Exercise Physiology Lab #1: ***DUE on Jan. 30***

ISOKINETIC TESTING LABORATORY

Your Name and Exercise Physiology Lab #1 Somewhere On Top of Page

Class, all labs must be TYPED (double spaced), stapled and presented in the following way:
TITLE, INTRODUCTION, METHODS, RESULTS & DISCUSSION
Title: As written above with your name below title of lab
Introduction: Up to 150 words describing the physiological component of the lab and purpose of the lab. **Below is an example (in paragraph form), which you are welcome to retype!**
Methods: Follow example below (feel free to just retype-include EVERYTHING). Methods typically include equipment, subject(s), procedures, and data collection procedure.
Results and Discussion: Answer Questions in complete sentences on your own!
ALWAYS turn in a data collection sheet with labs (it may be retyped or just neatly written).
Special Point: One major goal of lab experiences is for all students to learn how to create computer-generated graphs of data. MS Office and other software (and online) programs make this very easy to do—please achieve this learning objective.
LASTLY—DO YOUR OWN WORK ON ALL LABS! Academic Dishonesty Policy Clearly Stated in Syllabus! NO LATE LABS ACCEPTED

INTRODUCTION:

An isokinetic action is a muscle contraction against a resistance that moves against a constant velocity. The profile obtained from an isokinetic evaluation can be used to predict susceptibility to injury, to monitor progress of rehabilitation/injury, and to determine readiness to return to activities of daily living, work, or exercise. When obtained data is converted to relative values (per kilogram of body weight) results can be compared between subjects. Interpretation of isokinetic data usually involves careful analysis of a subject's ability to generate torque, work, and/or power. Torque (ft/lbs) refers to the force applied about an axis, usually expressed in foot-pounds (ft/lbs). Work (ft/lbs) is the product of force (torque in this lab) multiplied by distance. Power (watts) is equal to work divided by time.

Isokinetic testing in the lab can provide useful demonstrations of the force/velocity relationship, peak torque angle for a given joint, and muscle fitness profile. The purpose of this lab was to identify the torque/velocity relationship, the work/velocity relationship, the power/velocity relationship and describe the percent fatigue of knee extension.

METHODS:

Equipment:

A Cybex isokinetic exercise machine was used for this single case study.

Subject:

One student volunteered to be the subject for this laboratory experience. The student was free of any knee-related injuries.

Procedures:

The Cybex machine was prepared for knee extension/flexion. Next, the subject was familiarized with the testing equipment and the testing procedures. During the familiarization process the subject was connected to the Cybex.

Data Collection:

The subject performed three sets of 6 repetitions at 90, 150, and 210 degrees per second. Average torque value (for extension) from each speed was recorded and **graphed (Figure 1)** with velocity on X-axis and

torque on Y-axis. Peak work and peak power values from each speed were recorded. **Figure 2 is the graph of** the peak work (velocity on X-axis and peak work on Y-axis) and **Figure 3 is the graph of** the peak power (velocity on X-axis and peak power on Y-axis). Lastly the subject performed 20 repetitions at 240 degrees per second. A percent fatigue was calculated and recorded.

RESULTS & DISCUSSION: (Answer the following questions in complete sentences)

1. Describe the relationship between torque (force) and velocity (inspect the graph)?
2. Inspecting the graph, describe what happens to peak work as the velocity increases.
3. Inspecting the graph, describe what happens to peak power as the speed increases.
4. Describe the % fatigue for the subject (average is 20-30%). What inferences can you suggest about the type of (recreational) athlete and muscle fiber type dominance? (HINT: if % is below average we could suspect subject was primarily using slow twitch fibers; if % is higher than primarily using fast twitch fibers)
5. What are some potential sources of error in collecting isokinetic data?

SAMPLE figures that you will be creating. Note how the Y-axis will change for each graph.

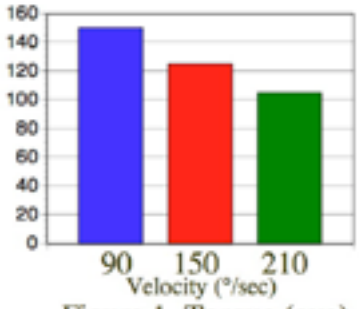

Figure 1. Torque (ave)

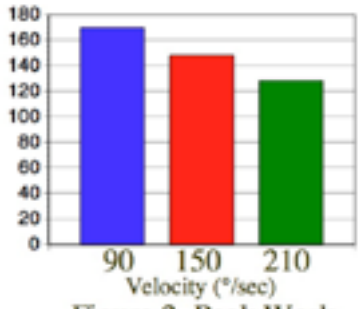

Figure 2. Peak Work

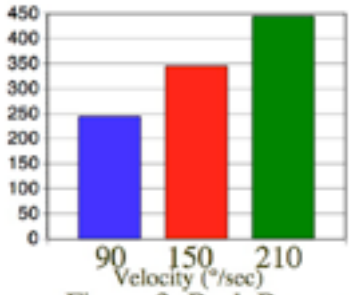

Figure 3. Peak Power

Data Collection

Subject_____ Current Physical Activity_____

Date_____ Weight_____ Height_____

Rep #	90°/sec **Torque** (ft/lbs)	150°/sec **Torque** (ft/lbs)	210°/sec **Torque** (ft/lbs)
1			
2			
3			
4			
5			
Average Torque			

Peak Work (ft/lbs)			
Peak Power (Watts)			

Fatigue _____ % (240°/sec)