37. COMPUTER SCIENCE AND MATCH ANALYSIS

P-127 Analysis of actions ended with shots at goal in Women's European Football Championships

Józef Bergier [1] ✉, Andrzej Soroka [2] and Tomasz Buraczewski [1]
[1]The Jozef Pilsudski University of Physical Education, Warsaw, [2] State Higher Vocational School, Biała Podlaska

OBJECTIVE Female football is quite a young sport; hence it still requires understanding and constant observations. Important contests, among which the European Championships undoubtedly hold a crucial place, give an opportunity to notice changes and tendencies initiated by teams representing the highest level in this field. Actions of players, ending with shots at the goal, are of particular importance. The aim of this study was to analyse in detail offensive actions from their beginning stage till the final one – a shot at the goal. Detailed objectives deal with a structure of quick attacks and positional attacks and topography of characteristic activities with a ball.

METHODS The research material consists of observations of 15 games played during Women's European Football Championships held in England in 2005. 353 offensive actions were analysed during which 50 goals were scored. The course of offensive actions ended with a goal was coded from a video record with the help of author's observation sheet.

RESULTS Due to multidirectional analysis of offensive actions ending with a goal, it was demonstrated that the place of their beginning stages is usually within an area of attack of a football field (41,6%) and a central area (41,2%). Most of the actions were short, after a quick, lasting up to 5 seconds (56,9%), attack after individual attack (30,3%) and conducted by two players (18,4%).

DISCUSSION The small amount of the treatises over the characteristics of the game of women proved the necessity of further research, because the game of women and men are different. Recognition of women's activities with and without the ball would make the programming of women's training process more effective.

REFERENCES
Economos et al. (1993) *Sports Medicine* **16,** 381-399.
Fogelholm (1994) *Journal of Sports Sciences* **12,** 23-27.
Schokman et al. (1999) *International Journal of Sports Nutrition* **9,** 60-69.

KEY WORDS Football, women European football championships, match analysis.

P-128 Ulti-camera wide-angle video recording and analysis

A. Murat Tekalp ✉
Koc University, Istanbul, Turkey

OBJECTIVE Automatic analysis of soccer videos for various purposes requires tracking of the position of the players and the ball on the field. Tracking across changing scenes (cameras), poses some challenges since there are discontinuities in the player and ball trajectories across different camera views. We proposed construction of a mosaic view of the field on PC by patching views from different cameras. In this study a multi-camera video recording and display system was developed to view the entire field of a soccer match, and propose new game analysis procedures. A camera acquisition and display system was designed to simulate the actual viewing experience in a stadium.

METHODS The capture system involves N-cameras and twin SVGA or a HD display with a PC. Each camera view was compressed individually on-board the camera, and then sent to a PC, which drives a twin SVGA or HD display.

RESULTS Initial results of soccer analysis are successful.

DISCUSSION The multi-camera video recording and display system developed in this study can be applied to the video recording of the soccer matches for better analyses.

KEY WORDS Wide angle complete field video recording, automatic soccer game analysis.

P-129 A critical survey of football rating systems

Richard Pollard [1] ✉ , Raymond Stefani [2] and Aylin Seckin[3]
[1] California Polytechnic State University, San Luis Obispo, [2] California State University, Long Beach, USA, [3] Bilgi University, Istanbul

OBJECTIVE Rankings have now become an important part of many sports. Three football codes currently issue regular rankings, which are posted to the appropriate websites and published in the media. These are international soccer, U.S. college football and international rugby union. Both the FIFA world soccer rankings and the BCS system used in college football have made significant changes following heavy criticism. The rationale behind these systems needs to be understood. In this study two main objective rating procedures were defined and explored, accumulative rating procedures and adjustive rating procedures. After tracing the history of sports rating systems, a detailed description of rating procedures that have been used for football codes was made with the aim of critically assessing their validity.

METHODS Details of the rating systems to be analyzed are available from the websites of the governing bodies concerned. These are FIFA, the International Rugby Board (IRB) and the BCS. An alternative to the FIFA system for soccer is also considered, the Elo ratings. The main features of these systems are described and discussed in the context of the framework introduced by Stefani (1997; 1999).

RESULTS FIFA uses an accumulative system which takes into account strength of opponents and game importance but ignores home advantage. The BCS uses both subjective rankings and adjustive computer ratings, combined in a way which often changes from year to year. The IRB rugby and the Elo soccer ratings are both adjustive and take into account strength of opponents, game importance and margin of victory.

DISCUSSION FIFA's new system is an improvement, but raises several questions, especially by not incorporating home advantage and by treating all losses as equal regardless of the opponents. The way in which the BCS system combines its components lacks logical rationale. In contrast, the IRB rugby and Elo soccer ratings have theoretical justification, include all relevant factors and should produce fair rankings.

REFERENCES
Stefani (1997) *Journal of Applied Statistics* **24**, 635-646.
Stefani (1999) *Man and Cybernetics* 29, 116-120.

KEY WORDS Rankings, ratings, football, FIFA world rankings, BCS.

P-130 Has soccer changed in the last three world championships?

Julen Castellano Paulis [1], Abigail Perea [1] ✉, Angel Blanco Villaseñor [2]
[1] Universidad del País Vasco, Spain, [2] Universidad de Barcelona, Spain

OBJECTIVE A common characteristic in the Observational Methodology is that we can only observe the behaviour partly. That is the reason why we need to know if the observed variance is related with the individuals, the measuring tools, the place or other facets. This study focused on the Football World Championship facet. The study investigated if there was a significant difference in the way soccer was played along the last three World Cups.

METHODS 56 professional matches were registered with the taxonomic tool SOCCAF, 24 of them were played in France ’98, 20 in Korea – Japan ’02 and 12 in Germany ’06. In total, more than 150.000 multievent sequences were registered. An analysis of 4 facets was performed; World Championship (3 levels), result (7 levels), area (5 levels) and categories (48 levels). A variance components analysis was done.

RESULTS The result of the analysis was demonstrated in Table 1. The variance assumed by the World Championship facet is 1%, this is, by means of the chosen facets, the teams have played almost the same way.

DISCUSSION Using the variance and Generalizability studies, we can obtain more information than just a description of ‘here’ and ‘now’. Would we obtain the same results if we had registered 20 more matches? And using a different category system? What would happen if we divide the field in more areas? Variance analysis models give us information about the variance of each chosen facet.

Table 1. Results of the analysis including four facets.

Word Championship*Result*Area*Category			
$r^2 = 0.7877$			
Facets	**g° de l**	**Pr > FType III SS**	**Variance%**
World Championship (M)	2	<.0001	1
Result (R)	6	<.0001	4
World Championship*Result	12	<.0001	2
Area (Z)	4	<.0001	1
World Championship*Area	8	0.5482	0
Result*Area	24	<.0418	1
World Championship*Result*Area	48	1.0000	0
Category (C)	47	<.0001	16
World Championship*Category	94	0.1090	2
Result*Category	191	<.0001	6
World Championship*Result*Category	382	1.0000	4
Area*Category	188	<.0001	35
World Championship*Area*Category	376	1.000	5
Result*Area*Category	764	0.9999	15
World Championship*Result*Area*Category	1528	1.0000	9
R Z C / M		e2 = 0.916Ω = 0.914	

KEY WORDS Observation, generalizability theory, variance analysis, world championship, soccer.

P-131 Movement analysis of elite junior Australian Rules Football: Comparison to elite senior results

James P. Veale ✉, Alan J. Pearce and John S. Carlson
Centre for Aging, Rehabilitation, Exercise and Sport, Victoria University, Australia

OBJECTIVE To date, no published research on the movement activities and demands exists in elite junior Australian Rules football (ARF) with junior ARF coaches relying on senior research data to prepare their developing players. Collection of movement activity data in elite junior ARF players and compared our results to previous research in elite senior ARF players (Dawson et al., 2004).

METHODS Thirty athletes (17.07±0.89 years) participated in the study. All on-field positions were tracked over seven home games during the 2006 Victorian U18 ARF season. Post match analyses involved reviewing each tape, calculating number of efforts, duration of efforts, and distance covered for each position. The data from the positions was then compared to elite senior data by Dawson et al. (2004).

RESULTS Across all playing position categories, elite senior athletes completed a greater number of efforts over the course of an entire game (ranging from 226-387) and subsequently a greater estimated total distance covered compared to the elite junior athletes. Similarly, elite junior players recorded less game time (2-13mins) than their senior elite equivalent (Table 1).

DISCUSSION Although further research is required at both junior and senior levels to further understand game demands and optimize training regimes, the results from this Australian first study will assist junior elite ARF coaches to plan specific training programs for their junior players whilst developing them in preparation for elite senior competition.

REFERENCES
Dawson et al. (2004) *Journal Science Medicine Sport* 7, 278-291.

Table 1. Comparison results of the junior and senior soccer players.

Position	Movement	Time (min)		No. of Efforts		Distance (meters)	
		Senior	Junior	Senior	Junior	Senior	Junior
Small Foward/Back	Standing	21	16	210	103	-	-
	Walking	66	58	397	287	7029	4917
	Jogging	32	31	379	276	6188	5303
	Running	6	8	164	103	2342	2360
	Sprinting	1	1	31	25	719	582
	TOTAL	127	115	1181	794	16278	13163
Midfield	Standing	13	9	143	86	-	-
	Walking	58	54	381	336	5422	4927
	Jogging	41	42	434	369	8652	7683
	Running	7	10	186	128	2532	2791
	Sprinting	1	1	24	23	359	504
	TOTAL	119	117	1168	942	16976	15905
Ruck	Standing	18	12	154	88	-	-
	Walking	59	54	407	312	4775	5002
	Jogging	44	34	462	276	8708	5393
	Running	5	13	162	145	1628	3345
	Sprinting	1	1	17	22	283	527
	TOTAL	127	114	1202	843	15393	14268
Centre Half Forward/Back	Standing	13	26	161	138	-	-
	Walking	58	60	413	321	5560	5573
	Jogging	41	28	407	274	8266	4545
	Running	5	7	147	105	1902	1947
	Sprinting	1	1	18	21	278	485
	TOTAL	118	123	1146	859	16005	12550
Full Foward/Back	Standing	29	33	180	159	-	-
	Walking	67	55	369	291	6217	5757
	Jogging	23	23	312	205	5270	3270
	Running	4	5	128	76	532	1308
	Sprinting	1	1	30	21	595	531
	TOTAL	125	116	1019	752	13614	10419

KEY WORDS Movement analysis, comparison.

P-132 Kinematical analysis of Brazilian professional soccer players using an automatic tracking

Louise Martin ✉, Ricardo Barros, Milton Misuta, Rafael Menezes, Pascual Figueroa and Sergio Cunha
Campinas State University - College of Physical Education - Laboratory of Instrumentation for Biomechanics

OBJECTIVE Kinematical analysis of soccer players in play can provide useful information about their performance and it can be used for planning better subsequent training periods or evaluating the player performance during competitions. In previous studies, a method for automatic tracking of soccer players was developed (Figueroa et al., 2006). The aim of the present study was to do a kinematical analysis of Brazilian professional soccer players measured with an automatic tracking system.

METHODS Four regular Brazilian First Division Championship matches between different teams were filmed using four digital cameras. A novel computer vision system (DVideo) was used as a solution for tracking simultaneously all

players during entire games. Evaluations of uncertainties, data filtering and data analysis were addressed. The trajectories of 112 different players were tracked and analyzed.

RESULTS The results of controlled tests showed that uncertainties to determine positions in the field were around 0.3 meter. The mean distances covered and the distribution of velocities were analyzed and compared to data in the literature. The trajectories of players were presented in various ways and modelled as a function of time.

DISCUSSION The kinematical analysis showed the reduction of performance as a function of time. The distances covered by Brazilian soccer players were not different than that reported in the literature. The novel method used has proved to be reliable and less labor-intensive than previously reported methods and should constitute an important tool for supplying data about the performance of players.

REFERENCES
Figueroa et al. (2006) *Computer Vision and Image Understanding* **101**, 122-135.

KEY WORDS Soccer; tracking; distance covered; biomechanics

P-133 Offensive and defensive characteristics of 18th FIFA World Cup

Jinshan Xu ✉, Jianhua Shen and Xinhua Zhou
Shanghai University of Sport, China

OBJECTIVE The world cup games of level is the top-flight in the world. The character of the offence and defence reflect the development of football. All teams in the 18th FIFA world cup attached importance to the defence and carried out the golden rule of offence based on good defence. The characteristics of balance were represented fully by the goals in the modern football games. This research aimed to reflect the basic characteristics of the offence and defence in the 18th FIFA world cup, and to put forward some useful references to improve the level of Chinese football.

METHODS The materials were the video tapes of the 16 games of the top 16 teams engaged in the semi-quarter- final of the 18th FIFA world cup. The method included the literature method, observation method, statistics method etc.

RESULTS There were differences in every field's offence of goals, but the offensive effect was nearly same. All teams attached importance to the defence and carried out the golden rule: The interception was main way to get the ball controlling in every zone defence, The characteristics of balance was represented fully by the goals in the modern football games.

DISCUSSION Results demonstrated that the offence comparatively less but most threatening. According to vertical analysis, the offence points were widely scattered in different zones as well as the characteristics of flexible point offence. It is generally accepted that the guideline for football match is the offence based on a good defence. Based on analysis, the changes that goals rule in average each match are 2-3 are objective.

KEY WORDS 18th world cup, football, offence, defence, analysis

P-134 Home advantage in Turkish professional soccer

Aylin Seckin [1] ✉ and Richard Pollard [2]
[1] Istanbul Bilgi University, Turkey, [2] California Polytechnic State University, San Luis Obispo

OBJECTIVE Home advantage is an important factor in determining the results of soccer games although its precise causes are not clear (Pollard, 2006a). In national leagues worldwide an average of 61% of points are won by the home team, although marked regional variations exist (Pollard, 2006b). Building on previous work by Seckin (2006), a detailed analysis of home advantage in Turkish soccer is made. The first part of the study assessed the magnitude of home advantage in different situations in the Turkish Super League, and in League A, compared with other countries. The second part made use of match performance data to quantify and explain differences in performance among home and away teams. For both parts a comparison is made with similar studies from the Premier League in England.

METHODS Results of all games played in the Turkish Super League for the 12 seasons since 1994-95 are used together with the last 4 seasons of League A. Comparisons in home advantage are made over time, between the leagues and as a function of distance travelled. Match performance data is used for the 2005-06 season from which home and away teams are compared in relation to many performance variables.

RESULTS Overall home advantage in the Super League was 62%, similar in League A and declining over time. It was lower for games played between the Istanbul teams, but much higher for games involving Vanspor (76%). Home teams took 26% more shots than away teams, and made 11% more successful passes in the scoring zone ($p<.01$), but there was no significant difference in tackles, fouls and yellow cards.

DISCUSSION Home advantage in Turkey is similar to the major leagues in Europe. A high figure for the team from Van is consistent with a remote location, at altitude with harsh weather. Differences for attacking performance variables are similar to those in England. However the lack of differences in the aggressive variables, fouls and cards, contrasts with England where they are higher for the away team.

REFERENCES
Pollard (2006a) *Journal of Sport Behavior* **29**, 169-189.
Pollard (2006b) *Journal of Sports Science* **24**, 231-240.
Seckin (2006) *Paper presented at ECOMOD conference in Hong Kong.*

KEY WORDS Home advantage, Turkish Super League, match performance.

P-135 Analysis of offensive playing patterns in soccer

Luis Casais Martinez [1] ✉ and Joaquin Lago-Ballesteros [2]

[1] Department of Special Didactics, University of Vigo, Spain, [2] Faculty of Education and Sport, Pontevedra, Spain

OBJECTIVE Competition in soccer is the most important source of data to extract tactical conclusions. Studying the goals allows defining the offensive and defensive tactics in the soccer teams. Different offensive patterns can be used, although their criteria of successes are different. Coaches must know more effective tactics to construct training programs. Describe patterns in offensive play. Extract conclusions to tactical training programs

METHODS This was an indirect observational study about goals scored during 220 matches in the Spanish leagues of First and Second division in 04/05 season. Passing sequence was defined in terms of sequence length. Analysis data includes descriptive and logistic regression.

RESULTS Goal-scoring: 2.44 goals per match, 33.4% in actions to stopped ball. In dynamic play, direct play (40.2 % goals per match) is more effective than possession play (32.6%) or contra attack (27.1%)
Sequences 1-4 passes/possessions are more effective than longer possessions.

DISCUSSION In Spanish modern soccer, effective static play (stopped ball actions) and smaller or rapid passing sequences define successful teams. In longer possession attack, defence had more opportunity to minimize surprise and dislocation. Coaches must use this information to improve tactical training.

KEY WORDS Performance analysis, offensive playing patterns, modelization of training.

P-136 Techno-tactics and running distance analysis by camera

Orlando Fernandes ✉, Pedro Caixinha and Pedro Malta
Universidade de Évora

OBJECTIVE The purpose of the present research was to identify the energetic strategy and the relation with the techno-tactic options used by soccer players during a game. The objective was to find a relation between the energy-functional capacity (distance traversed, speed of displacement) and the actions techno-tactics carried out by the players during the game. The objective was to find a relation between the energy-functional capacity (distance traversed, speed of displacement) and the actions techno-tactics carried out by the players during the game. For collecting the techno-tactics information we elaborate a table contain all the important actions propose by the coach before the game.

METHODS Three soccer players of Portuguese first league, representatives of three different sectors were analysed using video analysis during nine games of the Portuguese first league. For the calculation of the distances traversed and speed, we used elaborate software for the effect named by "TACTO" that has collected the coordinates of the players later to be transformed to real measures through parameters DLT.

RESULTS The middle-fielder was the player that traversed bigger distance (14198,87m) with an average speed of 2,46 m/s, followed by defender (12958,53) with a speed of 2,91 m/s, and finally the forward (11224,77) with a speed of 2,65 m/s. Only the middle-fielder presented significant differences in the reduction of speed of the 1st half for the 2nd half.

DISCUSSION The players did not present significant differences in the reduction of the adequate actions to the processes (offensive and defensive), of the 1st for the 2nd half. The defenders carried out more adequate defensive actions than offensive ones, in the middle-field had been registered approached values, as well as forwards.

CONCLUSION In conclusion, recommendations for female soccer players are to encourage consumption of carbohydrate-electrolyte beverages to enhance carbohydrate intake and increase fluid intake, and ensure sufficient iron rich foods are included in the diet to meet the DRI.

KEY WORDS Soccer, time motion analysis, running velocities.

P-137 Analysis of successful scoring situations in football matches

Józef Bergier ✉ and Tomasz Buraczewski
The Jozef Pilsudski University of Physical Education, Warsaw, Poland

OBJECTIVE In the contemporary world, objective research and analysis are the basis of effective work and success. Getting familiar with match analysis in the football world constitutes a supportive insight into the training process. Thus it is of great importance to systematically and carefully gather data on players' performance on the field. This paper investigated the characteristics of successful scoring situations in the most prestigious matches. The questions raised were as follows:
1. What are the main characteristics of the scoring situations?
2. From which areas in the football pitch most goals are scored?
3. What kind of shots at the goal are the most successful?

METHODS The analysed material consisted of the recording goals in 76 most prestigious football matches: 27 in World Cup 2002, 16 in Euro 2004, 17 in Champions League 2004/05 and 16 in World Cup 2006. The analysis of the video recordings of football matches was conducted with filling in observations sheets, on which the information concerning the pre-scoring situation was recorded.

RESULTS The time of the scoring situation did not exceed 15 seconds (76%) and most often two (16,7%), three (25%) or four players (22,9%) were involved. Most goals were scored from between the goal area and the penalty line (62,4%). The most effective were both goals scored after the shot without receiving the ball (38.8 %) and goals scored with using the technique of kicking the ball with the front part of the instep and with the inside of the foot (30.3 %-30.8 %).

DISCUSSION The research results indicated that actions ended with a goal lasted up to 15 seconds and in the most actions 2-4 players were involved playing small number of passes. The goals were scored mainly from the penalty area and there were the most effective after the shot without receiving the ball and with using the technique of kicking the ball with the front part of the instep and with the inside of the foot.

KEY WORDS Football, championships, match analysis, scoring situations, goals.

P-138 Performance indicators distinguishing matches between regions in World Cup

Hyongjun Choi ✉, Mike Hughes and Peter O'Donoghue
University of Wales Institute, Cardiff

OBJECTIVE Performance indicators (PI's) (Hughes and Bartlett, 2002) have been used to analyse performances rationally and efficiently. The optimal number of performance indicators to be used can be determined through statistical techniques (Choi et al., 2006). The aim of this study was to identify an optimal set of performance indicators for World Cup 2002 and 2006 and compare matches of regions in terms of predetermined performance indicators.

METHODS Data of all matches (n=128) from the FIFA web site was entered into MS Excel. And the absolute difference of two teams' performance was used to determine the performances. Mann-Whitney U tests were used to compare matches of teams from regions and ranking levels.

RESULTS Between the 2002 and 2006 data, 12 indicators ($p<0.05$) in the matches of Africa vs Europe and Europe vs South America regions were significantly distinguished. And 5 indicators ($p<0.05$) in Asia vs Europe, 6 indicators ($p<0.05$) in Europe vs Europe were distinguished the 2002 and 2006 world cup. Additionally, free kicks to goals and direct free kicks distinguished the all regions.

DISCUSSION The PIs distinguishes regions of teams used outcome indicators related to scoring opportunities. No PIs related to tactical style or patterns of play had a significant effect.

REFERENCES
Choi et al. (2006) *World Congress of Performance Analysis of Sport* **7**, 124-127.
Hughes (2002) *Journal of Sports Sciences* **20**, 739-754.

KEY WORDS Construct validity, performance indicators.

P-139 Regional comparisons of team performances in World Cup 2002 and 2006

Hyongjun Choi ✉, Mike Hughes and Peter O'Donoghue
University of Wales Institute, Cardiff

OBJECTIVE Performance indicators (PI) are used to represent team performances (Hughes et al., 2002). In the 1990 World Cup, regional origin was found to influence the playing style of teams (Yamanaka et al, 1993). The purpose of the current study was to compare teams of different regions using the 256 performances within the 128 matches of the 2002 and 2006 World Cups.

METHODS Data were collected from different tournament web sites and regions compared in terms of 48 significant PIs using Kruskal Wallis H tests with post-hoc Mann-Whitney U tests.

RESULTS There are significantly differences found in ranks (23.6 ± 16.6, $p<0.05$), goals (1.1 ± 0.6, $p<0.05$), goals conceded (1.3 ± 0.8, $p<0.05$), shots on goal (5.2 ± 1.5, $p<0.05$), crosses (20.5 ± 5, $p<0.05$), corner kicks (5.1 ± 1.7, $p<0.05$) and bookings (2.7 ± 1, $p<0.05$).

DISCUSSION This study has showed that, rather than disappearing, regional differences in patterns of play have emerged between 2002 and 2006. The findings presented there are significant differences between the regions, but no same results were found in each comparison of regional differences.

REFERENCES
Hughes et al. (2002) *Journal of Sports Sciences* **20**, 739-754.
Yamanaka et al. (1993) *Science and Football* **2,** 206-214.

KEY WORDS Performance indicators, regional factors, construct validity.

P-140 Relevance of penalty kick methods and scoring ratio in World Cup 2006

Sheng Ping Chang [1] ✉, Hsiang Hsing Liu [2], Tsung Hui Cheng [3] and Ding Syong Chen [2]
[1] National Chiao-Tung University, [2] National Taiwan College of Physical Education, [3] Dan Feng Junior High School

OBJECTIVE Four different types of penalty kicks were derived according to parts of the foot used: instep kick; outside of instep kick; inside of instep kick; and inside of foot kick. Furthermore, the trajectories of the ball were grouped into 5 groups: power shots, swerve balls, push passes, chips, and trick shots. Fake moves done by the kicker to trick the keeper were also included in the analysis. The objective of this research is to reinforce existing literatures on the strategy of penalty kicks. By using the data of WC2006, it was expected to construct an analytic model that identifies the relevance between penalty kicking methods and their scoring ratio, thus, providing coaches and players more scientific assistance on penalty kick strategies.

METHODS Using a digital recorder, the videos of all 50 penalty kicks in the 64 matches of the FIFA World Cup 2006 were recorded and analyzed. The chi-square ($\chi 2$) test was used to analyze those penalty kicks.

RESULTS 34 penalty kicks went in and the other 16 were either saved or missed. The numbers of penalty kicks were categorized according to the kicking methods used into: instep kick, 10; outside of instep kick, 2; inside of instep kick, 34; and inside of foot kick, 4.

Table 1. Results of the analyzed penalty kicks.

	Place of Kicking				
Result	**Instep Kick**	**Outside of Instep Kick**	**Inside of Instep Kick**	**Inside of Foot Kick**	**Sub Total**
Goal	6	0	27	1	34
Missed/Saved	4	2	7	3	16
Sub Total	10	2	34	4	50

DISCUSSION It was found that different methods of taking a penalty did make a significant difference in the result-the inside of instep trick kick had the highest scoring ratio; the inside of instep swerve ball was second. However, the latter contributed to the most goals scored from the penalty spots in WC2006. The lowest scoring ratio was the outside of instep power shot.

KEY WORDS World Cup, penalty kick, instep kick, outside of instep kick, inside of instep kick, inside of foot kick.

P-141 Comparison of corner kicks of host and visitor teams in 2005-2006 Super League and 3rd League matches in Turkey

Halit Egesoy
Pamukkale University, Denizli, Turkey

OBJECTIVE Dead Balls such as corner kicks are more important in today's soccer games than ever before as they have started to give more importance to tactical strategies in the corner kicks to score goals. Therefore, it is the effectiveness of corner kicks that determines the results of the soccer matches that needs to be better analyzed. The purpose of this study was to analyse the effectiveness of the corner kicks used by the host and visitor teams in the matches of Denizlispor and Denizli Belediye Spor soccer teams in Denizli, Turkey.

METHODS The corner kicks within the penalty area were evaluated in 32 matches in Denizli, specifically Denizlispor and Denizli Bld.Spor. The penalty area was divided into six areas and the player by sending the ball to their teams' players in the corner kicks is the foundation stone of the effective corner kicks.

RESULTS Per match, to send within the penalty area and effective corner kick means by used the host teams were found more values according to visitor teams. The host teams have scored 5 out of 49 goals from the corner kicks. But, visitor teams scored 3 out of 31 goals. Among the six areas, 2nd area was where most of the corner kicks of the host and visitor teams were received.

DISCUSSION The percent of the effective rates of the corner kicks were % 36,93 for host teams and % 32,49 for visitor teams. In terms of the effectiveness rates the Super League teams gained more points than the 3rd League teams. These results could be explained by the soccer player's quality.

CONCLUSION In conclusion, recommendations for female soccer players are to encourage consumption of carbohydrate-electrolyte beverages to enhance carbohydrate intake and increase fluid intake, and ensure sufficient iron rich foods are included in the diet to meet the DRI.

KEY WORDS Soccer, corner kick, effectiveness.

P-142 Heart rate data files compiling for coaching control and research: HRDC Osasuna 1.0

Raul Martinez-Santos 1 ✉, Fernando J. Sanchez [2] and Asier Los Arcos [3]
[1] University of the Basque Country, [2] University of Vigo, [3] Club Atletico Osasuna, Spain

OBJECTIVE Heart rate (HR) monitoring during practice and competition is the only way that soccer coaches can objectively assess the organic response of the players without the assistance of medical staff. In addition, it can be a profitable way of getting continuous information about players and practice drills in terms of money and time, even though Polar Precision Performance SW© results of limited help for bigger sets of data or for the provision of record sets for advanced statistical analysis. Moreover, in soccer coaching HR data must be contextualized within the specific drill and moment they are produced. The purpose of this piece of work was to develop HRDC Osasuna 1.0, a software application that allows to access HR data in a totally free way.

METHODS HRDC Osasuna 1.0 has been written using Visual Basic .net Express edition©.

RESULTS HRDC Osasuna 1.0 let coaches and researchers to create as many record sets as they needed. This software put together three types of information: HR data, players' profiles and coaching diaries. Besides, several filters could be applied according to the needs of the staff (recording interval and time limits). Output could be a text file or other formats through ODBC protocol.

DISCUSSION This application can be very useful for coaches and researchers if they need to deal with more than a few HRM files or want to know if HR response is linked to the play action in any way.

KEY WORDS Heart rate, soccer.

P-143 Activity patterns in professional futsal players using global position tracking system

José Carlos Barbero Álvarez [1] and Carlo Castagna [2] ✉
[1]Facultad de Educación y Humanidades de Melilla, Departamento de Educación Física y Deportiva Universidad de Granada, Melilla, Spain, [2] Corsodi Laurea in Scienze Motorie, Facoltà di Medicina e Chirurgia, Università di Roma Tor Vergata, Roma, Italy

OBJECTIVE Futsal is played at professional, amateur and recreational levels all over the world. However despite its current and growing popularity only limited studies have addressed the physical demands of this indoor game. Furthermore the available literature only addressed amateur or recreational futsal cohorts (Castagna et al., 2006; Barbero et al., 2006). The aim of this study was to investigate game activity-pattern of professional Futsal players (age 22.5±1.7 years, body mass 75.3±7.3 kg, height 177.8±8.7 cm, and VO2max 64.6± 5.23 ml kg-1 min-1) in order to gain information for the development of training strategies.

METHODS Eight professional players (Generala IBI, Division de Plata) volunteered to this study. Players trained 10 times a week with a competition played at the weekend. Game activity was tracked and recorded during highly competitive outdoor training-games (4x10min) using GPS technology (SPI 10, GPSports, Canberra, Australia) in order to quantify physical demands.

RESULTS During the game players covered 118±7.5 m min-1 of which 22.2±5.4 % (10±3% of game time) were performed at high intensity (>15 km h-1, HI). Players performed 3.4±1.1 HI bouts min-1 (i.e. every 17.6 s). During the last period of the game HI distance (-28.4% and -26.9%) and HI (-27.8% and -37.8%) bouts significantly ($p<0.01$) decreased compared to first and second periods, respectively.

DISCUSSION These results showed that Futsal played at professional level is a high-intensity exercise that induces activity decrements across the game possibly due to fatigue. Given the documented decrement in sprint attempts the ability to repeat sprints may be regarded as a Futsal-specific ability.

REFERENCES
Barbero et al. (2006) *Journal of Sport Sciences,* in press.
Castagna et al. (2006) *Journal of Science and Medicine in Sport*, in press.

KEY WORDS Physical demands, training, GPS tracking system, intermittent exercise.

P-144 Home advantage in Asian football leagues

Nader Rahnama ✉, Effat Bambaeichi and Hamid Reza Sadeghiour
Faculty of Physical Education & Sports Sciences, Isfahan University, Isfahan, Iran

OBJECTIVE Existence of home advantage has been established for all major professional team sports in the world. The role of home advantage in determining the result of a football match was found to be greatest in soccer (Pollard, 2006). The aim of this study was to investigate the effect of home advantages in Asian Football Leagues.

METHODS The number of wining, losing and scores (at home and away games) of 17 teams from the Asian countries including two zones of West and South West and East and South East of Asia, were analyzed.

RESULTS The results showed that the home advantage on East and South East of Asia was 3.1 percent more than West and South West (52/4‰ vs 49.3‰). In West and South west Asian Countries, this phenomenon had the highest effect on Saudi Arabia (60.6‰) and lowest on Bahrain (50.3‰). In East and South East countries the highest effect was observed in Indonesia (65.3‰) and lowest effect in Hon Kong (55%).

DISCUSSION It can be concluded that home advantage has been effective in Asian Football Leagues.

REFERENCES
Pollard (2006) *Journal of Sports Sciences* **24**, 231-240.

KEY WORDS Football, away games, winning, losing.

P-145 Heart-rate and activity-speed of professional soccer players in match

José Carlos Barbero Álvarez [1] ✉ and Carlo Castagna [2]
[1]Facultad de Educación y Humanidades de Melilla, Departamento de Educación Física y Deportiva Universidad de Granada, Melilla, Spain, [2] Corso di Laurea in Scienze Motorie, Facoltà di Medicina e Chirurgia, Università di Roma Tor Vergata, Roma, Italy

OBJECTIVE Although there are limitations in using heart rates (HR) to assess intense intermittent activity HR monitoring is suggested to be a valid measure to determine ball-drills intensity or competition demands.However no information are available about the relationship between HR and match-activty speed in soccer. The aim of this study was to examine whether HR reflected match-activity speed in professional soccer players.

METHODS Match HR responses (short range telemetry) were coupled with time-motion analysis using GPS technology (SPI Elite, GPSports, Canberra, Australia) in 4 professional players during friendly matches (45 min). Comparisons were made dividing game duration into 3 minutes periods (n=15).

RESULTS Average match-speed (MS) and HR were 7±0.5 km h-1 and 165±7.1 b min-1 respectively. No significant correlations were found between HR and MS (r=0.43 p=0.11) or distance covered (r=0.46 p=0.10). Likewise, no significant correlations were found between HR and distance covered at high intensity (r=0.25 p=0.37).

DISCUSSION These results show that HR cannot be considered as a reflection of match-intensity in soccer. Therefore HR and time-motion analyses should be coupled together in order to assess match or ball-drill demands in soccer.

KEY WORDS Physical demands, competition, GPS Tracking System, intermittent exercise