Sitting for Task Participation
by Lori Potts, PT

At the end of this article, you will find the web link to the ISS Proceedings (Instructional Session 2002) upon which this article content is based. Full acknowledgment for concepts regarding seating for task performance is credited to this source.

Active Sitting for Functional Tasks

Sitting for function is not a static, single position. Sitting is an active range of postures that enables the mind to think, the eyes to see, and the head, arms and hands to accomplish a task. This is not an immobile position, but rather an "active holding" position to allow a range of controlled pelvic mobility simultaneous to the movement of the trunk and upper extremities. For a healthy human being, this pelvic weight bearing and pelvic stability occurs naturally in the context of the task. In order to perform a task while sitting, the pelvis shifts anteriorly, which sends a message to the shoulder girdle and head about the body's position relative to gravity. This shift of the pelvis forward into "active holding" or "co-activation" signals that the body is ready to work. The body will "kick in" trunk extension tone which lends further power to the pelvis and lower extremities for increased stability and weight bearing, and to the shoulder girdle and head for movement.

This combination of pelvic girdle stability with shoulder girdle mobility provides a foundation from which the head and upper extremities can be controlled and moved. The shift of the pelvis into an anterior posture, the subsequent active weight-bearing in the lower extremities, and the increase in extensor tone of the trunk is also an 'alerting' reaction throughout the musculoskeletal system. This body control is achieved via the body's relationship to gravity, through activation of the vestibular system and through proprioception. Weight bearing through the pelvis and lower extremities enables the body to stabilize and dynamically respond and react to gravity throughout the task, and is critical to every movement.

Sitting for function is a subconscious or inherent human characteristic. Human beings naturally carry the knowledge of this seated posture in the mid-brain’s memory bank. This motor skill emerges through experiences of seated task demands throughout motor development, and becomes part of us as a subconscious postural behavior. Why does this matter when we consider children with neuro-motor impairments and developmental delays?

Passive Sitting and Symmetrical Positioning

Individuals who are not mobile have little active experience with gravity. Children with neuro-motor impairments such as hyper-tonicity are often in seating systems in which they are "stabilized" by "not moving." Restricted, static, symmetrical seated postures do not allow for active pelvic stabilization.
result, these children have further difficulty learning how to integrate sensory–motor information for functional seated motor skills, especially head/eye/hand coordination.

Let's look at a typical wheelchair posture. Reclined with knees higher than hips, a decreased hip angle, and feet off the floor on raised footplates, the pelvis is in a static posterior tilt. Lower extremities are symmetrically abducted, often with knees placed wider apart than the hips. Feet may be parallel to the floor with knees at more than 90 degrees flexion. Although this position may reduce hyper-tonicity, it prevents any weight bearing on the thighs and feet, and certainly does not allow the pelvis to tilt anteriorly.

This is a resting, leisure, receptive posture in which tone is temporarily reduced. It is a passive, safe, symmetrical posture appropriate for transportation that does not allow any independent control.

Similarly, let's look at the 90/90/90 seated position. The concept for this posture is that by placing hips, knees, ankles and body in midline, this symmetrical posture provides control of tone and thus is optimal for sitting. But since this positioning is an attempt to maintain static symmetry for a child with increased or variable tone, a multitude of positioning straps are used to hold the child in place. Using straps does not allow the body to learn how to actively move in relation to gravity. Instead, this restriction prevents movement. For a child with high tone, it may even result in the body "fighting" the restrictive straps, in effect adding more power at those restraining points. Meanwhile, a child with low tone simply collapses their body into the many accessory supports and straps. The larger and more secure the straps, the more their body relies on the accessory supports.

Placed in wheelchairs in passive, static symmetrical postures, these children have great difficulty (without the experience of pelvic weight bearing) to find the active seated posture for function and task participation. With activity–focused adaptive seating, we no longer manage tone by attempting to stop or prevent it. Rather, we use positioning to enable individuals to control their tone with task–purpose. As we better understand how a body without adequate weight bearing works, we can provide systems that will allow better weight–bearing for pelvic stability and mobility to occur.

We want functional sitting, so we must enable active movement and tone to perform work. With that, task participation is made possible and on-going motor practice attained. By providing seating that is designed to assist individuals to assume active sitting, they too, can learn this functional posture. Once obtaining it, individuals can practice active sitting in the context of learning tasks. Over time this posture will be more easily assumed, practiced, and obtained until the needed supports can be reduced.

Adaptive Seating for Task Participation

Let's look again at the active, functional sitting of healthy able–bodied people. The individual's shoulders and head are in front of the pelvis, rather than in line with or behind the pelvis. Feet are on the floor, are weight–bearing, and may not be symmetrically placed. The knees are held at a posture "below" or "under" the body, with both hamstrings and quadriceps muscles co–activated. The pelvic movement into anterior tilt cues the entire body to sit with increased tone, power, and alertness: in short, to become ready to perform a task. The active sitting posture can be viewed as the posture used to get up from sitting to standing, but without getting up: leading with the head, the pelvis in anterior tilt, legs weight bearing, and shoulder girdle in front of the pelvis.

Appropriate adaptive seating can simulate this by providing a firm seat with sufficient seat depth. A slight forward seat angle of the chair can provide the posterior thighs with tactile/kinesthetic input, and encourage anterior pelvic tilt for weight bearing of the pelvis and lower extremities. A well–designed pelvic harness prevents forward sliding of the pelvis into a posteriorly tilted, sacral sitting position. Leg straps can be secured around the front of the lower legs, and the footboard can be positioned to graze the bottom of the feet.

The seat back is placed at shoulder height. Antero–lateral trunk support is provided as a cue to the trunk rather than as secure positioning, and thus is present when the individual brings the trunk forward. Options for support at the forearms include forearm prompts or a tray for a secure base of support that will enable upper body weight bearing–assist for trunk stabilization and postural control of the head and shoulder girdle.

In this way, even an individual with high or fluctuating tone finds that their tone now contributes to power for real task use. With containment of the pelvis, support at the lower legs and optional weight bearing–assist at the forearms, active sitting results in extensor muscle tone that improves head control, rather than the extensor pattern of pushing off the footrest into a dysfunctional extension posture. Providing adaptive seating for function in this way may even make the use of head support or a chest strap unnecessary, as the individual’s head and upper body shows progressive improvement in postural control. Individuals may now use their head as an extremity to control assistive technology with a head switch.
In active, functional sitting, the individual must be able to move — by controlling the movement.
This pelvic and trunk control is learned through repeated practice of an activity which is enjoyed. Observe closely as the individual works for short periods of time at the activity (less than 10 minutes). Make note of their active sitting performance in the context of the task and carefully assess seating supports as to their true value. The goal is to provide just enough support to enable a challenge for practice, but not so much support that active practice isn’t possible.
For example, if the seat is anteriorly tilted too much, the individual may lose trunk control. If the anterior support (at forearms or chest) is not adequate, the trunk may collapse forward. If the pelvis is not adequately stable, the lower extremities may kick out, show increased tone, or move into abduction. With good pelvic stability, the lower extremity supports can be minimized. If the feet are pushed against the footrest causing pelvic and trunk extension, consider lowering the footrest.

Sitting for task participation is not a seated posture to be maintained for long periods. For able-bodied individuals, this position is one that is assumed, maintained, and then moved from as it relates to a particular task being performed. So adaptive seating, too, should allow a change in postures. This can best be implemented with adaptive seating features that offer adequate support without excessive restriction, along with the use of the tilt–in–space function for rest periods.
As the individual gains experience with “active holding” and “controlled moving” in this posture, he or she becomes better able to initiate and maintain active sitting. As strength, posture, and motor control improve, supports can be reduced. In time, while seated, these individuals will more readily replicate the required movements that the functional task or routine may demand.

Source:
Related Research:


