**The effects of lower extremity fatigue on postural control with perturbations over time in physically active males and females**

1. In this research, thirty to forty physically active individuals will be recruited from Texas State University. Physically active males and females will be actively recruited between 18-30 years of age. Recruited subjects have no previous history of hip, ankle, knee surgery or significant lower leg injury. Subjects will be excluded from this investigation if they have a current upper respiratory illness or sustained an injury within the previous two months of the hip, ankle, or knee. Each subject will be required to complete and sign an informed consent. Demographic information such as height, weight, and age will be assessed using a health questionnaire designed to evaluate physical status and health history. An ortho-screen testing range of motion, strength, and looseness of the lower leg will assessed by a licensed health care provider and will be documented as pass or fail in the health questionnaire.
2. Subjects will be recruited using flyers that will be on display in the Jowers Center at Texas State University. Physically active will be determined as defined by the American Heart Association. The investigator will explain them the purpose of this procedures, and answer any questions regarding of this research project. Each subject will read the consent form and agree to participation prior to the project with written signature.
3. The procedure for this study will be as follows: Subjects will warm up for five minutes on an indoor cycle bike followed by performing static stretches of the hip flexors, quadriceps, hamstrings and gastrocnemius. After completing warm-up subject will be asked to remove shoes in order to decreases time between the fatigue protocol and motor control testing. A safety harness provided by Equitest ® will be placed on each subject to analyze baseline postural control. The safety harness will remain on in order to minimize time between fatiguing the subject and analyzing muscle control. A pre-fatigue baseline motor control test (MCT) using the Equitest® will be taken from each subject immediately before fatiguing the lower extremities. After baseline MCT the subject will randomly draw three time intervals from an envelope that will determine the order in which motor control will be tested. At this point subjects will engage in a fatigue protocol. Fatigue will be defined as the point in which the subject can no longer do three consecutive squats unassisted. Each subject will perform repetitive bilateral squats using body weight. When the subject can no longer do 3 consecutive squats the stopwatch will start. At a time interval of 0, 5, 10 or 15 minutes which will be previously determined, the subject will then be placed on the Equitest® to complete the post fatigue MCT trial. The fatigue protocol followed by 4 minutes of rest will be completed between each time interval. The principle investigator will record all numerical values at time of fatigue and MCT will be analyzed using Smart Balance software. Data will also be analyzed using SPSS software. Values will be compared using repeated measures ANOVA. Alpha will be set at a p < 0.05 level of significance. A Tukey’s Honestly Significant difference post hoc will be used to identify differences between trials. It is hypothesized that fatigue will cause a decrease in postural control.
4. The potential risks for this experiment are minimal because the subjects will be supervised by the principal investigator during the duration of the study. Minor discomforts may be experienced due to the fatigue phase of the experiment. This may cause delayed onset muscle soreness. Other risks include the possibility of some feelings of slight dizziness or imbalance during the vision or balance testing.
5. Delayed onset muscle soreness will last 24 to 48 hours and can be relieved with over the counter non-steroidal anti-inflammatory drugs. Risks will be minimized by warming up prior to fatigue protocol and cool down afterwards. To ensure your safety on the Equitest, you will wear a safety harness during the standing tests with a trained assistant at your side. All recorded data will be kept for a minimum of 3 years and will be kept in the primary investigator’s locked office in a locked cabinet in the athletic department. If the participant experiences excessive pain the Texas State University Health Center should be contacted at (512)245-2167 or for emergencies contact 911. Participants are responsible for their medical bills if injury occurs or medical attention is needed as a result of participation in research.

6. The potential benefits gained by the subjects will help them learn about: Knowledge of postural control analyzed by the Motor Control Test. Personal limits of lower extremity fatigue will be determined as defined by bilateral body weight squats. Subjects will also learn personal limits of lower extremity fatigue defined by bilateral body weight squats. Identifying the effects fatigue may have on postural control can potentially allow practitioners to identify various prophylactic techniques such as bracing and taping that could be used to prevent injuries. Gathering such evidence also allows clinicians to be aware of the effects fatigue can have on balance while conducting sideline postural control exams. This evidence can also serve as valuable in order to accurately evaluate injuries that effect postural control and are influenced by neuromuscular fatigue.

1. There will be no compensation for participation in this study.
2. It is very clear that there are more benefits than potential risk to the subjects. Precaution will be taken to decrease potential risks such as an ortho-exam to make sure strength and flexibility of each subject is within normal limits. A safety harness will also be worn to decrease the risk of fall down while performing the motor control test on the Equitest. In order to decrease risks of delayed onset muscle soreness a warm up and cool down will be performed by each subject.
3. The testing site is the Athletic Training Lab (D108) in the Jowers Center at Texas State University. There are no current agencies associated with this investigation.
4. Athletic training involves recognition, treatment and rehabilitation of athletic injuries. Identifying the effects fatigue may have on postural control can potentially allow practitioners to identify various prophylactic techniques such as bracing and taping that could be used to prevent injuries. Gathering such evidence also allows clinicians to be aware of the effects fatigue can have on balance while conducting sideline postural control exams. This evidence can also serve as valuable in order to accurately evaluate injuries that effect postural control and are influenced by neuromuscular fatigue. My supervising faculty member is Dr. Jack Ransone, a professor at Texas State University. Dr. Jack Ransone, Department of Health and Human Performance can be contacted by phone at (512)-245-8176 or email at [ransone@txstate.edu](mailto:ransone@txstate.edu).
5. This proposed study has not been reviewed by another IRB.
6. Future researchers and the committee will have access to the results of study.