SCA Functional Index – Case Report Form

Rater (initials):_____

Date of examination:_____

Timed walking test: 8m walk (8MW)

☐   test not performed, reason:_____

☐   proband unable to walk due to physical limitations

assistive device   ☐ none   ☐ one cane /crutches   ☐ orthesis
                                              ☐ two cane /crutches
                                              ☐ wheeled walker

Did situations arise that necessitated repetition of a trial (e.g. proband fell, external interference during walking, examiner forgot to start/ reset stopwatch) ?

_____

Other factors that might have affected performance ?

_____

Times are only given for two successfully completed trials.

Trial 1   [   ] *(0.1 sec)*   **Trial 2**   [   ] *(0.1 sec)*

         8MW_T1   **8MW_T2**

Timed dexterity test: 9-hole peg test (9HPT)

☐   test not performed,
reason:_____

☐   proband unable to perform test due to physical limitations

Did situations arise that necessitated repetition of a trial (e.g. pegboard not sufficiently secured on the table, external interference, examiner forgot to start/ reset stopwatch/ turn pegboard) ?

_____

Other factors that might have affected performance ?

_____

Times are only given for two successfully completed trials for each hand

DOMINANT HAND   **Right**   **Left**

                                                                 ☐   ☐

Trial 1   **Trial 2**

                    (0.1 sec)   *(0.1 sec)*

      9HPTD_T1   **9HPTD_T2**

NON-DOMINANT HAND   **Right**   **Left**

                                                                 ☐   ☐

Trial 1   **Trial 2**

                    (0.1 sec)   *(0.1 sec)*

      9HPTN_T1   **9HPTN_T2**

_____

Timed speech task: PATA rate

☐   PATA rate task not performed, reason:_____

☐   Proband unable to perform PATA rate task

Did situations arise that necessitated repetition of a trial (e.g. proband coughing, external interference during testing, examiner forgot to start stopwatch/ tape) ?

_____

Othe factors that might have affected performance ?

_____

Counts are only given for two successfully completed trials.

Trial 1   **Trial 2**

      PATA_T1   **PATA_T2**

SCA Functional Index – Instruction Manual

General rules of application:
- The SCAFI investigator can be a clinical investigator or technician, if training is provided.
- The SCAFI should be administered close to the beginning of the study visit to obtain optimal results, definitely before any other motor testing (e.g. SARA rating) is performed.
- The SCAFI components should be assessed in the order given below without major pauses (< 5 min) inbetween. For discontinuation of a single component follow the discontinue rules.
- Instructions given to the proband should follow standardized procedures as given below. Practice trials are limited to those stated in the instructions.
- Efforts should be made to keep distractions during testing to a minimum (designated area for timed walk, separate room with only proband and investigator present for peg test and speech, phones turned off).
- Discourage the proband from talking throughout the 8m-walk test and 9-hole peg test.

It is important for data analysis to distinguish, if proband was unable to perform due to physical limitation or if a single component was not performed/rated due to other reason (time constraints, refusal by proband, no staff).
Any deviation from standard instruction due to proband's or examiner error or external interferences should be noted on the record form.
The stopwatch used should be counterchecked for accuracy with a different reliable stopwatch before the first SCAFI assessment.

Timed walking test: 8m walk (8MW)
Equipment:
- clearly marked 8 m line in designated unobstructed area to minimize external interference.
- stopwatch
- assistive device for walking, if needed by proband

Instruction:
The proband is directed to one end of the 8 m line and asked to walk the 8 m distance to the other end as quickly as possible but safely (Trial 1). Examiner walks along with the proband. Exact time is taken, recorded and stopwatch reset. The task is immediately administered again by having the proband walk back the same distance (Trial 2). Exact time is taken (excluding time for turning). The test is performed from standing start with both feet behind the start line (assistive device may be ahead of startline), but without stopping at the finish line. Timing begins when lead foot passes the starting line and stops when lead foot passes the finish line. Walk time is reported to within 0.1 second, rounded as needed. Maximal rest period between both trials is 5 minutes.
Probands may use assistive devices, usually their customary device. For probands with significant gait impairment, the investigator should have the proband use a wheeled walker, even if this is not the customary device (decision on assistive device to be made by neurologist). In general, non-wheeled walkers should not be used. Assistance of another person or using the wall as support is not allowed. If such attempts are made more than twice, repeat the trial or reevaluate proband for use of assistive device. The same device should be used at follow-up if possible.

Discontinue rules:
1. if proband cannot complete a trial in 3 minutes.
if proband cannot complete trial 2 of the timed walk after max. 5 –min rest period after trial 1, discontinue 8m-walk.

Timed dexterity test: 9-hole peg test (9HPT)
Equipment:
- stopwatch
- solid table (not rolling bedside table)
- Rolyan 9-hole peg test apparatus(plastic one-piece model)
- (exactly) nine pegs in the peg container of the 9-hole peg board

- extra pegs to replace fallen pegs in examiner's hand
- adhesive material to anchor the apparatus on the table, e.g. Dycem™ obtained by suppliers of occupational therapy materials.

Instruction:
The pegboard is placed and secured on the table directly in front of the proband with the mould (peg container) in front of the hand that is going to be tested (i.e. to the right side, if right hand is tested). The dominant hand is tested first for two consecutive trials, immediately followed by two consecutive trials of the non-dominant hand. Handedness here refers to the hand that is used or has been used for writing the majority of time.
The following instruction is given to the proband:
"On this test, I want you to pick up the pegs one at a time, using one hand only, and put them into the holes as quickly as you can in any order until all the holes are filled. Then, without pausing, remove the pegs one at a time and return them to the container as quickly as you can. We'll have you do this two times with each hand. We'll start with your (dominant) hand. You can hold the peg board steady with your (non-dominant) hand. If a peg falls onto the table, please retrieve it and continue with the task. If a peg falls on the floor, keep working and I will retrieve it for you. See how fast you can put all of the pegs in and take them out again."
Timing begins when proband touches the first peg and stops when the last peg is removed and hits the container. Time is reported to within 0.1 second, rounded as needed. After trial 1 of the dominant hand is completed, time is recorded and stopwatch reset. Then proband is asked to perform again with the same hand.
If subject stops after having put all the pegs into the holes, examiner may prompt the subject (without interruption of timing) to continue directly with removing them one by one. If more than one is removed at a time, remind the proband to remove them one by one. Other communication throughout the test should be avoided and if proband starts talking she/he should be reminded not to talk.
If pegs drop onto the table within proband's arm reach, proband is to retrieve it. If it falls on the floor or onto the table beyond proband's reach, examiner is to retrieve it and puts it back in the container.
After trial 2 of the dominant hand, the pegboard is rotated 180° with the peg container towards the other hand and proband instructed as follows "Now I'd like you to switch and use your (non-dominant) hand. This time you may use your (dominant) hand to stabilize the peg board."
Two consecutive trials are performed with the non-dominant hand.
No major pause (>5 min) between all four trials.

Discontinue rule:
1. if proband cannot complete one trial in 5 minutes (i.e. 300 seconds) with dominant hand, move on to the trials with non-dominant hand.
2. if proband cannot complete one trial in 5 minutes (i.e. 300 seconds) with non-dominant hand, discontinue 9-hole-peg test.

Timed speech task: PATA rate
Equipment:
- stopwatch
- tape recorder that can play at fast and slow speed. Recordings should be done at normal (2,4 cm/sec) speed, while counting is done by playing at slow speed.   OR
- standard PC equipped with microphone, using audio software to visualize vocalization (e.g. free download of www.audacity.sourceforge.net). In this case, time count is included in the software.   OR
- standard PC and text software

Instruction:
The proband is asked to repeat "PATA" as quickly and distinctly as possible for 10 seconds until told to stop. Say "go" and as soon as proband starts speaking, start timer and begin counting the number of PATA repeats. After 10 seconds, stop timer and stop counting.
The test is performed two times without major pause (< 5min) inbetween.

The count of PATA repeats usually needs a technical device and can be done by different means:
1. record the test on a tape recorder and use playback at slower speed for counting the numbers of PATA between the "go" and "stop" signal.
2. record the test on PC and count the numbers of PATA repeats within 10 seconds. Slow playback and time count is inherent in the software.
3. press any key on the PC keyboard for each PATA repetition in any text software looking at the stopwatch. After 10 seconds, count the number of keystrings.
4. paper and pencil: put a mark on paper for each PATA repetition. After 10 seconds, count the number of marks.

Discontinue rule:
1. If PATA articulation is too difficult to distinguish for counting
2. If proband cannot complete 10 seconds for two consecutive trials

SCA Functional Index - Rating Manual

Raw scores
The performance of SCAFI yields the following raw scores:
8MW_T1   to 0.1 seconds
8MW_T2   to 0.1 seconds
9HPTD_T1   to 0.1 seconds
9HPTD_T2   to 0.1 seconds
9HPTN_T1   to 0.1 seconds
9HPTN_T2   to 0.1 seconds
PATA_T1   number per 10 seconds
PATA_T2   number per 10 seconds

For each subtest/each hand in 9HPT the mean of trial1 and trial2 is calculated which yields the following data:
8MW_average
9HPTD_average
9HPTN_average
PATA_average

If a subtest was only performed once for any reason, the remaining trial is taken as mean.
If a subtest (or one hand in 9HPT) was not performed at all, see missing values section.
Analysis of average differences between trials 1 (T1) and trial2 (T2) as measure of practice effects is recommended before conclusions are made on score changes.

To convert 8MW and 9HPT performance times into the same dimension (velocity measure) as the PATA rate, their reciprocals are formed as 1/8MW_average and 1/9HPTD_average and 9HPTN_average. The reciprocal averages of both hands in 9HPT are further condensed into their arithmetic mean as (1/9HPTD_average + 1/9HPTN_average) / 2. This yields the following data:
8MW_recipr
9HPT_recipr
PATA_average

Formation of subtest Z-scores
Each subtest is converted into a Z-score with the following algorithms (SD= standard deviation). We recommend the use of the baseline data of the study population as reference in longitudinal studies.

8MW-Z-score = (8MW_recipr – baseline 8MW_recipr mean) / baseline SD 8MW recipr

9HPT-Z-score = (9HPT_recipr – baseline 9HPT_recipr mean) / baseline SD 9HPT recipr

PATA-Z-score = (PATA_average – baseline PATA_average mean) / baseline SD PATA average

The individual Z-scores can thus be expressed as SD higher (positive Z-score) or below (negative Z-score) the baseline mean of the population under study in each subtest.

Missing values
The cases with either 8MW, 9HPT (in one or both hands) or PATA tests not performed at all ("unable to perform due to hpysical limitations" or "not performed for other reason") are excluded from the calculation of baseline means.
Only in cases "unable to perform due to physical limitations", since this a clinically relevant information, a Z-scores is attributed as follows:

"8MW unable"
8MW_recipr is replaced by 1/1800 s (the 10-fold value of the maximally allowed performance time of 180 s) and the Z-score calculated as stated above.

"9HPT (one or both hands) unable"
If proband is unable to perform in only one hand, 9HPT_average of that hand is replaced by 3000 s (the 10-fold value of the maximally allowed performance time of 300 s) and the 9HPT_recipr of both hands and according Z-score calculated as stated above. If proband is unable to perform in both hands, 9HPT_recipr is replaced by 1/3000s and Z-score calculated as stated above.

"PATA unable"
PATA_average is replaced by 0 and the Z-score calculated as stated above.

SCA Functional Index
The SCAFI is generated as the arithmetic mean of all three Z-scores. The cases "unable to perform" single or all tests are included with their attributed Z-scores (see mising values) whereas probands who did not perform single or all subtests for "other reason" are excluded.