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Shaping Better Lives



Lateral Trunk Support System

Clinical Guide for Selection & Use

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Integration with Complete Seating System

The Spex Seating system as part of whole-body positioning.

Spex Lateral Trunk Supports are a key part of the Spex seating system, designed to help manage trunk asymmetry, lateral scoliosis, and postural instability in wheelchair users.

This guide outlines a practical approach to the assessment, prescription, and implementation of Spex lateral trunk support hardware within a complete seating system.

Head Support: Adjustable support for optimal head positioning and alignment

Back Support: Supports the trunk into optimal alignment, distributes load and provides comfort

Lateral Trunk Supports: Spex system *(focus of this guide)*

Pelvic Support: Positioning belt, cushion with contouring, possible wedges

Upper Extremity Support: Arm supports, trays as needed for function *(not shown)*



Lower Extremity Support: Foot supports positioned to support optimal seat-to-back angle

Interaction Points:

Pelvis affects trunk: Always address pelvic position before finalising lateral placement *(Lange, 2021)*

Trunk affects head: Proper lateral support improves head position and control *(ter Haar, 2013)*

Seat-to-back angle affects everything: May need to open or close angle based on hip flexor tightness or postural needs. *(Lange, 2021)*

Remember: *Lateral Trunk Supports do not work in isolation.*

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Clinical Applications



Scoliosis

A lateral deviation of the spine in the coronal plane with rotation in the transverse plane. This three-dimensional deformity involves not only lateral curvature but also rotational displacement of the vertebrae, often resulting in rib cage asymmetry and complex trunk contours. In wheelchair users, it presents as convex and concave curvatures.

Common causes of Scoliosis:

- **Idiopathic scoliosis:** A pre-existing curve that may progress over time due to gravitational forces and inadequate postural support. Accounts for around 80% of cases.
- **Neuromuscular scoliosis:** Occurring in neurological diagnoses such as Cerebral Palsy, Spinal Muscular Atrophy, Muscular Dystrophy and Spinal Cord Injury. Accounts for 20% of remaining cases.
- **Habitual postural scoliosis:** May result from prolonged asymmetrical sitting in non-supportive seating systems and unsupported lying positions.

A scoliosis tends to be described as structural (non-reducible) or compensatory (reducible). Defining the type of scoliosis can be achieved by reviewing X-rays and completing a postural assessment. This is an important step as it will determine your approach to supporting intervention and defining product parameters.

Lateral Trunk Flexion

A lateral deviation of the trunk without a rotational component. The spine remains in a single plane, bending laterally while maintaining its anterior-posterior orientation without vertebral rotation.

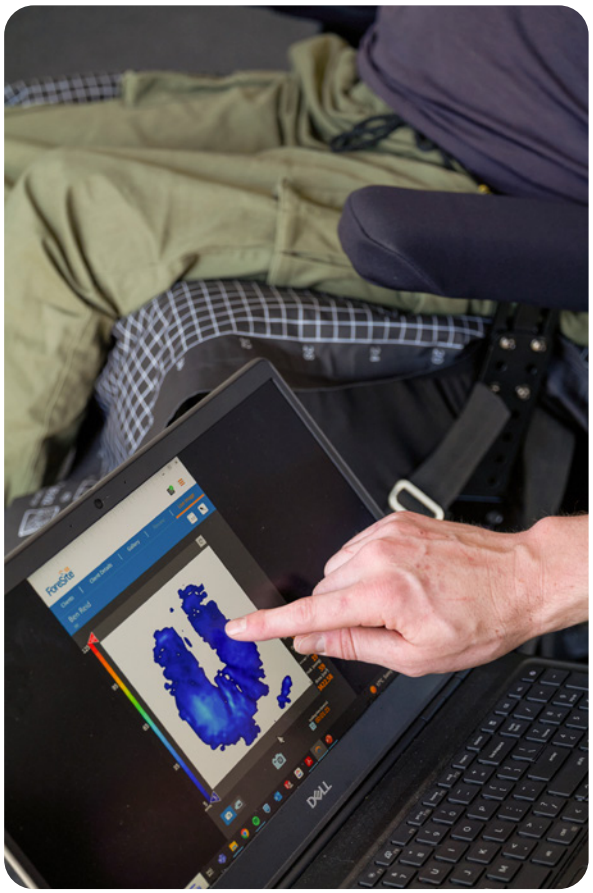
Common causes in wheelchair users:

- **Neuromuscular causes:** Asymmetrical muscle tone, or trunk hypotonia with inadequate lateral stability
- **Functional causes:** Inadequate lateral support, seat base that is too wide, or repeated reaching to access controls or interact with the environment
- **Orthopaedic causes:** Pelvic obliquity without spinal rotation, unilateral hip pain or contracture
- **Compensatory pattern:** Visual field deficits, preference for one-sided orientation, or the influence of a persistent asymmetric tonic reflex (ATNR).

Clinical Assessment Procedure

Step 1: Comprehensive MAT Evaluation

Before prescribing any AT equipment, it's important to conduct a thorough MAT evaluation to define the product parameters.



A **MAT Evaluation** (Mechanical Assessment Tool) is used by seating clinicians, including OTs and PTs, to assess posture, range of motion, and skeletal alignment outside the wheelchair to understand an individual's wheelchair seating support requirements & configuration. It helps identify whether orthopaedic limitations, such as contractures or scoliosis, are non-reducible (fixed) or reducible (flexible), so the seating system can be prescribed to support pressure management, function, and long-term comfort.

1. Review the client in their current wheelchair to develop an understanding of their baseline presentation:

Spot and document seated presentation, high loading sites for pressure care and review function in the current system.

2. Supine postural assessment:

- Assess spinal curve flexibility and reducibility in sitting
- Evaluate the impact of gravity on trunk position
- Assess functional trunk strength
- Assess range of motion in lower limbs and document limitations and signs of contractures

3. Simulated Seated Postural assessment:

- Assess spinal curve flexibility and reducibility in sitting
- Evaluate the impact of gravity on trunk position
- Assess functional trunk strength and stability with completing upper limb activities
- Position the client in their optimal posture that balances alignment, pressure care, comfort and function

Step 2: Functional and Environmental Assessment:

- Evaluate the user's physical presentation in the context of daily activities and their environment
- Assess how physical impairments affect function, independence, and safe mobility
- Link identified impairments to specific postural support components
- Consider the risk of secondary complications when prescribing support
  (RESNA Guidelines Rehabilitation Engineering and Assistive Technology Society of North America., 2011)

Step 3: Outcome Measure Assessment:

- Use a validated outcome measure alongside the MAT evaluation where appropriate
- Consider tools such as the Posture and Postural Ability Scale (PPAS)
- Use outcome measures to support clinical decision-making and document change over time *(Rodby-Bousquet, 2014)*

Clinical Rules

Before prescribing any equipment, it's important to understand some clinical rules to help us achieve optimal positioning.

Rule 1: Pelvis First

Support and align the pelvis. Pelvic obliquity is often a primary driver of lateral trunk flexion and can lead to the development of scoliosis.

- Assess the pelvis. Reduce to an optimal position that provides stability and upright alignment if possible.
- Use the Spex Strategic positioning kit to reduce or accommodate the pelvic obliquity if present
- Block compensatory lateral pelvic movement
- Reassess spinal curve after pelvic correction
- Document your findings and the position of the trunk following the improvement of the seated pelvic position

Clinical Tip: Always stabilise the pelvis first. Many apparent spinal deformities reduce significantly once the pelvis is properly positioned and secured. *(Korkmaz, 2022)*

Rule 2: 3-Point Control System

For lateral spinal curvatures, the 3-point control system is the most effective biomechanical approach to halt or correct curve progression. *(Holmes, 2003)*

Superior counter-force (F1)

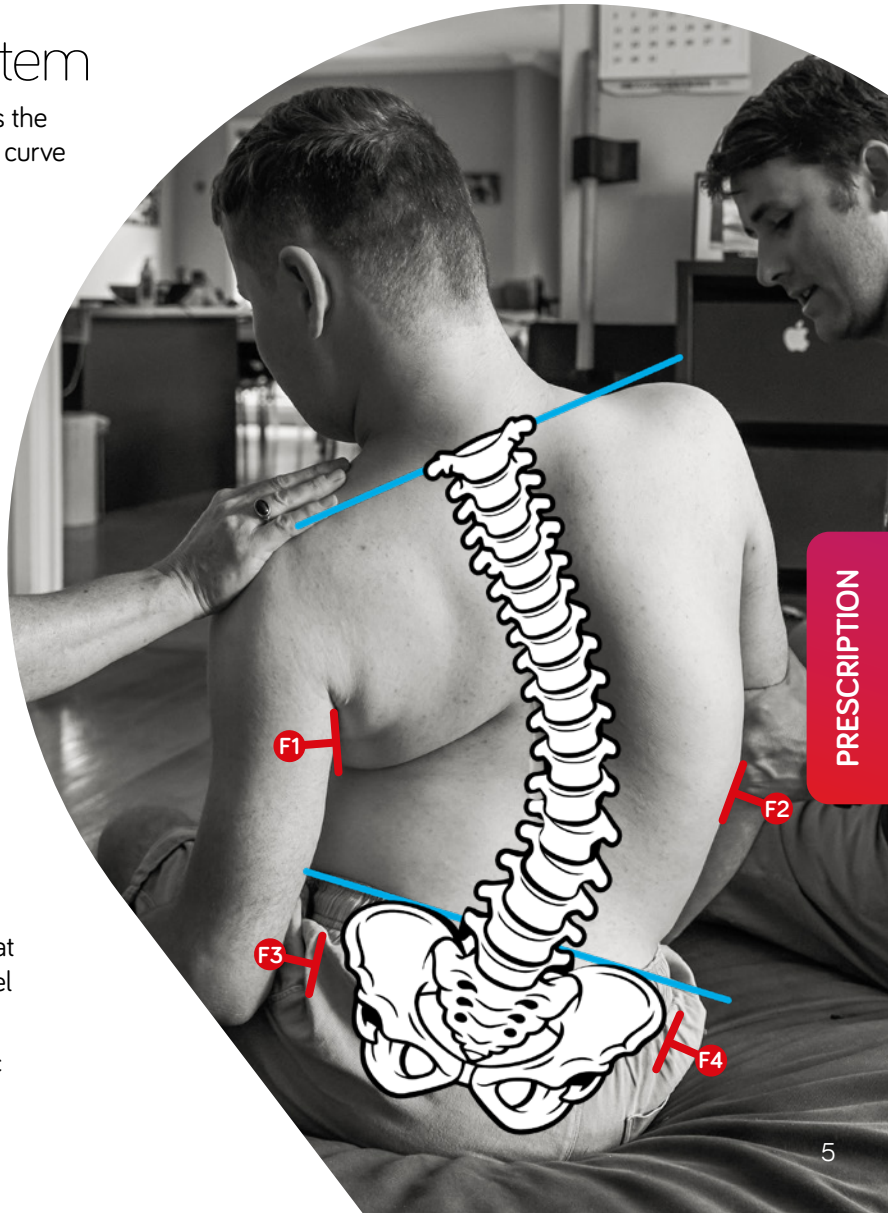
Anatomical Placement	On the opposite concave side, typically near the axilla
Biomechanical Function	Stabilises upper trunk and prevents lateral shifting

Primary corrective force (F2)

Anatomical Placement	At the apex of the curve on the convex side
Biomechanical Function	Applies the main corrective force to guide the spine back towards midline

Inferior counter-force (F3/F4)

Anatomical Placement	On the opposite concave side at the pelvic or lower thoracic level
Biomechanical Function	Stabilises the base of the trunk and helps prevent lateral pelvic migration



Rule 3: Force Direction

- Apply forces in line with the deformity to avoid creating shear or redirecting forces that worsen the curve
- Position lateral supports asymmetrically to address the individual curve pattern
- Use pad types and placement that match the corrective goal on each side
- Consider combining different pad shapes, such as a broad pad at the apex and a narrow curved pad on the opposite upper trunk

How to Build a Spex Lateral Trunk Support

Step 1: Lateral Hardware Options

Next, we will explore the available hardware, pad, and cover options.



Fixed

Key Feature	Permanently attached to the wheelchair's back- post or backrest shell, provide maximum level of rigid stability
Clinical Indications	Heavy leaners with high forces who do not perform independent or frequent lateral transfers
Adjustability	Baseline adjustability in both width and depth



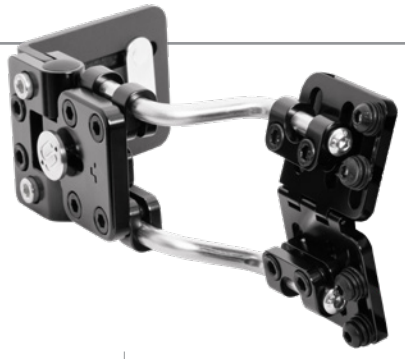
Axial

Key Feature	Multi-directional adjustment, including rotation
Clinical Indications	Complex postural presentations such as scoliosis, trunk rotation and non-symmetrical curves; mimics clinician hand positioning
Adjustability	Multi-axis: angle, depth, height and rotation



Swing-Away

Key Feature	Flip-away mechanism with barrel locking system
Clinical Indications	Active users who need the support moved away during transfers or functional activities
Adjustability	Height, width and depth



Axial-Biangular

Key Feature	Pivot-hinge within the pad allows ±90° angle adjustment. Once the padding and cover are on, the angle adjustment is more limited
Clinical Indications	Concave and convex trunk contours that require more detailed angular accommodation
Adjustability	Extreme angle adjustability

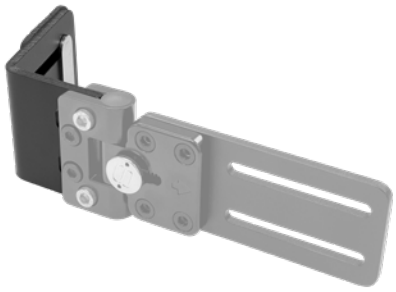


Quick-Release

Key Feature	Removal with a simple quick-release lever mechanism, available in axial fixed angle or axial swing-away
Clinical Indications	For sports or recreation users to allow full range of upper limb movement, or users who need completely unimpeded transfers in and out of the wheelchair
Adjustability	Multi-axis: angle, depth, height and rotation

Additional Hardware Options

Deep Contour Bracket

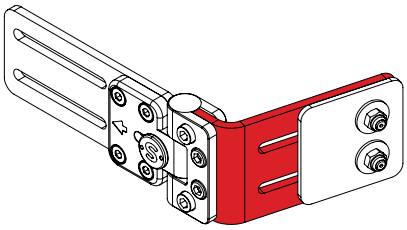


- Extends depth by 1.2"
- Use when back support build-up requires forward positioning of mechanism

Deep Contour Extended Bracket Kit

- Extends depth by 2.9"
- Use in conjunction with extra deep back support build-up

Lateral Reinforcement Plate



- A heavy-duty upgrade to support or accommodate for forceful side leaning or users over 225lbs

Step 2: Lateral Pad Options

Mix and match pad shapes and sizes to build a customised support profile.



Narrow Straight

Design Features	Flat profile	
Clinical Indications	Users who lean forward out of support while retaining trunk stability; pelvic-level support; mild postural needs	
Size Options (HxD)	**0** - 3.3" x 4.5"	**1** - 3.7" x 5.7"
	2 - 3.7" x 7.1"	**3** - 4.5" x 8.3"



Narrow Curved

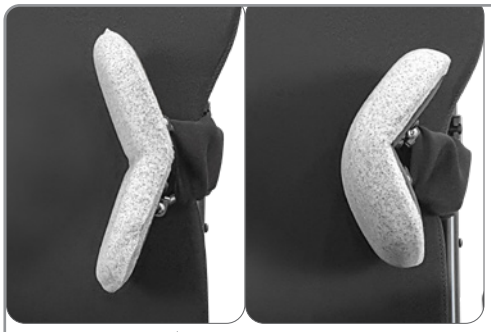
Design Features	Anatomical 'Natural-Lateral' contour following rib cage	
Clinical Indications	Anatomical fit on concave side of scoliosis; provides lift and support	
Size Options (HxD)	**1** - 3.7" x 5.7"	**2** - 3.7" x 7.1"
	3 - 4.5" x 8.3"	**4** - 4.5" x 9.4"

PRESCRIPTION



Broad

Design Features	Large surface area
Clinical Indications	Heavy leaners; high risk of skin breakdown; apex of scoliotic curve (convex side); high forces against pad
Size Options (HxD)	**1** - 4.1" x 5.1" **2** - 4.9" x 5.5" **3** - 5.5" x 5.9" **4** - 6.3" x 6.1" **5** - 7.7" x 6.5" **6** - 9.1" x 6.9"



Biangular

Options:
12mm
24mm

Design Features	Angle-adjustable contact surface to conform closely to both concave and convex body deviations
Clinical Indications	Users with semi-flexible to fixed scoliosis who need increased superior surface contact, improved pressure distribution, and gradual correction of trunk asymmetry towards midline.
Size Options (HxD)	**4** - 6.5" x 6.9" **6** - 8.5" x 7.7" **8** - 10.4" x 7.7"

PRESCRIPTION



Pad Combination Strategy for Scoliosis

Typical Configuration

- **Concave side (Upper trunk/ F1)** Norrow curved pad for correction and lift

+

- **Convex side (Apex /F2)** Broad lateral pad for primary corrective force

+

- **Pelvis (F3/4):** Contoured seat cushion + positioning belt to anchor pelvis and prevent lateral migration

=

Result: Effective 3-point control with optimal pressure distribution

Step 3: Cover Options

Standard Cover

- Padded neoprene fabric sleeve ensures the user's arms are protected from any hard surfaces
- Provides functional coverage without specialised features



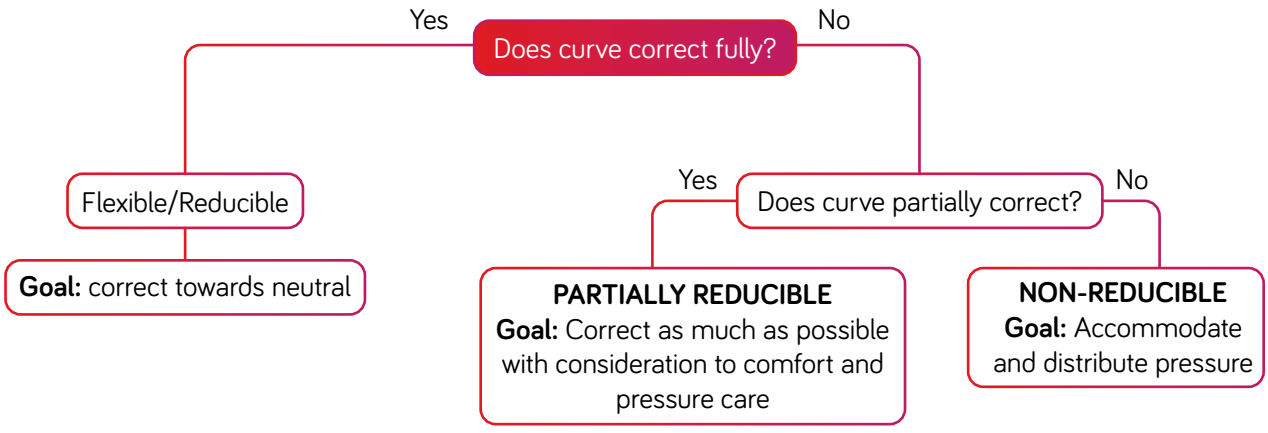
Easy Pull Cover

- Wraps over the hardware beside the arm
- Includes pull strap and thumb loop which make it easier for users to independently open the lateral support
- Provides enhanced comfort at pad interface
- *Not available for the biangular pad/axial bracket*

Step-by-Step Prescription Process

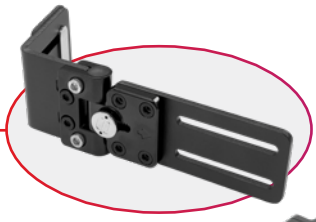
Step 1: Curve Reducibility Decision Flowchart

Assess curve in supine (gravity eliminated)



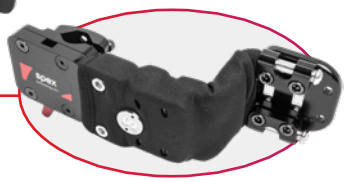
Step 2: Assess Functional Needs

Does the user transfer independently? — Consider Swing-Away



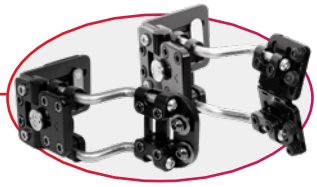
No

Is the wheelchair used for sports/recreation? — Consider Quick-Release



No

Does the curve involve rotation? — Select Axial or Biangular bracket



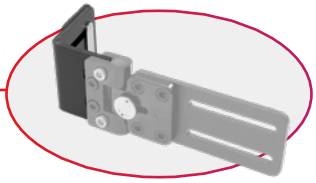
No

Is there forceful side leaning? — Choose Broad pads and consider reinforced hardware



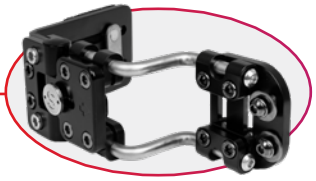
No

Is back support built up with foam? — Add 1.2" Deep Contour Bracket



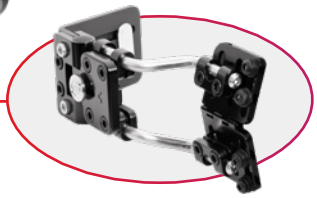
Step 3: Select Bracket Type

Complex 3D curve with rotation? — Axial Bracket



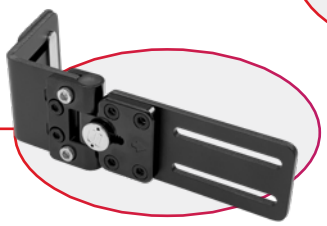
No

Need extreme angle adjustments? — Biangular Bracket



No

Need transfer assistance? — Swing-Away Bracket



No

Maximum stability, no transfer concerns? — Fixed Bracket



No

Frequent removal needed? — Quick-Release



Step 4: Configure Pad Combination

Lateral Scoliosis

1. Identify apex of curve (convex side)
2. Place Broad Pad at apex for primary corrective force
3. Place Narrow Curved Pad on concave side superiorly
4. Consider Straight Pad at inferior counter-force point

Trunk Instability (no scoliosis)

1. Use Narrow Straight or Curved Pads bilaterally for gentle support
2. Position to provide stability without excessive constraint
3. Allow functional forward movement as needed

Forceful Side Leaning

1. Use Broad Pads on leaning side
2. Maximise surface area for pressure distribution
3. Consider lateral reinforcement plate

Step 5: Determine Cover Needs



Easy Pull Cover
Users with ability to self-adjust



Standard Cover
Most other applications

Step 6: Measure Outcomes

There are several ways to measure whether the seating setup has been successful:

1. Cobb angle (baseline and follow-up)
2. Pelvic obliquity angle
3. Skin integrity (no pressure injuries)
4. Sitting tolerance (duration the user can sit comfortably)
5. Functional reach and upper extremity use
6. Head position relative to midline
7. User satisfaction and comfort ratings

Installation and Adjustment

Setup Checklist:

- ☐ Ensure the transfer into the wheelchair is optimal
- ☐ Pelvic positioning belt installed and adjusted correctly
- ☐ Back support properly tensioned and secured
- ☐ Lateral hardware mounted at correct height
  - Superior pad: Near axilla level (avoid pressure in axilla)
  - Primary force pad: At apex of curve
  - Inferior pad: Lower thoracic or upper pelvic level
- ☐ Pads positioned in line with deformity forces
- ☐ Offset/extension added if needed for optimal positioning
- ☐ All mounting hardware secure with reinforcement plates if required

Fine-Tuning Adjustments:

Depth Adjustment:

- Pad should contact trunk without excessive pressure
- User should not be able to lean significantly away from pad
- Avoid pad being too deep (causing pressure) or too shallow (ineffective)
  Tip: Slide your finger between the pad and the user to check the pressure on the user's trunk

Height Adjustment:

- Superior counter-force: High enough to stabilise shoulders, not in axilla
- Primary force: Exactly at apex of curve
- Inferior counter-force: Upper pelvis or lower thorax

Angle Adjustment (Axial/Axial Biangular):

- Pad face should match trunk contour
- Forces should be perpendicular to desired correction
- Use 5mm Allen key for adjustments
- Lock securely after positioning

Rotational Adjustment (Axial):

- Orient pad to match rib cage angle
- Consider 3D presentation of deformity
- Pad should conform to body, not force body to conform to pad

Monitoring and Reassessment

Initial Follow-Up (2–4 weeks after setup)

- Check for pressure areas or skin irritation
- Verify hardware has maintained position
- Adjust pad position if needed
- Gather feedback from user/caregiver on comfort and function

Regular Reassessment (Every 3–6 months)

- Review outcome measures relating to postural presentation to determine improvement or progression of trunk asymmetry
- Check for growth changes (Paediatric users)
- Assess hardware integrity and function
- Adjust positioning as needed

Annual Comprehensive Review (Every 12 months)

- Repeat full MAT evaluation
- Compare baseline and current measurements
- Determine if equipment still meets needs
- Consider upgrade or modification if indicated

Red flags requiring immediate attention

- Skin breakdown or pressure injuries
- Increased pain with use
- Loss of function or decreased sitting tolerance
- Hardware failure or loosening
- Significant curve progression despite support
- User avoidance or refusal to use equipment

Justification for Funding:

Documentation Requirements: Letter of Medical Necessity (LMN)

"The Spex Lateral Trunk Support System is medically necessary to [select applicable]:

- ☐ Prevent progression of [reducible / partially reducible / non-reducible] scoliotic curve…
- ☐ Accommodate non-reducible trunk deformity and distribute pressure to prevent skin breakdown
- ☐ Provide 3-point biomechanical control for neuromuscular scoliosis
- ☐ Enable upright trunk position for respiratory function, visual field, and upper extremity use
- ☐ Stabilise trunk to allow safe mobility in power/manual wheelchair"

Key Justification Points:

1. **Clinical evidence:** Reference research showing effectiveness of 3-point control systems for scoliosis management
2. **Functional goals:** Specific measurable outcomes (e.g., maintain current Cobb angle, prevent curve progression >5°)
3. **Comparison to alternatives:** Why this specific hardware/pad configuration is superior to standard laterals
4. **Customisation needs:** Why adjustability features (Axial, Biangular) are necessary for this individual
5. **Safety:** Prevention of falls, pressure injuries, or aspiration risk due to poor positioning

Common Challenges and Solutions

Challenge	Possible Causes	Solutions
User leans away from lateral support	• Pad too aggressive • Pad not in line with force • Poor pelvic positioning	• Reassess pelvic position first • Adjust pad depth • Check pad angle relative to trunk
Pressure marks on trunk	• Pad too deep • Pad edge digging in • User pushing forcefully	• Reduce depth • Consider larger pad for better distribution • Reassess positioning
Curve not improving	• Non-reducible curve • Inadequate 3-point control • Poor pelvic stabilisation	• Confirm curve flexibility • Check all three force points present • Improve pelvic belt
Hardware loosening	• Insufficient mounting • High forces • Inadequate reinforcement	• Add reinforcement plates • Check attachment screws • Verify bracket capacity
User discomfort/ refusal to use	• Poor fit • Excessive constraint • Aesthetic concerns	• Reassess all positions • Ensure proper padding • Involve user in decisions • Consider Easy Pull Cover
Limited functional reach	• Laterals positioned too far forward • Excessive constraint	• Reposition laterals more posteriorly • Consider straight pads that allow forward lean



Quick Reference Guide

User Need	Hardware Selection	Pad Type	Cover
Reducible C-curve scoliosis	Axial or Biangular bracket for precise positioning; consider dynamic adjustments	Broad (convex) + Narrow Curved (concave)	Standard or Easy Pull
Non-reducible severe scoliosis	Axial and/or Biangular bracket for precise positioning; Emphasis on larger lateral support pads to distribute pressure	Multiple Broad pads	Standard
Partially reducible trunk rotation with scoliosis	Axial or Biangular with adjustable positioning	Narrow Curved bilaterally	Easy Pull if independent
Active user with mild instability	Swing-Away	Straight or Narrow Curved	Easy Pull
Sports/recreation user	Quick-Release	Narrow Curved	Standard
Heavy leaner with high forces	Fixed (with reinforcement)	Broad pads	Standard
Growing child needing frequent adjustments	Axial	Size-appropriate, plan for upgrades	Standard or Easy Pull

Key Takeaways

1. **Pelvis First:** Always neutralise and stabilise the pelvis before addressing trunk asymmetry
2. **3-Point Control:** Ensure primary corrective force at apex with appropriate superior and inferior counterforces
3. **Match Hardware to Need:** Consider curve complexity, functional requirements, and growth potential when selecting brackets
4. **Customise Pad Configuration:** Mix and match pad types for optimal biomechanical control and pressure distribution
5. **Monitor and Adjust:** Flexible curves require ongoing assessment and adjustment; fixed curves need accommodation and comfort focus

How do we know the setup has been successful?

- Thorough MAT assessment in supine and seated positions
- Understanding force vectors and 3-point control biomechanics
- Appropriate bracket selection for user's specific needs
- Strategic pad combination for curve pattern
- Proper installation with correct angles and depths
- Regular follow-up and willingness to adjust
- User and caregiver education and buy-in

Additional Resources

- **Spex Product Catalogue:** Complete specifications for all hardware and pads
- **The Shaperator:** Virtual MAT learning tool with Spex Seating product configuration options
- **Seating Simulation:** Use mat assessment to trial positioning before ordering
- **Continuing Education:** Attend seating clinics and workshops for hands-on practice
- **Clinical Evidence:** Research supporting 3-point control for scoliosis management
- **Vendor Support:** Contact Spex/manufacturer representatives for case consultation

Go to **spexseating.com** for more clinical resources.

This clinical guide is intended for use by qualified rehabilitation professionals including occupational therapists, physical therapists, and seating specialists. Individual client needs may vary. Always conduct thorough assessment and use clinical reasoning when prescribing seating equipment.

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