

Muscle Fibers Part 2 of 3

Pennebaker's '*Orderly Recruitment*':

Coined the ideology of the amount muscle fibers being recruited depended on the increasing force of a muscle action. Meaning, motor units were recruited on rank order; ie: the smaller motor units were recruited before the larger motor units, or low to high conduction velocity.

Henneman's '*Size Principle*':

Piggybacked on Pennebaker, Henneman defined '*size principle*' as the consecutive, size-ordered activation or recruitment of motor units during movement. Meaning, the smaller, less strong Type I motor neurons would fire first before the larger, stronger Type II motor neurons. The larger motor units require a larger excitatory input to depolarize the unit, thus self-preserving metabolic need for task-specific activities. In other words, Type II would only be utilized during intense metabolic demand, after Type I was utilized and insufficient. Size principle is not based strictly on load, but mostly on load (amount of force, duration, speed on contraction, angles and muscle length).

Debate With Insufficient Data:

Although, some textbooks state 'advanced athletes may bypass size principle and immediately activate larger motor units', quantitative data is limited and effortlessly mirrors Henneman's principle. Additionally, the philosophy of stretching before exercise to metabolically activate the muscles is considered unremarkable due to the lack of metabolic activity. Instead, in order to activate Type I fibers before a workout a metabolically demanding exercise is recommended, such as jogging.

Post-Activation Potential:

Post activation potential is a theory that contractive history of a muscle influences mechanical performance of subsequent muscle contractions. The peak torque as an isometric

twitch in skeletal muscle is transiently increased after a brief maximum voluntary contraction.

How so?—Myosin regulatory light chain becomes more sensitive to calcium absorption.