Getting Your Head in the Game

From the World Cup to youth tennis, a training fad emerges; the science of finding the zone

By RUSSELL ADAMS The Wall Street Journal July 29, 2006

Members of Italy's World Cup-winning soccer team have done it. A starting quarterback in the NFL has tried it out. And so has Jordan Kreuter, an 18-year-old golfer in North Carolina.

The thing they have in common: They've all turned to neurofeedback, a technique that promises to help athletes reprogram their brains so they can reach a zone of relaxed concentration during clutch situations.

Long used to treat medical conditions such as attention deficit hyperactivity disorder, epilepsy and dementia, it is beginning to emerge as a tool for pro and amateur athletes alike -- with neurofeedback machines even starting to show up at some local public golf courses.

Mind Games: Several members of Italy's World Cup-winning team, including Andrea Pirlo, second from lower left, did extensive neurofeedback in the runup to the tournament.

This technique is bringing some science to the mental side of athletics, afield also known as sports psychology, which has often been derided by many players and trainers as hokum. In neurofeedback, athletes strap on electrodes that measure brainwaves. They then try to learn how to control spikes in those brainwaves, which may signify distractions going on inside their heads, such as obsessing about a past performance. Critics say it's one thing to be able to manipulate a bunch of lines moving across a screen, but it's another to remain perfectly calm as a fastball zooms toward you at 100 miles per hour or network cameras hover over your par putt.

As a veteran sports reporter who has seen many training fads come and go, I was curious to try it out. Wiring myself up to a neurofeedback machine, Ispent two hours working my way through everything from complicated math computations to techniques for slowing my heart rate. It was far more grueling than I had envisioned. But it gave me some appreciation for what it feels to be more focused -- and for how stress and pressure can hijack your brain.

In one exercise, the goal was to use the power of concentration to move two mice forward across a computer screen. Just when I was starting to have some success, I was interrupted by a phone call from my editor, who was calling to burden me with more work. For the next five minutes, I couldn't even keep the mice from back-pedaling. (See this story for more details on my neurofeedback experience1.)

Neurofeedback's big claim to fame so far is its little-publicized connection to this year's World Cup. In February, months before the tournament started, some of Italy's best soccer players, including a handful who would later play in the Cup, began spending much of their practice time in a small room in Milan furnished with six luxury leather recliners facing a glass wall.

Our reporter tries neurofeedback and learns from computer-animated mice that he has a "busy brain."

On the other side of the glass Bruno De Michelis, head of the sports science lab for AC Milan, one of the country's top professional teams, monitored a bank of six computer screens wired to a system made by Thought Technology Ltd., a Canadian company. The screens showing how each player's brain responded to stressful situations. Some players, the data showed, were nervous about doing mental exercises in front of their teammates, while others either had trouble winding down after a match or winding up before one. In the following weeks, the players spent hours working on these issues through a series of exercises that resembled computer games, with the brain as the joystick.

Mr. De Michelis says a tremendous amount of energy in soccer games goes to waste because players lose concentration during key moments, like penalty kicks. "I call this useless suffering," he says. "We can't do magic here, but it can be of some help."

Having the ability to tune out distractions during competition -- known as having a "quiet mind" -- is one of the holy grails of sports. Jocks believe that the capacity to have extreme concentration during stressful moments gives you a big edge, whether it's a basketball player staying focused on the hoop while thousands of fans are waving their arms in the background, or a tennis player learning not to berate himself for a bad shot.

To help Tiger Woods learn to block out distractions during critical moments, his late father, Earl, used to jingle change in his pocket, drop golf bags and roll balls across his son's line of vision. Golfer Se Ri Pak's father used a different approach to make her mentally tougher. When she was a child, he took her to pit-bull fights and Korean cemeteries at night.

Until now, neurofeedback has mostly been confined to medical environments. Sufferers of attention deficit disorder, for example, have been found to have reduced activity in parts of the brain. Neurofeedback teaches them how to produce brainwave patterns that speed up those slow brainwaves. But brain-training has rarely been tried on healthy people, mainly because of doubts about its utility and its high cost, which can be as much as $200 an hour.

Over the last decade, university researchers and some of the companies that make neurofeedback devices have begun to dabble in the sports world, including helping Olympians like Austrian skier Hermann Maier.

Many of these same athletes have already had experience with a technique called biofeedback. Biofeedback differs from neurofeedback in that it focuses on controlling physiological responses to stress (like a fast heart rate and extreme muscle tension) as opposed to neurological responses. (To confuse matters, neurofeedback is sometimes referred to as EEG biofeedback.)

Proponents of neurofeedback say retraining your brain, as futuristic as it sounds, is now possible because scientists know precisely which brainwave frequencies correspond with optimal levels of focus. All a person has to do is learn how to achieve those same frequencies by practicing, they say.

But not all the kinks have been worked out yet, according to some people who have used the neurofeedback devices. Vietta Wilson, who has trained some Canadian track-and-field Olympians, says some of the devices she has tried pick up radio stations instead of brain waves. Another potential problem, according to some researchers: Some of the same devices track brainwaves in a particular part of the brain called the executive center -- but altering brainwaves there can trigger depression in certain people. Several device manufacturers say neither of those problems has been an issue with their products.

In the last five years, neurofeedback has become the focus of studies in some top medical and psychology journals. In general, they bolster the case that it's possible to retrain the brain.

Last fall, Canada's governing body of tennis put some of its top 20 youth players through neurofeedback. And McGill University in Montreal and the National Coaching Institute of Montreal have committed to a five-year study to test neurofeedback on the region's top 80 athletes in sports ranging from hockey to racquetball.

For high-school football player Michael Dell'Aquila, neurofeedback was part of a plan to gain an edge with college scouts. At the time, Mr. Dell'Aquila, a skilled defensive back, had already received letters of interest from dozens of colleges. But he was concerned about his ability to perform in front of recruiters day after day. Specifically, he wanted to learn how to clear his mind of the previous day's performance. So last spring, while he was finishing his junior year at Avon Old Farms prep school in Avon, Conn., he signed up with a nearby practitioner.

Over the course of about 10 sessions, he worked on boosting his concentration by trying to propel a rocket forward with his mind. If his focus drifted and he either began daydreaming or listening to his inner critic, different-colored rockets associated with those brain states would creep forward and begin to overtake his rocket. The sessions also showed that Mr. Dell'Aquila wasn't getting enough connectivity between the two hemispheres of his brain. So every night during the summer he listened to 30 minutes of specially engineered music. Mr. Dell'Aquila will play football for Boston College beginning this fall. Gio Valiante, a sports psychologist to a number of top golfers including Justin Leonard and Chris DiMarco, says neurofeedback will one day be the norm for PGA Tour pros. But he says he's not about to strap anything onto his clients until these devices are rigorously tested on amateur players.

For information contact
John Styffe
focus@swissonline.ch
078 806 95 16