



TAS ATHLETICS

Plyometric Training

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What are Plyometrics?

The term plyometrics is used to describe a mode of training where rate of force development, peak power, and change of direction are of the highest importance. This form of training takes advantage of our muscle's stretch-shortening cycle (SSC). Once the muscles are stretched, energy that accumulates in the muscle is available for use. The period of time between stretching and shortening, or eccentric and concentric phases, is called the amortization phase. The shorter this phase, the more stored energy the muscles can utilize, thus increasing the rate at which force is produced, peak power, and change of direction speed. New neural adaptations are also created through plyometric training, which allow for faster and greater activation of motor units within the muscle. This means when you need your body to react, it's able to do so with efficiency and power.

Proper Application

Although plyometrics have the potential to greatly enhance dynamic performance, they should be applied with a greater emphasis on quality rather than quantity. High rep plyometric training is very fatiguing on the nervous system, which can lead muscular fatigue and a greater risk of injury, especially in those with limited experience in weight training or a poor foundation of basic strength. Proper mechanical landing against ground reaction forces, or those forces pushing back against the body during plyometric movements, plays a vital role in the development of proper jumping and landing technique. In adolescents, ground reaction forces can be as high as five times one's body weight when performing drop jumps from height (McKay, 2004). These forces only increase as the athlete grows and gains more mass. This is why it's critical that athletes learn at a young age how to properly land using low-impact and high-impact plyometrics.

Plyometrics can include upper and lower body movements, so long as the movements emphasize the SSC to produce the desired outcome. Jumping for high reps and increasing the tempo minimizes full hip extension, which is the primary driver of the vertical jump and sprinting (Bach, 2016). Doing so will greatly reduce the capacity of the athlete to produce maximal force production, limiting the exercise's desired effect. Within sport, plyometric movements are performed quite often, but with the most dynamic ones interspaced with other, less dynamic movements. Therefore, in training sessions, athletes should be exposed to bioenergetics and movement patterns similar to what they would experience in a game or match. Allowing for recovery between bouts of plyometric exercises allows the muscle to recover and for the athletes to give at or near maximal output for the next rep or set.

Best Plyometrics for Athletes

Please come see us in the Tiger Health and Wellness Center to learn more about these exercises!

Jumping Jacks	Lunge Jumps
Ladder Work	Dot Drill Sequence
Front Box Jump	Lateral Box Shuffle
Side Box Jump	Single Leg Bound
Weight Lateral Jump	Depth Jump
Broad Jump	Seated Box Jump
Skater Jump	Box Broad Jump

References

Bach, Eric. "Tip: Use Box Jumps The Right Way." *T NATION*, 11 May 2016,
www.t-nation.com/training/tip-use-box-jumps-the-right-way

McKay, H, et al. "Ground Reaction Forces Associated with an Effective Elementary School Based Jumping Intervention." *Journal of Sports Medicine*, vol. 39, no. 10, ser. 14, 2005, pp. 10–14. 14,
doi:10.1136/bjism.2003.008615.

See below for additional studies on the effects of plyometric training:

Chelly M.S. et al. Effects of in-season short-term plyometric training program on leg-power, jump-and sprint performance of soccer players. JSCR 24: 2670-2676, 2010
<https://www.ncbi.nlm.nih.gov/pubmed/20844458>

de Villarreal E.S. et al. The effects of plyometric training on sprint performance. JSCR 26: 575-584, 2012
<https://www.ncbi.nlm.nih.gov/pubmed/22240550>

Meylan C. and Malatesta effects of in-season plyometric training within soccer practice on explosive actions of young players. JSCR 23: 2605-2613, 2009
<https://www.ncbi.nlm.nih.gov/pubmed/19910813>