



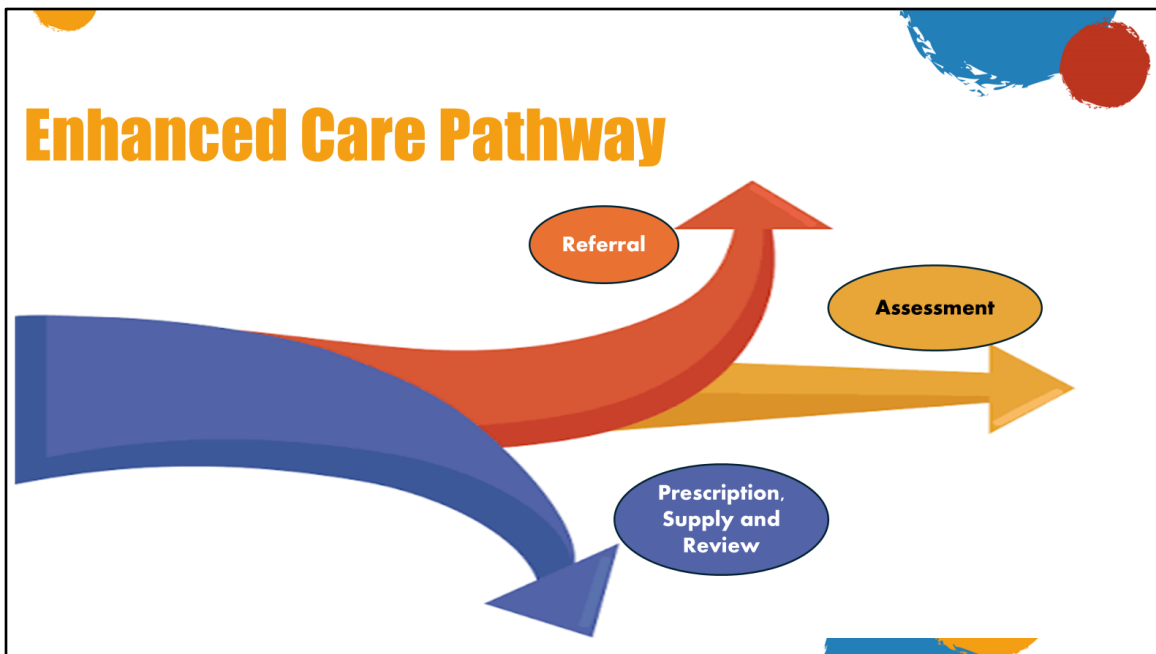
Custom Moulded Seating (CMS)

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Welcome to our ATSS Autumn Lecture series, today's module will cover custom moulded seating.

Danny's introduction and background

Nicola's Introduction and background



The ATSS department at the [Central Remedial Clinic \(CRC\)](#) is a national specialist service. It operates out of main hubs in **Dublin, Limerick, and Waterford**, alongside a number of outreach **centres** nationwide.

The department provides high-level consultancy and tailored interventions for children and adults with highly complex physical or neurological needs. Key clinical areas include:

- 1. Postural & Seating Management:** Custom-moulded and modular specialised seating solutions.
- 2. Mobility Solutions:** Complex manual and alternative-access powered wheelchairs.
- 3. Independence Tech:** Environmental control systems, computer access, and Augmentative and Alternative Communication (AAC) systems.

Enhanced care pathway works on the basis of Integrated Shared Care:

Instead of working in isolation, the national ATSS multidisciplinary team (which includes Senior OTs, Physiotherapists, Speech & Language Therapists, and Clinical Engineering Technicians) partners directly with local Primary Care and Children's Disability Network Teams (CDNTs)

Referral Criteria & Clinical Scope

To progress through the enhanced ATSS pathway, specific referral guidelines

must be met:

Eligible: Individuals with complex physical/intellectual disabilities or neurological and neuromuscular disorders (such as Cerebral Palsy, Muscular Dystrophy, or advanced spinal injuries) requiring specialised seating, custom posture management, or integrated assistive systems.

Who Must Refer: Self-referral is not permitted for new complex paths. Referrals must come from a primary clinician, such as a local GP, Occupational Therapist, Physiotherapist, or hospital consultant.

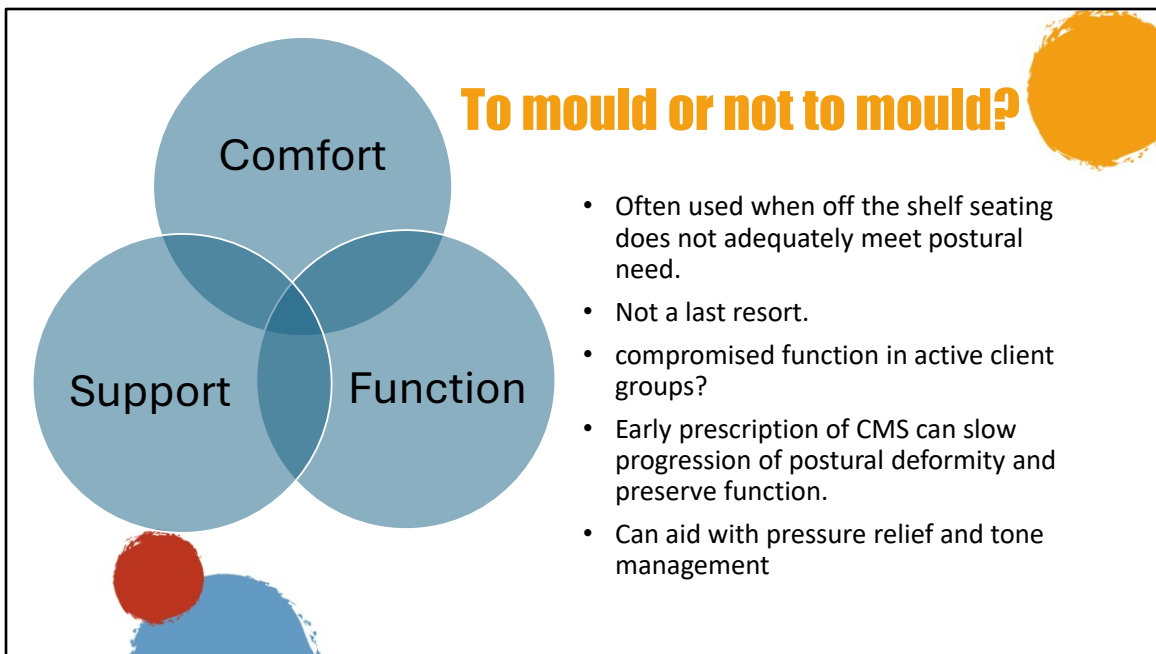
Exclusions: The enhanced specialist pathway strictly **excludes** requests for non-specialised standard seating, basic comfort chairs, or standard laptops/computers.

What is Custom Moulded Seating?

'A Moment in time'

Custom moulded seating is a seat manufactured from a variety of different mediums from a snapshot of a shape captured of a person in a seated position.





As with all supportive seating, we are looking to provide a client with a combination of comfort, function and support.

These 3 elements operate in a dynamic triad where no single element can exist in isolation. Rather than being competing priorities, they are interdependent clinical objectives. Providing the correct biomechanical support reduces the physical work of sitting, minimizing fatigue and maximizing physical comfort and function.

Depending on client's need we may need to focus specifically on one of these elements, e.g. chronic pain with reduced sitting tolerance focusing on comfort, or a client's reduced ability to drive focusing on support and function to better access joystick.

That's where the assessment process including subjective history and background and clinical plinth assessment is key.

- Often used when off the shelf seating does not adequately meet postural need.
- Not a last resort.
- compromised function in active client groups – not the case, variety of materials
- Early prescription of CMS can slow progression of postural deformity and

- preserve function.
Can aid with pressure relief and tone management

When is CMS appropriate?

- Young, medically complex children where standard seating is not providing adequate support.
- Non-ambulant clients with fixed skeletal deformities which can't be adequately accommodated for in standard seating e.g. scoliosis, reduced hip flexion
- Client with flexible asymmetries who require additional support due to risk of pressure/pain/fatigue



Examples of clients:

1. Medically complex young children, may not have fixed asymmetries, but standard seating is not providing adequate support. They need intimate fit of custom moulded seating to provide adequate trunk support and head support. Eg kids with low tone centrally, very poor head control

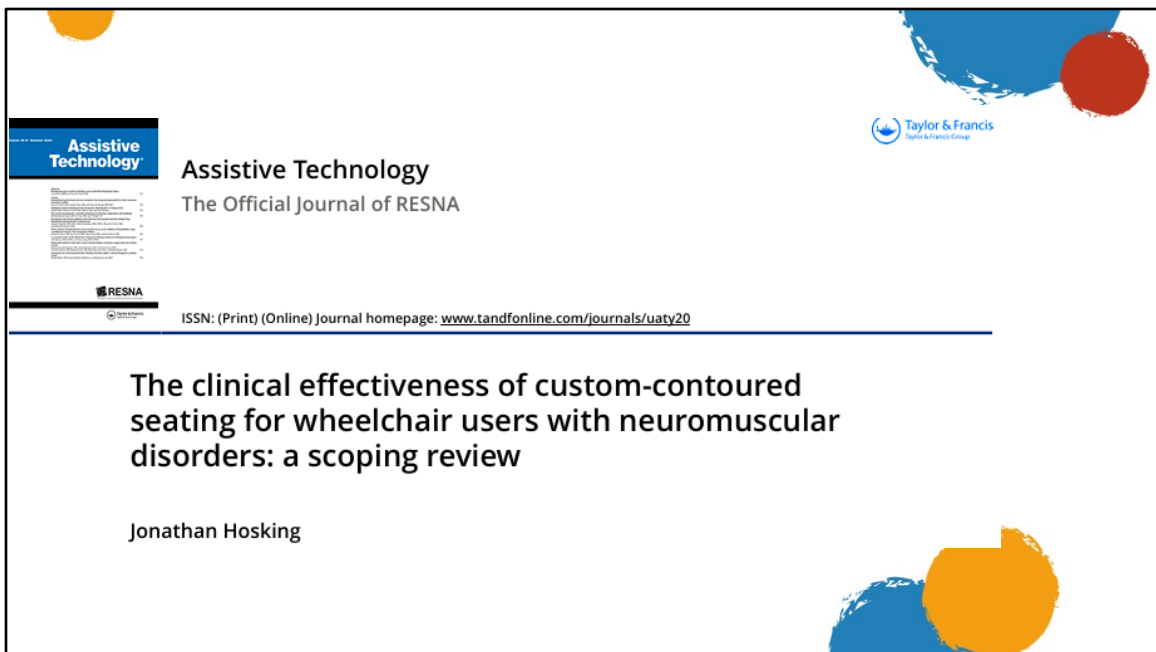
Benefits: Far more supportive, can be mounted on a buggy which is less medical and can be folded into a non adapted vehicle.

2. Non-ambulant clients with with fixed skeletal deformities which can't be adequately accommodated for in standard seating. We often think of scoliosis but also very applicable to someone but very limited asymmetric hip flexion where we want to allow one hip to drop into a more extended position but keep other hip flexed to 80-90 degrees to maintain sitting posture and prevent sliding.

3. Client with flexible asymmetries who require additional support due to risk of pressure/pain/fatigue

And this is where the assessment with client and caregivers is really important to know the medical background, whats worked and what hasn't and client and family goals, what they need out of their seating. Is it more comfort, is it more

function?



Scoping review of **17 studies** examining custom-contoured seating (CCS).
CCS demonstrated **immediate improvements in postural alignment**
High levels of **user satisfaction, comfort and functional benefit** reported across studies.

Limited evidence available regarding:

- Scoliosis progression
- Respiratory function
- Pressure management
- Upper limb function

Conclusion: CCS is a valuable intervention for comfort, posture and function, but further high-quality research is required to establish its long-term clinical effectiveness.

Research



Archives of Physical Medicine and Rehabilitation

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ORIGINAL RESEARCH

Impact of Wheelchair Seating Systems on Scoliosis Progression for Children With Neurologic and Neuromuscular Disorders: A Retrospective Study Of Custom-Contoured Wheelchair Seating and Modular Wheelchair Seating

Jonathan Hosking, MEng, MSc

From the Rehabilitation Engineering Unit, Posture and Mobility Centre, Cardiff and Vale University Health Board, Pontypridd, Wales, UK.

Retrospective study of 75 non-ambulant children (2012-2022) comparing custom-contoured seating (CCS) and modular wheelchair seating (MWS) for managing scoliosis progression.

CCS slowed scoliosis progression more effectively than MWS, although scoliosis continued to worsen in both groups.

Baseline scoliosis severity (Cobb angle) was the strongest predictor of future progression.

Seating type was the second most important factor, with CCS associated with better outcomes.

Age and sex did not significantly influence scoliosis progression.

CCS may be more effective due to its **improved trunk support, postural control, and accommodation of body shape deformities**.

Earlier referral for CCS may improve outcomes, as many children received it after significant spinal deformity had already developed.

Key takeaway: CCS is a valuable conservative management strategy that may help delay scoliosis progression and potentially postpone surgical intervention.

A qualitative study exploring clinicians' perspectives on best practice in custom moulded seating provision for children and young people

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Qualitative study of 54 international seating experts (OTs, physiotherapists, and engineers) exploring best practice in custom moulded seating (CMS).

Key Findings

- 1. Child and Family-Centred Care is Essential** with a focus on comfort, function, participation, and quality of life.
- 2. No Consensus on the optimal timing of CMS.** were differing views among clinicians, some supporting early intervention and others reserving it for more complex postural needs.
- 3. There is a need for International best-practice guidelines and standardised clinical pathways.**
- 4. Advanced Clinical Skills are essential for moulds to be successful**
- 5. Manufacturers need to Provide Better CMS Options**

The Emotional Impact of CMS

'Baby chairs and things, when you're out shopping and they're all cute and lovely...and then they bring out something like that...it is a little bit real, you know.'

Fitzsimons and Taylor (2018)



Subjective Assessment

- Current equipment: positives and negatives
- Client/Carer/Family goals
- History of pressure/pain
- Medical history including surgical history or upcoming planned interventions
- Medications
- 24 hour postural management
- Self propelling/attendant propelled/pwc
- Transfers
- Toileting
- Transport



Current equipment: positives and negatives. What has worked well and what doesn't work.

Client/Carer/Family goals – what do you want from new chair, eg increased sitting tolerance, better posture, reduced pain, better access to joystick

History of pressure/pain – always recommend viewing any active pressure areas where possible to get exact location, size and grade

Medical history including surgical history or upcoming planned interventions. If someone is waiting for spine or hip surgery in the next few months this is not a good time to start the process for custom moulded seating.

Medications – pain management, tone management, weight loss

Weight – stable or recent changes?

24 hour postural management – alternative seating; activity chair, comfort chair, do they have a sleep system?

Level of function: Self propelling/attendant propelled/pwc – to determine materials used. Also available width for seating on current frame.

Transfers – side transfers need to reduce lateral build up on side of cushion or could be removable. All day sling – need to ensure space

Toileting - ?need space for bottle. May need incontinence covers

Transport -

Physical Assessment

- Plinth assessment: Supine & Sitting
- Assess level of fixed v's flexible deformity.
- Correction / accommodation
- Measurements

MDT decision making and goal setting: therapist, moulding specialist and client determine priorities for seating.



Plinth assessment: Start with supine evaluation. Two clinicians. Start with the pelvis, the pelvis is the **"keystone" or foundation of posture**. Because the spine and lower extremities are anatomically anchored to it, the position of the pelvis directly dictates the alignment, comfort, and functional capacity of the entire upper and lower body.

If the pelvis is poorly positioned, attempting to correct the posture of the head, spine, or limbs is practically impossible.

Palpate ASISs to assess resting or non-weight bearing position, assessing for obliquity and rotation and whether this is flexible, meaning correctable, or fixed. We then assess hip range of motion in relation to the pelvis. In particular, we are looking for true hip flexion before the pelvis starts to tilt back into posterior pelvic tilt. We are thinking about sitting position so range of hip flexion is key. We also assess knee and ankle range of motion, hamstring range, and tone. Assess for windsweeping and how correction of windsweeping may alter position of pelvis. Assess trunk position in supine, shoulder levels and head position

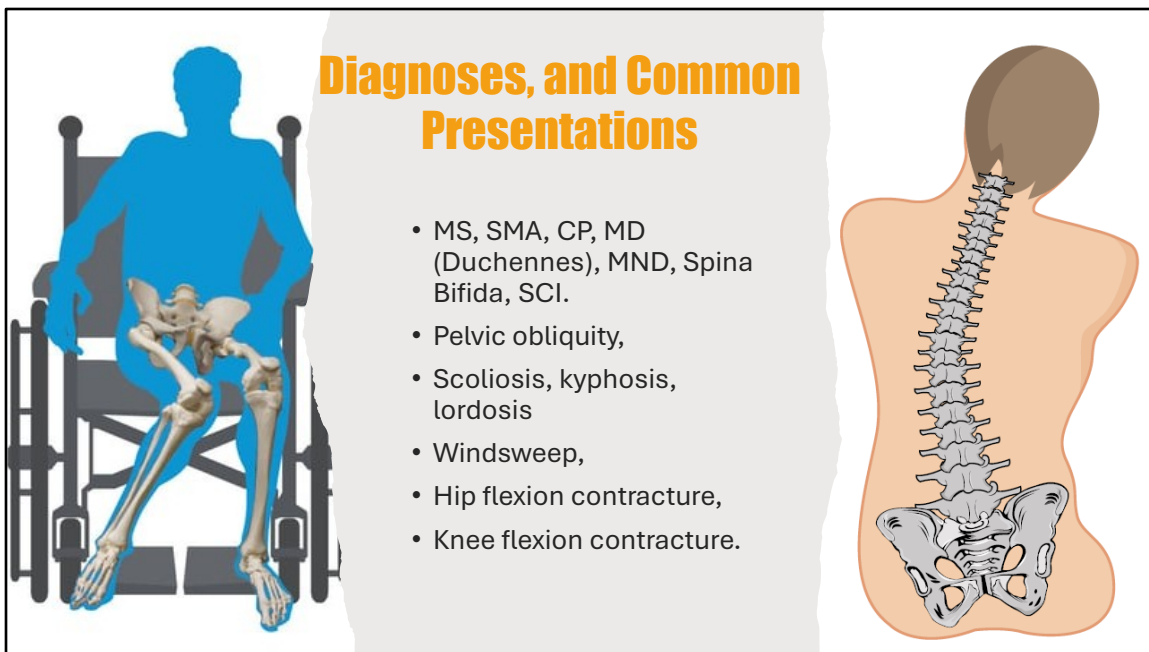
In sitting over edge of bed, often with one clinician behind the client and the other clinician in front, we assess pelvic position, this can be different to supine

now that client is weight bearing. We assess level of correction, we may try sitting with correction by using an obliquity pad to assess how pelvis and trunk position respond. We assess trunk position and spine.

Plinth can be moved up or down to change hip range and find position that works for the client taking the whole body into consideration.

From this we make decisions for the sitting position we are looking to achieve in the casting bag. In a client with cerebral palsy and spasticity in hamstrings and a posterior pelvic tilt, we may decide to open hip angle and slightly reduce hip flexion to 80degrees for in order to off load hamstrings, minimise posterior pelvic tilt and improve trunk position.

Windsweep.



Moulded seating is often indicated for individuals with complex neurological, neuromuscular, congenital, or spinal conditions that result in significant postural challenges and difficulty maintaining an optimal seated position.

Common clinical populations include people with:

Multiple Sclerosis (MS)

Spinal Muscular Atrophy (SMA)

Cerebral Palsy (CP)

Muscular Dystrophy, including Duchenne Muscular Dystrophy

Motor Neurone Disease (MND)

Spina Bifida

Spinal Cord Injury (SCI)

These conditions can lead to a range of postural asymmetries and deformities that are difficult to manage using conventional seating systems. Typical presentations include:

Pelvic obliquity, where one side of the pelvis is higher than the other.

Scoliosis, kyphosis, and lordosis, affecting spinal alignment in one or more planes.

Windswept deformity, where the hips and legs deviate to one side.

Hip flexion contractures, limiting the ability to achieve a neutral sitting posture.

Knee flexion contractures, reducing lower limb positioning options and affecting overall posture.

Moulded seating provides intimate contact and support across the body, accommodating fixed deformities where necessary while helping to minimise progression of flexible postural asymmetries. By maximising surface contact, moulded seating improves stability, distributes pressure more effectively, enhances comfort, and enables greater functional participation.

Key Message:

Moulded seating is particularly beneficial for individuals with complex postural presentations where standard seating solutions cannot adequately support posture, comfort, pressure management, and function.

innovation broadening client groups CMS suited to

- Early moulds were bulky and heavy not aesthetically pleasing
- More suited to Passive client groups
- Active client groups often had negative experiences limiting independence

Modern custom moulded seating is no longer just about maintaining posture; it is about enabling function, participation and independence for people with complex conditions such as SCI and Spina Bifida.



Historically, custom moulded seating was often associated with bulky, heavy designs that could be visually intrusive and difficult to integrate into everyday life. These early systems were primarily developed to provide postural support and accommodate severe deformities, with less emphasis on mobility, function, or user independence.

As a result, moulded seating was generally more suited to passive client groups with limited functional mobility. Active wheelchair users often reported negative experiences, including increased chair weight, reduced manoeuvrability, difficulties with transfers, and restrictions on participation in daily activities. These limitations sometimes created a perception that moulded seating would compromise independence in favour of postural support.

Over the last two decades, significant advances in materials, manufacturing techniques, digital shape capture, and wheelchair integration have transformed the role of custom moulded seating. Modern systems are lighter, more aesthetically pleasing, and designed to work alongside the functional goals of active users.

Today, custom moulded seating is increasingly used with individuals who lead active and independent lives, including people with Spinal Cord Injury (SCI), Spina Bifida, and other complex neurological or neuromuscular conditions. The

focus has shifted from simply maintaining posture to enabling participation, enhancing function, and supporting long-term health outcomes.

Modern custom moulded seating is no longer just about positioning the person within the wheelchair. It is about creating a stable foundation that improves upper limb function, propulsion efficiency, comfort, endurance, pressure management, and confidence in everyday activities.

Key Message:

The evolution of custom moulded seating has moved the technology from a predominantly passive postural management solution to an intervention that supports function, participation, and independence for active wheelchair users with complex seating needs.



Types of CMS

Production processes and materials used.

- FoamCarve
- Moulded seating insert (MSI)
- 3D printed Meshweave/
Powdercoated

Custom moulded seating is a rapidly evolving area of seating and wheeled mobility, driven by advances in digital manufacturing, material science, and scanning technologies. Modern production methods offer clinicians greater flexibility in balancing postural support, pressure management, durability, comfort, and user independence.

Foam-Carved Systems

One of the most established methods is **foam carving**, where a scanned body shape is digitally modelled and directly carved into a block of open-cell foam using computer-controlled manufacturing techniques.

The advantages of this approach include:

Proven clinical performance.

Excellent pressure redistribution.

Relatively simple manufacture and modification.

The ability to combine different foam densities in selected areas to provide targeted support, comfort, or pressure relief.

This allows clinicians to create softer areas around bony prominences while maintaining firmer support where stability is required.

Moulded Seating Inserts (MSI)

MSI technology uses a slightly different manufacturing process. A reverse carve

is produced from a polystyrene block, which forms the mould. A plastic shell and layers of closed-cell foam are then vacuum-formed over the shape to create the finished seating insert.

Benefits include:

A strong structural base.

Good durability.

Reduced weight compared to some traditional systems.

Compatibility with a wide range of wheelchair frames.

MSIs have become a popular option where both postural support and functional mobility are key objectives.

3D-Printed Custom Seating

The most recent innovation is the use of **3D-printed seating technologies**.

These systems allow precise control over the internal structure of the seat through computer programming.

Key advantages include:

Excellent breathability through open lattice structures.

Variable density within different parts of the seating system.

Softer, more compliant areas for pressure relief.

Enhanced comfort while maintaining postural support.

Improved microclimate management through increased airflow and reduced heat and moisture build-up.

Looking ahead, advances in additive manufacturing may allow seating systems to incorporate greater dynamic movement and responsive support, potentially improving comfort, pressure management, and sitting tolerance over longer periods.

Conclusion

While all three manufacturing approaches aim to achieve optimal posture and pressure distribution, the choice of system depends on the individual's clinical presentation, functional goals, lifestyle, and long-term seating requirements.

Key Message:

The evolution from foam carving to MSI and advanced 3D printing has expanded the possibilities of custom moulded seating, offering lighter, more breathable, and increasingly individualised solutions that support both postural needs and active participation.

Custom Seating Companies

Who to choose?

Factors to consider

- Who is moulding and what do they specialize in?
- What type of mould will suit clients needs?
- Cost, logistics, timeframe, follow up / aftercare.



With the growth of custom moulded seating technologies, clinicians now have access to a wider range of manufacturers and seating solutions than ever before. Selecting the most appropriate provider is not simply about the product itself, but about matching the company's expertise, manufacturing process, and support services to the individual client's needs.

1. who is carrying out the moulding and what they specialise in. Different manufacturers have developed expertise in different client populations. Some have extensive experience managing complex neuromuscular conditions and severe postural asymmetries, while others specialise in active wheelchair users with conditions such as spinal cord injury or Spina Bifida. Understanding a company's clinical expertise and experience can be just as important as the seating technology they offer.

2. which type of moulding technology best suits the client's presentation and goals.

Foam-carved systems may be most appropriate where intimate support, adjustability, and pressure management are the priorities.

Moulded Seating Inserts (MSI) may be preferred where durability, structural support, and compatibility with different seating systems are required.

3D-printed seating systems may offer advantages in breathability, weight

reduction, microclimate management, and opportunities for future innovation.

3. the practical aspects of service delivery:

Overall cost and funding requirements.

Availability of local assessment and fitting services.

Manufacturing and delivery timeframes.

Logistics for shape capture and follow-up appointments.

Availability of modifications and repairs.

Long-term aftercare and clinical support.

A technically excellent seating system can still fail if adequate follow-up and review are not available. Long-term partnership between the clinician, client, and manufacturer is often a key factor in successful outcomes.

Key Message:

Choosing a CMS provider is about more than selecting a product. The decision should consider clinical expertise, manufacturing method, client goals, cost, logistics, and the quality of ongoing support to ensure the best long-term outcome for the individual.

What makes a Good Mould?

- Individual Moulding experience
- Clinical team
- Communication with the Production facility
- Acceptance / readiness for CMS “**BUY IN**”
- Expectations (Not bracing, not surgery)
- Lessons from previous CMS
- A CMS should be used as primary seating system (>50% of time sitting)
- Paediatric potential to grow mould?

A successful custom moulded seating system begins long before the shape capture process. The quality of the final outcome is often determined by the clinical reasoning, collaboration, and expectations established at the start of the journey.

Perhaps the single most important factor is **the person carrying out the moulding process**. Their experience, clinical understanding, and ability to translate assessment findings into seating goals are critical. Moulding is not simply taking a shape. It involves making complex clinical decisions about what should be corrected, accommodated, supported, or allowed to move. It is worth considering whether the practitioner specialises in custom moulded seating or only carries out moulding occasionally.

The relationship between the clinician and the **production facility** is equally important. Some manufacturers follow highly standardised production pathways, while others offer greater opportunities for bespoke modifications. Effective communication between the clinical team and the manufacturing team ensures that the clinical objectives are accurately reflected in the final seat. A client's **readiness for moulded seating** should never be underestimated. Moving to a custom moulded seat can feel like a significant commitment for both the user and their family. It is often a leap of faith. If there is limited acceptance

or uncertainty about the benefits, it may be appropriate to continue exploring off-the-shelf or modular seating options until sufficient buy-in is achieved.

Managing **expectations** is another key element. Families and carers may hope that a custom moulded seat will prevent scoliosis or fully correct a postural deformity. In reality, CMS is not surgery and it is not bracing. For many clients, a successful outcome involves slowing progression, improving comfort, optimising posture, enhancing function, and maintaining quality of life rather than achieving full correction.

It is also important to recognise that the first mould is not always the final solution. Valuable learning often occurs following the first or second seating system. Feedback from the user, carers, and clinical team can help refine future moulds and improve outcomes over time.

Finally, custom moulded seating is most effective when it serves as the individual's **primary seating system**. To achieve meaningful postural and functional benefits, it should be used daily and for the majority of sitting time. A moulded seat that is only used occasionally, for transport or once or twice per week, is unlikely to deliver the intended clinical outcomes and may represent a poor use of resources.

When choosing to mould in paediatrics consideration should be given to **growth potential**. Accommodation for growth within the system can help to maximise the lifespan.

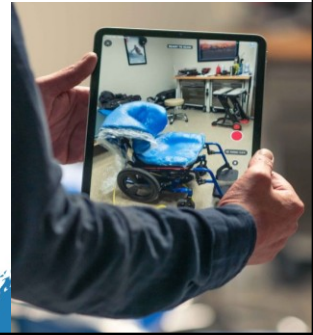
Key Message:

A good mould is the result of expert clinical decision-making, strong collaboration with manufacturers, realistic expectations, user buy-in, and consistent daily use. The best outcomes come when custom moulded seating is viewed as a long-term postural management strategy rather than simply a piece of equipment.

Casting Process (Shape Capture)



- Prep casting bag.
- shape bag around client
- (Straps/harnesses, covers) medium (foams, gels, air inserts breathable mesh material)
- Transfer out mark trim
- scan shape.
- Production notes images
- Mounting options
- Legrests.
- Overall height (WAV)



The most common shape capture method in custom moulded seating uses a large **latex vacuum bag filled with polystyrene beads**. When air is removed from the bag using a vacuum pump, the beads lock together and the bag becomes firm while still retaining the exact shape that has been moulded around the individual.

A useful way to think about the process is that, before vacuum is applied, the bead bag behaves like **playdough**. It can be manipulated, sculpted, and reshaped to support the pelvis, trunk, and lower limbs. Once the desired shape is achieved, the vacuum is applied and the bag becomes rigid enough to accurately capture the individual's posture.

Preparation of the bag is a critical step and should not be overlooked. **Pre-shaped bags**, or careful pre-shaping of larger bags, can be particularly beneficial when moulding individuals with severe asymmetry, scoliosis, windswept posture, pelvic obliquity, or complex spinal deformities. The ability to redistribute the beads before positioning allows support exactly where it is needed.

Once the optimal position has been achieved, the vacuum is applied and the shape is retained. The client is then transferred out, and the mould is inspected. Trim lines, anatomical landmarks, correction goals, and accommodation areas are marked directly onto the captured shape before digital scanning.

At this stage, comprehensive production information should also be documented, including:

Clinical objectives.

Pressure management requirements.

Photographs.

Wheelchair mounting requirements.

Leg rest configuration.

Overall system dimensions and transport considerations, including Wheelchair Accessible Vehicle (WAV) height restrictions where relevant.

It is important to remember that shape capture is not about creating the most symmetrical posture possible. The goal is to achieve the best balance between posture, comfort, function, tissue viability, and long-term tolerance.

Key Message:

Successful shape capture relies on careful preparation of the vacuum bead bag, skilled clinical handling, and a clear understanding of the individual's postural and functional goals. In complex asymmetrical presentations, pre-shaping and strategic bead placement can make a significant difference to the quality of the final mould.

Production Process

- 3D file processed and sent to carving / 3D printing.
- Programmed for carving
- Rough carve / print sent to finishing workshop.
- Midfit / Fit delivery
- Work completed Following instruction for finished profile, straps and harnesses different mediums (foam, gel air, recessed areas etc.)



Once shape capture has been completed, the mould is scanned to create a digital 3D file. This digital model forms the basis for manufacturing and represents an important stage where clinical expertise and technology come together.

A key difference between manufacturers is what happens next. Some companies prefer to manufacture the seat exactly as it was captured during casting, believing the clinical team has already achieved the optimal shape. Others are comfortable using CAD software to modify the scanned file before production, making adjustments to improve support, function, or pressure management based on the agreed clinical objectives.

This digital modification stage can be particularly valuable when additional support or accommodation is required. Through software, technicians may:

- Increase support in specific areas of the pelvis or trunk.

- Create recesses around bony prominences.

- Build in pressure-relieving contours.

- Fine-tune symmetry or accommodation of deformity.

- Optimise the seat profile before manufacture.

Following approval, the digital file is programmed for either **CNC foam carving** or **3D printing**. The machine then produces a rough version of the mould according

to the programmed specifications.

The rough carve or printed component is transferred to the finishing workshop, where skilled technicians complete the detailed clinical requirements identified during assessment. At this stage, the seat begins to evolve from a basic shape into a fully functional seating system.

Many manufacturers provide a **mid-fit** or test-fit stage. This allows the clinical team and user to review the seat before final completion and identify any necessary adjustments. Small modifications at this point can significantly improve comfort, posture, and long-term success.

The final finishing process may include:

- Installation of pelvic belts, harnesses, and postural supports.

- Addition of pressure-relieving mediums such as foam, gel, or air inserts.

- Creation of recessed areas for pressure-sensitive tissues.

- Final contouring of support surfaces.

- Covering and upholstery.

- Integration with the wheelchair base and mounting hardware.

The result should be a seating system that reflects not only the individual's shape but also the clinical goals established during the assessment process.

Key Message:

Modern production is far more than reproducing a captured shape. Digital modification, programming, and finishing techniques allow manufacturers to enhance postural support and pressure management, ensuring the final custom moulded seating system addresses both the client's anatomy and their functional needs.

Wheelbases Considerations

- Powered, transit, self propel
- Tilt
- Consider size of mould
- Fitting,
- Access to straps and harnesses
- Armrests
- Height, width, depth
- Footrests
- Headrest



Choosing an appropriate wheelbase is a critical part of the custom moulded seating process and requires careful consideration. A well-designed mould can be compromised if the wheelchair base does not adequately accommodate the seating system or the client's functional requirements.

One of the most common challenges is the effect a custom mould has on the overall dimensions of the wheelchair. A full mould can increase the overall width substantially, in some cases by up to 8 inches in some self-propelling tilt-in-space wheelchairs. This can affect access through doorways, transport, manoeuvrability, and the user's ability to function independently in their environment.

For active manual wheelchair users, additional seat depth may be required even when trying to minimise chair width. This extra depth can provide the adjustment space needed for backrest positioning, centre of gravity changes, and fine-tuning of backrest orientation. These factors should be identified before production to avoid compromising performance.

Experienced seating specialists can often develop creative solutions to minimise the impact of the mould on overall chair dimensions. For example, armrests can

sometimes be stepped in over the seat cushion to accommodate users who are wider at the hips than at the trunk, reducing the need to increase overall chair width.

The attachment hardware for pelvic belts, harnesses, and positioning straps can sometimes interfere with the wheelchair frame, making adjustment difficult for users and carers. Access for tightening, releasing, and maintaining these supports should be considered during the design process.

A custom moulded seating system may increase the overall seated height of the individual. This can have implications for everyday activities like fitting under tables and significant implications for transport safety. In particular, users who travel in Wheelchair Accessible Vehicles (WAVs) may no longer have sufficient head clearance if the increase in height is not identified at assessment stage. Additional height at the front of the seat cushion can sometimes mean that existing footrests or legrests cannot be adjusted high enough to provide adequate support leading to a need for different footrests or a custom made build up.

Head support requires careful planning as well. Depending on the client's needs, the headrest may be mounted directly to the wheelchair frame or integrated into the mould. This can present challenges for active wheelchair users who require low-profile backrests for propulsion and function, while simultaneously requiring head support for transport safety and fatigue management.

Ultimately, the seating system and wheelbase should be considered as a single integrated solution. Assessment should focus not only on posture and pressure management, but also on mobility, transport, access, transfers, maintenance, and long-term usability.

Key Message:

Successful custom moulded seating depends as much on selecting the correct wheelchair base as it does on producing the mould itself. Careful consideration of width, depth, height, transport requirements, support hardware, and functional access can prevent costly problems and maximise user independence.



Interfacing

- Who is responsible for interfacing mould onto 3rd party wheelbase?
- Wheelbase - Combination agreement?
- Workshop / in the field.
- Technical support.
- Crash testing?

Interfacing a custom moulded seating system with a wheelchair base can be one of the most technically challenging aspects of the process. A successful outcome depends not only on the quality of the mould but also on how effectively it integrates with the chosen wheelbase.

An important consideration is **who takes responsibility for the interface**. When the mould and wheelchair are supplied by different manufacturers, clear communication and agreed responsibilities are essential. The seating provider, wheelchair supplier, rehabilitation engineer, and clinical team may all have a role in ensuring compatibility and successful installation.

Different mould types present different interfacing challenges. Foam-carved systems, moulded seating inserts, and 3D-printed seating systems all require different mounting approaches. Similarly, powered wheelchairs, tilt-in-space wheelchairs, transit chairs, and active manual wheelchairs each present unique technical requirements.

The interfacing process may take place in a workshop environment or during a joint field-fitting appointment. Access to technical support throughout this phase is invaluable, particularly when modifications are required to mounting hardware, seating position, or chair configuration.

A well-designed interface should:

- Securely attach the mould to the wheelchair.

- Maintain wheelchair stability and performance.

- Preserve access to positioning belts and harnesses.

- Allow effective operation of tilt and recline functions.

- Facilitate future maintenance and modifications.

- Minimise unnecessary increases in chair dimensions.

Transport considerations should also form part of the discussion. Custom moulded seating systems are bespoke, one-off products and cannot themselves be crash tested in the same way as mass-produced seating systems. Therefore, attention should focus on the suitability of the overall wheelchair and transport arrangement, particularly for users travelling in a Wheelchair Accessible Vehicle (WAV).

The addition of a CMS can affect:

- Overall wheelchair height and head clearance within the vehicle.

- Positioning of occupant restraint systems.

- Access to transport tie-down points.

- Compatibility with existing headrest and transport support solutions.

- The stability of the complete wheelchair and seating configuration during transport.

These considerations are particularly important where a mould is being interfaced onto a third-party wheelbase that may not routinely be supplied with that seating system.

Ultimately, the most successful outcomes occur when the moulding company, wheelchair supplier, technical team, and clinicians work collaboratively from the beginning of the process.

Key Message:

Interfacing is about creating a seamless relationship between the custom moulded seat and the wheelchair base. Early collaboration, technical expertise, and careful consideration of transport and WAV requirements help ensure a seating system that is safe, functional, and practical for everyday use.

Supply Process

- Cleaning instruction
- Removal and folding
- Positioning advice
- Advice on building tolerance
- Straps and harnesses
- Headrest
- Modification?
- Follow up review



The handover phase is critical to ensuring the user, family, carers, and clinical team understand how to use and maintain the system effectively.

At delivery, users and carers should receive clear **cleaning and maintenance instructions**. Different cover materials, foams, and interfaces may require specific cleaning methods to maximise lifespan and maintain skin integrity.

Training should also be provided on **removing and refitting cushions or inserts**. A key component of handover is **positioning education**. The client, family, and carers should understand the intended seating posture, how belts and supports should be applied, and what constitutes good positioning within the mould. How to effectively transfer and achieve optimal position in a CMS is critical.

Many users require advice on **building sitting tolerance gradually**. A custom moulded seat often provides significantly greater contact and support than previous seating systems, and some individuals benefit from a gradual increase in sitting time during the first few weeks. Monitoring of comfort, skin condition, and pressure areas is particularly important during this period.

The fitting of **pelvic belts, harnesses, and postural supports** should be

reviewed carefully during handover. Users and carers need to know:
How supports should be positioned.
Appropriate levels of tension.
Signs that adjustment may be required.

Similarly, **headrest position** should be reviewed in relation to comfort, function, fatigue management, tilt use, and transportation requirements.

It is important to discuss the potential for **future modifications**. Despite detailed assessment and shape capture, changes are often required once the seating system is used in real-world environments. Minor modifications may improve comfort, function, pressure management, or accessibility and should be viewed as a normal part of the process rather than a failure of the seating system.

The final stage is **follow-up review**. Review appointments allow the clinical team to assess:

Postural outcomes.

Skin integrity.

Comfort and sitting tolerance.

Functional performance.

User satisfaction.

Changes in condition or posture.

Need for adjustments or modifications.

The best outcomes are typically achieved when moulded seating is regarded as an ongoing postural management intervention rather than a one-off equipment provision.

Key Message:

Successful custom moulded seating extends beyond manufacturing and delivery. Education, gradual adaptation, ongoing review, and timely modification are essential to ensuring the seating system continues to meet the individual's postural, functional, and lifestyle needs over time.

Research

DISABILITY AND REHABILITATION: ASSISTIVE TECHNOLOGY
2025, VOL. 20, NO. 2, 423–431
<https://doi.org/10.1080/17483107.2024.2382287>



RESEARCH ARTICLE



The positioning information that should be provided to caregivers of adults with a physical disability on supply of custom-contoured seating, a Delphi study

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Key Findings

Strong consensus (49/52 statements)
on six essential training areas:

Transfers

Positioning

Pressure care

General chair use

Post-supply follow-up

Functional activities [Hanley.pdf]

Preferred Training Method

Hands-on training at handover with opportunities to:

- Practise positioning

- Ask questions

- Record personalised videos for future reference [Hanley.pdf]

Clinical Implications

Caregivers want personalised, practical guidance.

Effective education is as important as the seating system itself for successful long-term use. [Hanley.pdf]

Case Study

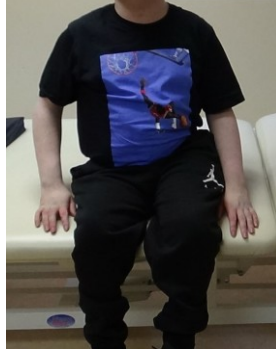
17Yr old boy CP Diplegia

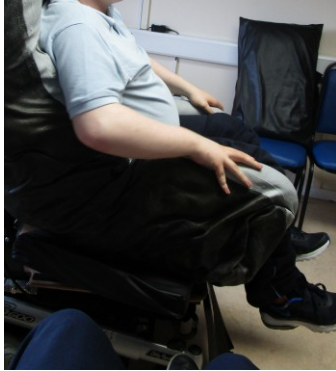
GMFCS level 4

Pelvic obliquity and rotation

Scoliosis concave left

Independent transfer and self propelling.









- Link to survey:
[ATSS Training & Education Needs Survey \(Page 1 of 5\)](#)
- Link to further training:
[ATSS Autumn Training Series 2026](#)
- **Referral Queries Email:** atssreferrals@crc.ie



Questions



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