The task of raising from supine position to the upright standing position as a measure of motor competence across the life span

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Aims of this presentation

1. To explore the Supine to Stand task conceptual and operational definitions
2. To argue that STS with a time constraint is a valuable tool to measure motor competence across the life span;
3. To describe some results of STS time performances in childhood, adolescence, adult and elderly Brazilian samples.
Supine to Stand task as a motor competence measure – conceptual and operational definitions -

✓ The study of human development across the lifespan assumes that age related change in motor behavior is a lifelong phenomenon (VanSant, 1990)

✓ In the motor domain we routinely observe changes in motor actions in children and adolescents via object control, locomotor and balance skills.

✓ Balance skills refers to maintaining a position, whether stationary or moving, in two aspects:

(1) Aligning body segments (attain and maintain the equilibrium)

(2) Righting the body (bringing the body in alignment as we move from one position to another)

(Haywood, Roberton & Getchell, 2012)
The RIGHTING TASK “Supine to Stand” (STS)

STS is a complex sequence of whole-body movements which has the goal to transferring oneself from the supine position on the floor to the upright standing position.

- It can be considered a developmental milestone and indicator of the health status of individuals (Nesbitt, 2016);
- The STS task have been investigated by Ann VanSant since 1980 decade; she proposed lifespan developmental sequences and provided us with a framework for movement categories and progressions in normally developing children and adults.
Also, STS task could be a very useful measurement for **motor competence (MC)**.

We are defined MC as: “… a global term to encompass all forms of goal-directed tasks involving coordination and control of the human body.” (p.124, Cattuzzo et al, 2016)

But, in the deeper understanding MC, is the Bernstein notion about dexterity/skill:

“… the ability to find a motor solution for any external situation, that is, to adequately solve any motor problem.” (p.228, Bernstein, 1996)

In this way, MC is a phenomenon that deals with the ability of the perceptual-motor system to meet its goals when challenged for it, or better, when the motor system has to respond some perturbation (Cattuzzo, not published).
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Also, STS task could be a very useful measurement for motor competence (MC).

Is this the case of the Supine to Stand task as a motor problem to solve? We are defined MC as: the ability to find a motor solution for any external goal-directed tasks involving coordination and control of the human body (Bernstein, 1996, p.228).

“… a global term to encompass all forms of goal-directed tasks involving coordination and control of the human body.” (Cattuzzo et al., 2016, p.124)
✓ For typical development in younger individuals, the **patterns of movement** to perform such complex sequence is a problem to solve, **but not for all the ages**...

**Most common form of rising to a standing position**

**Children (5 yrs old)**

**Adults (mean age= 28.6 year)**

(VanSant, 1988)
The STS with constraint of time

- Previous assessment of STS has included the instruction to rise as quickly as possible (VanSant, 1988a, 1988b; Ng et al., 2013; Nesbitt et al., 2016; Nesbitt, 2016);

- “Rise from the floor as quickly as possible” = it is a challenge to motor competence, because the individual (child, adolescent, adult, elderly) has to use his/her resources (energetic/control and coordination) in order to solve such motor problem;

- The ability to rise from the floor quickly demonstrates more effective control of coordinated body segment movements (i.e., increased function) (Nesbitt, 2016);

- Is an useful measure to use in extensive data collection because the instructions are few and simple, easy to understand for all ages,

- It is practical and low cost since and the requirements of equipment is limited.
STS time performance in the phases of life (from childhood to old age) in a Brazilian sample – preliminary data

MATERIAL AND METHOD

Participants: convenience samples* of five specific age ranges were recruited to participate in this study, in Brazil. These age groups cover developmental stages of early childhood, middle childhood, adolescence, middle adulthood and old age.

* Prior to participation, the study was approved by the University’s Human Subject Review Board and personal or parental consent and verbal assent from all participants was obtained.
MATERIAL AND METHOD

Place: Testing was completed in a gymnasium and/or designated indoor area.

Material: Camera and a tripod;

Procedures: STS individual performances were video recorded (side view); the participants started in a supine position with their hands by their side, legs extended, and their heels placed on a line which was on the floor, far 30 cm from the wall.
- A “go” command prompted participants to stand as quickly as possible and touch a spot on the wall;
- Individuals performed five trials;
- No verbal instruction or demonstration on how to rise was given;
- Time between trials was self-selected to minimize fatigue; for the elderly participants, the test administrator remained behind for help, if necessary.

Measurement: using Dartfish-7 video analysis software, the STS time was calculated from the frame of the first movement to the frame when the participant touched the spot on the wall.
RESULTS - descriptive analysis

As expected, in average terms, the younger children and elderly participants showed longer STS time than later children, adolescents and adults.
RESULTS - descriptive analysis

STS_time by age – Brazilian sample
Some previous results about STS with constraint of time

<table>
<thead>
<tr>
<th></th>
<th>Early childhood</th>
<th>Middle childhood</th>
<th>Adolescents</th>
<th>Young Adults</th>
<th>Middle adults</th>
<th>Elderly</th>
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<tbody>
<tr>
<td>Ng et al. (2013)</td>
<td>2,08 s (3-7 y)</td>
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<td>Brazilian sample (2017)</td>
<td>2,38 s (3-5 y)</td>
<td>1,91 s (7-10 y)</td>
<td>1,79 s (13-17)</td>
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<td>2,12 s (35-45 y)</td>
<td>6.35 s (65-90 y)</td>
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<tr>
<td>Nesbit et al. (2017)</td>
<td>2,39 s (3-6 y)</td>
<td>1,64 s (9-12 y)</td>
<td>1,71 s (13-17 y)</td>
<td>1,73 s (18-25 y)</td>
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- This is a comparison with other samples and with our data and we have found some similar results across age.
FINAL CONSIDERATIONS

✓ The current study examined the performance of STS during childhood to old age in a Brazilian sample;
✓ We assume that the STS task with time restriction is a challenge for the motor system and, reinforcing previous studies (Nesbitt, 2016; Nesbitt et al, 2017), we propose it can be a valuable tool for measure MC and present this phenomenon throughout life;
✓ We need to examine some health factors as BMI and physical activity;
✓ These are preliminary data, and we hope to improve these analyzes with more data collection and share with partners.
THANK YOU!

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