The Clinical Puzzle: Pain, Positioning and Evidence Based Practice

Telehealth Presenation

Sonja Magnuson, M.Sc
Occupational Therapist
Vancouver, British Columbia, Canada
smagnuson@cw.bc.ca

October 18th 2012

Objectives

- To describe the Sunny Hill Health Centre for Children positioning and mobility team.
- To clarify the role of positioning, based on best evidence, for the prevention/treatment of pain.
- To describe some outcome measures
- To provide thought provoking questions regarding clinical practice and outcome measurement.

British Columbia and Sunny Hill

- Team includes…
- All kinds of children
- CP=III, IV, V some II
- 14 medium and small communities
- Community team
- 2 x year
- Established network

Knowledge Brokering

- Bring people together
- Share ideas and evidence
- Effective

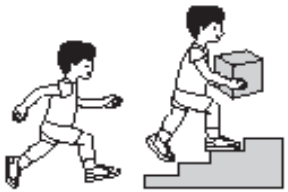
Three assumptions

1. Gross Motor Function Classification System (GMFCS)

2. Issues related to hips

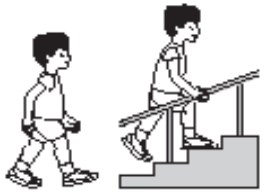
3. Children with neuromotor disabilities experience pain

GMFCS for children aged 6-12 years: Descriptors and illustrations



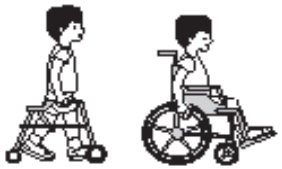
GMFCS Level I

Children walk indoors and outdoors and climb stairs without limitation. Children perform gross motor skills including running and jumping, but speed, balance and coordination are impaired.



GMFCS Level II

Children walk indoors and outdoors and climb stairs holding onto a railing but experience limitations walking on uneven surfaces and inclines and walking in crowds or confined spaces and with long distances.



GMFCS Level III

Children walk indoors or outdoors on a level surface with an assistive mobility device and may climb stairs holding onto a railing. Children may use wheelchair mobility when traveling for long distances or outdoors on uneven terrain.

GMFCS Level IV

Children use methods of mobility that usually require adult assistance. They may continue to walk for short distances with physical assistance at home but rely more on wheeled mobility (pushed by an adult or operate a powered chair) outdoors, at school and in the community.

GMFCS Level V

Physical impairment restricts voluntary control of movement and the ability to maintain antigravity head and trunk postures. All areas of motor function are limited. Children have no means of independent mobility and are transported by an adult.

2. Hips

Incidence of displacement and dislocation increases with GMFCS level (Soo et al, 2006)

2 main causes of hip problems: lack of weight bearing and asymmetry (Spriegal & Flynn, 2006)

Refer to E4P at www.childdevelopment.ca

Surveillance and Management of Hip Displacement

3. Pain is common for children with CP

Social Communication Model of Pain

Painful experience

Pain expression

Assessment

Decision to intervene

(Craig, 2006)

PICO QUESTION

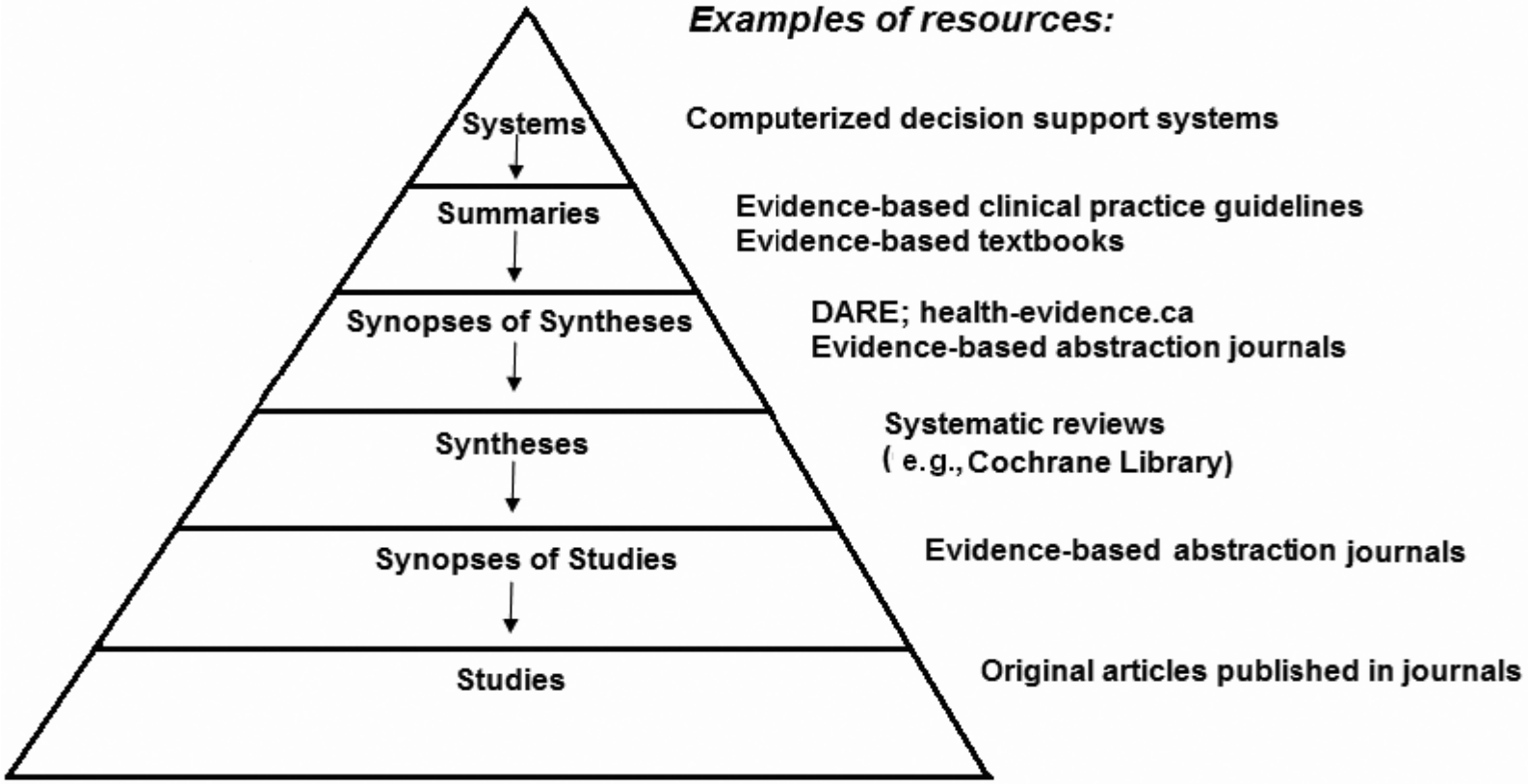
- April 2011: For children with neuromotor conditions, how does positioning effect the experience of pain?

- October 2012: For children with CP how does positioning effect the experience of pain

Literature

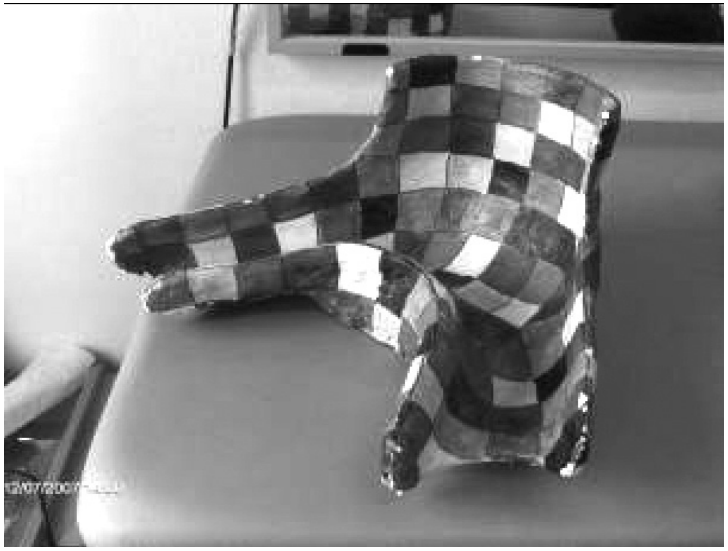
- April 2011 & October 2012
- Electronic Searches
  - Pubmed
  - CINAHL
  - Embase
  - EBM
- Text words and subject headings
- Hand searching

Hierarchy of Evidence



DiCenso, A., Bayley, L., Haynes, R.B. (2009). Accessing pre-appraised evidence: Fine-tuning the 5S model into a 6S model. *Evidence-Based Nursing*, 12:99-101.

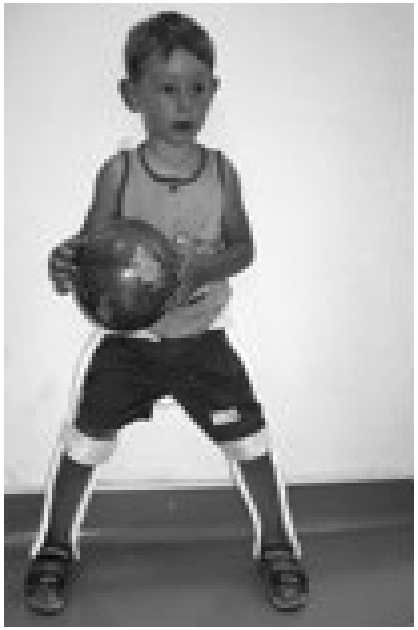
What we found:



7 Studies

Picciolini, O. et. al. (2009)

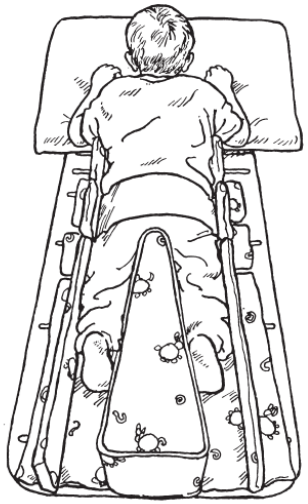
- 2 case studies
- Use of orthotic
- Hip migration percentage
- Positive difference from pre to post intervention



Next study

Pountney T.E. et. al. (2009)

- Prospective longitudinal cohort design
- Use of lying standing and sitting in hip abduction 20 degrees
- Intervention group less likely to have hip problems



igure 1. Prone lying support.

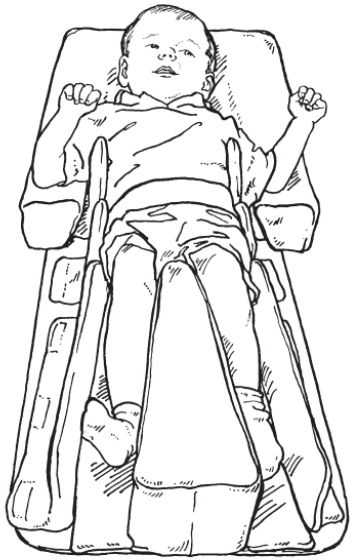


Figure 2. Supine lying support.

Figure 3. CAPS 11 seating system.

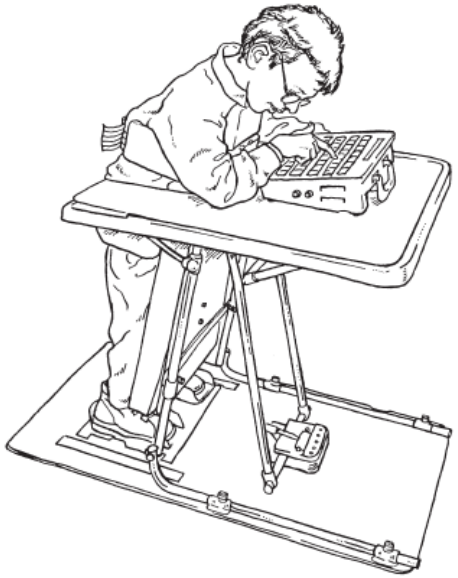


Figure 4. Chailey standing support.

Next study

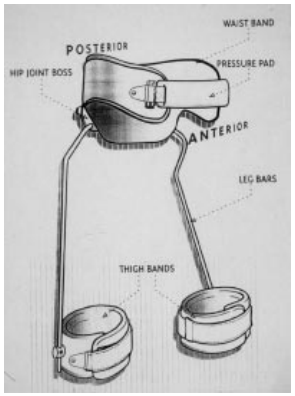
Richardson, M. & Frank, A. (2009),

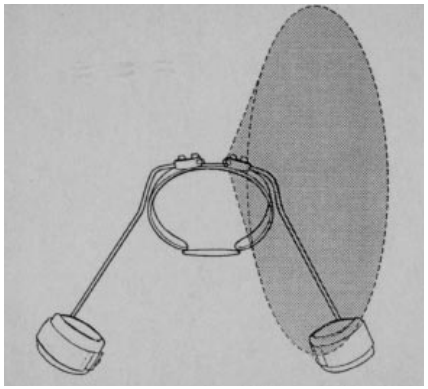
- Descriptive retrospective
- Provision of powered wheelchair and seating
- Nearly 1/3 had complaints of pain

Next Study

Boyd, R.N. et al (2001)

- Randomized N=39
- Botox and SWASH
- 1year follow up
- Outcome measures
  - GMFM (GMFM-66)
  - MP & acetabular angle
  - Clinical exam
  - Questionaires
- No treatment effect for gross motor function





Next study

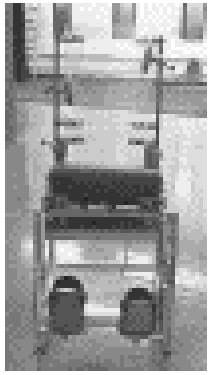
Graham, H. K. et al (2006)

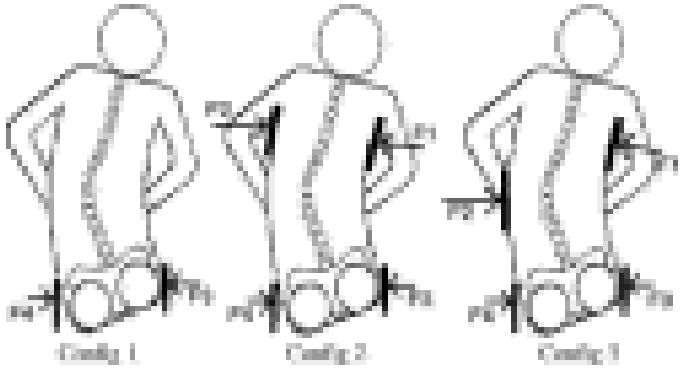
- Randomized control trial, 3 yr follow-up
- Botulinum Toxin A combined with SWASH prevent displacement
- MP
- Not recommended
- Use of SWASH

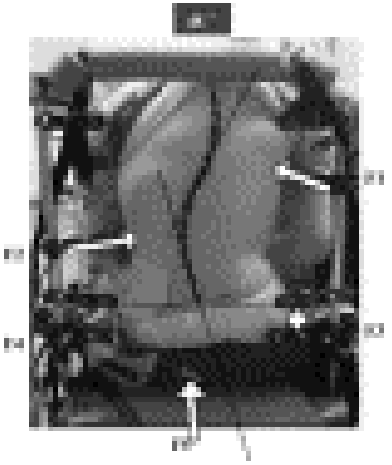
Next study

Holmes, K. J. et. al. (2003)

- Prospective study
- N=16, CP
- Trial of 3 chest lateral support configurations
- The 3 point asymmetrical chest lateral is potentially the best set up







Next study

Hankinson, J. & Morton, R. E. (2002)

- Pilot prospective trial
- N=14, N=7 finished
- Use of lying system in hip abduction over the course of 1 year
- Significant decrease in hip migration percentage in right hip, improved seating and sleeping…reduction of pain

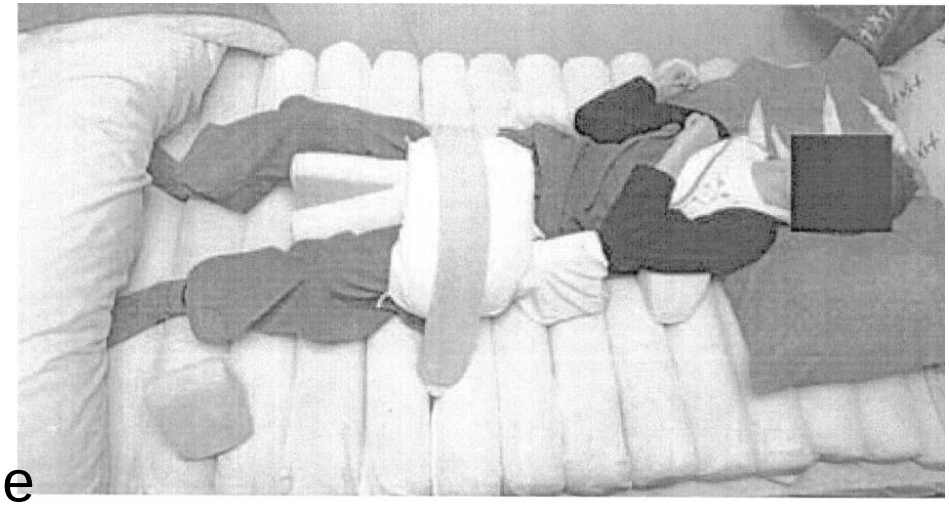
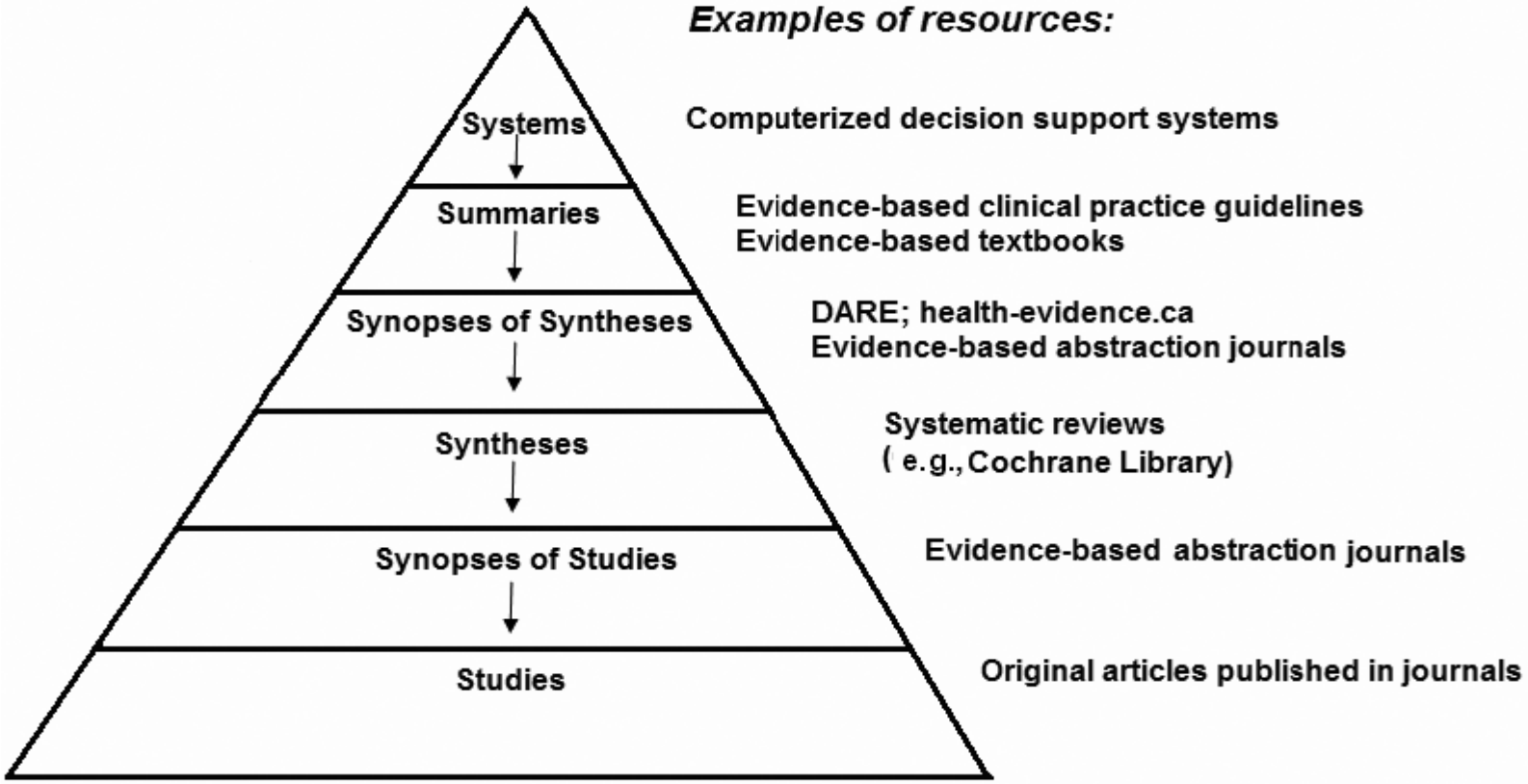


Figure 1: *The Jenx Dreama lying hip abduction system*

178 *Developmental Medicine & Child Neurology* 2002, 44: 177–180

Hierarchy of Evidence



DiCenso, A., Bayley, L., Haynes, R.B. (2009). Accessing pre-appraised evidence: Fine-tuning the 5S model into a 6S model. *Evidence-Based Nursing*, 12:99-101.

What we found

- 2 Synthesis Articles

  Loeters M.J.B. et al (2010)

  - Systematic
  - 10 studies
  - Weak association between severity of CP hip dislocation and pelvic obliquity and scoliosis

Synthesis next article

Farley R. et. al. (2003)

- Narrative
- 150 studies
- For children postural management plays are role in promoting musculoskeletal development

Synopses

Gudjonsdottir, B. & Mercer, V.S. (1997)

- Development of hip and spine in children with CP
  - Babies with CP have normal hips
  - Deformity develops
  - Shape of acetabulum and femoral head misshapen
  - X-ray
  - Relationship between spinal curves and hips
  - Early intervention in key
  - Medication, surgery & positioning

Synopses

Swiggum, M. et. al. (2010)

- If PT interventions sometimes cause pain therapists need to be aware of ways to assess and respond

Synopses

McKearnan, K.A. et. al. (2004)

•List common potential contributors to the experience of pain in children with CP

Table 1. Common Potential Contributors to the Experience of Pain in Children with CP

Surgical
- Selective dorsal rhizotomy
- Soft tissue releases
- Tendon lengthening
- Capsulotomy
- Fasciotomy
- Osteotomy
- Tenotomy
- Spinal fusion
- Pump implantation for intrathecal baclofen administration
- Fundoplication
- Gastrostomy tube placement

Procedural
- Intramuscular and other medication injections
- Adminstration of anesthesia
- Blood draws
- Placement of a nasogastric tube
- Dental procedures
- Enemas

Gastrointestinal
- Gastroesophageal reflux
- Nausea/vomiting following surgical procedures
- Gastrostomy tube-related pain or infection
- Abdominal pain

Orthopedic
- Hip subluxation/dislocation
- Cephalad displacement of the patella
- Equines of the ankle
- Valgus deformities of the ankle
- Varus and valgus deformities of the foot
- Radial subluxation/dislocation
- Cartilage degeneration scoliosis
- Pelvic obliquity
- Kyphosis
- Ordosis
- Contractures
- Degenerative arthritis

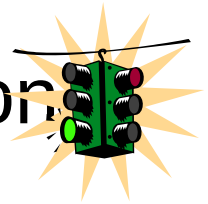
Neuromuscular
- Spasticity
- Overuse syndromes
- Nerve entrapments
- Radiculopathies
- Myelopathies
- Contractures

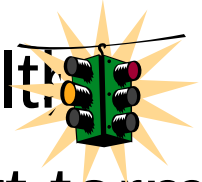
Rehabilitative
- Range of motion
- Home exercise programs
- Strengthening
- Electrical stimulation
- Functional mobility training
- Participation in activities of daily living
- Splinting and orthotic fabrication and follow-up
- Serial casting
- Training for use of adaptive equipment
- Utilization of standing frames and other positioning devices

What is the role of positioning, based on best evidence, for the prevention/treatment of pain?

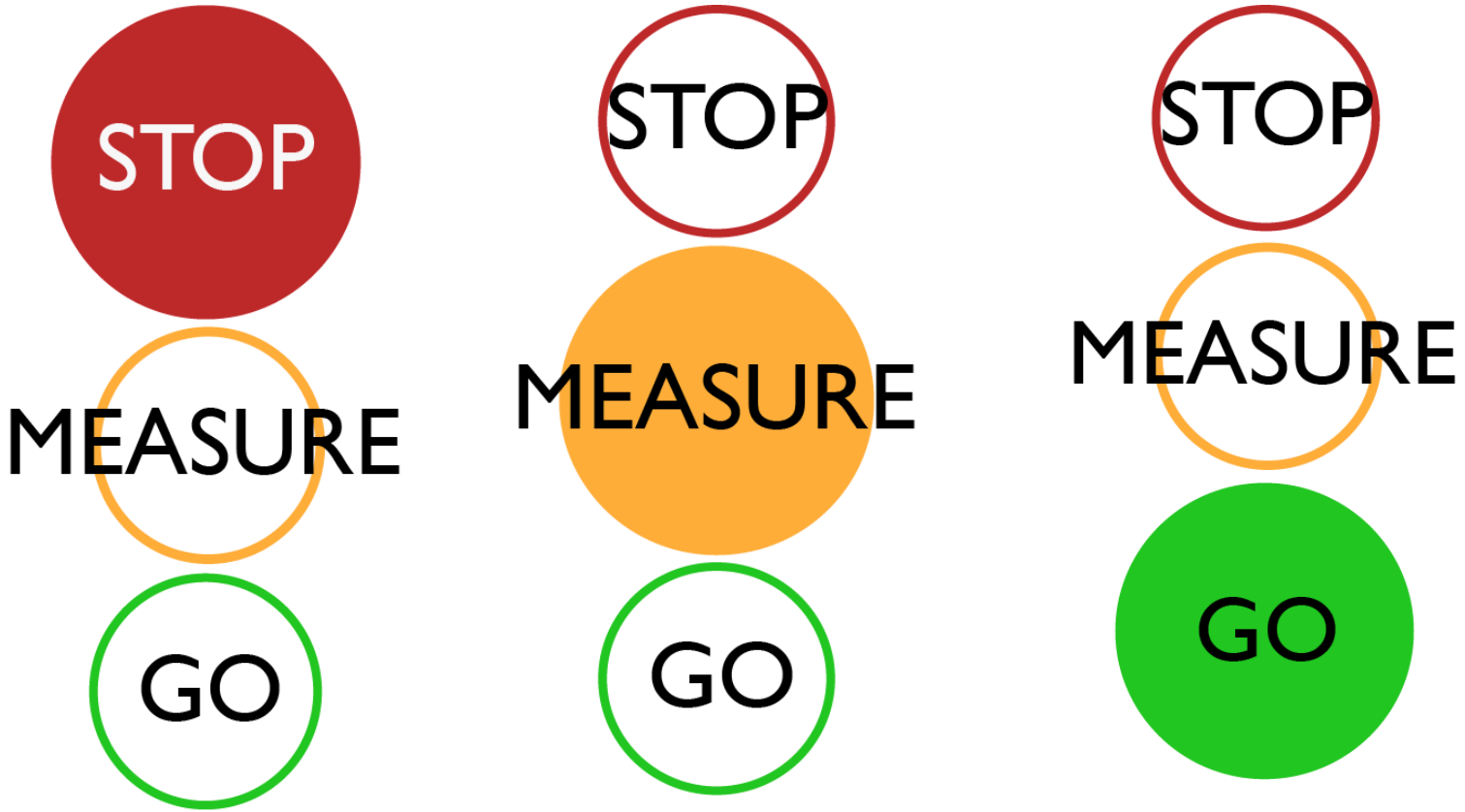
Summary of the Role of Positioning for prevention/treatment of pain

- Positioning can make a difference
  - GMFCS level is important
- Early intervention (before 2 years)
  - Sitting, standing, sleeping
- Hips and spine are connected
- Positioning for function/participation and long term health
- Measure it (short term, long term)

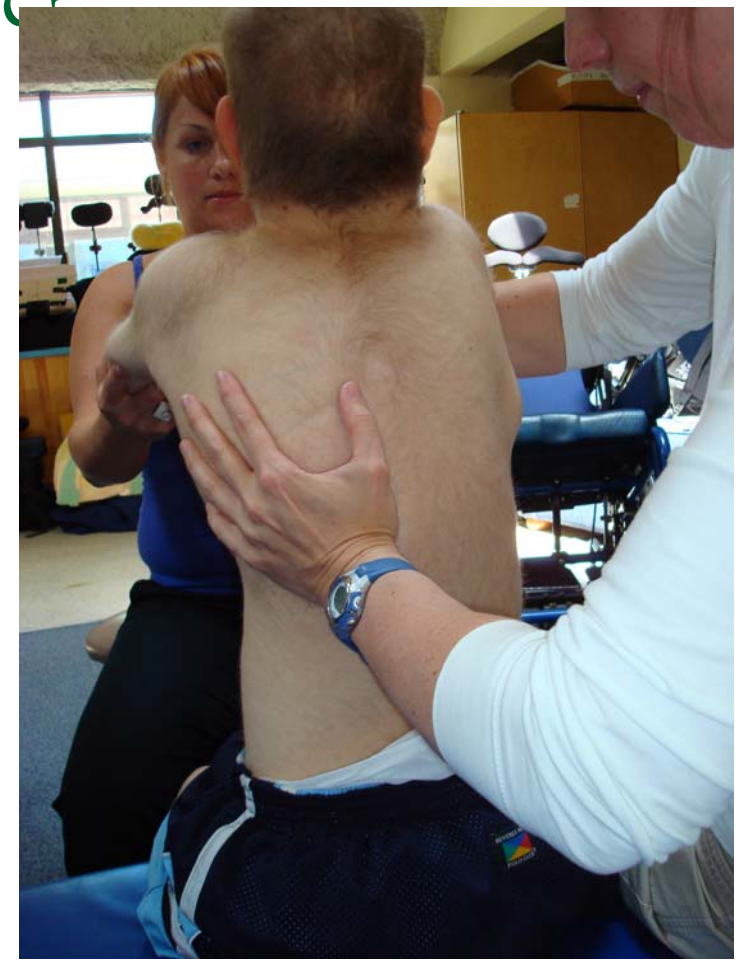




Red Light, Yellow Light, Green Light



Outcome Measures- What's the Difference?



Refer to E4P at www.childdevelopment.ca

Pain In Children with Cerebral Palsy

Outcome Measures?

Non-Communicating Children's Pain Checklist-Revised (Breau, et al. 2004)

Paediatric Pain Profile (Hunt, 2003)

Care and Comfort Hypertonicity Questionnaire (McCoy, 2006)

Non-communicating Children's Pain Checklist – Revised (NCCPC-R)

NAME:_____ UNIT/FILE #: _____ DATE:_____ (dd/mm/yy)

OBSERVER:_____ START TIME:_____AM/PM STOP TIME:_____AM/PM

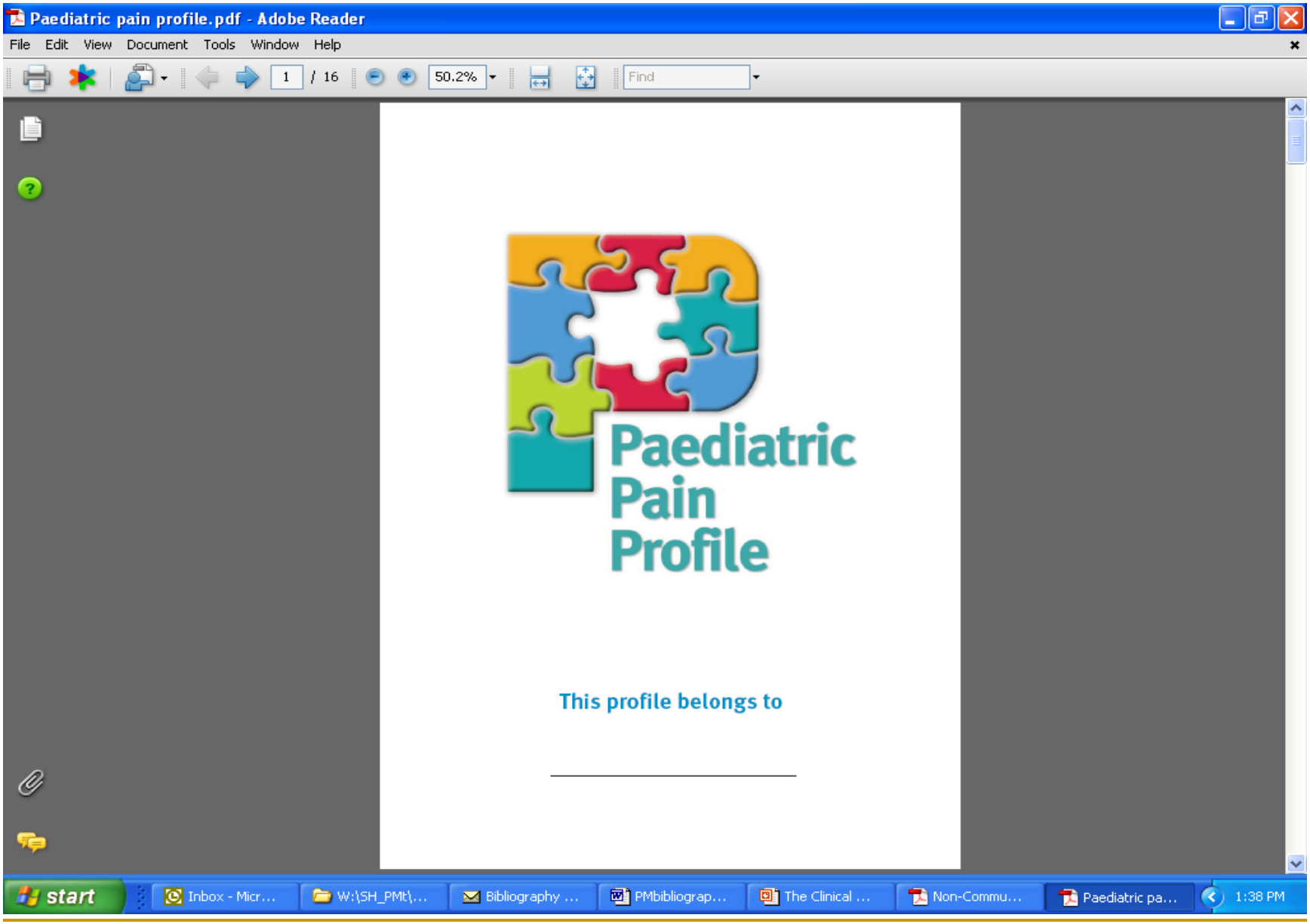
How often has this child shown these behaviours in the last 2 hours? Please circle a number for each item. If an item does not apply to this child (for example, this child does not eat solid food or cannot reach with his/her hands), then indicate "not applicable" for that item.

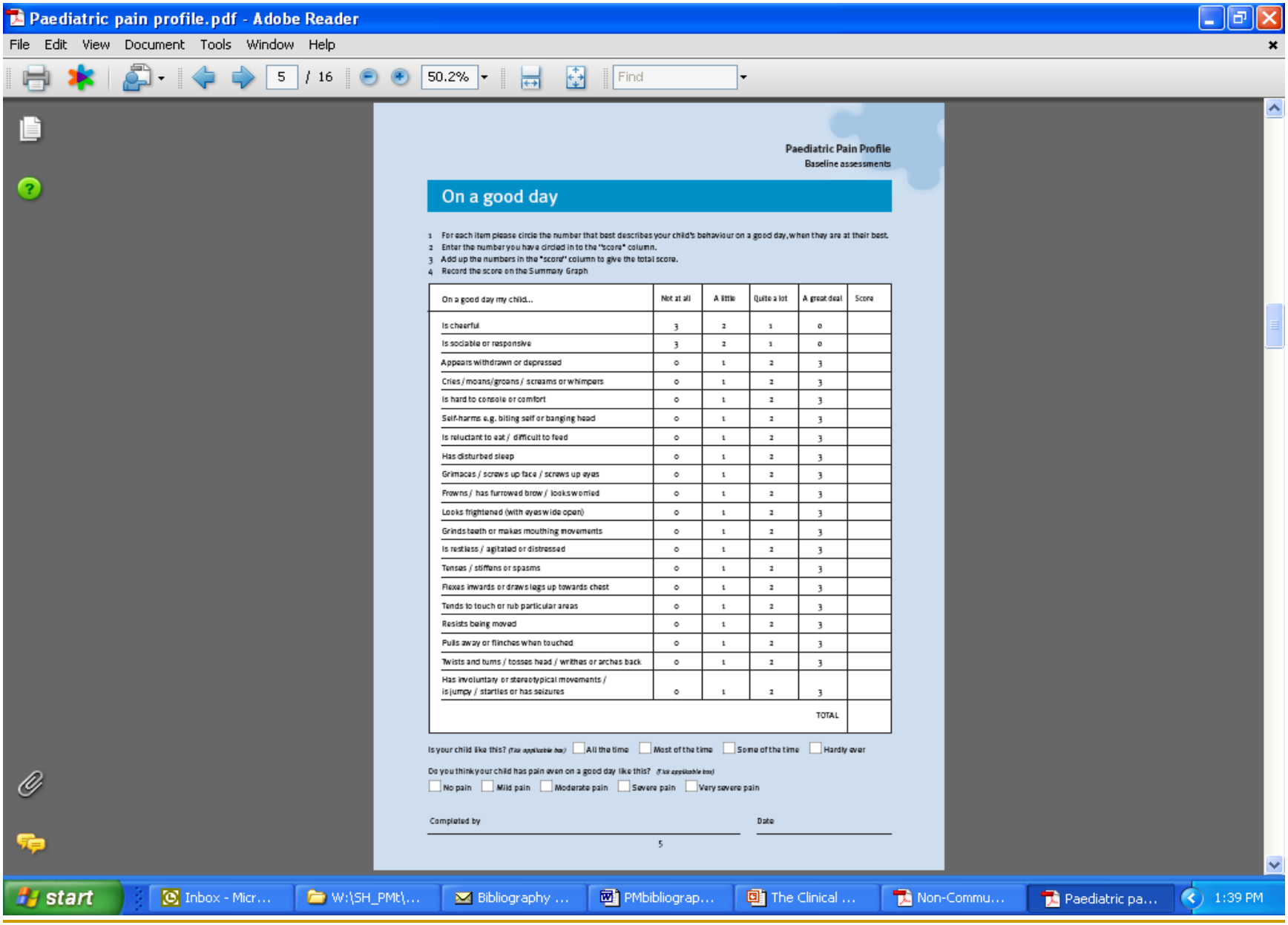
0 = NOT AT ALL	1 = JUST A LITTLE	2 = FAIRLY OFTEN	3 = VERY OFTEN	NA = NOT APPLICABLE

I. Vocal					
1. Moaning, whining, whimpering (fairly soft)	0	1	2	3	NA
2. Crying (moderately loud)	0	1	2	3	NA
3. Screaming/yelling (very loud)	0	1	2	3	NA
4. A specific sound or word for pain (e.g., a word, cry or type of laugh)	0	1	2	3	NA
II. Social					
5. Not cooperating, cranky, irritable, unhappy	0	1	2	3	NA
6. Less interaction with others, withdrawn	0	1	2	3	NA
7. Seeking comfort or physical closeness	0	1	2	3	NA
8. Being difficult to distract, not able to satisfy or pacify	0	1	2	3	NA
III. Facial					
9. A furrowed brow	0	1	2	3	NA
10. A change in eyes, including: squinching of eyes, eyes opened wide, eyes frowning	0	1	2	3	NA
11. Turning down of mouth, not smiling	0	1	2	3	NA
12. Lips puckering up, tight, pouting, or quivering	0	1	2	3	NA
13. Clenching or grinding teeth, chewing or thrusting tongue out	0	1	2	3	NA
IV. Activity					
14. Not moving, less active, quiet	0	1	2	3	NA
15. Jumping around, agitated, fidgety	0	1	2	3	NA
V. Body and Limbs					
16. Floppy	0	1	2	3	NA
17. Stiff, spastic, tense, rigid	0	1	2	3	NA
18. Gesturing to or touching part of the body that hurts	0	1	2	3	NA
19. Protecting, favoring or guarding part of the body that hurts	0	1	2	3	NA
20. Flinching or moving the body part away, being sensitive to touch	0	1	2	3	NA
21. Moving the body in a specific way to show pain (e.g. head back, arms down, curls up, etc.)	0	1	2	3	NA
VI. Physiological					
22. Shivering	0	1	2	3	NA
23. Change in color, pallor	0	1	2	3	NA
24. Sweating, perspiring	0	1	2	3	NA
25. Tears	0	1	2	3	NA
26. Sharp intake of breath, gasping	0	1	2	3	NA
27. Breath holding	0	1	2	3	NA
VII. Eating/Sleeping					
28. Eating less, not interested in food	0	1	2	3	NA
29. Increase in sleep	0	1	2	3	NA
30. Decrease in sleep	0	1	2	3	NA

SCORE SUMMARY:

Category:	I	II	III	IV	V	VI	VII	TOTAL
Score:								


Paediatric pain profile.pdf - Adobe Reader
File Edit View Document Tools Window Help
1 / 16
50.2%
Find
Paediatric
Pain
Profile
This profile belongs to
start
Inbox - Micr...
W:\SH_PMt\...
Bibliography ...
PMbibliograp...
The Clinical ...
Non-Commu...
Paediatric pa...
1:38 PM


Paediatric pain profile.pdf - Adobe Reader
File Edit View Document Tools Window Help
5 / 16
50.2%
Find
Paediatric Pain Profile
Baseline assessments
On a good day
1 For each item please circle the number that best describes your child's behaviour on a good day, when they are at their best.
2 Enter the number you have circled in to the "score" column.
3 Add up the numbers in the "score" column to give the total score.
4 Record the score on the Summary Graph
On a good day my child... | Not at all | A little | Quite a lot | A great deal | Score
Is cheerful | 3 | 2 | 1 | 0
Is sociable or responsive | 3 | 2 | 1 | 0
Appears withdrawn or depressed | 0 | 1 | 2 | 3
Cries / moans/groans / screams or whimpers | 0 | 1 | 2 | 3
Is hard to console or comfort | 0 | 1 | 2 | 3
Self-harms e.g. biting self or banging head | 0 | 1 | 2 | 3
Is reluctant to eat / difficult to feed | 0 | 1 | 2 | 3
Has disturbed sleep | 0 | 1 | 2 | 3
Grimaces / screws up face / screws up eyes | 0 | 1 | 2 | 3
Frowns / has furrowed brow / looks worried | 0 | 1 | 2 | 3
Looks frightened (with eyes wide open) | 0 | 1 | 2 | 3
Grinds teeth or makes mouthing movements | 0 | 1 | 2 | 3
Is restless / agitated or distressed | 0 | 1 | 2 | 3
Tenses / stiffens or spasms | 0 | 1 | 2 | 3
Flexes inwards or draws legs up towards chest | 0 | 1 | 2 | 3
Tends to touch or rub particular areas | 0 | 1 | 2 | 3
Resists being moved | 0 | 1 | 2 | 3
Pulls away or flinches when touched | 0 | 1 | 2 | 3
Twists and turns / tosses head / writhes or arches back | 0 | 1 | 2 | 3
Has involuntary or stereotypical movements / is jumpy / startles or has seizures | 0 | 1 | 2 | 3
TOTAL
Is your child like this? (Tick applicable box) All the time Most of the time Some of the time Hardly ever
Do you think your child has pain even on a good day like this? (Tick applicable box)
No pain Mild pain Moderate pain Severe pain Very severe pain
Completed by
Date
5
start
Inbox - Micr...
W:\SH_PMt\...
Bibliography ...
PMbibliograp...
The Clinical ...
Non-Commu...
Paediatric pa...
1:39 PM

CARE AND COMFORT HYPERTONICITY QUESTIONNAIRE

Patient's number: _____
Role of person completing form (parent, caregiver, etc): _____
Date: _____

Please rate how easy or difficult it is for you or the adult with NBIA in the last two weeks to perform the following tasks relative to a cooperative individual without a disability:

Personal Care

1. Putting on pants?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
2. Taking off pants?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
3. Putting on a shirt?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
4. Changing diapers?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
5. Ease of sitting on a toilet seat?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
6. Ease of sitting in a bathtub, with or without adaptive equipment?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
7. Ease of bathing?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
8. Ease of feeding?	Very easy	1	2	3	4	5	6	7 Impossible	N/A

Positioning/Transferring

9. Ease of positioning in a wheelchair?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
10. Ease of positioning in a device other than a wheelchair, such as a standing frame?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
11. Ease of transferring in and out of a wheelchair?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
12. Ease of putting on braces or positioning devices?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
13. Ease of controlling his/her wheelchair?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
14. Ease of getting out of a car?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
15. Ease of getting in a car?	Very easy	1	2	3	4	5	6	7 Impossible	N/A

Please answer the following questions using the scales provided:

Comfort

16. Is there pain or discomfort during position changes?	Never	1	2	3	4	5	6	7 Always	N/A
17. Is there pain or discomfort during diaper changes?	Never	1	2	3	4	5	6	7 Always	N/A
18. Does the pain or discomfort prevent you/person with NBIA from participating in school, various programs, or other activities?	Never	1	2	3	4	5	6	7 Always	N/A
19. Is NBIA individual using pain control medicine?	Never	1	2	3	4	5	6	7 Always	N/A
20. Does NBIA individual sleep through the night?	Always	1	2	3	4	5	6	7 Never	N/A

Interaction/Communication

21. How easy is it for NBIA individual to use communication devices?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
22. How easy is it for him/her to entertain self alone?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
23. How easy is it for him/her to interact with other adults?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
24. How easy is it for him/her to be completely understood by those who know him/her well?	Very easy	1	2	3	4	5	6	7 Impossible	N/A
25. Does he/she have a problem with drooling?	Never	1	2	3	4	5	6	7 Continuously soaked	N/A
26. My/his/her self esteem is	The best I could imagine	1	2	3	4	5	6	7 The worst I could imagine	
27. Describe individual with NBIA	Very happy	1	2	3	4	5	6	7 Very unhappy	

Limits

Research is limited

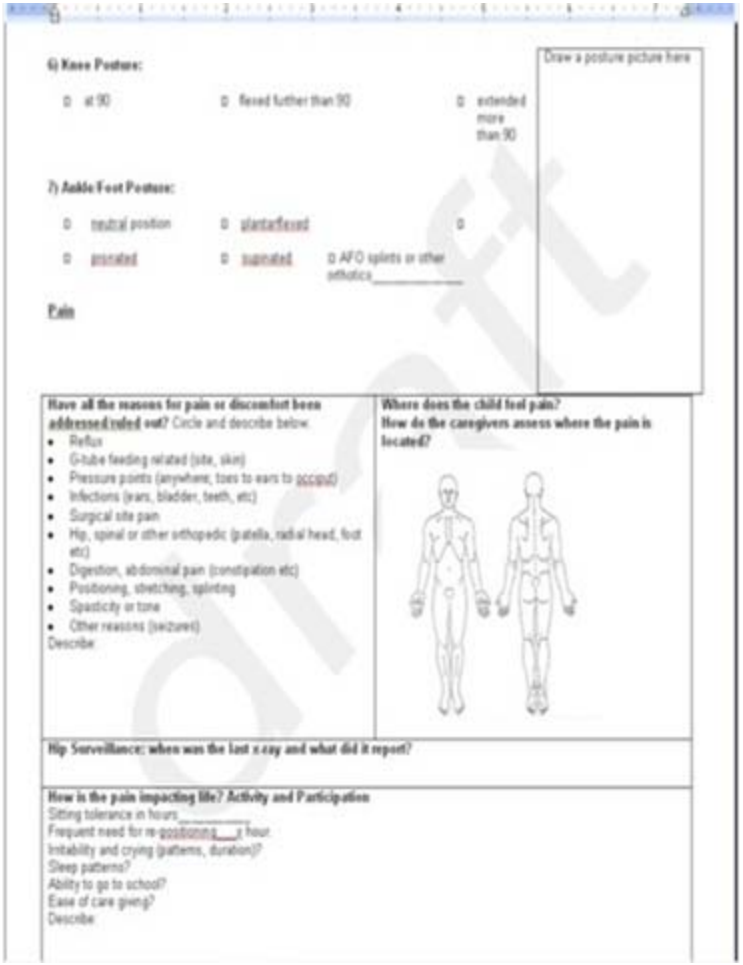
Outcome measures

Complicated topic

Thought provoking questions

- Clinical
  - What can clinicians do today?
    - How can we best translate the growing knowledge?
    - How does our assessment and advocacy change?
    - What is the critical “dosage” of positioning, hip abduction?
- Outcome Measures
  - How can we capture the impact of successful positioning over the long term?

Positioning and Mobility Team: Actions



6) Knee Posture:

Draw a posture picture here

☐ at 90 ☐ flexed further than 90 ☐ extended more than 90

7) Ankle Foot Posture:

☐ neutral position ☐ plantarflexed ☐

☐ pronated ☐ supinated ☐ AFO splints or other orthotics_____

Pain

Have all the reasons for pain or discomfort been addressed/ruled out? Circle and describe below:

- Reflux
- G-tube feeding related (site, skin)
- Pressure points (anywhere, toes to ears to occiput)
- Infections (ears, bladder, teeth, etc)
- Surgical site pain
- Hip, spinal or other orthopedic (patella, radial head, foot etc)
- Digestion, abdominal pain (constipation etc)
- Positioning, stretching, splinting
- Spasticity or tone
- Other reasons (seizure)

Describe:

Where does the child feel pain?
How do the caregivers assess where the pain is located?

Hip Surveillance: when was the last x-ray and what did it report?

How is the pain impacting life? Activity and Participation

Sitting tolerance in hours_____

Frequent need for re-positioning___x hour

Irritability and crying (patterns, duration)?

Sleep patterns?

Ability to go to school?

Ease of care giving?

Describe:

- Improving our assessment form
- Measurement
- Hip Surveillance
- Education

Objectives

- To describe the Sunny Hill Health Centre for Children positioning and mobility team.
- To clarify the role of positioning, based on best evidence, for the prevention/treatment of pain.
- To describe some outcome measures
- To provide thought provoking questions regarding clinical practice and outcome measurement.

Reference List

- Breau, L. M., Finley, G. A., McGrath, P. J., & Camfield, C. S. (2002). Validation of the non-communicating children's pain checklist-postoperative version. *Anesthesiology, 96*(3), 528-535.
- Breau, L. M., McGrath, P. J., Camfield, C. S., & Finley, G. A. (2002). Psychometric properties of the non-communicating children's pain checklist-revised. *Pain, 99*(1-2), 349-357.
- Boyd,R.N., Dobson,F., Parrott, J., Love, S., Oates, J., Larson, A., et al. (2001). The effect of botulinum toxin type A and a variable hip abduction orthosis on growss motor function: a randomized control trial. *European Journal of Neurology*, 8 (suppl.5), 109-119.
- Craig, K. D. (2006). The construct and definition of pain in developmental disability. In T. F. Oberlander & F.J. Symons (Eds.), *Pain in children and adults with developmental disabilities* (pp.7-18). Baltimore, MD: Paul H. Brookes.
- DiCenso, A., Bayley, L., & Haynes, R. B. (2009). Accessing pre-appraised evidence: Fine-tuning the 5S model into a 6S model. *Evidence Based Nursing, 12*(4), 99-101.
- Farley, R., Clark, J., Davidson, C., Evans, G., MacLennan, K., Michael, S., et al. (2003). What is the evidence for the effectiveness of postural management?... including commentary by Roxborough L. *International Journal of Therapy & Rehabilitation, 10*(10), 449-455.

- Graham, H.K., Boyd, R, Carlin, J. B., Dobson, F., Lowe, K., Nattrass, G., Thomason,P, Wolf, R. & Reddihough, D. (2008). Does Botoulinum Toxin A combined with bracing prevent hip displacement in children with Cerebral Palsy and “Hips at Risk”?: A Randomized, Controlled Trial. *The Journal of Bone and Joint Surgery*, 90, 23-33.
- Gudjonsdottir, B. & Mercer, V. S. (1997). Hip and spine in children with cerebral palsy: Musculoskeletal development and clinical implications. Pediatric Physical Therapy, 9, 179-185.
- Hankinson, J., & Morton, R. E. (2002). Use of a lying hip abduction system in children with bilateral cerebral palsy: A pilot study. *Developmental Medicine and Child Neurology, 44*(3), 177-180.
- Hicks, C. L., von Baeyer, ,C.L., Spafford, P. A., van Korlaar, I., & Goodenough, B. (2001). The faces pain scale-revised: Toward a common metric in pediatric pain measurement. *Pain, 93*(2), 173-183.
- Holmes, K. J., Michael, S. M., Thorpe, S. L., & Solomonidis, S. E. (2003). Management of scoliosis with special seating for the non-ambulant spastic cerebral palsy population--a biomechanical study. *Clinical Biomechanics (Bristol, Avon), 18*(6), 480-487.
- Hunt, A., Goldman, A., Seers, K., Crichton, N., Mastroyannopoulou, K., Moffat, V., et al. (2004). Clinical validation of the paediatric pain profile. *Developmental Medicine and Child Neurology, 46*(1), 9-18.
- Hunt, A., Wisbeach, A., Seers, K., Goldman, A., Crichton, N., Perry, L., et al. (2007). Development of the paediatric pain profile: Role of video analysis and saliva cortisol in validating a tool to assess pain in children with severe neurological disability. *Journal of Pain and Symptom Management, 33*(3), 276-289.

- Loeters, M. J. B., Maathuis, C. G. B., & Hadders-Algra, M. (2010). Risk factors for emergence and progression of scoliosis in children with severe cerebral palsy: A systematic review. *Developmental Medicine and Child Neurology, 52*(7), 605-611.
- McCoy, R. N., Blasco, P. A., Russman, B. S., & O'Malley, J.,P. (2006). Validation of a care and comfort hypertonicity questionnaire. *Developmental Medicine and Child Neurology, 48*(3), 181-187.
- McKearnan, K. A., Kieckhefer, G. M., Engel, J. M., Jensen, M. P., & Labyak, S. (2004). Pain in children with cerebral palsy: A review. *The Journal of Neuroscience Nursing: Journal of the American Association of Neuroscience Nurses, 36*(5), 252-259.
- Picciolini, O., Albisetti, W., Cozzaglio, M., Spreafico, F., Mosca, F., & Gasparroni, V. (2009). "Postural management" to prevent hip dislocation in children with cerebral palsy. *Hip International: The Journal of Clinical and Experimental Research on Hip Pathology and Therapy, 19 Suppl 6*, S56-S62.

- Pountney, T. E., Mandy, A., Green, E., & Gard, P. R. (2009). Hip subluxation and dislocation in cerebral palsy - a prospective study on the effectiveness of postural management programmes. *Physiotherapy Research International: The Journal for Researchers and Clinicians in Physical Therapy, 14*(2), 116-127.
- Richardson, M., & Frank, A. O. (2009). Electric powered wheelchairs for those with muscular dystrophy: Problems of posture, pain and deformity. *Disability and Rehabilitation.Assistive Technology, 4*(3), 181-188.
- Soo, B., Howard, J. J., Boyd, R. N., Reid, S. M., Lanigan, A., Wolfe, R., et al. (2006). Hip displacement in cerebral palsy. *The Journal of Bone and Joint Surgery.American Volume, 88*(1), 121-129.
- Spiegel, D. A., & Flynn, J. M. (2006). Evaluation and treatment of hip dysplasia in cerebral palsy. *The Orthopedic Clinics of North America, 37*(2), 185.

- Swiggum, M., Hamilton, M. L., Gleeson, P., & Roddey, T. (2010). Pain in children with cerebral palsy: Implications for pediatric physical therapy. *Pediatric Physical Therapy: The Official Publication of the Section on Pediatrics of the American Physical Therapy Association, 22*(1), 86-92.
- Willis, M. H. W., Merkel, S. I., Voepel-Lewis, T., & Malviya, S. (2003). FLACC behavioral pain assessment scale: A comparison with the child's self-report. *Pediatric Nursing, 29*(3), 195-198.

Discussion & Questions

smagnuson@cw.bc.ca

Thanks

Sunny Hill: Positioning and Mobility Team

Vivian McCallum: Clinical Librarian @SH

You, for your interest in this topic!