

Speed and Ancillary Training in the Distance Events

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Perspectives. Run training geared toward the development of energy system efficiency, cardiovascular fitness, and buffering capabilities is the foundation of any good distance program. Yet, there are several other forms of training that are applicable to endurance training, serving a specific purpose that can enhance performance, increase the effectiveness of other forms of training, and reduce injury risk. Our purpose here will be to outline these less traditional forms of training and provide rationale and guidance for their inclusion in the distance training program. Perhaps my perspective as a non-distance specialist might provide a unique view of the training process.

Training Modalities. Training modalities capable of enhancing distance performances and training include the following.

- Dynamic Flexibility Exercises
- Sprint Development Drills
- Hurdle Mobility Exercises
- General Strength Work
- Medicine Ball Exercises
- Circuit Training
- Multijump Training
- Olympic Lifting
- Static Lifting
- Bodybuilding Lifts
- Acceleration and Speed Development

Dynamic Flexibility Exercises

- **Dynamic Flexibility Work.** Dynamic flexibility work consists of exercises that require athletes to move joints through large ranges of motion. Leg swings and trunk twists are simple examples. Specifically one side of a joint is stabilized, while the other side moves through a large range of motion. The ballistic nature of these exercises is highly specific to the sport. Typical routines involve 5-10 different exercises addressing a variety of body parts and movements, sets of 10-15 repetitions, and usually last 5-12 minutes.
- **Why Should I Do These?** These exercises train the reflex response of Golgi tendon organs. They also decrease internal resistance in the joint itself, increasing efficiency and economy. An observant coach can use these for a chance to evaluate mobility patterns in more sophisticated manner. Usually athletes who have flexibility restrictions in one area compensate by becoming excessively flexible in another area. As a result, movements and gait might seem OK to the coach at first glance, but actually contain much dysfunction.

Sprint Development Drills

- **Sprint Drills.** Sprint Development Drills consist of various modifications of walking, running, and skipping mechanics, designed to serve as dynamic flexibility exercises and specific technical teaching progressions. Traditional exercises like High Knee Runs, A Skips, and B Skips fall into this category. Typical sprint development drill units employ 1-3 repetitions of 4-8 exercises, performed over distances of 10-50 meters. Total session volumes range from 150 to 500 meters.

- **Why Should I Do These?** These drills develop coordination and flexibility. They also provide an opportunity to teach certain technical aspects of sprinting, particularly postures and force application. They can also be used to evaluate movement quality and coordination.
- **Why Do My Kids Do the Drills Well but Sprint Poorly?** While these exercises provide opportunity to address many aspects of running mechanics, the intensities found in these exercises are not sufficient to elicit the reflexes found in competition. Thus, sprint drills do not improve running mechanics directly. Creating carryover to the event itself becomes the task of the coach.

Hurdle Mobility Exercises

- **Hurdle Mobility.** Hurdle Mobility Exercises use hurdles to provide an exercise environment that challenges mobility and coordination. Routines typically include variations of walks or skips over hurdles. The hurdles serve to challenge the athlete's range of motion, and also supply technical demand. Typical hurdle mobility units employ 1-3 sets of 2-8 exercises, performed over 6-12 hurdles. Total unit volumes typically involve negotiating 40-120 hurdles. Sessions may be performed at slow speeds, or done at fast speeds employing more ballistic movements.
- **Why Should I Do These?** These exercises are designed to improve mobility, flexibility, and coordination. They strengthen the lower back, lower abdominals, and pelvic regions and seem to help sharpen agonist/antagonist muscle group firing patterns.
- **Cautions.** Hurdle Mobility provides lots of reps really quick – for better or worse. Proper posture and firing patterns of the hip are a must. Athletes must stay tall. The toes should be turned outward as each forward step is initiated, and the knee must remain higher than the foot at all times, to insure development of proper balance in the hip musculature. Also, with older athletes who are already well versed in these, they might become baggy and produce more tightness than looseness.

General Strength Exercises

- **General Strength Work.** General Strength Exercises are strength exercises that involve no external loading. Bodyweight serves as the sole loading agent. These exercises are usually performed in circuit fashion. Normal protocols employ a variety of exercises comprising a training unit of 8-15 minutes in duration, with a session employing 1-3 such units. The exercises can take the form of simple calisthenics, specialized core training, or stability work.
- **Why Should I Do These?** General strength exercises improve general strength levels, strength endurance, coordination, body control, and flexibility. These activities are often the best way to address muscles and muscle groups not directly involved in the gross movements most used in training. Because of the lack of external loading, general strength work is a good way to prevent and alleviate muscle and strength imbalance situations. General strength can then enhance gross motor performance by preventing imbalance related dysfunction. In short, doing them improves running mechanics and economy. They can serve as a primary strength training modality for young athletes, and a primary recovery modality for older athletes. General strength work can also be used as a tool to develop fitness.

Medicine Ball Exercises

- **Medicine Ball Training.** Medicine Ball Routines include various exercises using the medicine ball as a load. Examples include catch/throw combinations from various positions, and exercises that resemble general strength work, using the ball as a light load. Normal protocols employ a variety of exercises comprising a training unit of 8-15 minutes in duration, with a session employing 1-3 such units.

- **Why Should I Do These?** Medicine ball work produces many of the same benefits of general strength work due to the relatively light loading and similar nature of the activities. Additionally, medicine ball work can be used to enhance postural strength and the body's ability to withstand impact by catching the thrown ball. The ability to quickly stabilize the core in anticipation of catching the thrown ball is far more specific and useful than all the situps and crunches in the world. Medicine ball work can also be used as a tool to develop fitness.

Circuit Training

- **Developing Fitness with Circuits.** Circuits are arrangements of general strength or medicine ball exercises that train fitness. In short, the work intervals and rest intervals are set up to produce fatigue and challenge the energy systems. This enables the circuit to address glycolytic and endocrine fitness.
- **Circuit Construction.** A circuit might look like this. Perhaps choose 16 medicine ball exercises, do each for 40 seconds with 20 seconds of rest in between... that will challenge even the fittest athlete. A favorite circuit of mine involves 12 general strength exercises, each done for 20 seconds. The athletes execute an all-out 10 meter sprint at the end of each exercise set. They start a new exercise every 60 seconds. It's tougher than any running workout I do. As a general rule work intervals should last between 20 to 40 seconds. For easier circuits, try a 1:1 ratio of work to rest. For tougher circuits, try 2:1. If you plan to employ short sprints in the circuit, use 1:2.
- **But We Are Distance Runners... We Train Fitness by Running!** Yes, but running involves risk. Training and racing are exciting to us. But to the human body, running is just right-left over and over again. In short, the vast amounts of running these athletes must do puts them at great risk of developing repetitive movement syndromes. Many mystery ailments fall into this category. If you are doing a variety of different exercises in a circuit, you are hitting bone, muscles, tendons, and ligaments in different ways with each exercise, and the chance of repetitive movement syndromes falls to zero. Of course circuits can't replace running as a fitness development tool, but using circuits might enable you to drop mileages by 5-10% which in turn drops injury risk by 10-20%.

Multijump Exercises

- **Multijumps.** Multijumps or plyometrics are jumping activities that develop reactive strength and the elastic response. They also develop technical efficiency and improve the ability to efficiently apply force to the ground. Incidentally, the majority of force application in the ground in distance running is vertical, so the vast majority of your multijump work should be vertically oriented.
- **But There is Already A Lot of Pounding Going On...Why Add This?** Good question, and for long distance athletes it's a huge concern. But as long as the Overload Principle is the Holy Grail of training, then we must subject athletes to overloading of all forms of competition demand, including impact intensities.
- **Categories of Multijump Training.** There are three main types of multijump exercises that distance runners should consider doing.
 - **In Place Jumping**
 - **In Place Jumps.** In place jumps are various jumps of low to medium intensity, performed without displacement. Tuck jumps, lunge jumps, and straddle jumps are common examples. They are done in circuit fashion, and the circuits can be assembled so that some fatigue results and fitness is trained. Normal protocols employ a variety of

exercises, 15-20 seconds of work per set, a work to rest ratio of 1:2, and 12-16 total sets of work. A circuit should total 12-15 minutes of work.

- **Why Should We Do These?** These exercises are used to improve reactive strength, power, coordination, and work capacity. In addition, if you are doing a variety of exercises, you are using a variety of footstrikes. The variety of footstrikes used enhances force application abilities, increasing running economy. Also, the variety of exercises used lessens the chances of injury. Diversity always assists in injury prevention.
- **Bounding**
 - **Extended Bounds.** Extended bounds are combinations of hops and bounds performed over 20-40 meters. Usually a session contains 300-400 total meters. Just be sure athletes are prepared prior to this type of work... it's not for beginners.
 - **Why Should We Do These?** Even though we normally think "triple jump" when we see these, the real buzzword here is "sustaining force production". For this reason they are extremely specific to the middle distance races.
- **Depth Jumping**
 - **Depth Jumps.** Depth jumps are rebounding efforts performed after a fall from some elevated surface...box jumps. The height of the elevated surface dictates the intensity of the exercise, and most depth jumps are of relatively high intensity. These exercises are designed to increase reactive strength in a specific manner. Normal protocols employ 20-40 contacts per session... short and sweet.
 - **Why Should We Do These?** Maybe you shouldn't. But in the middle distance races, where speed and explosiveness help, this is the ultimate form of speed and explosiveness training. Just be sure athletes are prepared prior to this type of work... it's not for beginners.

Olympic Weightlifting Exercises

- **Olympic Lifts.** Olympic Lifts are the competitive lifts, specifically the clean, jerk, and snatch. Also included in this group are exercises that are derivatives of these, such as pulls or pulling movements from various depths. They are complex lifts, requiring almost pure isometric activity at some times in some muscle groups, while requiring very high power and speed of movement in others. When done correctly, they require muscle firing patterns that are very specific to athletics. Normal protocols employ 4-6 sets of 1 to 6 repetitions, with recoveries long enough to guarantee the quality of work.
- **Why for Distance Athletes?** Olympic lifts increase not only force production ability but force application ability... something critical to running economy. The coordination demands of these exercises helps them to serve as a harmonizing agent, improving running mechanics and making gains made in other areas more functional to performance. They are also a great way to train explosive power, increasing basic footspeed and explosiveness.
- **But Won't They Make Us Too Big?** No. The time under tension a muscle fiber experiences during Olympic lifts is too short to stimulate hypertrophy.

Static Weightlifting Exercises

- **Static Lifts.** Static lifts are traditional weight lifting exercises that involve gross movements and major muscle groups. Fairly high resistances are employed, necessitating low speeds of movement. Full ranges of motion are used. Most static lifts take the form of squatting or pressing moves. Typical uses involve 3-5 sets of 4-8 repetitions. The best workout constructs only use a couple of exercises (one each for the upper and lower body, each totaling about 30 reps of work).
- **Why for Distance Athletes?** Static lifts, provided full ranges of motion are employed (such as deep squatting) strengthen the body in the correct proportions... they develop the correct ratios of core strength to peripheral strength. This fixes many running mechanic problems. They also involve huge amounts of muscle tissue, so the positive blood chemistry changes that result from them are huge. Finally, more than anything else you do, they stimulate calcium metabolism, strengthening bones and battling bone degeneration.
- **But Won't They Make Us Too Big?** Research shows that in response to endurance training, the body strives to increase the ratio of capillaries to muscle fibers. Thus, the running you do serves as a huge, anti-hypertrophy agent. In short, hypertrophy is nearly impossible as long as you are running normal training mileages.

Bodybuilding Weightlifting Circuits

- **Bodybuilding Lifts.** Bodybuilding lifts are weightlifting exercises performed in higher repetition/lower resistance/short recovery formats. The exercises typically employ smaller muscle groups. They may be very simple or highly technical and complex in nature. They should address a variety of body parts and movements. Normal protocols employ about 24 total sets (the 24 sets need not all be different exercises) of 10-12 repetitions in a session, with recoveries ranging from one minute to 90 seconds in length. Weights should be chosen so that some fatigue is experienced on the final repetition of each set.
- **Why for Distance Athletes?** These circuits, when done following the protocol described, create endocrine profiles that permit increases in strength, speed, and endurance. They also accelerate recovery from the tough work you are doing elsewhere in the program. They stimulate the replenishment of glycogen more effectively than anything else you can do on or off the track (provided nutritional support is present). For these reasons they are a great follow-up to the tougher threshold, interval, or repetition workouts you do, assisting recovery and improving work on the subsequent day.
- **But Won't They Make Us Too Big?** Once again, the running volumes you do serve as an anti-hypertrophy agent. Even though you will probably do these more often than static lifts, hypertrophy is tough to achieve here because you use a variety of exercises for a variety of body parts... no single body part is exercised to an extent where hypertrophy might result.

Acceleration and Speed Training

- **The Importance of Speed.** Put two talkative distance coaches together and the conversation quickly steers toward the methodologies of training aerobic fitness, interval workouts, glycolytic fitness. But ask them to predict the winner in a race, and the conversation quickly shifts toward speed capabilities... who can kick. It's no secret that speed is a tremendous asset to a distance runner. Not only can a faster athlete surge and kick more effectively, but a faster athlete is inherently more economical at any speed. Speed can be significantly improved, but it requires a systematic approach to coaching, adherence to a few basic tenets, and a small but consistent investment in time.

- **Acceleration Development.** Acceleration capabilities can be improved using acceleration development training. This training consists of short sprints in the 20-40 meter range. These should be run all-out, with recoveries long enough to guarantee that quality and intensity remain high throughout the session (1-2 minutes). Sessions should contain a total of 300-400 meters. Acceleration development training enables these athletes to shift gears in competition much more easily and economically. More importantly, acceleration development training is an important preparatory step for the speed development work that should follow it in the training calendar.
- **Resisted Runs.** While not a truly speed development, resisted sprints are close cousins in the speed development family. They are a good way to enhance acceleration and power capabilities. Dragging a sled or a tire, or uphill sprinting are typical ways to get this done. These are done full blast, and rests are sufficient to insure that intensity remains high throughout the workout (usually 1 ½ to 3 minutes) Distances used can range from 30-50 meters. Total session volumes should lie between 350 and 450 meters. These provide a nice contrasting effect to acceleration development sprinting.
- **Speed Development.** There is only one way to make athletes fast... allow them to run fast in training. The way to get an athlete faster is to allow them to reach and rehearse maximal velocity without using distances so long that fatigue produces deceleration as the end of the run approaches. For this reason, most speed development is done using top-speed sprints of 50-80 meters. Sprint-Float-Sprint or hollow sprint runs in the 80-90m meter range accomplish similar objectives. Once again, these efforts must be of maximal intensity, with recoveries long enough to insure intensity doesn't fall during the session, usually 3-5 minutes. It's about quality, not quantity, so total volumes should range from 400-550 meters.
- **Progressions.** Over the course of time, progress from acceleration development to speed development. Risk of injury in speed work is decreased with shorter efforts. For this reason, acceleration work is used to prepare the athlete's body for speed development. Once new speed levels are developed, you can progress with other forms of training. To use old-school terms, in your speed training program, work from short to long.
 - **When Should This be Scheduled?** The best time to schedule this progression of acceleration and speed training is during general prep. In triple periodization models, it's best to use it in the summer, throughout cross country, and possibly partway into the indoor season before discontinuing it.
 - **General Prep? You Can't Be Serious?** Stop and think about the most basic tenet of Training Theory... a progression from general to specific training. Pure speed is not specific to the distance events, never will you see an athlete hit those velocities in competition. But we have agreed that it is important. So if it's important, but it's not specific, it must be general... so it goes in general prep.
 - **Won't They Get Hurt?** Just the opposite...it keeps them healthy. General prep typically features aerobic development, lots and lots of slower stuff. When running this slower stuff, runners use smaller amplitudes of movement (less kneelift and armswing)... something that inherently produces tightness and increases injury risk. Including this work every now and then in general prep gives the runner a chance to open up, use big amplitudes of movement, and restore efficiency to the stride. It provides a healthy contrast to the slower paced work. The general prep period should be a period of extremes... working not only significantly slower than race paces, but significantly faster than race paces as well.

- **Common Misconceptions about Speed Development**

- **They Aren't Tired!?!?** Well, after an acceleration or speed development session, they aren't tired. At least not in the way we commonly understand "tired". Speed development is about training the nervous system, and the nervous system responds only to high intensity. True, the combination of high intensities and long rest intervals means they won't be anywhere close to vomiting after the workout. But the nervous system is extremely fatigued, which is what you are shooting for on these days.
- **You Can't Train Speed While Tired.** You can't make someone faster while they are tired. Many coaches run sprints or strides after a workout to train "speed". This does teach them something about finishing strong and kicking under conditions of fatigue, but it doesn't increase their basic, fundamental speed capabilities. These speed levels can only be improved when athletes are fresh. To enable an athlete to sprint effectively when tired, they must first be taught to sprint effectively when not tired.
- **Speed Endurance.** Speed endurance training is a natural extension of the previously discussed process of progressing from acceleration development to speed development. This type of work employs high intensity runs in the 100-150 meter range, usually 5-8 efforts per session. Recoveries must be long enough to insure the quality of work stays high throughout the session, usually 5-8 minutes. This type of work has a huge glycolytic component, so it's not just about speed here.

Practical Application Guidelines

- Use dynamic flexibility, sprint development drills, and hurdle mobility to build complex warmups that develop coordination, enhance flexibility and mobility, improve running mechanics, and give you a chance to identify mobility problems before they cause injury.
- At certain times of the year, devote one practice every week to pure speed development and speed related qualities. After the warmup, do acceleration and speed development, multijumps, Olympic lifts, and static lifts. Let the distance athletes train like sprinters once a week. Their running mechanics, surging ability, and kicking ability will improve dramatically, and injury risk will decrease. Don't confuse the adaptation process by mixing in other distance related elements. There's lots of time for that on other days and at other times. (a morning jog and then a speed workout in the afternoon is OK though). The best time of the year to include this work is during general prep, but touching on it at any time when the training and racing calendar are not too crowded is a good idea. I typically like to use it in the summer, throughout XC, and possibly partway into the indoor season before discontinuing it.
- Start your speed training year with acceleration development – 15x20 meters. Then add 10 meters to the length of the runs every 1-2 practices (keep total volumes within the suggested guidelines). This is an easy way to accomplish the natural progression from acceleration development, to speed development, to speed endurance.
- Athletes must be "fresh" to train speed effectively, so be sure the previous day's workout permits this to happen. It's best to precede a speed day with an easier day. For example, A long run on Sunday followed by a speed day on Monday is not a good arrangement. In this case, move the long run to Saturday, use easier recovery runs on Sunday, and then train speed on Monday.
- The speed day trains qualities that are very different than those trained in most other types of endurance training work. For this reason, it's possible and safe to do a tough threshold or interval workout the day after a true speed development day.

- Use resisted runs in place of speed training when you sense injury risk might be heightened. The resistance slows them just enough to keep it safe, but the athlete's work intensity remains extremely high. These are also valuable to use after a workout, when many coaches would traditionally use strides. They produce better running mechanics than strides yet accomplish the same things.
- During late specific prep it's a good idea to scrap an interval or repetition workout every now and then in lieu of a speed endurance session, maybe once every 14-17 days. You are still developing glycolytic fitness, and also developing the ability to sprint while fatigued... a very useful skill.
- Use bodybuilding lifts after your toughest running workouts. During general and specific prep, do them after running workouts on the two fastest running days of the week (excluding the true speed day). These days are usually lactate threshold, interval or repetition days. Using them in this way enhances the repletion of glycogen and gets the recovery ball rolling earlier. In season, use them once a week, again after a tough running workout.
- Use milder general strength and medicine ball training after running on the easiest training days. They are a great way to restore mobility after longer, extended efforts, so they go well after long runs, recovery runs, or tempo runs.
- Every 14-17 days skip a tough running workout and substitute a tough fitness circuit day. Or, stop a tough workout a little early every once in a while, and then complete the day with a tough circuit. Possibly use circuits to tide you over fitness-wise when the competition calendar is crowded. Injury risk will decrease dramatically.