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ANAEROBIC A-LACTIC TRAINING:

SPEED COMPETITIONS TO PREPARE TO TAKE ON THE WORLD

BY RICHARD BUCCIARELLI

Upon receiving our pre-tournament training camp and official match schedule for the 2012 FIFA Women's U17 World Cup, one particular thing stood out to me right away – the number of days off in between matches. We had three days off in between our group matches, and (assuming we qualified) we would have a further four days off in between the last group match and quarterfinals, as well as another four days off between the quarters and semis. This extra time off between games at international competitions presents an interesting challenge for fitness coaches. Specifically, it boils down to determining which energy system (aerobic, anaerobic/lactic, or anaerobic/a-lactic) should be trained and what exercises should be used to provide the training stimulus. This article will examine the different options for training the body's three energy systems, and the rationale – or lack thereof – for training them during days off between matches.

1. Aerobic Energy System:

By the time a team has reached the finals stage of a major international tournament, the aerobic energy system (responsible for endurance and recovery between high intensity running/sprints) is about as developed as it is ever going to be; in order to see improvements in aerobic fitness, athletes would need 2-4 workouts per week for 4-6 weeks, so there is not enough time during an international tournament (lasting a maximum of four weeks) to see improvements in aerobic fitness through training. Furthermore, training the aerobic energy system in soccer typically requires a high volume of work, which can lead to over-use injuries and symptoms of over-training for players who are playing two or more games per week, as is the case during international tournaments. For these reasons, training the aerobic energy system on days off between matches is not practical or advisable.

2. Anaerobic / Lactic Energy System:

The anaerobic/lactic energy system helps soccer players to sustain long periods (45 or more seconds) of high intensity running/sprinting. This system is primarily responsible for the production, tolerance, and clearing/removal rate of lactic acid, which is a painful by-product of sustained high intensity running. During anaerobic/lactic training sessions, large amounts of lactic acid are produced, which can then take up to 36 hours to be fully removed from the body / exercising lower body muscles. Even within a long (6-8 month) competitive season, anaerobic/lactic training would only be done one day per week, due to the high training load and long recovery period required between workouts. Thus, training the anaerobic/lactic energy system in the days between matches is also not productive for soccer players.

3. Anaerobic / A-Lactic Energy System:

The anaerobic / a-lactic energy system, responsible for providing energy during short duration, high intensity activity (sprinting, jumping and kicking in soccer) is the one system that is most responsive to training in days off between competitions. Anaerobic / a-lactic training involves performing high/maximal intensity activities such as short sprints (which have a high force output and high speed of movement), while allowing for a lot of recovery between repetitions, which ensures maintenance of the high force output and speed of movement during the entire training session. Much of this type of training is aimed at stimulating the central nervous system (the body's connection between the brain and exercising muscles), so while the intensity is high, there is a lot of rest between repetitions, making the overall training load – and thus the chances of overuse injuries – much lower than with anaerobic/lactic training. Furthermore, repetitive high intensity movements stimulating the central nervous system have been proven to help keep the muscles (and connection between the brain and the muscles) fresh, enabling a higher rate of force production during competitions in a variety of sports, including soccer. These factors combine to make training the anaerobic / a-lactic energy system the ideal choice during international soccer tournaments.

The one variable which must be kept constant during anaerobic/a-lactic training, however, is a high speed of movement/rate of force production. If athletes performing short sprints are not running at 95-100 percent of their maximal running speed, the training adaptation will not be great enough to see any positive effects. Technology such as accelerometers or global positioning satellites (GPS) can measure athletes' exact running speeds; however, fitness coaches still must ensure that the athletes are motivated to run as fast as they possibly can in every repetition of every exercise during anaerobic/a-lactic training. One simple and effective way to accomplish that goal is to set up training exercises where two athletes compete with each other, in some form of a "race," with "rewards" for the winner and "punishments" for the loser. Turning speed exercises into a competition has been, in my experience, the best and most effective way to motivate players to run at their highest possible speeds. Often times, the simple fear of having to do 10 push-ups as a result of losing a race is enough to push

players past their thresholds!

Following are 2 examples of anaerobic/a-lactic speed competition exercises I used with the Canadian National Women's U17 team in the days off between matches at the 2012 FIFA Women's U17 World Cup in Baku, Azerbaijan. These exercises are a simple and effective way of preparing the central nervous system for optimal performance during international competitions.

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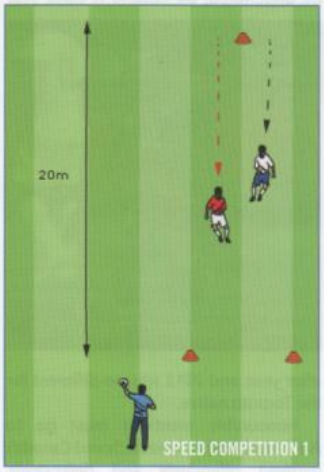
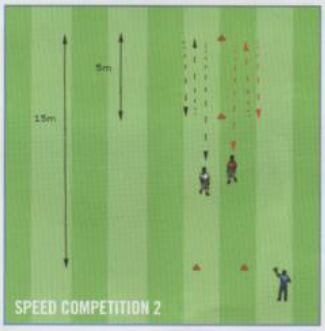


SPEED COMPETITION 1: LINEAR 20 METRE SPRINT

- Players split into groups of 12
- Six players on one side of the start cone, and six on the other side
- Six players use pinneys tucked into their shorts, sticking out, as "tails"
- "Tail" players start the exercise standing up; players on the other side "Chasers" start the exercise lying face down
- Coach stands behind the 20 metre gate, with two different color cones held behind the back (use green and red cones if possible)
- Coach starts the exercise by lifting a green cone
- When the green cone is lifted, both players begin sprinting towards the 20 metre gate (players only move when the green cone is lifted; not the red cone)
- If the "Tail" player gets through the gate first, the "Chaser" must do 10 push-ups' if the "Chaser" is able to pull out the piney (tail) of the "Tail" player before they get through the 20 metre gait, the "Tail" must do 10 push-ups
- Each athlete performs five sprints as a "Tail" and five as a "Chaser"
- Total of 10 repetitions of 20 metre sprints, with a work-to-rest ratio of 1:5



SPEED COMPETITION 2: LINEAR 25 METRE AGILITY SPRINT

- Set-up is the same as in exercise #1
- Gate is moved to 15 metres away, and a cone is placed five metres from the start cone
- Coach starts the exercise by lifting a green cone
- When the green cone is lifted, both players begin sprinting towards the five-metre cone, then back to the start cone, then forward again towards the 15 metre cone
- "Chasers" can only attempt to pull the pinneys from the "Tails" once both players have run to the five-metre cone and back to the start cone
- If the "Tail" player gets through the gate first, the "Chaser" must do 10 push-ups' if the "Chaser" is able to pull out the piney (tail) of the "Tail" player before they get through the 20 metre gait, the "Tail" must do 10 push-ups
- Each athlete performs five sprints as a "Tail" and five as a "Chaser"
- Total of 10 repetitions of 20 metre sprints, with a work-to-rest ratio of 1:5