865	
10	Hip Joint Set, size 1	2 pcs	28866-06	
10	Hip Joint Set, size 2 - 6	2 pcs	28866-08	28867-08
11	Allen Wrench Key Set	1 set	28868	28868
12	Buckles 25 mm, for size 1 - 3	2 pcs	28869-25	28869-25
12	Buckles 38 mm, for size 4 - 6	2 pcs	28869-38	28869-38

This product should only be fitted by a
SWASH[®] certified professional.