



Plyometrics and Performance

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What are “plyometrics?”



- ▶ Complex answer:

- ▶ Elastic energy stored in muscles and tendons that is increased with a rapid stretch and then stored followed by immediate concentric action (i.e., high-velocity movements).
- ▶ Mechanical and neurophysiological

- ▶ Simple answer:

- ▶ Exercises that enhance explosiveness, power and bodily control.
- ▶ Also referred to as “plyos”
- ▶ **NOT** cardiovascular training/conditioning. This is an example of **POWER** and **EXPLOSIVE** training.



Attention Endurance Enthusiasts!!!!

- ▶ “Wait. . . . Plyos are for training power? But running is endurance. Why do I need to train power?”
- ▶ GREAT QUESTION!!
- ▶ Plyometrics teach your muscles and tendons to act like springs, giving you more quickness by generating your muscles faster.
 - ▶ Improve anaerobic threshold (*maximal aerobic power*).
 - ▶ Improve submaximal strength and maximal power.
 - ▶ Easier time running/cycling hills, performing quick bursts, interval training, improving maximal speed.
 - ▶ Combat stress related to the high intensity exercise.
- ▶ *Still don't believe me??*



THE EFFECT OF STRENGTH TRAINING ON PERFORMANCE INDICATORS IN DISTANCE RUNNERS

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- ▶ 40-week strength training program that included plyometrics in 20 competitive runners (age: 28.45 ± 8.6 yr).
- ▶ Variables assessed: 1RM back squat, countermovement jump, 0.3 m drop jump, blood lactate, VO_2max , running economy, and body composition.
- ▶ Results:
 - ▶ Significant improvements in maximal and reactive strength, running economy and VO_2max in the intervention group.
 - ▶ No differences in body composition or strength.
 - ▶ Despite popular belief, resistance training WILL NOT make runners “bulky.” You will still be aerodynamic.

Mode



▶ Lower-Body Examples

- ▶ Jumps in place
- ▶ Standing jumps
- ▶ Multiple hops and jumps
- ▶ Bounds
- ▶ Skip variations
- ▶ Box drills
- ▶ Depth Jumps

▶ Upper-Body Examples

- ▶ Medicine ball throws
- ▶ Catches
- ▶ Push-up variations
- ▶ Trunk plyometrics

Intensity

- ▶ The amount of stress placed on muscles, connective tissue and joints.
- ▶ Dependent on the exercise you select.
- ▶  Intensity,  Volume
- ▶ Factors that affect plyometric intensity:
 - ▶ Points of contact (e.g., single leg vs. both legs)
 - ▶ Speed
 - ▶ Height of the drill (increase height, greater force on landing)
 - ▶ Body weight (increase weight, including external weights, increase intensity)

Frequency and Recovery

- ▶ Frequency
 - ▶ Allow 42-72 hours between plyometric sessions
 - ▶ Roughly 2-3x per week
- ▶ Drills **should not** be thought of as a cardio workout. This is power training- BE EXPLOSIVE!
- ▶ Example: Depth Jumps
 - ▶ 5-10 seconds of rest between repetitions
 - ▶ 2-3 minutes between sets



Implementation

TABLE 18.6 Sample Schedule for Integrating Resistance Training and Plyometrics

	Resistance training	Plyometrics
	High-intensity upper body	Low-intensity lower body
	Low-intensity lower body	High-intensity upper body
	Low-intensity upper body	High-intensity lower body
	High-intensity lower body	Low-intensity upper body

TABLE 18.4 Appropriate Plyometric Volumes

Plyometric experience	Beginning volume*
Beginner (no experience)	80 to 100
Intermediate (some experience)	100 to 120
Advanced (considerable experience)	120 to 140

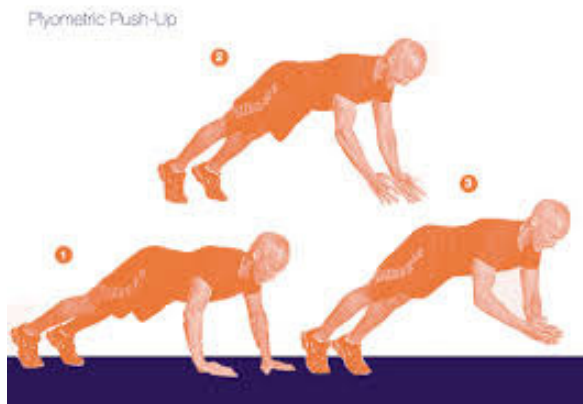
*Volume is given in contacts per session.

- ▶ Program length: most programs range from 6 to 10 weeks; however, improvements can be seen in vertical jump height in as little as 4 weeks.
- ▶ Should **ALWAYS** be performed first after a brief warm-up such as dynamic and mobility drills. **NEVER PERFORM STATIC STRETCHING BEFOREHAND!**

Examples for Endurance Enthusiasts

► Upper Body:

- Medicine Ball Chest Passes: 4 sets, 6 reps, 1 min rest
- Supine Medicine Ball Reactive Throws: 4 sets, 6 reps, 1 min rest
- Plyo Push-ups: 2 sets, 6 reps, 1 min rest



Examples for Endurance Enthusiasts

► Lower Body

- Box Jumps: 4 sets, 6 reps, 1 min rest
- Split Jumps: 4 sets, 6 reps, 1 min rest
- Lateral Hurdle Jumps: 3 sets, 6 reps, 1 min rest



Examples for Strength Enthusiasts

- ▶ Specificity is key!
- ▶ Improve bench explosiveness:
 - ▶ Explosive/speed (light) form work, pause bench, cluster sets, chain bench, medicine ball drills, banded bench, plyo pushups, etc.



Examples for Strength Enthusiasts

- ▶ Specificity is key!
- ▶ Improve squat explosiveness:
 - ▶ Pause squats, box jump variations, countermovement jumps, depth jump variations, speed squats, cluster sets, Olympic lifts, prowler sprints, resisted sprints, medicine ball drills, chain squats, banded squats, etc.



Examples for Strength Enthusiasts

- ▶ Specificity is key!
- ▶ Improve deadlift explosiveness:
 - ▶ Pause deadlift, deficit deadlift, knee pulls, countermovement jumps, cluster sets, Olympic lifts, box jump variations, depth jump variations, prowler sprints, resisted sprints, chain deadlifts, etc.





Questions????