

Resistance/Strength Training



Strength Training Principles/Terminology

- **Progressive Resistance** - must advance to see gains
- **Overload** - stress on muscle
- **Arrangement of exercise** - usually large movements to small using multijoint exercises
- **Specificity** - little cross over to untrained limb (train all muscle groups)
- **Set** – a group of repetitions of an exercise (ex - one set of 8 to 10 reps) warm-up, pyramid, super
- **Repetitions** – number times a weight is moved during a set
- full, partial, concentric or positive, eccentric or negative and forced
- **Intensity (% of 1 RM – record max)** - where to start, desired outcomes – strength, endurance, growth?
- **Multijoint Exercise** – what is it, why is it important
- **Repetition Speed** – related to “power” goals (remember as speed of a movement increases force decreases)
- **Flexion** – decreased angle about a joint (bending elbow) often called a curl – examples?
- **Extension** – increased angle about a joint (straightening the elbow out) – examples?
- **Presses** – pushing a weight away from body – examples?
- **Adduction/Abduction** – pulling towards midline of body/pulling away from the midline of body – examples?

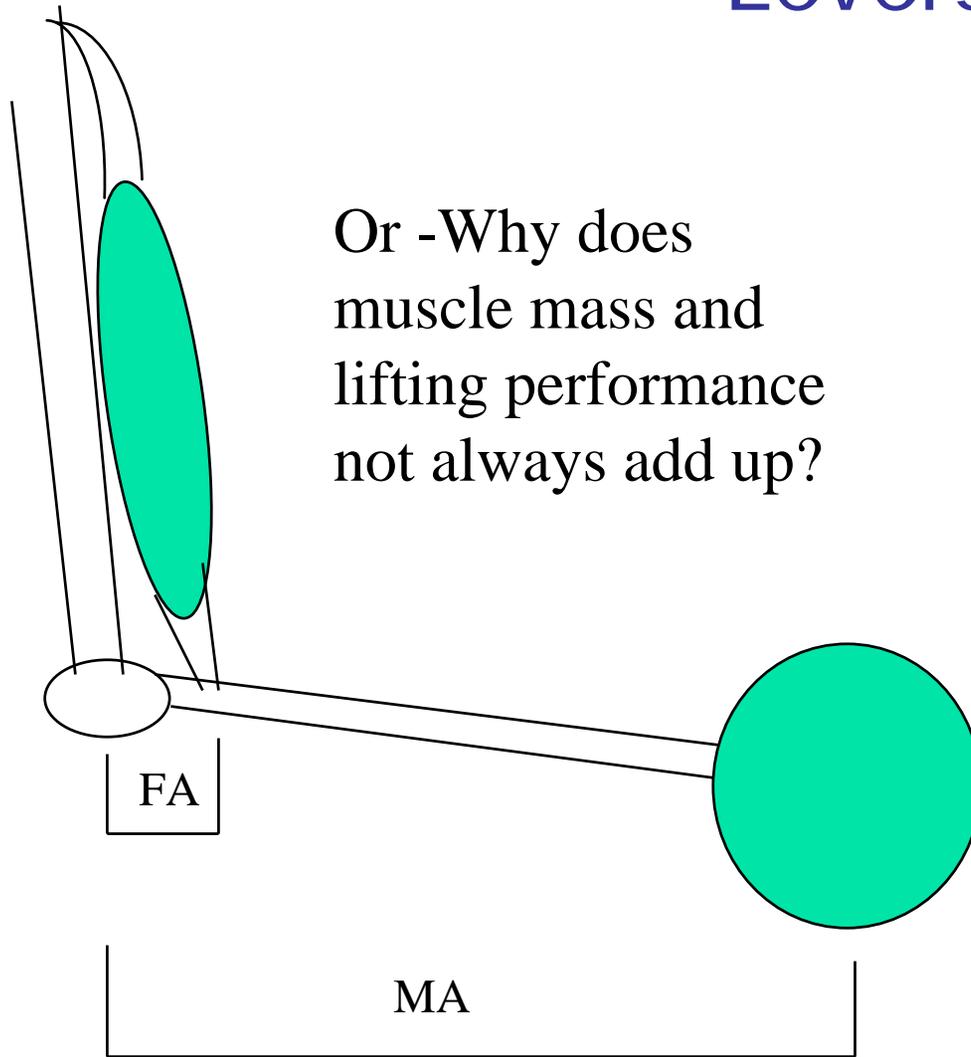
Strength Training Principles/Terminology

- **Core Work** - Its importance in fitness and sports
- **DOMS** - delayed muscles soreness - accentuated by eccentric contractions can be reduced if training properly but also gives feedback concerning your workouts so it is not really an enemy
- **Workouts** –
 - whole body
 - Split – upper/lower body, push/pull splits,
- **Training Volume** – a way of monitoring your total amount or resistance training work (combines numbers of sets, weights, reps, number of exercises, frequency etc – often expressed in tons)

Basic Resistance Training Guidelines

- Work/train all muscle groups and periodically increase resistance
- be safety conscious about equipment, breathing, and form
- Types of resistance training equipment: machines (usually stack or plate loaded), free weights, resistance tubing, etc
- work out only one to three days per week on same muscle group
- begin with one set of each exercise and increase up to 2 or 3 after several weeks
- shoot for 8 to 16 repetitions per exercise reaching *failure of form* to get a mixture of strength and endurance (higher reps for endurance and lower reps for strength, overall volume probably most important for hypertrophy). Most importantly do each exercise slowly and deliberately
- Increase lifting speeds though if primary focus is power (watch, however, for hidden dangers of momentum)
- Choose three dimensional exercise, multimuscle, body weight balanced exercise and bilateral work whenever possible. (I.e. 45 degree lunges, one leg balance work)
- rest for only a short time between exercises to maximize calorie burning effects and reduce extra workout time.

Levers and Strength



Or -Why does muscle mass and lifting performance not always add up?

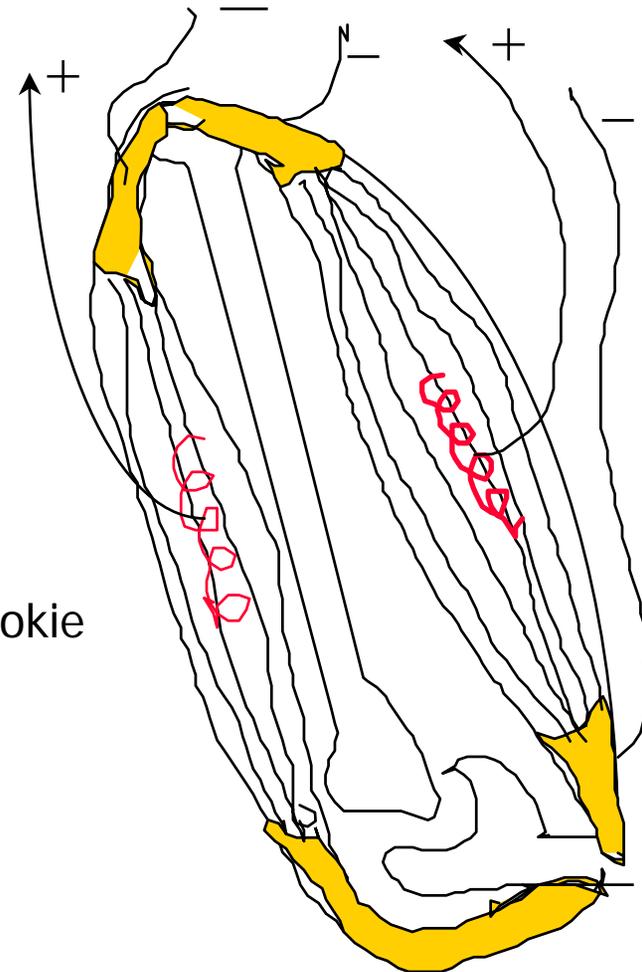


The longer the mass arm is compared to the force arm the heavier the weight will feel



Muscle Fine Tuning and Protection The Stretch Reflex, Muscle Spindles and GTO's

- **Muscle Spindles** - respond to change in muscle length causing stretch reflex
- **Golgi Tendon Organs** - respond to tension placed on a tendon causing a muscle to relax
- **Reciprocal Innervation** - the body is one smart cookie
- **Super Sets** make sense



A Basic Whole body Resistance Training Regimen

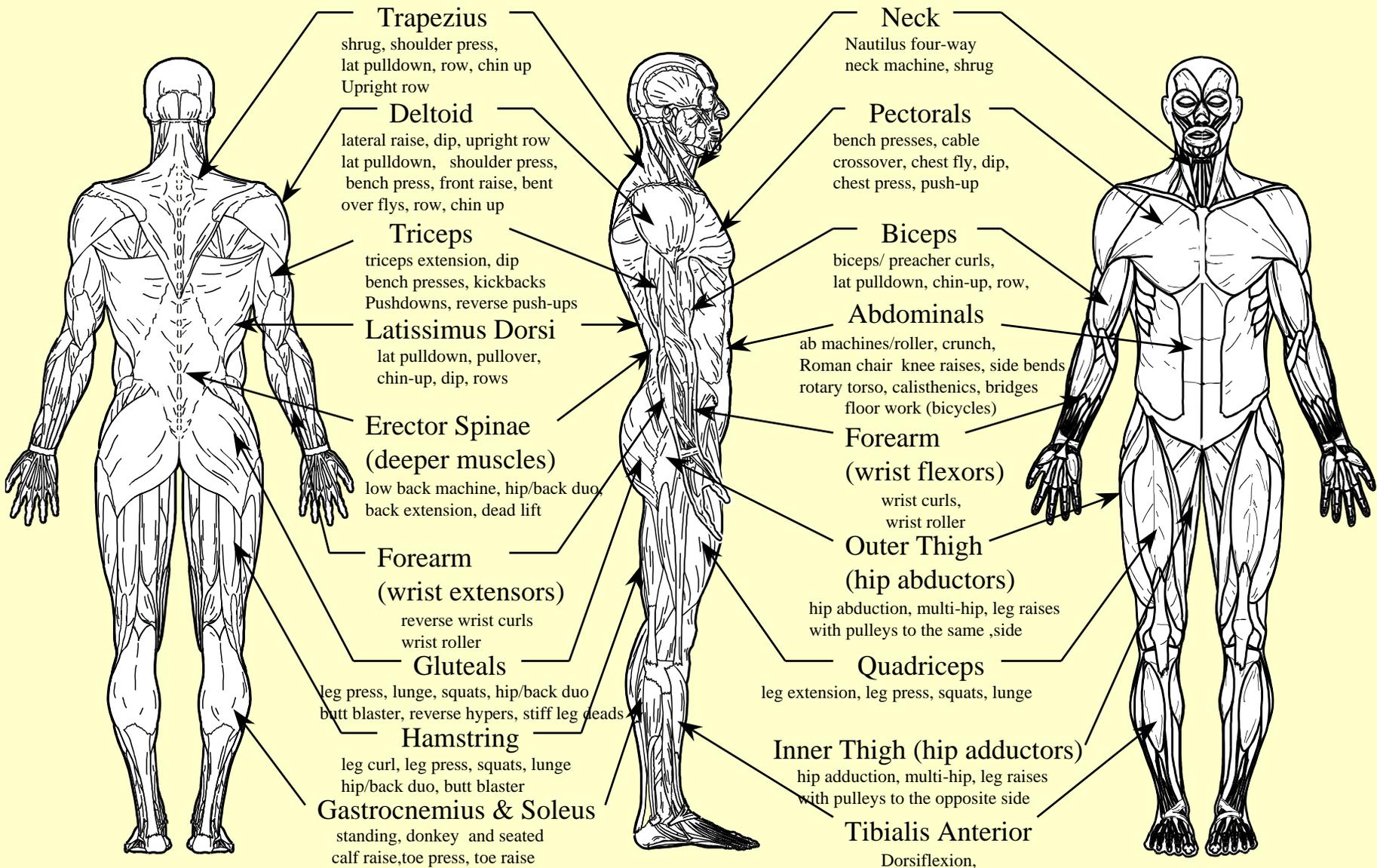
■ 6 Resistance Exercise “Equivalents”

- 1. **upper body push** (push-ups, bench, chest press, dips)
- 2. **upper body pull** (rows, lat pull down, chins)
- 3. **lower body push/pull** (squats, lunges, leg presses)
- 4. **calf work** (standing or sitting calf machine, one legged calf raise)
- 5. **abdominals - core** (crunch, bicycle maneuver, hanging leg raise)
- 6. **low back - core** (low back extension, dead lift, swimmer strokes)

This simple selection of 6 exercise equivalents will work all the major muscle groups to some extent. Start with 1 set of 10 to 12 reps after 3 weeks add a second then after 3 weeks add a third with each set using slightly higher weight and lower reps. For those involved in sports requiring 360 degree movements you should also add exercise for inner/outer thigh and a strength rotational component (see more later on day two).

- **Later add specialty exercises** to the basic movements listed and vary equivalent choices to keep muscles responding
- **Specialty exercises include**- chest flies, shoulder raises, bent over rows, triceps pushdowns, arm curls, shrugs, leg extensions, leg curls, seated calf raises, oblique crunches or leg raises, hyperextensions, and a variety of calisthenics, throws, plyometric and movement pattern work.

MAJOR MUSCLE GROUPS and RESISTANCE EXERCISE CHOICES



BACK VIEW

SIDE VIEW

FRONT VIEW



Resistance Training Injury Concerns

- **Form** – don't cheat
- **Breathing** – avoid prolonged breath holding it may prevent elevated BP response and decreased venous return
- **Full versus Partial Range of Motion (ROM)** – work large part of your normal pain free range of motion (there is a 15% ROM leeway)
- **Momentum** – control momentum or be ready to deal with it
- **Shear and compression forces** – those with joint pain may respond better to exercise that produce compression as opposed to shear forces



Strength Training Options on Base

SelectORIZED Machines

Upper
Body

Lower Body

core





Strength Training Options on Base

Plate Loaded Machines and Body Weight Exercises

Upper Body



Lower Body



Core



Strength Training Options on Base

Free Weights – Ideas only limited by your imagination

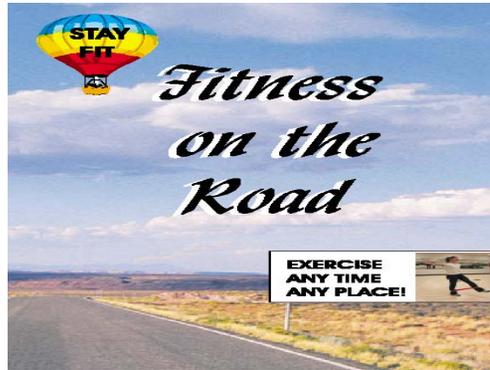




Strength Related Classes/Programs on Base



Boot CAMP



Fitness on the Road Program



Stability Ball Class



Services Trainers



Push-up/Crunch Challenges



Military Muscle Competition



Some folks just make their runs tougher



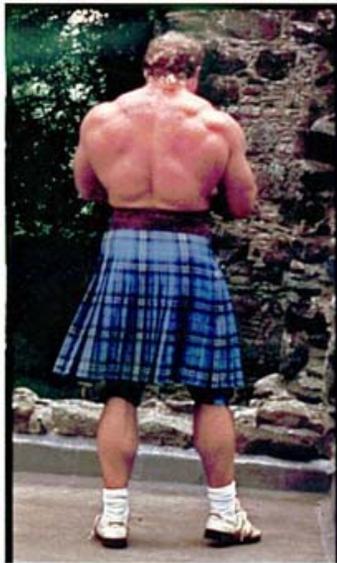
References on Strength Training

- **Weight Training Steps to Success** , Thomas Buchele Ed.D. and Barney Groves Ph.D., Leisure Press
- **Designing Resistance Training Programs**
Steven Fleck Ph.D. and William Kraemer Ph.D., Human Kinetics
- **Strength Training for Coaches**, Bruno Pauletto M.S., Human Kinetics
- **Getting Stronger**, Bill Pearl and Gary Moran Ph.D., Shelter Publications
- **Essentials of Strength Training**, Thomas Buchele Ed.D. Human Kinetics
- **Beginning Weight Training Programs**, V. Patteson Lombardi, Academic Athlete, Brown Publishers
- **Journal of Strength and Conditioning Research**, (quarterly scientific journal geared to fitness researcher), Human Kinetics
- **Various other health/fitness magazines** (many excellent articles although may sometimes be a mixed bag of information - watch for suitability to your training needs and author's credentials)
- **Great Website on Strength Training and Exercise** – www.exrx.net

Remember you don't need fancy weights to get a good strength workout use you imagination!



Throw
around some
trees in the
backyard



Workout
with a
buddy



Hand start some
old prop planes

Indoor Training Ideas

- **Boot Camps** – as per instructor Kirk Links (shown below in recent photo) “**Boot Camp is a 40 minute – in-your-face exercise**”





Indoor Training Ideas

Boot Camp Suggestions

- The instructor should demonstrate but must also circulate, give feedback and watch members for proper form and signs of any distress
- Have a stopwatch to time exercises
 - Set strength intervals at around at 40 seconds per exercise
- Give alternatives for those with higher or lower fitness (I.e. push-ups on knees versus standard or try decline staggered push-ups for the most fit)
- Alternate large muscle groups to maintain intensity and produce a whole body workout (push-ups alternate with lunges etc)
- Add in cardio links (I.e. run in place or jumping jacks) every few exercises for 2 minutes.
- Keep the pace fast and try to keep transition between exercises as fast as possible to maintain cardio benefit.
- Adding in step exercise can really increase work level and can be used for upper or lower body work an in inclined or decline positions
- Add in dumbbells, weight plates, rubber tubing if available to increase intensity and variety



Body Weight Boot Camp Exercises



Boot Camp Exercises with Added Resistance



Stability Ball Class

- This is a challenging class geared to improving overall balance, body control and strength
- Keys to this class are
 - Breaking through the “running or weight training mentality”
 - This is a learning class. Each member will progress at his or her own rate. Try to challenge members but don't discourage them with what seems impossible tasks
 - Although almost any exercise on the ball will require balance, make sure to develop a well rounded class that includes a variety of exercises to improve overall strength and flexibility.
 - Add in additional equipment to spice it up – I.e tubing and dumbbells
 - Periodically add in some fun competition for example seeing who can kneel in a two point stance the longest

Some Stability Ball Class Options

BALANCE



STRENGTH



USING ADDED RESISTANCE



GAMES AND CHALLENGES





Indoor Group Cycling - Spinning



Indoor Group Cycling

- Presently bikes and or classes are available at the three base gyms
 - The first indoor group cycling program was developed by cyclist Johnny G in 1989 and was named “Spinning”. Since then several other cycling programs have been developed and exercisers have found these programs to be a fun low impact fitness option that is not just for the elite cyclist.
 - All cycling programs utilize an upright stationary bike with limited instrumentation (no speedometer, rpm etc)
 - Benefits include allowing all fitness levels into one group, the ease at which students learn the movements and the addition of the cadence and beat of accompanying music to help motivate students and keep it fresh
 - Drawbacks – initial “glute” pain and the periodic poor unmotivated instructor that makes the class a drag



The Start of a Spinning Class

- **Bike Part and Functions** – the instructor should instruct each member on their first day the proper use and function of each of the bike parts paying particular attention to brake and tension controls. They should also review hand and body positions (seated, standing, climbing) used during cycling and methods to monitor intensity (talk/sing test, heart rates and how to monitor overexertion) New members should be encouraged to come to class 5 to 10 minutes early for this initial training. These topics, however, also be taught in an abbreviated form during the beginning of each class as a review.
- **Bike Adjustment** – the instructor teaches each member how to adjust saddle, and handlebars for proper positioning.
- **Warm-up and Cool Down** – just like any other fitness class, a group cycling class should start and end with a few minutes of easy low load cycling and stretching especially at the end of the class.



During the Group Cycling Exercise Period

- The instructor may be on or off the bike as they lead the class and check on each student.
- Music is used to add to the class. Selections should have a strong beat and selections should vary throughout the separate and individual classes.
- For example during a 40 minute class you may have 8 or more different songs. For example a song with a strong slow powerful beat may be used for a few minutes when students are out of their seat simulating climbing an arduous hill. Or a fast upbeat song may be used during a period where students are pedaling fast at the end of an imaginary race.
- During the class the accomplished instructor will use imagery, dissociation and association techniques to drive classes. One class I had members climb at higher and higher tensions will pedaling to an ever loudening tape of the Ohio State band belting out Script Ohio.

Final Group Cycling Thoughts

- Try to attend a few classes offered at the different gyms to get more ideas how to lead classes
- If you are really interested try to get formal training in a group cycling program and teach a regular class – you'll get much more comfortable teaching classes and may be even able to make a few bucks.

