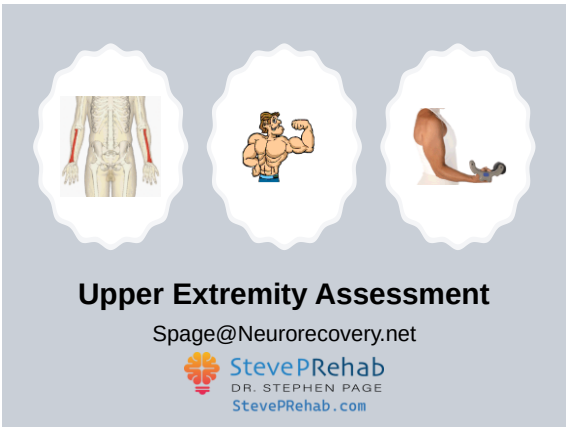

Upper Extremity Assessment
Spage@Neurorecovery.net
StevePRehab
DR. STEPHEN PAGE
StevePRehab.com

1


The Neurologic UE Parts I and II
Part I: Impairments and Preparation
Part II: A Multilevel Approach to Restoration and Compensation

2


Where Can I Find The “Best” Stroke Measures?

3

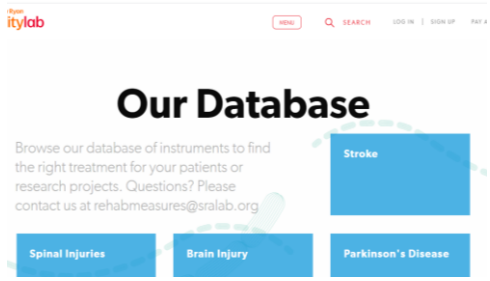
Web sites for stroke specific outcome measures

- StrokEngine *Assess*

The Internet Stroke Center, Washington University, St. Louis, MO

4

https://www.sralab.org/rehabilitation-measures



5

The Brunnstrom stages
(according to Brunnstrum)

- **Stage 1**: The first stage is flaccidity. The whole hemiparetic side is completely limp. The arm, the leg, the torso, the face including the mouth and tongue, the whole body on one side is flaccid or limp.
- **Stage 2**: The second step is where spasticity starts to creep into the effected side of the body. Spasticity is generally seen as a positive step because it signals the beginning of some sort of messages getting through to the limbs. There may be some small amount of voluntary synergistic movement available.
- **Stage 3**: Spasticity may become severe during this stage. That is the bad part of stage 3. The good part is that voluntary control of synergies develops.

Movement Therapy in Hemiplegia: a Neurophysiological Approach

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The Brunnstrom stages…

- **Stage 4** During stage 4, spasticity begins to decline. Stage 4 also is the stage where some movement outside of synergy is possible.
- **Stage 5** Synergies continue to decline. Folks in stage 5 are able to have more voluntary control
  out of synergy and spasticity continues to decline.
- **Stage 6** This is the final stage and, if this stage is achieved, movements are near normal and spasticity absent except when fatigued or performing rapid movements. Individual joint movements become possible and coordination approaches normal.

Movement Therapy in Hemiplegia: a Neurophysiological Approach

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The Brunnström stages simplified

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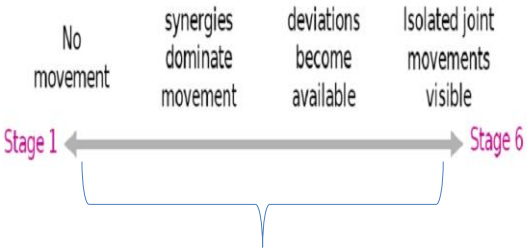
The Fugl-Meyer



Captures Most Levels

9

Characteristics of the Fugl-Meyer

- All parts of the UE
- Well-established (1975) → Insurance likes it
- "Highly Recommended" in all settings (StrokeEdge)
- Any time post stroke
- Correlated with functional outcomes (*but not functional*)
- *Hierarchical = fast*
- Few equipment needs

https://www.sralab.org/rehabilitation-measures/fugl-meyer-assessment-motor-recovery-after-stroke

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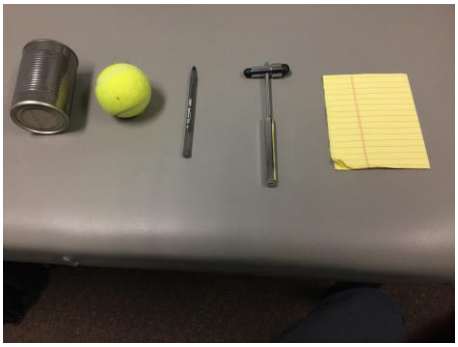

11

ARM MOTOR FUGL-MEYER

- Unaffected side is assessed first: 2 reasons
  - Tester can see what "normal" looks like
  - Participant can demonstrate they understand
- Up to three attempts are allowed and the best performance is scored
- Use as a "dive in" to other measures
- ***Most*** items are scored on a 3-point scale:
  - **0 = cannot perform**
  - **1 = performs partially**
  - **2 = performs fully**

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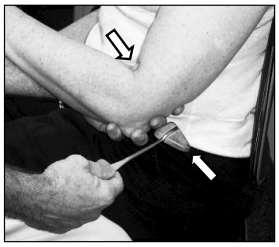
ARM MOTOR FUGL-MEYER
Reflex-Activity

0 = NO reflex activity
2 = YES reflex activity

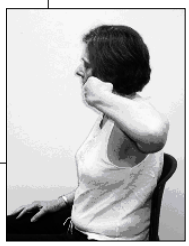
This is the only task that is scored 0 or 2;
Everything else is 0,1, 2



13

ARM MOTOR FUGL-MEYER
Dynamic Movement Within Flexor Synergy

- **Retraction** of the shoulder girdle
- **Elevation** of the shoulder girdle
- **Abduction** of the GH joint
- **External rotation** at the GH joint
- **Elbow flexion**
- **Supination** of the forearm



0 = cannot perform
1 = performs partially
2 = performs fully

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Flexor synergy testing: Anterior

15

Flexor synergy: Posterior

16

ARM MOTOR FUGL-MEYER
Dynamic Movement Within Extensor Synergy

- **Adduction/Internal Rotation** of the shoulder
- **Elbow extension**
- **Pronation** of the forearm

0 = cannot perform
1 = performs partially
2 = performs fully

17

Extensor synergy

18

ARM MOTOR FUGL-MEYER
Hand to lumbar spine

Score:
0 = Hand does not move posterior to the ASIS

1 = Hand does move posterior to the plane

2 = Hand is placed on the small of the back equal to the unaffected side

Hand= FROM WRIST CREASE ON

19

Hand to back

20

ARM MOTOR FUGL-MEYER
Shoulder flexion to 90˚ with elbow at 0˚

Score:
0 = Participant cannot achieve the testing position
OR elbow flexion occurs at the onset of shoulder flexion
OR there is no shoulder flexion

1 = Elbow flexion occurs following the onset of shoulder flexion OR shoulder flexion does not reach 90˚

2 = Elbow remains fully extended equal to or greater than the unaffected side and shoulder flexes to 90˚

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ARM MOTOR FUGL-MEYER
Pronation/Supination with elbow at 90˚

The
"shake hands"
position

22

ARM MOTOR FUGL-MEYER
Abduction to 90˚

Assessed by asking the participant, "rest your arm at your side; without bending your elbow bring your arm out to shoulder height; be sure not to bend your elbow and keep your palm facing the floor; do it like this (demonstrate)."

0 = Participant cannot achieve the testing position
OR elbow position is lost the onset of AB
1 = Elbow flexion/supination occurs following the onset of AB
OR AB does not reach 90˚
2 = Elbow remains fully extended and forearm remains pronated equal to or greater than the unaffected side and AB is to 90˚

23

Abduction

24

ARM MOTOR FUGL-MEYER
Shoulder flexion 90° to 180° with elbow at 0° and forearm in neutral

Starting position: The participant must begin with the arm outstretched with 90º of shoulder flexion and with the elbow fully extended to 0º in order to score > 0.

25

ARM MOTOR FUGL-MEYER
Pronation/Supination with elbow at 0° and shoulder between 30° and 90° of flexion

Starting position: The participant must begin with the arm outstretched with the elbow fully extended to 0º. If this is not possible, support is given just proximal to the elbow to stabilize the humerus in the correct position. Elbow extension cannot be assisted.

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ARM MOTOR FUGL-MEYER
Wrist stability with wrist in 15° extension and elbow at 90

Slight downward pressure

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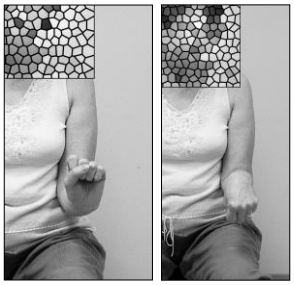
ARM MOTOR FUGL-MEYER
Wrist mobility with the elbow at 90˚



Forearm pronated

28

ARM MOTOR FUGL-MEYER
Wrist stability with wrist in 15˚ extension and elbow at 0˚
and shoulder between 30˚ and 90˚ of flexion

- The examiner may provide support just proximal to the elbow to stabilize the humerus in the correct position.
- Elbow extension cannot be assisted.

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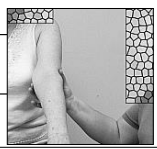
ARM MOTOR FUGL-MEYER
Wrist mobility with the elbow at 0˚
and shoulder between 30˚ and 90˚ of

Forearm pronated



The examiner may provide support just proximal to the elbow to stabilize the humerus in the correct position. Elbow extension cannot be assisted.

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ARM MOTOR FUGL-MEYER
Circumduction of the wrist

Resting position on lap

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ARM MOTOR FUGL-MEYER

Mass flexion

Mass extension

Support allowed

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ARM MOTOR FUGL-MEYER
Grasp A (hook)

- The MCPs are extended and the DIPs and PIPs are flexed.
- Resistance is applied in a pulling motion only if the participant can achieve the testing position.

The "shake hands" position- support allowed

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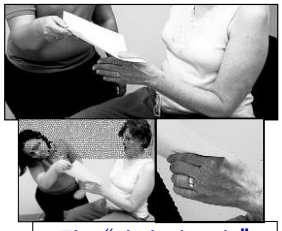
ARM MOTOR FUGL-MEYER
Grasp B (thumb adduction)

- The MCPs, DIPs, and PIPs are extended to 0˚.
- Paper is placed between the pad of the thumb and the radial surface of the 1st MCP joint if the participant can achieve the testing position.
- The paper is pulled away only if the participant can achieve the grasp in the correct testing position.



The "shake hands" position- support allowed

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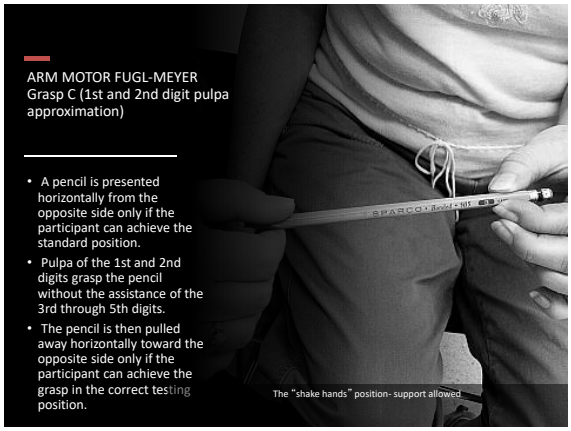

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ARM MOTOR FUGL-MEYER
Grasp D (1st and 2nd digit cylindrical)

- A can is presented from the opposite side only if the participant can achieve the standard position.
- The volar surface of 1st and 2nd digits interpose the can without assistance from the 3rd through 5th digits.
- Resistance is applied in a pulling motion toward the opposite side only if the participant can achieve the grasp in the correct testing position.

The "shake hands" position- support allowed

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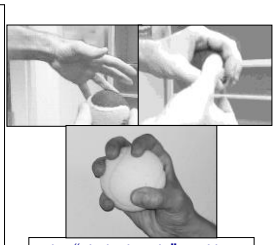
ARM MOTOR FUGL-MEYER
Grasp E (spherical)

- A tennis ball is presented only if the participant can achieve the standard position.
- Distal and volar surfaces of all digits interpose a tennis ball.
- All digits must be in contact with the ball.
- Resistance is applied in a pulling motion toward the opposite side only if the participant can achieve the grasp in the correct testing position.



The "shake hands" position-support allowed

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ARM MOTOR FUGL-MEYER
Coordination/Speed

Tremor:
0 = Marked tremor
1 = Slight tremor
2 = No tremor

Dysmetria:
0 = Pronounced or unsystematic dysmetria
1 = Slight and systematic dysmetria
2 = No dysmetria

Speed:
0 = At least 6 seconds slower than the unaffected side
1 = Between 2 and 5 seconds slower
2 = Less than 2 seconds slower

Knee to nose, 5x, rapidly as possible

ADD: distance

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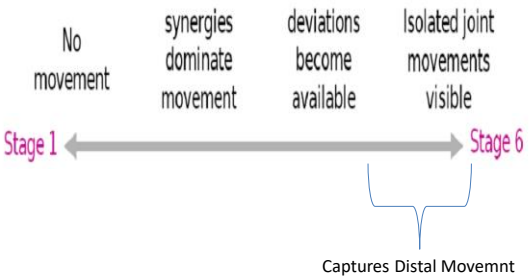
The ARAT
(in your notes)



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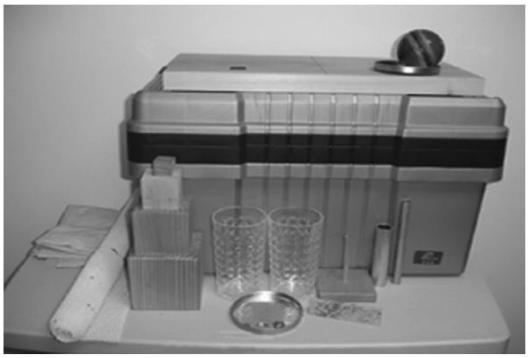
Characteristics of the Action Research Arm Test

- Distal parts of the UE (mostly)
- Moderate to minimally impaired UEs
- Well-established (1981)
- "Recommended" in all settings (StrokeEdge)
- Any time post stroke
- Correlated with functional outcomes (*but not functional*)
- Moderate equipment needs
- Can be used in other dx's

https://www.sralab.org/rehabilitation-measures/action-research-arm-test

40



Yozbatiran et al; *Neurorehabil Neural Repair* 2008; 22; 78

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Task Material	Dimensions
Table	Height, 75 cm; width, 76 cm; depth, 49 cm
Chair	Height of seat 46 cm from floor; no arm rests
Shelf (or box on the table)	37 cm above level of table
Four wooden blocks	10.0, 7.5, 5, and 2.5 cm^3, respectively
Large alloy tube	Diameter, 2.5 cm; length, 11.5 cm
Small alloy tube	Diameter, 1 cm; length, 16 cm
Cricket ball	Diameter, 7.1 cm
Marble	Diameter, 1.6 cm
Sharpening stone	10.0 × 2.5 × 1 cm
Ball bearing	6-mm diameter
Two plastic tumblers	Upper diameter, 7 to 8 cm; lower diameter, 6 to 7 cm; height, 12 to 15 cm

Yozbatiran et al; *Neurorehabil Neural Repair* 2008; 22; 78

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Task Material	Dimensions
Washer	Outer diameter, 3.5 cm; inner diameter, 1.5 cm
Plank for the tubes	
Starting point	1.5 × 8.5 × 8.5 cm
Target point	3.5 × 8.5 × 34 cm
Bolt for the large alloy tube	
Starting position	Round wooden peg; diameter, 2.0 cm; height, 13.5 cm
Target position	Round wooden peg; diameter, 2.0 cm; height, 8.0 cm
Bolt for the small alloy tube	
Starting position	Round wooden peg; diameter, 0.8 cm; height, 6.0 cm
Target position	Round wooden peg; diameter, 0.8 cm; height, 6.0 cm
Plank for the washer	1.5 × 8.5 × 8.5 cm
Bolt for the washer	Round wooden peg; diameter, 0.8 cm; height, 8.5 cm
Tin lid	Diameter, 9 cm; rim height, 1 cm

Yozbatiran et al; *Neurorehabil Neural Repair* 2008; 22; 78

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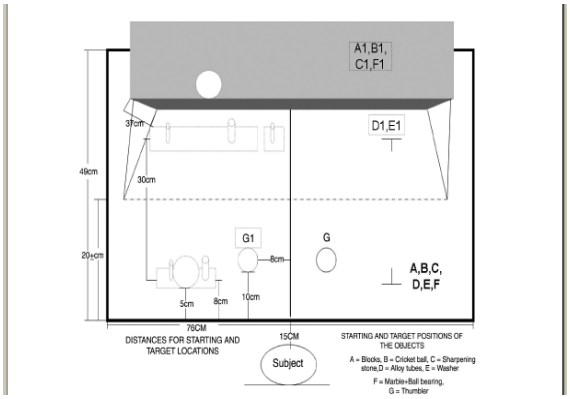

Yozbatiran et al; *Neurorehabil Neural Repair* 2008; 22; 78

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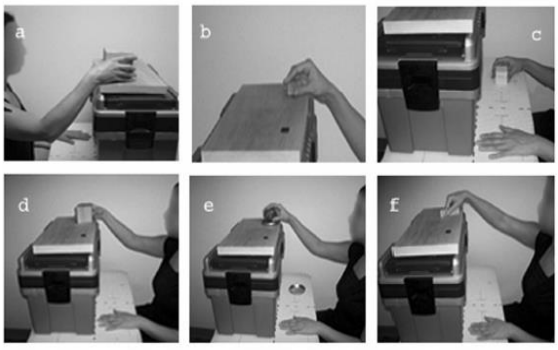

Yozbatiran et al; *Neurorehabil Neural Repair* 2008; 22; 78

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ARAT Scoring, simplified

0 – cannot perform the activity at all. Usually no movement.

1 – Can initiate and/or perform some pieces of the movement but is very messy and/or very slow. May drop items several times.

2 – The performance resembles the less affected UE but is slow and/or a little clumsy

3 – Looks like less affected UE

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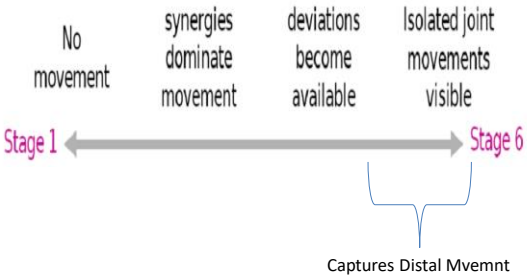
The AMAT
(manual and example in your notes)



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Arm Motor Ability Test (AMAT)

- All parts of the UE
- Moderate to minimally impaired UEs (frustrating for max impaired)
- Well-established (1997)
- "Recommended" in all settings ***EXCEPT acute*** (StrokeEdge)
- Any time post stroke
- Functional
- Substantial equipment needs
- Can be used in other dx's

https://www.sralab.org/rehabilitation-measures/arm-motor-ability-test

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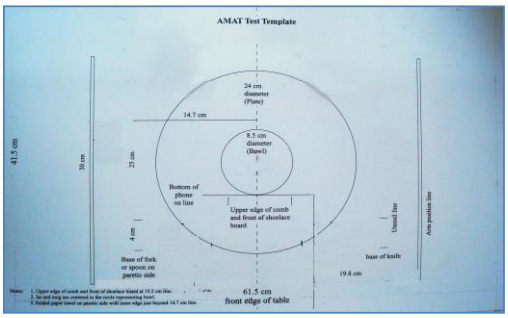
AMAT-9
(Ohio Modified Arm Ability Test)



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AMAT Scoring

- 0 = They didn't even try. No movement.
- 1 = Tried and there is some movement. Completely non-functional, no ability to weight-bear.
- 2 = Movement/Task accomplished, but it is ugly. *Really* ugly.
- 3 = Movement/ Task accomplished but with synergy or its uncoordinated
- 4 = Movement close to normal, but: slightly slower, or less coordinated of movement
- 5 = Normal

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See AMAT Manual To Review the Tasks in Detail

1. *Cut "meat"*
2. *Foam sandwich*
3. *Eat with spoon*
4. *Comb hair*
5. *Open Jar*
6. *Tie shoelace*
7. *Use telephone*
8. *Put on cardigan*
9. *Put on T-shirt*

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Questions?

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