
Biomechanical Modeling

Research on the biomechanics of stroke victims while pedaling a bicycle.

Our Purpose

In order to better understand the needs of our clients, we conducted research on the biomechanics of pedaling a bicycle. This was done in order to design a pedaling system that most aptly suited our target demographic and presented an appropriate amount of resistance training.

Research Material

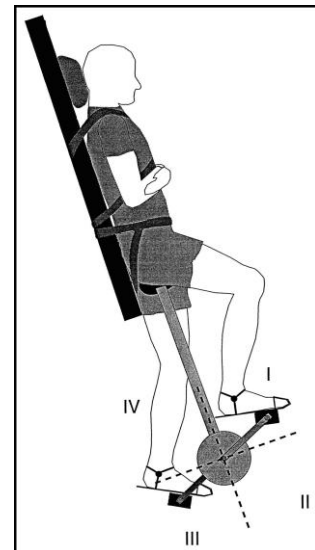
The main source of information used was a journal article written for *Physical Therapy* by David Brown and Steven Kautz called “Speed-Dependent Reductions of Force Output in People with Poststroke Hemiparesis”. In it they describe the method and results of their study.

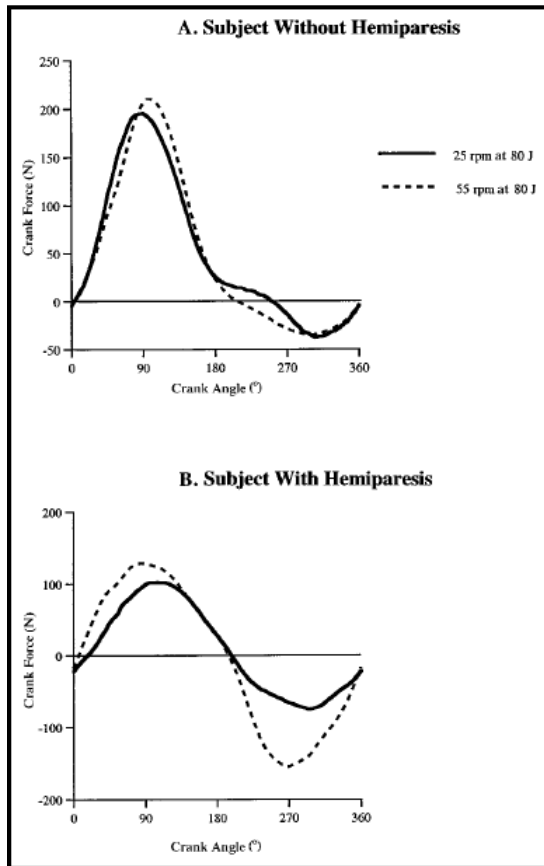
Subjects:

1. 12 elderly people with no known neurological impairment. (control group)
2. 15 people with poststroke hemiparesis.

Method:

1. Subjects pedaled at random workloads and cadence combinations.
2. The pedal reaction forces were used to calculate work done.
3. EMG (electromyography) activity was recorded from 7 lower extremity muscles.





Results:

The study showed that the work produced decreased as speed increased.

1. As expected, the paretic subjects produced less force than the healthy subjects at all positions of the pedal.
2. At 25 rpm, the average net force generated by the paretic subjects was approximately 30N.
3. At 55 rpm the net force is near 0N.

Works Cited

Brown, David, and Steven Kautz. "Speed-Dependent Reductions of Force Output in People With Poststroke Hemiparesis." *Physical Therapy*. 79.10 (1999): 919-930. Print.