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CO-37. LEFT VENTRICLE ROTATION AND TORSION (SPECKLE TRACKING MULTI-LAYER APPROACH) IN ATHLETES WITH BICUSPID AORTIC VALVE

Laura Stefani, Alessio De Luca, Roberto Mercuri, Gabriele Innocenti, Giorgio Galanti.

Sports Medicine Center. University of Florence. Italy.

Introduction: Myocardial rotation and torsion are recently concerned to quantify the heart's contractility in normal, in valve dysfunction and also in endurance athletes. In athletes with Bicuspid Aortic Valve (BAV), even if asymptomatic, a progressive enlargement of the left ventricle chamber has been recently demonstrated. The aim of this study is to evaluate the Left Ventricle (LV) systolic performance by the rotation and torsion measurement in a group of BAV athletes compared to Tricuspid Aortic Valve (TAV) athletes.

Methods and results: 20 BAV athletes (aged 25 ± 3) and 20 TAV athletes, were submitted to an echocardiographic exam. From the short axis LV view image, the circumferential strain, rotation, torsion, distinguished in the endocardial and epicardial component at the basal and apex, were calculated by the speckle tracking multi-layer approach (X-Strain software -ESAOTE-Italy). In BAV only the epicardial (5.74 ± 1.4) and endocardial (8.64 ± 4.0) apical rotation are significantly higher than TAV (3.40 ± 1.6 Epi; 5.89 ± 1.8 Endo $p < 0.01$) while the LV basal segments tend to be at the lower limits. The endo/epi torsion result therefore to be normal in both (BAV Endo 13.51 ± 5.0 ; TAV Endo 11.80 ± 2.4 ; BAV Epi 9.45 ± 2.5 ; TAV Epi 7.31 ± 3.4)

Conclusions: The multi-layer approach of 2D speckle tracking imaging provides additional information on assessment of LV myocardial function in asymptomatic BAV athletes confirming the persistence of a normal heart performance despite the trend in them to show an enhancement of the LV chamber dimensions.

Key words: Torsion. Bicuspid Aortic Valve. Left Ventricle.

CO-38. PREVALENCE OF CONGENITAL HEART DISEASE IN ATHLETES BY ECHOCARDIOGRAPHIC EVALUATION

Giorgio Galanti, Laura Stefani

Sports Medicine Center-University of Florence-Italy

Introduction: Congenital Heart Disease (CHD) are more frequently diagnosed at the birth or in young age. The pharmacologic and surgery treatment has gradually improved the childhood survival allowing a normal life and also sport activity either agonistic or not agonistic. In asymptomatic subjects with possible clinical effects, the echocardiographic exam represent the first evaluation. The aim of the study is to analyzed the prevalence of CHD, including Mitral Valve Prolapse (MVP) and also to clarify when the eligibility is permitted.

Methods: From 1999 to 2008 10018 echocardiographic exams have been performed in athletes usually as the second level check up Among them the prevalence of the most common minor

CHD present in adult population including the aortic bicuspid valve (BAV) and also the prevalence of mitral valve prolapse (MVP) was determined.

Results: Among them 410 MVP (4,10%), 201 BAV (2.05%), 45 Foramen Ovale Pervium (PFO)(0.45%), 16 Atrial Septal Defects ASD (0.16%), 25 Ventricular Septal Defects VSD (0.25%), 7 Coarctation of the Aorta C/O (0.06%), 3 Tetralogy of Fallot T/F (0.03%), 2 Pulmonary Valve Stenosis PS (0.02%), 2 Ebstein's anomaly (0.02%) were found. None of the athletes diagnosed for CHD, resulted in first line to be eligible for competitive sports. They were all submitted to a physical echo-stress to decide to practice agonistic sport activity or not. The 97% of the athletes affected by MVP were eligible for competitive sports as well as the 96.5% of athletes with BAV, the 89% of athletes with PFO, the 50% of athletes with ASD and the 28% of athletes with VSD.

Conclusion: These results are in agreement with the data of the current literature. This investigation suggests, therefore, that the athletes generally show the same prevalence of CHD like normal population, anyway only BAV and MVP are often compatible with sport activity.

Key words: Congenital cardiac disease. Sport activity.

CO-39. NOTATIONAL TIME ANALYSIS PLAY IN TOP ITALIAN FUTSAL TEAM

Sannicandro I, Di Donna VM, Piccinno A, S. De Pascalis, R.A. Rosa

Course for Degree in Motor Activities Science, University of Foggia

Introduction: The study of movement through the time variable to characterize the specific needs of each sport. The analysis of action and duration of those is the starting point for analysis of performance in sports situation (Reilly, 2003).

This analysis lets you choose the best practice techniques and athletics for improving the performance specification. The study aims to identify the values for the time parameters of the model to provide calcium to 5, and some parameters related to the technical gestures - mostly used in football tactics 5.

Material and methods: The study was performed in 8 teams in the national sample of Italian Serie A championship in 2007/2008 and 65 athletes were observed. For the resumption of races were used simultaneously two video cameras with wide angle lenses whose images were then analyzed using a specific detection grid (Colli & Faina, 1987). For each race were recorded: time to play, pause times, number of ball possession, number of interruptions (and cause).

Results: Table 1.

Conclusions: Analysis of time parameters results showed high percentage of the phases of play (48.3%) with a duration between 1-10 seconds, followed by one last between 11-20 sec (28.3%).

The analysis of the number of shares available to teams during the race, showed that in all the matches analyzed the number of possession always increases in the second half. The technical error causes the loss of the ball more often than the rules infringement.

Table 1. Sannicandro I. *et al.*

PERIOD Sec.	PLAY		PAUSE	
	Frequency	%	Frequency	%
1-10	283	48,3	343	57,9
11-20	166	28,3	162	27,4
21-30	59	10,1	52	8,8
31-40	46	7,8	20	3,4
41-50	21	3,6	6	1,0
51-60	8	1,4	2	0,3
61-70	1	0,2	5	0,8
71-80	0	0,0	0	0,0
81-90	2	0,3	0	0,0
91-100	0	0,0	2	0,3
101-110	0	0,0	0	0,0
Total	586	100,0	592	100,0

References:

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CO-40. MOTOR ABILITY ANALYSIS IN TOP ITALIAN FUTSAL TEAM

Sannicandro I, S. De Pascalis, A. Piccinno, Di Donna V.M., Rosa A.R.

Course for the Degree in Motor Activities Science, University of Foggia

Introduction: Futsal require specific studies to understand the metabolic and biomechanical demands specific sports.

Are already known some works have investigated the relationship between system efficiency and aerobic capacity to repeat sprints in team sports (Berg, *et al.*, 2010; Spencer, *et al.*, 2005; Castagna, *et al.*, 2007).

The model performance of futsal requires a careful analysis of the reciprocal relationship between capacity mainly solicited. This study aims to investigate the relationship between Maximum Aerobic Speed (MAS) and the ability to repeat sprints, commonly known Repetead Sprint Ability (RSA) in the top division Italian players (Serie A) of futsal.

Material and methods: Were assessed 22 futsal players (23.7 ± 2.6 years, 174.8 ± 3.5 cm, 72.9 ± 9.1 kg) belonging to the Italian championship of futsal teams (Serie A) by Yo- Yo Intermittent Test and Capanna Test (6x40m shuttle - 20 sec recovery).

Results: In the Yo-Yo Intermittent tests showed a mean value of 17.8 ± 1.7 km / h and an average distance total of 2545.2 ± 820.8 m in the RSA test showed a mean decrease between the first two sprint and the last two equal to $9.3 \pm 4.0\%$.

And there was a correlation of $r = -0.66$ between MVA and percentage decrease Capanna test and a correlation of $r = -0.52$ m paths between the Yo-Yo test and percentage decrease in Capanna test.

Discussion: Today we know the specific demands of Futsal by volume analysis of race and its intensity through detailed match analysis (Castagna, *et al.*, 2007; Barbero Alvarez, *et al.*, 2008).

The assessment of MVA know the specific adjustment of futsal player in terms of aerobic. The RSA is another important indicator of performance in futsal (Matos, *et al.*, 2008).

Decrease in the RSA seems only partly attributable to aerobic

	Ball possession	Average	Ds
1° period	281	35,13	4,49
2° period	363	45,38	4,47
Total	644	80,5	8,96

	Technical error	Rules		
		Infringment	Average	ds
1° period	135	33	21,00	14,15
2° period	186	38	28,00	20,66
Total	321	71	49	34,81

components of futsal player confirming the data in the literature (Berg, *et al.*, 2010).

References

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CO-44. EFFECTS OF AN ENTIRE SEASON ON BODY COMPOSITION AND PERFORMANCE IN ELITE BASKETBALL PLAYERS

Rocha P.M¹, Santos D.A.², Silva A.M.², Matias C.N²

¹Sport Medicine and Training Control Unit - Portuguese Sport Institut. ²Exercise and Health Laboratory - Faculty of Human Movement

Introduction: Few studies have examined the effect of a competitive season in body composition and performance outcomes in elite basketball players. We aimed to characterize and compare changes in body composition, strength and jumping abilities in junior basketball players, from the pre-season to the competitive period.

Material and methods: Subjects were 21 basketball players (12 males and 9 females), aged 16-17 years (baseline), from the Portuguese elite teams who lived during the entire season at the national high performance center. Fat mass (FM), percent fat mass (%FM), lean-soft tissue (LST) and Mineral Osseous (Mo) were estimated using Dual Energy X-ray Absorptiometry (DXA). Body cell mass (BCM) was calculated as, LST-[Extracellular fluids (ECF)+Extracellular Solids (ECS)], where ECF was assessed with bioelectrical impedance spectroscopy and ECS calculated as $1.732 \times \text{Mineral Osseous}$. Squat jump (SJ), counter movement jump (CMJA), and leg press isometric strength (maximal strength and maximal rate of strength production) were evaluated in a platform with customized software. All measurements were made in the first week of the pre-season period and one week before the end of the competitive season.

Results: At baseline body weight was 78.4 ± 7.2 kg in males (M) and 64.8 ± 7.7 kg in females (F); height was 192.5 ± 6.5 cm in males and 175.5 ± 6.6 cm in females. Basketball season resulted in significant increase in weight (M: 3.2%, F: 2.0%), BCM (M: 5.2%, F: 5.5%), and LST (M: 4.0%, F: 3.3%) An adiposity reduction was observed only in females (FM: -4.5%; %FM: -4.99). In performance tests males increased their jumping (SJ: 10.1%; CMJA: 10.2%) while leg press results remained similar. In girls no significant changes were observed in the performance tests.

Conclusions: In spite of a general improvement in body composition of both male and female players during the season, females did not developed their performance in lower strength and jumping abilities.

Palabras clave: Basketball. Body composition. Strength outcomes.

CO-45. IS BODY CELL MASS IS A CARDIORESPIRATORY FITNESS PREDICTOR IN MALE AND FEMALE ELITE BASKETBALL PLAYERS?

Rocha PM¹, Santos DA², Silva AM², Matias CN², Pacheco R¹
¹Sport Medicine and Training Control Unit - Portuguese Sport Institut. ²Exercise and Health Laboratory - Faculty of Human Movement.

Introduction: Body cell mass (BCM) has been related to cardiorespiratory fitness (CRF), expressed by maximal oxygen uptake (VO_{2max}) in several studies. However, little is known regarding this relationship in elite athletes. We aimed to examine the associations between BCM and CRF in male and female elite basketball junior players both in pre-season and competitive period.

Material and methods: Subjects were 21 players, aged 16-17 years, from the Portuguese elite teams, divided in two groups (baseline): 12 males (body weight (BW): 78.4 ± 7.2 kg; height: 192.5 ± 6.5 cm; VO_{2max} : 4864.4 ± 296.0 mL/min; BCM: 37.6 ± 3.0 kg) and 9 females (BW: 64.8 ± 7.7 kg; height: 175.5 ± 6.6 cm; VO_{2max} : 3196.9 ± 317.3 mL/min; BCM: 26.9 ± 2.7 kg). A model [$BCM = LST - (ECF + ECS)$] was used to calculate BCM: LST is lean-soft tissue; ECF is extracellular

fluids; ECS is extracellular solids. DXA was performed to estimate LST and ECS (calculated as $1.732 \times \text{Mineral Osseous}$). Bioelectrical impedance spectroscopy was used to assess ECF. To assess CRF, a maximal graded exercise test protocol was performed on a treadmill using a variable speed and grade. VO_{2max} was estimated by a breath-by-breath system (Cosmed, Quark b2). Measurements were performed in the first week of the pre-season period and one week before the end of the competitive season.

Results: At baseline, a positive association was found between BCM and VO_{2max} in male players ($r=0.63$; $p=0.028$) which remained significant after controlling for BW and age ($r=0.68$; $p=0.030$). In female athletes, no associations were observed between BCM and VO_{2max} ($r=-0.097$; $p=0.791$) even when adjusting for age and BW ($r=0.097$; $p=0.819$). At the end of competitive period, no associations were found between BCM and CRF in both male and female players ($p>0.05$).

Conclusions: These findings suggest that higher CRF values in males are related with a larger metabolically active component (i.e. BCM), even when accounting for the potential effects of age and BW.

Palabras clave: Body cell mass. Cardiorespiratory fitness. Basketball players.

CO-62. EFECTO DE PARAMETROS ANTROPOMETRICOS Y DE RENDIMIENTO FISICO EN JOVENES FUTBOLISTAS DE ELITE DE DIFERENTES CATEGORIAS

Sesma J¹, Lekue JA², Urkiza I², Badiola A¹, Gil SM¹.
¹Departamento de Educacion Fisica y Deportiva, Facultad de las Ciencias de la Actividad Fisica y el Deporte, Universidad del Pais Vasco/Euskal Herriko Unibertsitatea, UPV/EHU. ²Athletic Club de Bilbao.

Introducción: El objetivo de la investigación fue observar las diferencias antropométricas y del rendimiento físico entre jóvenes futbolistas de distintas categorías de un equipo profesional. **Material y métodos:** Participaron 57 jugadores del Athletic Club de Bilbao (16.64 ± 1.19 años) de los equipos: cadete A (CA), $n=21$, juvenil B (JB), $n=18$ y juvenil A (JA), $n=18$. Al final del

Tabla 1. Sesma J, et al. Parámetros antropométricos

	CADETE A	JUVENIL B	JUVENIL A	ANOVA (p)
Edad	15.42 ± 0.48	16.93 ± 0.78	17.77 ± 0.72	0.000*¥#
Peso (kg)	64.02 ± 5.76	66.53 ± 4.94	71.20 ± 6.86	0.002*
Altura (cm)	173.89 ± 6.66	174.48 ± 4.29	179.79 ± 5.57	0.004*#
Seis pliegues (mm)	51.38 ± 6.84	60.49 ± 12.03	57.52 ± 10.67	0.018¥
% grasa	10.69 ± 0.71	11.54 ± 0.98	11.26 ± 1.00	0.015¥

*CA vs JA; ¥CA vs JB; #JA vs JB

Tabla 2. Sesma J, et al. Rendimiento físico

	CADETE A	JUVENIL B	JUVENIL A	ANOVA (p)
Test de agilidad (Barrow) (s)	10.30 ± 0.35	10.27 ± 0.23	10.13 ± 0.20	0.307
Salto (Abalakov) (cm)	47.65 ± 4.96	46.30 ± 3.63	50.10 ± 6.86	0.188
Velocidad (15 m) (s)	7.05 ± 0.21	7.06 ± 0.22	7.13 ± 0.22	0.663
YYIRTL1	18.87 ± 0.90	19.41 ± 0.67	18.99 ± 0.70	0.140

tercer ciclo de la preparación física, se tomaron medidas antropométricas (altura, peso, 6 pliegues cutáneos, 4 perímetros y 4 diámetros óseos), y test físicos: test de agilidad (Barrow), salto (Abalakov), velocidad (15 m) y test Yo-Yo Intermitente Nivel 1 (YYIRTL1).

Se realizaron tests de ANOVA (para las diferencias entre los equipos) y correlaciones simples y parciales entre parámetros (SPSS v17).

Resultados: Los jugadores con menor altura, peso y composición grasa fueron los del CA. Los jugadores del JA fueron más altos que los del JB (Tabla 1).

No se observaron diferencias significativas a nivel de rendimiento físico entre las diferentes categorías (Tabla 2), aunque los mejores valores fueron los del JA.

Hubo una correlación significativa positiva entre la prueba Abalakov y el peso ($R=0.309$, $p<0.05$), porcentaje muscular ($R=0.313$, $p<0.05$), y los perímetros del brazo ($R=0.492$, $p<0.01$), y muslo ($R=0.327$, $p<0.05$) independiente a la edad; así como una correlación negativa con la grasa corporal ($R=-0.323$, $p<0.05$).

La velocidad tuvo una relación significativa positiva con el peso corporal ($R=0.323$, $p<0.05$) y el peso muscular ($R=0.352$, $p<0.05$).

La correlación entre ambos parámetros, test de Abalakov y la velocidad, fue alta ($R=0.701$, $p>0.001$).

Conclusiones: Los resultados de las pruebas de rendimiento, teniendo en cuenta la edad/categoría, no reflejan una diferencia significativa, aunque si existen diferencias antropométricas. Es un dato a tener en cuenta ya que en otros deportes no se da esto por lo que se puede analizar en futuras investigaciones.

También es importante reflejar la relación entre la potencia y el desarrollo muscular, así como el efecto negativo de la grasa corporal. El desarrollo muscular unido a un porcentaje graso adecuado propiciará una mayor potencia y un aumento de la velocidad.

Reconocimientos: Este estudio fue parcialmente financiado por la Universidad del País Vasco/Euskal Herriko Unibertsitatea, proyectos de Investigación 2009 (EHU 09/44).

Palabras clave: Fútbol. Valores antropométricos. Rendimiento físico.

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