



RUN!



FUNDAMENTALS OF RUNNING

1. INTRODUCTION

The running events are sometimes described as non-technical, mainly because running is a natural activity which appears relatively simple when compared to the Pole Vault or the Hammer Throw. However, there is nothing simple about any of the running events. The relative emphasis of speed and endurance dictated by the distance of the race, the crouch start in the sprints, the exchanges in the relays and the presence of barriers in the hurdling and steeplechase races all make technical demands for which athletes must be prepared.

Note: For the purpose of this book, Race Walking has been grouped together with the running events. The rules and technique of Race Walking are, of course, very different and a detailed explanation of these differences is given in the Race Walking section.

Aims

The fundamental goal in all running events is to maximise average running speed over the course of the race. To achieve this aim in the sprint events the athlete must focus on reaching and maintaining maximum velocity. In the hurdle events the focus is the same with the added requirement of clearing the hurdles. In the longer events optimising the distribution of effort is of primary importance.

Biomechanical Aspects

An athlete's running velocity is determined by stride length and stride frequency. Optimal stride length is largely determined by the physical characteristics of the athlete and by the force he or she exerts on each stride. This force is influenced by the athlete's strength, power and mobility. Optimal stride frequency is dependent on the athlete's running mechanics, technique and coordination.

Specific endurance and tactics are, of course, important to the overall speed of a race, though from the sprints to the ultra-distances the degree of importance varies.

Movement Structure

Each running stride comprises a **support phase** and a **flight phase**. These can be broken down into **front support** and **drive** phases for the support leg and **front swinging** and **recovery** phases for the free leg.

The two parts of the support phase are of critical importance. In the front support phase there is actually a deceleration of the forward motion of the athlete's body. This must be minimised by (a) an active landing on the ball of the foot and (b) a 'pawing' action of the foot, particularly in sprinting. During this phase energy is stored in the muscles as the leg bends to absorb the shock of landing - a process known as **amortisation**.

The drive phase is the only part of the stride that accelerates the body. The athlete's aim is to direct the greatest amount of force into the ground in the shortest possible time. This force is created by contractions of the leg muscles and the release of the stored energy in the muscles and tendons as the leg extends. To achieve maximum acceleration from each stride it is essential that there is full extension of the ankle, knee and hip joints in combination with an active swing of the free leg and the powerful drive of the arms.

2. TEACHING RUNNING TECHNIQUE

Running technique can be taught by introducing the key skills that are related to the elements of all sprint races: reaction, acceleration, maximum speed and speed maintenance. As there is no way to train all elements at once, a variety of exercises and drills focussing on specific aspects are used.

Points to Emphasise:

- Improving reaction (using various starting signals and starting positions, such as lying, sitting, standing).
- Increasing stride frequency (by working on a high knee action and shortening the pendulum of the free leg).
- Optimising stride length (by working on the extension of the support leg).
- Additional exercises and drills focusing on:
 - a dorsiflexed, 'toe up' ankle at all times
 - the active, 'clawing' action of the feet
 - full body extension
 - powerful but relaxed arm action.
- A wide variety of games involving running and hurdling.

Points to Remember:

- Use a variety of exercises and drills
- Maximum effort sprints over various distances
- Never work on maximum speed when fatigued
- Most, if not all, of the foot contact will be on the forefoot.

Note: The strength and endurance capacities of youngsters are not fully developed. Therefore, exercises and load levels must be carefully considered and set to meet the ability and requirements of the individual.

3. SKILL AND CONDITIONING EXERCISES

Basic exercises and drills should be part of almost every training session, particularly for sprinters. They should be carried out after the general warm-up and active mobilisation exercises and should require about 10 minutes. The combined total of repetitions for all the different exercises used in a session should be 15-30.

Basic Exercise 1: Heel Kick-up Drill

Loading: 1 rep = 20-30 metres.

**Basic Exercise 2: Ankling Drill**

Loading: 1 rep = 15 metres.

**Basic Exercise 3: High-knee Drill**

Loading: 1 rep = 20-30 metres.

**Basic Exercise 4: High-knee with Extension**

Note: 'Clawing' action of the foot; simultaneous with extension of the knee joint of the free leg.

Loading: 1 rep = 20-30 metres.

Exercise Group 1: Combinations and variations

- Basic exercises with one leg then change leg for second repetition.
- High-knee – three running strides – Heel Kick-up – three running strides – High-knee – etc.
- High-knee – Heel Kick-up – three running strides – High-knee –
- Heel kick-up - etc.

Loading: 1 rep = 40-60 metres.

Exercise Group 2: Combinations and transitions

- From Ankling to High-knee.
- From High-knee to sprinting.
- From Heel Kick-up to sprinting.
- From High-knee with Extension to sprinting.

Loading: 1 rep = 40-60 metres.

Exercise Group 3: Arm Action

- Fix arms by grasping the hips. Accelerate for 20 metres, keeping arms fixed. Release arms then sprint normally.
- Hold hands up. Accelerate for 20 metres. Drop arms then sprint normally.

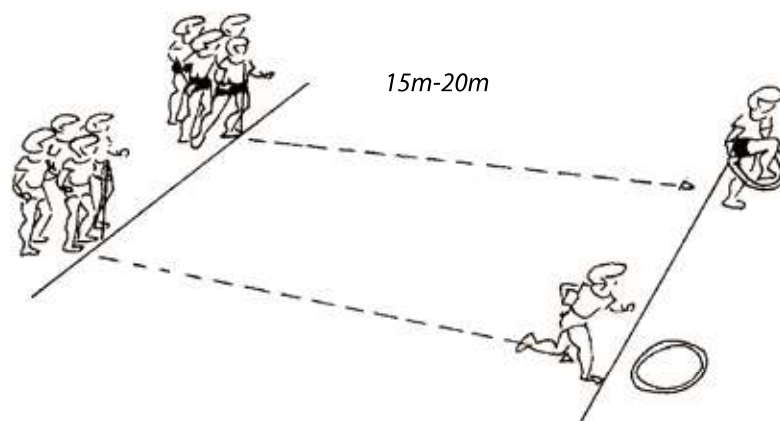
Loading: 1 rep = 40-60 metres.

Exercise Group 4: Ins and outs

- Accelerate for 10 metres – float for 10-15 metres – accelerate for 10 metres – float for 10-15 metres - etc.
Up to a maximum of 100 metres.

4. GAMES

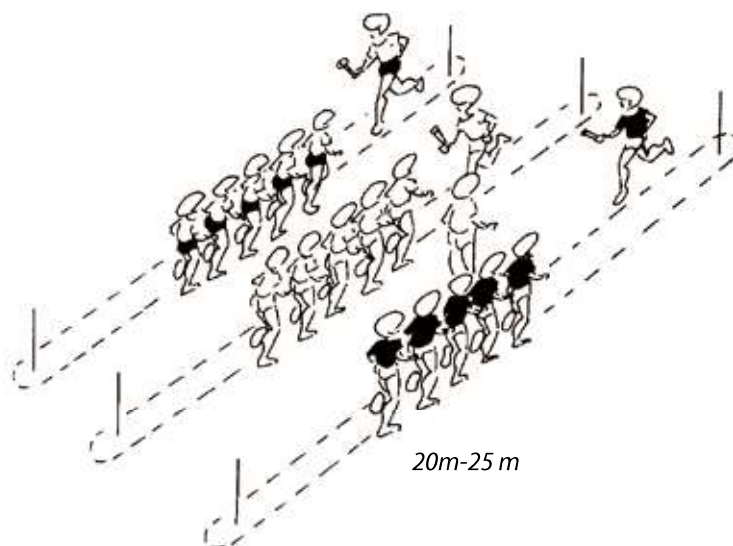
SPRINT GAME



A tyre or hoop is placed at the far end of each team's course. The runners sprint to the tyre and slip through it before starting the next runner with a hand clap.

Variation: All runners start together and slip through the tyre before sprinting back to the starting point together.

RELAY GAME



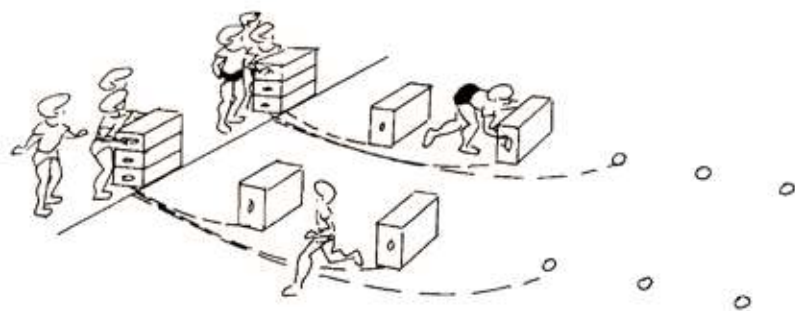
Teams run easily in single file around two turning marks. The first runner of each team carries a baton. On an agreed signal he/she sprints away from the rest of the team and follows the course until reaching the last runner of his/her team. The baton is handed over and passed forward to the new leader who sprints away, etc.

Variation: Run to music.

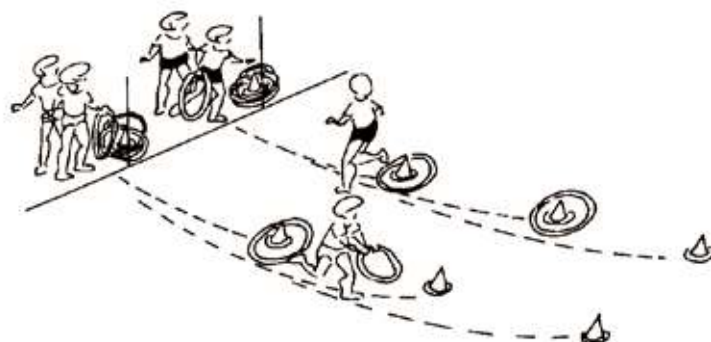
4. GAMES *(continued)*

HURDLE GAME

Each team is given a pile of cardboard boxes. Marks are placed showing the points to which the boxes must be carried. The first runner carries his/her box to the first mark, returns and sends off the next runner with a hand slap. The second runner carries his/her box to the second mark, etc. The first round is finished when all the boxes have been distributed. In the following rounds the boxes are used as hurdles. Shuttle and turning relays are possible. In the last round the boxes are collected one by one and returned to the start.



Note: The marks should be positioned in such a way that the boxes can be run over with a specific rhythm ("one-stride rhythm", "two-stride rhythm" etc.).

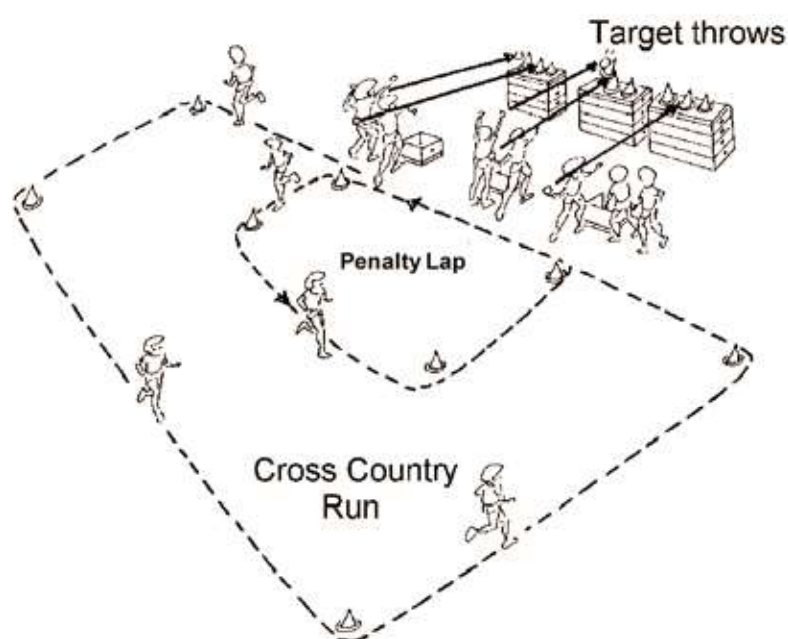


Variation: Cones can be set out instead of marks. In the first round the runners place rings over the cones. In the following rounds the runners hurdle the cones/rings.

ENDURANCE GAME

Runners must complete a prescribed number of laps on a 200 - 400 metre cross country course. Each lap is interrupted by a throwing station. Runners are allowed to continue only when they hit the target. Runners who fail to hit the target after three throws must run a penalty lap.

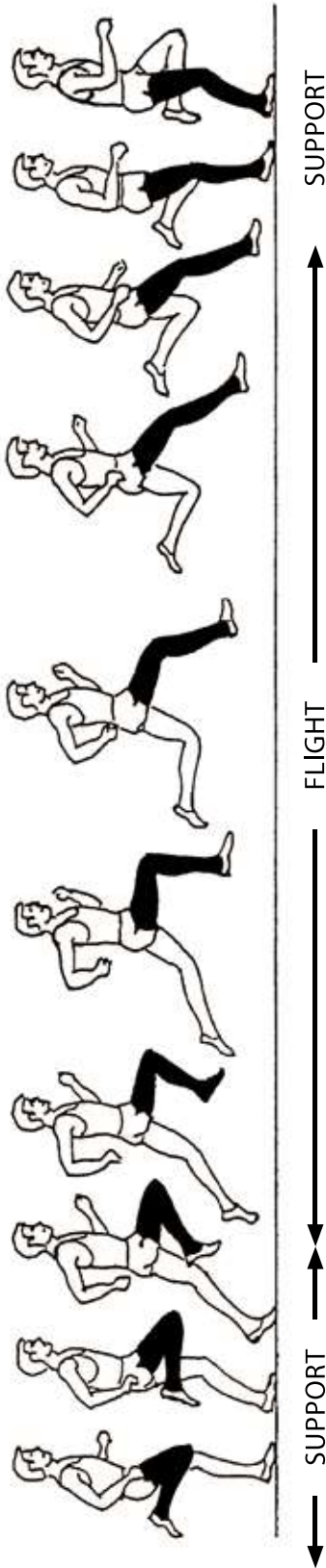
Variation: Run in teams. The team can only continue when all members have hit the target or completed the penalty lap.



SPRINTS







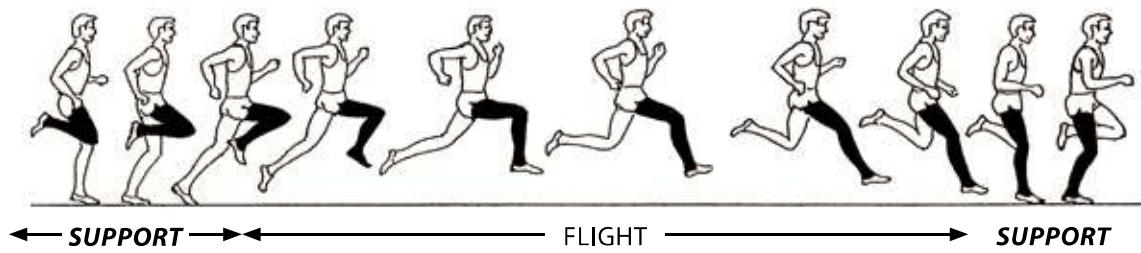
Sprints– Whole Sequence

Phase Description

Each stride comprises a SUPPORT PHASE (which can be divided into a front support phase and a drive phase) and a FLIGHT PHASE (which can be divided into a front swinging phase and a recovery phase).

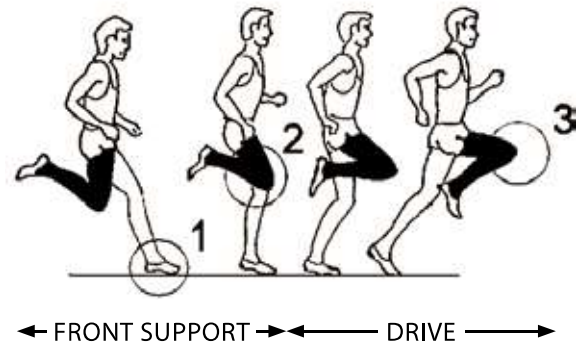
- In the support phase the sprinter's body is decelerated (front support) then accelerated (drive).
- In the flight phase the free leg swings ahead of the sprinter's body and extends for the touchdown (front swing) while the other leg bends and swings to the sprinter's body (recovery).





SUPPORT PHASE

Front Support



Objective

To minimise deceleration at touchdown and to maximise forward drive.

Technical characteristics

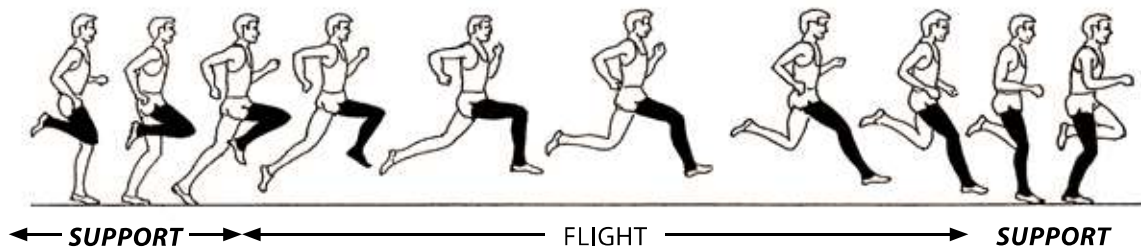
- Landing is on the ball of the foot. (1)
- Knee bend of the support leg is minimal during amortization; the swing leg is doubled up. (2)
- Hip, knee and ankle joints of the support leg are strongly extended at take off.
- Thigh of the swing leg rises quickly towards a horizontal position. (3)

COACHES SHOULD:

- Observe that the athlete does not brake when the foot contacts the ground.
- Ensure that the support leg does not collapse.
- Observe the overall rhythm of the sprint.
- Observe one component of a phase at a time.

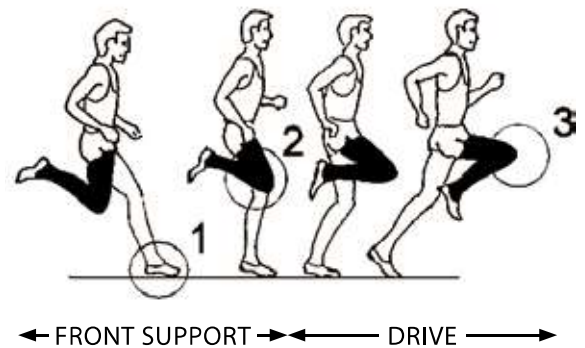
HELP ATHLETES TO:

- Actively 'claw' the ground at touchdown.
- Run relaxed, naturally and **lightly**.
- Maintain visual focus ahead and use to run 'tall'.



SUPPORT PHASE

Drive



COACHES SHOULD:

- Ensure that the support leg does not collapse.
- Observe lower limb, joint and body actions and angles.
- Observe the arm action.

Objective

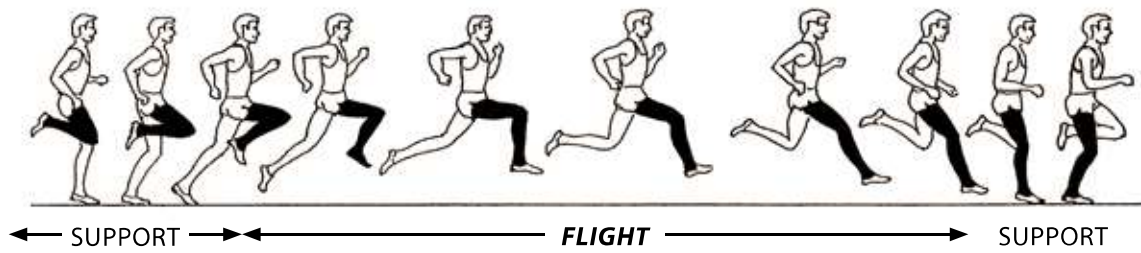
To minimise deceleration at touchdown and to maximize forward drive.

Technical characteristics

- Landing is on the ball of the foot. (1)
- Knee bend of the support leg is minimal during amortization; the swing leg is doubled up. (2)
- Hip, knee and ankle joints of the support leg are strongly extended at take off.
- Thigh of the swing leg rises quickly towards a horizontal position. (3)

HELP ATHLETES TO:

- Keep shoulders relaxed.
- Use a fast relaxed arm action emphasising the drive backwards.
- Run evenly and balanced.
- Maintain visual focus ahead.



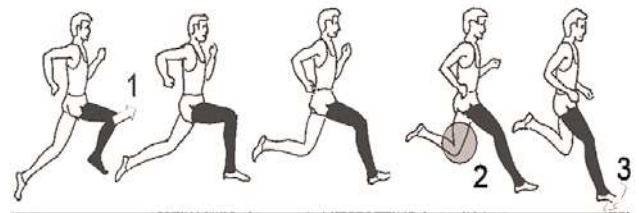
FLIGHT PHASE

Recovery



COACHES SHOULD:

- Observe from the side and front.
- Ensure that the heel comes quickly close to the sprinter's body.
- Use drills to develop the actions in the phases.



Objective

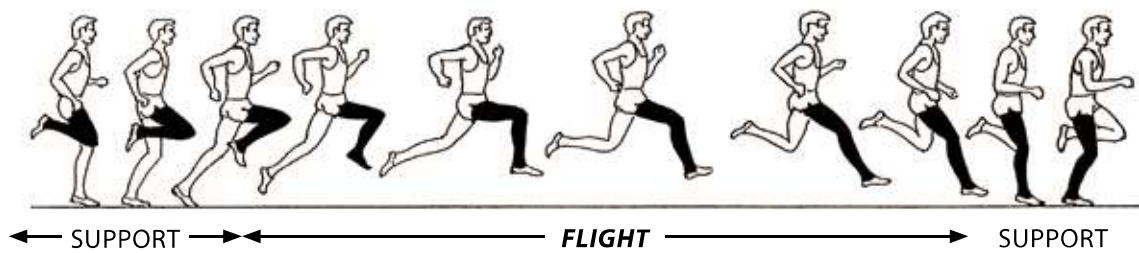
To maximise the forward drive and to prepare for an effective foot plant at touchdown.

Technical characteristics

- Knee of the swing leg moves forwards and upwards (to continue the drive and increase stride length). (1)
- Knee of the support leg flexes markedly in the recovery phase (to achieve a short pendulum). (2)
- Arm swing is active but relaxed.
- Next support leg sweeps backwards (to minimise the braking action at touchdown). (3)

HELP ATHLETES TO:

- Coordinate the support and flight phases.
- Keep trunk position upright.
- As the foot leaves the ground think 'Toe up, Heel up'.



FLIGHT PHASE

Front Swinging



COACHES SHOULD:

- Observe from the side and front.
- Develop appropriate strength and elastic power.
- Use drills to develop the actions in the phases.
- Ensure that the foot is moving back relative to the body so braking forces are minimised at touchdown.



Objective

To maximise the forward drive and to prepare for an effective foot plant at touchdown.

Technical characteristics

- Knee of the swing leg moves forwards and upwards (to continue the drive and increase stride length). (1)
- Knee of the support leg flexes markedly in the recovery phase (to achieve a short pendulum). (2)
- Arm swing is active but relaxed.
- Next support leg sweeps backwards (to minimise the braking action at touchdown). (3)

HELP ATHLETES TO:

- Coordinate the support and flight phases.
- Use a fast relaxed arm action emphasising the drive backwards.
- Keep trunk position upright.
- Bring the thigh of the free leg to horizontal in the flight.

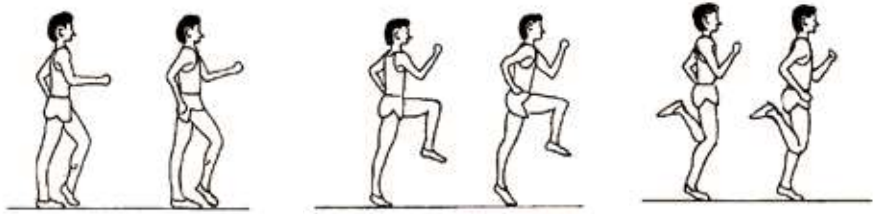
STEP 1 BASIC EXERCISES

OBJECTIVES:

To develop basic running skills.

TIPS:

- For high knees, "Thigh parallel to the ground."
- For heel flick, "Toe up, Heel up."
- Focus straight ahead and stride out smoothly at the end of the drill.



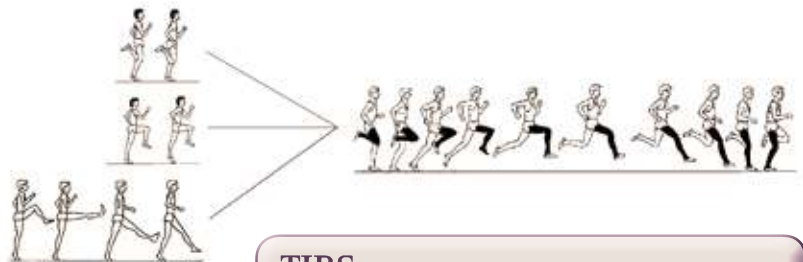
Use the basic exercises to complete the warm-up:

- Ankleing
- High Knees
- Heel Kick-up
- High Knees with extension

STEP 2 BASIC DRILLS

OBJECTIVES:

To develop sprinting skills and coordination.



- Combinations and Variations.
- Combinations and Transitions to sprinting (see figure).
- Arm Action Drills.
- Ins and Outs.

TIPS:

- Distance according to age and ability.
- Think, relaxed arms, "back, back".
- Focus straight ahead and sprint smoothly at the end of the drill.

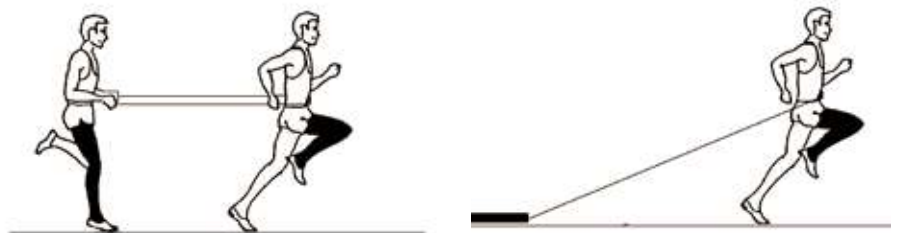
STEP 3 RESISTANCE RUNS

OBJECTIVES:

To develop the drive phase and specific strength

TIPS:

- Do not exaggerate the resistance.
- Run tall and without 'leaning into' the resistance.
- Walk back on all drills.



- Use the resistance of a partner or an implement.
- Do not exaggerate the resistance.
- Ensure full extension of support leg and short ground contacts.

STEP 4 PURSUIT RUNS

OBJECTIVES:

To develop reaction speed and acceleration.

TIPS:

- Lead runner, accelerate quickly and smoothly.
- Rear runner, focus on reacting to lead runner.
- Vary the starting pace.

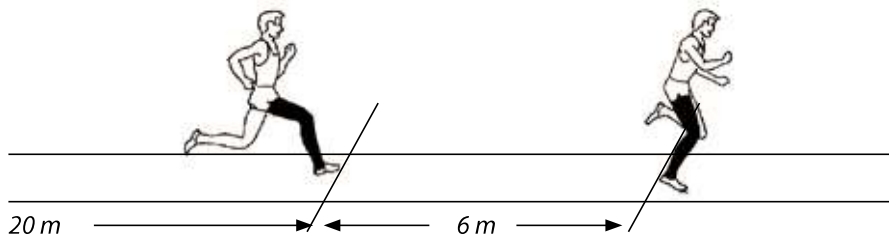


- Use a stick or a rope (1.5 m).
- Jog in line.
- Front runner releases the stick (or rope) to initiate the pursuit.

STEP 5 ACCELERATION RUNS

OBJECTIVES:

To develop acceleration and maximum speed.



- Mark a 6 m zone.
- One partner waits at the end of the zone.
- Accelerate when the incoming partner enters the zone.

TIPS:

- Incoming runner should sprint in strongly.
- Outgoing athlete should react quickly.
- Gradually lengthen the strides with acceleration.

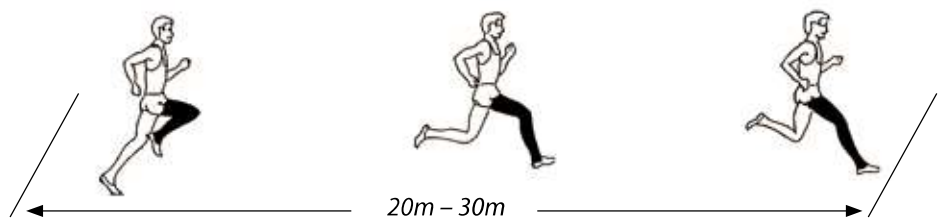
STEP 6 FLYING '30' – 20 TO 30 METRES SPRINT

OBJECTIVES:

To develop maximum speed.

TIPS:

- Maintain frequency throughout the speed zone.
- Keep arms fast and relaxed.
- Stop practice if cannot maintain speed.



- Mark a zone of 20m to 30m – depending on the developmental age and experience of the athletes.
- Always use 30 m approach with maximal acceleration.
- Run through the zone at maximum speed.

