EXERCISE AND JM

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OBJECTIVES

- Assessment of Muscle Strength and Function
  - MMT
    - DESCRIBE MMT 8
  - CMAS
    - REVIEW TEST ADMINISTRATION
MANUAL MUSCLE TESTING
FUNCTIONAL TASKS
**Advantages**

- Quantitative muscular assessment: very objective and reproducible
- Hand held dynamometry: objective, easy to use with children
- Manual muscle testing: ease of administration, can be administered at any location with any level of strength
- Functional tasks: no need for specialized equipment
DISADVANTAGES

- Quantitative muscular assessment: very expensive, time consuming, intimidating for children
- Hand held dynamometry: expensive, children have difficulty understanding instructions
- Manual muscle testing: subjective, subjective, moderate to low inter-rater reliability for individual muscles, esp with mild weakness
- Functional tasks: difficult to quantify changes
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
WHY MMT??

- Widely used in myositis clinical trials as part of primary endpoint
- Commonly and easily used in clinics to follow patient progress, responses to therapy
- Accepted by rheumatologists and neurologists
- Validated tool:
  - Excellent internal reliability
  - Very good to excellent inter- and intra-rater reliability (total scores, not individual muscles)
  - Good construct validity: correlation with other measures of myositis activity
  - Excellent sensitivity to change
Development of the Core Group of 8 Muscles:

- Neck flexors
- Deltoids
- Biceps
- Wrist extensors
- Gluteus maximus
- Gluteus medius
- Quadriceps
- Ankle dorsiflexors
CHILDHOOD MYOSITIS ASSESSMENT SCALE
OBJECTIVES

- Provide participants with background and validity information on the Childhood Myositis Assessment Scale

- Participants will be able to perform and score all 14 maneuvers of the Childhood Myositis Assessment Scale
BACKGROUND

- Designed to assess proximal muscle strength, function, and endurance for children with idiopathic inflammatory myopathies from 2 years to adulthood

- 14 maneuvers developed from 2 existing tools

- Originally published in 1999
VALIDITY

- 108 children with juvenile IIM were evaluated twice using various measures of physical function, strength, and disease activity

- Very good interrater reliability

- Good construct validity

- Moderate to strong responsiveness in large cohort of children with juvenile IIM
BASICS

- All 14 maneuvers are to be assessed, one after the other, in the order listed on the CMAS Scoring Sheet.

- Items needed: stop watch, exam table, chair, stepstool

- Takes approximately 10-15 minutes to administer

- Patients serve as their own control for serial testing
OBJECTIVES:

- Review of literature
- Current recommendations for exercise
OUTDATED PERSPECTIVE

- No exercises prescribed
- Believed exercise may cause muscle damage and increase inflammation (studies show an increase in muscle inflammation after strenuous ex – i.e. marathoners)
- Concern of development of calcinosis in areas of stress within the muscle (now known to be a complication of active and uncontrolled jdm)
- “waiting” for pharmacological intervention to take effect
REVIEW OF LITERATURE

- Malliard 2005
- 10 children with definite or probable JDM were subjected to a single bout of strengthening exercise
- Strength was assessed via HHD – neck flexors, shoulder abductors, hip abductors, knee extensors and hamstrings
- Muscle inflammation measured via MRI T2-weighted images of the thigh..before exercise, immediately after exercise and 60 mins post exercise
- No significant muscle inflammation was noted
Children with rheumatic diseases who are sedentary develop secondary impairments: aerobic impairments, muscle weakness, decreased bone strength, and functional limitations.

"Increased levels of moderate to vigorous physical activity and structured exercise may improve exercise capacity, performance of daily activities, and overall quality of life."
Omari 2010

Set of monozygotic twins, one with JDM, one without

Started on a 16 week ex program –combined strength training and aerobic ex on the treadmill

At the end, both exhibited an increase in the ability to use more weight with their strengthening ex, aerobic ex.

No significant change was noted with MMT, but noted changes with CK levels.
Omari 2012

A structured 12 week aerobic and strengthening exercise program in 10 children helped improve:

- Strength via: MMT
- CMAS was improved (combination of strength and endurance skills)
- VO2 improved
- PEDS-QL improved
- Resting HR decreased
Review of Literature

- Haber 2012
- 30 kids, 8-18 yrs of age, with JDM, enrolled in ex program
- Including aerobic (treadmill) 3-4 X/wk
  - Interval training
- Strengthening 2-3 X/wk
  - Interval training
- Goal of the study was to provide efficacy of a structured aerobic and strengthening program in children with JDM
Review of Literature

- Riisager 2013
- 10 patients (16-42 yrs of age), in remission from JDM
- 12 week cycle ergometer exercise program
- VO2 max was determined before and after intervention
- 8 pts completed the study, one stopped at 9 wks and one dropped out of the study.
- Training increased VO2 max and W max by 26% and 30%
EXERCISE PRESCRIPTION

- While each child should be evaluated individually, the literature suggests it is safe to prescribe aerobic and strengthening exercises in children with JDM, supervised by the medical/rehab team.
- It is best to evaluate current function using the assessments available: MMT, CMAS, CHAQ.
- Start them on the exercise program and then re-evaluate in 10-12 weeks, using the same assessments.
Table 13.1. Exercise and disease activity.*

<table>
<thead>
<tr>
<th>Exercise Type</th>
<th>Myositis Disease Activity</th>
<th>Muscle Strength Level</th>
<th>Exercise Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active Assisted ROM, Passive ROM</td>
<td>Initial Diagnosis, Flare</td>
<td>Below Gravity</td>
<td>Active Assisted ROM, Passive ROM</td>
</tr>
<tr>
<td>Active Assisted ROM, Passive ROM</td>
<td>Severe Activity</td>
<td>Against Gravity</td>
<td>Isometric Strengthening Stretch, Active Assisted ROM, Active ROM</td>
</tr>
<tr>
<td>Moderate Activity</td>
<td>Mild to Moderate Activity</td>
<td></td>
<td>(Light) Recreational, Light Aerobic, Isometric Strengthening, Stretch, Active ROM</td>
</tr>
<tr>
<td>Mild Activity</td>
<td>Mild Activity</td>
<td></td>
<td>Recreational Aerobic, (Low Weight) Isotonic and Isometric Strengthening, Stretch, Active ROM</td>
</tr>
<tr>
<td>Inactive</td>
<td></td>
<td></td>
<td>Recreational Aerobic, PRE, Isotonic and Isometric Strengthening, Stretch, Active ROM</td>
</tr>
</tbody>
</table>

*Specific exercises are modified based on bone density levels.

Abbreviations: ROM = range of motion; PRE = progressive resistance exercise.
PASSIVE RANGE OF MOTION
ACTIVE-ASSISTED RANGE OF MOTION
STRETCHING EXERCISES
STRETCHING EXERCISES
ISOMETRIC STRENGTHENING
RESISTANCE TRAINING
RESISTANCE TRAINING
AEROBIC EXERCISES
AEROBIC EXERCISES
AEROBIC EXERCISES
QUESTIONS??

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Thank you

CURE JM
Drs. Rider and Mellins
All of our patients