UNB TEST OF PROSTHETICS FUNCTION

A TEST FOR UNILATERAL UPPER EXTREMITY AMPUTEES

AGES 2-13

Bio-Engineering Institute
University of New Brunswick

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2.0 INTRODUCTION

Since 1965, the Bio-Engineering Institute at the University of New Brunswick has been involved in the development of myo-electric controls for artificial arms. Since 1981, with the addition of a Prosthetics Research Centre, the research has focused on young upper extremity amputees. In particular, we are involved in research designed to determine the optimal age of fitting for congenital amputees, the most effective type and duration of training, and the most advantageous type of prosthesis for youngsters. Very early on we realized that our efforts to compare one approach with another were hampered by the lack of a test which would measure the children's functional ability to use the prosthesis. We therefore undertook to develop such a test. The field of children's prosthetics is a relatively small one. A handful of professionals in various parts of the globe are working with small populations of limb deficient children, and attempting to answer many of the questions raised at UNB's Prosthetics Research Centre. In developing a test of prosthetics function we decided that it would be beneficial to collaborate with some of these centers and devise a test which would be useful to all of us. A research team comprised of occupational therapists from Canada, USA, Britain and Sweden was therefore established.

2.1 Purpose

The UNB Test of Prosthetics Function is designed to assist therapists in both research and direct service roles. For therapists in amputee clinics, the test can be used to determine the progress of an individual child during the stage of functional training. The child's scores can be compared with his or her own earlier scores, thereby providing a means to determine if therapy goals are being met. The test also clarifies the point at which no further training is required. For research therapists, the UNB Test offers several features which enable accurate comparison of training programs and research data from different centres. It is the first known prosthetics test which has a Rating Scale with demonstrated reliability. As well, this test can be used at 4 age levels, and at each one there are 3 versions for which inter-subtest reliability has been demonstrated. Finally, by involving therapists from several countries, the test items themselves comprise a culturally fair battery.
2.2 What is Prosthetics Function

Most prosthetics tests have been designed to measure one or more aspects of the amputee's skill in using the prosthesis. Frequently the dependent variable used is the speed of performance. Some tests assess the amputee's ability to pick up and release objects of various sizes and shapes, or to use the prosthesis in different body planes. All these are important aspects of prosthetics skill but they do not measure the amputee's ability to use the prosthesis for functional benefit.

The UNB Test is comprised of activities which would normally be encountered by a child in daily life. They were selected to be age appropriate and readily available. All items are normally carried out with two hands performing either symmetrical or assisting functions. With careful attention to the creation of a relaxed atmosphere, the examining therapist should be able to determine how the child would actually use the prosthesis in performing bimanual activities of daily living at home or at school.

Test items are not timed, since self-care and leisure activities are not normally performed as fast as the child can possibly manage.

2.3 Dual Rating Scale

An important and unique feature of the UNB Test of Prosthetics Function is the use of a dual rating scale, for Skill and for Spontaneity of Prosthetics Function. This innovation arose from our observation that many individuals possess sufficient skill to use a prosthesis very well but show little tendency to do so. Without this inner spontaneity, the child is unlikely to continue using the prosthesis when the therapist or parents are not available to remind him or her. Dexterous use of the prosthesis on request only is not enough to ensure good function. This dual rating scale addresses the need for separate measures of skill and spontaneity.
3.0 TEST ADMINISTRATION

3.1 Test Population

This test can be used with children from age 2 to 13 years. It has been subdivided into four age groupings, as follows; 2-4, 5-7, 8-10, 11-13 years. It is designed for unilateral amputees who have either congenital or acquired limb absence either below or above the elbow.

Field trials of the test were carried out with children wearing both conventional and myoelectric prostheses and care was taken to select test items suitable for both types of prostheses.

3.2 Equipment

Equipment required for administration of this test has been selected to include many items normally found in a pediatric occupational therapy department. Some items may need to be purchased, including supplies of food items. Since this is a test of everyday prosthesis use, it is important that equipment represent activities which children in your community normally do. Rather than specify a brand name for each toy, a photograph has been included beside each activity to be scored, so that the intent will be clear. You may feel free to substitute any locally available toy which is normally used bimanually and is of an equivalent level of difficulty. Substitutions should be noted on the test form. All items must fit in the child's terminal device so the child is never penalized for a toy that slips out or is impossible to grasp.

3.3 Environment

In order to observe the child's spontaneous approach to bimanual tasks it is extremely important to avoid any changes in your normal routine which would alert the child to the fact that he or she is being tested. Test forms should be out of sight. Parents should be present if they usually are for treatment sessions. Parents should be notified that you are observing their child to see how he or she will use the prosthesis without directions and they should be requested to avoid instructing the child during this session. If possible, the room used should be one in which the child feels familiar. A variety of toys and activities should be available so that test items can be intermingled with other activities which have been used in previous training sessions. The pace should be unhurried, and the child should be allowed to play with each toy for a reasonable amount of time if he or she wishes.
With older children, it is understandably more difficult to reduce the awareness that they are being observed by a therapist. Their conscious desire to please you may increase the frequency of prosthesis use during any session when you are present. It may be necessary to ask teenagers to show you how they would perform the task at home. Acknowledge what they show you with interest but avoid strong approval or disapproval of an approach which may alter the method they demonstrate on other items. This is an alternative approach to the one recommended but is an attempt to regain validity which has been lost because of their awareness of the testing situation. The therapist should be cautious in interpreting results in such cases.

3.4 Choosing a Subtest

First, select the correct tests for the chronological age of the child. For each age grouping there are three subtests of equivalent difficulty, and any one may be selected for the first testing session. Retesting may take place using one of the remaining subtests as soon as required, without concern that changes in the child's score are due to practice of specific test items during previous testing. This test is therefore suitable to be used as a progress check during training or on follow-up visits.

3.5 Order of Presentation

Each subtest consists of ten items and they should be presented at one session, although they may be given in any order chosen by the examiner. Some have been grouped together to form a meaningful activity, eg. Wrap a Parcel (cut paper, use tape dispenser, tie with string), and these should be presented as a unit. Others such as dressing activities, may be observed most naturally as the child enters or leaves the department. Items involving eating may be carried out part way through a session as a "break", or at the termination as a reward. If the child refuses a particular activity, go on to something else and return to this item once, later in the session. If the child is still unwilling to try, or shows no interest, record a dash (-) on the Score Sheet. (Note that the total score should be adjusted so that uncompleted items do not influence the total).

3.6 Instructions

A critical factor in the observation of spontaneous behavior is that no instructions be given regarding the use of the prosthesis. The examiner must present the task without any particular expectation of how the child will perform it. However, comments directed at capturing an interest in the activity will generally be necessary, e.g. "Let's play with Lego. What would you like to build?" It would not be appropriate to add "Don't forget to use your prosthesis", even after you have marked your score for spontaneity (A). This is a test of prosthetics function, not a training session, so save the teaching for another time. During testing, simply
observe the child as unobtrusively as possible.

Since it will sometimes happen that a child does not demonstrate any spontaneous active use of the terminal device, provision has been made to allow scoring of some use of the terminal device on request. On each subtest, two items are marked with an asterisk (*). For these items only, after the child's initial approach has been observed and a score of 0, 1 or 2 has been assigned for Spontaneity (A), the examiner may demonstrate the activity and suggest a way to use the prosthesis. The score for Skill (B) will then reflect the "on command" use of the prosthesis. Circle it on your score sheet to identify the items for which the child received specific instruction (maximum of 2 items per subtest).
4.0 SCORING

It is very important that the child not be aware that she or he is being tested until the session is complete. The examiner must become familiar with the Rating Scale before testing is begun so that score sheets are not present during the session. It is preferable to have a second therapist scoring through a one-way mirror, or to use video taping if possible. If not, the examiner should feel free to leave the room to make notes while the child is playing at certain points during testing.

Always assign a score for Spontaneity (A) first, then, rate the child on Skill (B).

Remember that it is the child’s use of the prosthesis which is being scored, not the quality of the completed task. The examiner must differentiate between awkwardness which results from unfamiliarity with operation of the prosthesis and difficulty because the task itself is novel. For example, you are not scoring whether the child can or cannot tie shoelaces. You are observing whether he or she automatically reaches for the lace with the prosthesis (A) and whether the grasp can be maintained and released when the child wishes (B).

The manner in which the prosthesis is used is entirely up to the child who is wearing it. Although normally one expects to see the prosthesis perform the non-dominant function, this is not always the case. Frequently, a traumatic amputee who has lost the dominant hand will retain former patterns of activity, and children with a congenital limb deficiency are sometimes observed to use the prosthesis in a dominant fashion too. Always score what you observe the prosthesis doing whether it is used in a dominant or non-dominant role. There is no penalty for reversing the roles.

4.1 Rating Scale

The rating scale for the UNB Test of Prosthetics Function requires the examiner to observe two distinct aspects of prosthesis use. Both are measured on a 5 point scale from 0 to 4. The criteria for assignment of scores are printed on the Rating Scale below. The term "active" refers to the grasping and holding functions of the terminal device. "Passive" describes use of the prosthesis as a "paper weight", without any attempt to open or close the terminal device.
A. Spontaneity of Prosthetics Function

Immediate, automatic, consistent use of terminal device for active grasp 4

Slightly delayed or inconsistent use of terminal device for active grasp 3

Very delayed, occasional or "last resort" use of the terminal device (either for active grasp or passively) 2

Use of prosthesis proximal to terminal device only 1

Prosthesis not used or used only on request 0

B. Skill of Prosthetics Function

Active use of terminal device is quick, skilled and smooth. Grasp is consistently maintained. 4

Active use of terminal device, shows some degree of awkwardness, slowness or uncertainty, Grasp is readily regained when lost 3

Active use of terminal device is attempted, but looks very slow or awkward. Grasp is frequently lost or regained with difficulty. 2

No active terminal device function, although terminal device or some other part of prosthesis may be used passively to stabilize or support. 1

Prosthesis not used 0

4.2 Spontaneity

The Spontaneity index measures the extent to which the child has incorporated the prosthesis into his or her body image. The examiner must observe the child's tendency to use the prosthesis to assist with the task. Judgment of the automatic use of the prosthesis is a unique feature of the UNB Test and examiners must be careful to distinguish between the Spontaneity and Skill indices of the Rating Scale.

A score of (0) indicates that the prosthesis was not used at all to accomplish the activity presented to the child (or in the case of the items marked with an
asterisk, that it was used only after the examiner suggested a bimanual approach). Do not use a (0) to indicate that the item was not tested.

A score of (1) generally indicates that the child is using the stump to assist with the bilateral task, in spite of the presence of the prosthesis. Scores of (2), (3) or (4) reflect the degree to which the child uses the prosthesis automatically. Is the prosthesis used as a last resort (2) almost without thinking (3), or as first choice (4)? To obtain a (3) or (4), the child must also have developed an automatic tendency to use the grasp function of the terminal device. A score of (4) indicates that the child used the prosthesis without conscious effort - as automatically as the sound hand was used.

4.3 Skill

This index measures the aspects of prosthesis function that most therapists are accustomed to observing, that is, the ability to open and close the terminal device to grasp and release objects of different sizes and shapes with confidence, speed and consistency. As well, it includes the ability to maintain grasp without letting go accidentally, the ability to apply the correct amount of pressure and the awareness of how wide to open the terminal device. All of these skills contribute to the dexterity with which the prosthesis is used.

A score of (0) indicates that the prosthesis was not used at all in attempting to complete the task. Do not use (0) to indicate that the item was not tested.

A score of (1) refers to "unit" use of the prosthesis without any attempt to open or close the terminal device.

A score of (2) is assigned when active terminal device operation is observed but is very awkward or slow. This may describe a trial-and-error approach when the child fails to find a method of stabilizing with the prosthesis that is satisfactory to him or her.

A score of (3) is given for relatively good prosthesis skill. There may be some trial-and-error but a satisfactory grasp is quickly found. If grasp is lost, it is regained readily. There will be some clumsiness or lack of confidence observed.

A score of (4) is given only when performance with the prosthesis looks as good as one could possibly expect for the type of terminal device being worn. The child will look confident and perform quickly in grasping and releasing objects. The terminal device will open only as wide as necessary. Objects will not fall out of the terminal device unexpectedly or be crushed because of excessive pressure.
5.0 INTERPRETATION

5.1 Statistical Results

Determination of inter-rater reliability was accomplished through the use of a video tape. Children of various ages and wearing different types of prostheses were taped while performing a variety of common bimanual tasks. Copies of the video tape were distributed to therapists assisting with this project, who scored each activity using the Rating Scale. Data from 47 professionals were returned to UNB. These data were divided into three groups according to the therapists' level of experience. For the 35 video episodes the mean score was determined for each of the three groups of therapists. Pearson Product Moment Correlations were computed for all three combinations of the three groups, for both Spontaneity and Skill. All correlations were highly significant (at the .01 level). These results are presented in Table 1 below.

<table>
<thead>
<tr>
<th>Comparisons</th>
<th>Skill</th>
<th>Spontaneity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experienced vs. Inexperienced</td>
<td>.91</td>
<td>.85</td>
</tr>
<tr>
<td>Experienced vs. Student</td>
<td>.76</td>
<td>.78</td>
</tr>
<tr>
<td>Inexperienced vs. Student</td>
<td>.77</td>
<td>.73</td>
</tr>
</tbody>
</table>

The conclusion which can be drawn from this is that the Rating Scale is reasonably easy to use, and can be used consistently by therapists with varying degrees of experience.

In designing this test, we had predicted that therapists observing prosthetics use would be able to discriminate between two different characteristics of function - Spontaneity and Skill. In order to evaluate this, data from 61 subjects was submitted by eight therapists, who had tested the children using the UNB Test. This data was analyzed within each age group and within each subtest, using t-tests. For each age group, differences between Spontaneity and Skill were highly significant with probabilities less than 0.1% (.001). The difference between Spontaneity and Skill held up within individual subtests at the 1% (.01) level, with the exception of the oldest age group in which the differences for Subtest C were significant at the 2% (.02) level, and Subtest B for which the probability was only less than 10% (0.10). The latter result was probably due to a very small sample size of six subjects.

Further testing with many children using the UNB Test will be necessary before valid interpretation of the scores can be made. Based on data collected during inter-rater reliability testing, the Rating Scale was revised to encourage wider distribution of scores over the scale. Therefore, any interpretation of scores obtained on this revised scale are speculative until we have obtained sufficient data.
All users of this test are invited to assist in this effort by returning copies of score sheets, with all three subtests completed, to UNB to permit calculation of norms and to determine test-retest reliability. Until these norms are available the following may serve as a guideline for program planning.

<table>
<thead>
<tr>
<th>Spontaneity</th>
<th>Skill</th>
<th>Implications for Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>High</td>
<td>It is possible for an experienced prosthesis user to obtain a total score of up to 40 on both Spontaneity and Skill Ratings. There is no further need for training in prosthesis skills and one can assume that the prosthesis will be used outside the therapy department, to assist with bimanual tasks encountered through the day.</td>
</tr>
<tr>
<td>High</td>
<td>Low</td>
<td>Children who show motivation to use the prosthesis, and a natural tendency to bring it into use, but who lack the proficiency to use it skillfully are excellent candidates for further prosthetics training.</td>
</tr>
<tr>
<td>Low (On tasks marked with a *)</td>
<td>High</td>
<td>Some children can use the prosthesis (on tasks skillfully on command but have not marked*) developed the habit of using it to assist with bimanual skills. Further training, directed at helping the child to become a habitual prosthesis wearer and user may be indicated, beginning with common activities of daily living and progressing to problem-solving with novel tasks. The parents may need further guidance from the therapist regarding implementation of the home program. As well, the child's attitude about the prosthesis should be explored.</td>
</tr>
<tr>
<td>Low</td>
<td>Low</td>
<td>Children who receive low scores on both ratings clearly require further prosthetics training in the therapy department. As well, the therapist should investigate the wearing pattern and encourage full time wear if this is not established. As mentioned previously the child's attitude and the parent's ability to carry out a home program should be investigated.</td>
</tr>
</tbody>
</table>

Retesting (using another subtest) after appropriate training will allow accurate evaluation of the child's progress when scores are compared with earlier test results.
6.0 TEST DETAILS

A complete listing of all subtests for the four age ranges (2-4, 5-7, 8-10 and 11-13) follows, together with a reference copy of the rating scale and score sheet. Score sheets for use in implementing this test are available in padded form.
6.1 Ages 2 – 4 - Subtest #1

1. **Item**: steer a ride-on toy  
   **Equipment**: ride-on toy or tricycle, whichever child prefers.  
   **Score**: attempt to use prosthesis on handlebars  
   **Special Instructions**: therapist may position terminal device appropriately if necessary (subtly, before toy is presented or after "A" has been observed)

2. **Item**: pull plastic pop-it beads apart  
   **Equipment**: minimum of 6 plastic pop-together beads, small enough to be held in terminal device  
   **Score**: attempt to stabilize chain of beads to pull one or more off  
   **Special Instructions**: N/A

**Make a collage**

3. **Item**: tear a sheet of paper into several pieces  
   **Equipment**: one sheet construction (sugar) paper  
   **Score**: attempt to stabilize paper for tearing  
   **Special Instructions**: therapist may begin the tear if this is too difficult for the younger child.

4. **Item**: snip paper with scissors  
   **Equipment**: one sheet construction (sugar) paper; one pair blunt end scissors (left or right as needed)  
   **Score**: method of stabilizing paper to snip at edge - not necessary to cut sheet in two pieces  
   **Special Instructions**: N/A

5. **Item**: open small glue bottle  
   **Equipment**: oval shaped bottle of white glue with twist or flip top (50 ml size); torn paper; full sheet of paper  
   **Score**: method of stabilizing bottle and opening top  
   **Special Instructions**: N/A
6. **Item**: remove one piece of loose clothing  
   **Equipment**: doll with loose clothing  
   **Score**: method of stabilizing doll while removing item of clothing  
   **Special Instructions**: N/A

7. **Item**: comb doll's hair  
   **Equipment**: doll with hair; comb or brush  
   **Score**: method of stabilizing doll while combing hair  
   **Special Instructions**: N/A

8. **Item**: make doll's bed  
   **Equipment**: doll from Item 6 and 7, doll's bed with 1 blanket  
   **Score**: attempt to grasp blanket to spread it over doll  
   **Special Instructions**: N/A

9. **Item**: bang a tambourine  
   **Equipment**: toy tambourine with lip 1-1/2”  
   **Score**: method of stabilizing tambourine to enable banging on it  
   **Special Instructions**: N/A

10. **Item**: peel a banana  
    **Equipment**: one banana (not too soft)  
    **Score**: method of holding banana while peeling  
    **Special Instructions**: therapist may start first section of peel if necessary
6.2 Ages 2 – 4 - Subtest #2

1. Item: remove playdough from a plastic bag  
   Equipment: lump of soft modelling dough inside a clear plastic bag (approximately 6" x 8")  
   Score: method of stabilizing bag while removing dough  
   Special Instructions: N/A

2. Item: use rolling pin  
   Equipment: rolling pin with separate handle and roller mechanism; soft play dough  
   Score: method of grasping rolling pin handles  
   Special Instructions: N/A

3. Item: thread beads  
   Equipment: wooden beads or empty cotton reels approx 1" (2.5cm) diameter; string with a 2" stiff tip  
   Score: method of stabilizing either bead or string using terminal device  
   Special Instructions: N/A

4. Item: pull on loose socks  
   Equipment: pair of stretchy tube socks  
   Score: attempt to use terminal device to assist in pulling sock onto foot  
   Special Instructions: N/A

5. Item: dry hands  
   Equipment: sink or basin at appropriate height (child standing on stool if necessary); water; soft towel (not paper towel)  
   Score: involvement of prosthesis in attempts to dry hand  
   Special Instructions: N/A
6. Item: open small jar with twist lid  
   **Equipment:** jar of bubble liquid with twist top (jar must be small enough to be held in terminal device)  
   **Score:** use of prosthesis to stabilize jar or turn lid  
   **Special Instructions:** if necessary, loosen top first so child is able to turn it

7. Item: pull the ring on a musical toy  
   **Equipment:** toy with pull-ring (toy must be small enough at some point to be grasped by terminal device)  
   **Score:** use of prosthesis to stabilize toy or pull on ring  
   **Special Instructions:** N/A

8. Item: open drawstring bag to remove small toys  
   **Equipment:** soft cloth bag with drawstring top, loosely closed; collection of small items to place in bag (or raisins, from Item 10)  
   **Score:** method of opening bag  
   **Special Instructions:** N/A

9. Item: ride-on toy with dowel hand grips  
   **Equipment:** rocking horse, spring horse, teeter totter, etc. with horizontal dowel handles (small enough to be grasped by terminal device)  
   **Score:** attempt to use prosthesis on handles  
   **Special Instructions:** N/A

10. Item: open small box of raisins  
    **Equipment:** raisins in box approximately 2cm deep 4cm wide  
    **Score:** method of holding box while opening  
    **Special Instructions:** therapist may open box and reclose prior to testing to loosen for young children
6.3 Ages 2 – 4 - Subtest #3

1. Item: take Duplo blocks apart
   Equipment: set of large Duplo - stack of at least 6 of the 1 ¼ " (3cm) square blocks, put together
   Score: method of taking blocks apart
   Special Instructions: N/A

2. Item: thread a wooden sewing block
   Equipment: wooden sewing toy with large string or lace (2" stiff tip)
   Score: method of stabilizing block or string with prosthesis
   Special Instructions: N/A

3. Item: play two-handed musical instrument
   Equipment: any normally bimanual instrument (cymbals, triangle, accordion, sound box and stick)
   Score: method of holding instrument to play
   Special Instructions: do not use instrument such as xylophone or drums which can be used unimanually

4. Item: open box of crayons
   Equipment: cardboard box of eight crayons
   Score: method of stabilizing box to flip open top
   Special Instructions: N/A

5. Item: remove adhesive-backed sticker from paper backing
   Equipment: suitable sticker approx 1" (2.5cm) diameter on paper backing (backing extends enough to easily be grasped in terminal device (eg. long strip of paper or sheet several inches wide)
   Score: method of grasping backing to lift off decal
   Special Instructions: N/A
6. **Item:** assemble nuts and bolts  
   **Equipment:** - plastic bolt with large plastic nuts  
   **Score:** method of grasping toy  
   **Special Instructions:** N/A

*7. **Item:** ride on swing  
   **Equipment:** solid seat with two ropes or chains hung outside or in doorway - low enough for child's feet to touch ground  
   **Score:** method of holding chains  
   **Special Instructions:** N/A

8. **Item:** assemble nesting barrels  
   **Equipment:** set of push-together barrels (use only the ones small enough to be held in terminal device)  
   **Score:** method of stabilizing both halves of barrel  
   **Special Instructions:** N/A

9. **Item:** open a chocolate bar  
   **Equipment:** a small foil and/or paper-wrapped chocolate bar  
   **Score:** method of stabilizing bar of chocolate to unwrap  
   **Special Instructions:** N/A

10. **Item:** wipe hands with cloth  
    **Equipment:** wet face cloth  
    **Score:** method of stabilizing cloth to wipe off sound hand  
    **Special Instructions:** N/A
6.4 Ages 5-7 - Subtest #1

1. Item: put toothpaste on brush  
   Equipment: tube of toothpaste; toothbrush  
   Score: method of stabilizing brush and tube to put paste on  
   Special Instructions: child stands at sink

2. Item: undo snaps  
   Equipment: provide dressing doll or clothing with snaps, placed on table in front of child  
   Score: method of stabilizing both halves of snap  
   Special Instructions: N/A

*3. Item: do up buckle on belt around waist  
   Equipment: belt with large buckle  
   Score: use of prosthesis in attempting to fasten buckle  
   Special Instructions: N/A

4. Item: ride a tricycle  
   Equipment: tricycle  
   Score: use of prosthesis on handlebars  
   Special Instructions: N/A

5. Item: use an egg beater to beat up soap suds  
   Equipment: rotary egg beater with D shaped handle, food colouring, bowl, soap powder  
   Score: use of prosthesis to stabilize beater or turn handle  
   Special Instructions: foam may be used for finger painting
6. **Item:** wring out a wet cloth (to wipe up soap from #5)  
   **Equipment:** dish cloth  
   **Score:** use of prosthesis to squeeze water out  
   **Special Instructions:** N/A

7. **Item:** thread small beads  
   **Equipment:** large needle and thread  
   **Score:** attempt to stabilize needle or beads with prosthesis  
   **Special Instructions:** N/A

8. **Item:** hammer nail  
   **Equipment:** 2" nails, block of soft wood, hammer  
   **Score:** use of prosthesis to stabilize nail or hold hammer  
   **Special Instructions:** N/A

9. **Item:** sand wood  
   **Equipment:** block of wood small enough in some dimension to be grasped in terminal device  
   **Score:** method of stabilizing wood while sanding  
   **Special Instructions:** N/A

10. **Item:** remove one candy from a roll of lifesavers  
    **Equipment:** roll of lifesavers (not necessarily unopened)  
    **Score:** method of stabilizing roll while removing 1 lifesaver  
    **Special Instructions:** N/A
6.5 Ages 5-7 - Subtest #2

Make a picture

1. **Item**: cut paper with scissors  
   **Equipment**: heavy paper (construction or sugar paper); left or right handed scissors as required  
   **Score**: ability to manipulate paper in terminal device while cutting out a 3” (7.5cm) diameter PacMan shape (3/4 circle)  
   **Special Instructions**: N/A

2. **Item**: peel back paper on crayon  
   **Equipment**: used or broken regular sized crayon with paper covering most of wax  
   **Score**: method of holding crayon to peel back some of the paper  
   **Special Instructions**: N/A

3. **Item**: use a hand-held pencil sharpener  
   **Equipment**: crayon from #2 and a crayon sharpener or coloured pencil and hand-held pencil sharpener  
   **Score**: method of stabilizing sharpener  
   **Special Instructions**: N/A

4. **Item**: open small box of gummed stickers  
   **Equipment**: "matchbox" of gummed stars or stickers  
   **Score**: method of stabilizing box to open and remove stickers  
   **Special Instructions**: N/A

5. **Item**: scrub fingernails with brush  
   **Equipment**: hand-held rectangular nail brush; soap and water  
   **Score**: method of stabilizing brush  
   **Special Instructions**: N/A
**6. Item:** knot tying  
**Equipment:** - boot or shoe with large laces (shoe should be big enough for child to put on)  
**Score:** use of terminal device to assist with tying knot  
**Special Instructions:** N/A

**7. Item:** use a kaleidoscope  
**Equipment:** a 2-piece kaleidoscope. The shaft must be small enough to be grasped by terminal device  
**Score:** use of prosthesis to stabilize toy  
**Special Instructions:** N/A

**8. Item:** dismantle a Lego construction  
**Equipment:** Lego blocks  
**Score:** method of stabilizing blocks to separate only  
**Special Instructions:** N/A

**9. Item:** use bow and arrow  
**Equipment:** toy bow and arrow  
**Score:** method of stabilizing both parts of toy to fire arrow  
**Special Instructions:** N/A

**10. Item:** unwrap gum or candy  
**Equipment:** one stick of paper-wrapped gum or one twist-wrapped candy  
**Score:** method of stabilizing to open  
**Special Instructions:** N/A
6.6 Ages 5-7 - Subtest #3

1. **Item**: open zippered pencil case  
   **Equipment**: cloth or plastic pencil case with full length zipper  
   **Score**: method of stabilizing case while pulling zipper tab  
   **Special Instructions**: N/A

2. **Item**: uncap large felt pen  
   **Equipment**: set of felt markers (approx f" (2cm) diameter)  
   **Score**: method of stabilizing pen and lid to remove  
   **Special Instructions**: make sure lids are not too tight for child to manage

3. **Item**: sharpen pencil  
   **Equipment**: wall-mounted pencil sharpener; regular pencil  
   **Score**: method of stabilizing pencil and turning handle  
   **Special Instructions**: method will vary depending on side of amputation in relation to handle

*4. **Item**: build with a simple construction toy  
   **Equipment**: plastic Meccano, large Erector, Construx, Imaginit, or some other appropriate construction toy  
   **Score**: use of prosthesis to stabilize pieces so they fit together  
   **Special Instructions**: N/A

5. **Item**: do up buttons  
   **Equipment**: provide dressing doll with large buttons, placed on table in front of child  
   **Score**: method of stabilizing button and fabric  
   **Special Instructions**: N/A
6. **Item**: thread a sewing card  
   **Equipment**: cardboard sewing card; long shoelace or yarn with stiff end  
   **Score**: method of stabilizing card while sewing  
   **Special Instructions**: N/A

7. **Item**: wind up toy  
   **Equipment**: small walking toy or car with key wind-up mechanism  
   **Score**: method of stabilizing toy to wind it up  
   **Special Instructions**: N/A

8. **Item**: remove coins from change purse  
   **Equipment**: small twist-top or zippered change pouch  
   **Score**: method of stabilizing purse with coins inside  
   **Special Instructions**: N/A

9. **Item**: hold onto chin-up bar  
   **Equipment**: doorway-mounted chin-up bar  
   **Score**: method of grasping bar  
   **Special Instructions**: N/A

10. **Item**: open small container  
    **Equipment**: small tube or bottle with Smarties inside  
    **Score**: method of removing lid  
    **Special Instructions**: ensure that lid is not too tight for child to remove
6.7 Ages 8-10 - Subtest #1

1. **Item**: start a zipper (the kind that separates at the bottom)
   **Equipment**: provide jacket big enough for child to put on, with large, easy zipper and large pull tab
   **Score**: use of prosthesis to stabilize one side of zipper
   **Special Instructions**: N/A

2. **Item**: hang jacket on coat hanger
   **Equipment**: jacket from #1; wire coat hanger
   **Score**: method of holding jacket and hanger
   **Special Instructions**: N/A

3. **Item**: open box of blackboard chalk and remove a piece
   **Equipment**: a closed flip-top box of chalk
   **Score**: method of stabilizing box
   **Special Instructions**: N/A

4. **Item**: draw on blackboard while holding notebook
   **Equipment**: notebook with pictures, phrases, jokes, etc. to copy; chalk from #3
   **Score**: method of holding notebook and chalk
   **Special Instructions**: N/A

5. **Item**: play with a yo-yo
   **Equipment**: small yo-yo that can be grasped around circumference by the terminal device
   **Score**: method of holding yo-yo to rewind string
   **Special Instructions**: N/A
6. **Item**: use paper punch  
   **Equipment**: single hole paper punch; sheet of paper  
   **Score**: method of stabilizing paper to punch holes  
   **Special Instructions**: N/A

7. **Item**: seal polythene bag with twist tie  
   **Equipment**: one small polythene bag with strip of wire twist ties; item to put in bag  
   **Score**: method of securing wire tie around bag  
   **Special Instructions**: N/A

*8. **Item**: play card game  
   **Equipment**: hand of five to seven playing cards  
   **Score**: method of holding hand of cards to play  
   **Special Instructions**: N/A

9. **Item**: open a plastic "bubble"  
   **Equipment**: foil-sealed bubble of jam or butter  
   **Score**: method of stabilizing plastic container to peel off foil  
   **Special Instructions**: N/A

10. **Item**: spread jam on crackers  
    **Equipment**: jam or butter from #9, crackers, knife  
    **Score**: method of stabilizing crackers and knife  
    **Special Instructions**: N/A
6.8 Ages 8-10 - Subtest #2

1. Item: hit ball with bat  
   Equipment: bat normally used for baseball, rounders or cricket; ball  
   Score: method of holding bat  
   Special Instructions: ball could be larger than one normally used

2. Item: pin badge on shirt  
   Equipment: metal badge with straight pin fastener on back; T-shirt placed on table in front of child  
   Score: method of stabilizing shirt to attach badge  
   Special Instructions: instruct child to pin badge to one layer of fabric only.

3. Item: fold shirt  
   Equipment: T-shirt from #2, on table in front of child  
   Score: method of folding shirt  
   Special Instructions: N/A

4. Item: open bandaid and apply  
   Equipment: paper-wrapped bandaid strip  
   Score: method of opening bandaid and tearing off adhesive protectors  
   Special Instructions: N/A

5. Item: take off jacket or cardigan  
   Equipment: provide jacket or cardigan if necessary  
   Score: attempt to grasp cuff of clothing on sound side with terminal device  
   Special Instructions: sleeves must be close-fitting, so jacket cannot be shrugged off
6. **Item**: ball and blanket game  
   **Equipment**: small blanket (baby's receiving blanket) or large towel; large light ball  
   **Score**: method of holding blanket  
   **Special Instructions**: two players stand facing each other. Each holds two corners of blanket. Ball is placed on blanket and bounced. Object is to try to keep ball aloft.

7. **Item**: make a "telescope"  
   **Equipment**: one sheet of typing paper; one rubber band  
   **Score**: method of holding rolled paper to slip on the rubber band  
   **Special Instructions**: N/A

8. **Item**: fill paper cup with water  
   **Equipment**: cone shaped cup; water faucet  
   **Score**: method of filling cup  
   **Special Instructions**: cone shaped cup prevents child from setting it on the bottom of the sink. Use of prosthesis to either hold cup or turn faucet is scored.

9. **Item**: open jar  
   **Equipment**: glass jar with twist lid no larger than 1 3/4" (4cm) diameter, with small toy (or candy from #10) inside  
   **Score**: method of removing lid  
   **Special Instructions**: N/A

10. **Item**: unwrap a candy with close fitting wrapper  
    **Equipment**: cellophane wrapped caramel or blackjack  
    **Score**: method of removing wrapper  
    **Special Instructions**: N/A
6.9 Ages 8-10 - Subtest #3

1. Item: tie a scarf around neck  
   Equipment: rectangular scarf (wool or silk), approximately 3 feet (1 meter) long  
   Score: method of tying scarf  
   Special Instructions: N/A

2. Item: pull glove onto sound hand  
   Equipment: pair of gloves  
   Score: method of donning glove  
   Special Instructions: can be any glove appropriate to another activity, (eg. white glove for dressing up as clown, gardening glove, child's own glove, etc.)

*3. Item: tie shoelaces  
   Equipment: sneaker with laces of adequate length  
   Score: method of tying laces, knot and bow  
   Special Instructions: child's own sneaker preferable, or supply one if necessary - score use of prosthesis, not ability to tie laces

4. Item: serve in badminton game  
   Equipment: badminton racquets and bird  
   Score: method of serving  
   Special Instructions: N/A

*5. Item: make pipe cleaner sculpture  
   Equipment: package of pipe cleaners (coloured if available)  
   Score: method of stabilizing pipe cleaners to twist together  
   Special Instructions: N/A
6. **Item**: lift end of table and move it  
   **Equipment**: small table  
   **Score**: use of prosthesis to assist in lifting table  
   **Special Instructions**: examiner lifts other end of table

7. **Item**: spread table cloth on table  
   **Equipment**: folded table cloth; table  
   **Score**: method of handling cloth  
   **Special Instructions**: N/A

8. **Item**: remove facial tissue from purse-size package  
   **Equipment**: one plastic or paper purse-size package of tissues with perforation down the centre  
   **Score**: method of removing tissue from package  
   **Special Instructions**: package is not necessarily unopened

9. **Item**: tear masking tape off roll  
   **Equipment**: 1 roll of 1" masking tape  
   **Score**: method of stabilizing roll while pulling and tearing tape  
   **Special Instructions**: N/A

10. **Item**: open a package of potato chips  
    **Equipment**: small bag of potato chips (foil or cellophane)  
    **Score**: method of opening package  
    **Special Instructions**: N/A
6.10 Ages 11-13 - Subtest #1
In the carpentry shop

1. **Item**: measure a length of wood  
   **Equipment**: narrow strip of wood (such as 1" x 2"); metal retractable carpenter's tape  
   **Score**: method of pulling out length of tape  
   **Special Instructions**: N/A

2. **Item**: place wood in a vice  
   **Equipment**: wood from Item 1; vice mounted on workbench  
   **Score**: method of stabilizing wood while tightening vice  
   **Special Instructions**: N/A

3. **Item**: use carpenter's square to mark line  
   **Equipment**: carpenter's square; pencil; wood from Item 1  
   **Score**: method of stabilizing square and wood  
   **Special Instructions**: N/A

4. **Item**: use hand drill  
   **Equipment**: rotary hand drill or brace and bit; small bit; wood from Item 3  
   **Score**: method of using drill  
   **Special Instructions**: N/A

5. **Item**: hang T-shirt on line  
   **Equipment**: T-shirt; clothesline, spring clothes pins  
   **Score**: method of stabilizing shirt while pinning onto line  
   **Special Instructions**: any small rope strung up inside will suffice as a clothesline
6. **Item**: fold letter and put in envelope  
   **Equipment**: two pieces of paper and appropriate sized envelope  
   **Score**: method of stuffing paper in envelope  
   **Special Instructions**: N/A

7. **Item**: clean fingernails with file  
   **Equipment**: nail file  
   **Score**: method of stabilizing file  
   **Special Instructions**: N/A

8. **Item**: wind a watch  
   **Equipment**: wrist watch  
   **Score**: method of stabilizing watch to wind it  
   **Special Instructions**: N/A

*9. **Item**: peel an apple  
   **Equipment**: apple, sharp knife  
   **Score**: use of prosthesis to stabilize apple or hold knife  
   **Special Instructions**: N/A

10. **Item**: put up an umbrella  
    **Equipment**: umbrella  
    **Score**: use of prosthesis to hold handle or open umbrella  
    **Special Instructions**: N/A
6.11 Ages 11-13 - Subtest #2

Wrap a parcel
1. **Item**: cut paper to size
   **Equipment**: brown wrapping paper or gift-wrap; scissors (left or right hand); parcel
   **Score**: method of stabilizing paper while using scissors
   **Special Instructions**: N/A

2. **Item**: use Scotch tape dispenser
   **Equipment**: hand held tape dispenser (not desk-top holder)
   **Score**: method of stabilizing dispenser
   **Special Instructions**: N/A

3. **Item**: tie up parcel
   **Equipment**: wrapped parcel from Item 2; ribbon or string
   **Score**: use of prosthesis to assist with tying
   **Special Instructions**: N/A

Sew on a button
4. **Item**: cut length of thread (cotton) from spool (reel)
   **Equipment**: scissors; spool of thread (reel of cotton)
   **Score**: method of stabilizing spool and thread
   **Special Instructions**: N/A

5. **Item**: thread needle
   **Equipment**: sewing needle; thread from Item 4
   **Score**: method of threading needle
   **Special Instructions**: may use wire needle-threading aid if desired
6. **Item**: sew button to shirt  
**Equipment**: needle and thread; shirt; button  
**Score**: method of stabilizing button and shirt  
**Special Instructions**: N/A

*7. **Item**: cut meat with knife and fork  
**Equipment**: knife and fork; meat (eg. hot dog) or plasticine; plate  
**Score**: method of holding knife and fork  
**Special Instructions**: N/A

*8. **Item**: wash and dry dishes  
**Equipment**: plate, knife and fork from Item 7; towel, soap and water  
**Score**: use of prosthesis to hold dishes or towel  
**Special Instructions**: N/A

9. **Item**: sweep floor  
**Equipment**: broom  
**Score**: method of holding broom  
**Special Instructions**: N/A

10. **Item**: sweep up pile of dust  
**Equipment**: dust pan and brush  
**Score**: method of stabilizing dust pan and brush  
**Special Instructions**: N/A
6.12 Ages 11-13 - Subtest #3

Make a salad

1. **Item:** slice a tomato  
   **Equipment:** tomato; sharp knife  
   **Score:** use of prosthesis to hold tomato or knife  
   **Special Instructions:** N/A

2. **Item:** scrub with vegetable brush  
   **Equipment:** carrot; brush; sink with running water  
   **Score:** use of prosthesis to hold carrot or brush  
   **Special Instructions:** N/A

3. **Item:** grate a carrot  
   **Equipment:** vegetable grater; carrot  
   **Score:** use of prosthesis to hold carrot or grater  
   **Special Instructions:** N/A

4. **Item:** open jar of salad dressing  
   **Equipment:** bottle of salad dressing  
   **Score:** method of opening jar  
   **Special Instructions:** N/A

5. **Item:** toss salad  
   **Equipment:** salad; salad fork and spoon  
   **Score:** method of tossing salad  
   **Special Instructions:** N/A
6. **Item**: strike a match  
**Equipment**: book of cardboard matches  
**Score**: method of stabilizing book of matches while tearing one off and striking  
**Special Instructions**: N/A

7. **Item**: place paper money in billfold  
**Equipment**: billfold; paper money  
**Score**: method of placing money in billfold  
**Special Instructions**: N/A

8. **Item**: use paper punch  
**Equipment**: 3-hole paper punch; several sheets of paper  
**Score**: method of stabilizing paper  
**Special Instructions**: N/A

9. **Item**: open binder  
**Equipment**: 3-ring binder; several pages with holes punched from Item 8  
**Score**: method of opening binder  
**Special Instructions**: N/A

10. **Item**: open can with metal pull ring or adhesive closure  
**Equipment**: small juice or pop can small enough to fit in terminal device  
**Score**: use of prosthesis to stabilize can or pull tab  
**Special Instructions**: N/A
7.0 RATING SCALE – UNB TEST OF PROSTHETICS FUNCTION

A. Spontaneity of Prosthetics Function

Immediate, automatic, consistent use of terminal device for active grasp 4

Slightly delayed or inconsistent use of terminal device for active grasp 3

Very delayed, occasional or "last resort" use of the terminal device (either for active grasp or passively) 2

Use of prosthesis proximal to terminal device only 1

Prosthesis not used or used only on request 0

B. Skill of Prosthetics Function

Active use of terminal device is quick, skilled and smooth. Grasp is consistently maintained. 4

Active use of terminal device, shows some degree of awkwardness, slowness or uncertainty, Grasp is readily regained when lost 3

Active use of terminal device is attempted, but looks very slow or awkward. Grasp is frequently lost or regained with difficulty. 2

No active terminal device function, although terminal device or some other part of prosthesis may be used passively to stabilize or support. 1

Prosthesis not used 0
Child’s Name: _____________________  Age: □2-4   □5-7   □8-10   □11-13
Examiner’s Name: __________________ Assessment Centre: __________________

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