

## **The Mental Edge**

### **How to find the “zone” or “combat peak performance” through imagination, combined with physical and simulation training**

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As many of you know, I am a big believer in the emotional, psychological, and physical triad to self protection training. Although there are a plethora of instructors out there teaching the physical, very few are utilizing training strategies to help strengthen motor skill performance through the emotional and psychological training methodologies that are currently being used in Brain science, sport psychology, and the science of NLP. This article is not really about the physical, but rather this article is going to discuss the emotional and psychological strategies to increase motor skill performance both in training and real world application. Science has proven that when you are both emotionally and psychologically ready, you will find it much easier to learn essential performance skills, practice those skills to perfection, and perform those skills effectively under demanding conditions.

#### **The Power of Imagination and Emotion:**

*“Your Images lead your reality, they always have and they always will”* Dr Terry Orlick

In his book, “pursuit of Excellence”, Dr Terry Orlick, one of Canada’s leading experts in the area of sport psychology states:

“Imagining in your mind and body the feeling of executing the moves that you need to be successful can help you accomplish those moves in the real world. Positive imagery can also enhance your confidence because you are repeating performance skills in your mind and body with focus and precision, exactly the way you would like to do them”

We have often heard from sport psychologists that utilizing mental imagery, in combination with physical training, can increase motor skill performance, but some critics have stated that mental imagery is nothing more than a “soft science” that cannot be substantiated with “hard science” . For those critics, I want to introduce you to Dr Alvaro Pascual-Leone; Chief of the Beth Israel Deaconess Medical Center of the Harvard Medical School. Dr Pascual-Leone has proven through “hard science” (TMS Brain Mapping) that we can change our brain anatomy simply by using our imagination.

Dr Pascual-Leone conducted a scientific study utilizing two groups of students who had never studied piano, a sequence of notes, showing them which fingers to move and allowing them to hear to notes as they were played. One group was only allowed to sit in front of the key board and mentally practise

playing and hearing the notes for two hours a day over a five day period, and the second group was allowed to physically practise the same skills for two hours a day over the same five day period.

The results were amazing, Dr Pascual-Leone found that both groups learned to play the sequence taught by him, and both showed similar brain mapping changes. He also found that mental practise alone produced the same physical changes in the motor system, as actually playing the piece. By the end of the fifth day, the changes in the motor signals to the muscles were the same in both groups, and the imagining players were as accurate as the actual players were on their third day.

Now does this research mean that one can become as competent in a physical skill by mental practise alone? NO !!!!!!!! In fact, Dr Pascual-Leone in the above noted research found that the level of improvement at five days in the mental practise group, however substantial, was not as great as in those who did physically practise. BUT of even greater interest for those of us who do teach the emotional and psychological through imagination and emotional training, was what Dr Pascual-Leone found next:

“When the mental practise group finished its mental training and was given a single two hour physical practise session, its overall performance improved to the level of the physical practise group’s performance at five days.”

Dr Pascual-Leone research clearly found that mental practise is an effective way to prepare for learning a physical skill **with minimal physical practise.** Specific to combatives, if one trains with imagination and emotion and integrates this with gross motor skills that are congruent with what the body will do under Survival Stress Reaction, motor skill performance competency can be greatly increased in a limited amount of time. By combining mental imagery with real movement, you often feel more and this can speed up and enhance the complete learning process. As a student becomes more skilled at feeling imagery, the sensations and emotions associated with the best movements will surface more naturally in one’s imagined performance and real performance.

Dr Pascual-Leone’s neuroscientific research has proven that imagining an act and doing it are not as different as they sound. TMS brain mapping has found that when people close their eyes and visualize or imagine a simple object such as a clock, the primary visual cortex lights up, just as it would if the subject were actually looking at the clock. These same brain scans have shown that in action and imagination, many of the same parts of the brain are activated. Although some who teach combatives believe that imagination and action are completely different and subject to different rules, science has proven how truly integrated both imagination and action truly are, and that imagining an act engages the same motor and sensory program that are involved in doing it. This is why, in my humble opinion, visualization, or what I call “Combative Based Action Imagery”, can improve combative performance.

### **Neuroplasticity and Training the Physical:**

*“it’s about redesigning the brain to learn a new or old motor skill”* Dr Norman Doidge

The science surrounding motor skill training in the past ten years has grown by leaps and bounds. What was thought impossible only a decade ago, is now possible today because of what we are learning in the area of “neuroplasticity”, especially when it comes to teaching and learning new motor skills. It was once thought by many in the medical field, that if the brain was damaged through traumatic injury, motor skills lost by such an injury could not be regained. The science of neuroplasticity has proven this belief to be incorrect, which have all kinds of potential implications for us as combative instructors.

As instructors, we want the “trained” response to become the “dominant” response when confronted with a threat stimulus. Traditionally we have accomplished this through physical repetition. I would also suggest that we can enhance the trained and physical response through the power of imagination (as mentioned above) and through simulation training (that I will discuss later).

Training the “physical”, through hands on repetition, creates what a neuroscientist by the name of Dr Merzenich calls a, “topographic order”. In other words, by practising the physical again, again, and again, you are repeating sequences in a fixed order that help to “hard wire” a motor skill. Neuroscience has a phrase for this learning process, “Neurons that fire together wire together.” Through physical hands-on practise we are “hard wiring”, or training the neuronal path between thought and action, to become more and more efficient, thus minimizing time delay between action and reaction. This is important because speed of thought is essential to our survival. Often when confronted by a threat things happen quickly, and if the brain is slow, it can miss important information. This is another reason why the brain has been wired with both a “high road” and “low road” response to specific threat stimuli, something that I have discussed in detail in my article, “The Anatomy of Fear and How It Relates To Survival Skills Training”

So how does this relate to combatives and motor skill enhancement, well neuroscientists, more specifically those who specialize in neuroplasticity , have discovered a number of training principles that we as combative instructors should utilize to increase motor skill performance:

- 1) Training is more effective if the skill closely relates to everyday life: What this means to me is that the stimulus/response training utilized in combatives training should replicate what will reasonably be faced in the real world of the street.
- 2) Training should be done in increments; and work should be concentrated into short time: In neuroscience this type of training is known as “massed practise” which has been found to be more effective than long-term but less frequent training. We see this type of “immersion” training in learning a foreign language. How many of us have taken a language course over years, and have not learned as much as when we went to the country and “immersed” ourselves in the language for a far shorter period. Daily immersion allows us to get massed practise. This is why in combatives training here at the school, we chunk learning into training

progressions/evolutions that are task specific (ie weapons training for a 4 week cycle, multiple opponents for a 4 week cycle, basics for a 4 week cycle)

- 3) Physical training needs to be taxing and systematically improving: In the example above specific to massed practise or immersion training, our time spent with people who don't speak our native tongue, force us to speak theirs (constraint). Daily immersion allows us to get massed practise. Our accent suggests to others that they may have to use simpler language with us; hence we are incrementally challenged, or shaped. Learned non-use is thwarted, because our survival depends on communication. I believe any instructor who is reading this can easily transition this principle to combatives training.
  
- 4) Physical training should be interesting to engage the motivational circuits in a student's brain: Focus in physical training is important. Brain science has found that the critical factor that changes the brain when it comes to motor skill learning is "attention". Attention actually regulates what is allowed to change in the brain, and this is why it is so important in the learning mode that attention be focused, sharp, and serious. Something that I call, "Training in state, with imagination and emotion"

### **Simulation Training:**

*"To have been there before and succeeded without ever having been there – that is the goal of simulation" Dr Terry Orlick*

Dr. Orlick has stated that, "simulation training lets you practise your desired performance response, as well as your focusing and refocusing strategies, in circumstances that are as real as you can make them before you take them into a real situation." The military, and more progressive law enforcement agencies, and even some progressive combative instructors, have been using simulation training to increase motor skill performance in their students. There is no doubt that simulation training can help prepare a student to perform closer to their capacity, and get them ready to meet the challenges that will likely be faced in one's performance context. Dr Orlick further goes onto say:

*"Simulation prepares you for the physical, technical, and mental demands through high quality, high intensity, focused training that replicates the performance demands of real performances or competitions. It helps you prepare mentally for potential distractions so that you are better able to stay focused and get the job done, regardless of the demands of your event of the happenings around you"*

Realistic simulation training is also important from a neuroscientific learning perspective. Remember, according to the neuroscientists, Physical training should be interesting to engage the motivational circuits in a student's brain. Through simulation training, not only do neurons fire faster, but because they were faster, their signals were clearer. Faster neurons were more likely to fire in sync with each other, becoming better team players, wiring together more and forming groups of neurons' that gave off clearer and more powerful signals (neurons that fire together wire together). This is a critical point in motor skill development in my opinion why?, because a powerful signal, replicated through realistic scenario based training, has a greater impact on the brain. When we want to remember something we have heard, or see something that we have seen, we must have heard it or seen it clearly, because a memory, according to the neuroscientists, can be only as clear as its original signal. This is another reason why a student, when participating in simulation training, must do so in "state" with imagination and emotion, utilizing all their sensory modalities (sight, sound, touch, smell, taste, etheric).

### **Realistic simulation training offers 7 tenets to combative learning:**

- 1) Change can only occur when the brain is in the mood: Realistic Simulation training if approached in "state" with imagination and emotion places one in the "mood"
- 2) Change strengthens connection between neurons engaged at the same time: The more a student conducts realistic simulation training, the more a student will strengthen the neural muscular pathway of a learned combative motor skill. The "magic" of simulation training is "selectivity", changing the neural connections selectively that contributes to the desirable rather undesirable attempt.
- 3) Neurons that fire together, wire together: The more a student conducts realistic simulation training, utilizing state with imagination and emotion, and incorporating all sensory modalities, the better the transition of the trained skills will be to the real world.
- 4) Initial motor skill changes are just temporary: Training in simulations needs to be inherently fascinating or novel and be based upon the "probable" rather than "possible", so that the training experience can become more permanent.
- 5) Brain plasticity is a two-way street, and we can either drive brain change positively or negatively through simulation training: what this means is that there is much more to "functional" simulation training that just throwing on a combatives suit and having a student go hog wild. I have seen so called simulation training run that is doing nothing more than programming a student for failure in the real world.

- 6) Memory is crucial for learning: Realistic simulation gives a student added confidence in knowing that they have the ability to do what needs to be done. Simulation helps the student to believe in themselves and their focus, which is crucial in a performance context. In simulation training, a student's objective is to reach the point where they can face all kinds of challenges or distractions and still have the confidence in their abilities. A student knows that their capabilities are there, and their best focus is there with them no matter what.
- 7) Motivation is a key factor in learning and brain plasticity. This tenet is directly related to tenet #1. If a student believe that there is very little utility is a skill taught, then motivation is negatively impacted. Realistic simulation training provides the litmus test needed to provide the synergy between motivation and motor skill taught.

### **Conclusion:**

I know that some who will read this will say, "Hey what's the big deal, I'm doing this already".... I shared this information because I like to provide a scientific basis for why I do what I do, and teach the way that I teach. One of my favorite quotes is:

"Research is to see what everyone else has seen, and think what no one else has thought"

Albert Szent-Gyorgy (Nobelish 1927)

- Seek out those instructors who are qualified to conduct "Combative Based Action Imagery"
- Seek out those instructors who understand the issues surrounding Neuroplasticity and Training the Physical
- Seek out those instructors who are qualified to conduct realistic simulation training

By doing so, you will take your training to a much higher level

Cerebral Food for thought  
Darren