Plyometric Training
History of Plyometrics

- First formalized in the early 1960’s as a scientific training system by Dr. Yuri Verkhoshansky
- Earliest published use of the term seems to be in a Soviet publication in 1966
- Verkhoshansky favored the term ‘shock method’ to distinguish between naturally occurring plyometric actions in sport and the training system he devised to develop speed-strength
What are Plyometrics?

- Plyometric action basically consists of stimulating the muscles by means of a sudden stretch preceding any concentric voluntary effort.
- It is characterized by a reflexive action, referred to as *stretch-shortening action*, between the end of the eccentric braking phase, and the beginning of the concentric acceleration phase.
- Defined by an amortization phase of less than 0.15 sec.
- Not to be confused with the training system used to develop *speed-strength* (Mel Siff & Yuri Verkoshanki often used the term ‘powermetrics’).
- It occurs naturally in virtually all sporting actions.
Steps in Plyometric Action:

1. Initial momentum
2. Eccentric contraction
3. Amortization
4. Rebound phase
5. Final momentum
Why Plyometrics?

- Maximizing kinetic energy by increasing stored energy has shown significant increases in power output
- Assists in the development of speed and reactive ability
- Virtually all sporting actions are performed at high velocities
- Easy to implement
- Most athletes enjoy plyo’s, and therefore show positive results relatively quickly
Myths about Plyometric Training

**Myth**  
- Dangerous to joints  
- Complex drills or elaborate equipment must be used  
- High reps lead to fatigue resistance

**Truth**  
- SAID principle applies to joints (bone and cartilage building increases with impact)  
- Simplicity, technical correctness favored  
- High reps become jump training, not plyometric
Who should use Plyometrics?

- Running, jumping, throwing, changing direction and other ballistic motions are part of most anaerobic sports
- Aerobic sports can use low level plyometrics in conjunction with a resistance training program to increase anaerobic power

ANYONE wanting to run faster, jump higher, throw farther or move quicker can benefit from plyometric training!!
When to use Plyometrics:

- A plyometric program should be implemented in an athlete's off-season and pre-season phases.
- Plyometric training can occur in-season, but should be of less volume than off-season or pre-season.
- Lower level, less intense plyo’s should make up most of your off-season volume, while higher intensity plyo’s are performed in the pre-season.
- Generally done prior to weight bearing exercise, but can also be incorporated during weight lifting as supersets or complex sets.
- A speed, agility & plyometric ‘day’ can be incorporated into your program as well.
Preparation for training:

- Develop technique: Initial posture, landing posture
- Develop strength:
  - Lower body: Squat 1RM = 1.5xBW
  - Upper body: Bench 1RM = BW
    **or 5 clap push-ups in a row
- Develop speed:
  - Lower: squat 5 reps @60%1RM in 5 sec.
  - Upper: bench 5 reps @60%1RM in 5 sec.
- Develop balance
How to use Plyometrics:

- Repetitions should not exceed 5-8 in a particular set
- Should be preceded by a good warm-up involving the muscles to be activated
- Aim to increase speed of movement and reaction time before increasing the intensity of the exercise (drop height, etc…)
- Amortization phase must be extremely short (less than .15 sec.)
- Make sure to incorporate full rest periods
# PLYOMETRIC DEMAND RATING SCALE

<table>
<thead>
<tr>
<th>Rating</th>
<th>Recovery Time</th>
<th>Example</th>
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<tbody>
<tr>
<td>1 = Very Low Stress</td>
<td>Recovery very rapid.</td>
<td>Low amplitude jumps: jump rope, ankle bounces</td>
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<tr>
<td>2 = Low Stress</td>
<td>Recovery rapid. 1 day required.</td>
<td>Stair jumps or similar jumps onto elevated surface</td>
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<tr>
<td>3 = Moderate Stress</td>
<td>1-2 days for recovery.</td>
<td>Tuck jumps or similar jumps in which vertical displacement is 18 inches+</td>
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<tr>
<td>4 = High Stress</td>
<td>Recovery slow. 2 days required.</td>
<td>Hops or bounds for distance or similar long jumps</td>
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<tr>
<td>5 = Very High Stress</td>
<td>Recovery very slow. 3 days required. Highest nervous system demand.</td>
<td>Depth jumps or other similar shock type jumps</td>
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