Course Name: Bachelor of Physical Education
Year: Ist
Paper Name: Skill and Prowess
Paper No.: I (Part-B 1)
Topic No. B (1)
Topic Name: Sprints
Lecture No.: 45

Lecture Title

Sprints

Introduction

Sprinting is a type of running in which the participant runs the entire distance at near maximum speed. It differs from fast running in that longer, the number of strides per second is greater, and the force of the driving leg against the ground is less. In other words, it is an all out effort by the contestant to move as fast as his can over the indicated distance in as short a time as possible. Sprint, also called dash , in athletics (track and field), a footrace over a short distance with an all-out or nearly all-out burst of speed, the chief distances being 100, 200, and 400 meters and 100, 220, and 440 yards.

The course for sprint races is usually marked off in lanes within which each runner must remain for the entire race. Originally sprinters used a standing start, but after 1884 sprinters started from a crouched position using a device called a starting block (legalized in the 1930s) to brace their feet. Races are begun by a pistol shot; at 55 to 65 meters (60 to 70 yards), top sprinters attain maximum speed, more than 40 km per hour (25 miles per hour). After the 65-metre mark the runner begins to lose speed through fatigue.

All important international races at 200 meters and 220 yards, as well as 400 meters and 440 yards, are run on an oval track. The starts are staggered (the lanes farther from the centre begin progressively farther forward on the track) so that each runner will cover an equal distance. As a result, the competitors, particularly in the 400 meters and 440 yards, have no exact knowledge of their respective positions until they have completed the final turn. Great emphasis is therefore placed on an athlete's ability to judge his own pace, as well as upon his speed and endurance.

The sprints include the following track events: 100 meters, 200 meters, 400 meters, 4 x 100 meter relay and the 4 x 400 meter relay. Although the sprints are events in themselves, the ability to sprint is an important weapon in an athlete's armory for many track and field events and many sports.

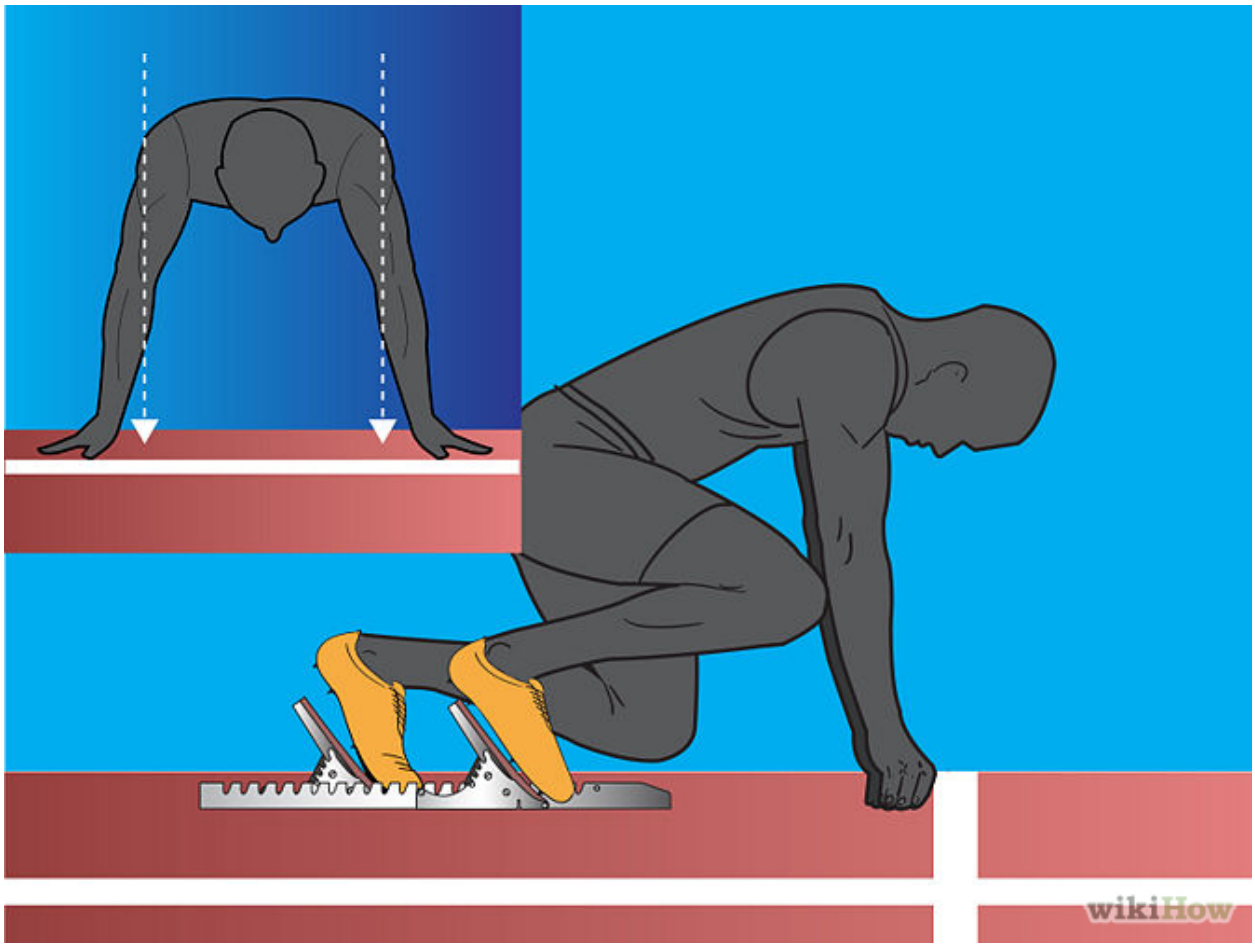
2. Sprint Technique

Guidance on the sprint technique takes the form of a checklist, for each phase of the sprint, of points for the coach to monitor. The information provided here is for athletes using starting blocks. For details of standing or crouch starts see the sprints start page.

Pre race start

- Blocks correctly positioned in the lane (200 meters/400 meters at a tangent to the curve)
- Correct distances from the start line to the front and rear blocks
- Foot blocks at the correct angles
- Blocks firmly located in the track
- Athlete relaxed and focused on the race

On your marks



- Feet correctly located in the blocks

- Fingers behind the line
- Fingers form a high bridge
- Hands evenly positioned slightly wider than shoulder width
- Shoulders back and vertically above or slightly forward of the hands
- Arms straight but not locked at the elbows
- Head and neck in line with the spine
- Eyes focused on the track (1 to 2 meters ahead)
- Gentle breathing
- Face and neck muscles relaxed

Set

- Hold the breath
- Hips rise slowly to a position above the shoulders
- Head and neck in line with the spine
- Eyes focused on the track one or two meters ahead
- Shoulders vertically above or slightly forward of the hands
- Front leg knee angle approx. 90 degrees
- Rear leg knee angle approx. 120 degrees
- Feet pushed hard back into the blocks

B of the Bang

- Exhale
- Drive the arms hard
- Extend the whole body so there is a straight line through the head, spine and extended rear leg - body approx. 45 degree angle to the ground
- Eyes Focused on the track 2 to 3 meters

- Run out of the blocks - do not step or jump out of the blocks

3. Drive Phase (0-30m)

- Drive the back leg forward keeping the heel low until the shin is approx 45° to the ground and then drive the foot down (see picture to the right) hitting the ground just behind the body's centre of mass
- Over the next 7-8 strides (approx. 10 meters) the angle of shin of the front leg, before it is driven down, will increase by 6-7°/stride so that by the 7-8 stride the shin is vertical
- Over the first 7-8 strides the whole body angle will increase from 45° to approx. 30° degrees - approx. 2°/step
- After the first 7-8 strides you will be at approx.70% of your max velocity
- Eyes focused on the track to keep low to allow the buildup of speed
- Forward lean of the whole body with a straight line through the head, spine and extended rear leg
- Face and neck muscles relaxed (no tension)
- Shoulders held back and relaxed, square in the lane at all times
- Arms move with a smooth forward backward action - not across the body - drive back with elbows - hands move from approx. shoulder height to hips
- Elbows maintained at 90 degrees (angle between upper and lower arm)
- Hands Relaxed - fingers loosely curled - thumb uppermost
- Legs - fully extended rear leg pushing off the track with the toes - drive the leg forward with a high knee action with the knee pointing forward and with the heel striking under the backside (not the back of the backside as the knee is low and pointing down to the ground) - extend lower leg forward of knee (rear leg drive will propel the foot forward of the knee) with toes turned up - drive the foot down in a claw action with a ball of foot/toe

strike on the track vertically below the knee - pull the ground under you into a full rear leg extension - (elbow drive assisting the whole action)

- On the ball of foot/toes at all times - feet pointing forward straight down the lane
- Elbow drive commences just before rear leg drive
- Fast leg action, good stride length allowing continual acceleration
- Appearance of being smooth and relaxed but driving hard with elbows and legs
- The drive is maintained for first 20-30 meters (approx.16-17 strides) at the end of which the body is tall with a slight forward lean
- At the end of this phase you will be at approx. 90% of your max velocity

Stride Phase (30-60m)

- Smooth transitions from drive phase to stride phase
- Eyes focused at the end of the lane - tunnel vision
- Head in line with the spine - held high and square
- Face relaxed - jelly jaw - no tension - mouth relaxed
- Chin down, not out
- Shoulders held down (long neck), back (not hunched), relaxed and square in the lane at all times
- Smooth forward backward action of the arms- not across the body - drive back with elbows - brush vest with elbows - hands move from shoulder height to hips for men and from bust height to hips for the ladies
- Elbows held at 90 degrees at all times (angle between upper arm and lower arm)

- Hands relaxed - fingers loosely curled - thumb uppermost
- Hips tucked under - slight forward rotation of the hip with forward leg drive to help extend the stride
- Legs - fully extended rear leg pushing off the track with the toes - drive the leg forward with a high knee action with the knee pointing forward and with the heel striking under the backside (not the back of the backside as the knee is low and pointing down to the ground) - extend lower leg forward of knee (rear leg drive will propel the foot forward of the knee) with toes turned up, stepping over the knee of the lead leg - drive the foot down in a claw action with a ball of foot/toe strike on the track just behind the body's centre of mass - pull the ground under you into a full rear leg extension - (elbow drive assisting the whole action)
- On the ball of foot/toes with the feet pointing forward straight down the lane
- No signs of straining or tension in the face, neck and shoulders
- Appearance of being Tall, Relaxed and Smooth with maximum Drive
- At or close to the end of this phase you will have reached your max velocity

Lift Phase (60m+)

Around 50-60 meters we will have reached max velocity and now we start to slow down. Technique as the Stride Phase but with emphasis on:

- High knee action (prancing)
- Leg action fast and light as if running on hot surface

- Fast arms - more urgency
- Hands slightly higher at the front

Sprint Starts In the sprinting events, there is a need to have an efficient start. let us look at the standing, crouch and block starts and the correct positions for the "On your marks" and "Set" positions.

4. Standing Start

On your Marks

- The foot is placed up to the starting line but not on it.
- The feet are about shoulder width apart to obtain a good balanced position
- The weight is distributed so that about 2/3rds of the weight is on the front foot

- Bend the knees and lean forwards.
- Arms synchronized with the legs - in this case left foot forward and right arm forward
- Back, neck and head in line
- Remain motionless

Crouch 4 point start

On your Marks

- Place the left foot behind the line
- Place the right foot behind the left
- Remove the left foot and place the left knee adjacent to the right ankle
- The toe of the left foot should be turned under
- Hands should be slightly wider than shoulder width
- Arms should be straight but not locked at the elbow
- The fingers must be behind the line
- The fingers should form a bridge, with the thumbs pointing towards one another
- When viewed from the side the shoulder should be above the start line
- The head and neck should be in line with the spine

Set

- Hips raised to a position slightly higher than the

shoulders

- There should be an angle of 90 degrees at the front knee
- There should be an angle of 120 degrees on the rear knee
- When viewed from the side the shoulder should be above the start line
- The head and neck should be in line with the spine
- Remain motionless

40 yard dash 3 point start

- Place your stronger leg, usually the leg you jump with, in front.
- From a kneeling position, place the left (stronger) foot forward so that the edges of your toes are approximately 16 to 20 inches behind the starting line
- With the knee of your back leg on the ground, position it alongside the ball of your front foot with a 4 to 6 inch space (fist) between the legs
- Extending your right arm out just behind the line, raise your hips up to a position where the angle of the front leg is about 90 degrees, and the angle of the rear leg is about 120 degrees
- The right hand should be extended up onto the fingertips with the fingers spread
- The left arm should rest on the thigh of the left leg or in a position behind the body as if in a running position.
- Assume a relaxed position with most of your body weight on the legs and a small amount of your weight on the extended front arm
- The power at the start comes from your legs, not your arm, so do not lean too far forward so that too much weight is on your arm

Block starts

On your Marks

- Blocks correctly positioned in the lane (200m/400m at a tangent to the curve)
- Correct distances from the start line to the front and rear blocks
- Foot blocks at the correct angles
- Blocks firmly located in the track
- Feet correctly located in the blocks
- Fingers behind the line and form a high bridge
- Hands evenly positioned slightly wider than shoulder width
- Shoulders back and vertically above or slightly forward of the hands
- Arms straight but not locked at the elbows
- Head and neck in line with the spine
- Eyes focused on the track (1 to 2 meters ahead)
- Gentle breathing
- Face and neck muscles relaxed

Set

- Hold the breath
- Hips rise slowly to a position above the shoulders
- Head and neck in line with the spine
- Eyes focused on the track one or two meters ahead
- Shoulders vertically above or slightly forward of the hands
- Front leg knee angle approx. 90 degrees
- Rear leg knee angle approx. 120 degrees
- Feet pushed hard back into the blocks

Types of sprint starts

There are three types of sprint starts:

- Bunch or Bullet start - The toes of the rear foot are approximately level with the heel of the front foot and both feet are placed well back from the starting line.

- Medium start - the knee of the rear leg is placed opposite a point in the front half of the front foot.
- Elongated start - the knee of the rear leg is level with or slightly behind the heel of the front foot.

The medium start, compared to the other two starts, allows the sprinter to exert a higher force against the blocks for the longest practicable time, which in turn produces the maximum impulse so that the athlete leaves the blocks with the greatest possible velocity.

Right foot forward or left

A question often asked with regards starting blocks is "which foot should be in the rear block?"

left foot was in the rear block, reaction time was better

right foot was in the rear block movement and total response time was better - time from stimulus (gun) until the end of the movement

The results suggest that the right foot in the rear block will produce a more powerful drive from the blocks. Perhaps a way forward would be to evaluate the athlete's times over the first ten meters, for both start positions, to determine which produces the best acceleration phase for the athlete

5. Sprint Technique Drills

There is no doubt that time spent on warming up and cooling down will improve an athlete's level of performance and accelerate the recovery process needed before training or competing again. An element of the warm up program should include event specific drills to stimulate the appropriate neuromuscular action for the range of movement and correct posture.

Drills should be conducted wearing trainers and not spikes. In all the drills, the coach/athlete should ensure a tall and relaxed posture with a correct range of movement of the arms. Check for

- Eyes focused at the end of the lane - tunnel vision
- Head in line with the spine - held high and square
- Face relaxed - jelly jaw - no tension - mouth relaxed
- Chin down, not out
- Shoulders down (long neck) relaxed and square in the lane at all times
- Back straight (not hunched)
- Abdominals braced (not tummy pulled in)
- Smooth forward backward action of the arms - not across the body - drive back with elbows - brush vest with elbows - hands move from shoulder height to hips for men and from bust height to hips for the ladies
- Elbows held at 90 degrees at all times (angle between upper arm and lower arm)
- Hands relaxed - fingers loosely curled - thumb uppermost
- Hips remain stable during execution of drills

General Sprint drills

Walking on Toes

- Aims - develop balance and strengthen the lower leg muscles (reduce shin splints)

Walking on Heels

- Aims - develop balance and strengthen the lower leg muscles (reduce shin splints)

Sprint Arm Action

- Aims - develop shoulder muscle power and endurance

Leg Cycling

- Aims - develop correct leg sprint action and strengthen hamstring muscles

Leg drives

- Aims - develop hip flexor strength and speed

Butt Kicks

- Aims - develop correct leg sprint action in the mid section following the drive off the rear leg

Skips

- Aims - to develop correct leg and foot action in preparation for the foot strike

Side strides crossover

- Aims - to increase flexibility and range of hip movement

Skip and clap

- Aims - to increase flexibility and range of horizontal leg movement

Skip Claw

- Aims - to develop the drive down action of the leading leg

Skip for height

- Aims - to develop rear leg drive

Plyometric work

Leg Plyometric drills can be include as appropriate e.g. single leg hopping, bounding, bunny hops, tuck jumps - one set of 5 to 10 repetitions (aim for quality not quantity)

Chest pass

- Aims - develop shoulder and chest strength and speed

Speed Hops

- Aims - develop reactive ability of your leg muscles

Speed Hops Leg Cycling

- Aims - develop fast sprint leg cycling action - see Leg Cycling exercise above

Run outs

- Aims - to develop a tall, relaxed and smooth sprint action

  Aims - to develop the elbow drive

Conclusion

Sprint training is said to improve your overall aerobic capacity and heart, so this should make you better at long-distance runs too. If you don't have something to time yourself with, count the number of steps you do, and after a certain number of steps, switch from sprinting to walking or walking to sprinting. Always build up to top speed in your warm up so your body can get used to the high intensity training to avoid injury.