



# Neurological Biofeedback Experiment

An Exciting Look Into the Archer's Mind

*September 18-19, 2008*

Neurological Biofeedback Testing

On September 18-19, 2008, we conducted experiments with a neurological biofeedback head unit and program with Dr. KooHyung Lee. The first day of the experimentation process consisted of a “game” that detects increased or decreased focus activity in the brain and relaxation or, as Dr. Lee calls it, meditation activity. The second day included testing the archers while shooting. During this process we were able to monitor and record brain activity levels during the shot.

The game program was tested with Brady Ellison and Jake Kaminski. In the “game”, objects could be moved based on how much they were focused on or how much the brain relaxed. The athletes were able to increase their ability to focus on something in order to move objects in the game. The harder the athlete stared or focused on the object, the easier and farther it would move in the game. With the meditation game, the more the athlete relaxed their brain, the more the selected object would move. Both athletes were able to improve their abilities with the game in only a short amount of time.



The second day of the testing was initially meant to be an information gathering session. We were able to track the archer's focus and concentration ability while they shot at a target with a wireless head unit attached to the forehead. The head unit detects the brain activity and sends it to the computer, and the computer program then differentiates the brain activity into focus or meditative brain waves. The immediate feedback we were able to see on the monitor allowed us to adjust the archer's thought process and test different mental routines. We were able to see several different patterns, and based on our current understanding, we believe that we were able to detect several things.



First, any spike or drastic change in brain activity lead us to believe that there was a change in thought process or a drastic change in eye focus. Most notably were instances where the archer experienced collapsing or target panic similarities. It was obvious that during the critical instance of release and follow through that a spike would appear in the readings if the archer changed their thought process. Most small spikes and changes in brain activity were fixed by having the archer think the same thought during the entire expansion process and all the way through follow through.



One of the most incredible improvements from the feedback program occurred with Emily Blake. During the experiment process, she had extremely erratic brain activity and was basically not focused on anything. At this point, we were able to suggest an actual mental routine and thought process. The new thought process included staring at the center of the target for 3 seconds while

keeping the eyes completely still, then mentally rehearsing the execution of the shot, and finally focusing on one single thought during the expansion and follow through phase. The change in brain activity resulted in an “ideal” theoretically correct feedback(i.e. no spikes upon release). This led to an approximate 12% increase in score per end for Emily. According to Emily, “Rehearse your shot routine in your head before you shoot, it will remind you of the rhythm of your shot, and you will be less likely to speed past a crucial step in shooting an arrow, in addition, staring at your target will help you get a better mindset.”

One of the most amazing things about the tools presented by Dr. Lee is the fact that it actually gives the coaches an opportunity to monitor and test focus abilities. The reason this is so important is that it allows us to see whether an athlete is improving or not. Mental abilities are very difficult to monitor and test, however, this technology will give us just that ability. Therefore, it will allow us to adjust mental training and mental routines in order to maximize performance.



In only two days of testing, it became evident that this can be a great tool for us to use. It became evident this year at the Olympics that the level of the world has drastically increased. We must utilize every option available in order to catch and surpass our competition. According to one of the tested athletes, Heather Koehl, “I think we need to seriously get our hands on some of this technology in hopes of making the RA program that much more elite. Giving us the mental edge will help increase our potential and reach our goals.”

In conclusion, everyone involved in the testing process was not only extremely impressed with the information that was gathered but also highly motivated to continue using this technology to improve mental skills. It seems only fitting that the B.E.S.T. technique be accompanied by the B.E.S.T. mental training available. It is in our opinion that this technology will not only help us but allow our athletes to reach their highest potential.