COACHING WITH PLYOMETRICS

A Course for the Safe and Effective Application of Plyometric Exercise and Jump Training

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Power may be likened to a skilled act in which prime movers must be fully activated, synergists appropriately activated and antagonists suitably inhibited.


Thank you for choosing the NFPT Coaching with Plyometrics course for your advanced learning of this specific training method.

Some Background

Origin: Eastern Europe

Plyo- (prefix): More

Metric- (suffix): Measure

Plyometric- (Latin): Measurable Increases

The interest increased for this form of training during the 1970’s. Soviet Block athletes began to produce powerful and superior athletes in track and field, gymnastics and weightlifting. Other countries became interested in this training method after seeing the success of these athletes. The term Plyometrics was coined in 1975 by Fred Witt (Track and Field Coach). Plyometrics then became known to coaches and athletes as exercises or drills. This was aimed to link both strength and speed together to produce power in real life situations. In the 1980’s, coaches began using Plyometric exercises in sports like volleyball, football and weightlifting.

The term Plyometric is erroneously called ‘Jump Training’. It is important to remember that not all plyos are based on jumps, and not all jumps are Plyometric. The problem that developed was that most American coaches didn’t understand the science and application behind this method; they thought more was better. The result was unrealistic expectations turning into over training and higher risk of injuries.
Exercise is Medicine and Plyometrics is a Powerful Medicine

The American College of Sports Medicine (ACSM) has worked hard to help us understand that exercise is medicine. We must understand that Plyometrics and related forms of ballistic training are very powerful types of medicine. These ‘medicines’ can have serious potential for harmful side effects. Applying Plyometric ‘medicine’ to the wrong client is the same as a doctor prescribing a powerful drug or an invasive medical procedure inappropriately. They have the same consequences and liabilities.

Dangers & Pitfalls of Plyometrics

Plyometrics play a very powerful role when training and improving an athlete’s ability to perform explosively. It also helps individuals who need to develop their power or rate of force production (e.g. certain military and law enforcement personnel). Some fitness activities, such as sprinting or jumping rope, have Plyometric components that are appropriate for the general public. Plyometrics specifically trains and improves the myostatic capabilities of the body. This is the type of training that is the subject to this course. Plyometrics have no place in general fitness applications. Unfortunately, amongst the general population, jump training, Olympic style weightlifting, and Plyometrics have become very popular.

Many certified fitness professionals have taken to Plyometric training inappropriately with little or no relevant education; CrossFit, P90X, un-certified sports coaches, and even some average health clubs tend to fall into this category. This course was created as a correction to this growing, industry-wide problem. After taking this course, as a better practitioner, you will know how to train using Plyometrics, and more importantly, who to train Plyometricly. We don’t want to discourage you from using Plyometric training; we just want you to do it the right way with the right clients. This will make you a more effective trainer or coach and protect your clients and athletes. It will also help protect you from the legal ramifications to which so many of your peers are being exposed by utilizing Plyometrics inappropriately.

The first chapter of this course will teach you how to assess physical readiness for training, guidelines for choosing appropriate Plyometric exercises, and progressions. It is important to know that Plyometrics are contraindicated for most individuals. Even individuals with the physical capability and desire to do Plyometrics can be ill-served by this type of training. This is because very few people (e.g. speed/power athletes) have training objectives that substantially benefit from this type of training.

When one of your general fitness clients ask you to duplicate the ‘plyo workout’ that they saw you conduct with an athlete, or that they saw on YouTube, you need to be able to explain the risk vs. reward as it relates to Plyometrics. Yes, high risk does equal high reward, but the high risk of injury produces high rewards that are specific only to those who need to train for speed/power events. Remind overzealous clients that an increased vertical jump or a faster 40-yard dash may seem like good objectives, but they are capabilities that can be more appropriately and safely improved through other types of training. Plyometrics has an unavoidable higher risk of injury.
Chapter 1
The History and Exercise Physiology of Plyometric Training

Mechanism Behind Plyometrics

Plyometrics = movements that achieve maximal force in the shortest possible time.

This definition is correct but leaves much to the imagination. To better help new trainers understand the true meaning, we explain it as “a loop consisting of forceful ground contact followed by a coordinated forceful movement in the opposite direction”. The less contact time with the ground the better the result.

Muscle Spindles are the main stretch receptors in the muscle. When a muscle is forcefully and rapidly stretched, the muscle spindles initiate a stretch reflex response. These responses produce power outputs that greatly exceed that of simple volitional muscular contractions.

Types of Muscle Contraction

Eccentric: The tension developed in the cross-bridges are less than the external resistance. The lengthening of a muscle (group) resulting in an increase in the angle between two (or more) segments across an articulation (extension).

Isometric: The tension in the cross-bridges equals the resistance in shortening, and the muscle length remains relatively constant.

Concentric: The total tension developed in all the cross-bridges of a muscle is sufficient to overcome any resistance to shortening. The shortening of a muscle (group) resulting in a decreased angle between two (or more) segments across an articulation (flexion).

During many sports related skills a *quasi-isometric contraction is achieved briefly between the eccentric phase and concentric phase. This will allow great lengthening in tendons during ground contact by an involuntary flexion or extension of the joint. This results in tremendous power output because a tendon is capable of involuntarily producing forces over 2 times the capability of muscle in less time.

During a Plyometric exercise, energy is stored during the eccentric/quasi-isometric pre-ground phase. During early-ground contact, energy is partially recovered during the involuntary concentric muscle/tendon response.

NOTE: A quasi-isometric contraction is our way of describing the moment right before the change of direction. During this extremely short period of time it is almost like an isometric contraction as opposing muscles change roles.
If the anticipatory eccentric/quasi-isometric contraction is not immediately followed by an involuntary concentric muscle/tendon response, then the energy stored can be lost and dissipate as heat. This diminishes the Plyometric value.

The Rate of Force Development, RFD is crucial for optimal performance. This measures the rate at which force is developed. The time it takes to achieve peak force is usually greater than the contact time.

Types of Strength

*Starting strength* is the muscles’ ability to overcome inertia by creating enough force to initiate movement. This applies to the initial force a sprinter uses off the line or a weightlifter picking a barbell off the floor. This is considered to be concentric.

*Stopping strength* is the body’s ability to absorb force via the muscle-tendon system; think of a running back planting the foot and ‘cutting’ to change direction. This is considered an eccentric contraction.

*Elastic strength* is the ability of the muscle-tendon system to absorb force within the stretch-shortening cycle, to overcome the force in a relatively short *amortization* time and to explosively move the body in the opposite direction.

Stretch-Shortening Cycle

*Stretch Shortening Cycle* (SSC): Utilizes the energy storage capabilities of the Series Elastic Component (SEC) and stimulates the stretch reflex. This cycle facilitates a maximum increase in muscle recruitment over a minimal amount of time.

SSC involves three distinct phases:
1. Eccentric Phase
2. Amortization Phase
3. Concentric Phase

*Eccentric Phase*: involves preloading the agonist (prime mover) muscle group(s). This is also known as the deceleration phase. The eccentric phase will tap into the stored elastic energy when done properly.

*Amortization Phase*: The time from the end of the eccentric phase to the initiation of the concentric phase (ground contact).

*Concentric Phase*: The PNF / CNS reflexive response to the eccentric and amortization phases where energy stored in the SEC is used for muscle contraction. *Inefficient movement will result in the loss of this elastic energy, which will dissipate as heat.*
Importance of the Amortization Phase

This phase is crucial in allowing greater power production; therefore, its duration must be kept short.

*Remember: If the amortization phase lasts too long, the energy stored during the eccentric phase dissipates as heat and the benefit is lost. The stretch reflex will not increase muscle force capabilities during the concentric phase if ground contact time is too long, i.e. Great, high jumpers are on the ground for approximately 0.12 seconds.

Importance of the Landing Phase

The landing phase starts as soon as the muscles start to experience an eccentric contraction. The rapid eccentric contraction serves to stretch the elastic components of the muscle/tendon complex (MTC) and activate the stretch reflex. A high level of eccentric strength is needed during the landing phase. Inadequate strength will result in a slow rate of MTC stretch and less activation of the stretch reflex.

Proper Landing Technique

Developing 'Proper Landing Technique' is a key aspect of injury prevention and safe execution of Plyometrics.

As a general rule, an athlete should not be jumping if they do not know how to land. A good landing involves the knees remaining aligned over the toes, hips back, trunk inclined forward slightly, the head neutral, and the back flat. This establishes a good center of gravity.
If the center of gravity is offset from the support base, the loss of balance will result in loss of energy; directionally lost energy will hinder performance and may cause injury.

When an athlete is learning to do Plyometrics for the first time they should focus on the box jump and depth drop landing. Focus on being able to move out of a landing before moving on to more intense drills. Depending on the athlete, this could take between 2 days and 3 weeks.

Micro-hurdle Plyometrics progression (linear or lateral) athletes land in the athletic position driving the heels into the ground. Doing this correctly increases the speed of eccentric loading and decreases time in the amortization phase. Initiating taking off by driving the heels into the ground will force the glutes to activate and begin the positive direction of force application by hip extension.

In bounding Plyometric athletes land on the ball of the foot making ground contact underneath or slightly behind the center of mass. As ground contact is made through the extending leg, the leg continues to drive down and back decreasing time in the amortization phase. The athlete should feel as if they are driving the heels into the ground in the opposite direction of the comfortable direction of movement. This will take full advantage of fascial reflexes that protect the anatomy and increase force and speed.

Use the athletic position, with emphasis on the heels for landing to help absorb shock to joints. Athletes should progressively learn eccentric loading as opposed to landing forcefully too soon. Proper landing also avoids any twisting or sideways motion to joints.

**Landing Surface**

Plyometrics can be performed indoors or outdoors. The landing surface should be able to absorb some of the shock of landing.

Field turf or thick enough rubber flooring/track lanes are good indoor surfaces as well as the sprung wood floors found in basketball courts and many aerobics studios. Plyometrics are done on the grass and turfs if performed outdoors.

Jumping on concrete or asphalt can lead to knee, ankle, hip and back problems, and therefore these surfaces should be avoided.

**Minimum Strength Requirements**

*Lower Body Plyometrics:*
Movement technique should be adequate and athlete’s 1RM squat should be at least 1.5 times his or her body weight before bounding type Plyometrics are applied.

*Upper Body Plyometrics:*
Athletes should be able to maintain neutral alignments throughout their body during high-speed Plyometric movements.

The athlete must be coordinated to perform safe Plyometrics. It is not just about being strong. The key is great motor control. If an athlete can’t pass the basic tests, do not move forward to a Plyometric program.

**Importance of Strength and Flexibility**

1) Poor coordination and poor strength can result in loss of stability when landing.
2) Poor flexibility and mobility will inhibit a full range of motion and will disrupt eccentric loading.

3) Lack of flexibility will result in a higher risk of injury.

4) Early fatigue can also become a problem.

*Lack of these two elements will result in a decrease in performance and an increased chance of injury.

**Minimum Speed Requirements**

Speed is an important component when performing any Plyometric exercise because of the amortization phase of the SCC. The less contact time the better.

An athlete must be able to perform five squats (lower body plyo's) and five repetitions of the bench press (upper body plyo’s). This must be done with 60% of their body weight in less than 5 seconds, or a display of a high level of coordination during low level plyo’s in order to move on.

Note: Participation in Plyometrics should be delayed until minimum requirements are met.

**Minimum Balance Requirements**

Assessing balance is important because many lower body Plyometric drills require the athletes to move in nontraditional movement patterns (backward, skipping, single leg drills).

*Beginner*: Stand on one leg for 30 seconds.

*Advanced*: Perform a single-leg half squat in proper alignment without falling for 30 seconds.

**Importance of Joint Stability and Mobility**

Many professionals overlook this part of the equation. If a joint is unstable or lacks mobility the athlete will have improper form during movements. Poor form creates compensation patterns and greatly increases chance of injury. A good example is your ankle, it needs to be neutral during Plyometric training. The same is true while playing sports. Look for joint instability and tightness during the balance tests and simple movement screenings.

**Importance of Recovery**

Plyometric training is strictly anaerobic and utilizes the ATP-CP energy system, allowing maximum energy to be stored in the muscle before an explosive movement is performed.

In order to stay in the ATP-CP energy system, the duration of effort should be 6 seconds or less.

Recovery should be complete between each set. Depending on the athlete, recovery should be approximately 2-5 minutes. You can measure the athletes’ recovery by monitoring his/her heart rate.

*If sufficient recovery is not allowed, then the activity will be more aerobic, the quality and explosiveness of the movement will suffer. (CHU)*
Chapter 2
Fundamental Plyometric Warm Ups and Exercises

The following section breaks the warm ups down into very general categories and are arranged in order of difficulty. Subsequent to the general dynamic warm up break down, there are some general warm ups for sports. We offer videos for many of the general movements, but not all of the advanced exercises are explained or demonstrated because this is a foundation level course. The majority of exercises contained in this course are best learned in a live environment after completing this course. Our goal is to introduce you to the truth about Plyometrics and provide a learning base. This course is not intended to create experts in Plyometrics. The next step, after completing this fundamental course, is to practice the simple moves learned here and supplement your education through additional reading and live course work.

Dynamic Warm-up for Movement Preparation

1) Used to develop fundamental movement skills.

2) Used to increase circulation, elasticity and CNS activation.

3) Helpful in establishing motor patterns that will carry over to the development of speed and jumping ability. (CHU)

4) Performed as a skill enhancement drill, aimed at reinforcing motor patterns, and not as conditioning drills.

5) Performed over distances of 10 to 20 meters.

Why No Static Stretching?

Do not do any static stretching as a warm up for Plyometrics. Through experience in the industry, our team of professionals have found that most fitness enthusiasts, and even trainers, insist that 3-5 minutes on the stationary bicycle and static stretching are a proper warm up. What these individuals fail to realize is that increasing body temperature alone may have some benefit, but it is not enough. Despite popular belief, improvement and optimization are not one and the same. Although the body may be warm, the muscle groups need to be specifically warmed up through active and dynamic movements, not by static stretching. Once your warm up is completed properly, you move into the event or routine.

- Scientific evidence demonstrates that static stretching of muscle decreases isometric and dynamic muscle strengths at different velocities.
- Isometric strength is important for stability during complex movements.
- Dynamic strength has obvious importance when it comes to actual movement.
  - This means you will be slower and weaker on tasks that are fundamental to high-level performance.

Static Stretching Acutely Impairs

- The muscle and nervous systems ability to perform slow-speed, high force movements such as power lifting.
• The muscles and nervous systems ability to perform high-speed, lower force movements such as jumping & sprinting.
• Research also demonstrates that balance, reaction time and overall movement time are negatively affected.
• Static stretching also reduces muscular endurance. This is important for endurance athletes.

**Classification & General Progression of Plyometric Exercises**

- Jumps-In-Place
- Footwork Drills
- Standing Jump
- Multiple Hops and Jumps
- Skipping Drills
- Lunging Drills
- Bounding
- Box Drills
- Box Drills w/Multiple Ground Contacts
- Depth Jumps

**Jumps-In-Place:**
- Done with relatively low intensity
- Provides stimulus for developing a shorter amortization phase by requiring the athlete to rebound quickly from each jump using the proper mechanics
- Performed one after another, with a short amortization phase

**Footwork Drills:**
- Start with simple drills at slow speed and build up
- Require hip movement and quick changes in direction such as shuttle drills, multidirectional side shuffle drills, and “drop” step drills
- Reinforces proximal to distal muscle firing sequences
- Simple drills are great warm ups

**Standing Jumps:**
- Stresses single maximal effort
- May be repeated several times, but full recovery should be allowed between each effort

**Multiple Hops and Jumps:**
- Combine skills developed by jumps-in-place and standing jumps
- Requires maximal effort but are done one after another

**Skipping Drills:**
- Practices reciprocal movements that are required during efficient running
- Will warm-up the athlete and prepare them for more complex drills

**Lunging Drills:**
- Dynamic movements where the athlete must explode off the ground as soon as contact is made. The force generated by the leading leg must be so great that the athlete returns to starting position. The back-planted leg is mainly for stabilizing and balance and really shouldn’t help.
- Jumping split squats or explosive multi directional lunges are great choices
Bounding:
- Exaggerates (under the proper mechanics) the normal running stride to stress the direction of force application and recovery of the running stride cycle
- Used to improve stride length and frequency (without over-stride)
- Typically performed for distances greater than 20 yards

Box Drills:
- Combine multiple hops and jumps with depth jumps and incorporate both horizontal and vertical components.

Depth Jumps:
- Use the athlete’s body weight and gravity to exert force against the ground
- Perform by stepping out of the box, dropping to the ground, then jumping back up to the height of the box
- The key to performing this exercise and decreasing the amortization phase is to stress the speed in the action of the arm, just before ground-contact. Then begin driving down into the ground with your heels.

Considerations for Determining Maximum Depth Jump Height
If the height of the box is too great for the intramuscular coordination in the sequence of lower body and core activation, then the legs spend too much time absorbing the impact of the landing. This inhibits the ability to reverse the eccentric loading quickly enough to take advantage of the SEC and the stretch reflex. Thus, it has no training benefit and increases the risk of injury.

Determining Maximum Depth Jump Height
In order to determine the depth jump height, you must measure an athlete for a standing jump-and-reach (vertical jump test). The athlete then performs a depth jump from an 18-inch box while trying to attain the same standing jump-and-reach score.

If the athlete reaches this height with proper mechanics, the athlete may proceed to a higher box. If the athlete fails to reach their jump score, then that box becomes their jump height. If an athlete cannot rebound from an 18-inch height but he/she displays good mechanics then they could have a low level of intramuscular training adaptation or a weak core.

Principles of Warming Up
The warm up is meant to mirror the proper recruitment/firing order of the lower body muscles during sprinting and jumping.

Part 1: Hip Flexors, Quadriceps and Glutes
Part 2: Hamstrings
Part 3: Abductors
Part 4: Adductors

Within each part or muscle group, the muscles are:
A.) Activated
B.) Dynamically Stretched
Order of Standard Plyometric Warm-Up

1. Hip Flexors, Quadriceps and Glutes
   A) Activation:
   Forward jog / backward jog (w/ or w/out arm circles) 2x 20 yards
   Forward jog backward snap skip (with arm action) 2x 20 yards
   Forward jog / backward reach run 2x 20 yards

   B) Dynamic stretch:
   Heel-to-butt raise 5x each leg
   Angled lunge-twist-reach 5x each leg

2. Hamstrings
   A) Activation:
   Butt kickers 2x 5 yards
   Linear strait leg bound (mini-bounds) 2x 20 yards

   B) Dynamic Stretch:
   Strait leg march 2x 5 each leg
   Inverted toe touch 2x 5 each leg

   2 point starts 75% 2x 20 yards

   Linear leg swings 10x each leg
   Lateral leg swings 10x each leg

3. Abductors
   A) Activation:
   Skip (in-place) 5x each leg
   Carioca quick-step 2x 20 yards

   B) Dynamic stretch:
   Leg cradle 5x each leg

4. Adductors
   A) Activation:
   Groin Skip 5x each leg
   Lateral Gallop 1x 20 yards each direction

   B) Dynamic Stretch:
   Sumo Squat 5x
   Forearm to instep 5x each leg
   Iron cross 5x each leg
   Prone scorpions 5x each leg
   2 point starts 50% 2x 20 yards
Basics for Designing a Plyometric Program

This section is meant to introduce you to some basic principles. Plyometrics are extremely detailed oriented and can be dangerous. Students need a live class to execute almost all of these exercises. Our goal here is an introduction, so please do not start adding bounding exercises to your 50 year old clients routines!

Begin: A period of preparation into cycles with specific goals, i.e. 6 week cycle beginning with pretest.

Goal: Increase distance in the standing triple jump.

Cycle Ends: Post test to see if goal was obtained.

An effective program accomplishes specific goals through the manipulation of 5 variables:
1. MECHANICS
2. INTENSITY
3. VOLUME
4. FREQUENCY
5. RECOVERY

MECHANICS
For beginners, take it slow. Introduce simple movements that will progress into true Plyometrics. For example, try a single jump onto and off of a box. Have them master the landing before attempting to explode into repetitive jumps.

INTENSITY
The type of Plyometric exercise performed determines intensity. The exercises range from simple technique work to highly complex and stressful exercises.

Intensity can be increased by:
Progressing from technique work to athletic movement application drills: increasing the height of the platform, or covering greater distances for longitudinal jumps.

Intensity order from low to high:
Jump-in-place, standing jumps, multiple hops and jumps, box drills and depth jumps, linear and lateral bounding.
It is important to account for time of year when training athletes because intensity may need to be lower in season.

VOLUME
This is the total work performed in a single workout session or cycle.

Volume Measured by: Counting foot contacts. The warm-ups are generally not included in the number of foot contacts when calculating volume.

FREQUENCY
We broke the plyometrics into three categories below. We suggest doing each category one time per week for a total of three plyometric workouts each week.
RECOVERY
This is the most overlooked aspect of most training programs. Recovery is the key variable for determining whether Plyometrics will develop power or muscular endurance. Foam rolling and static stretching should be done at the end of each workout. *A Lymphatic drain is a good idea to do at the end of each week. Plyometrics are extremely fatiguing to the CNS. They train two anaerobic energy systems, ATP-CP and the lactic acid cycles. Plyometrics that last 4 -15 seconds depletes the energy stores in the creatine phosphate system. Therefore, sufficient rest or recovery is needed (e.g. 2-5 min) between sets. Beginners should rest 48hrs between plyometric sessions.

*A simple Lymphatic drain protocol is to ride the bike at 90 rpm for 90 seconds and then immediately lye on the floor with your legs up on the wall for 90 seconds, repeat four times for a total of 12 minutes.

Drills
In an effort to keep it simple, we broke the drills into three categories; Lateral Acceleration, Linear Acceleration and Max Velocity. Many of these exercises are for more advanced athletes and should not be prescribed without taking live courses on proper technique. In addition to the three categories, we have included some generic programs to help you understand how athletes train.

Lateral Acceleration

Mini Hurdle Series (Lateral)
*Stick and Hold the Landing, 2x5.
*Double Tap- Ground contacts before jumping into next hurdle, 2x5.
Bound – As little ground contact as possible, this is done extremely quick, 2x5.

Single Leg Series (Lateral)
*Stick and Hold Landing Single Leg- Shift weight into each heel upon landing to activate gluteus maximus. Hold landing for a second, 2x8.

Wedge Step (Ladder)
Athlete stays low in athletic position (squat or defense position). Athlete laterally moves forward, each leg crossing over the other into each step of the ladder. Weight should be on the leg closest to the ladder;this is so the opposite leg can cross over into thigh block and back into the ladder.

Lateral Wall Drill
Arms are extended on the wall. Shoulders are retracted and core held tight. Gluteus maximus are squeezed on inside of the legs. Outside leg comes up to thigh block and then drives back down to the ground. Leg does not cross mind line of the body (refer to the belly button as reference). Single equals one ground contact. Double equals two ground contacts. Triple equals three ground contacts and landing on the opposite leg.

Lateral Acceleration with Resistance
Athlete mimics the wall drill while moving laterally. Coach applies resistance as athlete propels forward with as many ground contacts as possible. Face both directions.
**Linear Acceleration**

Mini Hurdle Series  
*Stick and Hold the Landing*, 2x5.  
*Double Tap*—Ground contacts before jumping into next hurdle, 2x5.  
*Bound*—Little ground contact as possible and done extremely quick, 2x5.

Single Leg Series  
*Stick and Hold Landing Single Leg*—Shift weight into heel upon landing to activate glutes. Hold landing for a second, 2x8.

Wall Drills (Linear)  
Single—45 degree angle on the wall. Athletes’ heels should be slightly off the wall while the gluteus maximus is squeezed for hip extension and shoulders in retraction. Then bring the single leg up to thigh block.  
Double equals both feet come up to thigh block as quickly as possible.  
Triple, you begin on one side while making three ground contacts as quickly possible. This should end on the opposite leg.

**Max Velocity**

Mini Hurdle Series  
*Stick and Hold the Landing*, 2x5.  
*Double Tap*—Ground contacts before jumping into next hurdle, 2x5.  
*Bound*—Done extremely quick with little contact to ground as possible, 2x5.

Single Leg Series  
*Stick and Hold Landing Single Leg*—Shift the weight into heel upon landing to activate gluteus maximus. Then hold landing for a second, 2x8.

Max Velocity Wall Drill  
Athlete must be in the same position as lateral acceleration wall drill.  
*Front Side Mechanic*—Athlete starts in thigh block, foot extends slightly passed the knee and drives downward with a pulling motion. The middle of the foot to the front of the foot is the only part to make ground contract. Gluteus maximus is squeezed tight on planted leg that is closest to the wall, 2x10.  
*Back Side Mechanic*—Athlete must start with foot on the ground. The heel travels up the planted leg. Heel comes up to the butt and makes a circle around the knee into thigh block. Athlete must hold this position, 2x10.  
*Full Mechanic*—Athlete combines both front and back side mechanic into one, 2x10.

Ankling  
Athlete must make tiny circles around their ankles and will maintain dorsiflexion. The toes come up to the shins.  
Athlete must make as many ground contacts as possible with very small steps.

*“Peg Leg”*  
Athlete must perform the ankling movement.  
Athlete must then incorporate the full mechanic and then into the ankling movement.
Single Leg - One full mechanic and change legs after ten yards.
Double - Two full mechanic strides.
Continuous - Nonstop full mechanic with one leg and then alternate to other leg.
Alternate - Full mechanic right leg and then immediately follow with the full mechanic left leg.

Plyometric Drills
http://fitandfunctional.com/videos/plyometrics-drills

Plyometric Exercises
http://fitandfunctional.com/videos/plyometric-exercises

Plyometric Exercises Advanced
http://fitandfunctional.com/videos/plyometrics-advanced

Warm Ups
http://fitandfunctional.com/videos/stretching-videos
<table>
<thead>
<tr>
<th></th>
<th>Beginner</th>
<th>Intermediate</th>
<th>Advanced</th>
<th>Intensity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Off-season</td>
<td>60-200 Depends on phase</td>
<td>100-250 Depends on phase</td>
<td>120-300 Depends on phase</td>
<td>Low-High Depends on Ability of athlete</td>
</tr>
<tr>
<td>Preseason</td>
<td>60-120 This does not include sprints</td>
<td>100-200 This does not include sprints</td>
<td>100-200 This does not include sprints</td>
<td>Mod-High</td>
</tr>
<tr>
<td>In-season</td>
<td>Volume for power is half that of off season</td>
<td>Volume for power is half that of off season</td>
<td>Volume for power is half that of off season</td>
<td>Mod-High</td>
</tr>
<tr>
<td>Championship Season</td>
<td>Super compensation workouts 48 – 72hrs before competition</td>
<td>Super compensation workouts 48 – 72hrs before competition</td>
<td>Super compensation workouts 48 – 72hrs before competition</td>
<td>High</td>
</tr>
<tr>
<td></td>
<td>Example 1</td>
<td>Example 2</td>
<td>Example 3</td>
<td></td>
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<tr>
<td>----------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td>-----------------</td>
<td></td>
</tr>
<tr>
<td><strong>Monday</strong></td>
<td>Weight training</td>
<td>Plyo's (LE)</td>
<td>Plyo's (LE)</td>
<td></td>
</tr>
<tr>
<td><strong>Tuesday</strong></td>
<td>Plyo's (LE)</td>
<td>Weight training</td>
<td>Plyo's (UE)</td>
<td></td>
</tr>
<tr>
<td><strong>Wednesday</strong></td>
<td>Weight training</td>
<td>Plyo’s (UE)</td>
<td>Running Program</td>
<td></td>
</tr>
<tr>
<td><strong>Thursday</strong></td>
<td>Plyo's (LE)</td>
<td>Weight Training</td>
<td>Plyo’s (LE)</td>
<td></td>
</tr>
<tr>
<td><strong>Friday</strong></td>
<td>Weight training</td>
<td>Plyo’s (LE)</td>
<td>Rest</td>
<td></td>
</tr>
</tbody>
</table>
## Chapter 3
### Sport Specific Plyometric Exercise

#### Basketball

<table>
<thead>
<tr>
<th>Jumps-in-Place</th>
<th>Standing Jumps</th>
<th>Multiple Hops</th>
<th>Box Drills</th>
</tr>
</thead>
<tbody>
<tr>
<td>DL and SL jumps, hops, bounds (L - M)</td>
<td>Standing Long Jump (L) and Standing Jump &amp; Reach (M)</td>
<td>Linear Micro-hurdle (L)</td>
<td>Eccentric Landing (L)</td>
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<tr>
<td>Squat Jump, w/ or w/out Resist (H)</td>
<td>Micro or macro-hurdle Jumps (L-M)</td>
<td>Inside edge ladder (M)</td>
<td>SL Push Off, Lat Push Off, Box Blast (M)</td>
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<tr>
<td>5-5-5 Squat Jump (VH)</td>
<td>Lateral long Jump With Two leg or single leg application inside edge / outside edge (M)</td>
<td>Rim Jumps (M-H)</td>
<td>Box jumps DL or SL (M)</td>
</tr>
<tr>
<td>Jump Rope Progressions (L)</td>
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<td>Standing Long Jump w/ Hrdl Hop (VH)</td>
<td>Box jump bound DL or SL (M-H)</td>
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<tr>
<td>Depth Jumps</td>
<td>Bounding</td>
<td>Medicine Ball Exercises</td>
<td>Zig-Zag Drill (VH)</td>
</tr>
<tr>
<td>Drop from box to vertical jump, or Jump to Box (L-M)</td>
<td>Acceleration bounding No arm action (M-H)</td>
<td>Over-Under (L)</td>
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<tr>
<td>Depth Jump w/ Rotation (H-VH)</td>
<td>Acceleration bounding With Arm Action (M-H)</td>
<td>Low Post Drill (H)</td>
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<tr>
<td>Depth Jump to Rim Jump (VH)</td>
<td>Inside / outside edge line bounding Inside / outside edge ladder bounding</td>
<td>Depth Drop w/ Pass and Shoot (VH)</td>
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### Baseball and Softball

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<thead>
<tr>
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<th>Standing Jumps</th>
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<tr>
<td>DL and SL jumps, hops, bounds (L - M)</td>
<td>Standing Long Jump (L)</td>
<td>Linear Micro-hurdle (L)</td>
<td>Lateral Step-Up (L)</td>
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<td>Micro or macro-hurdle Jumps (L-M)</td>
<td>Lateral Micro-hurdle (L)</td>
<td>Box jumps DL or SL</td>
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<tr>
<td>Lateral long Jump With Two leg or single leg application inside edge / outside edge (M)</td>
<td>Inside edge ladder</td>
<td>Box jump bound DL or SL</td>
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<td>Depth Jumps</td>
<td>Bounding</td>
<td>Medicine Ball Exercises</td>
<td></td>
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<tr>
<td>Drop from box to vertical jump, or Jump to Box (L)</td>
<td>Acceleration bounding No arm action (M-H)</td>
<td>Over-Under (L)</td>
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<td>Acceleration bounding With Arm Action (M-H)</td>
<td>Overhead Throw (L-M)</td>
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<td>Inside / outside edge line bounding</td>
<td>Inside / outside edge ladder bound</td>
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<td>Inside / outside edge ladder bounding</td>
<td>Side Throw (L-M)</td>
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<td>Kneeling Side Throw (M)</td>
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## Downhill Skiing

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<tr>
<td>Hip-Twist Ankle Hop</td>
<td>Linear micro-hurdle stick landings (L)</td>
<td>Linear Micro-hurdle Hops (M)</td>
<td>30 (L)-60 (L-M)-or 90 (H)-Second Box Drills</td>
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<tr>
<td></td>
<td>Lateral micro-hurdle stick landings (L)</td>
<td>Lateral Micro-hurdle hops (M)</td>
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<tr>
<td>Tuck Jump With Heel</td>
<td>Inside / outside edge sticking landings (L-M)</td>
<td>Inside edge ladder hops (M)</td>
<td>Multiple Box-to-Box Jumps with Single leg Landing (H)</td>
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<tr>
<td>Kick (M)</td>
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<td>Outside Edge ladder hops (M)</td>
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<tr>
<td>5-5-5 Squat Jump</td>
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<td>Wedge step ladder drills</td>
<td>SL Box jump to DL bound</td>
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<tr>
<td>(M-H)</td>
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<td>Inside edge ladder cont.</td>
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<tr>
<td></td>
<td></td>
<td>Outside edge ladder cont.</td>
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<tr>
<td>Depth Jumps</td>
<td>Bounding</td>
<td>Medicine Ball Exercises</td>
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<tr>
<td>Depth drop bound</td>
<td>Micro-hurdle bounds DL and SL (M-H)</td>
<td>Vertical toss (L-M)</td>
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<tr>
<td>(M-H)</td>
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<td>In-line lunge lateral wall slams (L-M)</td>
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<tr>
<td>Depth drop double</td>
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# Football

<table>
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<th>Box Drills</th>
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<tbody>
<tr>
<td>5-5-5 Squat Jump stick landing, hops, bounds (M-H)</td>
<td>Micro-hurdle jumps (L-M)</td>
<td>Linear Micro-hurdle Hops (M) Lateral Micro-hurdle hops (M)</td>
<td>30 (L)-60 (L-M)</td>
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<tr>
<td>5-5-5 Squat Jump stick landing, hops, bounds (M-H)</td>
<td>Standing Long Jump With linear / Lateral Sprint (M)</td>
<td>Inside edge ladder hops (M) Outside Edge ladder hops (M)</td>
<td>Wedge step ladder drills Inside edge ladder cont. Outside edge ladder cont.</td>
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<td>5-5-5 Squat Jump stick landing, hops, bounds (M-H)</td>
<td></td>
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<td>Zigzag Drill (H)</td>
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<tr>
<td>Depth Jumps</td>
<td>Bounding</td>
<td>Medicine Ball Exercises</td>
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</tr>
<tr>
<td>Drop From Box (L)</td>
<td>Micro-hurdle bounds DL and SL (M-H)</td>
<td>Quarter-Eagle Chest Pass (M-H)</td>
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<tr>
<td>Depth Jump With Blocking Bag (H)</td>
<td>Acceleration bounding No arm action / arm action (M-H)</td>
<td>Medicine Ball Grab (M-H)</td>
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<td>Depth Jump With Pass Catching (H)</td>
<td>Inside / outside edge line bounding Inside / outside edge ladder bounding</td>
<td>Power Drop (H)</td>
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<tr>
<td>Depth Jump With Pass Catching (H)</td>
<td>Lateral Acceleration bounding (position Dependent)</td>
<td>Catch and Pass With Jump-and-Reach (H)</td>
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# Gymnastics

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<tbody>
<tr>
<td>Tuck Jump With Heel Kick (M)</td>
<td>Micro-hurdle jumps (L-M)</td>
<td>Hexagon Drill With Barriers (M-H)</td>
<td>Pyramiding Box Hops (M-H)</td>
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<tr>
<td>Split Pike Jump (H)</td>
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<td>Linear Micro-hurdle Hops (M)</td>
<td>Lateral Micro-hurdle hops (M)</td>
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<tr>
<td>Depth Jumps</td>
<td>Bounding</td>
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</tr>
<tr>
<td>Jump From Box (L)</td>
<td>Acceleration bounding no arm action / arm action (H)</td>
<td>Over-Under (L)</td>
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<tr>
<td>Depth Jump (L-M)</td>
<td>Micro-hurdle bounds DL and SL (M-H)</td>
<td>Underhand Throw (L)</td>
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<tr>
<td>Single Leg Depth Jump (H)</td>
<td></td>
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<td>Power Drop (H)</td>
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<tr>
<td>Incline Push-up Depth Jump (M)</td>
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<tr>
<td>Handstand Depth Jump (H)</td>
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## Track & Field: Jumping Events

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<th>Multiple Hops</th>
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<tr>
<td>Single Foot-Side Ankle Hop (L)</td>
<td>1-2-3 Drill (M)</td>
<td>Standing Long Jump With Hurdle Hop (M-H)</td>
<td>Multiple Box-to-Box Jumps with Single leg Landing (H)</td>
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<tr>
<td>5-5-5 Squat Jump (M-H)</td>
<td>Standing Long Jump With Sprint (H)</td>
<td>Three-Point Stance With Single Leg Hurdle Hop (H)</td>
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<tr>
<td>DL and SL jumps, hops, bounds (L-M)</td>
<td>Micro-hurdle jumps (L-M)</td>
<td>Linear Micro-hurdle Hops (M)</td>
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<td>Lateral Micro-hurdle hops (M)</td>
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<td>Depth Jumps</td>
<td>Bounding</td>
<td>Medicine Ball Exercises</td>
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<td>Depth Jump to Prescribed Height (L-M)</td>
<td>Alternate Bounding With Single Arm Action (M-H)</td>
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<tr>
<td>Jump From Box (L)</td>
<td>Alternate Bounding With Double Arm Action (M-H)</td>
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<td>Depth Jump (L-M)</td>
<td>Combination Bounding With Single Arm Action M-H)</td>
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<td>Depth drop bounds (H)</td>
<td>Combination Bounding With Double Arm Action (H)</td>
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<td>Combination Bounding With Vertical Jump (H)</td>
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<td>Single Leg Bounding (H)</td>
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## Track & Field: Sprints

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<td>Single Foot-Side Ankle Hop</td>
<td>Standing Long Jump (L)</td>
<td>Double Leg Hops (M)</td>
<td>Lateral Box Jump (L-M)</td>
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<tr>
<td>(L)</td>
<td>Standing Long Jump With Sprint (H)</td>
<td>Barrier Hops (Hurdle Hops) (M-H)</td>
<td>Multiple Box-to-Box Jumps with Single leg Landing (H)</td>
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<td>Standing Triple Jump (H)</td>
<td>Single Leg Hops (H)</td>
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<td>Standing Triple Jump With Barrier Jump</td>
<td>Wave Squat (H)</td>
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<td>(H)</td>
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<tr>
<td>Depth Jumps</td>
<td>Micro or macro-hurdle Jumps (L-M)</td>
<td>Zigzag Drill (H)</td>
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<tr>
<td>Depth Jump to Prescribed</td>
<td>Linear Micro-hurdle Hops (M)</td>
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<td>Height (L-M)</td>
<td>Lateral Micro-hurdle hops (M)</td>
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<td>Jump From Box (L)</td>
<td>Bounding</td>
<td>Medicine Ball Exercises</td>
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<tr>
<td>Depth Jump (L-M)</td>
<td>Alternate Bounding With Single Arm Action (M-H)</td>
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<td>Depth drop bounds (H)</td>
<td>Alternate Bounding With Double Arm Action (M-H)</td>
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## Track & Field: Throwing Events

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<tr>
<td>Single Foot-Side Ankle Hop (L)</td>
<td>Micro-hurdle jumps Lateral DL or SL (L-M)</td>
<td>Lateral Micro-hurdle hops DL or SL (M)</td>
<td>Linear and Lateral box jumps DL or SL</td>
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<tr>
<td>Depth Jumps</td>
<td>Bounding</td>
<td>Medicine Ball Exercises</td>
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<tr>
<td>Jump From Box (L)</td>
<td>Lateral Ladder bounding series (M-H)</td>
<td>Trunk Rotation (L)</td>
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<tr>
<td>Depth Jump With 180-Degree Turn (M-H)</td>
<td>Micro-hurdle bounds DL and SL (M-H)</td>
<td>Backward Throw With Jump to Box (M)</td>
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<td>Depth Jump With 360-Degree Turn (H)</td>
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<td>Kneeling Side Throw (M)</td>
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<tr>
<td>Depth Jump With Backward Glide (H)</td>
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<td>Power Drop (H)</td>
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**Wrestling**

<table>
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<tr>
<td>5-5-5 Squat Jump (M-H)</td>
<td>Micro-hurdle jumps DL or SL Linear and Lateral (L-M)</td>
<td>Linear Micro-hurdle Hops DL or SL (M) Lateral Micro-hurdle hops DL or SL (M)</td>
<td>Lateral Step-Up (L)</td>
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<tr>
<td>Split squat jumps (M)</td>
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<td>Three-Point Stance With Single Leg Hurdle Hop (H)</td>
<td>Multiple Box-to-Box Jumps (M-H)</td>
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<td>Hexagon Drill With Barriers (M-H)</td>
<td>Multiple Box-to-Box Squat Jumps (H)</td>
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<td>Single Leg Hops (H)</td>
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<td>Moving Split Squat With Cycle (M)</td>
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<td>Micro-hurdle bounds DL and SL (M-H)</td>
<td>Medicine Ball Grab (M-H)</td>
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