

# Muscles, Movement and Microvolts

Broomhead, William

I had a desire to understand how muscles compensate following a surgery or injury. I competed at Trampoline and Tumbling Nationals months before I discovered I had cancer. A 13 cm x 10 cm x 4 cm portion of my erector spinae was removed due to left lumbar paraspinal synovial sarcoma. How can an athlete with a resected erector spinae perform a back handspring? I used a handheld surface electromyography (SEMG) to test the back muscles of five tumblers - three right-side and three left-side locations per athlete. The SEMG measured electrical activity of the muscles in microvolts so I could determine if the right side of the athletes' backs received equal electrical activity from the brain as the left side. The tumblers performed back handsprings and superman holds. My research showed that the tumblers with normal erector spinae muscles had similar SEMG readings when comparing the right to the left side. However, my readings were always different. I verified the results by using a professional SEMG on my back at a physical therapy center. The results were similar to the portable SEMG. My hypothesis was that the remaining muscles on the left side would compensate for the missing muscle and have a higher SEMG reading. However, it was the muscles on the right side that compensated. I concluded that muscles are able to compensate to help the body function properly which is how I can still perform gymnastic maneuvers.