



Original Article

# The importance of a multidisciplinary team and the conditioning services in elite clubs of roller hockey

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**Abstract.** [Purpose] This study describes and compares the conditioning services of the roller hockey teams of the two most important leagues in Spain: the OK Liga and the First Division. [Subjects and Methods] A survey was administered to the people responsible for physical preparation. The response rate was 93%. [Results] 75% of the OK Liga teams have hired someone full time exclusively for training, with a university degree. The percentage was significantly lower in the First Division, at a 43.7%. A low percentage of the physical trainers continued with their academic training, and the consultation of scientific journals. The main deficiencies are associated with the strength training equipment and facilities. In the First Division teams, significant deficiencies were found in most of the variables associated with the training environment. These results show significant deficiencies in the conditioning services offered by the teams to their players, especially in non-professional and lower performance level teams. [Conclusion] Spanish physical trainers should take advantage of advances in scientific knowledge in the area of conditioning by studying Masters and consulting scientific journals. The clubs directors and/or coaches should be aware of the importance of conditioning to improve the training environment. Both aspects would offer a better training and rehabilitation procedure in the club.

**Key words:** Trainers, Formal education, Training

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## INTRODUCTION

Traditionally, efforts to improve team sports performance often focus on technique and tactics at the expense of physical fitness<sup>1-3)</sup>. However, physical conditioning can be effective for the improvement of speed in specific skills of sports team<sup>4-6)</sup>.

With the accepted importance of physical conditioning today, many teams have considered it necessary to hire competent physical conditioning coaches (PCCs), and to improve the training environment for an optimal development of physical condition.

Concerning the training environment, several factors can be considered especially relevant: (i) having the necessary time for the development of physical conditioning (availability of players, availability of the PCCs), (ii) having the necessary infrastructure, materials and equipment (e.g., training facilities, strength gear, evaluation equipment, recovery means, etc.), (iii) taking trips in optimal conditions, (iv) having access to a multidisciplinary sports science team which, besides encouraging maximum performance of the players, will make it possible for the PCC to be completely dedicated to his work, and (v) making the PCC feel that his work is appreciated.

Whereas investigators have examined some aspects of conditioning practices and of the PCCs profile in National Leagues

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of baseball<sup>7,8</sup>), American football<sup>8-10</sup>), basketball<sup>8,11</sup>), and ice hockey<sup>8,12</sup>), they have never been examined in the roller hockey field. The purpose of this study was to determine the use of conditioning services in elite Spanish Clubs of roller hockey.

## SUBJECTS AND METHODS

To accomplish the proposed objectives interviews were made to those responsible for the physical conditioning preparation of the male teams that participated during the 2014/15 season in the Spanish league of roller hockey: OK Liga (N=14, elite teams) and roller hockey First Division (N=16) (League of the roller hockey Clubs Association). There are two maximum categories of the roller hockey.

The survey was created with the help of experts in questionnaire design and was pilot tested with an informal advisory group of physical conditioning coaches<sup>13</sup>). The survey was divided into 2 areas of inquiries: (a) physical conditioning coaches' profile: formal education, sources of information, (b) training environment: multidisciplinary sport science team, functions performed by the PCC, level of attendance of the PCC to training sessions and competitions, deficiencies at work, feeling appreciated for the professional work of the PCC. The survey instrument and the research design were approved by the Committee on Biomedical Ethics of the Catalonia Government, Spain (PI 17/0151).

A statistical analysis was performed with software (Statistical Package for Social Sciences, Version 20.0). Data are expressed in percentages.  $\chi^2$  or Fisher and de Mann-Whitney U test were applied for qualitative and quantitative ordinal variables respectively, in order to determine differences among sports and classes. The  $\alpha$  level was set at 0.05 (Table 1).

## RESULTS

The profile of physical conditioning coaches: differences among categories, 80% of the physical conditioning coaches of OK Liga have degrees in Physical Activity and Sport Sciences in contrast to a 40% of the physical conditioning coaches of First Division ( $p<0.001$ ) Respectively, a 45% and a 20% of the physical conditioning coaches had a Master and Doctoral degree in related fields of human performance. A high percentage of physical conditioning coaches attended at least one course of more than 20 hours in the last three years (80%), and know the physical preparation work developed by at least one team of his league (90%). The majority of physical conditioning coaches consult specific journals related to their professional activity (75%), however only a 10% consult journals included in the Science Citation Index (ISI).

All the teams had a head coach. The percentage of OK Liga teams that had a physiotherapist, doctor and physical trainer was significant (>80%). A smaller proportion of First Division teams had a doctor and physical trainer (<45%) ( $p<0.001$ ). The percentage of teams with kit men is higher in the OK Liga than in the First Division (>83.5% versus 62.4%) ( $p<0.001$ ). With the exception of the OK Liga teams, the full-time masseurs are not usually part of the team of technicians ( $p<0.001$ ). There is no team that has contracted the services of a sports psychologist.

The majority of OK Liga teams had a full-time physical trainer and physiotherapist (>75%), in contrast to the 43.7% of the physical trainers and physiotherapists of the First Division ( $p<0.001$ ).

The OK League was attended by a part-time or full-time coach assistant (50%), and a masseur (41.6%). Most teams in the First Division had full-time or part-time coach assistants (31.2%) and masseurs (18.7%).

No person responsible for physical preparation performed the duties of the head coach. 40% of the physical trainers of the First Division performed functions as 2nd coach or coach for specific positions (i.e., goalkeepers) compared to 34.0% of OK Liga physical trainers ( $p<0.05$ ).

The average number of physical trainers attending all the training sessions in the OK Liga teams is high (>80%), in relation to the 60% of the First Division trainers ( $p<0.05$ ). A similar relationship can be established when comparing these two groups of leagues in relation to the attendance of the physical trainers to all competitions (90% vs. 50.8%,  $p<0.05$ ).

Table 3 shows the percentage of physical trainers that think that an improvement in several of the aspects analyzed could lead to an improvement in the physical condition of the players. The main deficiencies were associated with the improvement of strength training equipment and facilities, mainly in the First Division. There were also differences in relation to strength training equipment, evaluation experts and means of recovery. The main deficiencies associated in the First Division teams occurred in the availability of the players ( $p<0.05$ ).

Only 5 physical trainers did not mention any deficiency at work. The average of deficiencies was high in the First Division teams ( $3.5 \pm 1.4$ ), in relation to the OK Liga ( $2.1 \pm 1.3$ ) ( $p<0.05$ ) (Table 2).

The majority of the physical trainers feel valued by the players (90%) and by the head coach (80%). In relation to managers and the press, the feelings of valuation were negative. 20% of the physical trainers of the First Division estimated that their work is well remunerated economically. In the OK Liga, 50% felt adequately remunerated.

Seventy five percent of First Division physical trainers would like to get involved in a different professional activity, compared to 40% of OK Liga trainers ( $p<0.05$ ) (Table 3).

**Table 1.** Physical conditioning coaches response rate

League	OK Liga	First Division
Number of teams (n=30)	14	16
Number of teams interviewed (n=28)	12	16
Total interviewed rate	93.3%	100%

**Table 2.** Percentage of teams with professionals

	OK Liga (n=12)		First Division (n=16)	
	Full time	Partial	Full time	Partial
Coach	100.0%	0.0%	100.0%	0.0%
Physical conditioning coaches	75.0%	0.0%	43.7%	0.0%
Assistants coaches	50.0%	0.0%	6.2%	25.0%
Physicians	16.6%	50.0%	0.0%	50.0%
Physiotherapists	75.0%	16.6%	43.7%	25.0%
Massage coaches	16.6%	25.0%	0.0%	18.7%
Psychologists	0.0%	0.0%	0.0%	0.0%
Kit men	75.0%	8.3%	56.2%	6.2%
Other professionals	33.3%	0.0%	62.5%	0.0%

**Table 3.** Deficiencies at work

	OK Liga (n=12)	First Division (n=16)
Strength equipment	50.0	81.2
Infrastructures	41.1	75.0
Evaluation equipment	41.1	75.0
Time devoted to physical conditioning	33.3	56.2
Physical fitness assistants	25.0	25.0
Trips	33.3	50.0
Players' availability	16.6	62.5
Evaluation experts	41.1	56.2
Relations with the coaching body	16.6	18.7
Recovery means	25.0	56.2
Other aspects	16.6	12.5

Data are expressed in percentages.

## DISCUSSION

This is the first known study that documents the conditioning services in roller hockey teams. The analyzes potentially represent a reflection of roller hockey conditioning services in one of the best leagues in the world.

Probably, due to the use of personal interviews, the response rate (>90%) is higher than that reported in most national league surveys<sup>2, 7, 8, 11-13, 14</sup>).

The results of this study show that the physical trainers profile and the training environment are associated with the level of professionalization of the teams. Thus, most of the teams of the OK Liga have hired a physical trainer with a degree in Physical Activity and Sport Sciences exclusively for the development of the conditioning of the players. On the other hand, only 43.7% of the physical coaches of the First Division were hired full-time. The results of this study confirm that the conditioning is associated with the level of professionalization of the teams. The OK Liga is considered one of the best in the world.

In the non-professional leagues (First Division), a high percentage of the physical trainers do not attend all training sessions and competitions. Additionally, in these leagues, a high percentage of physical trainers expressed deficiencies regarding

the availability of the players and the time dedicated to the development of their physical condition. The lack of continuity of the physical trainers and the players of these teams during the training makes it impossible to train them adequately<sup>2, 3)</sup> and, as a consequence, hinders the optimal development of the physical condition.

Significant differences were observed between the leagues, which are especially relevant for the development of the physical condition: availability of the physical trainer, attendance of the physical trainer to the training sessions and competitions, availability of the players, time dedicated to the physical condition program, strength training equipment, and appreciation of the professional work of the physical trainer. These results suggest that the most professional teams, with higher budgets, consider strength and conditioning needs of their players essential and try to better prepare them for the competition.

However, important deficiencies were also observed in the professional teams, which cannot be associated with a budget deficit. The deficiencies mentioned by the physical trainers in relation to some of the aspects that would improve the physical condition of the players should be analyzed with caution. It is assumed that these deficiencies derive from a subjective opinion and that they may be influenced by the lack of knowledge of some of the factors that were analyzed. Thus, a physical trainer may consider a certain aspect as non-deficient, even when the conditions in his team are deficient, while in another equipment with better conditions, a physical trainer may think that the resources are still insufficient.

The main deficiencies are associated with strength training equipment and facilities, which may be justifiable in some teams due to budget limitations, but it is likely that in other teams it is the result of the lack of awareness of managers and/or coaches in relation to the importance of these aspects. In fact, a high percentage of people responsible for physical fitness programs did not feel recognized for their professional work by the team managers.

However, the percentage of physical trainers that did not express deficiencies in relation to evaluation equipment and means of recovery is surprisingly low. It is difficult for a team that does not have the ideal conditions of equipment for strength training to have evaluation equipment and optimal recovery means, given the budget limitations to acquire this equipment. Probably, these results can be explained by the lack of knowledge of the person responsible for the physical condition, the evaluation and recovery for the development of the physical condition of the players, and/or by the deficiencies in the handling of this equipment. This leads to the conclusion that there are deficiencies in the evaluation and recovery process of the players. Probably, these results may be related to the fact that many physical trainers have not received enough continuous scientific information<sup>15, 16)</sup>.

A high percentage of physical trainers are not satisfied with the financial compensation they receive. This may indicate that team managers give little importance to the fitness program.

It is of special interest that, during the years following the graduation of the physical trainers, only a very low percentage continued with more academic education (Master or Doctor degree) or consulted journals included in the Science Citation Index. The percentage of physical trainers with a Master's degree is lower in Spain than American and Canadian professional leagues of baseball, basketball, football and ice hockey<sup>8)</sup>, and also less than among American college fitness trainers<sup>17)</sup>. Probably, these deficiencies may be an indicator of the lower degree of development of the conditioning area in Spain. According to Durrell et al.<sup>17)</sup>, and based on these findings, there is a possibility that many strength and conditioning programs are based on sources that lack scientific credibility.

This study compares the conditioning services in the Spanish leagues of the highest category of hockey skates. The results found show important deficiencies in the profile of the physical trainers and in the training environment.

Probably, the further development of the profile of the physical trainer, the promotion of continuing to acquire scientific training and the improvement of the training environment could enhance the physical condition of the teams.

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### *Conflict of interest*

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## REFERENCES

- 1) Stølen T, Chamari K, Castagna C, et al.: Physiology of soccer: an update. *Sports Med*, 2005, 35: 501–536. [Medline] [CrossRef]
- 2) Reverter-Masia J, Legaz-Arrese A, Munguía-Izquierdo D, et al.: The conditioning services in elite Spanish clubs of team sports. *Int J Sports Sci Coaching*, 2008, 3: 431–443. [CrossRef]
- 3) Oliveira T, Abade E, Gonçalves B, et al.: Physical and physiological profiles of youth elite handball players during training sessions and friendly matches according to playing positions. *Int J Perform Anal Sport*, 2014, 14: 162–173. [CrossRef]
- 4) Gorostiaga EM, Izquierdo M, Iturralde P, et al.: Effects of heavy resistance training on maximal and explosive force production, endurance and serum hormones in adolescent handball players. *Eur J Appl Physiol Occup Physiol*, 1999, 80: 485–493. [Medline] [CrossRef]
- 5) Newton RU, Kraemer WJ, Häkkinen K: Effects of ballistic training on preseason preparation of elite volleyball players. *Med Sci Sports Exerc*, 1999, 31:

323–330. [\[Medline\]](#) [\[CrossRef\]](#)

- 6) Ingebrigtsen J, Ian J: Relationship between speed, strength and jumping abilities in elite junior handball players. *Serb J Sports Sci*, 2012, 6: 83–88.
- 7) Ebben WP, Hintz MJ, Simenz CJ: Strength and conditioning practices of Major League Baseball strength and conditioning coaches. *J Strength Cond Res*, 2005, 19: 538–546. [\[Medline\]](#)
- 8) Sutherland TM, Wiley JP: Survey of strength and conditioning services for professional athletes in four sports. *J Strength Cond Res*, 1997, 11: 266–268.
- 9) Ebben WP, Blackard DO: Strength and conditioning practices of National Football League strength and conditioning coaches. *J Strength Cond Res*, 2001, 15: 48–58. [\[Medline\]](#)
- 10) Draganidis D, Chatzinikolaou A, Jamurtas AZ, et al.: The time-frame of acute resistance exercise effects on football skill performance: the impact of exercise intensity. *J Sports Sci*, 2013, 31: 714–722. [\[Medline\]](#) [\[CrossRef\]](#)
- 11) Simenz CJ, Dugan CA, Ebben WP: Strength and conditioning practices of National Basketball Association strength and conditioning coaches. *J Strength Cond Res*, 2005, 19: 495–504. [\[Medline\]](#)
- 12) Ebben WP, Carroll RM, Simenz CJ: Strength and conditioning practices of National Hockey League strength and conditioning coaches. *J Strength Cond Res*, 2004, 18: 889–897. [\[Medline\]](#)
- 13) Reverter-Masià J, Legaz-Arrese A, Munguía-Izquierdo D, et al.: A profile of the resistance training practices of elite Spanish club teams. *J Strength Cond Res*, 2009, 23: 1537–1547. [\[Medline\]](#)
- 14) Reverter-Masià J, Jove-Deltell MC, Legaz-Arrese A: Conditioning services in elite Spanish water polo clubs. *J Phys Educ Sport*, 2012, 12: 164–170.
- 15) Reverter Masià J, Hernández González V, Jové Deltell C, et al.: La productividad científica en WoS y el índice H de hirschs del área de Educación Física en España y Brasil: productividad y comparación entre países. *Movimento*, 2013, 19: 125–147.
- 16) Reverter-Masià J, Hernández-González V, Sans-Rosell N, et al.: Disponibilidad en abierto de los artículos en web of science y scopus que publican y citan los profesores universitarios de educación física: el caso de España. *Movimento*, 2015, 21: 419–433.
- 17) Durell DL, Pujol TJ, Barnes JT: A survey of the scientific data and training methods utilized by collegiate strength and conditioning coaches. *J Strength Cond Res*, 2003, 17: 368–373. [\[Medline\]](#)