Speed and Agility Study Guide: Grotthuss

Sprinting Technique and Mechanics
- Acceleration
- Transition
- Maximum Velocity

Agility Techniques and Mechanics
- Dynamic Balance
- Coordination
- Explosiveness
- Directional Changes (cutting left or right)
- Transitions (turn and run from backpedal to forward sprint)

Speed Training
- Stride Length
- Stride Frequency
- Strength
- Power
- Functional Flexibility
- Acceleration
- Proper Technique
Guidelines to Improving Agility

- Take your time (weeks and months) with many repetitions
- Develop athletic timing, rhythm, and movement.
- Minimize the loss of speed when shifting the body’s center of gravity
- Do drills that require rapid changes if forward, backward, vertical, and lateral directional movements. Train your body to make these shifts more quickly and efficiently.
- Focus on intricacies of controlling small motor transitions in neck, shoulder, back, hip, knee, and ankle joints to achieve the best possible postural alignment.
- Emphasize strength, power, acceleration, deceleration, coordination, and balance.

Guidelines for Developing Speed Potential

- Do speed training at the beginning of a workout session
- Use proper sprinting technique
- Take time (months) with lots of drill repetitions
- All sets and repetitions must be accompanied by adequate rest
- Sprint drills should last 6-8 seconds at maximum or near maximum effort
- A one to four work to rest ration should be used
- Vary days between light, medium, and heavy days
- Track the total distance run during each maximum speed workout
- Run relaxed but give 100% effort
- Warm-up and Cool Down (Flexibility session)
- For speed endurance run for longer intervals (165-440 yards) or decrease the rest between short intervals (20-65 yards). Make sure to have water breaks after warm-up, in the middle of the main body of the session, and at the end of the main body of the session
Terms and Definitions

Acceleration
The rate of change in velocity. Being able to go from stationary or near stationary to maximum speed in a very short time.

Ways to Improve Acceleration
- Increase stride length and stride frequency
- Increase strength levels for entire body to produce greater amounts of force while at the same time decreasing the time spent in contact with the ground
- Train body to use attained strength gains

Active Warm-Up
jogging, lunge walking, calisthenics, skipping, and any other aerobic activities. Should be 5-10 minutes.

Agility
The ability to explosively start, decelerates change directions, and accelerates again quickly while maintaining body control and minimizing loss of speed. In conjunction with the ability to coordinate several sport specific tasks simultaneously.

Arm Action
Range of motion and velocity of the athletes arm

Cool-Down
Gearing down working on range-of-motion and using flexibility exercises

Coordination
The ability to control and process multiple muscle movements in order to effectively perform athletic skills
Deceleration
The ability to decrease speed or come to stop from a maximal or near maximal speed

Duration
The distance or time of a work intervals

Dynamic Balance
The ability to maintain control over the body while in motion

Stride Frequency
The number of strides taken in a given amount of time

Frequency
The number of training sessions performed in a given week; athletes should perform an agility-training workout twice per week during the off-season and once per week during the season.

Intensity
The speed at which the drill is performed; if the drill is timed, the distance covered can measure the intensity

Leg Action
Relationship of the hips and legs relative to the torso and the ground

Posture
Alignment of the body

Power
The rate at which work is done (force x velocity)

Repetition
The execution of one complete movement skill
Recovery
The period or rest between repetitions; it should be based on the complexity of the skill and the metabolic demands of the sport

Set
A group of agility drills and relief interval

Sprint Mechanics
Made up of three elements
• arm action
• leg action
• posture

Strength
Maximal force that a specific muscle or muscle group can generate at a specified velocity

Stride Length
Distance covered with steps taken per minute

Volume Load
The quantity of exercise performed per workout; for example, an athlete may perform four drills on an agility ladder, doing each drill twice
## Example Drills

### Speed
- Butt Kickers
- March
- Skips
- Ladder Speed Run
- Small Hurdles
- Sled/Tire Pull
- Parachute Running
- Stairs
- Uphill to Flat contrast speed Runs
- Sand Run
- Downhill to Flat Contrast Speed Runs
- Partner Tubing Assisted Acceleration drills.

### Agility
- Carioca
- Crossover Skipping
- Sprints
- Backpedals
- Cone Drills
- Z-Pattern Cone drills
- Figure Eights
- Line Jumps
- Tumbling
- any combination of above drills

### Balance
- single leg/with and without weight
- Lunge Patterns
- Hop then Stick balance drills
- and use the Bosu Balance Trainer.

### Quickness
- Multidirectional Skipping
- Medicine Ball Drills
- Goalie Drill
- Ball Drops with Partner
- Partner Blind Tosses
- Wheelbarrow Drill
- Rope Jumping
- Lateral Skaters
- Vertical Jump
- Barrier Jumps (we used Hurdles)
- Object drop Test,
- Partner Lateral Shuffle and Chase
- Mirroring Sprints
- Push-ups with Clap
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