Effects of the Interactive Metronome on Memory Process and Balance with Aging Adults 60+ Population

Leonard Trujillo, PhD. OTR/L, FAOTA, East Carolina University

Note: All Training and assessment were done using modified IMLF and IM training sessions. Clients elected to remain in a chair facing the IM activities were all Upper Extremity based. Initially clients were given the option of standing or sitting; all of them moved to a sitting position and therefore all interventions were done in this manner. Repetitions began at 120 per activity and lasted 30 min moving to 45 min for each training session. The maximum number of repetitions was 275 without changing activities.

N=9, Ages 60 – 80
Training:
1. Pre-Assessment-
   12 sessions over 2 months
   Re-Assessment
2. Break for 6 Weeks-
   Re-Assessment
3. 6 sessions over 1 month-
   Re-Assessment
4. Overall Post Assessment

Assessments
- IM Long Form Assessment
- IM Short Form Assessment
- D2 Test of Attention
- Woodcock Johnson
  - Decision Speed
  - Visual Matching
  - Math Fluency
  - Reading Fluency

*All notable changes are given the assumption that all participants were in fact healthy normal aging adults and yet they made changes.

Modified IM Long Form Assessment*
- After 1st first round of 12 sessions on IM: 78% improvement
- Overall gains after a total of 18 sessions: 77% improvement

IM Short Form Assessment
- After the first round of 12 sessions on IM: 28% improvement
- Overall gains after a total of 18 sessions: 31%

D2 Test of Attention
- After the first round of 12 sessions on IM: 15% improvement
- Overall gains after a total of 18 sessions: 16% improvement
  - Implications improved ability to stay focused and attend to more difficult tasks and task over time

<u>Woodcock Johnson</u>
- Math Fluency
  - After the first round of 12 sessions: 17% improvement
  - Overall gains after a total of 18 sessions: 23% improvement
- Reading Fluency
  - After the first round of 12 sessions: 11% improvement
  - Overall gains after a total of 18 sessions: 12% improvement
- Decision Speed
  - After the first round of 12 sessions: 2% improvement
  - Overall gains after a total of 18 sessions: 5% improvement
- Visual Matching
  - After the first round of 12 sessions: 1% improvement
  - Overall gains after a total of 18 sessions: 4% improvement

<u>4 Step Square test of Balance</u>
- After the first round of 12 sessions: 67% improvement
- Overall gains after a total of 18 sessions: 88% improvement
  - Implications improved speed and balance, improved sense of balance and confidence in independent walking and other daily tasks
  - This includes ability to dress and bath with confidence

<u>Nine Hole Peg Test - Manual dexterity changes</u>
- After the first round of 12 sessions: 2% improvement
- Overall gains after a total of 18 sessions: 3% improvement
  - Implications improved fine motor and dexterity improved sense of accuracy and confidence in independence in other daily tasks
  - This includes ability to dress, eat and perform fine motor tasks with confidence

Effects of the Interactive Metronome on Memory Process and Balance with Aging Adults 60+ population.

Leonard G. Trujllo, PhD, OTR/L, FAOTA
East Carolina University, Greenville, NC, USA
Jane Patton, EdD, OTR/L, FAOTA
East Carolina University, Greenville, NC, USA

INTRODUCTION

The first wave of the Silver Tsunami has arrived with over 78 million baby-boomers 65 and over [2], many seeking new and innovative health care. Local, state, and federal agencies are anticipating an exponential need for services for older adults who have balance and cognitive processing concerns. [3,4] The Interactive Metronome may be one source of ongoing maintenance and restorative care [1].

METHODS

This presentation outlines the positive outcomes of an ongoing longitudinal study has completed 9 residential clients and their outcomes with the Interactive Metronome (IM) introduced into their daily lives. The IM was done in lieu of other activities they may have elected to participate in within their continual care retirement setting and environment. Outcome measured were established using standardized tests and compared to the outcomes noted on the IM Long Form evaluation tool. The vast array of standardized evaluations provides insight on specific areas enhanced by the Interactive Metronome both in the cognitive process skills area and that of motor coordination and possible gains towards preventing falls through preventative interventions.

Clients selected were ages 60+ and were asked to complete a 12 session series of IM protocols established with consideration for endurance and stamina expected for individuals in their age bracket

Standarized Assessment Tools

IM Long Form & Short Form evaluation **Woodcock Johnson II subtests** on *Visual Matching and Decision Speed; Reading and Math Fluency subtests*. **The d2 Test of Attention** and two motor coordination tests the: **Four Step Square Test** **The 9 Hole Peg Test**

Interactive Metronome Modified

RESULTS

Means of test results over time

IM LFT = IM Long Form; 9HPT= 9 Hole Peg test; 4 Step=5 Step Test of Balance
d2TA; = d2 Test of Attention;
WCJ-RF= WCJ Reading Fluency; WCJ-MF = WCJ Math Fluency;
WCJ-DS= Decision Speed; WCJ-VM= WCJ Visual matching

Maintain Change over time:

Each of the standardized tests were administered for a series of repeated measures grouped into July, Sept, Nov, Dec times frames. The average loss of sustained skill was 6.47% when combined as outcomes. With the final total average gain of 29.33% on the sum of changes

Interactive Metronome Protocols

RESULTS: IM LF Assessement

IM July –Sept	Change 88%
IM Nov. No Tx	Change -14%
IM Nov – Dec Abr. Tx	Change 8%
IM July – Dec Total	Change 88%

DISCUSSION

Discussion

The outcomes demonstrated a 88% percent in overall gains for the participants; with an average of 14% loss of skill levels on the IM during the interim time between the first series of IM protocols and implementation the second run of the abbreviated protocols. Upon completion of the second series there was a return to the previous gain with an average of a 8% gain over the initial gains using the IM. Which is positive in regards to adult learning and retentions [5]. The range of percentage of change with the seven standardized tests given was 31% - 5.56% with the average falling at 16.07%. Clients gave anecdotal descriptions of small, but noticeable changes in daily life tasks.

CONCLUSIONS

The IM appears to be an effective intervention tool and strategy that should be considered by OT practitioners within their settings and viable modality to use within their practice.

Anecdotal Incidents

Individuals completing the full series of IM protocols provide anecdotal incidents of things that have improved in their daily life. Such incidents as: Enjoying riding the Segway with more zip and confidence; remembering appointments that had not been written down on the calendar; grocery shopping; being able to do price comparisons between items. Feeling they could select from the whole restaurant menu, because they could remember the different items presented.

ACKNOWLEDGEMENTS

We would like to Acknowledge Interactive Metronome for equipment used in the study and research support funding.

REFERENCES

1. Interactive Metronome: Accelerate outcomes, exceed expectations. (2004) Retrieved from http://www.interactivemetronome.com/IMPublic/Home.aspx

2 Barry, P (2008). 'SilverSurge': Who will take care of aging boomers? AARP Bulletin May 2008.

3 Center for Disease Control and Prevention (2014). Costs of falls among older adults. Retrieved from: http://www.cdc.gov/homeandrecreationalsafety/falls/fallcost.html

4. National Council on Aging (2014). Health aging. Retrieved from: http://www.ncoa.org/assets/files/pdf/FactSheet_HealthyAging.pdf

5. Knowles, M. S. (1980). The modern practice of adult education. Chicago: Follet Publishing Company.