2002 Sprinting Seminar Table of Contents
Bucknell University

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What is Sprinting?

There are 2 things that will tell you how fast you are going:

1) Stride Length
2) Stride Frequency

You are looking for an optimum of the two.
The slower you are going the shorter the stride.
The faster you are going the longer the stride.

Running is a series of catching yourself, every step you take.

Proper Sprint Mechanics

Before you start to read about proper sprint mechanics it is important to know that everything that is mentioned below you will be able to practice and do. It has nothing to do with a person’s biomechanics.

Posture:
This is crucial. When sprinting, you are always in a straight line. Your alignment is head, hips and balls of the feet. It is the same as when you are standing tall. (Think about a straight board.)

Feet and Legs:
1) Always have toes up (cocked foot or dorsi- flexed). Foot and shin should be at a 90 degree angle. (Your Achilles tendon will be in a stretch reflex position.)
2) Always have the ball of your foot strike the ground first.
3) When your foot strikes the ground your leg will be slightly bent and your foot will be slightly out in front of your center of gravity.
4) Always push throw your toes (bridge on your toes). By bridging on your toes you will create a stretch reflex in your toes and feet. By pushing all the way through your toes your shin angle from the ground will be decreased, meaning you will be pushing farther out into the direction you are running.
5) At the start of a sprint there will be lower heal recovery, but after the first few steps your heal will come all the way up under your butt (full leg cycle). (If you have a full leg cycle your quadriceps will produce a greater stretch reflex.)

Knees and Legs:
Run with high knees. When sprinting your quads should be 90 degrees to your torso. You are looking for a big knee separation (or in other words, your knees are as far away as possible from each other). You are looking to put as much force into the ground as possible and one way to achieve this is to have a high knee lift. To continue to apply force you must push all the way through your leg until it is straight.

Hips:
1) Your hips should always be underneath you and in alignment with the rest of your body. After the drive phase and you are tall, your hips must be facing straight down the track. The hip joint produces most of your power. (Don’t be the clasped board.) Remember when you are sprinting that you are 8 times your body weight. Proper hip alignment will allow more force to be returned to the body, which can be directed into forward movement. One of the goals of being a sprinter is to put as much force into the ground as possible.
2) When running you will see a slight rise and lowering of the hips. When the ball of your foot first strikes the ground your center of gravity will be slightly lower from when you push through the ground and bridge on your foot. Basically you will see a lowering and raising of your center of gravity (hips) every step you take. (When you bridge on your foot, your leg is straight and your hips are underneath you, you will produce stretch reflex in the hip joint.)

**Stomach:** Tight.

**Arms and Hands:**
Have your hand come to the level of your chin with a closed angle between your forearm and biceps. From this position throw your hand straight down towards the ground to produce as much force as possible. (An open hand will produce more force then a closed fist. The reason is the longer the lever, the stronger the lever and your arm is longer when your hand is open. Also, when you have an open hand you are more relaxed. A clinched fist is not relaxed and this will produce strain.) You want your arm to come almost completely straight next to your side. After you throw your hand straight down next to your side your elbow should come back as far as possible so your triceps are 90 degrees to your back. By getting your elbow back you will help to balance yourself out.

**Example:** When your left foot is bridging on the ground and just about to leave the ground your right elbow is back to balance out your leg being back. Your arm is much smaller in comparison to your leg and if you don’t get your elbow all the way back (90 degrees from your back) you may become off balanced. Also, by getting your elbow all the way back, you will produce a stretch reflex in your chest, which will help your arm come forward.

**Shoulders:**
If you are standing tall and your arms are hanging to your sides, your shoulders are relaxed and low. This is the same position your shoulders must be in the whole time sprinting.

**Head and Neck:**
Always in the same alignment has your chest. You should not move your head and your face and neck must be relaxed. If you strain your face or neck you are tense and you will not be an efficient sprinter. Be relaxed but also in control.

**Whole Body:**
You want to have controlled, relaxed, and fluid movements. A relaxed runner is a fast runner.

**The objective:**
1) The obvious objective in sprinting is to go as fast as possible, but you will not live up to your potential unless you do the things mentioned above.
2) To have optimum stride length and stride frequency.
3) To put as much force into the ground as possible.
4) To run efficient. A relaxed runner can be an efficient runner.
5) Put your body in stretch reflex positions.
Things to Remember to be a Better Sprinter

A longer lever is a stronger lever and a shorter lever is a faster lever.
Stretch Reflex will produce much more force without even trying.
Don’t try to bring your limbs forward a stretch reflex will do it for you.
Core strength is essential. Core meaning from your shoulders to your knees.
Strength is speed and speed is strength.
It is 7 times harder to recover mentally then physically.

Warm-up

If it is cool or cold out it is important to have the proper closes on. Stay warm. Your primary goal during the warm-up is to raise your core temperature. Your other goals during the warm-up are to recruit muscle fibers and to put your body through a full range of movements.

Jog
800 meters

General Circulation (you do this 1 or 2 sets)
Leg Raises 1x15
Superman 1x15
Star Jumps 1x25 (or jumping jacks)
Leg Raises: in-out 1x15
Push-Ups 1x15-20
Crunches 1x25

Stretching/Dynamic Flexibility
Side Bends 7 each side
Hip Circles 5 to 7 each way
Sumo Wrestlers 5 to 7 each direction
Lunge Walks 20 steps long stride/emphasize stretching the hip flexor
Roll backs (hamstring) 7 to 10 each leg
Leg Swings 10 front-back, 10 side-side

Specific/Neuromuscular Warm-Up
Wall Drills
Trail Leg: Forward 10 Reverse 10
Leg Cycle (On Coach Klim’s command)
Drive Steps: (On Coach Klim’s command)
  one at a time: 5 each leg alternate/pause: 5 each leg
  alternate/continuous: 10 each leg
The following are part of the Specific/Neuromuscular Warm-up

**Form Runs**: (Each exercise is usually done twice for approximately 25 to 35 meters)

Carioca
- High Knee Carioca

Hip Skips

Straight Legged Runs
- Over exaggerated Skips (bring your knee all the way to your chest)

Backward runs
  - a) *standing tall
  - b) *squatting down
  - c) *standing tall with a full leg cycle
  - d) as fast as you can
  - e) be creative and think up some of your own

*Backward runs are very good for the hamstrings. I usually do 2 to 3 exercises of backward runs everyday*

*“A” Skips
“B” Skips
*High Knees
*Butt Kicks

Leg Cycle drills
  - a) right leg only
  - b) left leg only
  - c) both legs

Fast Feet (2 sets of 6 to 10 seconds)

High Knees as fast as possible

Power Strides (75% run with high knees and trying to put as much force into the ground as possible with the legs)

Etc.

*Accelerations (I recommend that you do 6 approximately 50 meters. Start at around 65% and work up to around 90%. If the workout is going to be very intense and the team will be sprinting at 95% effort then their accelerations must go to 95%.)

**For the seminar instead of doing the accelerations you will be doing the Sprint Progression.**

* These are the form runs we typically do every day. Sometimes to give them a rest, I will not have the team do any form runs, but they will do backward runs and accelerations.

I have listed many different form runs, but I think it is important to realize that this is still part of the warm-up and you don’t want to over do it. Mix up which form runs you will be doing from time to time and pick the form runs which you think will benefit you or your team the best.
Cool Down

Jog 800 meters or more if doing a longer interval day or an easier run day. On a short intense interval day you may walk 800 meters or so.

Stretching -
Do all the stretches: 2 times for 15 to 18 seconds (Dr. Dan Davis Wall Stretch do 10 times)

Calves
Dr. Davis wall stretch only

Quads
Stork Stretch – leg straight back – leg out to the side – leg across your back

Hamstrings
Hurdle stretch – Foot straight – Foot in – Foot out
Or
Pike stretch (feet together out in front of you) – Feet straight – feet in – feet out

Groin
Butterfly
Side lunge to the right and to the left

Hip Flexor
Static Lunge or walk-out Stretch

Back
Pretzel Stretch
Legs over the head stretch

Arms
Arm across the body
Pulling elbow down over your head

Sprinting Progression

The sprinting progression will be a series of striders (runs at 70 to 75%).

Each strider will build on the other. What you do on the first one you must do on the second one and so on.

Each strider of the sprint progressions will be run between 35 to 50 yards. If you are working with beginners you may want to start at a shorter distance. The stronger the athlete gets the longer the distance he or she will be able to do the sprint progressions.

What you will see by doing this progression is that your striders will get faster, by being in the correct body positions.

1) Keep head, hips and feet in alignment and push self to a tall position.
2) Keep toes up throughout the strider. As soon as your foot leaves the ground put your foot to a toe up position.
3) Start your strider with a high knee lift. (You are looking for a big knee separation. The further your knees are apart the better.
4) Run with high knees the entire way throughout the strider.
5) Feel the ball of your feet striking the ground first.
6) Push all the way through your feet. (Bridge on your toe.)
7) Feel your feet coming up all the way under your butt.
8) Use your arms more forcefully.
9) Be in absolute control of your body.
3 Phases of Sprinting

1) Drive Phase and acceleration phase:
At the start you are not in a stretch reflex position. Initiate your drive phase with a very forceful arm punch and high knee punch to get your body to a stretch reflex position. Make sure you keep your head in alignment with your chest, and you push yourself to a tall position. At the start you will have a low heel recovery. After you get going you want your foot to come up underneath your body as if you were doing a butt kick drill.

2) Maintain phase:
Your goal here is to maintain the speed you worked to get. You must stay relaxed to achieve this. To practice this you may do the sprint – float - sprint drill.

3) Deceleration phase:
When sprinting this phase will happen. Your goal is to relax and maintain your speed as best as possible. Don’t over stride (get your feet underneath you) and keep moving.

Starting Blocks

Setting your blocks:
1) Strong leg is the leg which is forward in the blocks.
2) Using your front leg as a measuring stick, place your knee on the ground, your knee should be approximately 4 fingers behind the line.
3) Your back foot should be approximately 8 inches (3/4 of your foot) behind your front foot.

Getting on your marks:
1) Relax, be comfortable and confident.
2) Make sure that your arms are vertical (Shoulders over the line).

Going to a set position:
1) Lift your butt slightly above your head (you should have a 90-degree angle in the front leg and approximately 110-degree angle in the back leg).
2) Head is down, in alignment with your chest and it does not move.

Coming out of the blocks:
1) React to the gun. Try to make it a reflex by making the gun scare you.
2) If your left leg is forward in the blocks you want to punch out with the left arm. And if it is right leg forward, punch out with the right arm. The opposite arm will be forcefully driven back.
3) Forcefully drive out with the back knee. You want to start with a high knee and continue with high knees. You are looking for your knees to be as far apart as possible.
4) Throw your hips out. This should happen if you drive your knee out.
5) Wherever your chest is your head should be. Since your chest is facing down so should your head. Feel yourself pushing to a tall position.

Always be positive. If you say you can’t, you won’t. If you say to can, you will. To be your best you must always be a 100% positive.
Training

The 3 rules of training:
1) Moderation
2) Consistency
3) Rest

It is not who practices the hardest, it is the person who practices the smartest. This person will be the one that will produce the greatest potential. You can’t compete if you are sick or injured.

The 2 ways to overload your body:
1) Volume
2) Intensity

How to improve your fitness level:
1) Overload your body
2) Rest (sleep, eat, ice, stretch, etc.)

If you rest enough your fitness level should improve.

5 Bio Motor Abilities (5 things you can train)
1) Strength
2) Speed
3) Coordination
4) Flexibility
5) Endurance

When training the 5 bio motor abilities you will emphasize the different abilities depending on what time of the year.

Example:
Early in the season the emphasis may be strength.
Right before competitions start and during competitions the emphasis may be speed and coordination.

When training you will see your max gains between 21 to 28 days.
Example of training schedule may be to change up the workouts every 4 weeks. The first 3 weeks you will do similar training and during the 4th week you may do similar training but with less volume. This way on during the 4th week you are getting some rest so you are recovered and ready to start another 4 week block of workouts. (Look below for example.)

Example with Olympic lifting during the first month of track practice:
Week 1: Monday and Thursday: Bench and Squat 2 sets of 10 at an easy weight.
Week 2: Monday and Thursday: Bench and Squat 3 sets of 10 at an easy weight.
Week 3: Monday and Thursday: Bench and Squat 3 sets of 10 at medium weight.
Week 4: Monday and Thursday: Bench and Squat 2 sets of 10 at a medium weight.

The 3 Energy Systems:
1) Creatine Phosphate Phase (running duration of 6 to 10 seconds)
2) Glycogen Phase (running duration up to 45 seconds)
3) Krebs cycle (running duration more than 45 seconds)

During a session (one workout) it is important not to mix energy systems. Only work on one energy system per workout.
Water:
Make sure that you are always hydrated. Drink water before, during and after exercising.

Eating:
If you eat something immediately after exercising you will start recovering right away. The sooner you eat the better.

Exercises

Med balls are for upper body plyometrics. Be quick and explosive.

Low Level Med ball Exercises:
Standing chest pass
Standing over head pass
Seated Straddle chest pass
Seated Straddle over head pass
Twist Throw (to the right and to the left)
Etc.

High Level Med ball Exercises:
Squat down over the head throw
Squat down front throw
Etc.

Hurdle Mobility Exercises:
Walk over
Backwards walk over
Side over (left and right)
Chorus line
Over - Under
Under – Under
Etc.

Plyometrics:
Low Level Exercises:
Running
Jumping jacks
Skipping and etc.

Intermediate Level Exercises:
High Bound
Long Bound
One legged hops
Two legged hops
Standing in place high knee jumps
Straddle Jumps and etc.

High Level Exercises:
Box jumps at different heights
Balance drills (exercises):
Standing on one leg and moving the free leg around.
Jump and stick it
Etc.

Ab Exercises:
Chinnies (bicycle)
Straight Crunches
Side Crunches (left and right)
V-ups
Static Leg raise with feet six inches off the ground
Leg raise flutter kick
Posture drills (Iso abs meaning static abs) on elbows in a push-up position, left and right
Pick pockets
Sit-ups
Leg raise (part of the warm-up)
Leg raise in and out (part of the warm-up)
Etc.

Olympic Lifts (Core Lifts):
Hang Clean and Power Clean
Squats
Bench
Jerks
Snatch
Etc.

Body Building Exercises:
flys on the bench
flys on the incline bench
weighted arms swings
shrugs
upright rows
military press
rotator cuff
lat pull down
seated row
bent over row
biceps curl
triceps extension
inverted sit-ups
leg extension
leg curl
toe raises
Etc.
General Strength Exercises:
Pull-ups
Chin-ups
Push-ups
Circle push-ups
Dips
Prisoner Squats
Abs
Lunge walks
Bear Crawl (Forwards, backwards, left and right)
Stairs or bleachers (walking, jogging and running)

Pool Exercises:
Deep End:
Aqua Jog
In chest deep water:
Cross country skiing
High Knees
Butt Kicks
Fast Feet
Ankle Jumps
Double tuck jumps (hands out of the water bringing both knees to the chest at the same time)
On the side of the pool, with back flat against the wall.
Criss-Cross Leg
Straight leg pull back

Daily Journal Entries

Yearly Goals (write this down everyday):

Daily Goals:

Hours slept:
Pulse:
Nap:

Total Daily Sit-ups:

Daily Meals:
  Breakfast: yes or no (optional: but good habit to write down what you ate)
  Lunch:
  Dinner:
  Snack: what you ate and the time of the snack

Nutrition Checklist:
Fruits   Vegetables   Carbohydrates   Proteins(meats)   Water   Milk

How you feel that day. Examples: I feel great. My hamstring hurts. I am sore everywhere.

Running Workouts:

Weight Lifting Workouts:
Seminar Evaluation

Scale: 1) Poor  2) Average  3) Above Average  4) Excellent

Presenter  __________
Information  __________
Overall Presentation  __________

Comments:
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