allard

Technical manual/Professional IFU
for the Hybrid Night Brace

Contents

About Allard UK

Today, Allard UK continues to manufacture the Original Boston Brace. Previously a sister company of Boston Brace International Inc. and formerly known as Boston Brace Europe Ltd. The company is now under the ownership of the Camp Scandinavia A.B. (Sweden).

Allard Support UK continues the role of being the preferred supplier of spinal orthotic devices to the O&P field. As manufacturer of the Original Boston Brace for the conservative treatment of Scoliosis, we have developed a wide knowledge base and technical expertise which allows us the ability to offer a single source of supply for all your spinal bracing needs.

Introduction

The Hybrid Night Brace for the treatment of Scoliosis has been developed in collaboration with Basko Healthcare since 2022. This brace works by means of pressure, with which we aim to achieve a three-dimensional correction in brace. Here, we mainly focus on the derotation of the spine. The brace is made of a light plastic outer shell and a soft inner lining. Because the brace only needs to be worn during the night, there is no weakening of the muscle and acceptance of the brace is easier. The aim of brace treatment is to prevent the scoliosis from worsening.

Each brace is custom made to the individual patient using a series of circumferential, M/L and A/P measurements of the patient in combination with measurements taken from a measurement board. This information is used in conjunction with computer software to create a mould of the patient with the curve correction bult into the mould. Which is then used to fabricate a spinal brace. The Hybrid Night Brace is not a full-time wearing brace, it is worn at night only.

Principals of the Bracing System

The principles of the Hybrid Night Brace are to apply a laterally directed force in combination with a rotational force to re-align the spine towards midline or beyond.

The brace uses a three-point pressure system with the corrective force at the apical vertebra of the curve/curves.

In addition to the lateral force/forces there will be a rotational force applied at the apical vertebral body of the curve/curves. The degree of rotational force is determined be the evaluation of the patient curve/curves and the tolerance of the forces applied.

A specification design drawing is performed for each patient. The specification design drawing displays the lateral and rotational forces that must be applied to correct the spinal deformity.
The objective of the brace design specification is to modify a computerised symmetrical mold template to the appropriate curve pattern as per the patients x-ray.

Pad Pressure at the Apex (and below)

When a patient is aligned on a measurement board, corrective/pressure pads are positioned appropriate to the curve of the patient. Pressure is applied to push the curve to midline or beyond.
Explanation of Novel Features

- Each brace is manufactured to the patients criteria i.e., 100% customised product that can be Made To Measure (MTM), Made To Scan (MTS) or Made to Case (MTC).
- The rotation and lateral shift is applied based on the patients curve(s) pattern(s).

Patient criteria

The Scoliosis Research Society (SRS) criteria for bracing is 25°- 45° with growth remaining. We have treated patients with higher degree curves and the Hybrid Night Brace has proved effective with these patients. The Hybrid Night Brace can be used to treat single and double curves.

Intended Use

The SRS criteria for bracing is 25°- 45° with growth remaining. We have treated patients with higher degree curves and the Hybrid Night Brace has proved effective with these patients.

Indication

- Curves with a Cobb angle between 20 and 45 degrees both single and double.
- Curves below 25 degrees where the gibbus is greater than 7 degrees and family scoliosis is known.
- Apex thoracic no higher than Th 6-7.
- Risser 0-4.
- Procrastination for surgery.
–Patients with a curve of >25o with growth remaining.

Contraindications

At this current time we have not encountered any contraindications relating to the Hybrid Night Brace.

Goal of Bracing

The goal of brace treatment is to prevent progression of the scoliosis by:

1. Correcting the lateral curve.
2. Correcting the malrotation
3. Returning the torso to a balanced position over the sacrum
4. Properly aligning the spine in the sagittal plane

Summary

The Hybrid Night Brace has been developed to correct the scoliotic deformity by taking a series of measurements of the patient and reference measures on a measurement board. This information in combination with a patients x-ray is imported into CAD/CAM to create a corrective model for the patient.

The Hybrid Night Brace Bracing System for Idiopathic Scoliosis

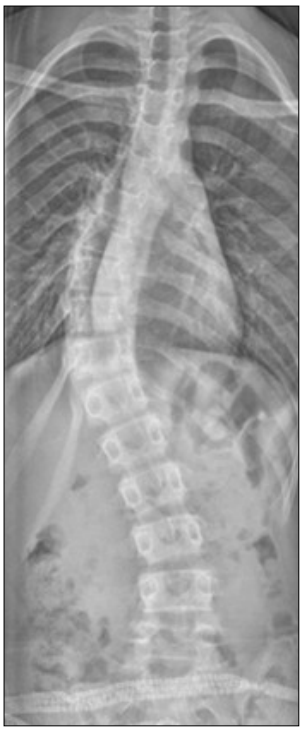
Terminology

The Hybrid Night Brace utilises a symmetrical 3D model chosen on the bases on the patient's physical dimensions. An individual patient orthosis design specification is drawn by the orthotist using the patients measurements, correctional pad locations, corrections force, etc.

Design Types

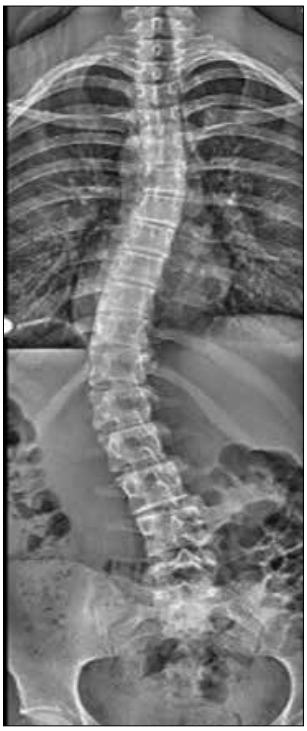
There are four design types for the Hybrid Night Brace.

Type 1



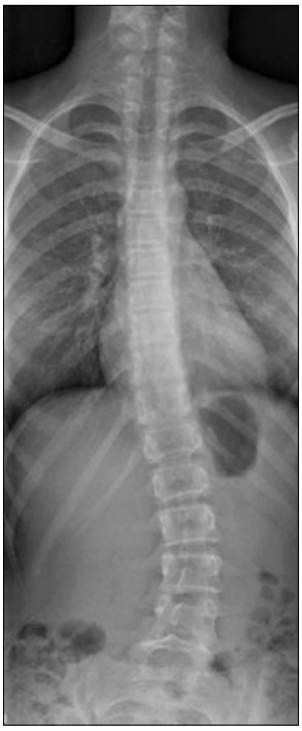
The brace design is designated for a Single Thoracic Curve Pattern with the apex of the curve above T12.

Type 2



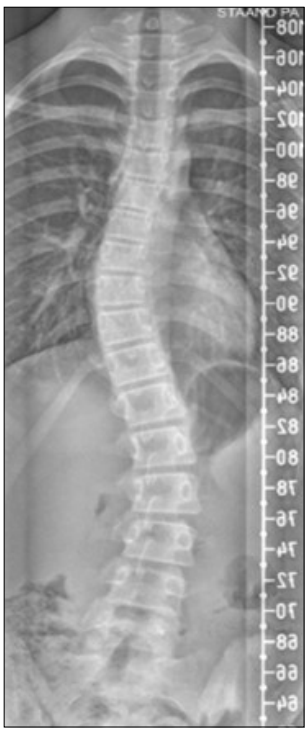
The brace design is designated for a Thoracolumbar Curve Pattern with the apex of the curve on T12 or L1.

Type 3



The brace design is designated for a lumbar curve pattern with the apex of the curve on L2-L5.

Type 4



The brace design is designated for a Thoracic and Lumbar curve (Double Curve) pattern.

Brace Design Specification

Principals of the Brace Design

The goal of “Brace Design” is to fabricate a custom brace to an individual orthosis for the specific needs of one patient. In the manufacturing of the brace, the availability of a “Brace Design Specification” facilitates the transition between a design drawing and a finished product. Likewise, in the fabrication of a Hybrid Night Brace it is helpful for the orthotist or technician to have a “Brace Design S pecification”. Using the Cobb method, the physician measures the patients x-ray, and the degree value of the curvature is documented on the x-ray. This x-ray will now become an integral part of the brace design specification.

Brace Design Specification

To create a brace design specification, you must do the following:

1. Receive an order with the Hybrid Night Brace Measurement Chart and the Pad Co-Ordinates from the Measurement Board. Orient the x-ray and mark the spinous process of S1, draw a centre line from this point parallel to the side of the x-ray.
2. Find a “degree value” for each vertebra by drawing a line along the inferior edge of each vertebra across the centre line and measuring the angle between this line and the centre line.
3. Measure a degree value for every vertebra.
4. Locate the “Null” point (apex) of the curve (the level at which the degree values change from right to left or vice versa). This point is used to determine the pad placement in the measurement board.
5. Locate the space between the top of the iliac crest and the lower rib. This is the position for the lumbar corrective pad/block.
6. Mark the apex of the curve(s), this determines where the apex of the curve(s) and the distance from the waist to the curve.
7. Position the corrective pads on the measurement board relevant to the apex of the patient curve(s).

   Before starting the measurement process the patient x-ray needs to be evaluated to determine the curve pattern of the patient and to create a design drawing/ blueprint for the brace. The brace de sign specification will allow the orthotist to place the pressure pad/pads on the measurement board in the relevant positions to apply the corrective force/forces to the spine.

Measuring the Patient

A series of measurements are taken of the patient. Circumferential M/L and A/P measurements are taken. The circumferential and M/L measurements should be taken with the patient supine and the A/P measurements taken with the patient standing. These measurements are taken at the level of trochanter, ASIS, waist, lower rib, xyphoid and axilla and entered onto the measurement chart.
Take measurements of the patient both M-L and circumferences of the following areas:

- Trochanter,
- A.S.I.S.,
- Waist,
- Lower Rib,
- Xyphoid,
- Axilla.
- Distance from the waist to xyphoid and
- Distance from the waist to pubis.

Measurement Form

F126 Hybrid Night Brace Measurement Chart **Allard UK**

	Hybrid Night Brace Measurement Chart	
		P.O.#:
		Date:
		Delivery Date:
		Serial Number:

Customer: _____
Patient I.D.: _____
Age: _____ **Height:** _____ **Sex:** _____
Diagnosis: _____

Scoliosis Description:

Curvature:

Thoracic	L ☐ R ☐
Lumbar	L ☐ R ☐
Thoracolumbar	L ☐ R ☐

Apex:

Thoracic: T-	_____
Lumbar: L-	_____
Thoracolumbar:	_____

COBB-angle: (°)

Thoracic	
Lumbar	
Thoracolumbar	

Rotation:

Thoracic Scolio:	_____
Lumbar Scolio:	_____
Thora/Lumbar Scolio:	_____

Pads Position Board:

Stabilisation Pads:

	Column	Row
Axilla:		
Trochanter:		

Correctional Pads:

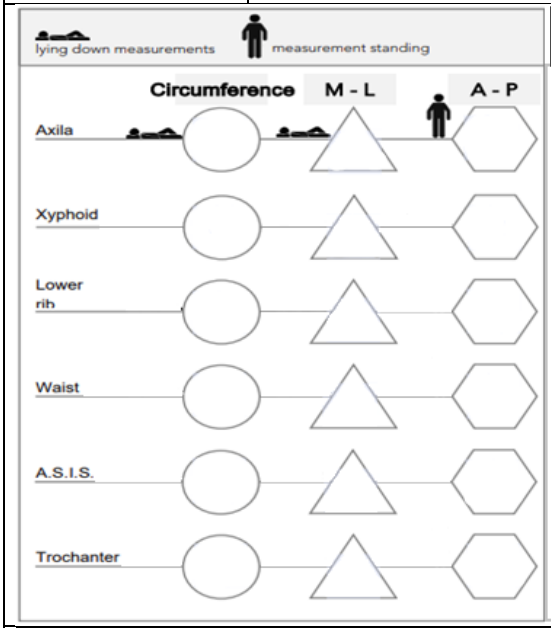
	Column	Row	Distance (mm)
Thoracic:			
Lumbar:			
Thoracolumbar:			

Brace Design:

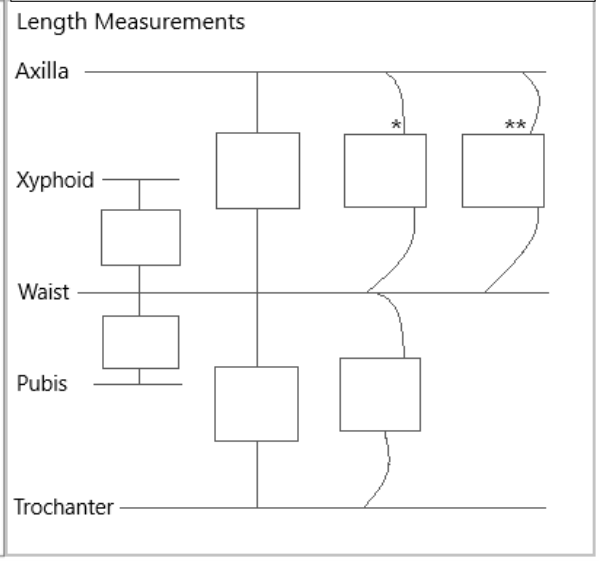
Trim Lines:
Type 1 ☐ Type 2 ☐
Type 3 ☐ Type 4 ☐

Transfer:
(1) _____
(2) _____
TWO TRANSFER OPTIONS MUST BE GIVEN

Remarks:



Overcorrection: Yes ☐ No ☐



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		Information Transcription Check

Under Trochanter text :
***The patient's curvature length is measured from the primary curvature and along the side of the body in maximum bend.**
****Please indicate the desired orthosis height here (this may deviate from the curvature length)**

Document Name: Hybrid Night Brace Measurement Chart **Revision Number: D**
Document Number: F126 **Date: 04/04/2025**

Positioning the Patient

Measurement Board

The measurement board is a board used to centralise a patient and to calculate the necessary correction to correct the spine to midline and beyond. The peg holes in the measurement board have co-ordinates which aid in locating the apex of the curve/curves more accurately.

There are two reference lines on the board to align the patient centrally on the board. There is the vertical centre line and a horizontal line at waist level. The vertical line allows the patient to be centralized between the pelvis and the head and the horizontal line (point 0) positions the patients waist level. The patient is placed on the measurement board with the waist level at point "0" on the board. An adjustable lumbar pad is placed at the waist at Point "0" (between the Iliac crest and lower rib). The trochanter and axilla pads are placed as a hold/stabilisation pad. An adjustable thoracic pad is placed in relation to the apex of the curve.

The adjustable thoracic pad is adjusted to centralise the thoracic spine to midline. The adjustable lumbar pad is used to centralise the lumbar spine to midline.
When the patient is in the optimal corrective position on the measurement board, the block positions are then recorded along with the degree of adjustment on the lumbar and thoracic correctional pads.
The benefits of using the measurement board are to achieve a physical representation of the patients corrective position. The measurement board also allows to centralise the patient and apple the corrective force required using the corrective thoracic and lumbar pads.

Patient Positioning

Type 1 and Type 4 correction to midline

There are two sizes of pads used on the measuring board. The paediatric pad is typically used for patients up to 8 years old. The standard pad is used in the remaining cases.
The patient lies supine on the measurement board with the patient centralised on the vertical line. The patient is also centralised with the patients waist at point "0" (between the iliac crest and lower rib).
The lumbar pad is always positioned first. This is always located on the "0" line. The lumbar pad should be between the iliac crest and the lower rib i.e., the patients waist. The lumbar pad should now press on the bone.

The trochanter pad is then placed with the centre of the pad on the trochanter and is always in the negative digit range and located on the opposite side of the lumbar pad. If in doubt of the trochanter pad location, always place the trochanter pad one hole lower on the measurement board.

The axilla pad is positioned so that the shoulders are at least horizontal or that the shoulder is lifted slighlty higher on the side of the pad if it is an over corrective brace. The axilla pad is adjacent to the ribs. Ensure, that the patient is still central on the measurement board. There should be at least two holes between the axilla pad and the thoracic pad.

The thoracic pad is placed at the height of the apex and therefore not one rib below the apex of the curve. If necessary, the distance and the position of the thoracic pad can be measured from the patients x-ray (waist-apex distance).

Once, the pads are in place, the pressure of the pads can be determined.
The lumbar pad is turned first. It can be noticed by the orthosis/technicians hand whether the lumbar processus spinosus comes to the midline of the measuring board.

Note: Type 1 bends, the lumbar pad is a "hold" (stabilisation block) and typically only required a few turned. On a type 4 bend, both bends are deployed corrected.

The thoracic pad is then adjusted. The patient experiences the adjustment thoracic pad pressure faster. Turn the thoracic pad until the processus spinosus is at the midline of the measuring board.

Thoracic Overcorrection Type 1

Note: Overcorrection is only possible if there is no high compensatory bend. There must be at least three holes between the thoracic and axilla pad. The lumbar pad is used as a "hold" stabilisation function and typically requires a few twists when adjusting.

There are two sizes of pads used on the measuring board. The paediatric pad is typically used for patients up to 8 years old. The standard pad is used in the remaining cases.
The patient lies supine on the measurement board with the patient centralised on the vertical line. The patient is also centralised with the patients waist at point "0" (between the iliac crest and lower rib). The lumbar pad is always positioned first. This is always located on the "0" line. The lumbar pad should be between the iliac crest and the lower rib i.e., the patients waist. The lumbar pad should now press on the bone.

The trochanter pad is then placed with the centre of the pad on the trochanter and is always in the negative digit range and located on the opposite side of the lumbar pad. If in doubt of the trochanter pad location, always place the trochanter pad one hold lower on the measurement board.

The thoracic pad is placed at the height or just below the apex of the thoracic curve. If necessary, the distance and the position of the pad can be measured using the patients x-ray (distance waist-apex). The patient is then bent over the thoracic pad so that the patients head of completely off midline. The axilla and is then placed so that the shoulder is lifted higher on the side of the pad, but the patients arm can still be lowered. The axilla pad is adjacent to the ribs.

Thoracolumbar to Midline Type 2

There are two sizes of pads used on the measuring board. The paediatric pad is typically used for patients up to 8 years old. The standard pad is used in the remaining cases.
The patient lies supine on the measurement board with the patient centralised on the vertical line. The patient is also centralised with the patients waist at point "0" (between the iliac crest and lower rib). The lumbar pad is always positioned first. This is always located on the "0" line. The lumbar pad should be between the iliac crest and the lower rib i.e., the patients waist. The lumbar pad should now press on the bone.

The trochanter pad is then placed with the centre of the pad on the trochanter and is always in the negative digit range and located on the opposite side of the lumbar pad. If in doubt of the trochanter pad location, always place the trochanter pad one hole lower on the measurement board.
The axilla pad is located on the same side as the trochanter pad and is placed so that the shoulders are at least horizontal or that the patients shoulder is slightly lifted higher on the side with the axilla pad if it is an over corrective brace. The pad is adjacent to the patients ribs. There should be at least two holes between the axilla pad and the thoracic pad.

The thoracic pad is placed above the lumbar pad with a maximum of one hole between them. Ensure that the patient is still positioned central on the measurement board.
Once, the pads are in place, the pressure of the pads can be determined.
The lumbar pad is turned first. It can be noticed by the orthosis/technicians hand whether the lumbar processus spinosus comes to the midline of the measuring board.
The thoracic pad is then rotated. The patient experiences the adjustment thoracic pad pressure faster. Continue rotating until the processus spinosus is on the midline. As the lumbar pad and thoracic pad are located on the same side, both pads will have to be rotated alternately until the maximum correction is achieved.

Thoracolumbar Overcorrection Type 2

Note: This overcorrection is only possible if there is no hight compensatory curve and there are at least three holes between the thoracic and axilla pad.
There are two sizes of pads used on the measuring board. The paediatric pad is typically used for patients up to 8 years old. The standard pad is used in the remaining cases.
The patient lies supine on the measurement board with the patient centralised on the vertical line. The patient is also centralised with the patients waist at point “0” (between the iliac crest and lower rib).
The lumbar pad is always positioned first. This is always located on the “0” line. The lumbar pad should be between the iliac crest and the lower rib i.e., the patients waist. The lumbar pad should now press on the bone.

The trochanter pad is always in the negative digit range and located on the opposite side of the lumbar pad. The thoracic pad is placed above the lumbar pad with a maximum of one hole gap between them. Ensure that the patient is still central to the measurement board.

The axilla pad is located on the same side as the trochanter pad. The patient is then pushed over the thoracic pad. The upper bend of the upper part of the bend is over midline. The axilla pad is placed in the axilla with an over correction depending on what the patient can tolerate. An overcorrection is only possible if there is no high compensatory bend and the distance between the thoracic and axilla pad differs by at least three holes.

Once, the pads are in place, the pressure of the pads can be determined.
The lumbar pad is rotated first, it can be noticed by the orthosis/technicians hand whether the lumbar processus spinosus comes to the midline of the measuring board.
The thoracic pad is then rotated. The patient experiences the adjustment thoracic pad pressure faster. Continue rotating until the processus spinosus is on the midline. As the lumbar pad and thoracic pad are located on the same side, both pads will have to be rotated alternately until the maximum correction is achieved.

Lumbar to Midline Type 3

There are two sizes of pads used on the measuring board. The paediatric pad is typically used for patients up to 8 years old. The standard pad is used in the remaining cases.
The patient lies supine on the measurement board with the patient centralised on the vertical line. The patient is also centralised with the patients waist at point “0” (between the iliac crest and lower rib).
The lumbar pad is always positioned first. This is always located on the “0” line. The lumbar pad should be between the iliac crest and the lower rib i.e., the patients waist. The lumbar pad should now press on the bone.

The trochanter pad is then placed with the centre of the pad on the trochanter and is always in the negative digit range and located on the opposite side of the lumbar pad. If in doubt of the trochanter pad location, always place the trochanter pad one hole lower on the measurement board.
The thoracic pad is placed on the opposite side of the lumbar pad. The thoracic pad is located at the height of the upper dorsal vertebra that is a part of the curve. Above this dorsal vertebra, the vertebra is straight. Ensure that the patient is still located on the midline of the measurement board.
Once, the pads are in place, the pressure of the pads can be determined.
The lumbar pad is rotated first, it can be noticed by the orthosis/technicians hand whether the lumbar processus spinosus comes to the midline of the measuring board.
The thoracic curve is then rotated, this pad is used as a "hold" (stabilisation pad) and typically only required a few turns to reach midline.

Lumbar Overcorrection Type 3

There are two sizes of pads used on the measuring board. The paediatric pad is typically used for patients up to 8 years old. The standard pad is used in the remaining cases.
The patient lies supine on the measurement board with the patient centralised on the vertical line. The patient is also centralised with the patients waist at point "0" (between the iliac crest and lower rib).
The lumbar pad is always positioned first. This is always located on the "0" line. The lumbar pad should be between the iliac crest and the lower rib i.e., the patients waist. The lumbar pad should now press on the bone.

The trochanter pad is then placed with the centre of the pad on the trochanter and is always in the negative digit range and located on the opposite side of the lumbar pad. If in doubt of the trochanter pad location, always place the trochanter pad one hole lower on the measurement board.

The thoracic pad is located on the same side as the trochanter pad. The patient is then pushed over the lumbar pad. The upper part of the bend is pushed over midline on the measurement board. The thoracic pad is placed at the height of the upper dorsal vertebra that is a part of the bend, with an overcorrection depending on what the patient can tolerate. An overcorrection is only possible if there is no high compensatory curve and that the distance between the thoracic and axilla pad differs by at least three holes on the measurement board.

Once all the pads are positioned appropriately, the pressure of the pad can be determined.
The lumbar pad is rotated, it can be noticed by the orthosis/technicians hand whether the lumbar processus spinosus comes to the midline of the measuring board.

Double Curve Correction to Midline Type 4

There are two sizes of pads used on the measuring board. The paediatric pad is typically used for patients up to 8 years old. The standard pad is used in the remaining cases.
The patient lies supine on the measurement board with the patient centralised on the vertical line.
The patient is also centralised with the patients waist at point "0" (between the iliac crest and lower rib).
The lumbar pad is always positioned first. This is always located on the "0" line. The lumbar pad should be between the iliac crest and the lower rib i.e., the patients waist. The lumbar pad should only press on soft tissue and not on bone.

The trochanter pad is then placed with the centre of the pad on the trochanter and is always in the negative digit range and located on the opposite side of the lumbar pad. If in doubt of the trochanter pad location, always place the trochanter pad one hole lower on the measurement board.
The axilla pad is positioned so that the shoulders are at least horizontal or that the shoulder is lifted slightly higher on the side of the pad if it is an over corrective brace. The axilla pad is adjacent to the

ribs. Ensure, that the patient is still central on the measurement board. There should be at least two holes between the axilla pad and the thoracic pad.

The thoracic pad is placed at the height of the apex of the curve. If necessary, the distance and the position of the thoracic pad can be measured from the patients x-ray (waist-apex distance).
Once, the pads are in place, the pressure of the pads can be determined.

The lumbar pad is turned first. It can be noticed by the orthosis/technicians hand whether the lumbar processus spinosus comes to the midline of the measuring board.
Note: Type 1 bends, the lumbar pad is a "hold" (stabilisation block) and typically only required a few turns. On a type 4 bend, both bends are being corrected.
The thoracic pad is then adjusted. Turn the thoracic pad until the spinous process is at the midline of the measuring board.

The measurement board grid reference for all blocks and the distance turned for the thoracic, thoraco-lumbar and lumbar corrective blocks should be recorded on the measurement form.
Using the information from the measurement board and the measurement form we now create a 3D model using software programme.

Double Curve Overcorrection Type 4

Note: Overcorrection is only possible if there is no high compensatory bend. There must be at least three holes between the thoracic and axilla pad. The lumbar pad is used as a "hold" stabilisation function and typically requires a few twists when adjusting.

There are two sizes of pads used on the measuring board. The paediatric pad is typically used for patients up to 8 years old. The standard pad is used in the remaining cases.

The patient lies supine on the measurement board with the patient centralised on the vertical line. The patient is also centralised with the patients waist at point "0" (between the iliac crest and lower rib). The lumbar pad is always positioned first. This is always located on the "0" line. The lumbar pad should be between the iliac crest and the lower rib i.e., the patients waist. The lumbar pad should only press on soft tissue and not on bone.

The trochanter pad is then placed with the centre of the pad on the trochanter and is always in the negative digit range and located on the opposite side of the lumbar pad. If in doubt of the trochanter pad location, always place the trochanter pad one hold lower on the measurement board.

The thoracic pad is placed at the height or just below the apex of the thoracic curve. If necessary, the distance and the position of the pad can be measured using the patients x-ray (distance waist-apex). The axilla pad is then placed so that the shoulder is lifted as high as possible on the side of the pad, while allowing the patients arm to be lowered. The axilla pad is adjacent to the ribs.
Once, the pads are in place, the pressure of the pads can be determined.

The measurement board grid reference for all blocks and the distance turned for the thoracic, thoracolumbar and lumbar corrective blocks should be recorded on the measurement form.
Using the information from the measurement board and the measurement form we now create a 3D model using software programme.

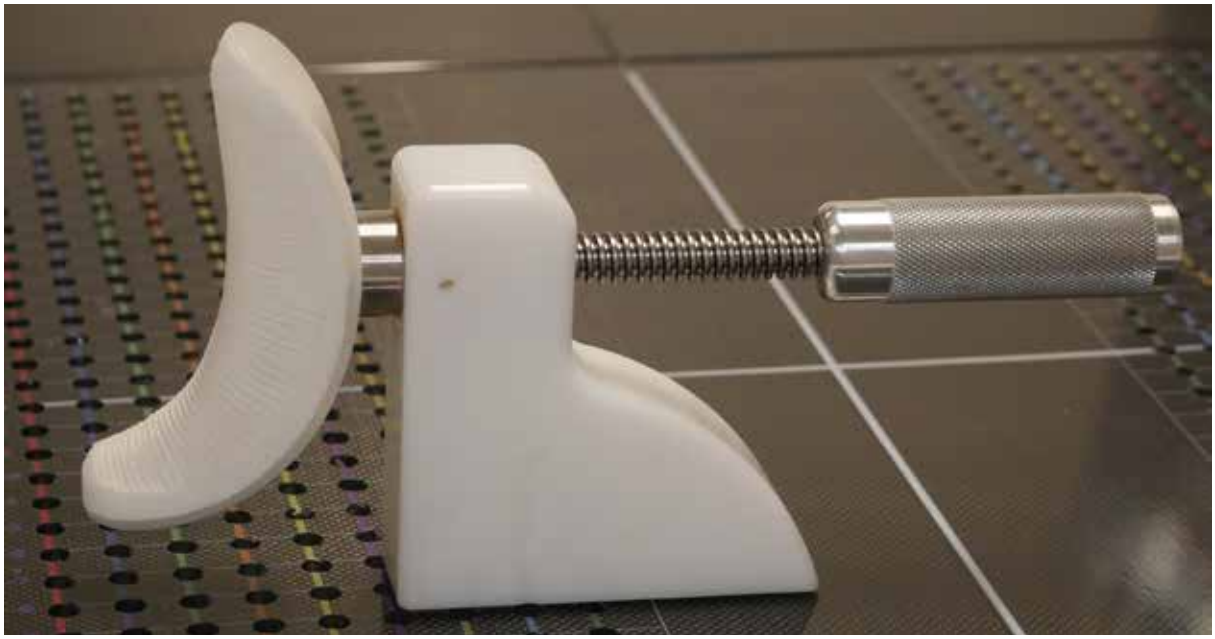
Block/Pad Placement

Pads are placed close to the patient as possible without pushing the patient off the centreline. The stabilising pads are to maintain the patients position on the centre of the measuring board (Trochanter pad and Axilla pad). The corrective pads are as close to the patient as possible.
There are four types of pads:

- Trochanter Pad,
- Lumbar Pad,
- Thoracic Pad,
- Axilla Pad.

Trochanter Pad

The trochanter pad is used to stabilise the patient and to “hold” the patient in the correct location.

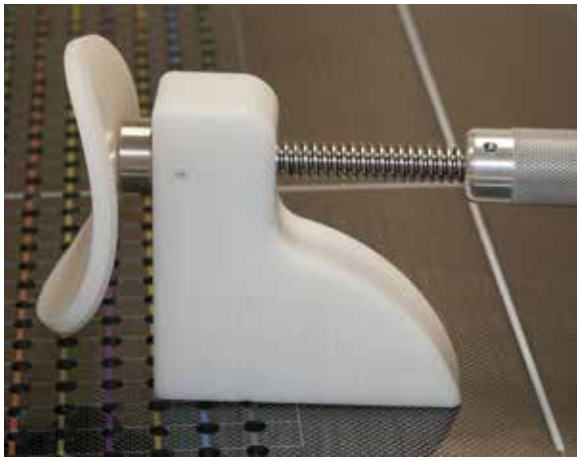


Lumbar Pad

The lumbar pad is used to position the patient centrally at row “0” and to locate the waist roll.
The lumbar pad is always located at row “0”.

Thoracic Pad

The thoracic block is placed at the apex of the curve or below (refer to the patients x-ray) with the thread at zero.



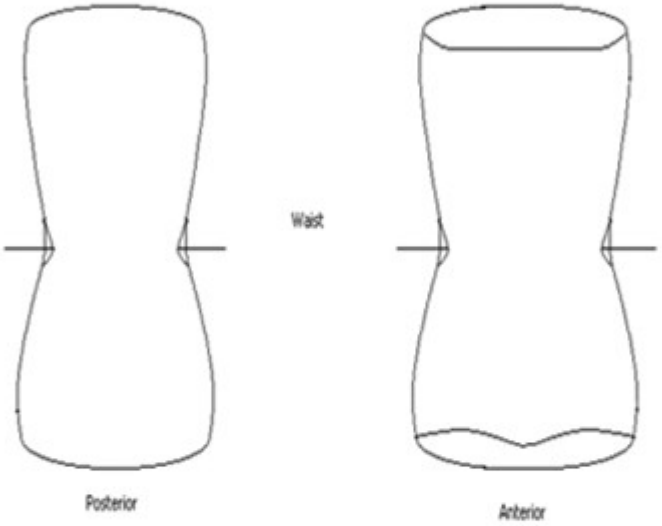
Axilla Pad

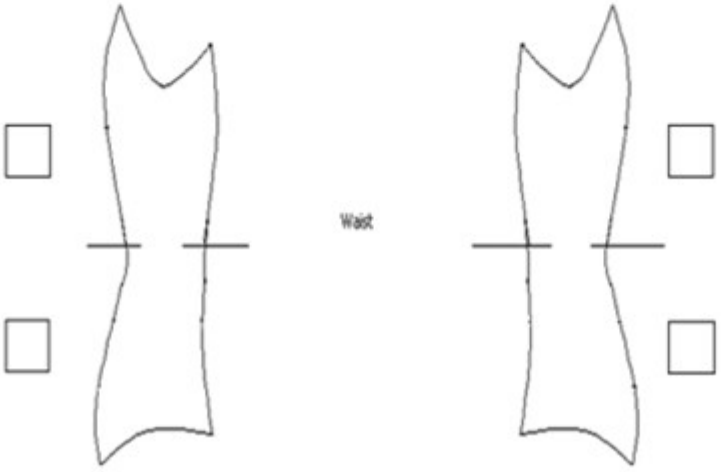
The axilla pad is used to stabilise and maintain the patients position on the measurement board.

Brace Construction

Hybrid Brace Design

Order Number	
Patient Name	
Material Thickness	
Designed By	
Approved By	
Date	
Mold Number	





Pads are placed close to the patient as possible without pushing the patient off the centreline. The stabilising pads are to maintain the patients position on the centre of the measuring board (Trochanter pad and Axilla pad). The corrective pads are as close to the patient as possible.
There are four types of pads:

- Trochanter Pad,
- Lumbar Pad,
- Thoracic Pad,
- Axilla Pad.

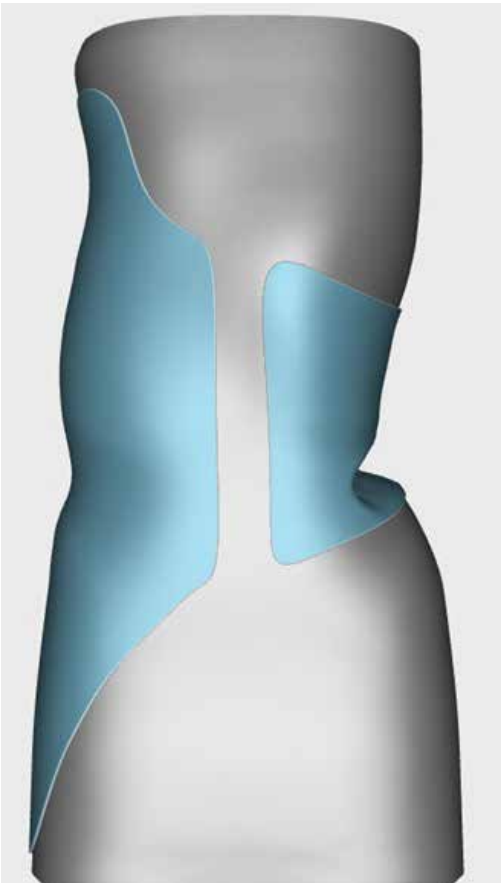
Trim Lines

The trim lines for the Hybrid Night Brace will be determined by the brace design, which in turn is dictated by the curve pattern. As there are four brace design types, there are four different trimlines. Once the trim lines have been drawn onto the model it is ready to be trimmed.

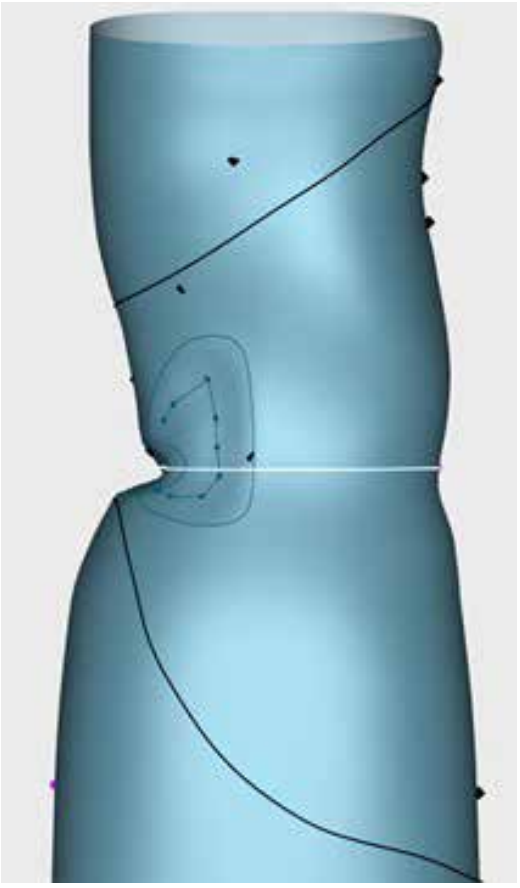
1. Using an electric jigsaw remove the excess material.
2. The brace is then machined to ensure that all edges are sanded. Fine sanding is necessary to prevent nicks, which can lead, to fatigue and fuzzing of the polypropylene and foam liner.

Type 1

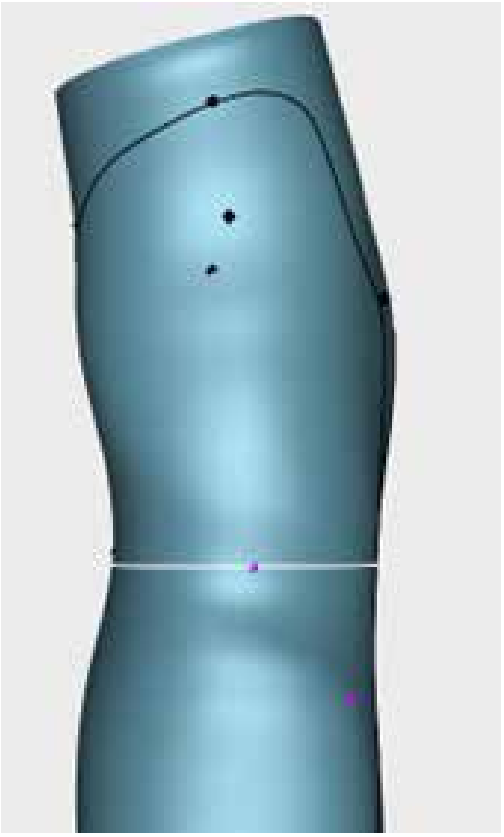
Anterior View



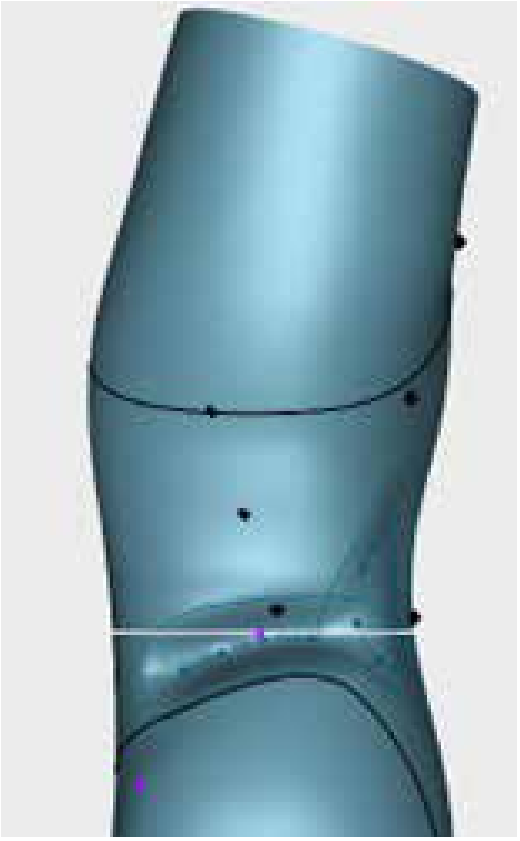
Posterior View



Right Lateral View

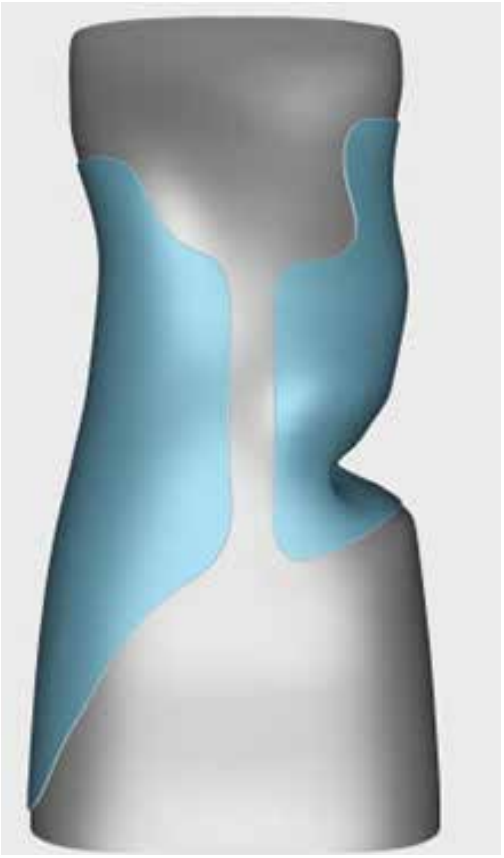


Left Lateral View

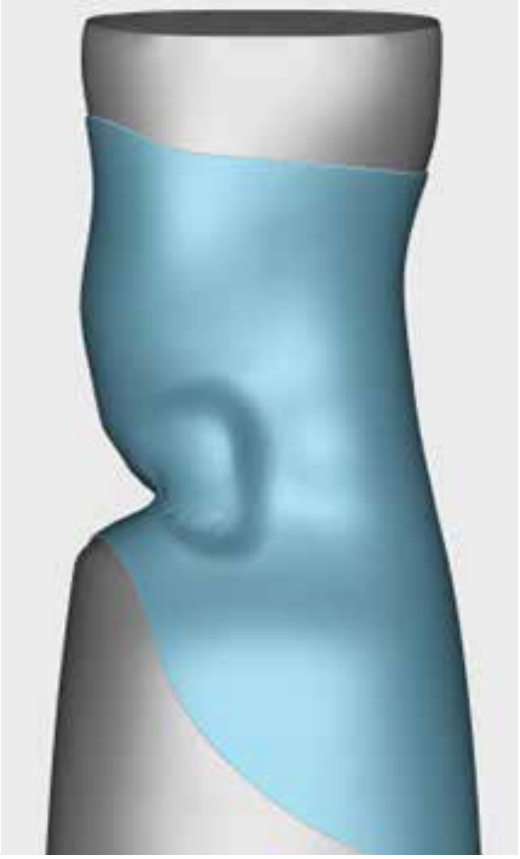


Type 2

Anterior View



Posterior View

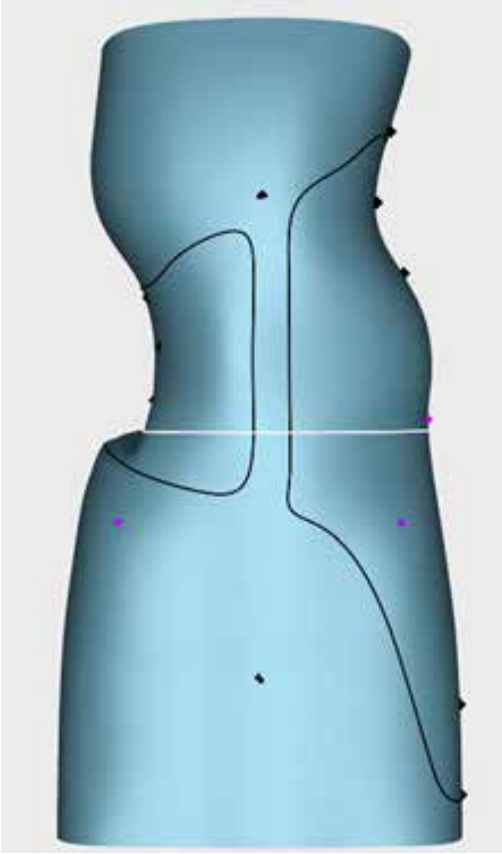


Right Lateral View

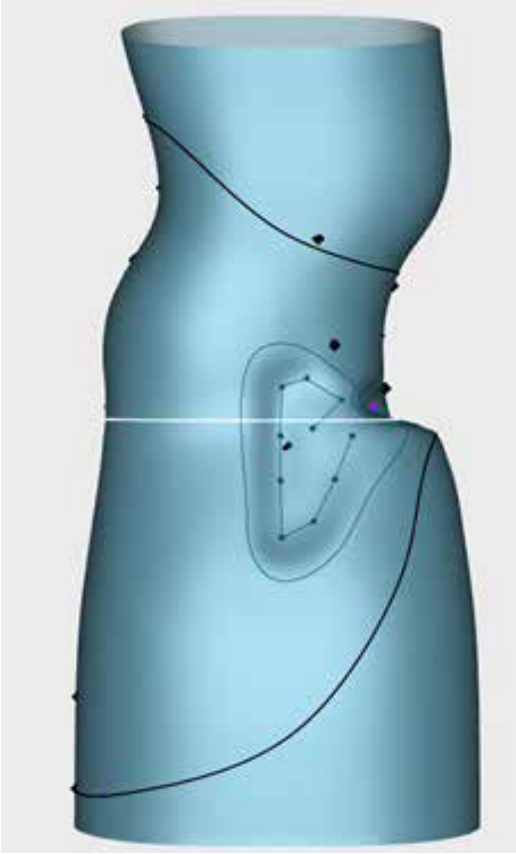
Left Lateral View

Type 2

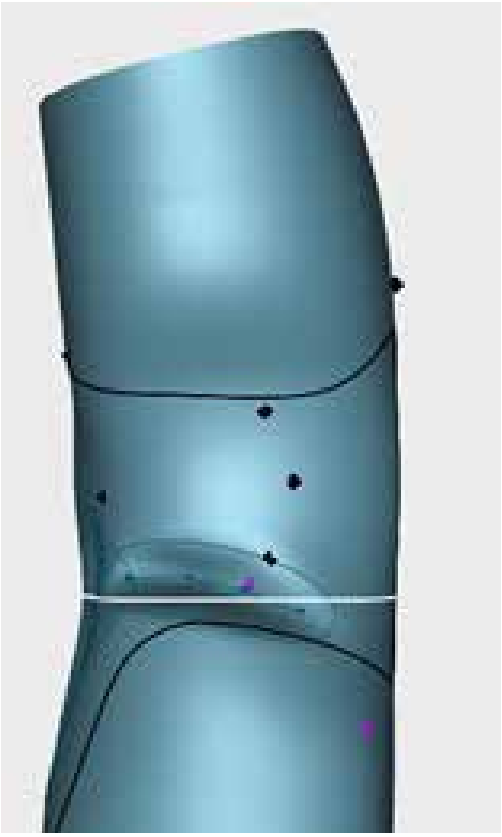
Anterior View



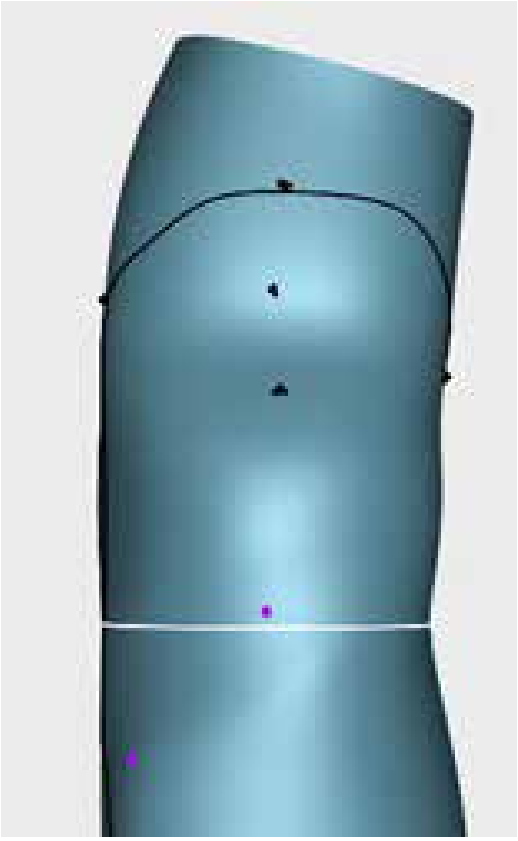
Posterior View



Right Lateral View

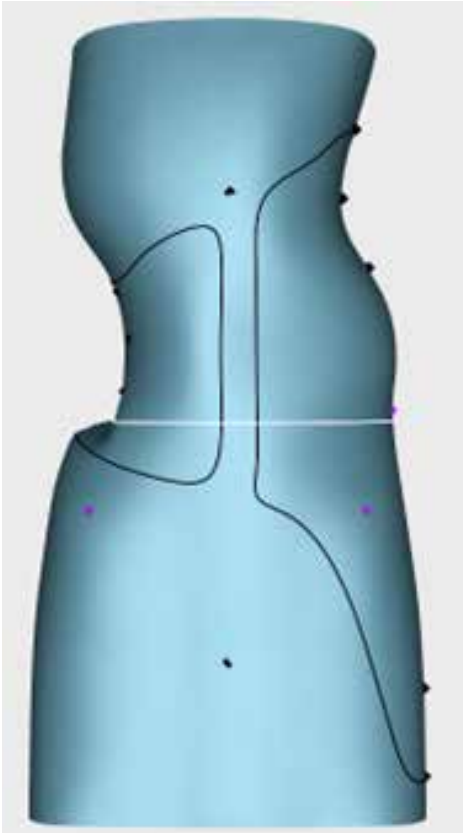


Left Lateral View

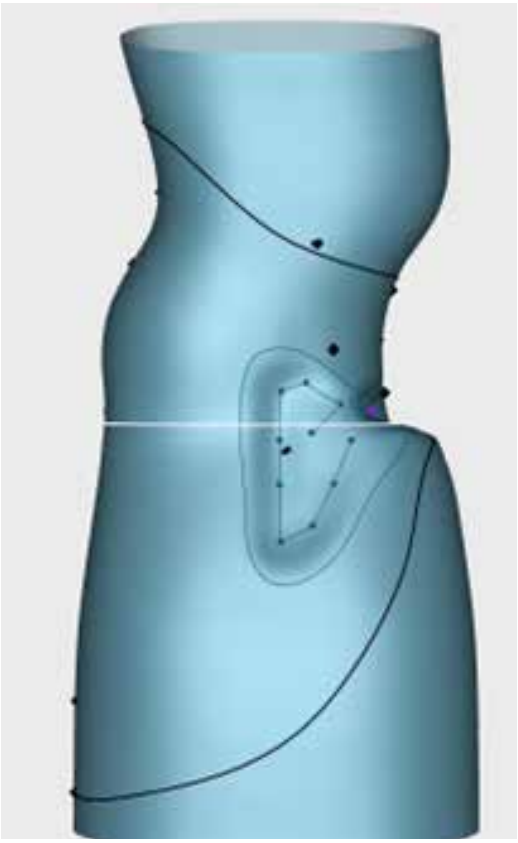


Type 4

Anterior View

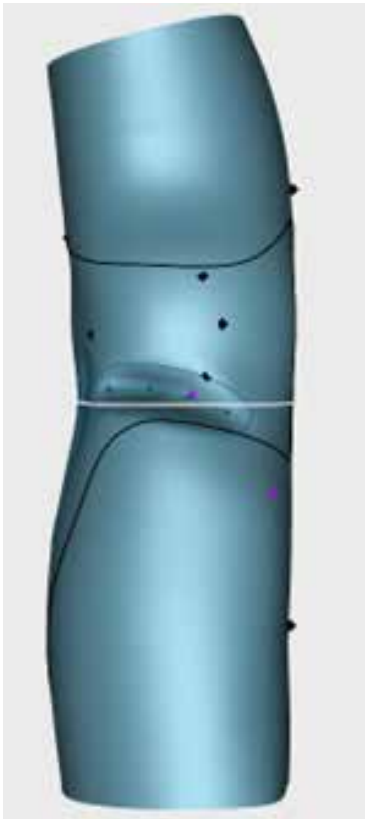


Posterior View

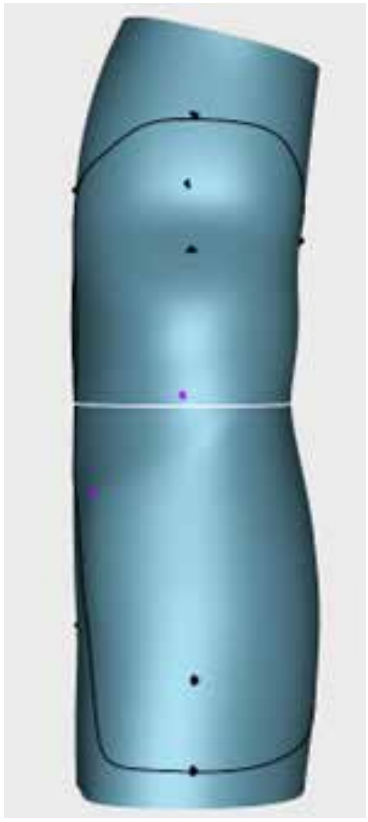


Type 4

Right Lateral View



Left Lateral View



Strap Placement

There are straps attached with each Hybrid Night Brace. Brace Types 1,2 and 4 consist of three straps. Brace Design Type 3 has two straps attached to the hybrid brace. Each hybrid brace also has a polyethylene tongue attached.

- Bottom buckle is on the side where the lumbar pad is located.
- Middle buckle is located on the waist.
- Top buckle is located on the side where the thoracic pad is located.

Patient Evaluation

Lumber Pad Placement
All braces have a lumber pad at Row 0. This pad is for stabilisation/hold and/or correction. The lumbar pad helps locate the brace at the correct position i.e., stops migration.

The lumbar pad is typically placed on the side most deviated from midline (L2/L3).

Stabilisation Pad Placement (Trochanter)
The stabilising pad is place at the trochanter level.

Recumbent Rule (lying down)
When the patient is lying down, the spine elongates.

Thoracic Pad Placement
The thoracic pad should be placed at the apex of the curve or below.

Stabilising Pad Placement (Axilla)
The stabilising pad is place at the top end of the thoracic curve.

Brace Evaluation and Critique

Checkout of the Brace

Purpose of the Checkout:

The purpose of the checkout is to review the brace design, fit and function. Brace checkout should be done when the brace is first delivered, when the patient returns for the first in-brace X-ray, and on Subsequent return visits. The initial brace checkout should be done with the brace design specification available for reference, and subsequent visits should include comparison to the most recent X-ray. The orthotist, physical therapist, nurse, and physician should all be competent in brace checkout.

Trim Lines

Examine each of the trim lines in sequence. In each case, consider why the trim line is located as it is, and whether that part of the brace is fulfilling its particular function.

Anterior Superior

Does the anterior superior trim line just cover the xyphoid process? Does it allow easy breathing?

Anterior Inferior

Does the anterior inferior trim line follow the contour of the lower edge of the crest roll into the trochanter? Check to see that the brace is properly applied, and the crest roll is located between the iliac crest and lower rib. The curves should flow freely, with no sharp points.

Posterior Superior

Do the posterior superior trim lines contour from the thoracic extension to the axilla?

Posterior Inferior

Does the posterior inferior trim line follow the contour of the lower edge of the crest roll into the trochanter?

Anterior Opening

Is the anterior opening centred?

Lateral Inferior

Trochanter Extension. Is the trochanter extension on the correct side?
Opposite the Trochanter Extension. Is the opposite side trimmed appropriately.

Checking the Brace Against the Blueprint

Examine the brace on the patient while referring to the blueprint. Consider each component of the brace blueprint and make sure that the finished brace embodies your blueprint design.

Pads and Relief Areas:

Trochanter Pad

Is the trochanter pad on the correct side? Does it keep the brace balanced? Is the opposite trochanter free to move?

Lumbar Pad

Is the lumbar pad pressure located appropriately contacting the paraspinal muscles with the upper margin of the pad at the null point?

Thoracic Push

Is the upper margin of the thoracic pad at the appropriate?

Axillary Extension

Is the axillary extension at the correct level?

Rotational Force Couples

Are rotational forces applied at the correct locations?
Examine each of the following for rotational control:

1. Lumbar Spine
2. Thoracic Spine

Checking the Brace off the Patient

Remove the brace to check the patient's skin and the brace. The condition of the brace gives a clue as to how much it is used.

Brace Lining

Are the Lining and edges of the pads smooth, even, and free of glue? Is the Lining beaten down any-where suggesting areas of excessive pressure? Check for loose edges.

General

Are the straps long enough? Are there any rough edges?

Patient:

With the brace removed, check the skin.

Skin Condition

Is there excessive redness or breakdown? If irritation is present, check the brace lining. Check pelvic control if irritation is excessive over the iliac crests. Excessive motion will often cause such irritation.

Location of Skin Pressure Areas

Check the areas of hyperaemic skin against the blueprint. Is the pressure located where pressure is desired?

Follow Up Schedule

How often should the patient be seen in follow-up?
Follow-up schedules must often be tailored to the individual needs of a patient, but our standard regimen tries to achieve a balance between excessively frequent visits which may cost too much time from school and family, and too widely spaced visits during which the brace may no longer fit or be adjusted properly or the patient easily loose enthusiasm for wearing the brace. When in doubt, the patient should be seen frequently. Once adapted to brace use, most patients should be seen every 3 months. Although little may appear to occur with these visits, it seems necessary to frequently validate the patient's efforts in brace usage and encourage or realistically assess their progress. If given a more remote follow-up appointment and told to 'come back sooner if there is a problem', patients rarely seem to come back for compliance and psychosocial problems, poor fit, skin irritation, etc. Yet when given an appointment for every 3 months, these issues are noted earlier and dealt with somewhat more effectively.

How often should there be radiographs?
In the past, radiographs were taken every 3 months. We now try to make each radiograph count and would like to think that there are no 'routine' radiographs, rather each radiograph is taken to answer a specific question or help with a specific decision. Many of our patients whose brace treatment is proceeding routinely receive only one radiograph each year.

Typical schedule for visits and radiographs is outlined below.

Visit	Frequency	Procedures	Radiographs
Initial Visit		Evaluation, PT if stiff, measure for brace	PA
Brace pick up	2-3 weeks later	Orthotist delivers brace. Reviews brace usage, schedule. PT assesses, instructs exercises	none
First In –brace follow up	2 – 4 weeks, when wearing full time	See brace shop for final fit, adjustment, tightening. Nurse, PT and Physician review brace fit, critique, in-brace correction	PA (rarely lateral) in- brace.
Routine follow up	3 months	All team members review adjustments	Standing PA in or out of brace depending on physician preference. Radiograph frequency depends on many factors, but typically 6 months after brace initiation, then yearly thereafter. Wrist for bone age frequently helps in determining approximate length of time remaining in brace.

Skeletal maturity, beginning of weaning		All team members	Standing PA, spine out of brace (wrist for bone age if needed.)
End of bracing	1 year later	MD, PT and Nurse	Standing PA and Lateral out of brace.
1 year follow up	1 year later	MD	Standing PA spine
2 years follow up	2 year later	MD	Standing PA spine
5 years follow up	5 year later	MD	Standing PA spine
10 years follow up	10 year later	MD	Standing PA spine

Terminology and Definitions

Adam's Forward Bending Test: The standard screening exam for spinal asymmetry – the patient places their hands together and bends forward. The examiner sights along the spine looking for a rib or lumbar hump.

Adolescent scoliosis: Spinal curvature presenting at or about onset of puberty and before maturity.

Adult scoliosis: Spinal curvature existing after skeletal maturity.

Angle of thoracic inclination: With the trunk flexed at 90° at the hip, the angle between horizontal and a plane across the posterior rib cage at the greatest prominence of the rib hump.

Apex of Curve(s): The point where angulation of a curve changes from one curve to another.

Apical vertebra: The most rotated vertebra in a curve; the most deviated vertebra from the vertical axis of the patient.

Axilla Stabilising Block: A pad that is used to stabilise/centralise a patient.

Body alignment, balance, and compensation:
1. The alignment of the midpoint of the occiput over the sacrum in the same vertical plane as the shoulders over the hips.
2. Roentgenology: When the sum of the angular deviations of the spine in one direction is equal to that in the opposite direction.

Café au lait spots: light brown irregular areas of skin pigmentation. If sufficient in number and with smooth margins, they suggest neurofibromatosis.

Cervical curve: Spinal curvature that has its apex from C1 to C6.

Cervico-thoracic curve: Spinal curvature that has its apex at C7 or T1.

Cobb Angle: A standard measurement used to determine and track the progression of scoliosis.

Compensation: Accurate alignment of the midline of the skull over the midline of the sacrum.

Compensatory curve: A curve, which can be structural, above or below a major curve, tends to maintain normal body alignment.

Congenital scoliosis: Scoliosis due to congenitally anomalous vertebral development.

Curvature of Curve(s): The rate at which a spinal curve is turning.

Curve measurement:
Cobb method: Select the upper and lower end vertebrae. Erect perpendiculars to the transverse axes. They intersect to form the angle of the curve. If the vertebral endplates are poorly visualized, a line through the bottom or top pedicles may be used.
Ferguson method: the angle of a curve is formed by the intersection of two lines drawn from the center of the superior and inferior end vertebral bodies to the center of the apical vertebral body.

Degree of Rotation: The angle between the longitudinal axis of each vertebra and the mid-sagittal axis of the trunk.

Double structural curve. Double major scoliosis: A scoliosis with two structural curves. Two structural curves in the same spine, one balancing the other.

Double thoracic curve (scoliosis): A scoliosis with a structural upper thoracic curve, a larger, more deforming lower thoracic curve, and a relatively non-structural lumbar curve.

End vertebra: The most cephalad vertebra of a curve whose superior surface, or the most caudad vertebra whose inferior surface, tilts maximally toward the concavity of the curve.

Fractional curve: A compensatory curve that is incomplete because it returns to the erect. Its only horizontal vertebra is caudad or cephalad.

Full curve: A curve in which the only horizontal vertebra is at the apex.

Functional curve: Nonstructural curve: A curve that has no structural component and that corrects or overcorrects on recumbent side bending radiographic views.

Genetic scoliosis: A structural spinal curvature inherited according to genetic pattern.

Gibbus: A sharply angular kyphosis.

Hysterical scoliosis: A nonstructural deformity of the spine that develops as a manifestation of a conversion reaction.

Idiopathic scoliosis: A structural spinal curvature for which no cause can be established.

Iliac epiphysis, Iliac apophysis: The epiphysis along the wing of the ilium.

Iliac epiphysis sign, Iliac apophysis sign: In the anterior-posterior radiographic view of the spine, when the excursion of the ossification in the iliac epiphysis (apophysis) reaches its ultimate medical migration, vertebral growth may be complete.

Inclinometer: An instrument used to measure the angle of thoracic inclination or rib hump.

Infantile scoliosis: Spinal curvature that develops during the first three years of life.

Juvenile scoliosis: Spinal curvature that develops between the skeletal age of three years and the onset of puberty.

Kyphosis: A change in the alignment of a segment of the spine in the sagittal plane that increases the posterior convex angulation.

Kyphoscoliosis: lateral curvature of the spine associated with either increased posterior or decreased anterior angulation in the sagittal plane in excess of the accepted norm for that region. In the thoracic region 20 –40 degrees of kyphosis are considered normal.

Lordoscoliosis: Lateral curvature of the spine associated with the increase in anterior curvature or a decrease in the posterior spine angulation of the thoracic spine where posterior angulation is normally present, less than 20 degrees would constitute lordoscoliosis.

Lumbar Corrective Block: An adjustable pad that is positioned at the waist to add correction to the spine of a patient.

Lumbar curve: Spinal curvature that has its apex from L1 to L4.

Lumbosacral curve: Spinal curvature that has its Apex at L5 or below.

Major curve: Term used to designate the larger (largest) curve (s), usually structural.

Minor curve: Term used to refer to the smaller (smallest) curve (s).

Myorzenic scoliosis: Spinal curvature due to disease or anomalies of the musculature.

Neurogenic scoliosis: Spinal curvature due to disease or anomalies of nerve tissue.

Osteogenic scoliosis: Spinal curvature due to abnormality of the vertebral elements and or adjacent ribs, acquired or congenital.

Pelvic obliquity: Deviation of the pelvis from the horizontal in the frontal plane. Fixed pelvic obliquity's can be attributable to contractures either above or below the pelvis.

Primary curve: The first or earliest of several curves to appear, if identifiable.

PSIS – Posterior Superior Iliac Spine: The bony prominence felt just above and to the side of the sacrum – the posterior, superior corner of the iliac wing.

Rib hump: The prominence of the ribs on the convexity of a spinal curvature, usually due to vertebral

rotation best exhibited on forward bending.

Skeletal age, Bone age: The age obtained by comparing an anterior-posterior radiographic view of the left hand and wrist with the standards of the Greulich and Pyle Atlas.

Structural curve: A segment of the spine with a fixed lateral curvature. Radiographically, it is identified in supine lateral side – bending views by failure to correct. They may be multiple.

Thoracic curve: Scoliosis in which the apex of the curvature is between T2 and T11.

Thoracogenic scoliosis: Spinal curvature attributed to disease or operative trauma in or on the thoracic cage.

Thoracolumbar curve: Spinal curvature that has its apex at T12 or L1.

Transitional vertebra: Vertebra that is neutral in relation to rotation usually at the end of a curve.

Thoracic Corrective Block: An adjustable pad that is positioned in relation to the apex of the curve.

Trochanter Stabilising Block: A pad that is used to stabilise/centralise a patient.

Vertebral endplates: The superior and inferior plates cortical bone of the vertebral body adjacent to the intervertebral disc.

Vertebral growth plate: The cartilaginous surface covering the top and bottom of the vertebral body that is responsible for linear growth of the vertebra.

Vertebral ring apophyses: The most reliable index of vertebral immaturity seen best in the lateral radiographs or in the lumbar region in side–bending anterior posterior views.

Support for Better Life

Everyone should be able to live their life to the fullest, regardless of their mobility challenges. With innovative solutions developed in close collaboration with healthcare professionals and patients, we strive to provide Support for Better Life.

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