Introduction

Why Is Stretching Important?
As one starts to implement an exercise regimen into their daily lives, a common question sparks the interest in whether or not performing a stretching routine prior to exercise is important. Stretching has been demonstrated as an effective means to increase range of motion (ROM) about the joint and is commonly utilized by athletes to decrease muscle soreness, reduce or prevent the risk of injury resulting from tight musculature, and rehabilitation after injury. Although the debate between which type of stretching technique to be performed continues, past research suggests that initiating any kind of warm up prior to exercise is very important to reduce the risk of injury.

Different Types of Stretching Techniques
Although the general population is often trying to decide in either a static or dynamic routine, there are actually four commonly used stretching routines depending on the sport activity, training program, or personal preference: static stretching, dynamic stretching, ballistic stretching, proprioceptive neuromuscular facilitation stretching.

Anaerobic Power, Testing, and the Effects of Stretching
Anaerobic power is one of the main indicators in measuring performance in those who participate in short term maximal power output efforts, such as a Wingate anaerobic test. The effects of stretching on anaerobic power have been extensively studied, with mixed results. However, it is generally accepted that the type of stretching technique to be performed continues, past research suggests that initiating any kind of warm up prior to exercise is very important to reduce the risk of injury.

Methods

Subjects
- Six male students from the Department of Kinesiology at UT Arlington
- Each signed a consent form and filled out demographic data

Performance Testing
- The Wingate anaerobic test required pedaling for 30 seconds at maximum speed against a constant force or resistance and induced a noticeable development of fatigue within the first few seconds. The resistance was automatically removed at the end of 30 seconds.
- A vertical jump test was administered using a Vertec. The vertical distance was measured from the heights of the highest vane tapped during the standing vertical reach and the vane tapped at the highest point of the jump. After the recording was done, each subject repeated the jump two more times to get an average of the height differences. The best of three trials was recorded to the nearest 0.5 inches which was then converted to centimeters.

Statistics
- The independent variables include the types of stretching techniques (static and dynamic). The dependent variables include the measurement of peak, mean, relative peak, and relative mean power during each of the tests. The alpha level of significance was set to p ≤ 0.05. Independent t-tests were used to analyze any differences between the stretching techniques during a Wingate anaerobic test and a vertical jump test using Microsoft Excel 2010.

Results

Demographic Variables
- Age (yrs): Mean = 23.33 ± 1.11
- Height (cm): Mean = 179.48 ± 4.78
- Weight (kg): Mean = 83.90 ± 7.24

Performance Variables After Stretching Intervention In A Wingate Anaerobic Test
- Peak Power (W): Mean = 1704.10 ± 1180.83
- Mean Power (W): Mean = 524.88 ± 330.64
- Relative Peak Power (W/kg): Mean = 97.38 ± 58.45
- Relative Mean Power (W/kg): Mean = 524.88 ± 330.64

Performance Variables After Stretching Intervention In A Vertical Jump
- Peak Power (W): Mean = 14.10 ± 0.93
- Mean Power (W): Mean = 2.04 ± 0.77
- Relative Peak Power (W/kg): Mean = 97.38 ± 58.45
- Relative Mean Power (W/kg): Mean = 524.88 ± 330.64

Conclusions
- The findings of the analysis revealed no significant difference between the stretching techniques during a Wingate anaerobic test (p > 0.05). A separate analysis between the variables on a vertical jump test presented significant p-values for all variables (p < 0.01).
- Performing a dynamic warm up may elicit different physiological effects that improves performance on short bouts of exercise. These physiological principles may have a larger effect on bouts of exercise that last 1-3 seconds such as a vertical jump or shot-put. The effects of decreased viscosity after a static warm up, for example, may diminish during the 30 second maximal power test due to the fact that an increase in body temperature would occur during the prolonged bout of exercise.
- The null hypothesis was rejected due to the results showing a significant difference between stretching techniques on a vertical jump test even though there was no significant difference between a dynamic and static warm up during a Wingate.
- Performing a dynamic warm-up rather than a static routine significantly increases performance on short-term exercise bouts of 1-3 seconds, but has a lesser effect on exercise bouts ranging upwards to 30 seconds.