

Seeing Through Adversity With Interactive Metronome®

Simon, a 24 year-old male, sustained a traumatic brain injury one year ago from two gunshot wounds to the head. Simon was completely blind in the left eye and with only one quadrant of vision in his right, leaving him legally blind. He was eventually admitted to a comprehensive brain injury program and was found to have impairments with the following:

- Auditory processing (for immediate and delayed recall)
- Attention and concentration
- Frustration tolerance (mostly in the home)
- Judgment/safety
- Problem solving
- Generating options
- Initiation
- Insight
- Visual scanning
- Reading comprehension
- Organization
- Planning and sequencing

After approximately five months of the brain injury program, Simon was ready to begin Interactive Metronome® (IM). IM is a researched-based program that provides a structured, goal-oriented process that challenges the client to synchronize whole-body exercises to a precise computer-generated reference beat. The client attempts to match the rhythmic beat with repetitive motor actions. An auditory-visual guidance system provides immediate feedback measured in milliseconds (ms), and a score is provided. Over the course of the training, the client sees improvements in stronger motor control and coordination, enhanced balance and gait, and improved language and cognition.

An IM Pre Long Form Assessment (LFA) was also administered, which is comprised of 14 tasks through the use of upper and lower extremities bilaterally and in isolation. Simon was able to complete all exercises with moderate/maximum cuing from the occupational therapist due to his memory and visual impairments. Simon had much difficulty using both hands with the guide sound exercise due to his inability to remember the meaning of each of the guide sounds. Despite his difficulties, he was able to hit on the “cowbell” very accurately. The results of the Pre-LFA were 129.3 ms which indicates “Below Average” based on the IM Indicator Chart (shown to the right).

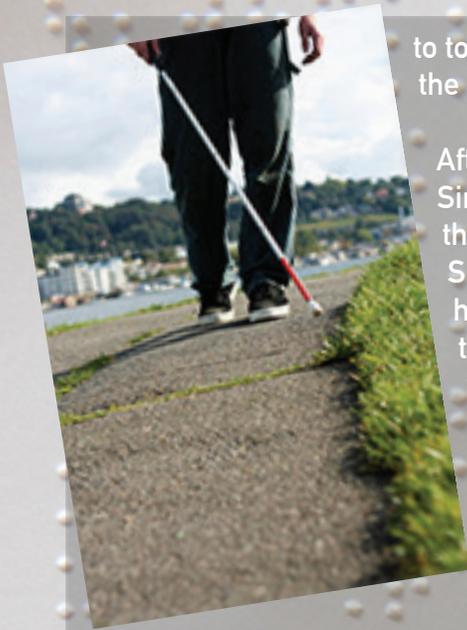
Due to Simon’s visual impairment, using IM’s visual guides was not going to be an option, therefore the clinician had to make modifications to the various tasks. The plan was to start Simon off with completing the exercises he scored well on and then increasing the repetitions each IM session to increase his attention/concentration as well as his frustration tolerance. Once he learned the guide sounds and exercises, the next phase was to add a few of the more challenging exercises while continuing to increase the

Age	6	7 - 8	9 - 10	11 - 12	13 - 15	16+
Extreme Deficiency	280+	270+	260+	240+	215+	200+
Severe Deficiency	175-279	170-269	160-259	155-239	150-214	147-199
Below Average	120-174	90-169	80-159	75-154	72-149	70-146
Average	90-119	65-89	55-79	45-74	43-71	41-69
Above Average	56-89	45-64	38-54	36-44	33-42	30-40
Exceptional	40-55	32-44	28-37	26-35	23-32	22-29
Superior	Below 40	Below 32	Below 28	Below 26	Below 23	Below 22

repetitions of one exercise to test his limits. Simon’s first IM session began with basic hand and foot exercises with 1100 total number of repetitions. He was able to learn the guide sounds much faster than the provider thought given the severity of his memory impairments. By the fourth IM session he was able

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to tolerate a total of 1500 repetitions and needed only minimal cuing to complete the same exercises correctly.

After approximately eight sessions an Interim LFA was completed to determine Simon's progress. His overall unadjusted millisecond score was 39.2. At this point he was able to tolerate up to 2000 repetitions in a single session. Simon continued to get somewhat distracted in between exercises, however his tangential speech was decreasing and he was easily re-directed back to the IM tasks. After five more sessions, Simon's score for 1100 repetitions for both hands was 15 ms and 500 repetitions for both toes was 13 ms. The treatment team began noticing his improved ability to attend and concentrate. For example, during lunchtime, Simon was easily distracted by others' conversations and he was now demonstrating an increased ability to stay focused on his own conversation or the task he was working on.

Simon was soon able to tolerate up to 1600 repetitions for both hands, with a score of 13 ms, the goal was to modify the program to increase the challenge for Simon's memory, attention/concentration, planning, organization, and sequencing. The provider created a new exercise, which had Simon tap two times with the right hand and two times with the left hand, then to switch to three taps with the right hand and three taps with the left hand, alternating the sequence. He continued to have a low score (17 ms) however he was only able to maintain the correct alternating sequence approximately 25% of the time. After attempting this new exercise in several sessions, Simon was able to get his score down to 15 ms and was following the alternating sequence approximately 50% of the time.

Once Simon met his goals, a Post-LFA was administered and had an unadjusted score of 19.5 ms. Simon's scores significantly improved as compared to his Pre-LFA. The overall millisecond score decreased by 109.5. He was now in the "Superior" range according to the IM Indicator Chart. The team also noticed improvements with his attention, concentration, and sequencing skills. It was very significant that an individual with such cognitive impairments was able to learn the IM guide sounds and IM tasks, as well as be able to maintain the rhythm. He was also able to learn new challenging exercises, even though he was not able to master them he showed significant improvement.

Simon felt the IM program helped him with his attention/concentration, frustration tolerance, and memory. He also feels it made him calmer and more open when interacting socially. Simon reported really enjoying IM and felt it really enhanced his treatment. IM training proved to be effective and provided no barriers to an individual that is legally blind. His provider used clinical knowledge to develop a new exercise and modify the program to simultaneously accommodate and challenge Simon's abilities further. He was able to take on the challenges which in turn motivated Simon to stick with Interactive Metronome® and it certainly paid off!

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