Abstract

Title:
A quantitative technique to evaluate Reciprocal Inhibition in the hamstring muscles and using it to assess physiological changes of the neuro-muscular system produced by a short term high Intensity Plyometric Training Program in Adult Untrained Population.

Aim:
To develop a quantitative physiological method to measure components of the reciprocal inhibition and the use this method to assess physiological changes in muscles produced by a short term plyometric training program.

Objectives:

1. To develop and standardize a quantitative physiological method to measure reciprocal inhibition by mechanically stretching the muscle (flexion stretch)

2. To assess intensity and latency of reciprocal inhibition using surface EMG before and after 12 episodes of plyometric training.

3. To assess muscle strength, agility and time taken for a 30 meter sprint before and after 12 episodes of plyometric training.

4. To compare the changes produced by plyometric training with that produced by ordinary Standardized Aerobic Exercise Protocol in controls.
**Design and setting:**

Randomized controlled trial design with all testing and development of equipment done in the Clinical Physiology laboratory, Department of Physiology, Christian Medical College Vellore, and Department of Bioengineering, Christian medical College Vellore.

**Subjects:**

Naïve (untrained) college students randomized into control group and intervention group.

**Measurements:**

1. Intensity and latency of reciprocal inhibition measured using rectified EMG from the hamstrings.
3. Agility was measured using the T test and the Illinois test for agility
4. Time taken for a 30 meter sprint was measured as an indicator of speed.

**Outcomes of the Randomised controlled trial:**

Primary outcome: Changes in Reciprocal inhibition

Secondary outcome: Changes in muscle strength, agility and speed.

**Results:**

With this setup we could reliably elicit and record both the myotactic reflex and reciprocal inhibition. No statistically significance difference was seen in the change in
Maximum voluntary force, agility, speed or latencies or amplitudes of reciprocal inhibition in the hamstring muscles, between the intervention and control groups after the 12 episodes of intervention/ control exercises.

**Conclusion**

This is an accurate method to quantitatively study the myotactic reflex and reciprocal inhibition using physiological amounts of stretch. This setup can be used for a comprehensive study of various parameters of the spinal arc under physiological conditions. The Randomised controlled trial need to be continued to sample size to be able to comment on the effect of plyometrics on reciprocal inhibition.

**Keywords**

Reciprocal Inhibition, Plyometrics, Exercise Physiology.