

building futures



Editorial

by Jo Ford

July and August are perfect months for sitting back in front of the fire with a nice hot chocolate, glass of red wine, a good book/magazine or this edition of TechnoTalk!

This month why not learn more about the seating and positioning considerations relating to the trunk. Catherine and Sarah (TASC Seating Consultants) provide a comprehensive summary of the anatomy of the trunk and positioning principles and techniques essential for optimal seating solutions and outcomes. This information follows on from the March edition of TechnoTalk which presented an article on positioning the pelvis.

For a change of focus Alana, (TASC Speech Pathologist) has put together a table which summarises the features of five Palm Sized Speech Generating Devices. We find these tables are a great reference tool when considering the various options on the market as we can quickly identify the equipment that has features required to meet individual client needs.

This month we welcome Catherine Kos back from maternity leave. We wish Alana Lum bon voyage as she jets off for a three month holiday in England, Europe and North America.

Until next time, happy reading!

Jo

Seating and Positioning of the Trunk



Sarah Nottage



Catherine Kos

Following on from the last seating article about the pelvis, this month we will be addressing the seating and positioning considerations relating to the trunk.

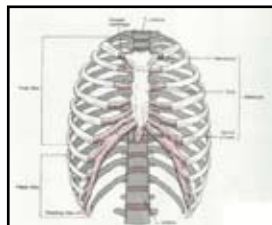
The trunk consists of the abdomen, thorax and back and all bony prominences, vessels and muscles there within.

It is essential that the trunk is positioned optimally in any seating system, as it may impact greatly on the individual's:

- Vision and head control
- Respiration
- Swallowing, digestion and nutrition
- Upper limb function
- Ability to communicate and interact within their environment
- Transport and community access

It is important to view the trunk in context of the rest of the body and not as a separate body part, (i.e. the position of the pelvis may affect that of the trunk, which in turn may relate to head and neck position. Alternatively, impaired vision may result in asymmetrical trunk position, impacting on postures of the lower body). It is vital to continue to assess the role environment and function may also have on trunk position.

Anatomy



The **thorax** (chest) is the superior part of the trunk, located between the neck and abdomen. It houses and protects the heart and lungs and other internal organs. Bony landmarks of interest for seating assessment include the vertebrae, ribs and sternum.

The **abdomen** is the part of the trunk found between the thorax and pelvis. It is largely muscular and contains the gastrointestinal organs, liver, pancreas, adrenal glands, kidneys, etc. as well as nerves, lymphatics and major blood vessels. The posture of the trunk in a seated position may consequently affect the workings of these important organs.

The **back** is the posterior aspect of the trunk, consisting of the vertebral column (spine). It is the main part of the body to which the head, neck and limbs are attached. The vertebral column usually consists of 33 vertebrae, which articulate with each other. They are arranged in 5 regions - cervical (C), thoracic (T), lumbar (L), sacral (S) and Coccygeal (Co). It forms a strong, but flexible support for the trunk and is important for posture, support of body weight, locomotion and protection of the spinal cord.

4 curvatures are usually visible within the adult spine. The thoracic and sacral curvatures are concave anteriorly, whereas the cervical and lumbar curves are concave posteriorly. The extent of these curves can differ greatly from person-to-person and may be influenced by age, gender, diagnosis, muscle tone and function.

Assessment

Below are some tips that may be useful when attempting to assess somebody's trunk:

Background information:

It is particularly important when assessing the trunk to gather all information related to:

- Health and medical status and recommendations, (eg. orthopaedic management/bracing/positioning recommendations)
- Plans for future intervention
- Participation in activities of daily living and other tasks
- Transfer procedures and considerations
- Transport and community access

Thorough assessment of these domains (amongst others) will ensure that the correct amount of consideration is given to what type of postures are desirable for the individual to function in a healthy, productive and comfortable manner.



Postural Assessment:

It is extremely important that the trunk is not viewed in isolation from the rest of the individual's body. It is particularly necessary to assess the pelvis (and possibly the hips and lower limbs), prior to considering the postural presentation of the trunk, as flexible asymmetry at the pelvis may lead to secondary positions of concern noted at the trunk, if the position of the pelvis is not corrected first (for example, a flexible pelvic obliquity, high side left at the pelvis may cause the individual's trunk to appear to lean to the right, giving the impression of scoliosis, when in fact if the pelvic obliquity was successfully corrected the trunk may appear to be more in midline).

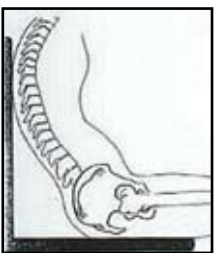
It is equally important to assess the impact that any postural support may have on other parts of the body, (e.g. head), as this may have functional, comfort and/or health consequences, (e.g. vision, swallowing, pressure management).

Assessment of the trunk should occur in supine and assisted sitting. It is necessary to assess in supported sitting to correctly assess the effect of gravity and to simulate possible postural supports that may be trialed.

Below are some basic points of advice for trunk assessment:

- Bony prominences of interest are the acromium processes, ribs and sternum and vertebrae. It may be useful to use stickers (dots) to visualise the vertebral column more clearly, once palpated
- Assess the trunk in supine. Note elevation/depression, protraction/retraction of the shoulder, based on relative position of acromium processes. Note if there is rotation of trunk (if one shoulder is forward of the other or the ribcage is noted to be forward on one side compared to that of the other). Test if postural asymmetries are fixed or flexible. Note where the correction needs to occur and how much support is required. Kyphosis and scoliosis may be viewed at this stage but may be more obvious in supported sitting
- Assess the trunk in supported/assisted sitting on a foam surface. If possible another pair of hands to assist can be helpful. Ensure that the individual's feet are supported and that the minimal assistance is required. Simulate optimal position of pelvis and lower limbs. Note the alignment of the vertical column and assess if scoliosis, kyphosis and/or rotation of the trunk are present. Determine if postures are fixed or flexible and simulate possible support options that may be trialed. Use your hands to provide support and determine:
 - where the forces are required
 - how much force is required
 - in what direction the forces are required
 - what is the least amount of support needed to provide stability
 - how much surface area of support is required to provide stability
 - remember to address issues of endurance, pressure, head and neck positioning and upper limb functioningPhotos at all stages of trunk assessment may be highly valuable.

Positioning Principles and Techniques



Kyphosis – when the trunk is curved forward.

Check that the seat depth is correct; as if it is too long the individual's pelvis may be pulled into posterior tilt, resulting in adoption of kyphosis to promote adequate vision.

If the kyphosis is flexible, possible seating solutions may include:

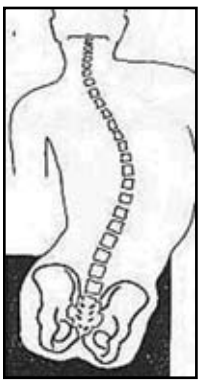
- A firm upper backrest (above sacrum) to contour and support the spine
- An upper backrest angled backwards to encourage the mid-trunk to extend backwards, past their neutral point of balance
- Tilting the system backwards, particularly if low tone is present, to encourage the head and neck to remain upright
- Applying firm pressure just above the level of the sacrum and opening up the seat-to-back angle slightly to promote trunk extension
- Lateral support may act as a guide, encouraging the trunk to rest in an optimal position. This support may be in the form of slight contouring of the lateral component of the backrest, commercial thoracic supports or custom-made backrest with lateral support
- Anterior support, (e.g. harness) may be beneficial. Ensure consideration is given to The Spastic Centre's Safety Guidelines prior to scripting or fitting any type of harness, to ensure it is appropriate. Remember it is necessary to provide adequate pelvic and trunk support prior to introducing a harness to the seating system

Products to trial may include backrests with the capacity to provide different support at the lower backrest compared to the upper backrest, (e.g. the dual-flex backrest or V-Trak backrest), backrests that include capacity for insertion of sacral pads. (e.g. The Personal backrest) or backrests that incorporate basic lateral contouring, (e.g. Glide deluxe plush backrest). All seating systems come with lateral thoracic support options, which should be trialed with the individual for comfort, position and ease of use.

If the kyphosis is fixed the aim of the seating should be to support the spine in its fixed position and promote optimal vision. Some ways of accomplishing this may include:

- Increase the lower seat-to-back angle and contour the backrest to the person's spine
- Use tilt-in-space to improve vision and interaction with the environment. Tilt-in-space may also be used to improve distribution of pressure throughout the day
- The backrest may need to be cut away or incorporate pressure-relieving material in certain segments to allow for pressure care if the individual is exerting high levels of pressure at any given point within their spine

Products that allow for the seat-to-back angle within the backrest to be changed without the need to change the wheelchair's seat-to-back angle may be appropriate, (e.g. the V-Trak backrest or Personal backrest which have adjustable mounting mechanisms). Custom moulded seating may be required to provide adequate contoured support.



Scoliosis – when the trunk is curved to the side.

This is best assessed in sitting. Remember to ensure that the pelvis and lower limbs are optimally positioned and supported, prior to assessment for scoliosis. Scoliosis can take the form of a 'c curve' (i.e. the spine is curved in a shape similar to a 'c' or back-the-front 'c' where there is only one apex/point) or an 's' curve (2 apexes are noted, with a primary (larger) curve and secondary (smaller curve) to form the shape of an 's' or back-the-front 's').

Scoliosis can be difficult to describe, but it may be best to take this approach:

- Stand behind the person being assessed, making sure you can clearly see the outline of the vertebral column (use coloured dot stickers or palpate as necessary)
- Firstly describe if there is no curve, a 'c' curve or a 's' curve. If there is a 'c' curve present, you only need to describe one apex. The direction in which the apex is 'pointing' can be considered to be the convex side, (e.g. 'c' curve convex right). If a 's' curve is present, there are 2 apexes that need to be described. The primary curve should be described firstly, followed by the secondary curve.

For example:



's' curve, convex left mid-thoracic; convex right cervical.

If the scoliosis is flexible, 3 points of pressure or control should be applied to provide support and correction as required. This involves placing lateral thoracic support just below the apex of the curve and 2 supports on the other side of the body – one above and the other below the level of the thoracic on the other side. Remember, the pelvis and lower limbs need to be supported in an optimal position prior to the introduction of thoracic supports!

It is highly recommended to simulate this support with your hands, prior to product selection. This will help you determine the correct positions to introduce support, how much force is required, the impact on other body parts and how the person responds to the support (consider comfort, fatigue and pressure distribution).



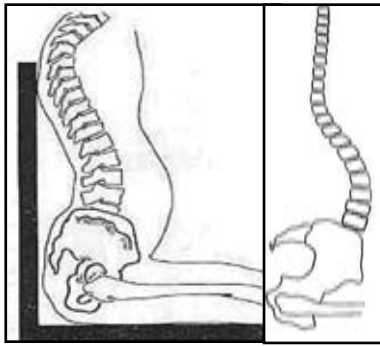
If the scoliosis is fixed, the seating system needs to support the trunk in its fixed position. Attention should be paid to adequate pressure distribution and optimal positioning for vision and interaction with the environment.

Products related to lateral thoracic support are in abundance and are available with virtually any seating system, thus requiring careful trial and selection. Lateral thoracic supports can be flat or curved to include anterior support, swing-away mounts may be adapted to incorporate a custom-made thoracic pad. Thoracic supports can be considered as a complete lateral support inherent in a custom-moulded system. Such a support may be insitu, removable as a whole or partly removable. Supports of any nature may be removable on only one side to promote ease of access and transfers, while ensuring adequate positioning.

Whichever product is selected, adequate attention needs to be given to the following issues (amongst others) at the time of assessment and product trial:

- Transfers (how does the person transfer into the system? Does the lateral support need to be removable, swing-away or insitu. Will caregivers and equipment be able to manage the choice of support?)
- Function (what activities does the individual take part in? Will the lateral support aid or impede their ability to participate? Does the support need to be used only at certain times of the day – how will this happen?)
- Health and comfort (are the supports comfortable? Do they assist in pressure care? Do they promote a safe posture for swallowing, transport etc.)

These are just some of the issues to be considered when prescribing a lateral thoracic support. Other general recommendations include: making sure the supports are as thin as possible, contoured to body shape, positioned to ensure mounting/hardware does not protrude, positioned to ensure they do not encroach under the arm/axilla.



Rotation – when the upper trunk is rotated forward on one side

If the rotation is flexible possible solutions may involve the use of lateral supports, chest harnesses and lateral supports with anterior curvatures.

If the rotation is fixed you may need to add custom support or mould the backrest to ensure adequate support and pressure distribution. Consideration also needs to be given to head and neck position requiring exploration of means of rotating the system to promote optimal positioning (assess how the person reacts to the change in orientation though).

Lordosis

An exaggerated lordosis may be present, particularly in people who present with a fixed anterior tilt of the pelvis. In such cases it may be necessary to support the increased space created by the curve by building up the backrest appropriately. Tilt and pelvic support may also be used effectively to promote improved positioning, however particularly consideration needs to be given to how the person is able to function in the position. It is important to gain appropriate feedback from the client.

Summary

When assessing the trunk for seating and positioning it is essential that it is viewed in relation to the rest of the body (particularly the pelvis, head and neck).

Although it is important to conduct a thorough postural assessment, it is equally valuable to explore issues and considerations related to health, comfort, function and performance across the person's range of roles. It may be necessary to make it a point of seeking the advice and input of a range of people on the team including the individual requiring assessment, carers, other health professionals or specialists, as required.

A considerable number of products exist that can promote optimal trunk posture (including backrests, lateral thoracic supports, harnesses and custom contoured options), however it is necessary to trial these products with an appropriate seat cushion that promotes optimal pelvic positioning (the importance of which was discussed in the last seating article about the pelvis).

Thorough assessment will ensure that postural goals and abilities are accurately determined. Assessment findings can consequently be communicated to appropriate therapists, consultants and/or product suppliers in order to match the individual's needs to appropriate equipment.

References

Moore, L. 3rd Ed. 1992. *Clinically Oriented Anatomy*. International Addition.

Zollars, Otto Bock Seating Manual – available in TASC



by Alana Lum



Palm-Sized AAC devices



As technology continues to develop and improve, there have been developments in communication devices and technology. In recent years, we have seen the introduction of Personal Data Assistants (or PDAs). PDAs are small handheld computers that allow you to store names and addresses, schedule appointments, take notes, do word processing, and so on. They now form the basis for a new range of palm-sized communication devices. This means you get a communication device with all the functions of a PDA. The PDAs have been specifically tailored for communication – with communication software, improved speakers and longer battery life. The devices are dynamic, meaning that the touch-screen will change according to what button has been activated.

Palm-sized devices are suitable for people who need a small, portable and compact dynamic device and are able to direct access (point) or use a stylus. They can be used for phrase-based communication as well as sentence construction. All of the devices are able to store and use photos and Picture Communication Symbols (PCS).






There are a number of different PDAs now available. **The table on the next page** provides an overview of the palm-sized devices that are available. The prices given are current from June 2007, but please check with the supplier for exact prices. When considering devices, remember to keep in mind the features that are important for you or your client when considering devices, e.g. do they require word prediction, how much recorded (digitised) speech is needed, is text-to-speech required, etc...

Information and pictures sourced from:

NovitaTech www.novitatech.org.au

Spectronics www.spectronics.com.au

Technability www.technability.com.au

	ChatPC M3	ChatPC M3+	iChat 3	Palmtop 3	Say-it! SAM
Speech Output	 Synthesised: DECTalk Digitised: approx 60 minutes	 Synthesised: DECTalk Digitised: approx 60 minutes	 Synthesised: DECTalk and Acapela HQ voices Digitised: approx 218 minutes	 Synthesised: DECTalk and Acapela HQ voices Digitised: approx 218 minutes	 Synthesised: DECTalk Digitised: approx 60 minutes
Dimensions (approx)	Size: 8.9cmx14.7cm Weight: 480g Screen: 10.2cm (diagonal) colour display	Size: 8.9cmx14.7cm Weight: 480g Screen: 10.2cm (diagonal) colour display	Size: 9cmx14cm Weight: 500g Screen: 9.4cm transreflective colour LCD display	Size: 9cmx14cm Weight: 500g Screen: 9.4cm transreflective colour LCD display	Size: 8.4cmx13.5cm Weight: 284g Screen: 10.2cm (diagonal) colour display
Text-to-Speech	Yes	Yes	No	Yes	Yes
Word Prediction	No	Yes <input checked="" type="checkbox"/> Letter prediction <input checked="" type="checkbox"/> Word prediction <input checked="" type="checkbox"/> Abbreviation expansion	No	Yes <input checked="" type="checkbox"/> Letter prediction <input checked="" type="checkbox"/> Word prediction <input checked="" type="checkbox"/> Abbreviation expansion	Yes <input checked="" type="checkbox"/> Letter prediction <input checked="" type="checkbox"/> Word prediction <input checked="" type="checkbox"/> Abbreviation expansion
Access Method	Direct touch screen access	Direct touch screen access	Direct touch screen access	Direct touch screen access 1-2 switch scanning or 2-3 switch Morse code (switch access kit is required)	Direct touch screen access
Battery	Approx 6 hours	Approx 6 hours	8 hours of continuous use	8 hours of continuous use	Approx 6 hours
Computer editing software	Yes Access to pocket versions of Microsoft Words and other Microsoft CE applications	Yes Access to pocket versions of Microsoft Words and other Microsoft CE applications	Yes Access to pocket versions of Microsoft Wordds and other Microsoft CE applications	Yes Access to pocket versions of Microsoft Words and other Microsoft CE applications	Yes Access to pocket versions of Microsoft Words and other Microsoft CE applications
Supplier	Technability NovitaTech	Technability NovitaTech	Spectronics	Spectronics	Technability
Price (approx)	\$3,919 - \$4,041	\$5,169 - \$5,331 Dedicated version \$6,500 - \$7,172	\$3,790 Dedicated version \$4,590	\$4,990 Dedicated version \$5,790	\$4,670



5th National Wheelchair Symposium On Wheelchair Safety and Standards



During July Sarah Nottage, Seating Consultant/Occupational Therapist attended the 5th National Symposium on Wheelchair Safety and Standards in Brisbane. There were some interesting and relevant presentations, both for therapists and wheelchair technicians.

The symposium program included:

- What do the Standards Say? David Hobbs, NovitaTech
- Dealing with technology and the obese - Bill Contoyannis, RehabTech
- Assessing the Patient and the Wheelchair - Emma Friesen, North Sydney Central Coast Health
- Measuring Respiratory Function - Robert Bingham, Royal Perth Hospital
- Physiological Activity in Spinal Cord Injury - Bill Contoyannis, RehabTech
- Determining the centre of mass of the Patient and the Wheelchair - Robert Bingham, RPH and Bill Contoyannis, RehabTech
- The Pressure Mapping Tool - Robert Bingham, RPH
- Pressure Mapping Artefacts - Peter Slattery, Royal Brisbane Womens Hospital
- Research and Quality Practice Review - Dr Lloyd Walker, NovitaTech



The presentations will be posted in early August on
<http://rehabtech.eng.monash.edu.au/sympwc/index.htm>



We welcome any feedback, good or bad, that you have on our service. Please feel free to contact us by phone on 02 9972 8183, email at tasc@tscnsw.org.au or in writing at the address below.

TechnoTalk is available free from www.thespasticcentre.com.au/news/index.htm