THE TEST OF INFANT MOTOR PERFORMANCE

Suzann K. Campbell, PT, PhD, FAPTA
Infant Motor Performance Scales, LLC
Professor Emerita
University of Illinois at Chicago

PURPOSES OF THE TIMP

➢ Use by physical and occupational therapists to identify infants with motor delay before 5 months corrected age (CA)

➢ Plan intervention programs
  ▶ Nursery- and community-based

➢ Document change
  ▶ In motor performance over time
  ▶ With intervention

TIMP CONSTRUCTS

➢ Postural control
  ▶ control of position in space for stability and orientation
  ▶ stability is ability to maintain c of m within base of support
  ▶ orientation is alignment of body segments

➢ Selective control

Statement of Interests

➢ SKC is part- owner and manager of Infant Motor Performance Scales, LLC, the exclusive publisher of the TIMP and the TIMPSI

34 wks. post-menstrual age (PMA) to 4 months post-term (corrected age, CA)

OBSERVED ITEMS

13 Items

➢ Selective control
➢ Midline alignment
➢ Quality of movement (GMA)
  ▶ Fidgety
  ▶ Ballistic
  ▶ Oscillating
ELICITED ITEMS
29 Items

- Postural control
  - anti-gravity
  - organized synergies
  - in functional context
  - elicited by natural handling
  - predictive

ANTI-GRAVITY HIP FLEXION Response

- TIMP has age standards for performance that reflect the U.S. population of high risk infants
- Infants were sampled to reflect proportions of infants in each racial/ethnic group in the U.S. low birthweight population
- Infants were recruited from 13 nurseries in 11 cities across the U.S. (Campbell et al, PPT 2006)

ROLL FROM LEG Response

ORIENTATION TO SOUND

Evidence for Identification of Delayed Development

- TIMP has age standards for performance that reflect the U.S. population of high risk infants
- Infants were sampled to reflect proportions of infants in each racial/ethnic group in the U.S. low birthweight population
- Infants were recruited from 13 nurseries in 11 cities across the U.S. (Campbell et al, PPT 2006)
Standards provide means to compare infants being tested to normative values from the national sample of infants.

Tested 990 infants: 67-97 in each 2-week age range from 34 weeks postmenstrual age (PMA) through 17 weeks corrected age (CA).

Latino/a and high risk infants performed less well than other groups.

Test manual provides table of norms for comparing raw scores to the age standards for diagnosis of delay.

Results in Other Populations

- Studies in Brazil and the Netherlands suggest that age standards are appropriate for these populations.
- No information on TIMP performance in Australian infants.

Longitudinal Development: By Risk Group

<table>
<thead>
<tr>
<th>post-term age at testing in days</th>
<th>full term</th>
<th>low risk preterm</th>
<th>very low birthweight</th>
<th>bpd</th>
<th>cns</th>
</tr>
</thead>
<tbody>
<tr>
<td>140</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>100</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-60</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Midline head control

Pull-to-sit head control

RN DWKS

RN DWKS
Evidence for Usefulness in Planning Intervention Programs

- Illustrated test form showing developmental changes expected
- Studies showing handling in test related to mothers’ handling during bathing, dressing, and play
- Studies of usefulness of the test for parent education

ILLUSTRATED TEST FORM

- Shows photos of infants performing each level of each item's rating scale
- Enhances value for parent education
- Multi-cultural sensitivity

ECOLOGIC RELEVANCE OF THE TIMP

- In videotaped bathing, dressing, and play interactions with caregivers
  - 98% of TIMP items observed
  - modal infant experienced 37% of items
  - TIMP-related demand occurred 1.5 times per minute
  - approximately half of all demands were TIMP-related (Murney & Campbell, PT 1998)

FREQUENCY OF OCCURRENCE

- Hip/knee flexion 95%
- Standing 91%
- Rolling from arms 64%
- Pull to sit 64%
- Head midline with visual stim 55%
- Supported sit 55%
- Prone suspension 50%

- Diapering
- Place in stand
- Turn side during dressing
- Bring to sitting
- Show toy
- Place in sitting
- Turn prone while dressing

Studies of Value for Parent Education

- Goldstein found that observation of a TIMP increased knowledge of premature infant development in African–American low-income mothers who also retained information on activities to work on (Goldstein & Campbell, PPT 2008)
- Dusing found that viewing a videotaped TIMP was one preferred method for parents to learn about infant development (Dusing et al, PPT 2008)
Evidence of Ability to Document Change with Intervention

- Three clinical trials have shown that TIMP scores are sensitive to the effects of intervention
  - NDT provided for 34-wk PMA infants in the nursery
  - TIMP used to identify preterm infants with delay at nursery discharge who showed benefits of a home program
  - Sensory stimulation program with or without oral-motor program in the nursery

RESULTS OF FIRST CLINICAL TRIAL

A group of preterm infants (n=9) treated with NDT had better scores on a pilot version of the TIMP than an untreated control group (n=10). Furthermore, treated infants performed more like a group of full-term infants (n=8) in their postural control (Girolami & Campbell, PPT 1994).

CLINICAL TRIAL RESULTS

84 preterm infants in Thailand who scored poorly on the TIMP at 40 weeks PMA were randomly assigned to home physical therapy program versus regular care. Program reviewed monthly from discharge to 4 months. Infants who received intervention performed significantly better on the TIMP at 4 months CA and as well as a comparative group of infants who had done well on the TIMP at 40 weeks PMA (Lekskulchai & Cole, Aust J PT 2000).

Average TIMP Scores for Study Groups

- Oral–motor stim alone improved weight gain
- Tactile–kinesthetic stim improved weight gain
- Tactile–kinesthetic stim, with or without oral stimulation, improved motor performance on the TIMP (Fucile & Gisel, Neo Network 2010)
- One additional study of a massage and sensory stimulation program for dual-risk infants did NOT show differences on the TIMP or Bayley III Scales (White-Traut, unpublished data)
TIMP SCREENING ITEMS

- Age standards for a shorter screening version of the TIMP, the TIMPSI, were derived from the same 990 infants in the normative study.
- Performance compared on the TIMP and the TIMPSI over a 3-day period leading to recommendations for cutoffs to use in making clinical decisions (see TIMP manual).
- Scoring form places items in developmental order based on Rasch analysis (Campbell et al., PPT 2008).

AIDS TO LEARNING THE TIMP

- Self-instructional program is available from IMPS, LLC.
- See Research page at www.thetimp.com for a complete list of publications related to the TIMP, the TIMPSI, and also the Harris Infant Neuromotor Test (HINT).
- TIMP manual summarizes research on reliability and validity of the test.
- Hints for clinical practice:
  - Learning the test