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Sitting Volleyball Classification System: The Athletes' Perspective

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Abstract

The aim of this study was to evaluate the classification system in sitting volleyball (SV) based on athletes' opinions on different competitive level. During World Sitting Volleyball Championships in 2014, 187 participants and 35 players in Polish and Lithuanian SV leagues participated in this study. They completed the survey regarding the current classification system in SV. The classification procedure was assessed as positive by 74% of elite athletes and 94.1% league athletes. Elite athletes see a need to include functional procedures, and in contrast to league athletes, they assessed the current classification system positively. Many of the players see a need to change the current classification system from medical to functional or mixed procedures. League athletes in contrast to elite athletes agree to include able-bodied people to compete on the court with people with physical impairments

Keywords: Paralympic sports, adapted physical activity, classification

Sitting volleyball (SV) is a team sport, which is played at the Summer Paralympic Games. This sport appeared in the 1980s Paralympic Games (Arnhem, Netherlands), where only male athletes were allowed to compete. Female athletes started playing SV at a Paralympic level in Athens (Greece) in 2004 (Morgulec, 2003). SV rules are similar to standing volleyball. On a court there are 12 athletes, six in each team, who compete in a seated position. The SV court is smaller than a regular volleyball court (SV court is 10 m x 6 m and regular volleyball court is 18 m x 9 m) and the net is set lower (1.15 m and 1.05 m, respectively for men and women). The main difference in the rules between SV and standing volleyball is determined by the player's position on the court. In SV buttocks indicate a position of players on a court (in standing volleyball there are feet). When the team commits a fault/violation it loses a point, for example when a player lifts the buttocks during an attack, block or receiving the ball (lifting). Moreover, SV players can block a serve. Other rules are the same as in standing volleyball e.g., serve, points per set, set number, number of actions per team (World ParaVolley, 2013).

Only people with physical impairment (e.g. amputations, poliomielitis, cerebral palsy) or with minimal impairments can play SV at a Paralympic level. These athletes are divided into two classes: D – people with impairment and MD – people with minimal impairments. International rules allow one athlete with MD on each team to play on the court. This division of players is based on a medical classification system, which is supervised by the World ParaVolley and the International Paralympic Committee (IPC) (World ParaVolley, 2013).

A classification system is a set of activities and rules, which permits athletes to compete in sports under similar principles (Tweedy, 2002). Usually a classification system is used in able-bodied sports such as fighting sports (e.g., judo, boxing, or weightlifting) in order to divide athletes in terms of weight, in golf as a handicap to establish the level of the golfers' ability. Age and gender divide athletes in many sport disciplines as well. Thereby, a competition of those participants could be balanced. In sports for people with impairment there are two major types of classification: medical (e.g., in SV) and functional (e.g., wheelchair basketball), however, some disciplines combine medical and functional classification into a mixed classification system (e.g., wheelchair rugby). All of those classification types are used to divide athletes into sport classes in terms of impairment or the athlete's ability (International Paralympic Committee, 2007). Thus, that the main purpose of the Paralympic classification system is to minimize the impact of impairment on the outcome of competition (International Paralympic Committee, 2007; Tweedy and Vanlandewijck, 2009). Due to the different types/levels of athletes' impair-

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ment there is a need to divide them into classes in each sport discipline. The IPC emphasises that all classification should be based on the evidence-based classification system (Tweedy, Beckman and Connick, 2014; Tweedy and Vanlandewijck, 2009). The evidence-based classification system is defined by two components: (1) fixing a clear purpose of promoting the minimum impact of impairment on the competition outcome; and (2) providing empirical methods based on evidence to assess athletes and place them into the appropriate class in order to achieve the purpose defined above (International Paralympic Committee, 2009). Researchers verify classifications in different sports using the scientific evidence in wheelchair basketball (de Lira et al., 2010; Molik et al., 2010; Molik, Kosmol, Morgulec-Adamowicz, Hübner-Woźniak and Rutkowska, 2006; Molik et al., 2013), in wheelchair rugby (Morgulec-Adamowicz et al., 2010; Morgulec-Adamowicz, Kosmol, Molik, Yilla and Laskin, 2011) or in SV (Morres et al., 2006), but none of them mentioned the evidence-based classification. Furthermore, in studies which concern SV there are guidelines for further research. Morres et al. (2006) assessed the sport performance in relation to the impairment of male athletes during the 2003 Sitting Volleyball World Cup by video analysis (a pilot study). They found no correlations between performance and the types of impairment, but they indicated that there should be a continuation of their research in terms of association between performance and the types of impairment (e.g. single or double, above or below knee amputee) of SV players.

It needs to be highlighted that the classification systems should be as understandable as possible to all participants in each discipline (International Paralympic Committee, 2007, 2009). The understanding of the classification systems is important to promote sport among persons with impairment and encourage them to start training. However, it seems to be necessary to recognise the viewpoint of players with different levels experience to examine (i.e., level of expertise) their understanding of the classification system in SV. This recognition would enhance arguments concerning the need for changes and the development of the classification system. Accordingly, to the above consideration and additionally taking into account above mentioned recommendations from research of Morres et al. (2006) the aim of this study was to evaluate the classification system in SV based on elite athletes' opinions on different competitive level.

Method

The Senate Commission of Science Research Ethics approved this study. Before participation in the study, participants were asked to accept and sign the written consent form. The sample included SV players with different competition level and different impairments. During the World Sitting Volleyball Championships (Poland, 15-21 June 2014) 173 male athletes from 16 teams and 115 female athletes from 12 team were invited to fill in the survey regarding the current classification system in SV (elite athletes). Similarly, 16 players of Polish league and 21 players of Lithuanian league were asked to fill in the same survey (league athletes). Inclusion criteria were: age (>18 years old), the experience playing SV should be a minimum of 1 year for league players and 2 years for elite players. Exclusion criteria was a lack of correctness in filling in the survey.

The authors' survey was used to establish the position of SV players in terms of current classification system in SV. The survey was anonymous. This questionnaire consisted of 10 personal questions (name, age, gender, type of impairment, when the impairment occurred, special aids needed for ambulation, sport experience, other) and 16 questions about classification system in SV. Six out of 16 concerned: 1) knowledge of classification systems in Paralympic Games; 2) knowledge about the current classification system in SV; 3) status of the current classification system; 4) assessment of classification procedures; 5) perceived skill level of national classifiers; and 6) perceived skill level of international classifiers. This survey was created in Polish language and it was translated to English and Russian by language specialists. A back translation method was used (translation was from Polish to English or Russian and from English or Russian to Polish). The reliability of each language version of the survey was determined by Spearman rank test (>.90). Because SV rules are universal, there was no need to check the questions in terms of essential culture differences.

This descriptive survey was designed using a close-ended format with the assumption that our evaluation of the classification system could be done evaluating six fundamental factors: status of the current classification system in Paralympic Games and in SV (1, 2), status of the current classification system (3), evaluation of current classification procedures (4), perceived skill level of national classifiers (5), and perceived skill level of international classifiers (6). A Likert scale based on five levels was used with: 1 – very poor, 2 – poor, 3 – satisfactory, 4 – good, 5 – very good. Analysis of the validity and reliability was performed on the scale of classification system's evaluation, because other parameters had nominal character (they were not identified as parametric factors). Principal Component Analysis (PCA) was used for the theoretical confirmation of validity. It was accepted that the factors/ components that were used in the evaluation scale would be correlated > .70 with the first component (Bowling, 2002; Nunnaly, 1978). Analysis of the main components of scale of Status of the current classification system separated one correlate component on level from .74 to .88 with six components, who created it (this correlate component). Based on the level of validity of components who describe the evaluation of classification systems we are able to recognise questions as appropriate. Moreover, Cronbach's Alfa analysis for six fundamental factors shows a level of .90. The reliability of the questionnaire was evaluated using the method of internal cohesion and requires that the correlations be at least .40 (Kline, 1986).

The statistical analyses were performed using IBM SPSS statistics for Windows, version 21.0 (Armonk, NY: IBM. Corp.). Firstly, the ordinal variables were analysed using descriptive statistics (mean and standard deviations) and the comparisons between groups - elite and league athletes, was tested using the non-parametric test for independent samples (Mann-Whitney *U* test). This approach was done due to the ordinal nature of responses (rank-ordered data) that need to be considered as non-normally distributed (Field, 2009). The same test was used to check differences in answers in the survey between male and female athletes. Effect sizes (*ES*) were calculated using the *r* test and their interpretation were based on the following criteria: .10 = small effect, .30 = medium effect and .50 = large effect (Cohen, 1988).

Secondly, the nominal (categorical) variables were analysed using descriptive (frequencies, %) and inferential analyses (crosstabs commands, and then the Pearson's Chi-square test was used to analyse the effects between elite and league athletes in responses for each question of the questionnaire). The following Chi-square assumption was considered: the expected frequencies should be greater than 5, although it is acceptable in larger contingency tables to have up to 20% of expected frequencies below 5, the result is a loss of statistical power and then may either, to show higher *p* values, or may fail to detect a genuine effect (Field, 2009). Therefore, the Fisher's exact test was used when the percentage was below 1 in any variable or the expected frequencies distributions were below 5 (Howell, 2006). Significant level was set to $p<.05$. Effect sizes (*ES*) were calculated using the Cramer's *V* test. The interpretation was based on the following criteria: .10 = small effect, .30 = medium effect and .50 = large effect (Volker, 2006).

Results

The survey about the current classification system was completed by 224 athletes (31 athletes were classified as players with minimal impairment – group MD, and 193 athletes were classified as players with impairment - group D). There were 178 players (79.5%), who did not need any equipment for walking and 46 athletes (20.5%) who used wheelchairs, crutches or cane walk. The descriptive characteristics of elite and league athletes are presented in Table 1. There were no statistically significant differences in male and female athletes' answers in the survey.

Table 1
Characteristic of sitting volleyball athletes

		Elite athletes			League athletes		
		M	F	Total	M	F	Total
Number of athletes (n)		116	73	189	30	5	35
Age (years; months)	mean	34;1	31;8	33;2	42;6	44;7	42;10
	sd	7;8	9;9	8;8	15;0	14;2	14;8
Other practiced	yes	24 (20.8)	23 (31.9)	47 (25.1)	13 (43.3)	4 (0.8)	17 (48.5)
sports (n (%))	no	91 (79.2)	49 (68.1)	140 (74.9)	17 (56.7)	1 (0.2)	18 (51.5)
Training (training/	mean	3.34	2.70	3.09	2.00	1.60	1.94
week)	sd	1.25	1.55	1.40	.91	.89	.91
Training experience	mean	9.39	6.34	8.17	8.0	15.0	9.13
(years)	sd	5.64	5.25	5.67	8.35	8.22	8.60

Note. sd: standard deviation; n: number of athletes; M: male; F: female.

Table 2 presents the opinion of elite and league athletes regarding the current classification system in SV (questions with ordinal level of measure). There were significant differences in the question *How do you assess the classification procedure in SV (classifying athletes)?* between both groups with higher values for elite athletes between *good* (26.7%) and *medium* values (40.6%) than league athletes that considered mostly as *good* (52.9%) or *medium* (35.3%) the procedure; and in the question *How do you assess the level of skills of international classifiers?* with higher values for elite athletes as *medium* (29.3%) or *good* (38.7%) compared with league athletes as very *bad* (37.1%), *medium* (20.0%) or *good* (22.9%). The other questions did not show significant differences between groups, elite and league athletes. The descriptive results showed that SV athletes consider that: (1) the athletes' knowledge about the classification system in Paralympics was *satisfactory* or *bad*; (2) the athletes' knowledge about the classification system in SV was *satisfactory* or *good*; (3) the athletes' assessment about the current classification system in SV was *good* or *satisfactory*; and (4) the athletes' opinion about the level of national classifiers was *satisfactory* or *good* for elite athletes and *satisfactory* or *very bad* for league athletes. Almost half of league athletes assessed the level of national classifiers as *bad* or *very bad* (48.8%).

Table 2
Frequency distribution (%) of elite and league athletes according to first six questions (crosstab command: Pearson's chi-square, significance and effect size)

Questions	Answers	Elite athletes		League athletes		Z	p	ES
		%	n	%	n			
How do you assess your knowledge about current classification system in Paralympic Games?	very good	16.0	30	11.4	4	-1.427	.154	.01
	good	21.9	41	17.1	6			
	medium	26.2	49	20.0	7			
	bad	19.8	37	31.4	11			
	very bad	16.0	30	20.0	7			
How do you assess your knowledge about current classification system in SV?	very good	12.3	23	17.6	6	-1.160	.246	.01
	good	33.2	62	38.2	13			
	medium	32.6	61	26.5	9			
	bad	12.3	23	11.8	4			
	very bad	9.6	18	5.9	2			
How do you assess the current classification system in SV?	very good	6.6	12	8.8	3	-.784	.433	.01
	good	34.6	63	35.4	12			
	medium	34.1	62	38.2	13			
	bad	17.0	31	17.6	6			
	very bad	7.7	14	.0	0			
How do you assess the classification procedure in SV (classifying athletes)?	very good	6.7	12	5.9	2	-2.926	.003**	.21
	good	26.7	48	52.9	18			
	medium	40.6	73	35.3	12			
	bad	20.0	36	5.9	2			
	very bad	6.1	11	.0	0			
How do you assess the level of skills of national classifiers?	very good	7.1	13	11.4	4	-1.396	.163	.01
	good	31.3	57	17.1	6			
	medium	29.7	54	22.9	8			
	bad	7.1	13	5.7	2			
	very bad	24.7	45	42.9	15			
How do you assess the level of skills of international classifiers?	very good	10.5	19	14.3	5	-1.724	.015*	.12
	good	38.7	70	22.9	8			
	medium	29.3	53	20.0	7			
	bad	8.8	16	5.7	2			
	very bad	12.7	23	37.1	13			

Note. n: number of athletes; *p < .05; **p < .01; ES: effect size

Table 3 presents the opinion for elite and league athletes about the current classification system in SV (questions with nominal level of measure). The results showed significant differences between elite and league athletes' opinion for the question (1) *do you think that international classifiers are objective?* League athletes indicated that they *do not have opinion* (60% compared with 32.6% of elite athletes); (2) *do you think that precise classification system (divisions into classes/start groups) should be created in SV?* reflected that elite athletes do not consider a precise classification system (38% compared with 20%), and the league athletes thinking that *yes at a league level* (35.7%) and *in all the levels* (28.6%) it should be established; (3) *what kind of classification system would you prefer in SV?* showed that elite athletes mainly prefer *a mixed class* (43.8%) or *a functional class* (25.6%) while league athletes consider that they prefer *functional* (28.6%), *mixed classes* (40%) but 25.7% consider that they *do not have opinion*; (4) the question *Do you think that the classification system should promote beginners (first season of play)?* pointed out that elite athletes consider that it is not needed a promotion of beginners (49.2% compared with 31.4% for league athletes), while the league athletes consider that the beginners should be promoted during the first year (51.5% compared with 34.2% for elite athletes); and (5) the question *Do you think that able-bodied people should compete with disabled people in SV on the international level?* showed that

majority of elite athletes (67.9%) are against to compete together with able-bodied players, however the league athletes mainly consider that able-bodied players can compete with people with impairments in SV (74.3%).

Table 3
Frequency distribution (%) of elite and league athletes according to each question (crosstab command: Pearson's chi-square, significance and effect size)

		Elite athletes		League athletes		χ2	p	ES
Questions	Answers	%	n	%	n			
Do you think that national classifiers are objective?	yes	36.8	68	37.1	13	7.934	.150	.20
	no	28.3	53	14.3	6			
	have no opinion	34.9	66	45.7	16			
Do you think that international classifiers are objective?	yes	39.1	73	31.4	11	15.167	.002**	.27
	no	28.3	53	8.6	3			
	have no opinion	32.6	61	60.0	21			
Do you think that precise classification system (divisions into classes/start groups) should be created in SV?	yes - national	11.3	21	35.7	9	29.737	.001**	.40
	yes - international	30.5	57	14.3	5			
	yes - Paralympic	15.0	28	11.4	4			
	all	5.3	10	28.6	10			
	no	38.0	71	20.0	7			
Do you think that SV needs a precise division into classes/ start groups?	yes	41.7	78	48.6	17	.776	.888	.05
	no	36.4	68	31.4	11			
	have no opinion	21.9	41	20.0	7			
What kind of classification system would you prefer in SV?	medical class	13.8	26	5.8	2	31.597	.001**	.42
	functional class	25.6	48	28.6	10			
	mixed class	43.8	82	40.0	14			
	have no opinion	16.6	31	25.7	9			
Would you expect an explanation from classifiers regarding their decision in the classification process?	yes	83.9	157	85.8	30	2.276	.524	.10
	no	1.6	3	.0	0			
	have no opinion	14.4	27	14.3	5			
Do you think that male and female athletes should have the same classification system?	yes	80.2	150	80.0	28	3.430	.310	.12
	no	7.5	14	2.9	1			
	have no opinion	12.3	23	17.1	6			
Do you think that the classification system should promote beginners (first season of play)?	yes	34.2	64	51.5	18	4.746	.016*	.14
	no	49.2	92	31.4	11			
	have no opinion	16.6	31	17.1	6			
Do you think that the classification system should promote junior athletes?	yes	43.3	81	57.2	20	3.539	.287	.12
	no	41.2	77	25.7	9			
	have no opinion	15.5	29	17.1	6			
Do you think that able-bodied people should compete with disabled people in SV on the international level?	yes	23.5	44	74.3	26	39.111	.001**	.42
	no	67.9	127	14.3	5			
	have no opinion	8.6	16	11.4	4			

Note. n: number of athletes; *p < .05; **p < .01; χ2: chi-squared; ES: effect size; SV – sitting volleyball

The remaining five questions did not indicate significant differences between groups. The descriptive results indicated that SV athletes consider that (1) the national classifiers are objective; (2) SV classification system needs a precise division into classes; (3) the athletes consider that the classifiers should give a clear decision and justification regarding their classification process; and (4) the classification system for male and female athletes should be the same.

Discussion

The aim of this study was to evaluate the classification system in SV based on the athletes' opinions on different competitive level. It seems to be very important to consider athletes' opinion of classification in this sport discipline before any changes of rules. This point of view is well known by researchers in other sports disciplines, e.g., swimming, wheelchair rugby or wheelchair basketball (Molik, Kosmol, Mika and Rutkowska, 2007; Wu, Williams and Sherrill, 2000). Some authors (Wu et al., 2000) introduced a questionnaire regarding the classification system in swimming to classifiers. Others investigated the opinions of trainers, players and referees regarding the classification system in wheelchair basketball (Molik et al., 2017) and in wheelchair rugby (Altmann, Hart, van Limbeek and Vanlandewijck, 2014).

In the present study, more than 68% of the subjects (elite and league athletes) described the classification system in SV as *good* or *very good,* and no more than 25% of the subjects evaluated the classification system as *bad* and *very bad*. The positive assessment of the classification system has been consistent, which could mean that the current classification system is satisfactory for players in SV.

The knowledge of players about the current SV classification system was assessed positively (*very good*, *good* or *medium*) by themselves (more than 50% responses). Furthermore, it is interesting that more than 20% of elite athletes assessed the classification procedure in SV as *bad* or *very bad* by compared to 6% of league athletes. These significant differences in groups could be due to the fact that elite players have more experience when dealing with classifiers and they have a better knowledge of the classification procedures.

Another interesting result was the difference in opinion of the elite and league players on the skill level of international classifiers. In the classification process, all players have opportunity to meet national and/or international classifiers. League players can be assessed by national or international classifiers to receive a national classification status (classifiers always introduce themselves). After that, if players need to achieve international classification, they have to be assessed by three classifiers (a panel of three classifiers with international license). That is why league players could assess international classifiers' work. In our study, more than 40% of league players assessed skills of international classifiers as *bad*. However, almost 40% of the elite players considered that there is a need to create a precise classification system (division players into classes/start groups on national or international or Paralympic level).

The question regarding the type of classification system that should be used in SV (medical, functional and mixed) indicated that there were some differences in the opinion between the groups (elite and league). Nearly 25% of the league players group had no opinion while 16.6% of elite athletes did not have any opinion. The differences in responses could be caused by a misunderstanding of lower level players a. Perhaps they do not recognise what type of classification system used. Probably, national organisations should focus their attention to introduce national athletes to the rules of the current classification system in SV and specific of classifiers work with national athletes to increase their awareness about this field.

It is puzzling that SV players agreed that the promotion of junior athletes in the classification procedure should be advanced. The reason for this point of view is probably the desire to involve new and young players to play SV, because the environment in this discipline is outdated (there are not observed many new and young players from year to year, rotation of new players in the teams is reduced, there are the same players on each championship).

The increased popularity of SV may draw more and more able-bodied people to play SV. There is a possibility for able-bodied players to participate in SV game with players with physical impairments in most of national leagues, but they cannot take part in games on the Paralympic or international level. In this study, there were different responses between groups regarding the participation of able-bodied people with people with impairment in SV at the international level. Elite players were opposed to inclusion of able-bodied people during play in contrast to league players, who were strongly in favour of the integration. The opinion of elite athletes about inclusion of able-bodied players in wheelchair basketball is similar. Molik et al. (2017) found that 57% of elite wheelchair basketball players agreed that able-bodied players could join the game. Probably, elite players do not agree, because they do not want to be replaced by able-bodied athletes during the Paralympic Games or World Championships. The participation of able-bodied athletes is clearly described in Paralympic rules for each discipline and there is no reason to modify those rules. On the other hand, competition of athletes with physical impairments with able-bodied players on national level (in league games) could be a good way to develop SV (Molik et al., 2017).

The limitation of this study was a small group of league athletes in comparison to elite athletes. In future studies, the opinion of coaches/managers of teams should be studied, because they are the people responsible for informing and teaching players about the game and classification rules.

In conclusion, participation in SV could support players' functional capabilities, which were developed during the rehabilitation process. In order to increase the number of participants and SV players, classification and eligibility rules need to be clear for stakeholders (players, coaches, media, etc.). In this study, more than three fourth of elite and league players assessed positively the current classification system, what is a big step to promote and develop the discipline. The athletes' opinion should be a key factor to create and change the classification system in SV.

In this study classification system of SV was assessed by elite and league SV players. Although, athletes see some aspects of the SV classification system that could be improved. Due to the fact, that all the decisions, changes and modifications of the classification system should be based on evidence (International Paralympic Committee, 2007, 2015). There is a need to do objective research about classification in SV trying to look for some evidence to develop the current classification system (Morres et al., 2006). The research in this field should be continued.

Declaration of Conflicting Interests

The Authors declare that there is no potential conflict of interest.

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Sistema de clasificación de voleibol sentado: la perspectiva de los atletas

Resumen

El objetivo de este estudio fue evaluar el sistema de clasificación en voleibol sentado (SV) en función de las opiniones de los atletas en diferentes niveles competitivos. Durante el Campeonato Mundial de Voleibol Sentado en 2014, 187 participantes y 35 jugadores de las ligas SV polacas y lituanas participaron en este estudio. Completaron la encuesta sobre el sistema de clasificación actual en SV. El procedimiento de clasificación fue evaluado como positivo por el 74% de los atletas de élite y el 94.1% de los atletas de liga. Los atletas de élite ven la necesidad de incluir procedimientos funcionales, y en contraste con los atletas de la liga, evaluaron positivamente el sistema de clasificación actual. Muchos de los jugadores ven la necesidad de cambiar el sistema de clasificación actual de procedimientos médicos a procedimientos funcionales o mixtos. Los atletas de la liga, en contraste con los atletas de élite, aceptan incluir personas sanas para competir en la cancha con personas con discapacidades físicas.

Palabras clave: deportes Paralímpicos, actividad física adaptada, clasificación

Sistema de qualificação para o vôlei: a perspectiva dos atletas

Resumo

O objetivo deste estudo foi avaliar o sistema de classificação em voleibol sentado (SV) baseado na opinião de atletas em diferentes níveis competitivos. Durante o Campeonato do Mundo de Voleibol em 2014, participaram neste estudo 187 participantes e 35 jogadores nas ligas da Polónia e da Lituânia. Eles completaram a pesquisa sobre o sistema de classificação atual em SV. O procedimento de classificação foi avaliado como positivo por 74% dos atletas de elite e 94,1% dos atletas da liga. Os atletas de elite veem a necessidade de incluir procedimentos funcionais e, em contraste com os atletas da liga, avaliaram positivamente o sistema de classificação atual. Muitos dos jogadores vêem a necessidade de mudar o sistema de classificação atual de procedimentos médicos para procedimentos funcionais ou mistos. Atletas da liga, em contraste com atletas de elite, concordam em incluir pessoas fisicamente capazes para competir na quadra com pessoas com deficiências físicas.

Palabras chave: esportes Paraolímpicos, atividade física adaptada, classificação

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