

Top-down Approach to Postural Management
May 2007 – Final Version
Posture Management sub-group of Scottish Posture & Mobility Network (formerly SSWG)
Lead author Jan Morton

A Top-down model for assessing movement control has been described by Bidabe & Lollar (1995) and Butler & Major (1992). This paper proposes a similar model that may be of value to clinicians when assessing the need for postural management (PM) intervention.

Each level of impairment in the 'Top-down' model (*Figure 1*) identifies potential interventions that should be considered for the enhancement of function and prevention of deformity. Careful assessment of each individual can establish their level and type of control impairment. *Table 1* contains potential treatment modalities that may be of value to clinicians as part of a client-centred approach. The lists are not exhaustive but will provide a starting point for the clinical reasoning process. Areas of controversy are identified (**) where these are known to exist.

Two reference lists and three evidence tables have been produced as resources to support the need for evidence-based practice (5 associated documents).

In introducing any PM intervention clinicians should be mindful of issues of compliance and the need for training and education of those applying the method including the individual, any carers or support workers and a child's parents.

Those intervention options suggested for each level of impairment are listed in that section. It should be recognised that this model is hierarchical; therefore, options to manage impairment at lower levels should be considered along with those indicated for the level at which a subject's impairment is evident. The intervention options suggested for each level are in alphabetical order therefore are not in any order of importance or preference.

Assessment of control should begin at the head and should move downwards through the levels of the body as illustrated in *Figure 1*. This method is well described by Butler (1998).

Once an individual's level of impairment has been identified, there may be an indication for PM to intervene at that level (*Table 1*). Where dynamic control is present (stability of position but with movement possible, albeit impaired) there may be a different need for PM than if only static control exists (the ability to maintain a position but with no movement possible) see *Figure 1*. Usually these are found at different body levels; static control being found below the level where dynamic control exists; as dynamic control requires greater motor ability. Above these levels normal (or near normal) stability and function will exist.

There is an increasing need for 24-hour PM when impairment is evident at and above hip level (*Figure 1*). 24-hour PM should be considered a recommendation for impairment at and above the thoracic level. There will be a greater need for intervention where both lower limbs are impaired and increased consideration should be given to the use of night-time interventions when impairment is manifest at higher anatomical levels.

Appropriate onward referral and team working is required, with other members of the health care team, for assessment and provision once a postural need is identified.

References:

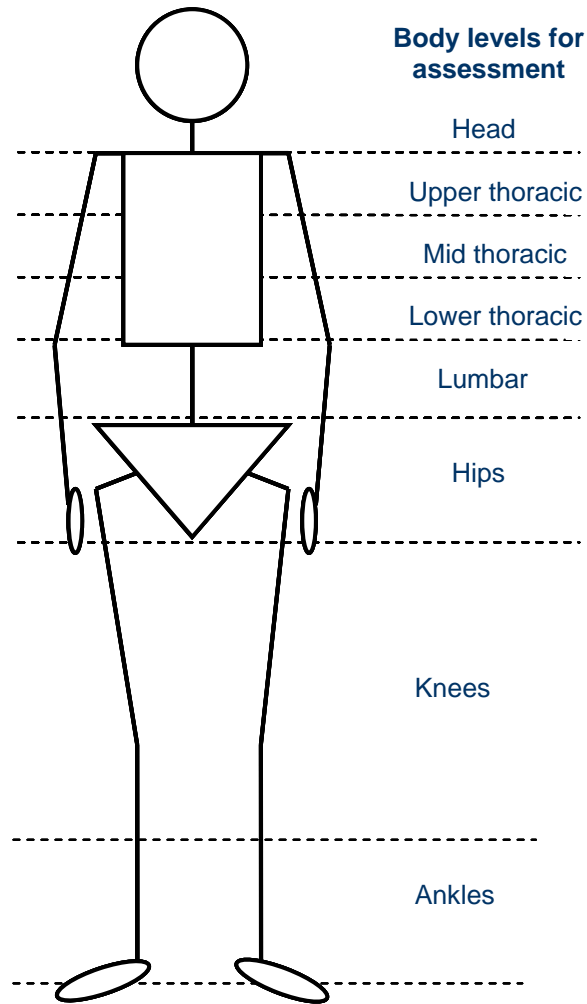
- Bidabe, L. & Lollar, J.M. (1995) The Top-Down Motor Milestones Test. In: *MOVE: Mobility Opportunities via Education*. (3rd edition). Kern County Superintendent of Schools: Bakersfield, USA.
- Butler, P.B. & Major, R.E. (1992) The learning of motor control: Biomechanical considerations. *Physiotherapy*. Vol.78, no.1, pp. 6-11.
- Butler, P.B. (1998) A preliminary report on the effectiveness of trunk targeting in achieving independent sitting balance in children with cerebral palsy. *Clinical Rehabilitation*. Vol.12, pp.281-293.

Table 1: Intervention options for different levels of impaired control.

Level of impaired control	Possible interventions for 'Dynamic control' (Stability with impaired functional movement)	Possible interventions for 'Static control' (Maintain static posture, no movement)
Ankle	<ul style="list-style-type: none"> ✓ Abnormal muscle tone altering techniques ✓ Ankle, foot orthotic devices ✓ Balance education ✓ Drugs for altered muscle tone ✓ Functional (& other) electrical stimulation ✓ Footwear recommendations and modifications ✓ Plaster (& serial) casting ✓ Referral to other specialist clinicians ✓ Strapping and taping ✓ Strengthening techniques 	<ul style="list-style-type: none"> ✓ Balance education ✓ Consider sensation problems ✓ Contracture management ✓ Orthopaedic surgery ✓ Programme of standing support ✓ Range of motion (ROM) increasing / maintenance techniques ✓ Standing / walking aid ✓ Wheelchair- support for distance mobility
Knee	Consider the above plus..... <ul style="list-style-type: none"> ✓ Bandaging, taping & strapping ✓ Bracing / splinting 	Consider the above plus..... <ul style="list-style-type: none"> ✓ Bilateral? Consider access issues and 'ADL' ✓ Standing frame
Hip	Consider the above plus..... <ul style="list-style-type: none"> ✓ ADL devices ✓ Consider access issues ✓ Hip protectors ✓ Mobility assistance using individually prescribed aids and wheelchairs. More advanced forms of mobility aids (e.g. braked, anti-reversing wheels, user interface) ✓ Orthopaedic surgery ✓ Interventions to retain / improve ROM, strength, weight-bearing & balance 	Consider the above plus..... <ul style="list-style-type: none"> ✓ Access & 'ADL' ✓ Interventions to retain / improve ROM, strength, weight-bearing & balance ✓ Night-time positioning (supine or side) to retain ROM in desirable <i>anatomical position</i> & for comfort using rolls, pillows, wedges, cushions and sleep systems ✓ (NOTE: Anatomical position may not always be most appropriate for physiological function – consider internal structural deformity) ✓ Pressure relief ✓ Seating with - ** knee block / pelvic harness, ** ASIS bar, pelvic lateral guides, pelvic harness, contoured cushion / base, ✓ Variety of positioning throughout the day and night to retain ROM ✓ Wheelchair
Lumbar	Consider the above plus..... <ul style="list-style-type: none"> ✓ Interventions to retain / improve ROM, strength, weight-bearing & balance as appropriate 	Consider the above plus..... <ul style="list-style-type: none"> ✓ Adjustable / profiled bed ✓ Robust & accurate control of pelvis, spine and lower limbs in

	<ul style="list-style-type: none"> ✓ Lying – <u>Side</u>: pelvic / lumbar positioning with cushion, roll, upper leg raise to neutral on cushion, pillow. <u>Supine</u>: equipment to achieve optimal <i>anatomical position</i> (**Beware physiological function; may not be optimal in 'normal anatomical position' (PcO₂)) ✓ Pressure care / relief ✓ Seating with – **pelvic tilt / obliquity control, sacral pad, lumbar support, ergonomic back support ✓ Standing – control of pelvis, lateral hip / spine support 	<p>sitting, standing and lying, (e.g. **BES Rehab vs CAPSII hip control methods) **harnessing / restraint issue</p> <ul style="list-style-type: none"> ✓ Orthopaedic surgery ✓ Sensation / pressure relief ✓ Standing frame / support
Lower thorax	<p>Consider the above plus.....</p> <ul style="list-style-type: none"> ✓ **Adaptive & custom made seating ✓ Chest support / harnessing ✓ Scoliosis management – orthopaedic surgery, intervene with underlying cause (muscle imbalance, posture, structure), **adaptive seating, spinal jacket, 'Lycra' garments 	<p>Consider the above plus.....</p> <ul style="list-style-type: none"> ✓ Variety of robust & accurate positioning as above with the addition of thoracic guides and supports to enable physiological functioning ✓ Day and night-time control of lying, sitting and standing using a variety of means best suited to each individual
Mid thorax	<p>Consider the above plus.....</p> <ul style="list-style-type: none"> ✓ Manage posture over 24-hours in optimal <i>anatomical positions</i> 	<p>Consider the above plus.....</p> <ul style="list-style-type: none"> ✓ Mid chest guides, harnessing and supports in all positions / equipment
Upper thorax	<p>Consider the above plus.....</p> <ul style="list-style-type: none"> ✓ Increasing need for higher chest support 	<p>Consider the above plus.....</p> <ul style="list-style-type: none"> ✓ Equipment to enable carer to move and handle the individual for daily care needs
Head	<p>Consider the above plus.....</p> <ul style="list-style-type: none"> ✓ Access and 'ADL' ✓ **collars, head support, cushioning, **tilt in space seating ✓ Wheelchair modifications – likely additional equipment to be transported – feeding, chest care etc 	<p>Consider the above plus.....</p> <ul style="list-style-type: none"> ✓ Airway access and protection ✓ Communication support ✓ Eye level / contact ✓ 'Chin tuck' posture ✓ Feeding position ✓ Full body management in 24-hours and variety of positions ✓ Prone standing frame, tilt table ✓ Support to achieve anatomical position passively and actively as the individual is able

A 'Top-down' model for the provision of Postural Management



GREATEST NEED consider '24-HOUR' Postural Management



LEAST NEED for Postural Management

