The Effect of Prophylactic Devices and Fatigue on Balance

1. A total of 30 subjects will be recruited for this study. These subjects will be physically active male and female volunteers between the ages 18 and 30. Exclusion criteria for subjects include any lower extremity injury within the past year, neurologic conditions, and uncorrected problems with vision. Prior to participation, all subjects will read and sign an informed consent document.
2. The subjects will complete a medical history questionnaire to determine their potential for participation as well as a brief questionnaire pertaining to their exercise habits. The subjects will be physically active individuals, according to the American College of Sports Medicine (ACSM) Guidelines for the Physically Fit
3. Additionally, a brief orthopedic exam will be done to each subject by a certified athletic trainer (ATC). These exercise recommendations require being physically active by doing moderately intense cardiovascular exercise for 30 minutes a day, 5 days a week or doing vigorously intense cardiovascular exercise 20 minutes a day, 3 days a week. The Texas State University Institutional Review Board will approve the study.
4. The instrument used to measure balance for this study will be the Neurocom Equitest Balance System (Clackamas, OR). This device will be used to assess the ability of the sensory and autonomic motor system to contribute to postural stability and recover from support surface disturbances. This system will be used to quantify the equilibrium as well as reaction time with numerical scores to represent each trial. The Neurocom System is fixed to a computer system that documents the results of the test. At the conclusion of the study, a database file will compile all the results and graphically represent the outcome of the study.
5. Each subject will be tested on the Neurocom Equitest for their baseline measurement at the start of the study with no prophylactic device. They will be required to stand on the forceplate and complete a Sensory Organization Test (SOT) and a Motor Control Test (MCT). The SOT is an assessment that incorporate six conditions: fixed surface with normal vision, fixed surface with eyes closed, fixed surface with sway-referenced vision, sway referenced surface with normal vision, sway reference surface with eyes closed, and sway referenced surface with sway referenced vision.Each of the six conditions will be tested three times for each of the subjects. The MCT is an assessment that identifies abnormalities in the timing and strength of the autonomic response and coordination in each leg in adapting to quick, unexpected support surface translations, either forward or backward. For this test, there will be small, medium, and large translations of the Neurocom force platform.
6. Each subject will wear a McDavid ankle brace (McDavid 195R Ultralite Ankle Guard; Woodrige, IL), ankle tape, and have a control balance measurement in which they will be barefoot.
7. The order of treatment (taping/bracing/barefoot) will be randomly counterbalanced for each subject.
8. The McDavid ankle braces will be fitted to each individual subject according to their shoe size. The ankle braces will be fitted to each individual subject by a certified athletic trainer, excluding the principal investigator to allow for a blind investigator. The ankle braces will be applied according to manufacturer guidelines.
9. The ankle taping method will consist of using 1.5 inch Johnson & Johnson tape with one layer of pre-wrap underneath. The ankle taping will be consistent for each subject and will be administered by a certified athletic trainer (ATC), excluding the principal investigator.
10. The primary investigator, nationally certified athletic trainer, will evaluate each participate for source of shoulder pain and identify the individuals with high risk of further injuries. Subjects with high risk will not be tested in this study. To minimize discomfort from tape removal, the investigator is trained in removal of the tape with slow and controlled movement. If a subject experiences skin irritation after tape removal, he/she will be referred to the Student Health Center.
11. 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 discomfort after tape removal and skin irritation at tape application site.
12. Thirty healthy subjects, aged 18-30, will be selected based on meeting various selection criteria. A detailed questionnaire will be used to narrow down the subjects to those that have not sustained a lower extremity injury in the past year. Both undergraduate and graduate students at Texas State University-San Marcos will be prospects of this study.
13. The testing site is the Athletic Training Lab in the Jowers Center at Texas State University. There are no current agencies associated with this investigation.
14. All subjects will report to the test site prior to initiating the treatment and subsequently submit their demographic and medical histories. The physical data include will height, weight, ankle range of motion, including inversion, eversion, plantarflexion, and dorsiflexion, and sex. During all testing sessions, participants will be instructed to wear appropriate clothing (gym shorts, tennis shoes, t-shirt, and socks) so that physical measurements may be obtained. During the initial assessment, participants will be randomly given a treatment order by a random number generation and equal number of male and female subjects will be assigned.
15. All subjects will be randomly selected and tested for balance on the Neurocom for both the SOT and the MCT a total of six times with no shoes on. The Neurocom will be used before and after the fatigue protocol for each subject for each of the three randomly selected conditions (control, taping, and bracing).
16. The fatigue protocol will consist of completing a pre-selected workout doing plantar flexion/dorsiflexion movements on the Biodex 4 Isokinetic Dynamometer (Shirley, NY) until fatigue is achieved. Fatigue will be at the point where there is a 50% reduction of the force generating capacity for 5 repetitions of plantarflexion/dorsiflexion in a row. During completion of the fatigue protocol, each subject will be asked to provide a rating of perceived exertion (RPE). Each subject will endure the fatigue protocol a total of 3 times, on 3 separate dates, with at least 48 hours of rest between testing. Verbal motivation will be given by the investigator consistently to each subject during the fatigue protocol.
17. Athletic training involves recognition, treatment and rehabilitation of athletic injuries. This research problem relates to my academic program, athletic training, by investigating the effect a rehabilitative tool in improving patient treatment and rehabilitation. The result of this investigation will hopefully provide information to subjects and fellow clinicians regarding ankle taping and bracing effectiveness on individuals who are fatigued. My supervising faculty member is Dr. Jack Ransone, a professor at Texas State University.
18. This proposed study has not been reviewed by another IRB.
19. Future researchers and the committee will have access to the results of study.