

GENERAL STRENGTH TRAINING PRINCIPLES

Strength training for the sport of triathlon is very complex and individualized. While it can be very useful for some athletes, if not done properly it can be ineffective or just plain dangerous.

Explosive lifting techniques and the concept of mixing these with the more traditional weight lifting methods will also be introduced.

There are many reasons to incorporate a strength-training program into a multi-sport athlete's training plan. Injury prevention, increased muscle power, and even increased speed and flexibility, are all reasons to hit the weight room.

A multi-sport athlete must already, but the nature of the sport, be training at least two different sports. This takes an incredible amount of time. Certainly there is some cross-over from a physiological standpoint, but still a significant amount of time must be spent swimming, cycling or running. For many athletes, this may be all they can manage. For these athletes it is important to incorporate sport specific strength training into the workouts. This includes, hill repeats for the run, strength endurance intervals on the bike and paddles for the swim.

Strength training, like endurance training, must be periodized. The athlete must begin by preparing the muscles to be strengthened, that is the transition phase. After this phase a hypertrophy phase can be utilized to build muscle mass. After that a basic strength phase will build more power, and finally a complex phase will add velocity training to the muscles and further increase power for sport.

Complex weight training is one of the most effective ways to ensure that a strength program will develop power and increase performance. It is the concept of combining standard weight lifting techniques with plyometrics and other ballistic types of training in one training session. The theory behind this kind of training is that the initial voluntary, high intensity lift brings about an extremely high excitation level in the motor unit for a couple of minutes. This enables there to be more muscle fiber recruitment for the explosive exercise that follows. What this basically means is that the athlete is tricking his or her muscles into reacting at a higher level during the second exercise, this generating a greater response than if either of the two exercises were performed solo. An analogy for this is if a full pail of water is repeatedly lifted, the body adapts to this and the muscles "ready themselves" to lift this heavy load again. If an empty pail is then lifted, the force generated by the muscles is great and the pail flies up explosively and with much greater power than it would had it been lifted first.

In addition to increasing performance, complex training is an extremely time effective way to train. Studies show that the response is greater and therefore the volume should be less. Quality is the key to maximizing the results of complex training. Studies also show that although complex training is effective

in its ability to build power, it does not build muscle mass, a desired effect for endurance sport.

There are a few fundamental things to consider when setting up a strength program, exercise variation, muscle balance and exercise order.

It is well documented that muscles adapt quickly over time. Therefore it is important to not only periodize the training, but to vary the individual lifts and exercises on a weekly basis. This doesn't mean that every exercise needs to be changed, but doing the exact same routine in the weight room will greatly reduce the training responses over time.

Muscle balance goes back to the principle of functional movement in strength training. All three disciplines of a triathlon use the arms and legs independently, therefore it is better to adjust exercises accordingly. Using dumb bells versus bar bells is far more effective in helping the muscles develop balance and peripheral muscles. Also doing single leg squats, lunges, leg presses and hops are much more effective for the lower body. Good muscle balance is important not only from a performance standpoint, but from an injury prevention standpoint, as well.

Lastly, exercise order, and the order of the workouts in the day are crucial to getting good results. It is best to perform the total body and large muscle movements first, working from the lower body to the upper body. There is no need to work only one section of the body at a time when lifting for performance enhancement. As far as workout order, strength training should always be done when fresh. It should come before a swim, bike or run. Therefore, if you have a key swim, bike or run, you should not lift that day. The exception might be during the strength phase of cycling or running. If you cannot commit 100% to strength training, then it is a waste of time. You will not get the response you are looking for, and worse, you might get injured.

Strength training for multi-sport encompasses a vast array of exercises and movements. These include sport specific exercises, resistance training and explosive training exercises. It is not an exact science, and it is up to you and the coach to determine what your needs are.

Strengthening the core of the body is a great way to increase strength and keep healthy, without getting into a hard-core training regimen. The exercises below are grouped and can be done daily, one or two per day in order to increase core stability, a very important component to training.

Stretch Cord Workouts

#1 - Catch Set

3x40	Full stroke
3x40	Catch phase
3x30	Full stroke
3x30	Catch phase
3x20	Full stroke
3x20	Catch phase
Rest between sets	

#2 - Finish Set

2x40	Finish phase
2x30	Full stroke
2x30	Finish phase
2x20	Full stroke
Rest between sets	

#3 - Catch Set

1x40	Full stroke
1x20	Catch phase
1x20	Full stroke
1x10	Catch phase
Keep tempo fast and explosive	
Straight through - no rest	

#4 - Finish Set

1x40	Finish phase
1x30	Full stroke
1x20	Finish phase
1x10	Full stroke
Keep tempo fast and explosive	
Straight through - no rest	

#5 - Failure Set

Pull to failure - minimum 100 repetitions	
Rest 1 minute	
Pull to failure	
Rest one minute	
Pull to failure	
Keep tempo fast and explosive	

Abdominal Circuits

Circuit #1

Cat Exercise	10x
Opposite Toe Touches	20x
Crunches	40x
Superman Pose	2x

Circuit #2

Cat Exercise	10x
Bicycles	30x
V-Ups	15x
Bird Dogs	10x

Circuit #3

Cat Exercise	10x
Straight Leg Trunk Twist	10x
Crunches	40x
Bird Dogs	10x

Circuit #4

Cat Exercise	10x
Russian Twist	25x
Opposite Toe Touch	20x
Superman Repetitions	15x

Circuit #5

Cat Exercise	10x
Reverse Crunch	15x
Balance Bicycle	25x
Bird Dogs	10x

Circuit #6

Cat Exercise	10x
Opposite Toe Touch	20x
V-Ups	10x

Circuit #7

Cat Exercise	10x
Russian Twist	25x
Crunches with Twist	40x
Superman Pose	2x

Circuit #8

Cat Exercise	10x
Superman Repetitions	20x
Straight Leg Trunk Twists	10x
Reverse Crunch with Twist	15x

Circuit #9

Front Squat	
Seated Row	
Step Ups	
Lat Pulls	

Circuit #10

Low Box Jump	
Lateral Box Jump	
Seated Row	
Glute/Ham Extensions	
Back Extensions	
Shoulder F.L.U	
Dumbbell Incline Press	

Circuit #11

Roman Dead Lift	
Leg Press	
Seated Row	
Lat Pull	
Dumbbell Incline Press	

Circuit #12

Heel to Butt Jumps	
Lateral Box Jumps	
Front Squats	
Glute/Ham Extensions	
Back Extensions	
Shoulder F.L.U	

Exercises

Cat Exercise – on all fours, arch back up as hard as you can, hold for 15 seconds, arch down as far as possible

Opposite Toe Touches – lie on back, legs straight up, touch right hand to left toe, reverse and repeat

Superman Pose – lie on stomach with arms above head, raise legs, arms and chest off ground and hold 30 seconds

Superman Repetitions – same as pose, just don't hold the position

Bicycles – lie on, bring right elbow to left knee, reverse and repeat

Balance Bicycles – same as bicycle, only balance on butt during the exercise

V-Ups – lie on back an while keeping legs straight, bring body and legs off the ground to a 'V' position

Bird Dogs – on all fours, lift right arm straight out front and left leg straight out back, hold 2 seconds, reverse and repeat

Straight Leg Trunk Twist - lie on back, arms straight out, legs straight up, touch feet to ground on right side, then bring straight up and over to the left side, repeat

1 LEG SQUATING

1 LEG SQUAT

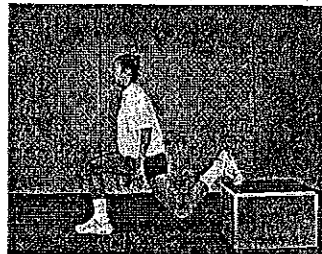
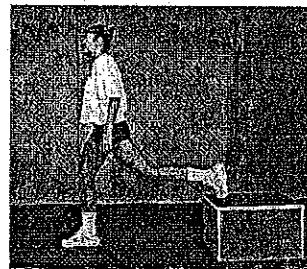


- Start in the upright position on a 12-16" box or bench.
- Balance on 1 leg focusing on body alignment and knee tracking.
- Lower hips down and back.
- Keep torso erect.
- Avoid excessive forward movement of the knee past the toes.
- Descend until thigh bone is parallel.
- Weight should be distributed from the middle of the foot to the heel..
- Return to starting position.
- Avoid excessive rotation of the knee.
- Perfect technique comes first with body weight, then add light weight.

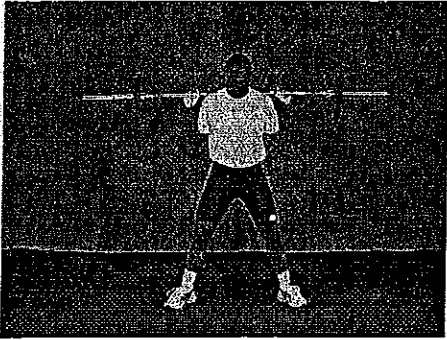


1 LEG BENCH SQUAT

- Start in the upright position with rear leg supported on box or bench not exceeding 16 inches.
- Balance on 1 leg, focus on body alignment and knee tracking.
- With knee remaining over ankle lower hips down and back to parallel.
- Keep torso erect.
- Avoid excessive forward movement of the knee past the toes.
- Descend until thigh bone is parallel.
- Weight should be distributed from the middle of the foot to the heel..
- Return to starting position.
- Avoid excessive inward rotation of the knee.
- Perfect technique comes first with body weight, then add light weight.



BACK SQUAT



FRONT VIEW



SIDE VIEW

- Same movement as front squat.
- Bar is placed in high or low bar position, high bar is recommended (above traps).
- Slightly wider base than front squat.
- Maintain arch (lordotic curve), chest out, abs and low back tight.
- Lift with legs and hips, not back.
- Back Squat should only be attempted after front squat technique has been mastered.
- Adjust width of base depending on comfort.
- Maintain proper knee alignment, avoid "knocking knees".

REGULAR DEADLIFT



- Start with feet placed firmly at hip width.
- Arch back, head up, chest out.
- Arms long and relaxed, avoid jerking the bar off the floor.

FOCUS: Hamstrings, Gluteus, Erector Spinae

****Avoid jerking the weight off of the floor.**



SIDE VIEW



- Maintaining arched position lift bar by extending hips forward.
- Focus on driving up through heels.
- Descend slowly to start position in the same fashion, or drop the bar if using heavy weights.

RDL (ROMANIAN DEADLIFT)

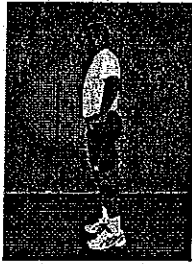


- Place feet approximately shoulder width (wider or narrower base depending on comfort).
- Slight flexion in knees.
- Shoulder blades pulled together, chest out, arms long and relaxed.
- Keep bar tight to legs, roll wrist under.
- Begin descent by rocking hips back while maintaining knee bend, arched back, and flat footed.



- Amount of descent depends on ability to maintain low back arch.
- Avoid rounding low back at bottom of lift.
- Transfer weight from middle of foot to heel at the bottom.
- Return to start position by driving hips forward.

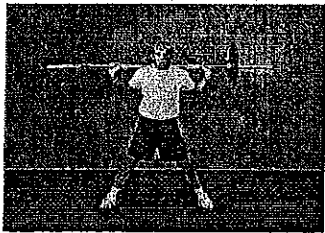
LUNGES



- Start in normal standing position.
- Step forward leading with heel.
- Flex knee and hip until thigh bone is parallel to floor.
- Return to start position by driving off of lead leg through the heel.
- Maintain upright torso, avoid excessive forward lean.
- Keep knee over ankle, remember to step out and down, do not lunge to far forward.

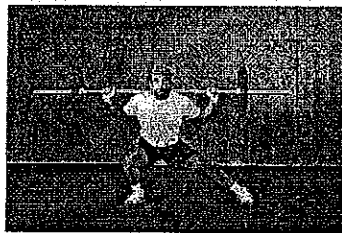


LATERAL SQUAT



- Start with a shoulder width times two stance.
- Keeping an upright torso, descend to one side by lowering the hip down and back over the ankle (note side view).

FOCUS: Groin, Glutes, Hamstrings, Flexibility



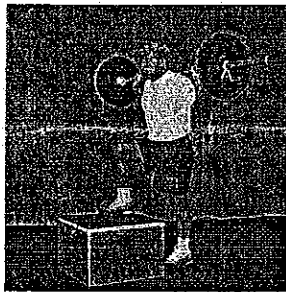
- Descend until thigh bone is parallel to floor.
- Return to starting position.
- Repeat to other side.



SIDE VIEW

- Note that hips go back as weight is transferred onto the heel.

STEP UP



- Pick a box height that will allow thigh bone to be parallel.
- Flex lead leg, place it in the middle of the box so knee remains over ankle.
- Place weight on lead leg, avoid using rear leg.

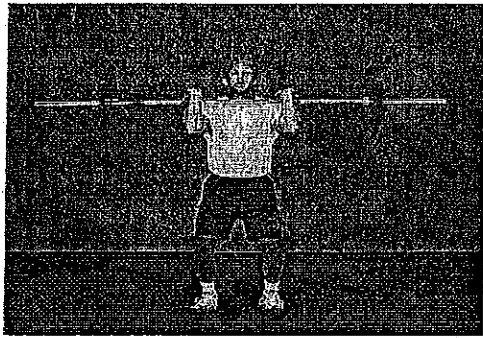


- Fully extend hip while maintaining an upright torso.
- Avoid hyperextension of knee.
- Focus on popping hip forward.
- Do not touch other leg on top of box, work on balance whenever possible.
- Return to start position by sitting back slowly.
- Alternate legs or continue on same leg.

SQUATTING

Squats, without a doubt, should be included in every strength & conditioning program. The fundamental mechanics that are necessary for squatting relate to most athletic activities. The squat (front or back) and its' variations are the best exercises to develop lower body strength, size, power, and endurance. The squat places specific demands on the musculature of the lower body while at the same time requires the athlete to stabilize the entire body. Balance, core stabilization, proper body alignment, flexibility, and overall strength demands are incorporated in this one simple movement. While the squat, front especially, benefits the lower body it also aids in Olympic lifting. Athletes should master the front squat before learning the back squat. Squat depth varies from program to program. A squat depth of thigh bone reaching a parallel positioning is recommended for full development of the glutes and aid in flexibility. The development of good squatting technique is also the first step to increasing speed and explosive type movements. Squatting is a very simple exercise though if performed improperly can be hazardous. Correct technique and flexibility must precede heavy weights.

FRONT SQUAT



START POSITION

1. Athlete assumes slightly greater than shoulder width stance.
2. Feet flat on floor, toes turned out slightly depending on comfort (limit degree of rotation).
3. Bar is positioned across shoulders with elbows parallel to floor.
4. With hands relaxed, grasp bar as close to deltoids as possible.
5. Head up, chest out, lumbar spine arched.
6. Isometrically contract abdominals and erectors.
7. Prior to descent, inhale and hold to increase inner thoracic pressure.



DESCENT/FINISH POSITION

1. Lower hips down and back (hip flexion) maintaining upright position with elbows parallel, chest up, and back arched.
2. Knees remain over ankles, avoid excessive forward lean.
3. Focus on driving through heels, avoid pushing with toes.
4. Avoid uncontrollable eccentric contractions (lowering).
5. Ascend by forcefully contracting quads and hips.
6. Avoid forward lean by punching elbows and chest upward.
7. Exhale air slowly just past sticking point (~30deg above parallel)
8. Extend hip until knees are almost locked, avoid hyperextension of knee joint.

POINTS TO REMEMBER

- The body is the ultimate free weight and should be taken advantage of.
- Form and technique must be mastered before weights are used.
- Always maintain proper body alignment to avoid insufficient line of pull and risk of injury.
- Belts are only recommended for maximal lifts, strive to increase torso strength through squatting.
- Avoid dropping to quickly.
- Always use a spotter.
- If problems with squat technique are evident, lighten the weight!!!!