

HSS 409: Kinesiology/Biomechanics

Quiz 2

Name _____

Please circle the correct response(s). There may be 0-4 correct responses for each item.

1. The following will decrease the force required by the muscle assuming all other dimensions, angles, and forces remain the same:
 - a. Increased radius of the associated anatomical pulley (P.299; WITH ALL OTHER THINGS STAYING THE SAME, THE ROTARY COMPONENT STAYS THE SAME WHICH THEN REDUCES THE OVERALL FORCE NEEDED)
 - b. Increased muscle insertion point distance from the axis (PROBLEMS IN CLASS; IF ALL OTHER THINGS STAY THE SAME, THEN THE TORQUE NEEDED BY THE MUSCLE STAYS THE SAME. IF INSERTION POINT DISTANCE GOES UP, THEN THE MUSCLE FORCE REQUIRED MUST GO DOWN)
 - c. Longer distance from the axis to the point of application of the resistance force (IF THE RESISTANCE FORCE STAYS THE SAME AND THE POINT OF APPLICATION FOR THE RESISTANCE INCREASES, THEN THE TORQUE DUE TO THE RESISTANCE MUST GO UP. TO COUNTERACT THIS, THE MUSCLE FORCE MUST ALSO GO UP.)
 - d. Decreased angle between axes of muscle line of pull and lever, away from perpendicular (P.297; THE ROTARY (PERPENDICULAR), COMPONENT MOVES THE LEVER. AS THE ANGLE MOVES FROM PERPENDICULAR, THE OVERALL FORCE MUST INCREASE TO KEEP THE ROTARY COMPONENT THE SAME)
2. Typically, the biceps and triceps muscles share the following similarities:
 - a. The non-rotary component can be either stabilizing or dislocating (YES FOR BICEPS, NOT FOR TRICEPS SINCE THAT ANGLE ALWAYS STAYS THE SAME AND, THEREFORE, ALWAYS STABILIZING IN ITS ORIENTATION)
 - b. Insertion point is almost always closer TO THE AXIS (ADDED IN CLASS) than the resistance point of application (PER CLASS DISCUSSION AND SAMPLE PROBLEMS)
 - c. Rotary (perpendicular) component of muscle force can be the same as the muscle force itself (PER CLASS DISCUSSION, YES FOR THE BICEPS WHICH CAN BE PERPENDICULAR, NEVER FOR THE TRICEPS GIVEN THE NATURE OF ITS ANATOMICAL PULLEY)
 - d. Location of the lever's center of gravity (LEVER FOR BOTH IS THE FOREARM – WHICH HAS THE SAME CENTER OF GRAVITY IN EITHER CASE)
3. Muscles with actions that require an anatomical pulley:
 - a. Include the triceps and quadriceps (P.299 – QUADS AND CLASS DISCUSSION - TRICEPS)
 - b. Are strong stabilizers (MUST BE, SINCE THE ANGLE IS SMALL, STAYS THE SAME, AND HAS A MUCH LARGER NON-ROTARY COMPONENT THAN ROTARY COMPONENT)
 - c. Are capable of significantly more maximal force than their respective antagonists (CLASS DISCUSSION – MUST BE SINCE THEIR ROTARY COMPONENTS ARE MUCH SMALLER THAN THEIR NON-ROTARY. NOTE: YOU CAN LOOK UP ANTAGONISTS ON P.57 FROM THE BOOK'S INDEX)
 - d. Generally have insertion points very close to the point of application of the resistance force (CLASS DISCUSSION; INSERTION POINTS ARE VERY CLOSE TO THE AXIS AND FAR AWAY FROM THE RESISTANCE)