Training the Female Athlete

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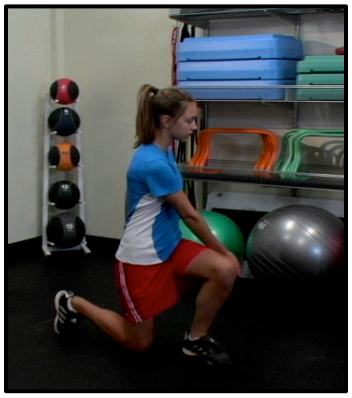
1. Introduction
    a. Through my experience as a strength coach over the last 11 years, I have often been faced with recurring trends that affect my female athletes performance. Whether in team training, fitness small groups or as individual athletes that were referred to my personal training business I found that many females were struggling with similar challenges and dealing with similar injury events that interrupt the season of play and cause great disappointment. As strength and conditioning coaches and trainers we are primed in today's performance training environment to overcome these current trends and positively impact the future female athlete.

2. Objectives
    a. Make fitness professionals, physical education instructors, group leaders and coaches more effective in training the female athlete.
    b. Address key factors that influence a female's ability to perform at high levels or successfully train to reach new goals in performance.
    c. Identify some of the key differences that set them apart from their male athlete counterparts
    d. What specific training strategies will allow fitness professionals to be more effective with the female athlete
    e. Give examples of exercises that target some of these key objectives
3. Key Concepts that effect females in fitness and athletics
    a. Four to six times as many females get Anterior Cruciate Ligament knee injuries compared to males (8-10 for non-contact ACL injury)
    b. Upper Body deficits play a large role in lack of intensity during strength training and limit performance gains
    c. Perception of training intensity is significantly greater in females at relative training intensities compared to relatively equal male athletes
    d. Lack of integrating key training components and strategies leaves weak spots in many training programs



4. What we know about ACL injuries and the female athlete
    a. In reviewing current research we can find explanations for this high rate of ACL injury that involve anatomical and physiological differences between sexes, neuromuscular deficits and lack of proper deceleration and landing technique.
    b. Also, researchers recognize and take into consideration the explosion of the number of female athletes that are competing and their increasing level of play.

    c. Quick facts:
        i. Female athletes injure their knees at a rate four to six times higher than men.
        ii. Female basketball and soccer players sustain three to four times more knee injuries males in the same sport, and six times more non-contact ACL injuries
        iii. It has been reported that “30,000 high school and college-aged females sustained knee injuries in 2004”
        iv. Reports by the NCAA show that female volleyball players injured their ACLs 73% more often in actual game situations than in practice.
        v. Most injuries occur during deceleration, when the female athlete is stopping, cutting, or landing.
        vi. As strength coaches, we see three of the more common intrinsic factors which we can make a tremendous impact through proper training.
        vii. The female’s ligament dominance is described as when weakness in the muscles of the lower extremity causing the ligaments to handle excessive loads to stabilize the knee joint.
        viii. Although the Q-Angle (the angle of the quadriceps muscles due to the angle of the femur as it enters the hip socket) has not proven to be a conclusive cause of ACL injury, experts have proven that it does alter patellofemoral tracking and cause anterior knee pain.
        ix. Another common issue is the tendency for females to collapse into valgus (Knock-kneed position) knee positions. Proper neuromuscular training can certainly be beneficial in resisting this potential problem.
        x. And lastly when addressing the third intrinsic factor strength coaches can impact is the imbalance to which females rely more heavily on the quadriceps muscle group as opposed to the hamstring and gluteal groups. This can be seen when female athletes land more flat-footed, hips extended and knees forward that creates increases anterior shearing stress of the femur over the tibia.

VII. Training Strategies for Better Fitness and Injury Prevention

1. Whether it is one or a combination of these factors next we will look at strategies to tackle injury prevention and resistance.
2. Integration of several key training components that include muscle strength, core and joint stability, proprioception, and improved motor learning for landing and deceleration.
3. When addressing strength training it is important to first focus on movement education and technique of the exercises. It is quality of movement that allows us to progressively increase the intensity and workloads
4. It is important to overload the body for strength gains but not to the points of diminishing returns.
5. Many females also do not have the training age and experience compared to males so it is imperative to spend the time addressing movement patterns and technique.
6. In addressing strength training techniques it is important to integrate traditional strength training with functional training modalities.
7. Traditional strength training has a long history of teaching athletes to proper load their body with or with out artificial support such as a machine or bench in order to maximize safety and success in lifting heavy loads. This is valuable when training to increase absolute strength and hypertrophy. Examples of exercises would be
    a. Back Squat
    b. Front Squat
    c. Dead Lift
    d. Dumbbell Lunges
    e. Cable Single-Leg Hamstring Curl
8. Functional strength training uses exercises that improve neuromuscular efficiency of the kinetic chain in order to stabilize, reduce force and produce force in multiple directions at varying speeds.
9. This includes balance work to improve proprioception and core stability that must be successfully engaged in order to create proper dynamic stability for lower body movements.
10. Functional exercises stimulate and load the same muscles that produce athletic movements. A primary benefit is that they activate the nerves that affect muscle firing and provide the muscle memory needed to perform difficult tasks.
11. Although it provides benefits, a single-joint exercise like the knee extension may not prepare the nervous system in the same way that a multi-joint exercise like a walking lunge, step up on box, power-up lunge, or multi-planar weight transfer exercise does.
12. Examples of functional exercises for the lower body are:
    a. Multi-planar Lunges
    b. Multi-planar reaching Lunges
    c. Decelerating Box Steps – Multi-planar
    d. Cross over box step-up
    e. Supine Hip Bridges
    f. Side Box Step-Up
    g. Side Lunge with Reach
    h. Three-Way Weight Transfer

i. Single Leg Deadlift
j. Single Leg Multi-planar Reaches
k. Squat with Rotation
l. Lunge to Balance
m. Lunge with upper body Rotation
n. Unilaterally Loaded Lunges (resistance on 1 side of the body)
o. Unilaterally Loaded Squats
p. Band or Cable Resisted Lunges (Vector based loads, resistance create force in a specific direction)
q. Band Resistance to reverse collapsing patterns for Squat, Lunge and single Leg exercise important when prescribing functional exercises that the value of the exercise is determined by the connection to the target activity or target purpose.

13. Teaching Deceleration Technique prior to high intensity plyometrics
    a. A major challenge for many athletes and especially female athletes is the ability to properly decelerate in preparation for changes of direction or in order to load the lower body for a powerful, explosive movement such as a jump, bound or short sprint.
    b. It is important to include drills and exercises that include these techniques and coaching points:
        i. Make sure that the female athlete understands how to properly drop the center of mass whether landing or decelerating a locomotive movement. (for females this means making sure the use both hips and knees to drop and absorb force)
        ii. Teach the proper shin angle or leg angle during changes of direction.
        iii. This means that if and athlete decelerates to change direction, the lead leg or main decelerating leg should be angled in the direction you are redirecting.
        iv. Practice low impact landing techniques and then move into dropping from box focusing on soft landing and proper joint alignment.
        v. Progress from 2-foot landing techniques to 1-foot landing techniques including forward, lateral and transverse movements.
        vi. For your exercise menus, here are some examples of exercises that focus on deceleration and landing training:
            1. drop squats in place
            2. jump-and-Stick
            3. Split jump and stick
            4. side shuffle and stick
            5. Drops of 8” Box (progressing to higher box when consistently successful)-Multi-planar
            6. Single Leg Lateral edge drops off Box / Medial Single leg Drops off Box
            7. Band Resisted Drop Squats
            8. Band resisted Step-Stick in multiple directions
            9. Short run-drop-stop drills
            10. Upper Body Strength

c. When training the female athlete there are some real differences in physical characteristics compared to males. The simple fact is that male athletes typically have more muscle mass naturally in the upper body. For this reason, it is generally easier forthem to express strength and power with the upper body.
d. For the female athlete, it is often the feeling of failure that not only limits training the upper body for strength but it is the lack of training background that is usually sociologically emphasized in many cases.
e. Typically we see that with the lack of foundation for training the upper body we must include stabilization strength for the core as well as the shoulder complex.

14. Key considerations for training the female for upper body strength are:
    a. There must be good core strength to stabilize the body to allow force generation for the upper body
    b. You must be able to train full movement patterns to increase neuromuscular function and muscle strength
    c. Closed chain exercises train joint stability for the upper body and create core strength demands
    d. Eccentric focused movements and upper body deceleration movements significantly enhance the upper body's ability to handle loads at varying speeds
    e. Thoracic Spine Mobility is important for overhead athletes and will ensure proper posture while loading the shoulder complex, especially during rotational motion such as a throw or swing.
    f. Some exercises that will help strengthen the upper body for females and prepare them for heavier loads as well as more explosive movements are:
        i. HandLifts from Plank Position
        ii. Clock walks in Push Up Position
        iii. Partner Wheel Barrel
        iv. Stability Rolls
        v. 4-2-1 Push Ups
        vi. Lateral Hand Touches
        vii. Drop downs from Push Up Position
        viii. Upper body Shuffles
        ix. Walkovers wit Medicine Ball
        x. Wall Passes with Rebound
        xi. Dive Bomber Push Ups/Hindu Push Ups
        xii. Standing Cable Presses and Pulls
        xiii. Explosive Push Ups

15. Programming Strategies
    a. There are some recommendations for integrating some of these training strategies in order to make program planning successful. The science of periodization has been proven to be effective and as experienced coaches this is something we have come to depend on. An example for

long-term plan:

b. Phase 1- General conditioning
    i. Use 4 exercise circuits which contain functional movements and traditional movements (Lower body, Upper body, Core Stability, Balance/Proprioception)
    ii. As general conditioning progresses integrate traditional and functional training exercises
c. Phase 2- Basic Strength
    i. Create super-sets which begin with a traditional strength move followed by a functional strength move that relates to the first exercise (ex; Front Squat to Lateral Box Step Up)
    ii. Use a transition in between sets that targets lower intensity functional emphasis for active recovery but also for the neuromuscular benefit for over all program (Upper body Stability rotations if lower body was taxed during main super-set

d. Phase 3- Strength/Hypertrophy
    i. Use a functional movement set at the beginning of each traditional strength exercise programmed for that day (complete 2-3 sets of Multi- planar Lunges with Reach as Specific Warm Up for Traditional Deadlifts)
    ii. Make sure you complete the Specific Warm Up then continue on to your traditional exercise set
e. Phase 4- Power Development or Preparation
    i. Less advanced athletes will focus on a traditional Strength exercise followed by a low level explosive movement or deceleration movement (Back Squat to Drop Squat and Hold)
    ii. More advanced athletes will focus on super-setting more traditional strength exercise with an explosive movement for the same general movement pattern.
    iii. Use a transition from a different movement group for active recovery and to add a functional training component
f. Phase 5- Unloading and Recovery/Regeneration
    i. Focus on general conditioning and circuits that allow for lots of variety in movement
        1. Create fun challenges through functional training and game-like environment
        2. Learn FUN conditioning skill-based games and use them to actively recover and back-off high intensity work or competition
        3. If available, use pool workout or play other sports to engage the athlete and change momentum.

16. Conclusion
    a. Whether in sports or in fitness activity many females are struggling with similar challenges and injury events that interrupt the their season or

ability to reach specific performance goals. This session discusses the specific challenges and gives you practical applications, exercises and programs that allow you to be most effective as the coach or fitness professional when working with female athletes of the future.

For Questions, References or Resources:

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