

Everything You Wanted to Know about Switches and More

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Introduction

1. To me and my practice and specialties, my history
2. Our challenge today
3. Seating and its relationship to access
4. Sensory processing and sensory integration
5. The myth of the optimal position, physiology not physics; and neurophysiology of human movement, not pathology
6. Children are not small adults; Individuals with complex bodies

A Definition of Access

1. How an individual is able to manage an activity of interest with intention, independently
2. How to manage a particular machine at a particular time for a specific activity which will produce an output (vocal or printed or image)

A Definition of Consistency and Efficiency

1. "Consistency" and "efficiency" and "reliability" are engineering terms, not "human" terms, nor human physiological terms
2. Isolated "motor" control is not "consistent," nor "reliable" but rather "process oriented," "routine dependent," and "adaptive"
3. We are never "error" free, nor "mistake-proof;" but rather we are able to recognize errors and repair them.
4. Motor "acts" and machine control, cannot be measured except in laboratory environments, which are not Life Situations, nor Life Environments.

A Definition of Seating

1. A range of postures, situationally specific, task defined, and individually preferred,
2. A treatment technique for OT's and PT's
3. Seating for Task Performance
4. Seating as a human characteristic, homo sapiens on planet Earth with its gravity

Old paradigms we need to leave behind

1. Access to activity and AT and must be assessed FIRST
2. Find the OPTIMAL site

(These "old" historical paradigms were developed from professionals who were working with adults who had a degenerative disease or an acquired injury. These individuals were competent readers, writers, and had been independent in functional activity.)

3. Teaching Cause and Effect??? (or Stimulus/response)

New paradigms we need to embrace

1. Access is the last, not the first
2. Child must know activity
 - The machine, how it works
 - The software the machine controls, the real activity
 - How a method of access works, by seeing it work first
 - Beginning, middle, and end of activity
 - Repeating the activity in frequency, rather than in length of time
3. In children, switch sites develop and increase
4. Scanning can lead to direct selection
 - (2 switch step, 3 switch mouse, head mouse)
5. Direct selection and scanning can be used simultaneously

Old paradigms we need to leave behind

1. Seating for function is to be restrictive, controlling the body
2. The seating the child comes to school in, is the "right" seating for activity
3. If only the student could hold up her head then we could work
4. The student wants to use her hands

New paradigms we need to embrace

1. Seating must allow for task participation and performance
2. Seating must provide pelvic weight bearing for visual convergence
3. Seating must be situationally specific, and task specific and change
4. For hands to work, heads must work, for heads to work, the pelvis must be weight bearing

Old paradigms we need to leave behind

1. Consistent switch site/s exist and are to be "found" in assessment before AAC/AT device use can occur
2. Single switch scanning is where to start, it's the simplest
3. Use only one or two choices to begin, it's easier
4. "Hand over hand" helps the child learn to use her hands

New paradigms we need to embrace

1. Access sites (body sites) develop from interest, intention, and experience with activity, not in isolation
2. Consistency is not what is needed, interest, intention, and attention are needed
3. The activity must be known, with the beginning, middle and end obvious
4. Repetition of the activity will bring anticipation of motor use and support its accuracy
5. Motor learning requires: no verbal prompts, a mental rehearsal, and specific feedback at activity's end

New paradigms we need to embrace

1. The switch is NOT the activity
2. Electronic (zero pressure) switches vs. mechanical switches for AAC, computer, mobility (automaticity and transparency)
3. Don't use automatic scanning first, 2 switch needed
4. Set up activity for student to join, supporting postural control to the activity itself, and its anticipation
5. The importance of "one to one" correspondence
6. Activities need to build, and be interesting, and complex
7. Mistakes will be made, expected, and encouraged
8. Alternative access must be used by others to support the "mental rehearsal" or "visualization"

New paradigms we need to embrace

1. Work for short periods, frequent breaks, support knowledge of beginning, middle and end of activity
2. Increase numbers of activity, to support a larger repertoire of experience and control
3. Expect real "access" to be revealed rather than "taught"
4. The activity must be known, and contain success and challenge, risk and reward

Let's not forget Mounting!!

1. Seating, Access, Switch and Mounting (all together)
2. Desk/table first
3. Human Mount (most flexible)
4. Readiness for permanent mounting
5. How to choose Mount/s; considerations

I. Evaluation of Seating for Function

A. For Postural Management (managed by others)

1. Safe, passive Transport
2. Being fed by another person, swallowing
3. Body stillness, relaxation is necessary
4. Primarily is use of the tactile system, **tactile processing**
5. Needed when body is to be receptive
6. Body, extremity control is range of motion only, no power

B. For Postural Control (independent)

1. Independent control of movement
2. Pelvic stability (which is control of mobility) is critical
3. Utilizing weight bearing, especially pelvis
4. Primarily is use of vestibular system, **vestibular processing**
5. Needed when body is to be active
6. Body, extremity control can exhibit power, and functional use

C. The Myth of the Optimal Position

1. Symmetry is a method of "waiting"; not a treatment to prevent/change pathology
2. No one/single position is ever correct; there must be independent mobility within seating systems, situationally specific
3. Not one chair, but more than one

II. The Neuro-Physiological Process of Movement ("Physiology Not Physics")

A. Based on body's need for survival and Protection

B. Moving within its sensory systems, primarily mobility and motor control utilize the tactile and vestibular systems

C. Initiation of motor acts, new patterns vs. automatic

D. Transitional patterns, a precursor to isolation of movement, (ROTATION)

E. Equilibrium reactions and postural security are developed through active and independent movement, and are *DULLED by lack of movement*

F. Impact of independent mobility on cognitive exploration & understanding

G. Moving with INTENT (intention)

- H. Stability is an "active" holding on/
- I. Consistent (process) movement based on sensory-motor information
- J. Importance of routines, for anticipation of motor control required
- K. Importance of novelty, for consistency development
- L. Repetition of activity vs. repetition of act
- M. Isolated patterns develop with functional demand and use, not from motor or visual -motor practice
- N. The task defines the motor act, NOT the ACCESS method.
- O. Motor Learning occurs (and can be supported) by paying special attention to these issues:
 1. Individual must be able to visualize themselves in activity, as competent (a mental rehearsal)
 2. While acting (performing activity), the adult cannot verbally coach or prompt
 3. When activity completed, no "good job" but rather report exact observation of what actually occurred. If a correction is needed, make it a suggestion, before another trial is attempted
 4. Presume intention, (don't look for "consistency" of actions); but interest and prolonged engagement
 5. Do not ask child "are you ready?" Make statements: "it's time to begin" "I know you are ready because I can see you..."

III. Switch Access, use of electronic switches

- A. The switch is not the activity.
 1. A switch accesses an activity.
 2. It must become transparent to the activity quickly
 3. **Mechanical Switches require 5 actions. (and graded force)**
Locate, Touch, Press, Hold, Release (5 steps)
 4. Electronic Switches require 2 actions. (and no force)
Locate, release (2 steps)
- B. The Challenge of Single switch scanning
 1. Single switch scanning requires rhythm and a large scanning array, "timing" plus "waiting" and "fluency" of array
 2. Two switch scanning requires no timing, no rhythm, no waiting
 3. Without zero pressure switches, we've forced single switch scanning
 4. Two switch scanning can move to 3 switch scanning (mouse emulation)
- C. Types of Electronic switches

1. Proximity switch (or the term "sensor")
 - Is activated by "skin touch," is a "capacitive" switch
 - Is Adjustable or Fixed
 - Can be embedded in head rest or mounted behind it (comfortable)
 - Can be located under a tray (no cables)
 - Or placed anywhere else.
 - Can be used for assessment with any body part
2. Fiber Optic switch
 - Is a "light beam," activated by "breaking the beam"
 - Used with little, but quite specific movement, especially with kids with muscular weakness (MD, SMI, adults with ALS)
 - Can be mounted within tray, within splint, within an adjustable "cable" length to reach
 - Used as a reset/mode change switch
 - Can be used in multiples to drive powered chair

IV. Understanding CP/Tone Problems

- A. Tone Management/relaxation
- B. Use & knowledge of body postures
- C. Sensory Integration inexperience
- D. "Primitive" reflexes
- E. Startle Reflex; protection, a "shot" of adrenaline and extensor tone
- F. Opisthotonic reaction (Opisthotonus)

Inadvertent touch to occiput, scapulae, or sacrum causes a dramatic increase in extension, almost "bridging" the body, which then leads to an ATNR, and then cycles back to neutral.
- G. Obligatory Reflexes/Extensor Spasm
- H. Spasticity, Athetosis, Ataxia, Mixed
- I. Dystonia and CP; Dystonia

"Stucked-ness", specific patterns of movement, surges of tone, inadvertent touch distally causes surge of tone, must anticipate routines, at rest exhibit "normal" postures, rhythmic "banging"; resting isolated distal patterns of movement; underlying "tremor-like" movement, intact equilibrium, generally lesion in basal ganglia; frequently demonstrates opisthotonic reaction

V. Real Problems/Real Change

- A. Seating for safe, passive transport
- B. Use of footrests/and of floor placement
- C. Seat to Floor Height (STF)
- D. Anti-thrust seat/wedged seat
- E. Chest straps/thick, swingaway trunk laterals
- F. Non-adjustable hip guides/pommels

VI. Head control and Support

- A. Real head control with supported trunk, pelvic weight bearing
- B. Passive head resting
- C. Removing head support for hand use
- D. Use of neck roll, and head movement as range of motion only
- E. Use of occipital supports
- F. Using head as primary extremity for access to assistive technology
allows hands to be free to be engaged in real activity