More Mechanics of Posture and Seating Designs

A Firsthand Perspective

Chapter 4

Posture Diversion Protocol

Interjecting a Bias for Improvement or Change

The Posture Diversion Protocol (PDP) is the formulated theory that while we may not be able to correct a physical deformity, we can at minimum, eliminate the bias towards progression and even introduce a bias for reduction and/or redirection. The PDP also includes a number of guiding precepts and parameters while asking the question: Should we ever be content to simply maintain the status quo?

Posture Diversion Principles

- The best seated posture imposes the least structural stress
- Time, distance and force dictate degrees of proactive intervention
- Consider the structural integration of the entire body relative to posture and pain
- At no time should realignment or diversion reach the limits of ROM of the targeted structures
- Positioning and alignment outside the wheelchair should reflect the goals established for seated posture
- The redirect of postural alignment requires the inclusion of open space or channels into which redirection or distraction can occur

For the sitting dependant person, the success for diversionary alignment depends significantly upon the application of gravity pressure in the direction of positive realignment; over prolonged periods of time. This theory is applicable to various forms of: kyphosis, scoliosis, Z-axis pelvic rotation, and posterior pelvic tilt.

In orthopedic management and deformity prevention, the protocol includes guidelines for positive outcomes, such as: minimum time requirements, distance parameters, degrees of force, and the identification of suitable anatomical structures. There are also critical precautions for over-correction and the requirement that gravity influenced postural improvements can only be achieved through engagement of the collective protocol.

The following are additional components of the protocol:

Structural Stress

The vertical stress applied to the seated body is both constant and structurally destabilizing. The natural curves that are necessary for standing and ambulation seem to be counterproductive to long-term seated posture. Since both the spine and pelvis have multiple pivot-points, the potential for derangement, under the stress of gravity, is very high. As the demand for sitting duration increases so does the stress from an imbalance in weight distribution. Add to these structures an intrinsic mechanical or neurologic anomaly and the propensity for progression of stress, pain and deformity become magnified. So long as a negative flexion bias exists so does the tendency for instability and deformation.

Total Body Integration

Unless the whole of the body is considered, no corrective or preventative measure will be adequately effective. In the presence of either scoliosis or kyphosis there exist two abnormal flexion biases: at the lumbosacral region and again at the region surrounding the apex of the superior curve (which translates into additional skeletal distortions and mal-alignment issues). Unless these biases are managed collectively or alleviated all together, the likelihood of progression and the rate of progression increase with time.

Time, distance and force

The degree of success in preventing deformity or deterring its progression is directly influenced by the amount of time a person spends, not just sitting in and effectively using the posture support system, but also the time spent in repose on other surfaces. The concept of effective posture diversion requires that at least a portion of time spent outside the seating system include time spent in a posture which reflects similar relative angles and structural alignments established by the seating system. Recognizing that these principles may conflict with ROM therapies, the protocol recommends a rational balance of objectives.

The most extreme implementation of posture diversion is the concept of 24-hour positioning. How this concept is integrated into a client's lifestyle and living arrangements can have considerable impact on medical care and routine maintenance. Cautionary insight for caregivers should be included within the protocol.

Over-correction

Interpreting maximum correctable ROM as the ideal alignment can prove highly counterproductive to the needs of long-term sitting posture. While this altered position may appear improved and not initially pain producing, it is very likely that a client will reposition away from any tension producing alignment. Within this category falls the misguided perception that posterior pelvic tilt should be minimized to correctly align head and shoulder positions. However, if an independent and highly experienced client's stability or function is predicated on pelvic alignment, then altering an established behavior can produce highly negative results. Other over-corrections outcomes include:

- The client who displays behavioral actions that align their body (or segment) into a position of their own choosing; no matter what postural altering forces are applied. The head righting reflex may be a good example.
- Fixed head and neck distortion that requires excessive force to improve alignment. The force should be simulated during the casting process to determine how the rest of the body must be aligned and supported. That force should then be diminished or removed altogether to determine postural response.

Principles of Six Points of Alignment Channeling (6-PAC)

6-PAC represents the application of an advanced interpretation of Three-Point-Pressure (TPP), where, in addition to three spots of localized pressure, three additional channels of open space are included in a molded seating system. The three channels of open space provide an area of deflection into which realignment or distraction can occur. This distinction is made because the lack of open space is a common omission in molded systems that include principles of TPP.

In recline, distraction is allowed with an emphasis towards midline channeling of all body structures. In passive upright sitting, postural alignment is directed rearwardly and to midline. Where significant spine or rib deformity exists, the use of 6-PAC is directed towards

de-rotation and lateral stability by means of establishing channels into which the point of postural equilibrium can be established.

_____

What I present here is just one point of observation of a still evolving approach to the management of sitting dependant, postural anomalies. As the concepts of 24-hour positioning advance, the Posture Diversion Protocol becomes a vitally important addition to the governances and teachings of the industry. A collective guideline must be established to encompass the widely diverse populations that could be affected by such aggressive interventions. It will become the responsibility of this industry to determine how such approaches and precautions are wholly fashioned.

_____

***Additional Observations**:*

- *Relative to planar seating and a lateralized hip: when too much leg length discrepancy is built into the seat, the opportunity for pelvic de-rotation is completely lost. This conflict becomes most apparent in the position of tilt-in-space.*
- *Total contact at the rear of the anteriorly rotated pelvis will also prevent de-rotation. Both observations are particularly true with low-tone sitting posture.*
- *Rotating the upper backrest to reduce a lateral flexion bias is a quick postural fix but does not correct the structural deficiencies inherent in the backrest. Furthermore, the allocation of support pressure will remain inappropriately dispersed and imbalanced.*

Richard Xavier Cushmaster
CUSHMAKER.com

Return to Articles page