

THE UBET

A UNILATERAL TEST OF BELOW ELBOW FUNCTION

ACPOC 2006

Workshop A



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OUTLINE

- Introduction
 - Rationale for development
 - General review of UBET
 - Statistical analysis
- Administration
 - Test items
 - Scoring
- Implications

Unilateral Below Elbow Test

–A new functional evaluation tool designed for children with unilateral congenital below elbow limb deficiency (UCBED)

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HISTORY

- **Shriners Hospitals Multi-Center Outcomes Grant Project in 1999**



TO DETERMINE THE FUNCTION OF CHILDREN with UCBED:

- **Measure how prosthesis wearers use their prosthesis**
- **Measure how non wearers use their residual limb**
- **Compare ability to perform task with and without prosthesis**

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TO DETERMINE THE FUNCTION OF CHILDREN with UCBED:

- **For different age appropriate tasks,
measure extent of completion of task
and method of use with and without
prosthesis**

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NEW FUNCTION TEST NEEDS TO BE:

- **Reliable**
- **Valid**
- **Age appropriate**
- **Quick to administer**

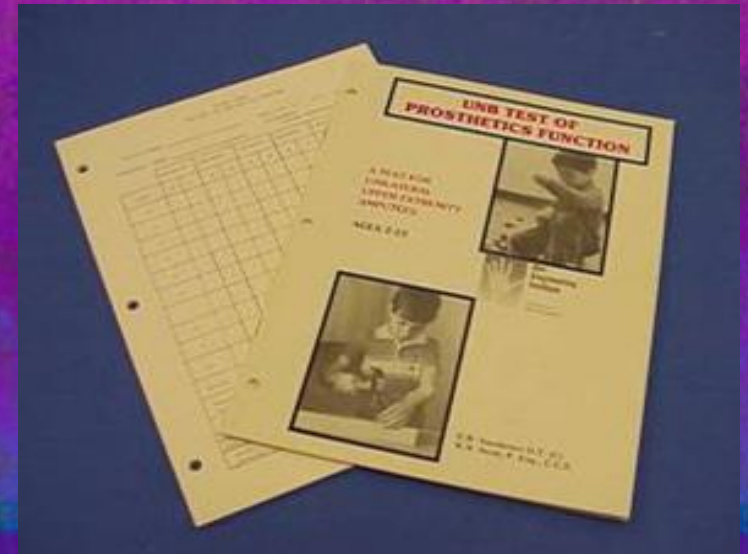


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REVIEW OF EXISTING TOOLS

- University of New Brunswick Test of Prosthetic Function met criteria for:
 - Use of prosthesis
 - Completion of task



HOWEVER

- **No tool available to compare children who wear a prosthesis to those who do not wear a prosthesis**
- **No tool to compare ability of prosthetic wearers to perform task with and without their prosthesis**

DEVELOPMENT OF A NEW TOOL

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DEVELOPMENT OF UBET

- **Criteria**
 - ✓ **Appropriate for wearers and non wearers**
 - ✓ **Appropriate for children ages 2 through adulthood**



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DEVELOPMENT OF UBET

- **Criteria**
 - ✓ Incorporate assessment of function and completion of task
 - ✓ Incorporate FM, GM and ADL skills
 - ✓ Correlate with tasks from the PUF1 and UNB



DEVELOPMENT OF UBET

- **Criteria**
 - ✓ Video taped evaluation
 - ✓ OT administered and interpreted



UBET

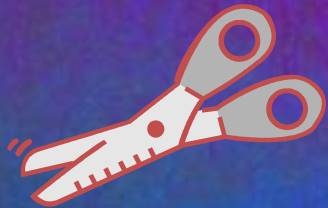
- Video Based Evaluation Tool
- Four Age Specific Categories
 - Nine tasks in each Category
- Two scoring scales
 - Method of Use
 - Completion of Task

UBET: 2-4 YEAR OLDS



1. Take Play-Doh® out of plastic baggie
2. Bang cymbals together
3. Put sock on foot
4. Thread beads
5. Open a jar of bubbles
6. Ride on a Roller Racer™
7. Open bag with drawstring and dump Duplos® out
8. Separate Duplos®
9. Open a new box of 8 crayons and remove one

UBET: 5-7 YEAR OLDS



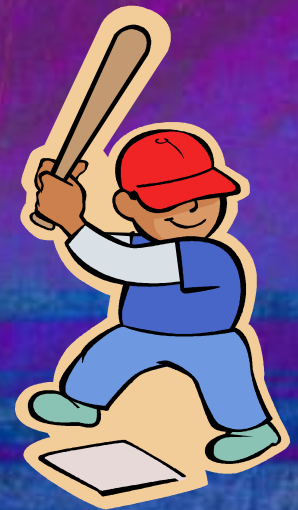
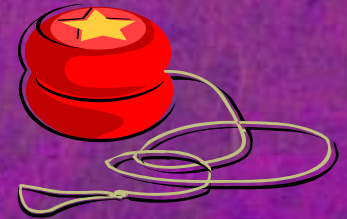
1. Cut a paper circle from construction paper
2. Remove cap from felt tip marker
3. Sharpen pencil
4. Do buttons on vest
5. Tie shoelaces into a knot
6. Turn kaleidoscope
7. Separate Legos®
8. Use bow and arrow
9. Ride on Rolling Racer™



UBET: 8-10 YEAR OLDS



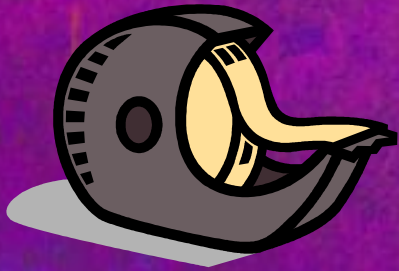
1. Swing a bat
2. Wind a yo-yo string onto the yo-yo
3. Open a Band-Aid
4. Tie shoelaces into a bow
5. Do buttons on shirt
6. Make a telescope with Paper and rubber band
7. Place glove on unaffected hand
8. Draw a line with a ruler
9. Start zipper on vest



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UBET: 11-20 YEAR OLDS



1. Cut paper from a roll to wrap a videotape
2. Tear a piece of tape
3. Secure wrap on videotape with tape
4. Cut putty on plate with knife and fork
5. Open a 3-ring binder
6. Start zipper on vest
7. Tie shoelaces into a bow
8. Do buttons on shirt
9. Use dust pan and small broom

METHOD OF USE SCORE

Coding	For Patients Wearing Prosthesis	For patients Not Wearing Prosthesis
A	Active Grasp of Terminal Device	Residual Limb end manipulation and/or stabilization
P	Passive Use of prosthetic terminal device or forearm	Forearm Stabilization
E	Elbow or trunk grasp	Elbow or Trunk Grasp
N	No use of affected limb	No Use of affected limb

COMPLETION OF TASK SCORE

Score	Performance of Task
4	Completes task with no difficulty. Movements are quick and smooth. Stability is maintained throughout task.
3	Completes task with minimal (25%) difficulty. Movements are quick, but slightly awkward. Stability is readily regained when lost.
2	Completes task with moderate (50%) difficulty. Movements are slower and awkward.
1	Completes task with maximal (75%) difficulty. Movements are very slow and awkward. Stability is frequently lost.
0	Unable to complete task.

**Inter- and Intra- Rater
Reliability Testing for
the
Unilateral Below Elbow
Test
(UBET)**

COMPLETION OF TASK

ORDINAL Scale 0-4

0 : Unable to complete task

1 : Maximum difficulty (75%), very slow, awkward, loses stability

2 : Moderate difficulty (50%), slow, awkward

3 : Minimal Difficulty (25%), slightly awkward, regains stability

4 : No Difficulty; Quick, smooth; stability is maintained

COMPLETION OF TASK

0 – Unable to complete task



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COMPLETION OF TASK

1- Maximal Difficulty



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COMPLETION OF TASK 2 - Moderate Difficulty



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COMPLETION OF TASK 3 – Minimal Difficulty



COMPLETION OF TASK 4 – No Difficulty



INTER-RATER RELIABILITY TESTING

12 Occupational Therapists thoroughly trained viewed videotapes of 9 children performing the UBET

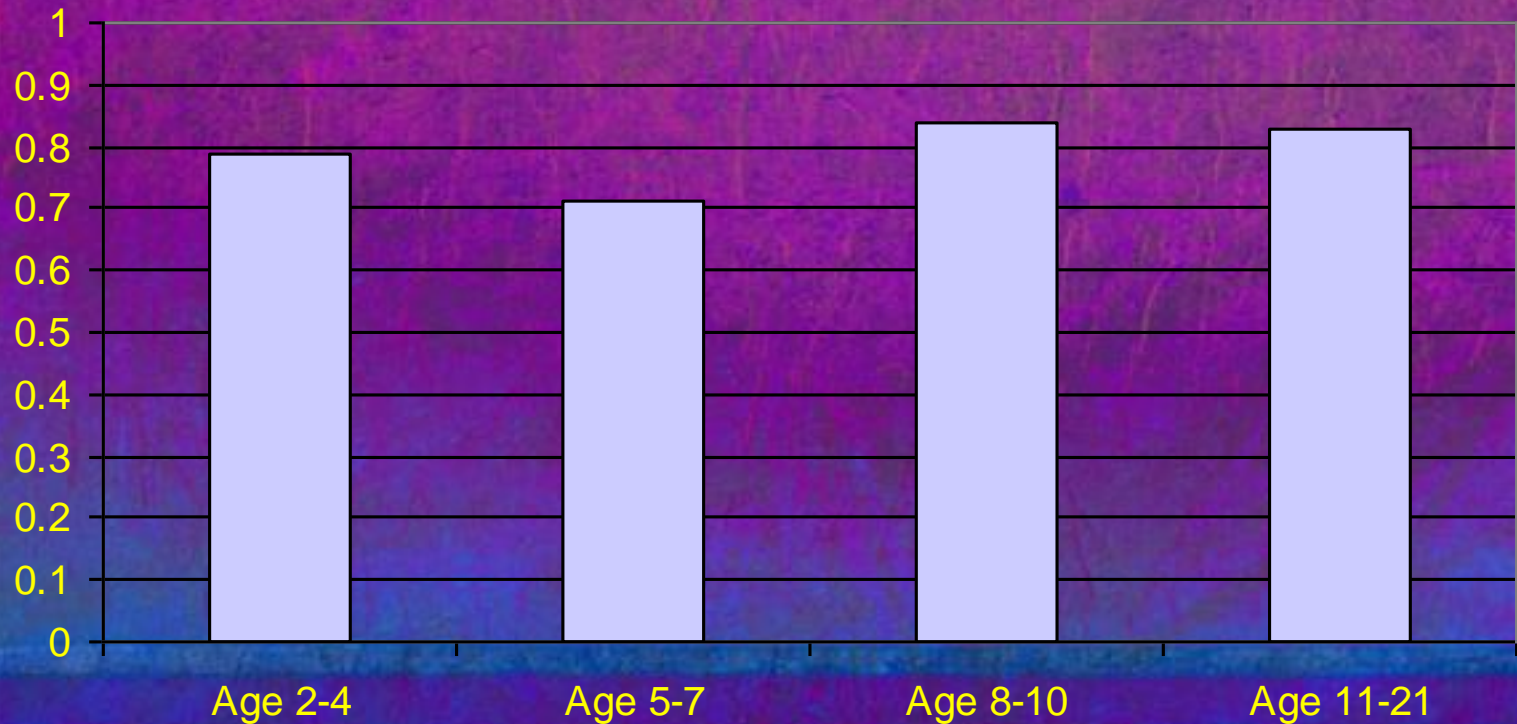
Therapists independently rated each child's performance on each task

COMPLETION OF TASK DATA

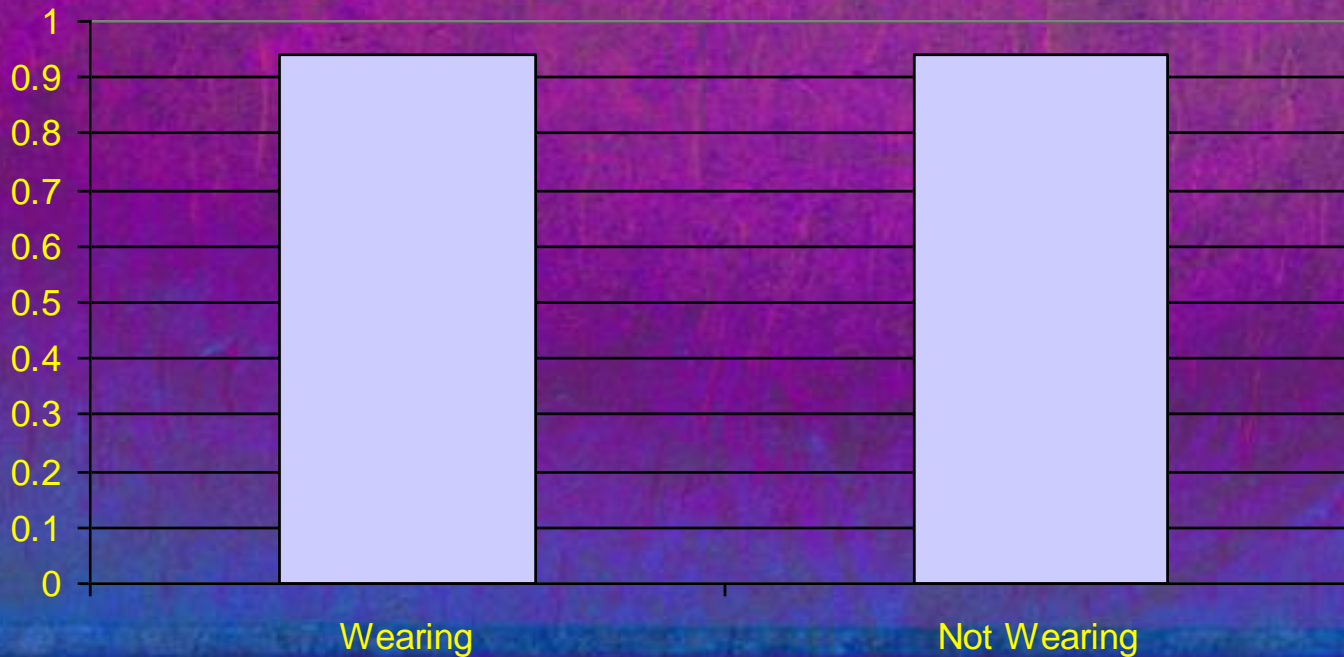
Overall a Spearman *rho* coefficient of .98



COMPLETION OF TASK BY AGE



COMPLETION OF TASK BY WEARER



METHOD OF USE SCORE

- A – Active Use
- P – Passive Use
- E – Elbow or Trunk Grasp
- N – No use of Affected Side

METHOD OF USE

Score A – Active



Wearer

Active Grasp Terminal
Device



Non-Wearer

Residual Limb End Manipulation
and/or Stabilization

METHOD OF USE

Score P - Passive



Wearer

Passive use of Prosthetic
Forearm or Terminal Device



Non-Wearer

Forearm Stabilization

METHOD OF USE

Score E – Elbow or Trunk Grasp



Wearer

Elbow or Trunk Grasp



Non-Wearer

Elbow or Trunk Grasp

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METHOD OF USE

Score N – No use of limb



Wearer

No Use of Affected Limb

Non-Wearer

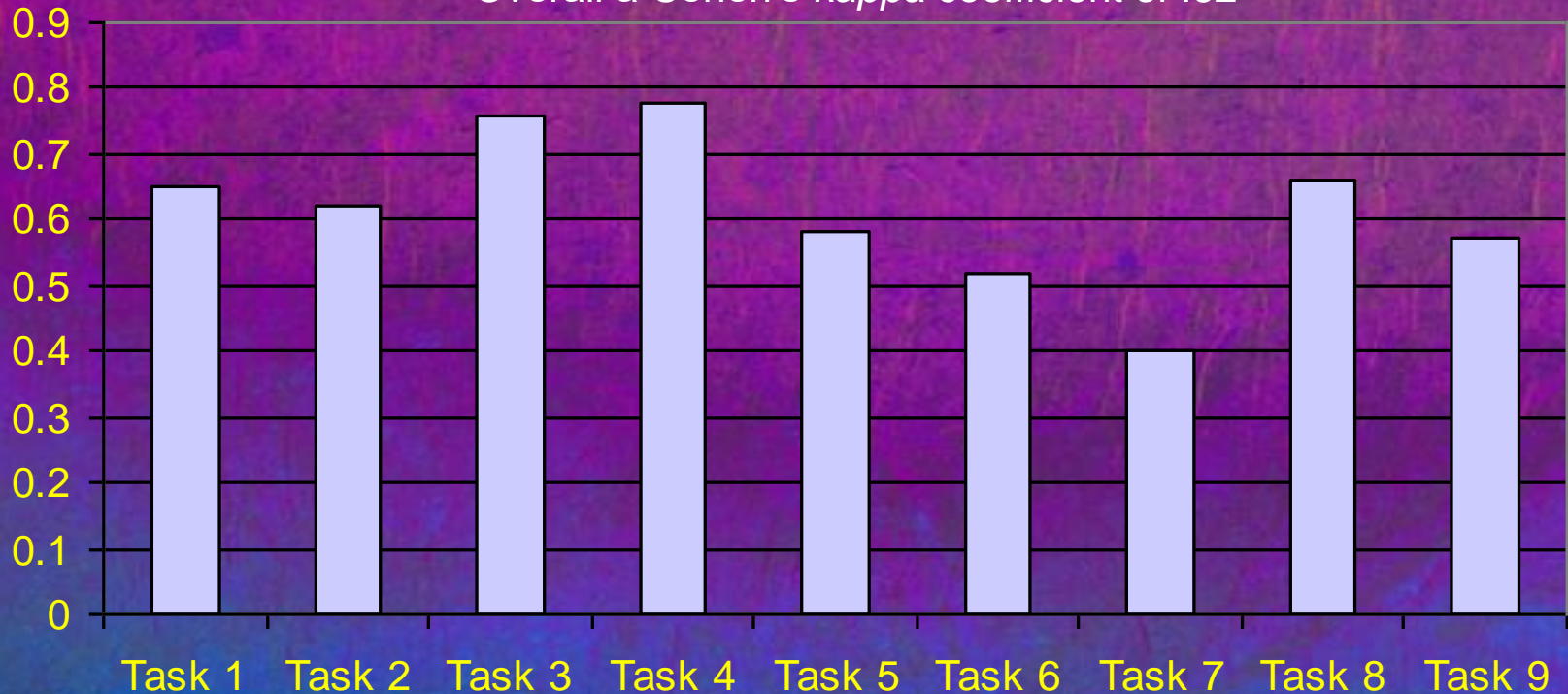
No Use of Affected Limb

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METHOD OF USE

Overall a Cohen's *kappa* coefficient of .62



METHOD OF USE DATA

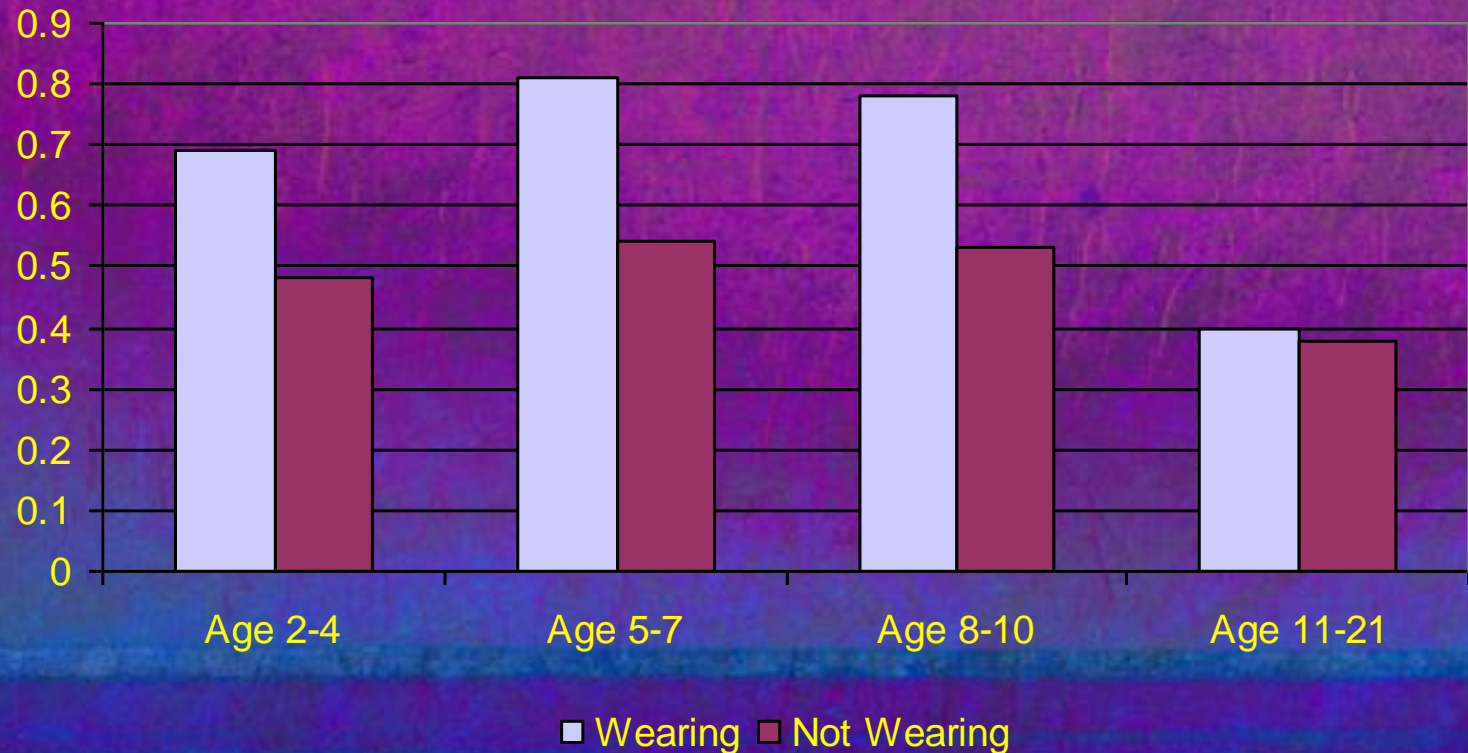
Coefficients by age group range
(0.43 to 0.68)

Coefficients for scoring the prosthesis
on and off conditions
(0.71 and 0.51)

INTER-OBSERVER TESTING FOR METHOD OF USE

- The 4 therapists who were most consistent amongst themselves in Method of Use Scoring performed reliability testing using larger sample sizes
- Therapists were paired and scored an additional 40-59 subjects

Method of Use by Prosthesis Condition, Age and Task



INTRA-OBSERVER TESTING FOR METHOD OF USE

- Three therapists re-scored Method of Use for a subject sample from their hospital
- Sample sizes varied from 27-32 subjects

INTRA-OBSERVER RELIABILITY: METHOD OF USE

Prosthesis on condition

.70 to .85

Prosthesis off condition

.43 to .64

INTRA-OBSERVER RELIABILITY: METHOD OF USE

- 2 – 4 year olds : .68
- 5 – 7 year olds : .69
- 8 – 10 year olds: .73
- 11 – 21 year olds: .57

SUMMARY

COMPLETION OF TASK

The UBET has good inter-observer reliability globally for the Completion of Task scoring

SUMMARY

METHOD OF USE

Good Inter- and Intra-Rater Reliability
for the prosthesis on condition
when all ages are combined

SUMMARY

METHOD OF USE

Moderate Inter- and Intra-Observer
Reliability for the
Prosthesis Off Condition
When All Ages are Combined

SUMMARY

METHOD OF USE

Inter-Observer Reliability for
Method of Use is
Fair for the Oldest Age Group

ADMINISTRATION

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SET-UP

- Equipment
 - Developed to incorporate common tasks
 - All items can be purchased to exact specifications as listed
 - Should have 4 age specific test kits

VIDEO GUIDELINES

- Focus on open and close function of prosthesis
- Adjust angle of camera during tasks
- Use swing away table
- Restrain long hair and remove caps
- Roll shirtsleeves up past elbow

PRESENTATION

- Present tasks in sequence given
- Present in midline
- No right or wrong way to perform tasks
- Verbal cues only EXCEPT for Rolling Racer, Telescope Making, and Bow and Arrow
 - if you must demonstrate, document