TechnoTalk

The TASC Newsletter

Volume 16 Issue 5 September 2007

Editorial

Welcome to our latest edition of TechnoTalk which we hope will provide you with latest interesting information in the world of assistive technology.

This month has seen the TASC Technology Consultants and Spastic Centre Staff from across our various regions and programs busily making final preparations for the our ChatterCamp. This is The Spastic Centre's inaugural communication camp for children 5 - 16 years old and their families to be held at Camp Breakaway on the Central Coast of NSW. More information on the camp can be found at http://www.thespasticcentre.com.au/news/news_items/chattercamp/index.htm.

Continuing on the previous months seating theme Sarah Nottage, Seating Consultant, has moved up the body to consider the positioning options for the head and neck. For those of you involved in seating and positioning we know the challenges we sometimes have in finding an effective solution for supporting the head in an upright position. We hope this article assists in presenting some ideas and considerations.

Finally, I hope that you enjoy the new look TechnoTalk and as always we look forward to your feedback and comments. Happy reading!

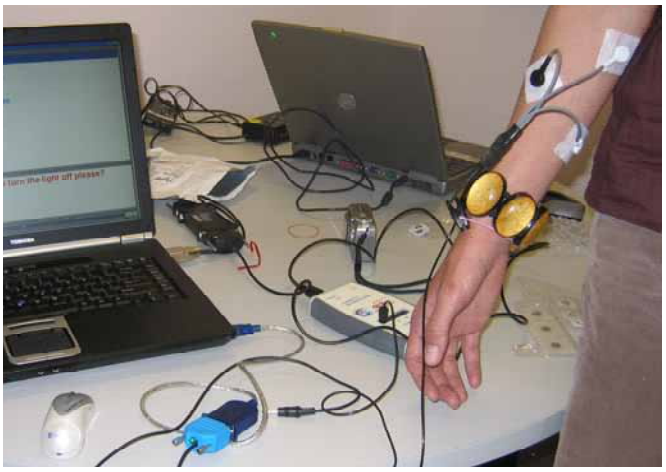
Jo Ford.

Inside

News...

NeuroSwitch™ Review

The TASC team recently had an opportunity to see a demonstration of the NeuroSwitch™. This switch uses electromyograph (EMG) signals from sensors on the skin and responds to changes to the muscle – no matter how small the movement. For more information on the NeuroSwitch™ visit www.controlbionics.com.



TASC staff member trying the NeuroSwitch™ by entering text into a computer.

Tips...

Looking for Educational Software:

Try New Horizons www.nh.com.au to browse various titles and download demos of some programs.

Computer Specs Guidelines:

If you are thinking of buying or upgrading your computer and not sure what are the best specs then give TASC a call on (02) 9972 8183 and we will send you a sheet of guidelines to assist.

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 tasc@tscnsw.org.au or by writing to The Spastic Centre PO Box 184 Brookvale NSW 2100

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

Main Story: Positioning of the Head and Neck by Sarah Nottage

In previous TechnoTalk issues we have discussed positioning of the pelvis and the trunk. This month we move up the body and will be covering seating and positioning considerations relating to the head and neck.

Head control and position is influenced significantly by the stability and posture of the entire body. Therefore, it is imperative that the pelvis, trunk, upper limbs and lower extremities are sufficiently supported prior to supporting the person's head and neck. Please refer to TechnoTalk March and July 2007 for information regarding pelvis and trunk positioning.

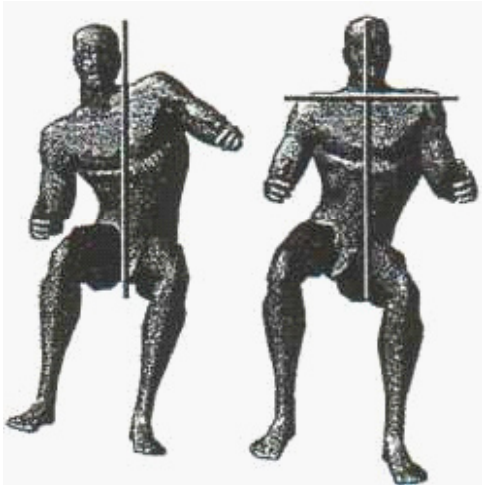


Figure 1.

The primary aim is to facilitate independent balance of the head on the body. If independent balance is not attainable, the aim would be to support the head in a neutral posture, i.e. in midline whilst enabling the person to move their head and neck within their functional range of movement. As evidenced in Figure 1, achieving a neutral pelvic position has compromised the head position.

Neutral head position is important for:

- Swallowing and digestion
- Respiration
- Encouraging social and environmental interaction
- Vision

Anatomy

The average human head weighs between 4.5kg and 5kg, constituting around 8% of the whole body mass. The head-neck support system can be likened to a 4-5kg ball on a flexible shaft (the spine) stabilised by guy wires (muscles).

The least stress on the spine will occur when the head is centered over the spinal column, as minimum muscle tension is necessary to hold up the head.

Every 2-3cm the head is held forward, back or to the side of the midline position requires the exertion of 7 to 14kg of extra muscle tension, which means that much less muscle strength is available to perform functional tasks. This extra muscular load is transmitted down the spine, increasing chronic loading on the vertebrae as well as the intervertebral discs (Yee, D., n.d.).

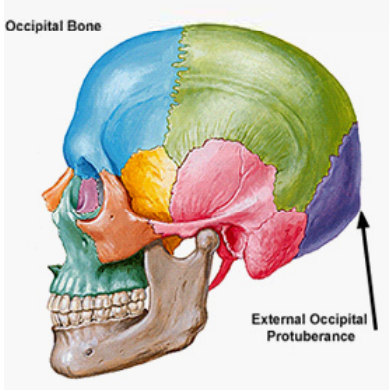


Figure 2. The Skull; Lateral view

The Skull

For seating purposes, the key bony prominence in the skull is the external occipital protuberance (see Figure 2). It is a projection that can be palpated at the base of the skull. When supports are used beneath the occipital protuberance, the head can be effectively blocked from tipping back and down, i.e. when the neck hyperextends into a jaw forward 'chin poke' position. When providing occipital support, take care not to elicit a pattern of extension.

Assessment

To determine the most appropriate head and neck position for seating, firstly obtain specific, detailed background information from the client, carer and therapists including:

- Health and medical status (e.g., swallowing, pressure areas, influence of tone, vision, behavioural issues). If a client has hydrocephalus, it is important to establish if they have a shunt. Any head support that is provided should ensure that pressure to the shunt site is minimised.
- Functional considerations (e.g., transfer style, aesthetic and environmental considerations, skill of client/carer to operate and adjust components, transport and community access issues, method of communication).

Next, conduct a detailed MAT evaluation in supine, preferably without a pillow under the head. When the pelvis and trunk have been placed into an optimal position, take note of head and neck position at rest, including patterns of movement, reflex patterns, influence of tone, active and passive range of motion. Determine if postures are fixed or flexible, noting where support is required for correction.

Observe the effect gravity has on head and neck position by conducting an assessment in supported sitting. First ensure that the pelvis, trunk, upper limbs and legs are appropriately supported.

Is the client able to maintain their head in an upright, neutral position in supported sitting independently? If so, for how long? If the client has reduced head control, try increasing the angle of recline on the backrest, and/or providing tilt into the seating system. This will reduce the effect of gravity on the head and neck. If additional support is required, use your hands to support the head. Simulate with your hands how much force, the angle of force and where force is required to achieve optimal positioning and control. Observe the client performing functional activities; are they able to communicate effectively, swallow safely, and operate a powered mobility device? Ask the question 'why is the person unable to maintain their head in an upright position?' Consider the influence of fatigue, muscle tone, strength and primitive reflex activity.

Positioning Principles and Techniques

HEAD POSITION

Improved head control and position may be possible by tilting the whole seating system back slightly to reduce the influence of gravity. Therefore the client does not have to expend as much energy maintaining an upright position. The angle of tilt can be adjusted throughout the day, according to the demands of the functional activity, for example more upright for meal times.

It is important to observe and assess the client in the tilted position at rest and during activity to ensure that they:

- Can manage their secretions and swallow safely at the chosen angle
- Aren't pulling forward to right themselves excessively
- Aren't fighting excess tone due to increased reflex activity as a result of the inner ear position

It is important to note that there are no 'rules' regarding how much tilt a client can tolerate to manage secretions, swallow and reduce the risk aspiration in a seated position. The ideal position to maintain a coordinated swallow is to provide chin tuck with the head in midline. Each client is unique, therefore needs to be assessed individually. Please liaise with your speech pathologist if you have any questions or concerns.

Head/neck support options

Issue – Head falls/pushes backwards

A simple contoured headrest may be appropriate for a client who has reasonable independent head control and requires support for transport (e.g. Glide Moulded Headrest, Figure 3) or whose head falls or pushes backwards occasionally.

Figure 3.

Figure 4.

If additional support is required, a curved headrest may be appropriate (e.g. Daher Large Headrest, Figure 4). The size of the support will depend upon the amount of support required and the shape of the client's head.

For a client who hyperextends at the neck, a neck rest fits under the occipital area and aims to provide enough support to assist the client to tuck their chin down (e.g. Daher Neck Rest, Figure 5). If the neck rest is curved and longer it provides a surface for the client to rest their head even when turning it from side to side. The neck rest should be trialled prior to provision, as it may be uncomfortable or stimulate arching of the neck and spine.

Figure 5.

It is important to assess the weight bearing aspect of the neck rest. A neck rest with pressure at the occiput may elicit increased neck extension and may not provide adequate surface area support, particularly in tilt.

Issue - Head falls/pulls laterally, rotates, or extends with rotation

Begin by giving support behind the head then provide support on the sides of the head / neck as required.

Possible options:

1) **Curved support** – with lateral support if a small amount of support is required (e.g. Daher Lateral Support Headrest, Figure 6)

Figure 6.

2) Blocks by the sides of the head – will limit more movement. Position the blocks above the ears. The amount of movement you want to allow or prevent will influence how close the blocks are to the head.

3) Blocks above and below the ears – blocks the side of the head and the jaw if more control is needed. A relief should be made for the ears, for example the Otto Bock X-Shaped Headrest (Figure 7).

Figure 7.

4) Offset curved support – if the client's neck is fixed into lateral flexion and/or rotation, mount the curved headrest to the side to accommodate the position.

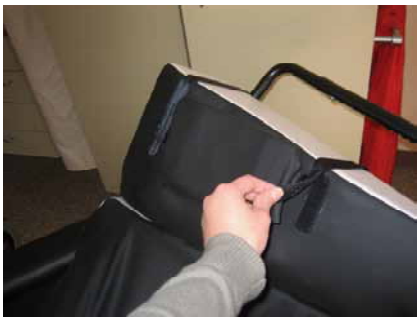


Figure 8.

5) Custom moulded headrest – if the client has significant postural symmetries, a commercial headrest may not provide sufficient postural support. Custom moulded headrests can be fabricated out of foam and plywood. For an example of a custom moulded headrest, refer to (Figure 8). The client required a wide headrest with occipital support to provide support for her strong reflex activity, and a removable insert to facilitate additional chin tuck for meal times only. Floam cells (gel filled pads) can be inserted into the foam to protect any area which is vulnerable to pressure areas.

Issue - Head falls/pulls forward

Begin with providing support behind the head then provide anterior head support. Anterior forehead supports consist of a "block" superior to the eyebrows. This could be a soft band, rigid ring, or some kind of cap. Does the band slip upward or downward? Are there any safety issues that may require supervision?

Possible options:

Figure 9.

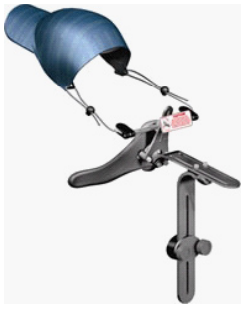


Figure 10.

The Mulholland Adaptive headrest system (Figure 9) is comprised of an individual pad or combination of pads and anterior halo support. The anterior support may be appropriate to use for clients with low tone, forward flexion patterns or who require positioning for meal times or maintenance of their airway. Whitmyer offers a range of anterior support components; options include the dynamic cap (Figure 10) or the static or dynamic forehead strap (Figure 11). The system relies on a pulley system which follows the client's movement. The Whitmyer is ideal for use during functional activities such as maintenance of head position during school lessons or meal times. The Static forehead strap provides perimeter support to limit the range of forward and lateral movement whilst enabling functional movement.

If additional support is required even after all postural support and anterior head support has been provided then any further interventions using collar type supports should be carefully assessed for use and a team decision made.

Figure 11.

Considerations relating to neck/head supports

- Is the client able to move their neck and head freely to perform functional tasks?
- What are the client's feelings pertaining to intervention at the head such as aesthetics, tactile sensitivity?
- Does the client need to have their head in different positions, for example at rest and for meal time?
- Keep it simple, especially if multiple carers

Summary

The priority in seating is to ensure that the pelvis is optimally positioned, with the trunk and head facing forwards for maximal interaction with others and the environment.

As we have discussed in previous TechnoTalk issues, it is vital to conduct a thorough interview with the client, carers and therapists to obtain detailed information, alongside a comprehensive MAT evaluation in supine and supported sitting. Listen to the client; at times what you would recommend from a clinical perspective cannot or will not be managed in the real life context, in which case although the client's postural needs are being addressed, it is likely that our recommendations will not be implemented in the longer term. Seating is a compromise and must be balanced and realistic.

There are a myriad of head and neck support options available, both commercial and customised. It is important that sufficient postural support has been provided prior to trialling head and neck support options. Ensure that trials are conducted within a variety of functional activities and environments.

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Profile

Jo Ford, Manager TASC

In 1985, I completed my degree in Occupational Therapy at Cumberland College, Sydney University.

Recently I celebrated 20 years of working in various roles and programs for The Spastic Centre in NSW. I have been involved in the specialist Assistive Technology Service for 15 years, as a therapist and now as the Program Manager of TASC. The field of Assistive Technology is so exciting and I believe that the use of appropriate equipment can make such a difference in people's lives.

I have also been involved with ARATA since its conception and I am currently on the board as vice president and chair of special interest groups. This provides me a fantastic opportunity to meet and network with people both across Australia and Internationally.

the spastic centre
For people with cerebral palsy

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