AACPDM Instructional Course #25

Alberta Infant Motor Scale (AIMS): A Clinical Refresher and Update on Evaluation of Normative Data

Purpose: This course will present updated information pertaining to the administration of the AIMS, interpretation of scores, and the validity of the normative data.

Target Audience: Physicians and Occupational Therapists, Physical Therapists, and Nurses.

Course Summary: Common scoring issues will be identified and discussed. The interpretation of percentile rank scores will be reviewed incorporating the results of a longitudinal study evaluating the stability of AIMS scores over time. The results of a recent study that re-evaluated the validity of the present normative data will be shared and the implications discussed. This study is based on data from the recent assessments of 650 Canadian infants. Course participants will have an opportunity to view videos and discuss their scores together. In addition, participants will score one AIMS assessment video independently and the presenters will provide them with e-mail feedback regarding their item-by-item agreement with the gold standard scoring. Previous experience with the AIMS is beneficial as this instructional course is not an AIMS training course but rather an opportunity to share experiences using the AIMS and to ask questions about clinical and research use of the AIMS. Participant discussion will be encouraged.

Learning Objective 1: To discuss common administration and scoring issues using the AIMS

Learning Objective 2: To understand the interpretation of an AIMS percentile score and how to present it to families and caregivers

Learning Objective 3: To discuss the results of a recent study re-evaluating the normative data

Learning Objective 4: To receive personal feedback on scoring of an AIMS assessment

Questions to Students for Course Feedback

1. What would you include in your interpretation of an infant’s score to parents/caregivers?
2. Are the normative data still representative of infants’ motor abilities?
3. Identify one way that your administration of the AIMS has changed after attending this instructional course

Course Format
Darrah (15 min): Introduction and Course Objectives
How have you used it?
Review of AIMS history and uses

Bartlett (15 min): Extent of AIMS use in Research

Darrah (20 min) Scoring Issues and Interpretation of Percentile Ranks – what to tell parents/caregivers

Break 10 minutes

Bartlett (25 min) The Normative Re-evaluation – why we did it, how we did it and what we learned

Darrah/Bartlett (20 min) Let’s Practice – scoring a videotaped assessment together and discussing scoring issues and scoring interpretation

Participants (15 min) Score a videotaped assessment independently. Course instructors will score the assessments and provide electronic feedback to individual participants regarding their item-by-item agreement with a ‘gold standard’ score obtained from expert consensus.

Background Information

- for use with infants from birth until independent walking
- observational assessment

Psychometric Properties

Inter-rater Reliabilities (One Occasion)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Reliability</th>
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<tbody>
<tr>
<td>Total</td>
<td>.99</td>
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<tr>
<td>0-3 mo.</td>
<td>.95</td>
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<tr>
<td>4-7 mo.</td>
<td>.96</td>
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<tr>
<td>8-11 mo.</td>
<td>.98</td>
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<tr>
<td>12 mo.+</td>
<td>.95</td>
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Intra-rater Reliabilities (Over Time, Same Assessor)

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Inter-rater Reliabilities (Over Time, Different Assessors)

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<td>.86</td>
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Concurrent Validity - Normal Infants

AIMS with Peabody .99
AIMS with Bayley .97
Normative Data

- 2202 infants
- 0-18 months, stratified by age and gender
- representative sample from urban and rural health units accessible population included all infants - preterm, full-term, and infants with congenital anomalies who were born in Alberta between March 1990 and June 1992
- each assessment performed in the infant's health unit by one of 6 physical therapists
- no gender differences

Format

- Observational

- Four Subscales (58 items):
  -- prone (21)
  -- supine (9)
  -- sit (12)
  -- stand (16)

- Each item has:
  -- descriptors weight bearing posture antigravity movement (short description) (prompt)
  -- line drawing
  -- graph
  -- photograph(s)
Administration Guidelines

- administered to infants 18 months or younger

- administered by healthcare professional with:
  -- an understanding of essential components of each item
  -- skill in the observational assessment of movement
  -- established reliability on the items

- materials: examining table (0-4 months)
  - mat or carpeted area
  - toys for infants 0-18 months
  - stable bench for pull to stand

- preparation

- parental involvement

- positioning, not facilitation

- prompting: specified if required
  - toys used to motivate

- issues of: sequencing
  - number of trials
  - bi-directional items

- scoring: observed/not observed
Scoring Procedure

- score after observing the infant move
- key descriptors on score sheet must be observed to give credit for an item
- item must be observed to receive credit
- no parent report

1. Identify the least mature 'observed' item in a subscale
2. Identify the most mature 'observed' item in a subscale
3. The items between these two items represent the infant's motor 'window' for the subscale
4. Score each item in the 'window' as 'observed' or 'not observed'
5. Credit 1 point to each item below the least mature 'observed' item
6. Credit 1 point to each item scored 'observed' in the motor 'window'
7. Sum the points to obtain a subscale score
8. Sum the 4 subscale scores to obtain a total AIMS score

Plotting the Score: 2 methods

Percentile Graph

Percentile Table
Uses and Limitations of the AIMS

1. Identification of Motor Delay

- 0-18 months
- identifies current gross motor performance of an infant compared to norm-referenced sample

2. Predictive Abilities

- cut-offs established for 4 and 8 month old assessments
- 10\textsuperscript{th} \%tile at 4 months and 5\textsuperscript{th} \%tile at 8 months provide best balance of sensitivity and specificity
- ages older than 8 months, 5\textsuperscript{th} \%tile recommended, but has not been formally evaluated

3. Evaluation of Motor Skills

- measures change in an infant's motor performance over time
- monitor change in infants demonstrating delayed/immature motor skills but who have essentially normal patterns of movement
- NOT appropriate to measure change over time in infants who are demonstrating atypical patterns of movement, eg. an infant with a diagnosis of cerebral palsy

4. Planning

- assists in identifying missing components of a motor skill
Re-evaluation of the Normative Data

WHY?
- the ‘back to sleep’ campaign initiated internationally in the early 1990s and concern that the current age of appearance of some infant gross motor abilities may be later because of the introduction of supine sleep position
- the changing ethnic diversity of Canadian infants
- concern that the AIMS norms are not applicable to infants in other countries and it would be beneficial to provide them with a feasible statistical method to compare their infants AIMS data with the normative data.

HOW?
- Study design mirrored the design of the original normative project.
- recruitment of 845 infants from six Canadian cities. Fifty-four preterm infants (8%) were included in the recruitment strategy to represent the prevalence rate of preterm births in Canada
- Each infant was randomly assigned an assessment age in one of the three age categories
- Trained therapists assessed the infants and sent scoresheets to project coordinators

RESULTS
- 650 infants (338 male) completed an assessment.
- For 11 items, the ages when 50% of the infants passed the item were younger in the contemporary data, for the remaining 47 items the ages were older. The average age difference between original and contemporary item sets was .85wk.
- most items differed by 2 weeks or less in the age when 50% of the infants passed the item and the average age difference between the age locations was 0.7 wk
- the correlation coefficient between the two sets of age locations was 0.99,
Percentile rank values from the original data were converted to contemporary values. The difference is 10 days or less for infants 12 months or younger and the maximum difference is 15 days at 18 months of age.