

Guide to Manual Muscle Testing – Polio

People who have lived with Polio may now be experiencing new symptoms. These may include new or increased weakness and fatigue, muscle and /or joint pain, muscle atrophy, swallowing difficulties and cold intolerances. This may present functionally as new limitation to walking, lifting, getting up from a chair or bed, increased tendency to fall and more difficulty with usual tasks.

The accepted cause is due to deterioration of the distal axons of the enlarged motor units plus the loss of motor neurons. Muscles which appear to be unaffected can have significant denervation and so both the affected and clinically unaffected muscles can be involved. Various causes may also attribute to weakness including disuse, overuse, immobilisation and decreased activity eg after hospitalisation.

Gaining accurate baseline information for strength, flexibility and joint stability is important to enable appropriate planning for exercise programmes and for establishing what other interventions may be required. It is also useful in conjunction with a thorough gait analysis as muscle testing can help explain gait patterns.

When a person is able to identify areas of difficulties they should be investigated further with appropriately targeted testing for joint instabilities, bursitis, nerve entrapment, ligamentous strain or tendonopathies. These secondary effects may have developed as a result of postural changes, joint and muscle tightness, or increasing reliance on walking aids placing more load on extremity joints.

As in all assessments a good subjective history should be taken to establish where the client has functional difficulties, new weaknesses and instabilities, and any new or worsening areas of pain.

Muscle assessment

A complete muscle assessment is needed to identify which muscle groups are weak and need to be focused on, and which joints have limited movement or need protection. This forms a baseline for future assessments and to formulate an appropriate strengthening programme

It is important to test each muscle group for fatiguability as a single contraction may give a false impression of functional strength. It is recommended each muscle is tested 3 consecutive times. Due to fatigue, a single contraction may give a false impression of strength as a one-off movement may be strong while sustained or repeated movement will highlight a lack of endurance.

Fatigue is multifactorial and can be general, physical, mental and emotional. It can impact on the musculoskeletal assessment. Consideration should be made for the time of day that the assessment is performed (generally more tired at the latter part of the day), the duration of the assessment, how many other services the client has been to that day before the manual testing is performed.

The client should be tested in a position that fully supports them eg supine, or supported sitting for the upper limb. Clients with severe deformity such as scoliosis may not be able to lie down.

Range of Movement

Usual orthopaedic range of movement (ROM) scale is used for passive and active ranges.

Active and passive ROM recorded for all limbs, neck and spine.

Limitations in expected range could be due to weakness, contractures or deformity and both active and passive ROM should be assessed.

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Strength

Consistency with the testing procedure is critical. For example, changing where the application of force is applied affects the length of the lever arm and therefore the muscle torque - shorter lever arms will provide higher testing scores when compared to using longer lever arms.

The test should be completed on the uninvolved or stronger side first to determine what normal strength is before being repeated on the involved side.

Strength is recorded through full active range and also isometric resistance at mid-range.

If full range is not achieved eg only gains $\frac{3}{4}$ range in a good movement pattern, then the strength is marked down as the client must reach full range.

Oxford scale

Oxford scale is used.

- 0 – No contraction present
- 1 – Flicker contraction
- 2 – Full ROM, gravity eliminated
- 3 – Full ROM against gravity
- 4 – Full ROM against gravity + added resistance
- 5 – Muscle function normal

Grade 3, movement against gravity, is a good guide to indicate if recovery is achievable as generally Grade 3 and above can be strengthened but Grade 2+ and below are unlikely to get higher. As a general rule the use of + / - to the score increases the level of subjectivity to the testing and should be avoided.

Documentation

Scoring and describing each test - shoulder flex 3/5 through range, 4/5 isometric mid-range

Scoliosis

Clothing needs to be removed so that the shoulder and scapular movement can be observed as kypho-scoliosis impacts on shoulder movement.

All trunk movement is tested – flexion, extension, side flexion (fingertip to lateral knee) and rotation in unsupported sitting.

Requesting the client to bend down to pick up an object from the floor can be used as a test and can highlight compensatory movements.

Plan

From the muscle assessment an appropriate management programme can be planned which can include endurance and strengthening regime, joint protection, use of orthotic and equipment, a programme of home exercises.

Prescription of exercises may need to be specific ie % of 1 Max that is suitable for the client if the client is returning to another provider for ongoing care.