

SOCCER FIT-FACTS

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7TH WORLD CONGRESS ON SCIENCE AND FOOTBALL

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LEARN ABOUT IN
THIS ISSUE:

- Physiology of Women's Soccer
- Optimal Kicking Mechanics in Soccer
- Choking Under Pressure
- Dealing with Heat Stress
- New and Improved Soccer Fitness Inc!



On May 26-31, 2011 in Nagoya, Japan, Richard Bucciarelli and Paolo Pacione attended and presented at the 7th World Congress on Science and Football. This event is aimed at individuals who have a specific interest in the scientific study and/or the practical performance of soccer players at either grass roots or the elite professional level. These include academics, full/part-time coaches, strength and conditioning specialists, physiotherapists, and sports medics. The Congress consisted of seminars, presentations, and workshops covering a wide variety of topics, including youth training and talent identification, sport nutrition, coordination and performance mechanics, testing and evaluation of players, and injury prevention.

Our Presentation: A Longitudinal Analysis of Speed Characteristics for Talented Youth Female Soccer Players: A Pilot Study:

Our Research:

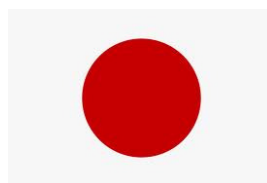
Speed, repeated sprint capacity, high intensity work capacity, have all been shown to be important predictors of performance in soccer, in the female game. In Canada, there are over 400,000 female soccer players playing at various different age groups, and levels of play in soccer. To date, there has been no longitudinal study that examined speed and high intensity running abilities — and specifically the differences in these abilities — between female soccer players at different levels of play in Canada. Our study was conducted to examine speed and high intensity running

ability in elite female soccer players. We conducted fitness tests on 14 female players, from a Regional high performance centre in Ontario. Data from these players was collected over a 3-year time span. The players were further categorized into two different groups: 1 group that made the junior (U17) National team (4 players in total) and 1 group that remained in the regional program (10 players in total). In the study we compared fitness test scores for players from these two different groups, over the 3-year time span. The test protocol used was designed by Dr. Jason Vescovi, Mr. Robert Rupf, of the Canadian Sport Centre of Ontario, and Mr. Bucciarelli and Mr. Pacione, and consists of the following tests:

- 20 metre linear sprint test (speed)
- 35 metre linear sprint test (speed)
- 10 x 20 metre sprint test (speed endurance)
- Yo-Yo Intermittent Recovery Test Level 1 (high intensity running capacity)

Our Findings:

Certain findings in our study were somewhat “predictable”. National team players were faster (20m sprint), had greater speed endurance (10x20m sprint test) and had better capacity for high intensity work (Yo-Yo test), than lower level players in the U14 age category. There are two possible explanations for this finding:



1. Female players playing at higher levels (Provincial and National teams) are receiving better physical training, combined with more physically demanding competition, and thus are showing greater improvements in physical fitness, or;
2. Provincial and National team coaches are selecting players who are bigger, stronger, faster, and more athletic.

While we suspect that both proposed explanations are true, more research into this topic is required before any definite conclusions can be made.

A second, less “predictable” finding from our study was that, among lower level female players, while speed, speed endurance and high intensity work capacity levels did not peak at the U14 age group (improvements were made in both the sprint and yo-yo tests), the players still did not reach the levels of their National team counterparts.

This finding is important, because it suggests that female players who are part of Provincial programs — a large proportion of the overall female National player pool in Ontario — are not receiving adequate physical training to stimulate improvements in speed, speed endurance, and high intensity work capacity to get to the National level.

OUR POSTER PRESENTATION:



A LONGITUDINAL ANALYSIS OF SPEED CHARACTERISTICS FOR TALENTED YOUTH FEMALE SOCCER PLAYERS: A PILOT STUDY

Rob Rupf¹, Paolo Pacione², Richard Bucciarelli³

Canadian Sports Centre Ontario, Canada¹, Ontario Soccer Association, Canada², Soccer Fitness Inc, Canada³



Introduction and Purpose

Previous literature on the growth and development of female soccer players has indicated that peak speed characteristics occur around the age of 16 (Loko J et al, 2003; Vescovi JD et al, 2010). However, these studies were cross sectional, and did not chart the progress of talented players. As a result, pilot work with a youth female soccer group has been started to examine longitudinally the speed characteristics of female youth soccer players, and determine if speed characteristics change over time amongst different levels of players.

Methods

Female soccer players (N=14) were recruited from a regional high performance center and performed a series of tests for three consecutive years (U14, U15, U16). Longitudinal data was created for a group that made the junior national team (NAT=4), and for those who remained at a regional level (REG=10). The tests performed were as follows.

20 Metre Linear Sprint (20SPRINT) – Infrared timing gates were set at the start and finish lines. Athletes began from a stationary position with one foot on the start line and sprinted maximally through the finishing gates. Three trials were performed with the fastest time recorded.

35 Metre Linear Sprint (35SPRINT) – Infrared timing gates were set at the start and finish lines. Athletes began from a stationary position with one foot on the start line and sprinted maximally through the finishing gates. Three trials were performed with the fastest time recorded.

Repeated sprint test (RSA) – Infrared timing gates were set at each end line 20 metres apart. Athlete performed ten sprints along the 20 metre course with 10 second recovery between each sprint. Time was recorded for each sprint with the mean time for the 10 sprints reported.

Yo-Yo Intermittent Recovery Test-Level 1 (YO-YO) – The 20 metre course and 5 metre recovery zone were marked with cones. Athletes traveled out and back on the course keeping pace with audible beeps from the Yo-Yo CD and had 10 seconds recovery between each shuttle (40 metres). A warning was given after the first unsuccessful shuttle and the test was terminated after the second. The final stage completed was recorded.

Statistics –A two-way ANOVA was used to compare differences in the tests amongst age groups and playing levels. The Turkey post-hoc test was used to identify significances between groups. The level of significance was set to $p < 0.05$. All data are reported as means \pm SD.

Results

Table 1. Physical characteristics of age groups.

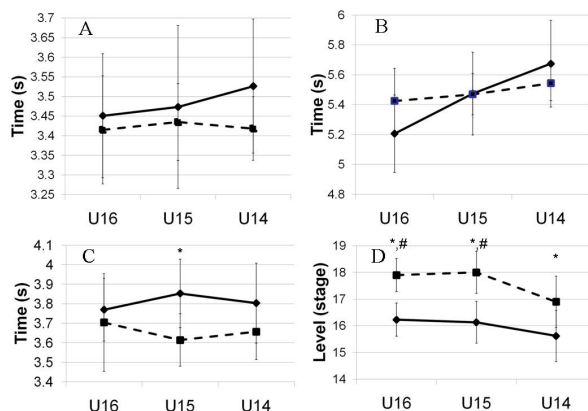
	Height (cm)	Body mass (kg)	BMI ($\text{kg}\cdot\text{m}^{-2}$)
U14	163.0 \pm 6.4	55.1 \pm 7.7**	20.7 \pm 1.4
U15	163.9 \pm 7.2	57.6 \pm 6.0	21.4 \pm 1.4
U16	165.4 \pm 6.8	62.3 \pm 6.1	22.8 \pm 1.8

**Indicate significant differences between age groups

The U14 players were lighter ($p < 0.05$) than at the U15 and U16 age categories. No differences in height and BMI were observed between the different years of testing, and no differences between NAT and REG were observed.

Results

Figure 1. Performance characteristics of NAT and REG players across different years. A) 20SPRINT time (s). B) 35SPRINT time (s). C) RSA average time (s) D) CMJ height (cm). *Significant difference between REG and NAT. # U16 and U15 age groups are significantly different from U14 age groups.



No significant differences were observed in 25SPRINT and 35SPRINT between REG and NAT, however, sprint times with NAT players tend to be 4.3% faster at the U14 age. REG players were also 3.4% faster for 35SPRINT at U16 age.

NAT players made no improvements during RSA over the three years observed, but were statistically faster by 6.2% than REG players at U15 age groups ($p < 0.05$).

NAT players reached significantly higher levels in the YO-YO than REG players across the three years tested ($p < 0.05$). Improvements were made by NAT players from the U14 to U15 and U16 age groups.

Discussion and Conclusions

NAT players reached higher levels consistently during the YO YO test throughout the years analyzed.

NAT players appear faster at earlier ages during short sprints, however, these trends do not improve over the years, whereas for REG players, times for sprints tend to improve.

The ability to perform repeated high intensity sprint bouts appears to be enhanced between the different levels of play at earlier ages, but tends to equalize by the U16 age group.

While top end speed might be an early indicator of a junior national female youth soccer player, high intensity work capacity, seems to be an important physical selection parameter between regional and national junior youth female soccer players.

Acknowledgements

Thanks is extended to the teams and coaches for participating in this study.

SEVENTH WORLD CONGRESS ON SCIENCE AND FOOTBALL: IMPLICATIONS/RECOMMENDATIONS FOR COACHES:

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General Implications / Recommendations for Youth Coaches in Canada:

Fitness testing is important for female soccer players at different ages (beyond age 13) and levels of play. Tests selected should be valid for measuring the components of fitness which have been shown to be important for soccer, including linear speed, speed endurance, power, and high intensity work capacity. The soccer-specific testing protocol developed by Jason Vescovi and Robert Rupf of the Canadian Sport Centre of Ontario, Mr. Pacione and Mr. Bucciarelli, which includes the 20 metre linear sprint, 10 x 20 metre repeated sprint test, counter-

movement jump test, and Yo-Yo Intermittent Recovery test, Level 1, contains tests which have been proven to be highly correlated with physical performance on the field, in both male and female soccer players. This protocol has been, and continues to be, validated in studies conducted by the CSCO, using female soccer players at different levels of play, including Canadian and US college, and North American Professional players. **Female players should be assessed a minimum of 3 times per year, to evaluate the effectiveness of training interventions and make adjustments and corrections where needed.**

Specific Coaching Recommendations:

Coaches of female players at higher levels of play (Provincial and National) should re-evaluate their selection process, to determine whether they are showing any bias towards players who are more physically and physiologically developed, especially in the younger (U14-U17) age categories.

Coaches of female players at lower levels of play (club, academy, and college) should re-evaluate their fitness training programs, to ensure that the players are receiving optimal training to elicit gains in speed, speed endurance, and high intensity work capacity.

“Coaches of female players at high levels of play should re-evaluate their selection process...coaches of female players at low levels of play should re-evaluate their fitness training programs ”

SEVENTH WORLD CONGRESS ON SCIENCE AND FOOTBALL: SUMMARY OF RELEVANT SPEECHES AND PRESENTATIONS: (CONT. ON PAGE 4)

Dr. Hiroyuki Nunome

Professor of Biomechanics,

Nagoya University.,

Nagoya, Japan:

Dr Nunome gave a speech, titled “Kicking Dynamics in Youth, Novice, and High Performance Players”. Highlights included:

- Kicking movements of both side-foot, and instep kicks, were compared among three groups of soccer players
- With side-foot kicking, youth players exhibited a much larger hip external rotation movement, as compared to professional players. Novice and Professional players’ side-foot kicking used a very simple rotation movement that was also recognized in their instep kicking
- There was one, highly successful, professional player, however, who demonstrated a side-foot kicking technique similar to that of youth players (greater hip external rotation). This fact provides a meaningful hint for how to introduce side-foot kicking technique to novice players

Dr. Geir Jordet

Associate Professor, Sport Psychology,

Norwegian School of Sport Sciences,

Oslo, Norway:

Dr. Jordet gave a speech, titled “Performing Under Pressure in Elite Football”. Highlights included:

- Multiple studies were presented that documented different aspects of choking under pressure in international penalty shootouts. Data was taken from in-depth interviews with elite level players who had taken part in penalty shootouts, in the UEFA Champions League, UEFA European Championships, and FIFA World Cup
- Choking under pressure is viewed as being related to the individual's view of themselves as being “under threat”. Performers who view themselves as being “under threat” will underachieve, because they engage in self-defeating self-regulation strategies which are initiated to escape the unpleasant affects associated with pressure

Dr. Peter Krustrup

Professor, Sport Science,

University of Copenhagen,

Copenhagen, Denmark:

Dr Krustrup gave a speech, titled “Physiology of Women’s Football: Match Performance, Fatigue, Training, Testing”. Highlights included:

- Elite female players cover 10-11 km, and perform 10-35 sprints and 125-200 high intensity running bouts, during a game
- The amount of high intensity running is closely correlated to players’ fitness levels
- Average heart rates in games are 80-90% of individual's maximum heart rates. Average blood lactate is 2-10 mMol
- Elite women soccer players have a superior cardio-vascular and musculo-skeletal health profile as compared to age-matched untrained women
- A combination of aerobic high-intensity training (with heart rates > 90% of maximum) and anaerobic speed endurance production training is the most effective way to improve soccer-specific fitness of top class female players

We are on the Web!
www.soccerfitness.ca

SOCCER FITNESS INC.

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SWCSF—PRESENTATION HIGHLIGHTS (CON'T FROM PAGE 3)

Dr. Magni Mohr,

Professor, Sports Science,
University of Copenhagen,
Copenhagen, Denmark;

Dr. Mohr gave an oral presentation titled "Hyperthermia Induced Fatigue During a Soccer Game". Highlights included:

- 17 Scandinavian professional soccer players took part in two experimental soccer games: one in normal environmental temperatures (22 degrees Celsius) and one in hyperthermic temperature (42 degrees Celsius)
- Total distance covered, as well as both high intensity running and sprinting, were higher in the normal temperature game. Total distance covered was correlated to the increase in core temperature in the hyperthermic game, however, absolute core temperature was not responsible for the decline in work rate between the two games
- These findings show that while heat stress does reduce work rate, players have individual heat tolerance thresholds

Dr. Esa Peltola,

Head of Performance Enhancement,
ASPIRE Academy for Sports Excellence,
Doha, Qatar;

Dr. Peltola gave an oral presentation "Sports Science Services to Young Football Players and Coaches". Highlights included:

- The ASPIRE Academy in Qatar is a new concept in the middle east: a sports school with elite sports programs, including soccer. They have brought together some of the world's leading sports coaches, trainers, doctors/physiotherapists, and exercise physiologists, to work with their athletes
- Dr Peltola's presentation introduced ASPIRE philosophy, as well as the structure of their sports science programs
- Sport science and medical support is an integral part of the preparation of young players at ASPIRE. The major sport science support is delivered through the following four areas: 1. laboratory testing; 2. sport-specific field testing; 3. match/competition analysis; and 4. applied research

Dr. Barry Drust,

Director, Football Exchange/Research Institute for Sports Sciences, Liverpool John Moores University,
Liverpool, England;

Dr. Drust gave an oral presentation titled "Current Approaches to Sport Science Support in the English Premier League". Highlights included:

- The integration of "science" into a variety of the processes and practices of football clubs is now common in the Premier League. Most clubs now have several sport-science related positions, including: sports researcher, fitness coach, rehabilitation practitioner) who work full-time with the club
- Fundamental practices commonly used by practitioners to support the optimal development of players include: evaluation of match demands, physical preparation for match play, planning/implementing/monitoring training programmes, injury prevention and maintenance strategies, and supporting performance with effective nutritional strategies

* NEW TO SOCCER FITNESS IN 2011 *

Soccer Fitness Inc. has undergone some exciting new changes in the past few months, and we wanted to take some space in our newsletter to share them with you! Firstly, we have revamped our website Member's Area, located at:

<http://www.soccerfitness.ca/members-area/>

We have added numerous abstracts, posters, and full articles/publications from the 7th World Congress on Science and Football. In addition, starting in July 2011, in a new feature/tab called Soccer Research Innovators, we will be profiling an accomplished researcher in the field of soccer-specific sports science, in our Member's Area, every month. These profiles will include relevant soccer-specific studies, some of which are unavailable to the general public, that have been published by the profiled author.

Second, beginning in October, 2011, we will be introducing some more unique assessment methods and equipment into our soccer-specific fitness assessment protocols. Now consisting of a full 2-hour protocol, our new Assessments will feature the Optojump Vertical Jump assessment (a Gold Standard measurement of single- and double-leg power, as well as the unique ability of measuring ground contact times for single- and double-leg movements) as well as the Functional Movement Screen (a revolutionary tool to assess and monitor athlete's movement efficiency and screen for imbalances and injuries). For more information about the new Soccer Fitness Soccer-Specific Assessments, visit: <http://www.soccerfitness.ca/soccer-fitness-services/soccer-specific-fitness-assessments/>