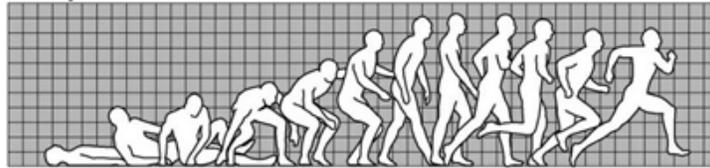


*Swanson McArthur Physical Therapy
& Aquatic Center*



Specializing in Orthopaedic & Sports Injury Rehabilitation

ACL Injury Prevention Program

Thank you for your interest and participation in Swanson McArthur Physical Therapy's ACL injury Prevention Program!

This program is **evidence based** (the information, education, and exercises have been studied and found to statistically reduce the potential for serious knee injuries). No program can guarantee to eliminate all potential for injury, but this program strives to reduce significantly **non-contact** knee injuries associated with the game of soccer.

Swanson McArthur Physical Therapy is a physical therapist owned and operated clinic serving the communities of Carmichael, Fair Oaks, Citrus Heights, Orangevale, Sacramento, Antelope, and Roseville for over 40 years.

2008 marked the start of the SMPT ACL Injury Prevention Program which focuses on female soccer players and includes educational seminars for coaches, parents, and athletes as well as on-field training. This soccer-specific program is designed to reduce the risks of ACL injuries utilizing education, exercises, and techniques to improve flexibility, strength, endurance, agility, power, balance, and **neuromuscular control**.

Running, cutting, and jumping are movements vital to the game of soccer. Inherent within these movements is the potential for injury if they are performed incorrectly. Non-contact ACL injuries often occur with the knee only slightly bent and in a valgus position (caving in). With highly skilled athletes playing longer seasons at a higher competitive level, the stresses at the knee can be significant. The research shows that differences exist between boys and girls in the way they run, cut, jump/land, and decelerate.

Our Philosophy: *"We must teach our soccer players the proper techniques of how to run, jump, land and move **prior** to teaching endless numbers of drills and exercises".*

Consider the following:

- Anterior cruciate ligament (ACL) injuries in high school female athletes have increased up to **80,000** per year.
- In 1972 300,000 girls played high school sports. By 2018, **3.4 million** did.
- ACL injuries peak in female athletes at the age of **16**.
- Female athletes are **2 to 9 times** more likely to experience an ACL injury than males(1).
- In females, **70%** of ACL tears are non contact (2).
- Athletes sport-specialize at a young age and now play single sport **year-round**.
- Riskiest non-contact injury sports: **Soccer**, volleyball, and basketball.
- Knee, hip, and foot positions combine to create unsafe **knee torque** (pivoting).
- One ACL injury costs about **\$38,000** which includes long term costs (6).
- Recovery time for ACL injury is approximately **1 year**.
- About **45%** of athletes do not return to competitive sport after ACL (6).
- ACL injuries often lead to a higher risk (**4 times**) of osteoarthritis, total knee replacement and impaired knee related quality of life at 5 to 25 years (6).
- Only **17%** of US female high school teams use injury prevention programs (6).
- **Anatomical factors:** smaller diameter ACL; A-shaped intercondylar notch.
- **Neuromuscular factors:** greater knee valgus angles, less knee flexion with deceleration, and land from a jump with less knee flexion (3) (4).
- Girls play soccer more “**upright**” - quad dominant - and underutilize hamstring and gluteal function.
- **Hormonal factors:** increased ligament laxity during specific phases of the menstrual cycle (5).
- Solution: Well controlled neuromuscular training for ACL injury prevention reduces the risk for ACL injury from **50-88%** in female athletes (6) (8).
- Coach or trainer-led programs are **statistically more beneficial** than non-supervised, individual programs (7).

Program:

General Frequency - 1 training day per week (25 minutes); 15 minutes before games; every 10 minutes **during** a game (Progressive movements at the half before starting the second half).

Specific Program Elements:

- Warm-Up
- Dynamic Stretching
- Strengthening
- Plyometrics
- Sport-specific Agilities
- Training/game
- Static Stretching (after all training/games)

Remember: It is important to use proper technique during jumping moves (jump straight up and down jumps without excessive side-to-side movement and aim for soft landings), decelerating and backwards running (knees bent and the body low), and pivoting/cutting avoid caving in of the knees.

Weekly Trainings

- **Warm Up** - jog sideline to sideline
- **Dynamic Stretching & Progressive movements**
 - **Dynamic Stretching** (1-7) then jog back to line. Move through **FULL ROM**.
 - **Progressive Movements**. Shuttle, skips, backward running, jumping headers, accelerated runs.
 - **Use this time for a discussion about proper mechanics** within the first couple sessions; keep reinforcing throughout the season.
 - Give examples, pull someone up to demonstrate
 - **STAY LOW**
 - **Soft landing**
 - ADD something fun to the dynamic movements to stay interested/challenged
 - Example- Group direction change/reaction drills: Point and yell- sprint, back pedal, shuffle, jump, change of direction
- **Strength**
 - **Walking lunges**- for distance (cone to cone 15 yards)
 - **Nordic hamstrings**- 30x, pair up (big sister, little sister)--> not before game
 - **SL calf raises**- 30x, pair up
- **Plyometrics**
 - Can vary by age, use the line on the field, more concerned about proper landing mechanics NOT height
 - **Fwd/backwards jumps** B x25
 - **Side to side jumps** B x25
 - **Fwd/back jumps** **SL** x25- not before games

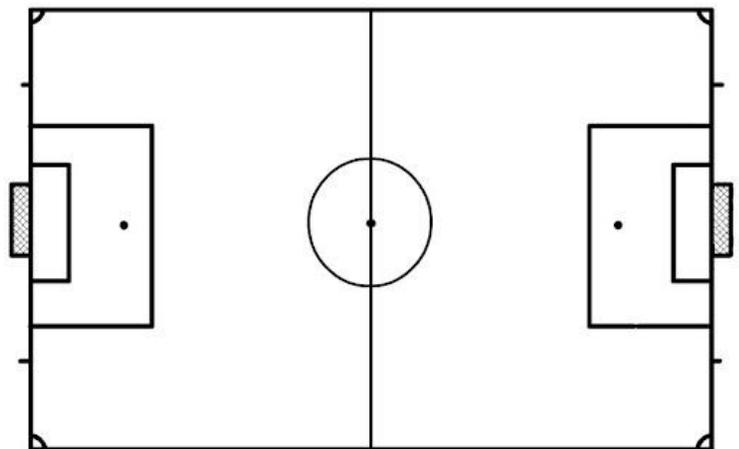
- **Scissor jumps** x25 - not before games
 - Jump together as a team, in unison
 - Add about 5 over the season once they get the hang of it and form improves
- **Mock headers** - without ball
- **Agility**- Weekly training (one day per week)
 - **Shuttle run** (zig zag pattern)
 - **Fwd/back run** (zig zag pattern)
 - **Cone drills**
 - Weaving with sprints, into zig zag
 - Acceleration, deceleration, get low, change of position
 - T test
 - Sprint up and then point to direction, shuttle to cone and then backpedal (challenges reaction time and movement quality)
 - Star drill
 - One person at a time- yell position, 5x back and forth and then sprint away
- **Soccer Training**
- **Cool down (static stretching)**

Before Games

- Dynamic & Progressive Movements - 3'
- Strengthening: Walking lunges and calf raises - x2 and 25x
- Plyos: Forward and back and side to side jumps - 20x each
- Agility: Two stations sideline to mid field
 - Incorporate: Lateral movements, accelerate, decelerate, quick feet, cutting

Soccer training/In Game

- Cones from bench toward corner flag with varying quick feet, high knees, shuttles, decelerating, backward movements
- In game- every 10 minutes→ players put bibs on
- Keeps players warmed up and ready to go
- **End of game- stretch with captains**



References:

1. Joseph, A. M., Collins, C. L., Henke, N. M., Yard, E. E., Fields, S. K., & Comstock, R. D. (2013). A Multisport epidemiologic comparison of anterior cruciate ligament injuries in high school athletics. *Journal of Athletic Training*, 48(6), 810-817. <https://doi.org/10.4085/1062-6050-48.6.03>
2. Griffin, L. Y., Agel, J., Albohm, M. J., Arendt, E.A., Dick, R. W., Garrett, W. E., Garrick, J. G., Hewett, T. E., Huston, L., Ireland, M. L., Johnson, R. J., Kibler, W. B., Lephart, S., Lewis, J. L., Lindenfeld, T. N., Mandelbaum, B. R., Marchak, P., Teitz, C. C., & Wojtys, E. M. (2000). Noncontact anterior cruciate ligament injuries: Risk factors and prevention strategies. *Journal of the American Academy of Orthopaedic Surgeons*, 8(3), 141-150. <https://doi.org/10.5435/00124635-200005000-00001>
3. Hewett, T. E., Myer, G. D., Ford, K. R., Heidt, R. S., Colosimo, A. J., McLean, S. G., Van den Bogert, A. J., Paterno, M. V., & Succop, P. (2005). Biomechanical measures of neuromuscular control and valgus loading of the knee predict anterior cruciate ligament injury risk in female athletes: A prospective study. *The American Journal of Sports Medicine*, 33(4), 492-501. <https://doi.org/10.1177/0363546504269591>
4. Hewett, T. E., Myer, G. D., & Ford, K. R. (2004). Decrease in neuromuscular control about the knee with maturation in female athletes. *The Journal of Bone and Joint Surgery-American Volume*, 86(8), 1601-1608. <https://doi.org/10.2106/00004623-200408000-00001>
5. Herzberg, S. D., Motu'apuaka, M. L., Lambert, W., Fu, R., Brady, J., & Guise, J. (2017). The effect of menstrual cycle and contraceptives on ACL injuries and laxity: A systematic review and meta-analysis. *Orthopaedic Journal of Sports Medicine*, 5(7), 232596711771878. <https://doi.org/10.1177/2325967117718781>
6. Petushek, E. J., Sugimoto, D., Stoolmiller, M., Smith, G., & Myer, G. D. (2018). Evidence-based best-practice guidelines for preventing anterior cruciate ligament injuries in young female athletes: A systematic review and meta-analysis. *The American Journal of Sports Medicine*, 47(7), 1744–1753. <https://doi.org/10.1177/0363546518782460>
7. LaBella, C. R., Huxford, M. R., Grissom, J., Kim, K., Peng, J., & Christoffel, K. K. (2011). Effect of neuromuscular warm-up on injuries in female soccer and basketball athletes in urban public high schools. *Archives of Pediatrics & Adolescent Medicine*, 165(11), 1033. <https://doi.org/10.1001/archpediatrics.2011.168>
8. Mandelbaum, B. R., Silvers, H. J., Watanabe, D. S., Knarr, J. F., Thomas, S. D., Griffin, L. Y., Kirkendall, D. T., & Garrett, W. (2005). Effectiveness of a neuromuscular and proprioceptive training program in preventing anterior cruciate ligament injuries in female athletes: 2-Year follow-up. *The American Journal of Sports Medicine*, 33(7), 1003–1010.