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THE CUTTING EDGE



Up-to-Date issues in the
Advancement of Health Care

9403 Keeping To The Rhythm – Retraining the Brain

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Click clock, click clock.

As anyone who has taken piano lessons can tell you, the metronome indicates the exact tempo in which a work is to be performed.

But that basic rhythm-indicator has now been adapted into a modality that has a use beyond that required by musician: helping children with Attention Deficit Disorder to focus, helping victims of stroke to regain movement, and helping you – if you're dying to break 100 on your golf game or show off your softball skills at the next company picnic – to even improve your swing.

In fact, the uses for Interactive Metronome – a device based on the metronome – may be endless.

Interactive Metronome (IM) was developed in the early 1990s and first used to help children with learning and developmental disorders. The children using IM were able to develop significant increases in neurological and motor areas that they had not sufficiently developed, such as: attention and concentration, motor coordination, language processing and control of impulsivity.

As a result of years of clinical research and the work of innovative therapists, IM is now being implemented as part of a therapy program for older patients who exhibit many of the deficits presented by pediatric patients. There's one difference – with children, it's developing areas that were underdeveloped originally; with adults it's "retraining the brain" to help recover the skills that once were there, but now have been lost.

"It's still being used with the kids, but there is this new area, where it can now be used," said Theresa L. Breen, clinic manager of outpatient pediatrics and an occupational therapist who is in charge of the IM program at HealthSouth Braintree Rehabilitation at Plymouth and Belmont, Mass., where HealthSouth Corp. has introduced the innovative therapy. "So we are using it for both kids and adults."

With that in mind, IM is now being used with adults who suffer neurological and motor impairment resulting from traumatic brain injury, stroke, amputation, multiple sclerosis or balance disorders such as Parkinson's disease, according to Ms. Breen.

"Physicians and therapists across the country have adopted IM as a rehabilitation program, resulting in some extraordinary recoveries by their patients," said Al Guerra, vice president of the Interactive Metronome Rehabilitation Technologies Division. "With the addition of HealthSouth facilities, IM therapy can benefit even more patients in their recovery."

So how does this all work, scientifically speaking?

IM has the ability to help the brain repair itself through a process known as "neuroplasticity." The human brain's efficiency and performance

depend on the seamless transition of neuronetwork signals from one area of the brain to the other. A recent study has suggested that IM works by augmenting the speed of those signals along the neuroaxis.

IM's impact on neurological recovery focuses on improving the brain's ability to perform two critical functions: motor planning and sequencing. Motor planning and sequencing are central to human activity – from the coordinated movements needed to walk or climb stairs to the order of words in a sentence. IM is the only therapy tool that improves human capacities by strengthening a person's sensory-motor synchronization, usually referred to as "timing."

"IM teaches you to focus and it strengthens the mind-muscle connection," said Ms. Breen. "Everything that you do starts with a thought in your mind, and then a process where your mind tells your body what to do," explained Ms. Breen. "The patient can then plan, organize, sequence and do (a task) more efficiently, whether it's figuring out paperwork to do next or hitting a ball."

For many years, occupational therapists have observed the significant role that motor planning and sequencing play in helping patients become more functionally independent in the activities of daily living (ADLs).

Practitioners in the field of speech-language pathology recognize the role of motor planning and sequencing in the acquisition of speech, language, communication skills, and cognition, social communication, planning and sequencing, attention and concentration, control of impulsivity and aggression, physical therapy.

IM provides a structured, goal-oriented process that challenges the patient to synchronize a range of hand and foot exercises to a computer-generated reference tone heard through headphones. The IM program involves repeated hand, toe, and heel exercises as well as weight shifting, and bilateral motor coordination. The patient attempts to match the rhythmic beat with repetitive motor actions.

These exercises are performed during therapy visits and are increasingly varied and extended so that most patients are able to perform thousands of repetitions. Since the treatment requires a high level of concentration, it provides the patient an opportunity to maintain a level of endurance.

"It is very rhythmic so it sounds like the old-fashion, wooden metronome, but some patients say it sounds like a cowbell," said Ms. Breen. "It's a steady rhythm and it measures accuracy for hitting on the rhythm – timing to the millisecond."

"What does change is the feedback it gives the patient so when we first start training with someone we get him use to getting on the beat, just as you would if you were teaching a dance step," said Ms. Breen.



Provided

"Using headphones, the patient hears through one ear a 'guide sound' that tells him if he is hitting too late on the beat; through the other ear he hears another 'guide sound,' which tells him if he is hitting too soon.

"I thought I had a lot of rhythm until I tried it, but my scores weren't good at all," said Ms. Breen, "but they are definitely improving."

There's visual feedback as well, showing, on a computer screen a bubble-type image, right in the middle of the screen. If the patient is doing fine, the bubble image gets bigger in the middle of the screen. If too early or too

late, the bubble moves either to the right or the left of the computer screen, according to Ms. Breen.

Because IM works on the core brain functions of motor planning and sequencing, it is being used successfully by occupational therapists, physical therapists, and speech therapists.

"When applied with traditional treatments, our therapists have seen significant improvements in gait and coordination, as well as in attention and mental processing," said Mark Tarr, HealthSouth Inpatient Division President

And improvement has been noticed in some athletes who use IM to help

them with their focus as well as their movements. Golf Digest has called it "the hottest piece of equipment on the tour." And top golfer Vijay Singh has used it as part of his workout routine. It's also been used at the high school, college and professional level in football and baseball.

If you or your hospital are using a promising new therapy or new technology to deliver better care to patients and think that it would be suitable for the Cutting Edge column, please email Geraldine Collier, senior staff correspondent, at Gerryc1231@aol.com.