

Lower Body Plyometric Training for Female Athletes

Joe Giandonato, MS

Like many of you, I loathe working out and training in commercial gyms. I also despise gimmicky workout programs like P90X, which is probably more harmful than wading in a pool Tony Horton's diarrhea. I'll save my rant on trashy workout programs for another time. But right now, I'd like to bring attention to a situation that is probably dumber and more problematic than The Situation and his ab training video to fitness and strength and conditioning professionals, and that is what I witnessed Tuesday night: an overweight woman performing high intensity plyometrics under the not-so watchful eye of an incompetent and uncaring personal trainer.

Box jumps, depth jumps, squat jumps, all performed in succession, making this situation much more dangerous than a couple of grenades sharing a hot tub with The Situation. Maybe the personal trainer was a former client of Jay Schroeder, formerly of Evo Sport, who transformed a scrawny Arizona State walk-on named Adam Archuleta into an NFL first round draft pick, or maybe she had just picked up a few books written by Dr. Donald Chu, one of the industry's foremost experts on plyometric training, skipping to the juicy exercises in the back of the books. Whatever the case may be and whether our dolt of a trainer was actually certified or not; implementing plyometric exercise into a program continues to stir a great debate amongst coaches, trainers, and physical therapists. Questions that are often posed include when a client, athlete, or one rehabilitating from injury – a much trickier situation, should begin a plyometric program. Loading parameters are often debated. People want to know how much intensity, volume, and frequency is appropriate. Your average idiot personal trainer at a commercial gym most likely doesn't know how to address and adjust these variables within a plyometrics program. Heck, if they were anything like me when I first started training people, they'd have them do an assortment of depth jumps, following Branch Warren's high-volume leg workout copied out of Flex.

Also, alluding a very thorough and thought-provoking article featured on EliteFTS a couple of years ago on ACL injuries in female athletes, written by Brian Grasso, Director of the IYCA, <http://www.elitefts.com/documents/acl.htm>, how should a plyometric program be designed and progressed for female athletes? And that's where we begin.

In his article, Grasso highlights the high occurrence of ACL injuries amongst female athletes, an injury that remains most prevalent and frequent in women. An overwhelming majority of ACL injuries are sustained without the incidence of contact, occurring when the athlete is landing from a jump, decelerating, or pivoting on one foot while running (2). ACL injuries can be caused by a myriad of things, which may include: an increased Q-angle, which is the relation among the pelvis, leg, and the foot; it should be noted that the average Q-angle in adults is 15 degrees (3). Recruitment patterns, connective tissue integrity, and bilateral deficits also have implications on ACL injuries. Insufficient neuromuscular control of the lumbo-pelvic-hip complex has also been proven to be a factor in ACL injuries (4). Before coaches and trainers can implement plyometric

protocols, all of the aforementioned factors must be addressed, unless of course you're a clipboard toting personal trainer at a commercial gym.

Here are some guidelines for coaches and trainers to follow, before moving onto those really cool seemingly gravity defying jumps you see Adam Archuleta perform on Jay Schroeder's Freak of Training DVD.

1. Strengthen the VMO to address knee stability, thus reducing the degree of the Q-angle. Additionally, strengthening the muscles of the posterior chain, specifically the hamstrings will help achieve knee stability (5).
2. Perform appropriate stretches and soft tissue work to improve flexibility and soft tissue extensibility. This will ease the burden of the connective tissue, which bears the brunt of muscular imbalances and tightness.
3. We've all heard that women are more "quad dominant". While women certainly lack the quad development of IFBB male bodybuilders, their quadriceps are typically activated first in movement. An EMG study, performed by the Department of Physical Therapy at Duquesne University found that women contracted quadriceps earlier during lower body weight-bearing exercises (6), thus increasing anterior tibial translation, which may induce ACL strain, inviting the possibility of injury. Conversely, men recruit the hamstrings first, which helps stabilize the knee during landing and change of direction activities.
4. Strengthen the core and focus on achieving hip mobility. A lack of hip mobility can be a factor in causing lower back pain, which can be a causative factor in knee ligament injury risk in men (4).
5. Plyometric training protocols can be implemented in a rehabilitative setting or with achieving enhanced performance in mind. If you are recovering from an ACL injury, it is best to reach out to a licensed physical therapist, certified athletic trainer, or a certified strength and conditioning specialist for exercise prescription, or at the very least, guidance throughout your recovery process.

Here are some basic guidelines to follow when jumping into plyometrics.

1. Learn to properly land. Remember, Force absorption precedes force development. What good is a fast car without brakes? Initially, you are retraining your body's neuromuscular control, teaching the muscles of the posterior chain to absorb the impact from landing.
2. Perform only low intensity jumps initially, progressing to higher intensity jumps throughout the program. Examples of low intensity jumps include: jumping in place, standing hops, and low box jumps. Higher intensity jumps usually add another movement, such as depth jumps.
3. Perform no more than 40 total jumps during the session, utilizing a work-rest ratio of 10 seconds. Ideally, you should keep your repetitions low during each set, ensuring that good form is maintained. Low intensity plyometrics are not meant to be a fatiguing exercise! Healthy athletes who are advanced in their training, may incorporate more volume (in upwards of 140 jumps per session).

4. You may substitute a maximum effort lower body training day with a plyometric training session. One to two sessions per week is sufficient, tapering off during the pre-season.
5. Plyometrics may be used by anyone who is healthy enough. They provide the trainee some variety and still serve as a solid training stimulus.

Remember the aforementioned guidelines and you should be set. Also, please refrain from slapping the token idiot personal trainer at your commercial gym when they have their clients, who have probably been sedentary since the Reagan Administration, perform the same exercises Joe DeFranco had Brian Cushing perform in preparation for his shortened 2010 NFL Season. Instead, tell them to check out this article. Better yet, don't infuriate yourself by training at a commercial gym!

Though his work was not directly cited in this article, Dr. Donald Chu's research on plyometric training has profoundly impacted the physical therapy, athletic training, and strength and conditioning communities. His books can be found here:

http://www.donchu.com/plyo_products/#books

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7. Meira E, Brumitt J. Plyometric training considerations to reduce knee injuries. *J Str Cond.* 2005; 27(2):78-80.
8. Joe Giandonato is a Philadelphia-area healthcare professional and personal trainer, he holds an M.S. in Exercise Science and has nearly a decade of personal training experience. Presently, he trains clients at Broad Street Fitness in Philadelphia, PA, before and after his day job as an office grunt. He is also pursuing a MBA and is a certified as a Performance Enhancement Specialist (PES) through the National Academy of Sports Medicine and is preparing for the CSCS examination.