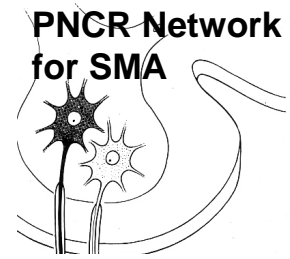




THE JENNIFER TRUST
FOR SPINAL MUSCULAR ATROPHY



Expanded
Hammersmith
Functional Motor Scale
for SMA (HFMSE)

March 7th

2009

Add-on module presented by PNCR - Expanded Hammersmith Functional
Motor Scale (HFMSE)

Smartnet
&PNCR

Hammersmith Functional Motor Scale for SMA (HFMS)

With add-on module presented by PNCR - Expanded Hammersmith Functional Motor Scale (HF MSE)

Introduction to this collaboration

In the UK physiotherapists involved in Smartnet (neuromuscular network aimed at improving the management of individuals with SMA) have been working on establishing a written manual for the Hammersmith Functional Motor Scale (HFMS) which has been shown to successfully assess the ability of non-ambulant individuals with SMA. At the same time, yet independently, in the U.S. the Pediatric Neuromuscular Clinical Research Group (PNCR) has been aiming to achieve the same thing for their Expanded version of the Hammersmith Functional Motor Scale (HF MSE) which combines the original HFMS with an add-on module, consisting of items adapted from the Gross Motor Function Measure (GMFM). The 13 add-on items were selected based on their ability to distinguish motor skills among individuals with SMA II and III and has been shown to do this successfully.

This manual provides proforma's and a detailed manual on operating procedures for both the HFMS and the HF MSE. This is in an effort to reduce fragmentation and promote harmonisation across the international community.

Notes on Testing Procedure

1. Intended Population

The HFMS is intended to be used with the non-ambulant SMA population and this manual clarifies the procedures.

2. Motor Scale Evaluators

HFMS assessments should be performed by individuals who have experience in the handling of children and adults with SMA, such as physical or occupational therapists. Use of this scale for research purposes should be predicated by the understanding of the scales' starting positions, operational definitions and scoring criteria. The reliability and validity of the scales have been documented, however if the scale is utilised for clinical research, evaluators are encouraged to undergo training to establish reliability prior to beginning data collection.

3. Instructions to the subject

This gross motor measure is used to assess the subject's best performance on the day. The evaluator will instruct the subject what to do without the use of qualifiers. For example, item 14 requires that the subject begin in supine. He/she is instructed to sit up. The evaluator should not instruct the subject in movement strategies (e.g. First roll on your side and then push up, try not to roll all of the way onto your stomach first, etc). Although these statements may improve subject's quality of movement, and consequently their score, scoring should be based on how the subject would most naturally perform the task. Instruction for the requested task should be given without qualifiers. Suggested instructions have been included for each of the 33 items.

4. Coaching parameters

The subjects should not be coached. Although coaching may improve performance, it is discouraged as it would compromise reliability. However, if after verbal instructions are given, the subject does not understand the command, or if clarification is needed, the evaluator may demonstrate the item. To make the demonstration uniform, the two-point item should be demonstrated. When the item is to be tested, the instructions are given verbally then followed by an optional demonstration. Any subject especially younger ones may require encouragement. Use what is appropriate and works for the individual.

5. Order of tests

Ideally all centres would follow the same test order and for research purposes this would be **essential** as fatigue can be an issue with these children. However the practicalities of busy clinic settings may make this unfeasible. It is perhaps more important to maintain a child's interest and avoid fatigue in order to get the most accurate or realistic measure of ability as possible. Therefore, in the clinic setting some therapists may test all activities in sitting, then lying etc.

6. Clinical evaluation

It is recommended that when using the test for clinical use that **all** the items should be attempted, even though you may have seen the child you are assessing before and think you know their level of motor ability. Their ability to score 1 or even 2 points maybe unexpected. At subsequent assessments you may feel it is clearly unnecessary to test the child on some items but they should be attempted once or twice.

7. Trials/ number of attempts to achieve items

The subject is allowed three trials for each item. The best-performed trial will be scored.

8. Orthotic use

During the testing, **no orthoses are to be used**. This includes scoliosis jackets, AFOs, socks and shoes. If the subject cannot perform the item without the use of orthotics, the score should be recorded as a zero.

9. Attaining /maintaining starting position

Ideally the subject should get into the starting position themselves. If they are unable to do so they may be placed into the starting position by the therapist. This is often due to the fact that many children with SMA are prone to soft tissue contracture, specifically of the tendoachilles, hamstrings, and hip flexors. In order to score an item the correct starting position must be achieved either by the individual or with the assistance of the therapist. If placed by the therapist, they must be able to maintain the position independently.

10. Clothing

Testing should be done with as minimal amount of clothing as is comfortable. This will allow the evaluator to assess posture and compensations. T-shirts and shorts are recommended. No socks or shoes.

11. Previous assessments

Please do not examine previous results prior to reassessing a patient as this is likely to bias your current assessment.

12. Compliance issues

When gaining and maintaining compliance is an issue, therapists are asked to make a value judgment as to whether test results give a true value of the patient's ability. If it is felt that data is poor this should be clearly noted on the assessment sheet. Distractions should be kept to a minimum wherever possible during testing.

13. Rest breaks

Rest breaks are allowed if required but should be included in the overall timing of the test.

14. Clinical environment

Ideally the clinical environment should be kept as free of distractions as possible.

15. Time taken to complete

Timing of administration should begin after the test is explained to the subject and parents and the subject is in the starting position for item 1. The subject should not be informed of the timed aspect of the test as it may result in a sped up effort and unnecessary fatigue. Once the final task is attempted, timing should cease. The time taken should be recorded in whole minutes (round up half minutes).

16. Timing tasks

Several tasks depend on being able to hold a position for 3 seconds. In the text this is called "for the count of 3". It is unnecessary to use a stopwatch for this amount of time when involved in a clinical assessment. When counting to 3 to time for 3 seconds use: "and 1 - and 2 - and 3" so that three seconds is achieved on the word of 3.

17. Safety

For some tests having the evaluator available to guard the subject whilst attempting the task will be a necessary safety precaution. For some items, such as "standing unsupported" or "stand to sitting on the floor", it may be advisable to have a bench nearby as well.

18. Equipment

Equipment needed for HFMS

Mat table or floormat

Chair

Stop watch

Additional equipment for HFMSE

Bench

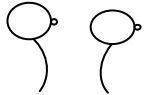
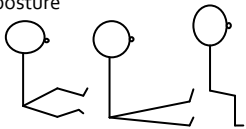
Stairs, at least 4 (6 inch in height) with a railing

Tape and ruler (see item 29).

Test item 1: **Plinth /chair sitting**

Starting position	Sitting on edge of plinth or chair (feet unsupported) or on a plinth/floor (feet supported) Not in wheelchair. Back unsupported		
Instruction	<i>Can you sit on the plinth/chair without using your hands for support for a count of 3?</i>		
Scoring detail / Diagram			
Activity Plinth / chair sitting	2	1	0
	Able to sit using no hand support for a count of 3 or more	Needs one hand support to maintain balance for a count of 3	Needs two hand support to maintain balance Unable to sit
Photographs / Notes	 <p>Figure 1a Score 2 Subject able to sit without hand support for more than a count of 3. Arms need to be clear of floor and body for more than a count of 3. This degree of shoulder flexion is not required.</p>	 <p>Figure 1b Score 1 Subject able to maintain sitting with one hand support for a count of 3.</p>	 <p>Figure 1c Score 0 Subject unable to maintain independent sitting for a count of 3 without the use of both hands.</p>

Test item 1: **Additional postural information**

Starting position	Sitting on floor / plinth You can record on the proforma predominant postures seen in the spine and in the legs. This does not affect the scoring but is for clinical use to monitor change over time.
Details of posture	<p>1 Predominant spinal posture</p>  <p>2 Predominant leg posture</p>  <p>Circle predominant spinal posture and leg position</p>

Test item 2: **Long sitting**

Starting position	Sitting on floor / plinth with the legs in maximal extension and kneecaps pointing to the ceiling. Back unsupported.
Instruction	<i>Can you sit on the floor/plinth without using your hands for support and with your legs straight for a count of 3? Don't let your legs roll out.</i>
Scoring detail / Diagram	Legs straight = knees maybe flexed but knee caps must be pointing upwards, ankles no more than 10cm apart. This defines neutral hip rotation. If contractures limit scoring mark in LBC column (Limited by contractures)

Activity	2	1	0
Long sitting	Able to sit on floor/plinth with legs straight without hand support for a count of 3	Able to sit on floor/plinth with legs straight propping with one hand support for a count of 3	Able to long sit using two hands for a count of 3 Or unable to sit with straight legs

Photographs / Notes



Figure 2a Score 2 Subject able to maintain long sitting with neutral hip rotation without the use of hands for a count of 3.






Figure 2b Score 1 Subject able to maintain long sitting with neutral hip rotation using one hand support for a count of 3.



Figure 2c Score 0 Subject unable to maintain neutral hip rotation in long sitting. Requires both arms to support.



Test item 3: **One hand to head in sitting**

Starting position	Sitting on floor / plinth or over edge of chair/plinth Not tested in wheelchair. No back support		
Instruction	<i>Can you get one hand to your head (above your ear) without bending your neck?</i>		
Scoring detail / Diagram	Hand must touch head above ear level. Ear level is an imaginary line made around the circumference of the head from the superior tip of the left ear, across the face to the eyebrow line, to the superior tip of the right ear and behind their head back to the starting point. Mark right or left arm in comments column Scores 1: If uses any neck flexion. If you observe minimal head flexion, ask them to repeat the test to see if they can score 2.		
Activity	2	1	0
One hand to head	Able to bring one hand to head. Head and trunk remain stable	Can only bring hand to head by flexing head	Unable to bring hand to head even using head and trunk movement
Photographs / Notes	 <p>Figure 3a Score 2 Subject able to touch the top of his head with one hand whilst maintaining stable trunk and head position.</p>	 <p>Figure 3b Score 1 Subject able to touch the top of his head, however requires neck flexion to achieve the movement. Repeat the movement if it is not clear whether neck flexion occurred.</p>	 <p>Figure 3c Score 0 Subject attempts to reach the top of his head but is unable to reach to ear line.</p>




Test item 4: **Two hands to head in sitting**

Starting position	Sitting on floor / plinth or over edge of chair/plinth Not tested in wheelchair. No back support		
Instruction	<i>Can you lift both hands up at the same time, to your head, without bending your neck?</i>		
Scoring detail / Diagram	Hands must be touching head above level of ears Must bring hands up to head together (at the same time)		
Activity	2	1	0
Hands to head in sitting	Able to place both hands on head arms free from side. Head and trunk remain stable	Able to place hands on head but only using head flexion or side tilt or crawling hands up or one at a time	Unable to place both hands on head
Photographs / Notes	 <p>Figure 4a Score 2 Subject can touch both hands to head above the ear line whilst maintaining stable trunk and head position.</p>	 <p>Figure 4b Score 1 Subject lifts both hands to his head at the same time and makes contact above ear line but flexes head.</p>	 <p>Figure 4c Score 0 Subject touches his face with both hands but is unable to reach above the ear line, despite use of neck flexion.</p>

Test item 5: **Supine to side lying**

Starting position Instruction	Supine arms by side or in mid-position (see item 6) <i>Can you roll onto your side in both directions?</i>		
Scoring detail / Diagram	The subject's shoulders must be perpendicular to the floor, and the trunk and hips are to be in line with the shoulder. Score 1: Mark right or left half roll in column scoring 1		
Activity	2	1	0
Supine to side lying	Able to ½ roll from supine both ways	Can ½ roll only one way R / L	Unable to half roll either way
Photographs / Notes	 <p>Figure 5a Score 2. Subject is able to achieve a ½ roll to both sides. His hips roll enough to be in line with his shoulders and perpendicular to the mat.</p>	<p>Score 1 if subject can ½ roll to one side but not the other. Right or left side roll should be circled on the score sheet.</p>	 <p>Figure 5b Score 0. Subject rolls his upper trunk but is unable to bring hips in line with shoulders and perpendicular to the mat.</p>




Test item 6: **Rolls prone to supine over R**

Starting position	Prone arms in mid position (see diagram) or by side		
Instruction	<i>Can you roll from your tummy to your back in both directions? Try not to use your hands</i>		
Scoring detail / Diagram	Scores 2: Momentum is allowed as long as not pushing or pulling with arms. Scores 0: If unable to bring hips and shoulders into supine.		
Activity	2	1	0
Rolls prone to supine over R	Turns to supine with free arms to the right	Turns to supine using arms to push / pull with	Unable to turn to supine
Photographs / Notes	 <p>Figure 6a Score 2 Subject rolls from prone to supine over his right side without pushing off his hands.</p>	 <p>Figures 6b Score 1 Subject moves from prone to supine independently using one arm to push them through the movement.</p>	 <p>Figure 6c Score 0 Movement to full prone is attempted but not achieved.</p>

Test item 7: **Rolls prone to supine over L**

Starting position	Prone arms in mid position or by side		
Instruction	<i>Can you roll from your tummy to your back in both directions? Try not to use your hands</i>		
Scoring detail / Diagram	Scores 0: If unable to bring hips and shoulders into supine		
Activity	2	1	0
Prone to supine over L	Turns to supine with free arms to the left	Turns to supine using arms to push / pull with	Unable to turn to supine
Photographs / Notes	See item 6		



Test item 8: **Rolls supine to prone over R**

Starting position	Supine, arms in mid position or by side		
Instruction	<i>Can you roll from your back to your tummy in both directions? Try not to use your hands</i>		
Scoring detail / Diagram	Scores 0 – if unable to bring hips and shoulders into prone		
Activity	2	1	0
Rolls supine to prone over R	Turns to prone with free arms to the right	Turns to prone by pulling /pushing on arms	Unable to turn into prone
Photographs / Notes	 <p>Figure 8a Score 2. Subject able to roll from supine to prone over his right side without pulling/pushing on his hands.</p>		 <p>Figure 8b&c Score 1 Subject able to achieve the task but uses hands (8b) or elbows (8c)</p>
	Score 0 if there is an attempt to transition from supine towards, but not achieving full prone.		

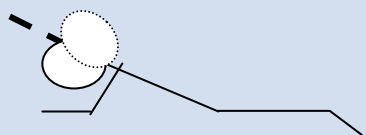
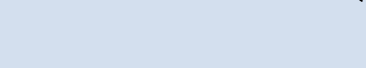


Test item 9: **Rolls supine to prone over L**

Starting position	Supine, arms in mid position or by side		
Instruction	<i>Can you roll from your back to your tummy in both directions? Try not to use your hands</i>		
Scoring detail / Diagram	Scores 0 – if unable to bring hips and shoulders into prone		
Activity	2	1	0
Rolls supine to prone over L	Turns to prone with free arms to the left	Turns to prone by pulling / pushing on arms	Unable to turn into prone
Photographs / Notes	See item 8		




Test item 10: **Sitting to lying**

Starting position	Sitting on plinth / floor		
Instruction	<i>Can you lie down in a controlled way from sitting?</i>		
Scoring detail / Diagram	Scores 2: Controlled fashion can mean through side-lying or by lowering themselves through their arms and legs		
	Scores 1: May use one of the techniques above but lacks total control or flops forward / rolls sideways. However remains safe – does not risk injury		
Activity	2	1	0
Sitting to lying	Able to lie down in a controlled fashion through side lying or using clothes	Able to lie down by flopping forwards and rolling sideways	Unable or falls over
Photographs / Notes	 <p>Figure 10a Subject moves from sitting to lying, through side-lying, in a controlled fashion without collapsing.</p>	 <p>Figure 10b Subject moves from sitting to prone by flopping forward/collapsing.</p>	

Test item 11: **Props on forearms**

<p>Starting position</p> <p>Instruction</p>	<p>Prone – arms by side (with pelvis in contact with mat)</p> <p><i>Can you prop yourself on your forearms and hold for a count of 3?</i></p>		
<p>Scoring detail / Diagram</p>	<p>If unable to achieve position due to contractures mark this in the "limited by contractures column (LBC) and give details if necessary.</p> <p>Scores 2: If head is level with trunk or above it</p> <p>Scores 1: If cannot lift head to neutral position or can only achieve when placed</p> <div style="display: flex; align-items: center; justify-content: center;"> <div style="margin-right: 20px;">score 2</div>  </div> <div style="margin-top: 10px;"> <div style="margin-right: 20px;">score 1</div>  </div>		
<p>Activity</p>	<p>2</p>	<p>1</p>	<p>0</p>
<p>Props on forearms</p>	<p>Able to achieve prop on forearms with head up for a count of 3</p>	<p>Holds position for a count of 3 when placed</p>	<p>Unable</p>
<p>Photographs / Notes</p>	 <p>Figure 11a Score 2. Subject able to independently transition from prone to prop on forearms and maintain this position for a count of 3.</p>	<p>Figure 11b Score 1. The subject is unable to attain this position independently but can maintain it for a count of 3 when placed.</p>	 <p>Figure 11c Score 0. Subject is unable to prop on forearms and maintain head up. When placed, the subject supports the head with his hands by propping on elbows. Forearms are not in contact with the surface area.</p>

Test item 12: **Lifts head from prone**

Starting position	Prone arms by side. Forehead resting on floor		
Instruction	<i>Can you lift your head up keeping your arms by your side for a count of 3?</i>		
Scoring detail / Diagram	Scores 2 or 1: Chin needs to be clear of floor		
Activity	2	1	0
Lifts head from prone	Able to lift head up in prone arms by side for a count of 3	Lifts head with arms in a forward position for a count of 3	Unable
Photographs / Notes	 <p>Figure 12a Score 2 Subject able to lift head and break contact with the mat for a count of 3</p>	 <p>Figure 12b Score 1 The subject can only lift his head off the mat when his arms are in the mid position but can do this for a count of 3.</p>	 <p>Figure 12c Score 0 Subject is unable to break contact with the mat with arms by the side or in the mid position.</p>

Test item 13: **Prop on extended arms**

Starting position
Instruction

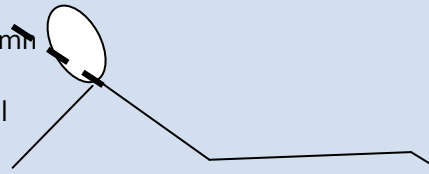
Prone arms by side (pelvis in contact with floor)

Can you prop yourself up with straight arms for a count of 3?

Scoring detail
/ Diagram

Note if limited by contractures in LBC column

To score 2 or 1 head must be **above** neutral position (neutral position means in line with neck represented by the dotted line)



Activity

Prop on extended arms

	2	1	0
	Able to prop on extended arms, head up for a count of 3	Can prop on extended arms if placed for a count of 3	Unable

Photographs / Notes



Figure 13a Score 2 Subject able to transition from prone to prop on forearms independently and hold for a count of 3.





Figure 13b Score 1 Subject can maintain this position when placed and then hold for a count of 3 without assistance. (Operator hands present for safety reasons however operator support is not allowed during scoring of actual item)






Figure 13c Score 0 Subject is unable to maintain the position for a count of 3.


Test item 14: **Lying to sitting**

Starting position	Supine arms by side		
Instruction	<i>Can you get from lying to sitting without rolling to your tummy?</i>		
Scoring detail / Diagram	Score 2: Able to get into sitting by using side-lying – not turning into prone or towards floor		
Activity	2	1	0
Lying to sitting	Able by using side lying	Turns into prone or towards floor	Unable
Photographs / Notes	 <p>Figure 14a Score 2 Subject moves from lying to sitting through side lying</p>	 <p>Figure 14b Score 1. Subject can independently move from lying to sitting by turning into prone and pushing up into sitting.</p>	<p>Score 0 If the subject is unable to transition from lying to sitting independently.</p>



Test item 15: **Four-point kneeling**

Starting position	Prone arms in mid position or by side		
Instruction	<i>Can you get onto your hands and knees with your head up and hold for a count of 3?</i>		
Scoring detail / Diagram	Score 2: Head extended, looking forwards		
	Score 1: Head may be in line with body or extended beyond neutral when placed in four point kneeling.		
	Score 0: They would score 0 if the head falls below the line of the body.		
Activity	2	1	0
Four-point kneeling	Achieves four-point kneeling. Head up for a count of 3	Holds position when placed for a count of 3	Unable
Photographs / Notes	 <p>Figure 15a Score 2 Subject is shown in independent transition from prone to four point kneeling, able to maintain this position, with head up for a count of 3.</p>	 <p>Figure 15b Score 1. Subject unable to independently achieve position but once placed can maintained four point kneeling with head in line with body for a count of 3.</p>	 <p>Figure 15c Score 0. Subject was unable to maintain the position when placed.</p>


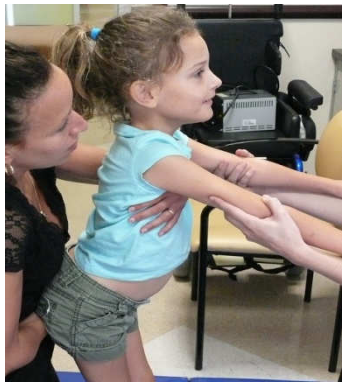
Test item 16: **Crawling**

Starting position	From four-point kneeling		
Instruction	<i>Can you crawl forwards?</i>		
Scoring detail / Diagram	A point equals a hand or a knee. Moving all four points means moving one arm, one leg, one arm and one leg. Scores 2: Must be able to move both hands and knees at least two times Scores 1: Must be able to move both hands and knees at least once.		
Activity	2	1	0
Plinth / chair sitting	Able to crawl forwards Moves all four points twice or more	Moves all four points only once	Unable
Photographs / Notes			


Test item 17: **Lifts head from supine**

Starting position	Supine with arms folded across chest		
Instruction	<i>Can you lift your head to look at your toes keeping your arms folded for a count of 3</i>		
Scoring detail / Diagram	Scores 2: Must be true neck flexion to lift head off floor, not just protraction Score 1: Uses side flexion and or protraction to lift head		
Activity	2	1	0
Lifts head from supine	In supine, head must be lifted in mid-line. Chin moves towards chest. Held for a count of 3.	Head is lifted but through side flexion or with no neck flexion. Held for a count of 3.	Unable
Photographs / Notes	<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>Figure 17a Score 2. Subject able to flex his neck and break contact with the mat, holding the position for a count of 3.</p> </div> <div style="text-align: center;">  <p>Figure 17b Score 1 Subject able to flex head, breaking contact with the mat for a count of 3 by side flexing.</p> </div> </div>		

Test item 18: **Supported standing**

<p>Starting position</p> <p>Instruction</p>	<p>Standing, supported as necessary, on a firm surface.</p> <p><i>Can you stand using one hand for support for a count of 3?</i></p>		
<p>Scoring detail / Diagram</p>	<p>Scores 2: Using their hand to hold on to support</p> <p>Scores 1: If can only stand momentarily (less than a count of 3) or if assessor needs to place hand on chest to prevent loss of control</p> <p>Scores 0: If needs hip and/or knee support or unable to stand</p> <p>When counting to 3 – Use “and 1 - and 2 - and 3” so that three seconds is achieved on the word of 3</p>		
<p>Activity</p>	<p>2</p>	<p>1</p>	<p>0</p>
<p>Supported standing</p>	<p>Can stand with one hand support for a count of 3.</p>	<p>Able to stand with minimal trunk support (not hip) for a count of 3.</p>	<p>Can stand with hand support but needs knee/hip support in addition for a count of 3. Or unable</p>
<p>Photographs / Notes</p>	 <p>Figure 18a Score 2 Subject able to stand with the support of one hand for a count of 3. Trunk support not required.</p>	<p>Figure 18b Score 1 Able to stand for a count of 3 but requires trunk support.</p>	 <p>Figure 18c Score 0 Subject unable to maintain standing whilst holding on with only one hand despite support at hip and trunk.</p>



Test item 19: **Stand unsupported**

Starting position	Standing, supported as necessary, on a firm surface.		
Instruction	<i>Can you stand without holding onto anything for a count of 3?</i>		
Scoring detail / Diagram	Score according to the length of time the subject is able to stand independently. Score 0 – Momentarily means less than a count of 3 therefore scores 0 if stands independently for less than a count of 3 When counting to 3 – Use “and 1 - and 2 - and 3” so that three seconds is achieved on the word of 3		
Activity	2	1	0
Stand unsupported	Can stand independently for more than a count of 3	Stands independently for a count of 3	Stands only momentarily (less than a count of 3) Or unable
Photographs / Notes	 <p>Figure 19a Score 2. Subject is able to stand independently for more than a count of 3.</p>	Score 1 Subject able to stand independently for a count of 3	Score 0 Subject is able to stand only momentarily or not at all.

Test item 20: **Stepping**

Starting position	Standing on a firm surface		
Instruction	<i>Can you walk without using any help or aids? Show me</i>		
Scoring detail / Diagram	Score 0 – if needs aids (including any orthotics) to take steps		
Activity	2	1	0
Stepping	Able to take more than 4 steps unaided	Able to take 2 – 4 steps unaided	Unable
Photographs / Notes			




Item 21: Right hip flexion in supine

<p>Starting position</p> <p>Instruction</p>	<p>Supine with hips and knees in maximal available extension</p> <p><i>Can you bring your right knee to your chest?</i></p> <p>Individuals should not use their arms to assist this activity</p>		
<p>Scoring detail / Diagram</p>	<p>Scores 2: The subject is able to perform full flexion of right hip and knee flexion. The thigh should approximate the subject's chest and the posterior calf should touch/approximate the thigh.</p> <p>Scores 1: The subject initiates right hip and knee flexion or flexes through partial range (partial range is defined as between 10% of flexion range of motion to sub-full range).</p> <p>Scores 0: The subject is unable initiate right hip and knee flexion.</p>		
<p>Activity</p> <p>Right hip flexion in supine</p>	<p>2</p>	<p>1</p>	<p>0</p>
<p>Photographs / Notes</p>	<p>Full hip flexion achieved</p>  <p>Figure 21a Score 2 Subject can flex her right hip approximating her thigh to her chest and calf to thigh.</p>	<p>Initiates right hip and knee flexion (more than 10% of available range of motion)</p>  <p>Figure 21b Score 1 Subject able to actively flex his left hip but is unable to lift his foot off the mat towards his chest, however greater than 10% of the motion is achieved.</p>	

Item 22: Left hip flexion in supine

Starting position	Supine with hips and knees in maximal available extension		
Instruction	<i>Can you bring your left knee to your chest?</i>		
	Individuals should not use their arms to assist this activity		
Scoring detail / Diagram	<p><i>Scores 2:</i> The subject is able to perform full flexion of left hip and knee flexion. The thigh should approximate the subject's chest and the posterior calf should touch/approximate the thigh.</p> <p><i>Scores 1:</i> The subject initiates left hip and knee flexion or flexes through partial range (partial range is defined as between 10% of flexion range of motion to sub-full range).</p> <p><i>Scores 0:</i> The subject is unable initiate left hip and knee flexion.</p>		
Activity	2	1	0
Left hip flexion in supine	Full hip flexion achieved	Initiates left hip and knee flexion (more than 10% of available range of motion)	Unable
Photographs / Notes	See item 21		


Item 23: High kneeling to right half kneel

<p>Starting position</p> <p>Instruction</p>	<p>High kneeling</p> <p><i>Can you bring your left leg up so that your foot is flat on the ground without using your arms and hold for a count of 10?</i></p>		
<p>Scoring detail / Diagram</p>	<p>This item may require a few "test trials" to determine whether or not the subject will require a bench for support. Half kneeling is defined as weight taken on one knee and the opposite foot and the buttocks are clear of the lower leg. Right half kneeling is with the weight bearing on the right knee and left foot. Alignment is not a consideration.</p> <p><i>Scores 2:</i> The subject transitions from high kneeling to half kneeling on right knee, with or without the use of arm support, and then maintains right half kneel for a count of 10 without arm support.</p> <p><i>Scores 1:</i> When placed in right half kneel, the subject can maintain the position for a count of 10 with the use of arm support. Once in right half kneel, any use of the bench for maintaining this position restricts the subject to a score of 1 or less.</p> <p><i>Scores 0:</i> The subject is unable to maintain right half kneeling, even when placed, for a count of 10 with the use of arm support.</p>		
<p>Activity</p> <p>High kneeling to right half kneel</p>	<p>2</p>	<p>1</p>	<p>0</p>
<p>Photographs / Notes</p>	<p>Arms used for transition, maintains arms free for half kneel</p>  <p>Figure 23a Score 2 Subject independently moved from high kneeling to right half kneel (using her arms on the bench) and maintained the position for a count of 10 with hands free.</p>	<p>Maintains half kneel with arm support</p>  <p>Figure 23b Score 1 Subject used her arms to move from high kneel to right half kneel. Maintained the half kneel position for a count of 10 with the use of one hand support.</p>	<p>Unable</p>  <p>Figure 23c Score 0 Subject unable to move from high kneeling to half kneel.</p>




Item 24: High kneeling to left half kneel

Starting position	High kneeling		
Instruction	<i>Can you bring your right leg up so that your foot is flat on the ground without using your arms and hold for a count of 10?</i>		
Scoring detail / Diagram	<p><i>Scores 2:</i> The subject transitions from high kneeling to half kneeling on left knee, with or without the use of arm support, and then maintains left half kneel for 10 seconds without arm support.</p> <p><i>Scores 1:</i> When placed in left half kneel, the subject can maintain the position for 10 seconds with the use of arm support.</p> <p>Once in left half kneel, any use of the bench for maintaining this position restricts the subject to a score of 1 or less.</p> <p><i>Scores 0:</i> The subject is unable to maintain left half kneeling, even when placed for 10 seconds with the use of arm support.</p>		
Activity	2	1	0
High kneeling to left half kneel	Arms used for transition, maintains arms free for half kneel	Maintains half kneel with arm support	Unable
Photographs / Notes	See 23		


Item 25: High kneeling to standing, leading with left leg (through right half kneel)

<p>Starting position</p> <p>Instruction</p>	<p>High kneeling, arms free</p> <p><i>Can you stand up from this position starting with your left leg without using your hands?</i></p> <p>May need demonstration Have a bench nearby in case the subject requires support for balance or strength</p>		
<p>Scoring detail / Diagram</p>	<p>Scores 2: The subject independently transitions from high kneeling to standing via right half kneel without arm support. Half kneeling on the right knee must be used in the transition from high kneeling to stand.</p> <p>Scores 1: Initiates transition to standing by un-weighting both knees, with or without arm support.</p> <p>Scores 0: The subject is unable to initiate standing.</p>		
<p>Activity</p> <p>High kneel to stand through right half kneel</p>	<p>2</p>	<p>1</p>	<p>0</p>
<p>Photographs / Notes</p>	<div style="display: flex; justify-content: space-around; align-items: center;"> <div data-bbox="343 884 726 1417" style="width: 30%; text-align: center;"> <p>Able with arms free</p> </div> <div data-bbox="726 884 1109 1417" style="width: 30%; text-align: center;"> <p>Able to shift weight off both knees (with or without arm support)</p> </div> <div data-bbox="1109 884 1489 1417" style="width: 30%; text-align: center;"> <p>Unable</p> </div> </div> <div style="text-align: center; margin-top: 20px;">  <p>Figure 25b Score 1 Subject uses arms to initiate standing.</p> </div>		


Item 26: High kneeling to standing leading with right leg (through left half kneel)

<p>Starting position</p> <p>Instruction</p>	<p>High kneeling, arms free</p> <p><i>Can you stand up from this position starting with your right leg without using your hands?</i></p> <p>May need demonstration</p>		
<p>Scoring detail / Diagram</p>	<p>Scores 2: The subject independently transitions from high kneeling to standing via left half kneel without arm support. Half kneeling on the left knee must be used in the transition from high kneeling to stand.</p> <p>Scores 1: Initiates transition to standing by un-weighting both knees, with or without arm support.</p> <p>Scores 0: The subject is unable to initiate standing.</p>		
<p>Activity</p> <p>High kneel to stand through left half kneel</p>	<p>2</p>	<p>1</p>	<p>0</p>
<p>Photographs / Notes</p>	<div style="text-align: center;">  <p>Figure 26a Score 2 Subject stands from high kneeling through left half kneel without the use of arm support.</p> </div>	<div style="text-align: center;">  <p>Figure 25c Score 1 Subject moves from high kneel to left half kneel and uses arm support to stand.</p> </div>	<div style="text-align: center;">  <p>Figure 25d Score 0 Subject unable to initiate standing from a high kneeling position.</p> </div>

Item 27: Stand to sitting on the floor

Starting position	Standing on a level floor or mat. In order to attempt this item, the subject must be able to maintain independent standing without arm support.		
Instruction	<p><i>Can you sit on the floor, in a controlled way? Try not to use your arms</i></p> <p>Sitting can be any style of comfort, i.e. short sitting, long sitting, frog sitting</p>		
Scoring detail / Diagram	<p>Scores 2: The subject is able to lower themselves to sitting on the floor with control and without using their arms. "With control" implies that the movement is regulated or directed, no fast movements or collapse permitted.</p> <p>Scores 1: The subject is able to lower to sitting on floor with the use of arms or crashes during the transition.</p> <p>"Crash" indicates a loss of control.</p> <p>Contact with the subject's own body, i.e. hands on thighs for support is considered arm support and therefore a score of 2 cannot be given.</p> <p>Scores 0: The subject does not transition to the floor.</p>		
Activity	2	1	0
Stand to sitting on floor	Able to sit down with arms free and no collapse	Sits on floor but uses arms or crashes	Unable
Photographs / Notes	 <p>Figure 27b Score 1 Subject able to sit down using arms</p>		

Item 28: Squat

Starting position Instruction	Standing on a level floor or mat <i>Can you squat? Pretend you are going to sit in a very low seat</i>		
Scoring detail / Diagram	<p>Scores 2: The subject attains a full squat position (hips and knees must be flexed to greater than 90°) without arm support.</p> <p>Scores 1: The subject crouches more than 10% of the motion (achieves 10° of knee flexion) to less than 90° hip and knee flexion with or without the use of arm support. If the subject attains the full squat position but requires the use of arm support in order to do so, a score of 2 cannot be given.</p> <p>Scores 0: The subject is unable to initiate the squat.</p>		
Activity	2	1	0
Squat	Squats with arms free	Initiates squat (more than 10%), uses arm support	Unable to initiate
Photographs / Notes	 <p>Figure 28a Score 2 Subject able to attain a full squat without using arms.</p>	 <p>Figure 28b Score 1 Subject using her arms to squat greater than 10% but does not reach 90° degrees of hip and knee flexion.</p>	

Item 29: Jumps 12 inches forward

Starting position	Standing on a level floor Position the standing subject comfortably in front of two parallel lines [taped 30cm (12in) apart on the floor].		
Instruction	<i>Can you jump as far as you can, with both feet, from this line all of the way to the other line?</i>		
Scoring detail / Diagram	<p>The subject must jump and land without the use of upper extremity support and without falling to receive credit for any score. The distance jumped is from the starting line to the back of the heels. In the case that the distance travelled by two feet is uneven, the lesser distance should be considered.</p> <p><i>Scores 2:</i> The subject jumps 30cm (12") with both feet simultaneously <i>Scores 1:</i> The subject jumps with both feet simultaneously (clearing both feet from the ground) but travels <12" <i>Scores 0:</i> The subject is unable to initiate jumping forward with both feet simultaneously. This includes one foot leading in a jump.</p>		
Activity Jumps forward 12"	2	1	0
	Jumps at least 12", both feet simultaneously	Jumps between 2- 11", both feet simultaneously	Unable to initiate jump with both feet simultaneously

Scoring Detail for Item 29

Photographs / Notes



Figure 29a Starting Position. Subject is placed with toes touching the starting line.

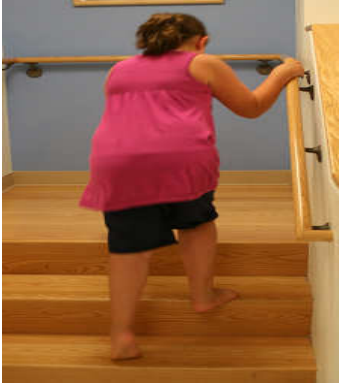




Figure 29b Subject jumping with both feet simultaneously leaving the floor.






Figure 29c Shows how the distance of the jump is measured, from the starting line to the back of the heels.



Item 30: Ascends 4 stairs with railing

<p>Starting position</p> <p>Instruction</p>	<p>Standing at the base of the stairs</p> <p><i>Can you walk up the steps? You can use one railing.</i></p>		
<p>Scoring detail / Diagram</p>	<p>Scores 2: The subject ascends four steps, holding one rail and utilizes an alternating stepping pattern. Two hands on one rail are acceptable. *If the subject ascends 4 steps using an alternating pattern and without the use of a rail, a score of 2 should be given.</p> <p>Scores 1: The subject ascends at least 2 steps, holding one rail utilizing a alternating or step-to pattern.</p> <p>Subjects who demonstrate a step-to pattern (moving one leg up one step and then bringing the opposite leg up to the same step) at any time during the four steps would only meet the criterion for a score of 1.</p> <p>Scores 0: The subject is unable to ascend 2 stairs with the use of one rail</p>		
<p>Activity</p> <p>Ascends 4 stairs, with railing</p>	<p>2</p> <p>Ascends 4 stairs with railing, alternating feet</p>	<p>1</p> <p>Ascends 2-4 stairs, one rail, any pattern</p>	<p>0</p> <p>Unable to ascend 2 stairs using one rail</p>
<p>Photographs / Notes</p>	 <p>Figure 30a Score 2 Subject ascends 4 stairs with alternating steps, holding onto one railing with one hand (two hands on one railing would still score 2).</p>	 <p>Figure 30b Score 1 Subject ascends at least 2 stairs, holding one rail using an alternating or "step to" pattern. Holds one railing with two hands.</p>	 <p>Figure 30c Score 0 Subject ascends 4 stairs using two rails</p>



Item 31: Descends 4 stairs with railing

<p>Starting position Instruction</p>	<p>Standing at the top of the stairs</p> <p><i>Can you walk down the steps? You can use one railing.</i></p>		
<p>Scoring detail / Diagram</p>	<p>Scores 2: The subject descends four steps, holding one rail and utilizes an alternating stepping pattern. Two hands on one rail are acceptable. If the subject descends 4 steps using an alternating pattern and without the use of a rail, a score of 2 should be given.</p> <p>Scores 1: The subject descends at least 2 steps, holding one rail utilizing an alternating or step-to pattern. Subjects who demonstrate a step-to pattern (moving one leg down one step and then bringing the opposite leg down to the same step) at any time during the four steps would only meet the criterion for a score of 1.</p> <p>Scores 0: The subject is unable to descend 2 stairs with the use of one rail.</p>		
<p>Activity Descends 4 stairs, with railing Photographs / Notes</p>	<p style="text-align: center;">2</p> <p>Descends four stairs , with railing, alternating feet</p>  <p>Figure 31a Score 2. Subject can descend 4 stairs holding onto one railing with one (or two) hand and stepping alternately.</p>	<p style="text-align: center;">1</p> <p>Descends 2-4 stairs, one rail, any pattern</p>  <p>Figure 31b Score 1. Subject can descend at least 2 stairs holding onto one railing with two hands but requires both feet on a step to move down to the next step.</p>	<p style="text-align: center;">0</p> <p>Unable to descend 2 stairs with one rail</p>  <p>Figure 31c Score 0. Two railings are required to descend steps.</p>

Item 32: Ascends 4 stairs without arm support

<p>Starting position</p> <p>Instruction</p>	<p>Standing at the base of the stairs</p> <p><i>Can you walk up the steps? This time try not to use the railing.</i></p>		
<p>Scoring detail / Diagram</p>	<p>Arm support includes contact with the rail or steps or subjects own body.</p> <p>Scores 2: The subject ascends 4 stairs and utilizes an alternating foot pattern without the use of arm support.</p> <p>Scores 1: The subject ascends at least 2 steps utilizing either an alternating or step-to pattern without arm support. If, at any time, a step-to pattern (one leg up one step followed by bringing the opposite leg up to the same step) is used, a maximum score of 1 should be given.</p> <p>Scores 0: The subject is unable to ascend 2 stairs without arm support. If the subject touches the railing or the evaluator for balance or support, a score of 0 should be given.</p>		
<p>Activity</p> <p>Ascends four stairs arms free</p>	<p>2</p>	<p>1</p>	<p>0</p>
<p>Photographs / Notes</p>	 <p>Figure 32a Score 2 Subject can climb 4 stairs using an alternating pattern and no arm support.</p>	<p>Figure 32b Score 1 Subject climbs at least 2 steps with either an alternating or a step to pattern without touching rails.</p>	 <p>Figure 32c Score 0 A requirement to touch or hold the rails scores 0.</p>

Item 33: Descends 4 stairs without arm support

<p>Starting position</p> <p>Instruction</p>	<p>Standing at the top of the stairs</p> <p><i>Can you walk down the steps? This time try not to use the railing.</i></p>		
<p>Scoring detail / Diagram</p>	<p>The subject may not touch the rail or the steps with either hand (i.e. must remain arms free). Arm support includes contact with the rail, as well as contact with the subject's own body.</p> <p>Scores 2: The subject descends 4 stairs utilizing an alternating foot pattern without the use of arm support.</p> <p>Scores 1: The subject descends at least 2 steps and utilizes either an alternating or step-to pattern without arm support. If, at any time, a step-to pattern (one leg down one step followed by bringing the opposite leg down to the same step) is used, a maximum score of 1 should be given.</p> <p>Scores 0: The subject is unable to descend 2 stairs without arm support. If the subject touches the railing or the evaluator for balance or support, a score of 0 should be given.</p>		
<p>Activity</p> <p>Descends 4 stairs arms free</p>	<p style="text-align: center;">2</p> <p>Descends four stairs, arms free, alternating feet</p>	<p style="text-align: center;">1</p> <p>Descends 2-4 stairs, arms free, any pattern</p>	<p style="text-align: center;">0</p> <p>Unable to descend 2 stairs arms free</p>
<p>Photographs / Notes</p>	<div style="display: flex; justify-content: space-around;"> <div data-bbox="359 981 699 1361">  <p>Figure 33a Score 2. Subject can descend 4 stairs without the use of a railing or arm support whilst utilizing an alternating pattern.</p> </div> <div data-bbox="742 981 1082 1361">  <p>Figure 33b Score 1 Subject can descend 4 stairs without the use of a railing but uses a step-to pattern.</p> </div> </div>		