

Supplemental Training & Conditioning for Runners

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Question: Do I need to supplement my running with other training and conditioning methods?

Answer: Perhaps. The answer depends upon your (A) running goals, (B) current performance level and time constraints, and (C) injury history.

A. Your Running Goals

Just running is one of the best things you can do to improve your health. Running regularly helps you lose weight, fight aging and disease, and maintain general health.

- Running burns more calories per minute than any other form of cardiovascular activity, with the exception of cross country skiing.
- Running prevents muscle and bone loss that often occur with age. Running has also been proven to promote the production of human growth hormone, which keeps you looking young.
- Running reduces the risk of stroke and breast cancer. Regular running has become a treatment option prescribed by doctors to patients who are at a high risk, or early stages, of osteoporosis, diabetes, and hypertension. It reduces the risk of heart attacks, by strengthening the heart and lowering blood pressure. Running lowers blood pressure and maintains the elasticity of arteries incredibly well since your arteries expand and contract nearly three times as much as usual when you run.
- Running raises HDL (or "good") cholesterol, reduces the risk of blood clots, and encourages use of the 50% of your lungs that usually go unused. Running also boosts the immune system by creating a higher concentration of lymphocytes (white blood cells that attack disease).

Question: Are these benefits enough – or do you also want to be as fast as possible? If you add speed to your desired list of benefits, supplemental training and conditioning is recommended.

B. Current Performance Level and Time Constraints

Conventional wisdom states that all training is specific – you improve the skills you practice. Runners improve endurance with regular long, slow runs and improve speed with periodic spells of faster running. Supplemental training and conditioning techniques are most effective in helping runners who have reached a performance plateau make the jump to the next level. They are not as effective for those athletes who are still improving while *just* running. And busy runners will not benefit from replacing a core workout with a supplemental workout.

Question: Are you continuing to make performance gains while *just* running? Will additional training require you to reduce your running? If the answer to both questions is "no", supplemental training and conditioning is recommended.

C. Injury History

Despite its many health benefits, running is tough on the body. 97% of running injuries are overload injuries. Why? A 150-pound runner impacts the ground with 630,000 to 1,275,000 pounds per mile – somewhere between 16 million to 33 million pounds during a 25 mile training week! During the average stride, the pelvis rotates 6 degrees, the tibia 18 degrees, the foot dorsiflexes 9.6 to 19 degrees, plantar flexion is 6.8 degrees, and toe-out is 6.8 degrees. Wow!

Question: Do you often suffer running-related injuries? Plantar Fasciitis?...Iliotibial Band Syndrome?...Achilles Tendonitis?...Patellar Tendonitis?...Shin Splints?...Stress Fractures?...Hip Bursitis?... If so, supplemental training and conditioning is recommended.

Q: Okay, So Supplemental Training and Conditioning May Help Me. What Are My Options?

A: There are a myriad of supplemental training and conditioning methods. Currently, the most popular (in alphabetical order) are:

- Active Release Techniques (ART)
- Aerobic Cross Training
- Conventional Strength Training
- Massage
- Pilates
- Plyometrics
- Stretching
- Technique Drills
- Yoga

Choosing the appropriate method(s) will make the difference between achieving improved health and performance or wasting time. It is imperative to know the benefits of each.

Active Release Techniques (ART) – According to www.activerelease.com, “ART is a patented, state-of-the-art soft tissue system that treats problems with muscles, tendons, ligaments, fascia and nerves...Shin splints, shoulder pain, sciatica, plantar fasciitis, knee problems...are just a few of the many conditions that can be resolved quickly and permanently with ART. These conditions all have one important thing in common: they often result from injury to over-used muscles...Every ART session is actually a combination of examination and treatment. The ART provider uses his or her hands to evaluate the texture, tightness and movement of muscles, fascia, tendons, ligaments and nerves. Abnormal tissues are treated by combining precisely directed tension with very specific patient movements.” ART can also be a part of a regular maintenance program. ART is practiced by certified chiropractors, massage therapists and physical therapists.

Aerobic Cross-Training – Substituting aerobic exercise such as cycling, swimming, elliptical training, dance aerobics, or rowing in place of a run allows the athlete to maintain cardiovascular fitness while reducing the loading on the body (and the accompanying injury risk). A run can be roughly matched by (1) using a heart rate monitor to determine the appropriate intensity level, (2) using a popular conversion method, the Equivalent Running Mile (ERM). 1 ERM = 4 cycling miles = 0.2 swimming miles, or (3) simply replacing one minute of running with one minute of another aerobic exercise.

Conventional Strength Training – As few as six weeks of *proper* weight training can significantly reduce or completely relieve many common running injuries. By strengthening muscle, as well as bone and connective tissue, weight training not only helps to prevent injury but also helps to reduce the severity of injury when it does occur. In addition to injury prevention, weight training improves performance. With as little as ten weeks of weight training, race times decrease. Finally, running economy (defined as the steady-state oxygen consumption for a standardized running speed) is improved by weight training. There are as many strength training programs as there are coaches. Many running coaches now believe that any individual exercise with weights (bench press, squat, etc.) should be completed in a single set with the runner lifting until exhaustion. The chosen weight should allow between 10 and 15 reps. The recommended number of reps for non-weighted exercises (crunches, lunges, etc.) often falls between 20 and 50. Leg exercises should be minimized during the competitive racing season.

Massage – A sports-specific massage may help the runner in many ways. It can:

1. break up scar tissue that may have built up in your muscles.
2. improve blood flow to your muscles.
3. loosen muscles that have contracted (shortened) with continued use.
4. allow more oxygen to move into your muscles.

5. improve the flow of lymphatic fluid, which aids in healing.
6. reduce the chance of injury, through proper stretching, race preparation and through deep tissue massage.
7. improve range of motion and muscle flexibility, resulting in improved power and performance.
8. shorten recovery time between workouts.
9. maximize the supply of nutrients and oxygen through increased blood flow.
10. enhance elimination of lactic-acid build up (a by-product of exercise).

Pilates – Pilates is a method of exercise and physical movement designed to stretch, strengthen, and balance the body. It is a systematic practice of specific exercises coupled with focused breathing patterns. Pilates yields numerous benefits. Increased lung capacity and circulation through deep, healthy breathing is a primary focus. Strength and flexibility, particularly of the abdomen and back muscles, coordination-both muscular and mental, are key components in an effective Pilates program. Posture, balance, and core strength are all heartily increased. Since all of these benefits are an integral part of strong running performance, Pilates has become a popular supplemental training method for runners.

Plyometrics – Plyometrics can be defined as bounding, jumping, and hopping exercises used to generate explosive power by building fast-twitch muscle fiber. After as little as six weeks, plyometric exercises can improve your running efficiency. And plyometrics may help reduce knee injuries.

Stretching – The best research on stretching and injury prevention has been done with military recruits. Military training has much in common with exercise, and the Army has a huge interest in keeping injuries to a minimum. In one study, titled "Physical Training and Exercise-Related Injuries," a U.S. Army research team found that trainees with the highest and lowest flexibility had the highest injury rates. They were, respectively, 2.2- and 2.5-times more likely to incur an injury than trainees with average flexibility. Apparently, when it comes to flexibility and injuries, don't try to be all that you can be. Settle for average. Spend time stretching your overly tight parts and strengthen your overly-flexible parts.

Technique Drills – Technique drills for runners are usually performed using three activities, marching (walking), skipping and running. Each activity helps to develop important components of proper and economical running technique. There are several reasons for using the activities:

- The exercises serve as an excellent warm-up tool for both training and competitive situations. After all, running drills imitate specific characteristics of technically sound running form, including upright posture of the trunk and spinal column, proper carriage of the arms during the running stride, proper knee drive and leg action and the coordinated dynamic balance associated with shifting weight from one leg to the other.
- The drills help to develop the important body awareness abilities that a runner must have to deal with changes in terrain while running, and also to "change gears" while training or racing. The drills are performed slowly at first while developing a "feel" for proper technique, and proper technique is then gradually carried over to drills and runs carried out at faster speeds.
- The exercises also help to strengthen specific muscle groups needed for powerful running, especially the muscles of the feet, calves, shins, thighs and hips. The ankle, knee and hip joints undergo considerable flexion and extension during the running stride, and each of these joints is exercised through a similar or greater range of motion during the various drills.

Yoga – Yoga increases joint stability and develops core musculature where runners need it most: in the abdomen, low back, and glutes. It also helps the body get rid of waste products held in the muscles and teaches proper breathing.

Q: How Do I Put Together a Specific Supplemental Training and Conditioning Program?

A: There are two key truths to consider when implementing a program to supplement your running training:

1. **Practice does not make perfect. Perfect practice makes perfect.** Many supplemental training methods are skill-based and require appropriate coaching to be effective.
2. **Proper progression and adaptation are required for improved performance.** Too much, too fast will result in injury and/or deterioration in performance.

The following supplemental training and conditioning plan meets the needs of most runners. Four different methods are included. Depending on your needs, you may safely integrate one or all of these methods. Each routine includes two levels. The first is intended for runners who wish to reduce their injury rate or have limited time. The second level is for those who wish to significantly improve their running performance.

David's Supplemental Training & Conditioning Plan

Plyometrics and Technique Drills

Level 1 – Here are four plyometric exercises recommended for runners by multiple authorities, including Donald Chu, Ph.D., director of rehabilitation at Stanford University and author of [Jumping into Plyometrics](#). They'll help improve explosive push-off, ankle range of motion, and stride length. Be sure to ease into these exercises gradually to reduce the risk of injury. Conduct these exercises once or twice each week. Warm up for each session with one mile of running. Wear shoes that permit maximum flexibility.

1. **Bounding:** When bounding, spring off of your toes, go for a very high knee lift and then land softly on the ball of your foot and with a bent or flexed knee. Don't go for maximum knee lift, height or distance in the first few sessions. Start by doing four 30 meter sets of this exaggerated running motion. Gradually increase the distance to 80 meters. After you gain experience, work all of your running muscles by going for height on one repeat and then for distance on the next.
2. **Skipping:** Skip for 30 meters and then rest 1 minute. Make sure that you are landing on your heel and pushing off strongly with your toes. Do four repetitions. In later sessions, increase the distance to 80 meters. Use an exaggerated arm motion and alternate skipping for distance and height.
3. **Split-Squat Jump:** Start in a lunge position, and jump upward and forward, pushing off the front leg. Land in the lunge position, and repeat continuously for 10 meters. Rest 45 seconds. Do three repetitions and work up to six. In later sessions, gradually increase the distance to 80 meters.
4. **Two-Foot Ankle Hops:** Stand up straight, and hop 18-24 inches forward for a total of 10 meters, keeping feet together. Rest 45 seconds between reps. Start with three reps and work up to a maximum of six.

Level 2 – For those interested in maximizing their performance, technique drills should be added to the Level 1 plyometric exercises. A detailed technique drill workout published in a 1995 edition of Britain's Peak Performance is attached.

Conventional Strength Training or Pilates or Yoga

Level 1 – When it comes to strength training, the old standards are still the best. Include push-ups, pull-ups, crunches, and lunges. Build to 25 to 50 push-ups, 10 pull-ups, 25 to 50 crunches (sit-ups), and 10 lunges with each leg.

Level 2 – An intensive strength training program requires an evaluation of your goals and abilities by a trained professional – and proper instruction on how to execute the resulting program. Whether the runner chooses conventional strength training with free weights or machines, Pilates or yoga, he/she should, at a minimum, work with a trainer to learn proper technique. For maximum benefit, sessions should be conducted once or twice a week. More weekly sessions may not benefit the runner.

Aerobic Cross Training

Level 1 – Each week, replace one of your easy runs with another aerobic workout of similar cardiovascular intensity.

Level 2 – When a runner adds mileage to their weekly training routine, there is a proportionate increase in their risk of suffering an overload injury. For runners who believe they are on the brink of injury but who still need to increase their training load, adding a non-weight-bearing aerobic workout will provide the needed workout, but with less injury risk. For maximum effectiveness, this workout should immediately precede or follow a running workout.

ART and Massage and Stretching

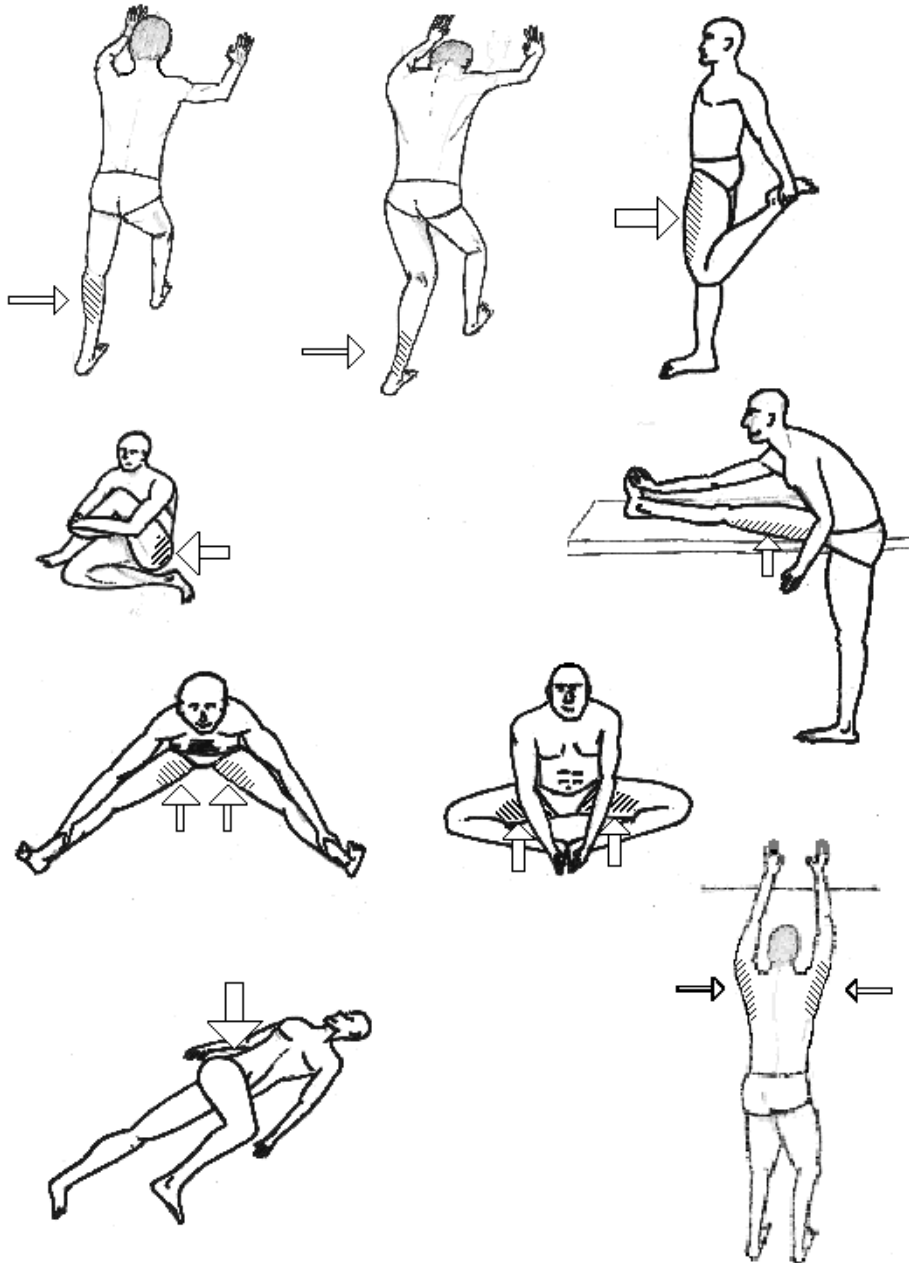
Level 1 – When suffering from a running-related injury, ART or massage treatment by a chiropractor, massage therapist or physical therapist who deals regularly with runners is recommended. In most cases, they will be able to recommend specific stretches to combat your particular problem area.

Level 2 – To ensure maximum performance, monthly to bi-monthly ART or massage treatments in conjunction with a basic stretching program are recommended. One such stretching program developed specifically for runners is attached.

Nine Great Stretches for Runners

Guidelines:

- Do not stretch before you run. Stretch after you run – when your muscles are loose.
- To be most effective, hold each stretch for a cumulative total of 90 seconds. You can do one long stretch, 3 sets of 30 second stretches, etc.
- Do not bounce. Move slowly into and out of each stretch.
- A gentle “pulling” should be felt in the stretched muscle. Do not stretch in pain.
- Relax and breathe during the stretch.



Technique Drills for Runners (Peak Performance, November 1995)

Marching, the most basic form of technical exercise provides an excellent starting point for beginners who will eventually rely more heavily on advanced drills such as skipping and technically sound running. Marching is performed slowly and deliberately at first but progresses in speed and cadence as balance, stability and body mechanics improve. Emphasis during marching (and in all of the drills) is on an upright body posture, coordinated movement of the arms and legs, wide range of motion at the hips, knees and ankles and stability of movement (your body should not be "rocking" back and forth sideways or lunging forward). As you become more accomplished with the drills, marching will represent a nice warm-up for the skipping exercises.

Skipping is a more advanced motor skill than marching and requires a greater degree of coordination and motor control for correct performance. Compared to marching, the speed of movement across the ground is slightly faster when skipping, and the frequency of foot strike is double that of marching, since each foot strikes the ground twice during a skipping stride. The ability to co-ordinate the cadence of the arm swing with the leg movements and the double foot strike is a skill that improves with practice. The basic form of skipping is slow and deliberate and should follow a straight line without significant deviation of the limbs or trunk to the right or left. During the drills, the arms and Legs will tend to move toward the centre line of the body slightly (as they should) but excessive movement of the knees or hands across the mid line of the body is often indicative of poor economy of movement. Over time, the speed of the skipping drills should be increased as your form improves and your movements become more fluid and natural.

Of all the drills, technical running exercises are the most intensive and potentially most difficult to perform correctly. For one thing, the speed of movement of the arms and legs is the highest of the three forms of drills. The rhythm of movement, as measured by the cadence of foot strikes, closely resembles full stride running.

Finally, the ground-impact forces are significantly higher during running drills, compared to skipping or marching. The major difference between running drills and regular running is in the length of the stride (during drills, the stride is significantly shorter, to allow for better concentration on limb and trunk mechanics). Major benefits of technical running drills include improved intermuscular coordination (including the proper timing of arm and leg movements), an enhancement of dynamic balance and an upgrading of the power of the primary running muscles.

Marching "A" drill

Begin by walking slowly forward on the balls of your feet using small (12 to 18 inch) steps. Your heels should not touch the ground during this exercise. Continue by raising your right knee to hip level (with thigh parallel to the ground) on each stride. Your right foot should be "cocked" (making your ankle and foot look like a fish hook) at the top of the leg swing, and your right ankle should be directly under or slightly behind your right knee (your knee should be at a 90 degree angle or slightly less). Rise on the toes of the left foot and extend the left ankle and knee as your body passes over the left foot during the walking stride. Your trunk should be held upright (think "chest tall and slightly forward"), and your chin should be held level. Swing your arms slowly and deliberately in a mock running motion in rhythm with the marching/walking strides. Your elbows should be bent at approximately 90-110 degrees, and your hands should swing to nearly chin level and slightly toward the mid line of your body during the forward arm swing. On the back swing, your hands should move one to six inches past the "hip-pocket" position, to the rear of your body. You probably didn't realize that marching could be so complicated! Repeat this action, raising the right knee to hip level with the left leg moving through a normal walking stride into full extension on the toes, for 20 to 40 meters. Walk back to your starting position and repeat the action, with the left knee rising and the right leg extending, for 20 to 40 meters. Continue to focus on short steps, proper posture and limb mechanics, whole-body balance and control of your marching rhythm. All of your movements should occur in a slow and controlled, not jerky manner. After performing the drill with each leg marching separately, combine the marching actions of both legs over the 20 to 40 metre distance. The marching high knee drill emphasizes proper running mechanics - a driving knee lift, upright posture and a coordinated arm swing - and should be practiced and mastered before progressing on to the skipping and running-technique drills.

Marching "B" Drill

Begin this high knee with extension drill in the same manner as the high knee drill walking forward slowly on the balls of your feet. Raise the right knee to hip level with each stride, and as the knee approaches hip height extend the knee by swinging the lower leg and foot forward to nearly full extension (your entire leg will end up parallel with the ground). Allow your momentum to carry your body forward, and step with the ball of the right foot one to two feet in front of the left foot. Your trunk should be held upright, and your chin should be level throughout the course of the drill. Your arms should compensate for the extended leg action by swinging in a slightly wider arc (100-plus degrees at the elbow) while maintaining rhythm with the strides of the legs. The actions of the left foot, ankle, knee and hip (extended) are similar to their activities in the high knee drill.

Repeat the high knee lift and extension action with your right leg for a distance of 20 to 40 meters. Then rest while walking back to the starting point, before performing the drill with your left leg. Finally, perform the exercise with both legs alternately over the same 20 to 40 meter distance. The marching high knee with extension drill emphasizes hamstring flexibility and body control in addition to other basic aspects of proper running mechanics. It provides the basis for learning more advanced skipping and running drills.

Skipping "A" drill

The skipping high knee drill follows the same basic format for posture and limb mechanics as does the marching form of this drill. The trunk position and arm and leg actions are identical to those of the march, but the cadence is slightly faster to accommodate the skipping action. Once again, the strides are short (about 12 to 18 inches between opposing foot contacts), and the action is performed primarily on the balls of your feet which helps you develop foot strength and balance.

Practice the skipping drill with one leg at a time before combining the movements (first lift only the right knee, then only the left knee, before alternating right and left legs) over a distance of 20 to 40 meters for each drill. The skipping high knee drill develops inter-muscular co-ordination during fast movements to a greater degree than do the marching drills, which are carried out at a slower tempo. In addition, the load placed on the musculoskeletal system is considerably higher during skipping, due to a greater vertical shift of the centre of gravity during the exercise. This additional loading leads to increases in strength in the motor support structures of the feet and lower part of the leg, as well as the thigh, hip and trunk muscles.

Skipping "B" drill

This "B" drill is like the "A" skipping drill, except that a swing forward of the lower part of the leg is added to the driving knee action. The emphasis during this drill should be on the "pulling down" (hip extension) of the swing leg rather than the kicking out of the lower part of the leg during knee extension. This "pawing" motion with the nearly extended leg is important for developing co-ordination and specific strength in the hamstring and gluteal muscles and should help prevent injuries in those areas (especially hamstring strains and tears).

All other aspects of proper running form (as outlined in the descriptions of the previous drills) should be observed. First, move 20 to 40 meters with the right knee driving and extending, then scoot through 20 to 40 meters with the left knee driving and extending, and finish by alternating from right leg to left leg over the same distance. Walk back to your starting point between drills to recover. This skipping "B" drill emphasizes the development of an active foot strike, providing the basis for improved stride length, in addition to strengthening the hamstrings, improving co-ordination and balance and upgrading running posture.

Running "A" and "B" drills

The running "A" and "B" drills are performed in the same fashion as the marching and skipping versions but utilize a short-stride (12 to 18 inch) running motion. These are the most advanced and difficult drills to perform correctly, and they are also the most specific of the three drills to the actual neuromuscular patterns used during full-stride running. Movement rhythm, frequency of foot strike, balance and co-ordination requirement, ground impact forces and energy expenditure are at their highest levels during these running drills. It is very important to maintain a forefoot (rather than heel) strike during these running drills in order to allow the foot and lower part of the leg to absorb the high impact forces. Upper torso and arm-swing actions should be similar to those in the previous drills.

Perform all running drills with one knee rising and the opposite leg "jogging" (low knee lift) for a distance of 10 to 20 meters. Walk back to the start and repeat the action with the other leg, before combining the actions and performing the drill with alternating legs. The distance covered (10 to 20 meters) for the running drills is shorter than for marching or skipping due to the greater intensity of effort. Over time, you may gradually increase the distance, but in the interest of maintaining proper technique and therefore positive training adaptations, it is wise to be conservative. It is far better to train over shorter distances with excellent form than it is to work over longer distances with average or poor form.

The running "A" and "B" drills develop specific intermuscular co-ordination, increase the strength of the entire foot/leg/hip/trunk complex, and enhance balance and body awareness during full-stride running. Running drills allow you to strengthen many important links in the running performance chain (posture, specific strength and power, mobility and agility) through specific overload of the various links.

Program

The following sample workouts are designed for runners of various ability levels. Do the following workouts two to three times per week at the end of your warm-up (before the main part of your training session begins) Please note: "1 X 20 meters each" denotes performing the drill for 20 meters with the right leg only, followed by 20 meters with the left leg only, followed by 20 meters of alternating legs. For recovery, simply walk back to the start between repetitions.

Beginner

- March "A": 1 X 20 meters each
- March "B": 1 X 20 meters each
- Skip "A": 2 X 20 meters each
- Skip "B": 2 X 20 meters each

Intermediate

- March "A": 1 X 20 meters each
- March "B": 1 X 20 meters each
- Skip "A": 2 X 30 meters each
- Skip "B": 2 X 30 meters each
- Run "A": 2 X 10 meters each

Advanced

- March "B": 1 X 20 meters each
- Skip "A": 2 X 30 meters each
- Skip "B": 2 X 30 meters each
- Run "B": 2 X 10 meters each

Key summary points about the drills

Emphasize proper trunk posture on all drills, keeping your chest up, your back straight, and your chin level. Swing your arms smoothly and under control, with hands coming forward to chin level in front and just past the hip in back. Emphasize the lifting action of the knee on the swing leg while keeping your foot cocked upward. Emphasize the driving action (extension) of the support leg at the ankle, knee and hip while stressing a "fall on your toes" action with the supporting foot.

To develop optimal movement co-ordination, perform all drills when your energy levels are high - before your main workout begins. Performing drills when fatigued leads to less ideal posture and form- and fewer gains in efficiency. To reduce impact forces and minimize the possibility of injury, perform all drills on grass, a rubberized track, a wood floor, or some other type of resilient surface.