

GET STRONGER FOR ORIENTEERING

by Violet van Hees

WHAT IS RESISTANCE TRAINING?

The terms “resistance training”, “weight training” or “strength training” are loosely applied to just about any kind of muscle-specific work that uses resistance to increase the workload. But, depending on how you structure the number of repetitions, amount of resistance, exercise sequence, and rest periods in your training program, you can choose to develop muscle *endurance* (for repeated, sustained muscle work), *strength* (for lifting a heavy weight once), *size* (for developing greater muscle mass for looks or function) or *power* (the ability to exert a lot of force quickly).

WHY IS RESISTANCE TRAINING IMPORTANT FOR ORIENTEERING?

Orienteering uses a lot of muscles. Being runners, orienteers need strong legs (calves, hamstrings, thighs, shins, hip flexors). But we also need strong glutes (buttocks) for climbing steep hills, backs (especially spinal erectors) for torso support and for ducking around and dodging whatever is blocking the route, and arms and shoulders to help us clamber about and to pump hard during those occasional long clear stretches. And, at the core of it all, we need solid abdominals - trained to act as stabilizers - to support the back and hold everything together.

The purpose of these resistance training programs is to build functional strength in the muscles, so that you can orienteer more comfortably and be better prepared physically for the rigours of the sport. This will complement your cardiovascular training, and will hopefully translate into better orienteering performance - although I can't promise it will help your route choices!

EQUIPMENT:

You don't need a fancy gym to get started with resistance training. The machines and gizmos that are around for working every imaginable muscle are truly mind boggling. You can do a complete workout with nothing more than your own body weight or things available around the house, or you can use special equipment if you have access to that. Where equipment is needed, use what is available, convenient, and suited to your body and fitness level.

BEFORE GETTING STARTED

The programs in this article are designed for a moderately fit, healthy, active adult. Consult with your doctor before beginning a resistance training program if you fall into any of the following categories:

- * you are 35 or over, new to resistance training and you have not had a physical examination in the past year;
- * exercise gives you chest pain or makes you feel dizzy;
- * you are on medication on a regular basis;
- * you have been inactive for the past year or more; or
- * you have a medical or physical condition that could be aggravated by exercise (e.g. pregnancy, arthritis, diabetes, high blood pressure, asthma, or an injury).

You may need to modify the programs in this article if do have any physical or medical condition that is affected adversely by exercise. Consult with your physician and a certified Personal Trainer or Strength/Weight Trainer to help you with this.

THE TYPES OF TRAINING (“Training Protocols”)

This article talks about four types of training protocols for four different kinds of results: muscular endurance, muscular strength, muscular strength/endurance in combination, and power. Note that a “rep” is one repetition of an exercise (e.g. one push-up), and a “set” is a series of reps done all at once (e.g. 12 push-ups done in a row).

Muscular Endurance

The following training zone will predominantly build muscular endurance:

Frequency of workouts: 3-4 times/week

of Reps: 12-15

Rest between sets: 1-2 minutes

of Sets: 1-3

Rest between workouts: 24-48 hours

Time per rep: 2-4 seconds

Source: Potvin, Andre Noel: [Strength Training Module Workbook](#)

Muscular Strength/Endurance

This training zone will develop moderate muscular strength and endurance in combination. This is the most functional training protocol for those seeking general overall conditioning.

Frequency of workouts: 2-4 times/week

of reps: 8-12

Rest between sets: 1-3 minutes

of sets: 1-3

Rest between workouts: 48-72 hours

Time per rep: 2-4 seconds

Source: adapted from: Potvin, Andre: [Strength Training Module Workbook](#)

National Strength and Conditioning Association: [Essentials of Strength Training and Conditioning](#)

American College of Sport Medicine: [ACSM’s Guidelines for Exercise Testing and Prescription](#)

Muscular Strength:

This training zone helps build maximal muscular strength – the ability to do one or a few contractions with maximal contraction of all the muscle fibres at once. It is good cross-training, especially when your eventual goal is to train for power.

Frequency of workouts: 3-5 times/week

of reps: 2-6

Rest between sets: 2-4 minutes

of sets: 3-6

Rest between workouts: 48-96 hours

Time per rep: 2-4 secs

Muscular Power:

Power is strength plus speed. It is what most sports require for optimal performance.

Power work should be done in the pre-competition season (not all year round), in order to take the base of strength you have developed during the “off season”, and gradually add speed so that the strength becomes performance-ready for your sport.

You can then do a maintenance program for power during the competition season – which generally means doing one workout a week that maintains the same INTENSITY of work you were doing during workouts, but you have reduced the FREQUENCY of the work to once a week.

Power training is sport specific, so there is no “blueprint” of sets and reps, etc. And of course, it is very muscle specific – **you need to do the real movements you need for your sport.**

And, it must be introduced carefully. You will have to lower your weights when you first introduce speed, in order to let the muscles adapt. And you must add only a little bit of power work at a time – power work is very hard on the muscles, so train SMART.

Realize that *the DECELERATION PHASE of a power movement, or the changeover phase from deceleration to acceleration, is where people tend to get injured* – so you must focus on controlling the movement through acceleration and deceleration when you train for power.

Examples of power training for runners are: sprint training; intervals on hills; jumps with knee tucks; bounding.

American College of Sport Medicine’s Position Statement on Muscular Training (1998)

- resistance training should be an integral part of an adult fitness program and be of sufficient intensity to enhance strength, muscular endurance, and maintain fat-free mass.
- resistance training should be progressive in nature, individualized, and provide a stimulus to all the major muscle groups. One set of 8-10 exercises that condition the major muscles groups 2-3 times per week is recommended. Multiple-set regimens may provide greater benefits if time allows.
- most persons should complete 8-12 repetitions of each exercise; however, for older and more frail persons (approximately 50-60 yr of age and above), 10-15 repetitions may be more appropriate.

“THE PLAN”

Ideally, orienteers would use the winter off-season to build a general conditioning base of all-over endurance and strength (see “The General Program”). Start at the endurance training level if you have not done weights before, and after 4 weeks switch to the endurance/ strength training level. Or, you can start with the endurance/strength protocol if you have done weights and your body is ready.

2- 3 months before the orienteering season starts, make sure your program is using exercises that require balance and coordination, and are specific to the muscles needed for orienteering (see “The “O” Program”). Start your power training during these three months – using very functional moves, that you need for the sport, done to gradually develop strength with speed.

Finally, during the competitive season, cut back to a maintenance level of one or perhaps two fairly intense but short resistance workouts a week using the sport-specific and core body (back and abs) exercises at the strength/endurance level. The key to maintenance is to sustain the INTENSITY of your workouts, although you are dropping the *frequency* of your workouts.

If you have no desire to do resistance training year round but instead want to do the minimum possible to still get some training results for the “O” season, do “The “O” Program” starting two to three months before orienteering season begins, working at the strength/endurance combo protocol level. Then continue with that routine 1-2 times a week during the competitive season.

EXERCISE GUIDELINES

Proper technique and complete control: Regardless of which training protocol you use, it is key to learn and then maintain good form and technique throughout every rep you do. As soon as you start to get sloppy in any exercise, stop and take a break. You will improve faster and significantly lower your risk of injury if you execute each move well and slowly (2-4 seconds per rep) in each workout, rather than trying to “fake your way through” more than you can do properly.

Intensity: When you first start a new exercise, go to the point of “volitional fatigue” - which means that you stop when you feel like you have done enough, and aim to have this within the number of reps suitable for your training level.

Once you can confidently do an exercise with good form, you can start to push a little harder and aim for “momentary muscle fatigue” (*not muscle failure/collapse*) in your last rep - which means that at the completion of your last rep you don’t think you could complete another rep while maintaining proper form. This higher level of intensity causes better and faster muscle adaptation, while allowing you to still maintain good form and work at minimal risk of injury.

Breathing: Always breathe throughout each exercise - try breathing out during the hardest part of the move. Holding your breath causes a major increase in blood pressure.

Core stabilizers: “Hold abs lightly firm and keep back neutral and tall” is a good guideline for every exercise, unless the exercise specifically requires you to do otherwise. Think TALL TALL TALL!

- TALL: lightly firm LOWER abs , with lower back and abs pulling lightly INWARDS and up
- TALL: open chest, feeling wide and open from shoulder to shoulder
- TALL: the *back* of the neck feels long and tall, with space between each vertebra

Work through a large Range of Motion (ROM): Muscles gain strength only in the specific way or range of movement that they are used. To gain functional strength throughout the full range in which a muscle can move, you need to train it through that same full range.

Don’t lock elbows or knees: Your arms and legs may be in an extended position for part or all of an exercise, but the knee and elbow joints should always be “soft” , never locked.

Work the front and the back of the body: Aim to generate a reasonable balance between the muscles on the front and back of the body. They function as “teams” for many real-life movements. An easy way to organize that is to do pairs of exercises that are “opposites” – e.g. do an exercise that pushes forward, then one that pulls back; push upward/pull downward; etc. Squats and lunges work the whole leg front and back, so they are already pretty balanced.

WARM-UP AND COOL DOWN

Resistance training requires a proper warm-up and cool-down, just like cardio training does.

To warm up, do an activity requiring the large controlled movements of the arms and legs (e.g. walking, light jogging) for about 10 minutes, with the goal being to become warm and be breathing slightly heavier than normal. Then do a light stretch, held for 5-10 seconds, for each of the thighs, calves, hamstrings, front of the hip, lower back. Then do a few shoulder rolls.

Finally, especially when you are doing the “strength” protocol, just before each resistance exercise do 5 reps of that exercise at a slightly lower level of difficulty/resistance that you will do during your regular set(s). This will prime your muscles for the specific job ahead of them.

At the end of your workout, walk or jog lightly for 5 minutes, then do a longer stretch (15-30 seconds) for the muscles noted for the warm-up, plus the muscles used during your workout.

STRETCHING.... SOME TIPS FOR EFFECTIVE RESULTS

For truly functional strength and performance, you need joints that can comfortably go through the full range of motion they are designed for. This requires, among other things, muscles that are long enough, and elastic.

To maintain or increase muscle length, you need to stretch the muscles you have used during each workout which tend to get short and tight. The best time to stretch is at the end of your workout, when your muscles are warm and responsive. (Warm-up stretching should be used just to lightly “wake up” the muscles and let them feel their range of motion.)

The key to successful stretching is to *be gentle* - a muscle must feel comfortable and safe before it will let go and lengthen. If your muscle feels like it is fighting back, it probably is - which means it is contracting (as a result of the “stretch reflex”), not lengthening. Forcing a stretch by bouncing or pushing too hard triggers the stretch reflex, defeating your purpose - so *relax!*

Do a stretch for the major muscle groups used during the workout which tend to get tight. For the “O” program shown here, you would need to stretch each of the following:

- * **quads** (front of thigh), and front of hip, *with knee bent*
- * **hamstrings** (back of leg, from knee to hip)
- * **pecs (chest)**: open the CHEST – not the shoulder joint!
- * **lower back**: in the lumbar spine, not across the upper back.
- * **calves**

To maintain your current flexibility, hold each stretch for 15-30 seconds. To increase flexibility, you should hold a stretch for 30-60 seconds. Gentle, static (non-moving) stretches held in a position where the muscle is as long as possible without fighting back or shaking, give consistently good results. Avoid bouncing while stretching. Make sure to choose and do a stretch so that it is centred in the belly of the target muscle, rather than in the tendons and ligaments around the joint(s).

For more ideas on stretches and how to do them properly, consult with a certified fitness professional.

THE EXERCISES

THE GENERAL PROGRAM – a sample

Do TALL TALL TALL at all times, unless you specifically choose not to. (See “core stabilizers”, above, for a description of what TALL TALL TALL is.)

MUSCLE GROUP / MAJOR MUSCLES USED	EXERCISE	EQUIPMENT NEEDED
pecs (chest), front deltoids (shoulder), triceps	BENCH PRESS: keep shoulders low, chest open, back of neck long.	- machine; barbells or dumbbells plus bench
traps and rhomboids (upper /mid-back), biceps, rear deltoids	MID ROW: keep shoulders low, chest open, back of neck long.	- cable machine, tubing, mid-row machine
quads, gluteals (buttocks), hamstrings (back of upper leg)	SQUAT: sit BACK with your sitting bones into your hips, butt and quads. Keep a neutral spine. Knees stay above foot, not pushed out to the front.	- none, barbell, dumbbells, tubing, a squat machine, or even a backpack!
lats (upper/mid back), biceps,	LAT PULL_DOWN: pull down on your front to your collar bone (not behind the neck). Keep shoulders low and wide, spine stable and neutral, back of neck long.	- cable machine with lat bar
deltoids (shoulders), triceps	OVERHEAD PRESS: keep shoulders low, chest open, back of neck long.	- machine; dumbbells or barbell
quads, glutes, hamstrings	STATIONARY LUNGE: place most of your weight in your front leg (quads and butt). Keep knee over foot (not pushed forward.)	- mirror – to check form!
(2 “single muscle” exercises if you want – e.g. biceps, triceps, calves, hamstrings, etc.)		
spinal erectors (muscles along both sides of your spine)	EXTENSION/ HYPER-EXTENSION: let the spine move through a <u>comfortable</u> range of motion, aiming to feel like you are ADDING LENGTH in your spine at all times.	- hyperextension machine - hyperextension bench (also uses gluteus and hamstrings) - laying on your front over a gym ball
abs as “movers”	- ab crunches or curls, straight to the front, or diagonally - feet NOT hooked under something, anchor from lightly pulling in your LOWER abs.	- nothing, or a mat
abs as “stabilizers”	- “Plank”: stationary push-up position, holding a neutral spine shape with light firm lower ab support, and open chest and shoulders.	- mat, or wall

THE ORIENTEERING-SPECIFIC PROGRAM – a sample

The main changes from the general program are: this program has moves requiring more balance and coordination; and the “single muscle” exercises focus on the calf and shin muscles.

Again, do “TALL TALL TALL” at all times unless you specifically choose not to.

MUSCLE GROUP / MAJOR MUSCLES USED	EXERCISE	EQUIPMENT NEEDED
quads, gluteals, hamstrings, leg and hip stabilizers	WALKING LUNGE: step forward, keeping “perfect lunge form” at all times.	- none, barbell, dumbbells, or even a backpack... mirror to check form!
pecs , front deltoids, triceps – plus torso control	PUSH-UPS: with PERFECT torso and shoulder form!	none
upper/mid back, biceps	MID-ROW: same cues as for general program.	- bungee cords, machine, or dumbbells
quads, glutes, hamstrings, calves	SQUAT JUMPS: do soft jumps, maintaining perfect squat form at all times.	- mirror – to check form!
gastrocnemius (calf)	STANDING HEEL RAISE: with weight even across the ball of the foot. Don’t let ankles roll out. Try one foot at a time too.	- none; or, stair or block of wood; dumbbell, weight or backpack.
tibialis anterior (shin)	TOE RAISE: raise just the toes towards the knees – try not to rock your body.	- none; or, cable machine, tubing, or plank/aerobics step.
spinal erectors (muscles along both sides of your spine); also glutes, hamstrings and abs.	BACK EXTENSION ON A SLIGHT DIAGONAL: do a smooth comfortable back extension, lifting the torso in a bit of a diagonal line each time.	- on a back-extension “frame”, on a ball, or laying on your front on the ground. Lift the chest using the back muscles as much as possible, and use your arms for back-up support.
abs as “movers”	<u>SLOW</u> full sit-ups (straight, and diagonal). Do NOT anchor your feet under anything. To do this right and keep the feet on the ground, you have to really “anchor” using the LOWER abs pulling in and up into your body.	- mat, may want an inclined surface (head UP hill) so that you can do this successfully
abs as “stabilizers”, plus oblique abs	PLANK AND PIKE: go from perfect Plank, to a hip Pike (inverted “V”), keeping the shoulders low and wide (anchored into your back) at all times. Go back and forth between pike and plank several times.	none

TO KEEP ON IMPROVING:

Muscles adapt to exercises you do. To keep on improving the results from your workouts, you need to continually challenge your muscles in new ways. The challenge has to be manageable and the increase gradual for muscle adaptation to occur. This is the essence of the “Progressive

Overload” principle of conditioning. You also need enough rest time between workouts to allow the muscles to rebuild and adapt - something that many people choose to ignore in both resistance training and cardiovascular training.

In resistance training, you can change the following to progressively increase the overload:

- * **do more reps:** with each level of resistance, work up through the recommended range of reps for your program goal: e.g. add one rep every two or three workouts to move from 12 to 15 reps, for the endurance training level.
- * **add more resistance** (weight, tubing strength), once you reach the top number of reps for your training level. **Increase the load by only 5-10% at a time.**
- * **do a different exercise** for the same muscle group: e.g. change from a machine bench press to push-ups (both work your chest, shoulders and triceps).
- * **do the exercise differently:** e.g. change from the “endurance” training level to the “strength/endurance” training level which uses fewer reps and more resistance. Or, change the speed: try slowing down the “return” phase of rep so that it takes 3-4 seconds! Or, change the training protocol – say from strength/endurance combo to just strength for a month or week or one day a week. Or, change the angle of pull on the muscle: do push-ups on a hill (head up or down hill) instead of on flat ground. Or, change the equipment used for the exercise: use dumbbells instead of a barbell or a machine, etc.

As a simple guideline, you should work with one routine for 6-8 weeks, gradually increasing the level of resistance, and the number of repetitions, so that you stay within your training protocol range and still feel challenged.

Then, set up a new routine by applying the last two variables: do a different exercise, or do the exercise differently, for each muscle group. Or, even just change the order in which you do your current exercises. Use this new routine for the next 6-8 weeks, gradually progressing through reps and increasing the resistance as before. Every 6-8 weeks change the routine again, or alternate between two routines. This kind of periodic change in routine will minimize the likelihood of hitting a “plateau” where you no longer seem to be improving.

During the first week or two of a new routine (or longer, if needed or wanted), concentrate on getting perfect technique before you even consider increasing the resistance. Then, once your technique is secure, increase the intensity as discussed under “Exercise Guidelines”, above. Keep adjusting your reps and resistance so that you achieve the intensity you want within the number of reps needed for your training level. If training at an intensity that gives you “momentary muscle fatigue” during each workout for a particular exercise, you will probably be ready to add one more rep or increase resistance for that exercise every 2-4 workouts, for most exercises.

A LAST WORD

You will encounter all sorts of ideas how to get the best results, how to do exercises, how to structure workouts, etc. There are many approaches that do work, and others that are inefficient, ineffective, inappropriate for your goals, or just plain dangerous. The guidelines in this article follow internationally accepted industry standards. For more details and guidance specific to your goals and interests, consult with a fitness trainer who is certified through a nationally and/or internationally recognized organization and who is current with new knowledge about fitness and training for results. Be a discerning consumer!

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