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The Evaluation of the Effectiveness of Interactive Metronome Training in Older Adults, as a potential modality for Enhancing Skills Necessary for Driving

As the population in the United States ages, the demands for occupational therapy interventions to improve the older adults' ability to maintain participation in desired activities are seen as paramount by the Baby Boomers. The baby boomer generation is aging. As of 2004, there were 36.3 million people over the age of 65 in the US (Lewis, 2003). By 2050, it is estimated that there will be 52.1 million people over the age of 65 living in the US (Lewis, 2003). At age 65 noticeable declines in motor function which include weakness, slowed movements, and reduction in force control begin to occur (Rice, 1995). These declines impact all areas of occupational performance (Rice, 1995).

The baby boomer population has shown that they are willing to look at alternative methods for maintaining and improving their health. In order to meet this demand of the changing population with the increase in baby boomers, occupational therapists must develop standardized measurable assessments and interventions that address this aging population. This study focuses on improvement of finger dexterity using the Nine Hole Peg Test after Interactive Metronome (IM) treatment. The IM program was chosen for this study due to its proclaimed ability to improve "an individual's fundamental neurological and motor information processing, planning and sequencing, and attentional capacities" (Interactive Metronome, 2004, p. 1 – 3). The purpose of this study was to determine if the IM is an effective treatment tool to increase finger dexterity in older adults. The assumptions being that if the improvements can be measured using an accepted standardized instrument these improvements would be seen in aging adults as they approach other daily tasks such as driving.

The study was conducted using a pre-test/post-test experimental study involving 12 participants ages 55 and older. The Nine Hole Peg Test was used to assess whether participants' finger dexterity improved. All participants' Nine Hole Peg Test scores on the first and last day were compared to determine the amount of change in finger dexterity. The inclusion of the Nine Hole Peg Test would provide the needed comparisons of outcomes as previous postings on improvement using the IM has been that the instrument of measurement used has been the IM results as viewed against itself.

The current literature, to include non juried research publications, indicate positive changes through the use of the IM. Given these positive results encourage the use of IM treatment with other populations such as the older adult. The design of our study

included the IM pre-test/post-test and the Nine Hole Peg Test pre-test/post-test. The Nine Hole Peg Test is one of the most commonly used assessments for evaluating finger dexterity due to it being inexpensive, quick, portable, and convenient (Grice et al., 2003). The independent variable is the IM treatment. The dependent variable is finger dexterity as demonstrated by the Nine Hole Peg Test results.

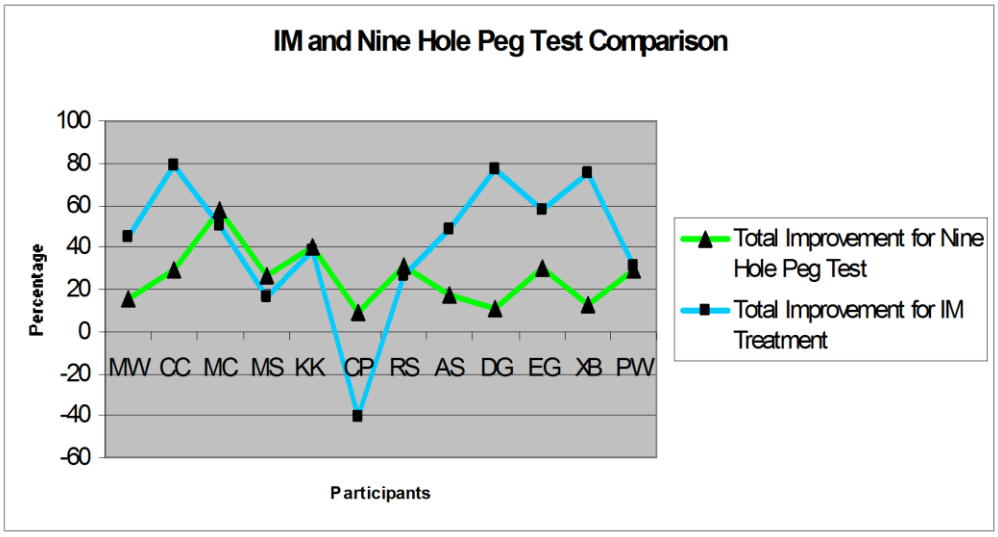
Each participant completed eight IM sessions. Following a protocol that was established in an earlier pilot study with older adults using the IM and the recommended IM patterns. All IM activities were completed seated in a solid chair, rather than in a standing position. Volunteers for the study were recruited by convenience and snowballing methods. Participants ranged in ages 55-68 years old. Participants varied in gender and ethnicity as well. There were 4 males, 8 females, 3 Hispanic participants, and 9 Caucasian participants.

Inclusion criteria included: (a) able to follow verbal directions, (b) motor ability to do fine motor tasks, (c) ability to initiate and sustain repetitive movements, (d) no previous conditions that would affect motor and cognitive performance in the IM, (e) tolerance to wear headphones, (f) desire to complete IM treatment, and (g) able to speak English. The study excluded anyone who had visual impairments severe enough to impair their vision while participating in IM sessions, or a hearing loss substantial enough to interfere with IM treatment.

The following table provides the overall scores of the cumulative right and left hand scares compared to those of the percentage scores of the IM. The cumulative percent improvement is the sum of the individual right and left hand percentage.

Participant	Cumulative % Improvement for the Nine Hole	IM % MS/SRO Improvement
MW	15.53	44.40
CC	29.15	78.60
MC	57.69	50.20
MS	26.50	16.20
KK	40.36	38.40
CP	9.00	-40.50
RS	31.24	26.6
AS	17.00	48.60
DG	10.42	76.70
EG	30.28	58.10
XB	12.74	74.80
PW	29.28	30.70

The following graph illustrates these Combined Percentage changes found in the Nine Hole Peg Test and those of the IM changes. Of special notes is that one individual did not demonstrate a change as measure by the IM scores, but even after participating showed an improvement on the Nine Hole Peg Test.



All participants improved on the Nine Hole Peg Text. A T-test paired was performed to determine if improvement is statistically significant A p-value of .05 or less indicates a statistically significant difference between the pre and post test times

The following are the right hand p-values as defined by the right and left hands:

Right hand:	Left Hand:
P-value: .000128	P-value: .000189

These findings indicate an increase in finger dexterity among the IM participants for both hands. Both hand times improved with the Nine Hole Peg Test significantly after IM treatment. The improvement in Nine Hole Peg Test times indicate that IM treatment can in impact and improve finger dexterity. However, further research is needed to increase the validity and applicability to various populations.

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