TALKING STRENGTH

MAX FORCE, ENDURANCE, AND FATIGUE FACTORS:

- 1. Skeletal system limb length, bone configurations, and muscle origins and insertion.
- 2. Muscle belly size to tendon ratio.
- 3. Muscle groups used in exercise performance (single vs. multi-joint).
- 4. Motor unit (MU) distribution in each acting muscle group.
- 5. Fiber type quantity in each acting muscle group.
- 6. Exercise range of motion.
- 7. Nervous system potential 30 to 40% neurological ability.
- 8. Energy systems potential training status and diet.
- 9. Mental drive/conscious ability to exert.

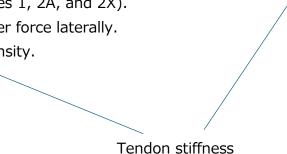
FACTORS DETERMINING MUSCLE STRENGTH:

Inside the muscles:

- 1. Cross-sectional area.
- 2. Fascicle length.
- 3. Sarcomere length (longer force).
- 4. Fiber pennation angle.
- 5. Moment arm length.
- 6. Fiber type (Types 1, 2A, and 2X).
- 7. Ability to transfer force laterally.
- 8. Myofilament density.

Outside the muscles:

- 1. Voluntary activation.
- 2. Antagonist co-activation.
- 3. Synergist activation.
- 4. Coordination.



INCREASING STRENGTH, IN ORDER:

- 1. Neuromuscular coordination first few workouts.
- 2. Learn how to recruit high-threshold MU's several weeks.
- 3. Tendon stiffness increases quickly, then plateaus.
- 4. Hypertrophy, myofibril density, and lateral force transmission.

LIGHT LOADS = DECREASE MAXIMUM STRENGTH GAIN POTENTIAL DUE TO:

- 1. Lesser recruitment & coordination of a maximum number of MUs.
- 2. Greater CNS fatigue lessens voluntary activation of high-threshold MUs if working to volitional muscle fatigue (VMF).

- 3. Lessens tendon adaptations.
- 4. Lessens lateral force transmission.
- 5. Type 1 fibers are smaller and have less potential to grow significantly large.
- 6. Type 1 does contribute to force, but max force is contingent on the stronger 2A and 2X.

MODERATELY HEAVY STRENGTH TRAINING:

- 1. Using moderately-heavy resistance (e.g., 80% to 90% 1-RM) and reps in the 8 to 15 range can shift Type 2X fiber qualities to type 2A, decreasing MAX strength potential.
- 2. Type 2A possesses both strength and endurance qualities.
- 3. Better hypertrophy if one possesses a higher percentage of 2A fibers training to VMF.

HEAVY STRENGTH TRAINING:

- 1. Increases pure strength type 2X fiber recruitment using 90%+ 1-RM resistance.
- 2. Not the best for increasing speed.
- 3. Use a low volume of work and avoid working to complete VMF.
- 4. Highly neural dependent increases coordination & decreases antagonist coactivation.
- 5. Longer rest times between sets.

ISOMETRIC TRAINING:

- 1. Increases isometric strength, but not so much maximum dynamic strength.
- 2. Can stimulate hypertrophy.
- 3. Increases CNS fatigue.
- 4. Not good for increasing force at fast speeds.
- 5. A large increase in tendon stiffness relative to eccentric strength, which can decrease the stretch-shortening cycle.