

Appendix XXXi-ii

Examples of GAS charts with four subscales, Child 1 and Child 7

i) GAS CHARTS: **J53, J51 or J52** please ensure this code matches the DVD you are scoring!

Activity limitation:

Movement forwards for assisted transfers from wheelchair

Functional measurable goal / outcome:

J53, J51 or J52 will slide hoop forward along table over upright wheelchair, sustaining bilateral palmar grasp with elbow extension, allowing forearm support, whilst sitting in wheel chair maintaining visual fixation on toy for 15 seconds to move toy 5cms (2 inches) distance - 2 of 3 trials by 7/17/09

Other goal conditions: Verbal & play encouragement + re ‘alien game’, wheelchair trunk harness off, shoes and AFO orthotics on.

Parameters for Gas Scale measurements for this goal 1.Movement forward 2. Grasp 3. Elbow extension / forearm support 4. Visual fixation

ATTAINMENT LEVEL: Please ✓1 level ONLY in each blue column to right of each of the 4 following Gas Sub-Scales for this goal - from what you have observed in the DVD.
Then please email me your results.

GAS SUB-SCALE 1 – Movement forwards	Levels	GAS SUB-SCALE 2 – Grasp	Levels	GAS SUB-SCALE 3 – Elbow extension / forearm support	Levels	GAS SUB-SCALE 4 - Visual fixation	Levels
Subject moves her trunk at least 5cm (2 inches) forward from back of wheelchair and slides hoop forward along table to move toy 5 cm (2 inches)* distance.	+2	Subject sustains bilateral grasp thumbs to fingers grasp on hoop throughout the trial.	+2	Subject sustains bilateral elbow extension < 5 degrees elbow flexion) and forearm support on table throughout.	+2	Subject maintains visual fixation on toy for maximum >20 seconds on one occasion whilst she moves it. .	+2

Subject moves her trunk at least 2.5cm (1 inch) forward from back of wheelchair and slides hoop forward along table to move toy 5 cm (2 inches)* distance.	+1	Subject sustains unilateral thumb to fingers grasp on hoop throughout the trial.	+1	Subject sustains bilateral elbow extension (< 30 degrees elbow flexion) and forearm support on table throughout.	+1	Subject maintains visual fixation on toy for maximum 16 - 20 seconds on one occasion whilst she moves it.	+1
Subject slides hoop forward along table to move toy 5 cm (2 inches)* distance.	0	Subject sustains bilateral palmar grasp on hoop throughout the trial.	0	Subject sustains bilateral elbow extension (< 45 degrees elbow flexion) and forearm support on table throughout.	0	Subject maintains visual fixation on toy for maximum 6 -15 seconds on one occasion whilst she moves it. .	0
Subject <i>predominantly</i> slides hoop reciprocally backwards & forwards (with little, if any, movement forward of starting position), along the table.	-1	Subject maintains bilateral palmar grasp on hoop, though left palmar grasp 'loosens' as left wrist flexes.	-1	Whilst grasping the hoop bilaterally throughout the trial, subject sustains unilateral right elbow extension with < 45 degrees elbow flexion and forearm support on the table throughout.	-1	Subject maintains visual fixation on toy for maximum 2 - 5 seconds on one occasion whilst she moves it.	-1
Subject <i>predominantly</i> slides hoop back & to sides of table.	-2	Subject initially holds hoop with right palmar grasp, and 'loose' left palmar grasp, then lets go with left hand; then 'loosens' or lets go with right hand.	-2	Whilst grasping the hoop unilaterally for at least most of the trial with the right hand, subject sustains ipsilateral elbow extension (with > 45 degrees elbow flexion at times) and partial to full forearm support on the table throughout.	-2	Subject appears to - at maximum - only visually fixate very briefly on the toy on one occasion whilst she moves it.	-2

* Each grid square is 5cm² (2 inches²)

ii) **GAS CHARTS: J13, J11 or J12** please ensure this code matches the DVD you are scoring!

Activity limitation:

Executing ‘Ronde de Jambe’ ballet move in ballet class.

Functional measurable goal / outcome:

J13, J11 or J12 will complete a ballet move – ‘Ronde de Jambe’ - (involving flexing her right hip with full knee extension and right ankle plantar flexed until her right big toe touches the ground, and then circumduct her right hip to trace the largest semi-circle possible until she reaches right hip extension in abduction/adduction neutral) while sustaining her left hip over her left ankle with her knee extended and sustaining head, neck, trunk and pelvic upright alignment, while holding the backrest of the chair with her left hand for light support, with the back leg of the chair positioned 20 cm (7.9 inches) from the lateral aspect of her left foot. She will complete 2/3 trials successfully by the 17/9/09

Parameters for Gas Scale measurements for this goal 1. Flex her right hip with full knee extension and right ankle plantar flexed until her right big toe touches the ground 2. Circumduct her right hip to trace the largest semi-circle possible until she reaches right hip extension in abduction/adduction neutral. 3. Sustain her left hip over her left ankle with her knee extended 4. Sustain head, neck, trunk and pelvic upright alignment.

ATTAINMENT LEVEL: Please ✓ 1 level ONLY in each blue column to right of <u>each</u> of the 4 following Gas Sub-Scales for this goal - from what you have observed in the DVD. Then please email me your results.							
GAS SUB-SCALE 1 – Initial right LE movement	Levels	GAS SUB-SCALE 2 – Trace semi-circle with right LE	Levels	GAS SUB-SCALE 3 – Sustain left hip over left ankle with knee extended	Levels	GAS SUB-SCALE 4 – Head, neck, trunk upright alignment	Levels
Subject flexes her right hip with full knee extension and right ankle plantar flexed until her right big toe (only) touches the ground, whilst maintaining her trunk aligned upright and looking ahead with her eyes.	+2	Subject circumducts her right hip to trace a semi-circle laterally (to the 6 th line in from the left of the grid) until she reaches right hip extension in abduction/adduction neutral (not more than 1 black horizontal lines in from the back of the grid).	+2	Subject sustains left hip over left ankle with knee extended whilst also sustaining head, neck, trunk and pelvis in upright alignment and looks ahead with eyes.	+2	Subject sustains head, neck, trunk and pelvis in upright alignment and looks ahead with eyes.	+2
Subject flexes her right hip with full knee extension and right ankle plantar flexed until her right big toe (only) touches the ground, whilst maintaining her trunk aligned upright.	+1	Subject circumducts her right hip to trace a semi-circle laterally (to the 7 th line in from the left of the grid) until she reaches right hip extension in abduction/adduction neutral (not more than 1 black horizontal lines in from the back of the grid).	+1	Subject sustains left hip over left ankle with knee extended whilst also sustaining head, neck, trunk and pelvis in upright alignment	+1	Subject sustains head, neck, trunk and pelvis in upright alignment and, given verbal cue, looks ahead with eyes.	+1

Subject flexes her right hip with full knee extension and right ankle plantar flexed until her right big toe (only) touches the ground.	0	Subject circumducts her right hip to trace a semi-circle laterally (to between the 8 th & 9 th lines in from the left of the grid) until she reaches right hip extension in abduction/adduction neutral (not more than 1 black horizontal lines in from the back of the grid).	0	Subject sustains left hip over left ankle with knee extended	0	Subject sustains head, neck, trunk and pelvis in upright alignment.	0
Subject flexes her right hip (right heel forward beyond left toe level) with full knee extension and right ankle plantar flexed until her right big toe touches the ground.	-1	Subject circumducts her right hip to trace a semi-circle laterally (at furthest her lateral foot is to the right side of the 9 th line in from the left side of the grid) until she reaches right hip extension in abduction/adduction neutral.	-1	Subject sustains left hip over left ankle with knee extended with only 1 incident of small amount of knee flexion or hyperextension..	-1	Subject flexes head / neck throughout; and thoracic spine mainly at beginning & end; leans to the left & some lean back then some lean forwards from hips.	-1
Subject flexes her right hip (right heel forward to approximately left toe level) with full knee extension	-2	Subject circumducts her right hip to trace a semi-circle laterally (at furthest her lateral foot is to the right side of the 9 th black line in from the left of the grid) until she reaches right hip extension in abduction/adduction neutral.	-2	Subject sustains left hip over left ankle with knee extended with small amount of knee flexion or hyperextension at times.	-2	Subject flexes head / neck throughout; and thoracic spine (mainly right side) during most of trial; she rotates her pelvis forwards on the right side; leans to the left & forward from hips.	-2

APPENDIX XXXI

Two children – operational definitions for treatment strategies

a. Table 30. K23, K21, K22 Treatment plan for a session goal - towards short term goal (sock donning)

NDT Evaluation	
Name: J113, J111, J112	Date of Birth: 01/01/2005
Date of Assessment: 07/07/2009	Diagnosis: Cerebral Palsy (Dystonia)

Investigator comments:

- *Prioritised impairments table (below) selected from treatment planning assignment*
- *Name replaced with code*
- *NDTA Instructor's review comments deleted*

Prioritized Impairments	Long Term Goal	Short Term Goal	Treatment Session Goal
1. Decreased coactivation of postural muscles – abs and glutes.	1, 2, 3	1,2,3	1,2,3
2. Decreased ability to sustain thoracic spinal extension	1, 3	2,3	1,2,3
3. Decreased scapular mobility on posterior rib cage	1, 2, 3	1,3	1,2
4. Decreased ROM latissimus dorsi	1, 2, 3	3	1,2

5. Decreased registration for proprioceptive inputs	1, 3	2,	1
6. Poor intralimb dissociation (L>R)	1, 2, 3	1,3	1,2,3
7. Increased stiffness wrist flexors, pronators, and FCU.	3	1,3	1,2,3

Treatment Session Plan: J113, J111, J112 (01/01/05), CP(Dystonia)

Friday, July 10th, 2009 9am – 10am

Functional Treatment Session Goal: *T. Jay will use chalk to play a game of Xs and Os on a chalk board at a height above his shoulder level holding the chalk in his left hand and holding on to the handle of his walker with his right hand, while standing 30 cm away from the board, ankles under hips, and maintaining alignment of the spine, head, and neck for 1 minute by the end of the treatment session.*

<i>Impairments</i>	Treatment Strategy/Equipment needed	Hand Placement/Direction of Pressure	Sensory Input	Expected functional change
2,3,4,5	“Superman saves the day” – child prone on the therapy ball, therapist assisting to move around room on ball to reach out and save people stuck in tall buildings (Need: therapy ball, ‘little people’ hidden in variety of places in therapy room.	1. One hand on lateral rib cage – anchoring and providing medium input to the obliques with other hand over lat dorsi under axilla, providing elongation towards humeral abduction. 2. Bilateral hands over scapulas – medium compression in and towards midline spine. Rhythmic compressions down towards support surface. Add in vibration input over Rhomboids, with input towards spine with active reach. 3. Direct input over t-7/8 to encourage active spinal extension.	*Vibration *Oscillations(ant/pos) *Vibration *Oscillations (lateral) *Compressions *Soft, slow singing *moderate direct compression – faded to hands off	Elongation of Lat Dorsi Increased active scapular adduction Increased spinal mobility – extension (passive and active) Increased scapulo- humeral dissociation.

1,4,5,6,7	<p>“Treasure Hunters” – child seated on small chair to reach into a box of ‘dirt’ to dig up ‘treasure’ placed on a table to his left side. (Need: small preschool chair, shoe box size box filled with raw macaroni, collection of small toys)</p>	<ol style="list-style-type: none"> Facilitate alignment in chair – hand at pelvis promoting movement toward anterior pelvic tilt by compression toward ITs Provide oscillations in a lateral direction to loosen pelvis and promote contouring of IT s to seat. Elongate pronators – via oscillations of radius over ulna, right hand cradling the ulna, fingers toward hand, and the left hand rolling the radius over the ulna and back. As child reaches into box, facilitate at the forearm to encourage supination (hand cupping proximal dorsal forearm, input into supinators) When he has a toy, encourage him to actively supinate his hand to show you the toy that he has found. 	<p>*oscillations in a lateral direction</p> <p>*moderate pressure faded to hands off</p> <p>*tactile feedback from macaroni in tub</p>	<p>Increased ROM in pronators</p> <p>Increased scapulo humeral dissociation</p> <p>Increased wrist flexion</p> <p>Increased proprioceptive feedback through arm and hand</p>
1,2,3,4,5,7	<p>“Laundry Day” – Child will remove socks from a clothes line, match them, and put them in a laundry basket. (need: Table with shallow basket placed on it at child’s standing anterior/midline, clothes line tied and positioned at child’s right side, 30cm away from them, 10 cm above their heads) with 12 mismatched socks clipped onto the line with pegs (child needs to pull down to</p>	<ol style="list-style-type: none"> Hands on scapulas (posterior) with compression towards abduction and down towards feet (BOS), encourage child to reach up, grasp and pull. If unable to grasp maintaining alignment, place compression through base of support toward weight shift/reach side from opposite side of pelvis or scapula, other hand over reaching hand’s tricep, finger’s toward child’s hand. Provide sweep tap/input towards axilla to activate eccentric triceps, while facilitating a position of scapulo-humeral dissociation and external rotation. If trouble with grasp, facilitate distally, by looping thumb through child’s web space and 	<p>*compression/proprioception</p> <p>*compression</p> <p>*sweep taps, intermittent tapping (Tactile)</p>	<p>*Increased active scapular mobility over posterior ribcage, with more neutral alignment of scapulas at rest.</p> <p>*increased wrist extension</p> <p>*increased proprioceptive registration through U/L</p> <p>*increased eccentric control of triceps.</p>

	remove sock)	with fingers around dorsal wrist, provide input into wrist extension/supination and elbow extension.		*increased spinal extension
1,2,3,4,5,7	“Potato Stamping” – Child holds potato stamp in left hand to make stamped picture on verticle surface – standing with paint plates on table (waist high) on child’s left side, paper taped to wall at height from waist – 30 am above child’s head. (Need: table, 2 potatoes, halved; small amount of finger paint on paper plate (4 colours), paint smock, large piece of paper taped to wall)	1. Facilitate standing alignment – provide compression through BOS at pelvis. If child is pulling into adduction, may need to facilitate abduction with cross arms at inner thighs. 2. Encourage child to reach out for potato and hold with a a palmer grasp. Facilitate pushing hard into paint plate for increased proprioceptive feedback to hand/wrist and shoulder. Facilitate humeral abduction with hand placed under the axilla – thumb can be facilitating depression of the shoulder girdle, while fingers can be facilitating external rotation to help with reaching up to ‘stamp’ the paper .Again encourage a big proprioceptive stamp. Sweep tap to triceps if eccentric control needed Fade hands and allow weight of potato to act as proprioceptive feedback.	*proprioception *proprioception *tactile toward line of action	Increased eccentric control biceps/triceps Increased wrist extension with contouring of palm to object Increased proprioceptive registration *elongated lat dorsi *better grading of tricep extension
1,2,3,4,5,6,7	Drawing on the chalkboard with posterior walker as support – left hand holding the walker, right hand making Xs and Os (need: child’s walker, chalk, chalkboard at preschool)	Minimal feedback during this task – encourage a whole hand grasp on the walker with non writing hand. Intermittent sweep taps to triceps of right arm to increase eccentric control. Verbal prompts to push into chalkboard with hand and arm, but to stay standing up tall. Compression through base of support at pelvis or shoulder girdle if adequate balance not achieved.	*tactile input towards tricep extension *auditory cues *proprioceptive feedback	*proprioceptive registration *dissociated movements of upper limb. *elongated lat. Dorsi

b. Table 31. J113, J111, J112 Treatment plan for a session goal towards short term goal (stand and play using hands)

Researcher’s comments:

- *All name references changed to code*
- *NTA Instructors review notes removed*

NDT Treatment Plan

Therapist :-

Discipline: PT

Child: K23, K21. K22

Age: 4y10months Diagnosis: L Hemiplegia

Functional Treatment Session Goal:

K23, K21. K22 will dance the first 8 counts of the dance “Nutbush” (starting standing on her left leg, with her foot flat and hip and knee in extension, tapping her Right foot out into hip abduction then back 2 times, and repeating with L foot out to side) while sustaining trunk and pelvic alignment and her L elbow in no greater than 100 deg flexion during the dance move by the end of the session. 2/3 trials

The Session has been planned based on a general feeling of progression through the treatment strategies to help K23, K21. K22 use new range and new muscle activity in a functional way.

Impairment	Treatment strategy	Hand placement	Sensory Input	Direction of Pressure	Equipment needed	Expected P & M/ functional change
Decreased strength in L hip abductors	High kneeling to side sitting while playing doctors, K23, K21. K22	Anterior trunk (to connect rib cage to pelvis) and L glutes, stopping at points of movement directed by	Increased prop input back into her BOS	Into BOS as she shifts weight to either side	Doctor’s bag, bench to kneel at.	Able to use hip abduction to keep her L LL in alignment when stepping up/ down.

	playing the doctor	handling to shift weight lat and post, with intermittent holds with compression. Can modify to increase lats elongation by having handling more up on humerous (see handling for Tight Lats below)				
Tightness in L gastrocs and toe flexors	Gastroc elongation with elongation of toe flexors in long sitting then prone with K23, K21. K22 as the patient	One hand cupping the calcaneous, using traction to draw down and forearm along the length of the foot to assist with the stretch. In Prone, one hand cupping calcaneous and the pads of the fingers of the other hand slowly draw along the base of the foot towards the toes to elongate the tissue.		Traction along line of tib through calc down and up. Traction along plantar surface of foot towards toes.	Nil	Able to translate her tibia over her ankle during walking more efficiently with greater ROM of DF
Tightness in QL and lat dorsi	Super Princess 'K23, K21. K22' over a ball in prone reaching out for food off the shelf for the picnic (reaching forward and up to encourage more active hip extension	Can either have hand on upper humerous assisting to traction away from sh. girdle and ext rot, and other hand on glute pressure into WB surface on ball and then down towards feet to help increase glute activity and/ or on ant rib cage connecting	Prop through elongation	See hand placement	Ball, pretend fruit	Hope to observe K23, K21. K22 using her lats and QL less in standing activities as a point of stability. - She will be able to perform the treatment session goal in a more upright posture and use active hip and knee extension to

Decreased eccentric control of L glutes and quads	Princess K23, K21. K22 up on the stairs, descending down slowly so as to not wake the mice, lowering on L leading with R	Hand ant on quad, drawing up motion and drawing up through L glute. This can progress by moving more distal to the hip by just being at the superior aspect of the knee on the quads drawing down to facilitate the eccentric control. Hands could also be placed on the adductor surface with line of force into abduction and down into the BOS to cue the eccentric control to be done while in hip and knee alignment.	Prop or vibration into tissue of quad and glute	Both hands drawing up (quad hand towards pelvis, glute hand towards superior pelvis)	Steps, Princess crown	As eccentric control is difficult for K23, K21. K22 , I would hope to see that by using her quads and glutes eccentrically, there would also be an improvement in her ability to isometrically hold her L LL in hip and knee extension during the treatment session goal activity.
Decreased strength in L everters	Ballarina Feet – long sitting to utilize vision to assist Sophie to actively use her everters	Hand on lat aspect of L foot, quick stretch applied to everters then provide prop input via providing resistance to everters. Can progress this to have her use her increased strength in eversion (on ballarina theme) and side stepping/ side skipping towards her L (Hand can assist to shift weight to R, and/or gentle facilitation into knee ext of L leg so as to encourage use of everters to clear the floor.	Prop via quick stretch and resistance	See hand placement	Nil	Hope to see K23, K21. K22 WB on a flatter foot during goal activity contouring to the surface of the floor more effective to be a foundation from which to weight bear on.

		Other hand providing sweep facilitation/ tapping over peronii muscles.				
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As the “Ballarina K23, K21. K22” activity flows into the dance step goal for the session, I would ask K23, K21. K22 to follow the steps of the dance with my handling at this point remaining more distally on her everters drawing up from the lateral aspect of her ankle in the line of force of the everter muscles when she is in the open chain component of the dance move (stepping out to the L). When K23, K21. K22 is in the closed chain component for her L LL (stepping out with her R leg), my hands would be either stabilizing at the superior posterior aspect of the L side of her pelvis with compression and the other drawing up through her lats to elongate and assisting weight shift to the L, or my hands could be on the medial aspect of her L leg near the knee and her glute (as described above in treatment strategy for quads and glutes). This would fade as soon as K23, K21. K22 became more active in her everters, quads and glutes of her L LL.

APPENDIX XXXII

Post-test and follow-up GAS outcomes, separated.

Post-test and follow-up GAS outcomes separated: * 'And FU' is 'and at follow-up', meaning achieved at post-test and follow-up, but has not been added into follow-up data (only included in post-test data).

PRE-TEST, POST-TEST recorded when highest score for subscale

GAS		Child 1	Child 2	Child 3	Child 4	Child 5	Child 6	Child 7	Child 8 Goal1,2	Child 9	Child 10	Child 11 Goal 1,2	Child 12	TOTAL Post-test
+2	0					✓		✓				✓ Goal 2		3
+1	0													0
0	1					✓ & FU ✓			✓ Goal 1					3
-1	3	✓✓		✓ & FU ✓	✓✓		✓✓✓		✓ Goal 2 ✓ Goal 2			✓ Goal 1 ✓ Goal 1	✓ & FU*	14
-2	38						✓		✓ Goal 1 ✓ Goal 1			✓ Goal 1 ✓ Goal 2 ✓ Goal 2		6
TOTALS	42													26

FOLLOW-UP recorded when highest score for subscale

GAS		Child 1	Child 2	Child 3	Child 4	Child 5	Child 6	Child 7	Child 8 Goal1,2	Child 9	Child 10	Child 11 Goal 1,2	Child 12	TOTAL Follow-up
+2		✓	✓								✓			3
+1			✓								✓			2
0				✓						✓	✓✓	✓ Goal 1	✓	6
-1		✓		✓				✓		✓		✓ Goal 2 (1 level change only as pre-test was entered at -1 level)		5
-2														0
														16