



MANUAL MUSCLE TESTING IN THE PEDIATRIC POPULATION

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History

- Medical Research Council's 5 point scale
 - Used by many physicians
 - Used in previous studies (Florence 1984)
 - Use of +'s and -'s, between whole numbers
 - Expansion of the 5 point into 10 points; but not validated



Kendall's 10 point scale

- Introduced in 1993
- Utilizes 0-10 scale
- Eliminates +'s and -'s
- Easier for statistical analysis



Reliability of 10 point scale

- Intrarater and Interrater reliability established
- 9 children with Juvenile dermatomyositis
- 4 raters tested 26 muscle groups
- Results:
 - Intrarater reliability : above .70
 - Interrater reliability: above .60



Muscles tested:

- **Sternocleidomastoid**
(neck flexors)
- **Gluteus Maximus**
(hip extensors)
- **Gluteus Medius**
(hip abductors)
- **Deltoid middle**
(shoulder abductors)
- **Quadriceps**
(knee extensors)
- **Extensor Carpii Radialis**
(Wrist Extensors)
- **Tibialis Anterior**
(ankle dorsiflexors)
- **Biceps Brachii**
(elbow flexors)



Testing Position with commands:

- **Upper Trapezius** (shoulder elevators)
 - Sitting
 - Supine (gravity eliminated)
- **Command**
 - “Now watch me, turn your head like I do and shrug your shoulder up (demonstrate test position). Now I’m going to try to push your shoulder and head apart and you hold it and don’t let me push it apart.”



Testing Position with commands:

- **Deltoid middle** (shoulder abductors)
 - Sitting
 - Supine (gravity eliminated)
- Command
 - “Hold your arm up in the air like this (demonstrate), and I’m going to push down here and you hold it. Don’t let me push it down, hold it up there as hard as you can”



Testing Position with commands:

- **Biceps Brachii** (elbow flexors)

- Sitting
- Supine (gravity eliminated)

- Command

- “Bend your elbow, now don’t let me pull your arm down. Hold it hard and don’t let me pull it out.



Testing Position with commands:

- **Extensor Carpii Radialis** (wrist extensors)

- Sitting
- Supine (gravity eliminated)

- Command

- “Bring your hand back like this (demonstrate) and hold it while I try to straighten it out. Don’t let me straighten your hand. Be strong.”



Testing Position with commands:

- **Quadriceps** (knee extensors)
 - Sitting
 - Supine (gravity eliminated)
- **Command**
 - “Kick your leg out so it is straight. Now hold it straight while I try to bend your knee. Be strong and keep it straight.”



Testing Position with commands:

- **Tibialis Anterior** (ankle dorsiflexors)

- Sitting
- Supine (gravity eliminated)

- **Command**

“Bring your foot up like this (demonstrate), now hold it up while I try to push it down. Don’t let me push it down.”



Testing Position with commands:

- **Sternocleidomastoid** (neck flexors)
 - Sitting
 - Supine (gravity eliminated)
- **Command**
 - “Bring your head up off the table, now hold it up there. Now hold it up there while I try to push it down and don’t let me push it. Hold it as hard as you can. ”



Testing Position with commands:

- **Gluteus Medius** (hip abductors)

- Sitting
- Supine (gravity eliminated)

- **Command**

- “Can you lie on your side? Now can you lift your leg up in the air? Make sure you keep your knee straight. Now hold it up there while I try to push your leg. Hold it hard. Be strong!!”



Testing Position with commands:

- **Gluteus Maximus** (hip extensors)
 - Sitting
 - Supine (gravity eliminated)
- **Command**
 - “Lie on your belly, and bend your knee. Now try to lift your whole leg up in the air (demonstrate passively). Hold it there, while I try to push down and don’t let me push it down. Hold it hard.”



Performing Muscle Resistance

- Grades 6-10--Begin resistance gradually, increasing to moderate resistance on the limb, hold for 3 seconds
- Grades 3-5—Re-test these grades for the next highest grade after 60 seconds of recovery time.
- Grade 5—Hold test position for 3 seconds



Performing Muscle Resistance

- Grade 4—Gradual descent from testing position to resting position should last 3 seconds.
- Grade 3—Assigned to muscles in the “Against Gravity” testing position
- Grade 1-2—Adjust range of motion criterion to adjust for contractures.
- Grade 0-T—Use skilled clinicians to determine the correct grade. Minimal movement (T grade)

