EUROPEAN Journal of Physical Education and Sport

Has been issued since 2013.
ISSN 2310-0133. E-ISSN 2310-3434
2015. Vol.(8). Is. 2. Issued 4 times a year

The journal is registered by Federal Service for Supervision of Mass Media, Communications and Protection of Cultural Heritage (Russia). Registration Certificate **ПИ № ФС 77 – 55400** 17.09.2013.

Journal is indexed by: **CrossRef** (UK), **EBSCOhost Electronic Jornals Service** (USA), **Electronic scientific library** (Russia), **Global Impact Factor** (Australia), Open Academic Journals Index (Russia), **ULRICH's WEB** (USA).

All manuscripts are peer reviewed by experts in the respective field. Authors of the manuscripts bear responsibility for their content, credibility and reliability.
Editorial board doesn't expect the manuscripts' authors to always agree with its opinion.

Postal Address: 26/2 Konstitutcii, Office 6
354000 Sochi, Russian Federation

Website: http://ejournal7.com/
E-mail: ejm2013@mail.ru

Founder and Editor: Academic Publishing House *Researcher*

Passed for printing 16.06.15.
Format 21 × 29,7/4.
Enamel-paper. Print screen.
Headset Georgia.
Ych. Izd. l. 4,5. Ysl. pech. l. 4,2.

Circulation 500 copies. Order № 8.

European Journal of Physical Education and Sport

2015

№ 2

Европейский журнал физической культуры и спорта

2015

№ 2

Европейский журнал физической культуры и спорта

Издается с 2013 г. ISSN 2310-0133. E-ISSN 2310-3434
2015. № 2 (8). Выходит 4 раза в год.

Журнал зарегистрирован Федеральной службой по надзору в сфере массовых коммуникаций, связи и охраны культурного наследия (Российская Федерация). Свидетельство о регистрации средства массовой информации **ПИ № ФС 77 – 55400** 17.09.2013.

Журнал индексируется в: **CrossRef** (Великобритания), **EBSCOhost Electronic Jornals Service** (США), **Global Impact Factor** (Австралия), **Научная электронная библиотека** (Россия), Open Academic Journals Index (Россия), **ULRICH's WEB** (США).

Адрес редакции: 354000, Российская Федерация, г. Сочи, ул. Конституции, д. 26/2, оф. 6
Сайт журнала: http://ejournal7.com/
E-mail: ejm2013@mail.ru

Учредитель и издатель: ООО «Научный издательский дом "Исследователь"» - Academic Publishing House *Researcher*

Подписано в печать 16.06.15.
Формат 21 × 29,7/4.
Бумага офсетная.
Печать трафаретная.
Гарнитура Georgia.
Уч.-изд. л. 4,5. Усл. печ. л. 4,2.
Тираж 500 экз. Заказ № 8.

C O N T E N T S

Articles and Statements

Published in the Russian Federation
European Journal of Physical Education and Sport
Has been issued since 2013.
ISSN: 2310-0133
Vol. 8, Is. 2, pp. 80-89, 2015

DOI: 10.13187/ejpe.2015.8.80
www.ejournal7.com

Articles and Statements

UDC 79

Contribution to the Identification of the Professional Skills Profile for Coaches in the Algerian Sport Judo System

[1] Belkadi Adel
[2] Benbernou Othman
[3] Sebbane Mohamed
[4] Laroua Abdelhafid
[5] Bensabeur Mohamed
[6] Jaques Gleyse

[1] Research Laboratory Optimization of Programs in Physical and Sporting Activity-Institute of Physical Education and Sport University of Mostaganem Algeria, Algeria
PhD doctoral degree student
E-mail: adel.belkadi@gmail.com
[2] Research Laboratory Optimization of Programs in Physical and Sporting Activity-Institute of Physical Education and Sport University of Mostaganem Algeria, Algeria
Teacher University, professor
E-mail: benbernouothmane@yahoo.fr
[3] Research Laboratory Optimization of Programs in Physical and Sporting Activity-Institute of Physical Education and Sport University of Mostaganem Algeria, Algeria
Teacher University, professor
sebbane2006@yahoo.fr
[4] Research Laboratory Optimization of Programs in Physical and Sporting Activity-Institute of Physical Education and Sport University of Mostaganem Algeria, Algeria
PhD doctoral degree student
E-mail: larouaeps@yahoo.fr
[5] Research Laboratory Optimization of Programs in Physical and Sporting Activity-Institute of Physical Education and Sport University of Mostaganem Algeria, Algeria
PhD doctoral degree student
E-mail: bp310mostaganem@hotmail.fr
[6] Interdisciplinary Laboratory of Research in Teaching, Education and Training (LIRDEF), France
Teacher University, professor
E-mail: jacques.gleyse@orange.fr

Abstract

This study was designed to determine The professional skills of Coaches which are identified and judged on a large number of factors (Belkadi, Benbernou, & Gleyses, 2014). The purpose of this article is to describe the views of the four different professionals actors on coach skills; athletes, coaches, leaders and experts from the Algerian judo sport system, all the actors of that system have

responded to the same series of questions regarding coaches skills. Across the five groups of specific professional skills, the views expressed are more similar than dissimilar, with each professional emphasizing a different item of the coaches' skills.

The information presented aligns both with and shows that, coaches and athletes have the same representations of technical and teaching skills. However, a discrepancy of representations regarding the organizational and managerial skills. Stakeholder views are compared to the coaching science literature and recommendations to develop a professional skills repository of the judo coach are provided.

Keywords: identification, professional skills, profile, coaches.

Introduction

If a coach, involved in high-level sport, is admitted to have (or should have) high skills, the nature of these skills must be specified, exactly as the conditions which favor their acquisition (Zarifian, 1995). They do not seem to be simple and thus raise questions, especially in view of the implementation of the training of coaches and transmission of their knowledge.

In fact, so many "very good" current coaches (recognized to be experts by their peers) did initially no training priori intending them to these functions. For this purpose, Ragni (1996) noted (The same phenomenon in athletics, more than half of high level coaches do not have B.E.E.S); For this author (in the expertise of coaches, something escapes the guarantee conferred by the possession of knowledge or qualifications), Indeed in interviews to establish a record of the Olympic experience coaches of different sports disciplines in 2012, Most of them emphasize their experience (of athlete), their knowledge of the environment, a teaching that is primarily realized in the training action, rather than through theoretical knowledge from books. The recruitment of the Olympic teams coaches (the highest level of sports competition), is carried out without being taken into account decisively a level of training certified by a recognized certification in this field.

Theoretical models of training processes (Bruant(G), 1989) (based on scientific and technical rationalization of the training); And the approach of the coach, addressed in training or presented in books (Weineck 1990; revues Helal, 1986); Dealing with sports training, are generally perceived by the coaches as being out of touch with their practice and inadequate party to organize their work. This seems also not to be limited to the training of Algerian coaches. Indeed, in an article on the expert knowledge structure coaches, Salmela (1994) reported an American research shows that only 46 % of the coaches think that there are weak principles, theories and designs in Judo field. In addition, he says that the training of trainers (coaching classes) and books on training (coaching books) are part of the resources deemed less important by the coaches (Salmela, 1994). Sports coaches who work with high-level athletes are often considered "professional" experts in sport milieu. Commonly, we credit them with high skills in very varied registers (Danvers, 1992). They are presented by many authors as "engineers" of performance (Helal, 1986; Platonov, 1988 Weineck, 1990), as educators, pedagogues (Piéron, 1992), psychologists (Partington, 1988), the managers (Bosc, B1986) etc.

The problem of our present study, constructs the notion of professional competence mainly in reference to the executives of the educational literature, especially (Mialaret 1979 Cardinet 1988 Gillet 1991). These skills are analyzed in two distinct dimensions:

1 / specific skills that allow "Within a family of situations identifying a task problem and its resolution by an effective action (performance" (Gillet, 1991).

2 / classes of business situations that characterize the families of tasks which are related to the functions of their coach. The skills are distinguished as well as and knowledge that stands behind them. (Malglaive 1990; Delbos & Jorion, 1998; Levy Leboyer, 1997).

Methods and Means:

Participants

This study is realized during the sporting season 2014-2015, The people who voluntarily took part in this study consist of 330 subjects, (225Athletes, 45Coaches, 35Leadershipand 25 experts from the judo field) divided as follows (see Table1, the constitution of the population of the research).

Materials and Procedure

The questionnaire

An analytical model of coaches' skills, articulating five groups of specific skills, and four groups of professional situations classes (technical, educational, relational of organizer and manager "managerial). With several items per classes of professional situations (design and preparation of the training, Conduct of trainings (and track competitions), Organization and management, Institutional and relationship situations.

The questionnaire was administered via the Internet (online). The survey collected, A total of 205 (approximately 62.12 % of responses) of the 330 (100 %) usable questionnaires from a statistical point of view.

The analysis model, briefly presented above, was the basis for the construction of a survey questionnaire, which combined closed questions, preceded for a quantitative treatment of responses, and spaces as free comment optional, for a possible future qualitative exploitation.

Statistical Analysis

The coding scheme is designed to facilitate data entry using the SPSS (Statistical Package for the Social Sciences) Version 22. The study of responses differences between groups was performed using the **Chi- squared Test.**

Results

The results of the quantitative analysis globally accredit the two advanced hypotheses. Yet, with regard to the first, the weakness of certain staffing prompts us to observe an extreme caution: we claim to identify only trends, which emphasize and strengthen the initial hypothesis.

Specific skills

Analysis of choice and non choice skills / coach profile:

Technical. Skills

Item A: Amount the training at the optimum level for athletes.

Item C: Being an expert in the knowledge of the competition

Teaching. Skills

Item D: Be a good teacher, able to facilitate engaging training sessions to explain and convey clearly his analyzes.

Item F: Get involved effectively with each athlete during the trainings.

Relational. Skills

Item B: having a strong personal investment in his work(Get involved without mattering).

Item E: having psychologist qualities, allow the athlete to confide his personal problems.

Organizer and Manager. Skills

Item G: be strict and effective organizer, logistically, on trainings and travel.

Item I: be a good manager of the team's funds.

Managerial, Animation and managing a team. Skills:

Item H: represent and defend the interests of the team and discipline in federal bodies.

Item J: ability to discuss with athletes the choices and the important decisions concerning the operation of the team.

Discussions

Below are expressed in percentages of observed frequencies after grouping responses from various categories of stakeholders on the modalities 15 (choice) on one hand, and non response (non choice) on the other hand.

The choice of skills in the constitution of the coach's profile:

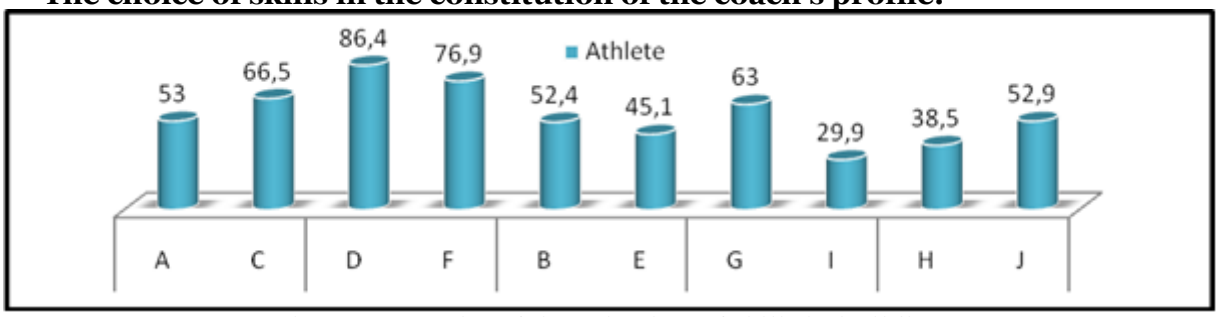

Figure 1: Results of the selection of skills in building the profile of the coach from Athletes

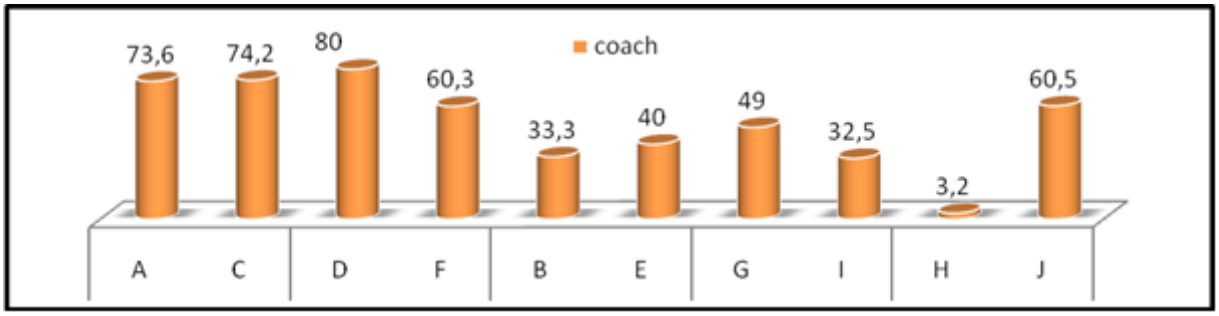

Figure 2: Results of the selection of skills in building the profile of the coach from the coaches.

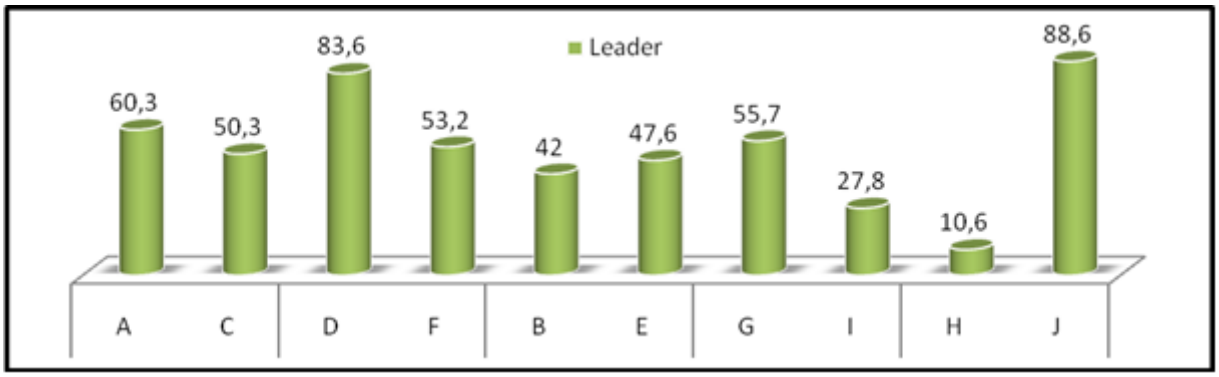

Figure 3: Results of the selection of skills in building the profile of the coach after the leaders

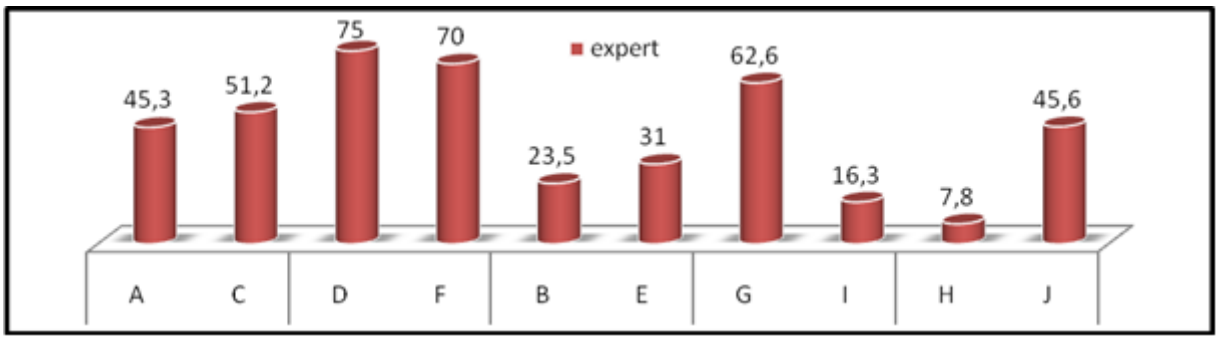

Figure 4: Results of choice analysis skills in building the profile of the coach according to Experts

Test application of Chi-squared:
Comparison of choices / non choice for each skill:

The test CHI.2 allows us to answer the question on differences in choice of Athletes / Coaches / Managers / Specialists, highlighted in the previous charts, are they significant?

Technical Skills:

Item A: CHI.2: 5.29.indiquant a non significant difference between these 4 categories, for 3 degrees of freedom; at p.05 threshold (p.05 threshold = 7.81) .However, the comparison AT / ENT gives a value of 4.80 CHI.2, indicating a significant difference between the two categories (p.05 threshold = 3.84 per 1 degree Freedom) .the athletes value less the skill coaches.

Item C: CHI.2: 3.33 indicating no significant difference between these 3 categories, for 2 degrees of freedom; at p.05 threshold (p.05 threshold = 5.99) .However, the difference observed between ENT and DIR is significant at (p.01) CHI.2: 3.34, p.01 threshold = 2.7 for 1 degree of freedom). These results indicate a tendency for coaches to exploit this expertise as leaders.

Educational Skills:

Item D: CHI.2: 0.26. indicating no significant difference between these two categories, one for degrees of freedom; at p.05 threshold (p.05 threshold = 3.84). The percentages of the responses of the four categories for this skill show an agreement of the various stakeholders on the importance of this skill: it is the most valued of all proposed items skill.

Item F: CHI.2: 3.45. indicating no significant difference between these 3 categories, for 2 degrees of freedom; at p.05 threshold (p.05 threshold = 5.99).

Relational Skills:

Item B: CHI.2: 0.70. indicating no significant difference between these 3 categories, for 2 degrees of freedom; at p.05 threshold (p.05 threshold = 5.99).

Organizer and Manager Skills:

Item G: CHI.2: 0.54. indicating a non significant difference between these 4 categories to 3 degrees of freedom; at p.05 threshold (p.05 threshold = 7.81).

Item I: It should be noted that the organizer and management skills collect a very small percentage of choices in four categories. This result would indicate an agreement of different actors on the low valuation of that skill

Managerial Skills:

Item H: testing the CHI.2 cannot validly apply here given the low observed frequencies (less than 2) on the modality choice for three categories of actors.

as in the case of previous skills, there seems to be a rejection of this skill, a very important agreement between the different actors of the sport system .

Item J: CHI.2: 0.56 indicating no significant difference between these two categories, one for degrees of freedom; at p.05 threshold (p.05 threshold = 3.84) .

Analysis of the choice of priority skills / coach profile:

Tech.skills:

Item B: analyze accurately the performance of athletes, know the technical solutions

Teaching. Skills:

Item D: varying the training situations and knowhow to adapt them if necessary.

Relational. Skills:

Item E: listening to athletes, seek out the knowledge and understanding them.

Organizer and Manager. Skills:

Item A: adopt strict principles of material organization and time management.

Managerial, Animation and managing a team. Skills:

Item C: generate knowledge and take into account the views of athletes prior to making important decisions for the team

The results: below are expressed in percentage of the observed frequencies after grouping responses from various categories of stakeholders on the terms 1 and 2 (both skills were identified as most important).

The priority skills in the coach's profile:

Table 1: Selection of priority skills in the coach's profile

%	TECHN .SKILLS (B)	PEDA.SKILLS(D)	SKILLS.RELAT (E)	SKILLS.ORG/GEST(A)	SKILLS.MANAG (C)
Athletes	41	39.6	58.2	19.2	41.6
coaches	75	20.8	45.8	29	29
leadership	52.8	17.6	52.8	29.4	47
experts	46	30.6	23	15.2	38.5

Test application of Chi-squared

Comparison of top choices for each category:

Technical competence (B):

CHI.2: 9.91 indicating a significant difference between these 4 categories to 3 degree of freedom at p.05 threshold (p.05 threshold = 7.81). It appears that the coaches group values this way of significantly higher competence than other groups. The largest difference is between the coaches (75%) and athletes (41%), making appear a disagreement between the two groups on the importance of the technical skills.

Teaching skills (D):

CHI.2: 3.16 indicating no significant difference between these two categories, for 1 degree of freedom, at p.05 threshold (p.05 threshold = 3.84). However, this difference is significant at p.01 (threshold = 2.70). This result reflects a tendency for athletes to exploit this instructional skill coaches in profile coaches.

Relational skills (E):

CHI.2 1.38 indicating no significant difference between these 3 categories, for 2 degrees of freedom at p.05 threshold (p.05 threshold = 5.99).

Organizer and management skills (A):

CHI.2: 1.94 indicating no significant difference between these 3 categories, for 2 degrees of freedom at p.05 threshold (p.05 threshold = 5.99).

Managerial (C):

CHI.2: 1.69 indicating no significant difference between these 4 categories to 3 degree of freedom at p.05 threshold (p.05 threshold = 7.81).

Analysis of first choice: comparative representation:

The most significant differences are in comparison Athlete / Coach; they concern the technical and pedagogical skills.

The choice analysis for deemed most important skill:

The results below are expressed as percentages of the observed frequencies for the modality 1: competence considered the most important of the five proposed items.

The most important skill in the coach's profile:

Table 2: Selection of the skills deemed most important in the coach's profile

%	Tech. skills (B)	PEDA. skills(D)	RELAT. skills (E)	ORG/GEST skills (A)	MANAG skills. (C)
Athletes	25.2	19.9	31.8	7.3	15.9
Coaches	45.8	0	33.33	20.8	0
leadership	47.1	5.9	11.8	17.6	17.6
specialists	46.2	0	7.7	7.7	15.4

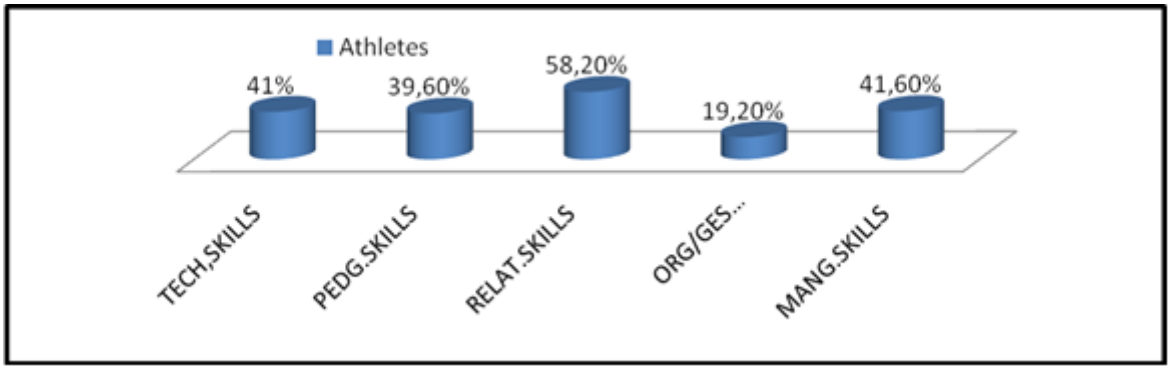

Figure 5: Results of choice analysis of the priority skills in the coach's profile according to Athletes

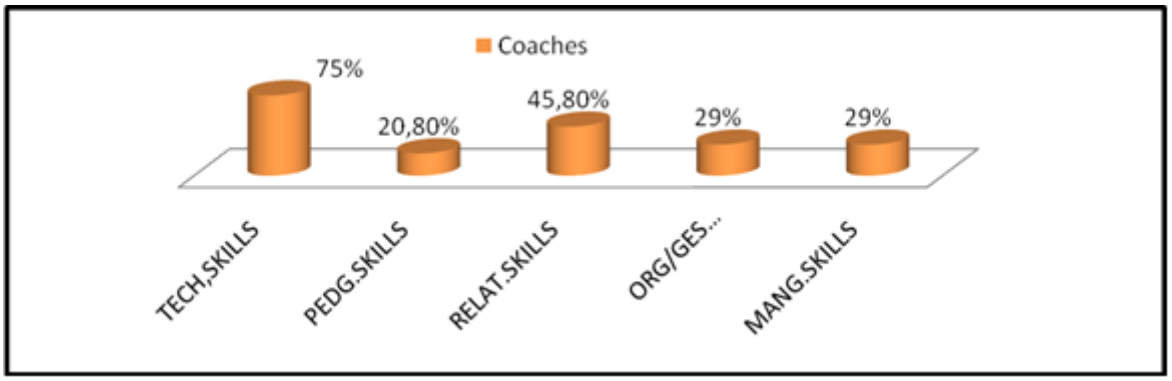

Figure 6: Results of choice analysis of the priority skills in the coach's profile according to the coaches

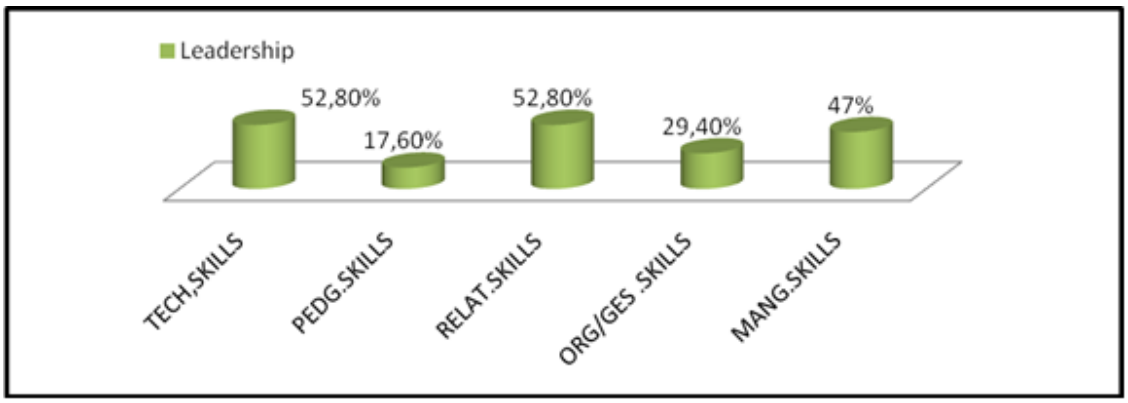

Figure 7: Results of choice analysis of the priority skills in the coach's profile according to leaders

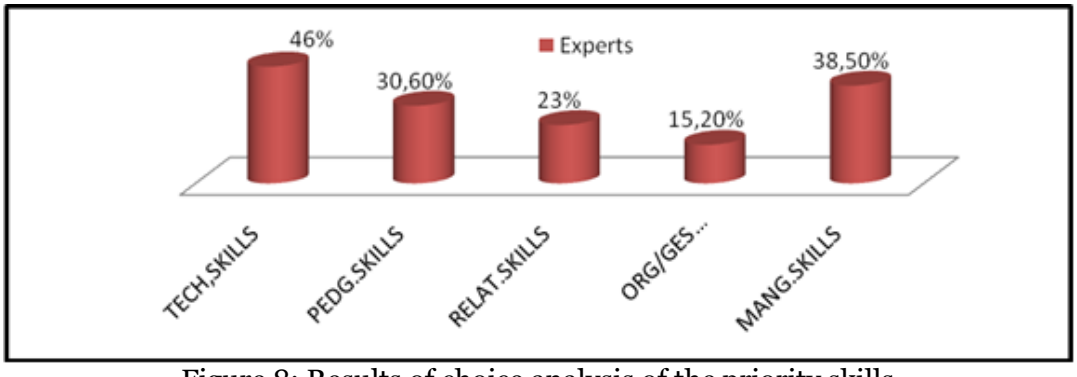

Figure 8: Results of choice analysis of the priority skills in the coach's profile according to the Experts

Test application of CHI.2 comparison of top choices for each category:

Technical competence (B):

CHI.2: 4.38 indicates a significant difference between these two categories, for 1 degree of freedom, at p.05 threshold (p.05 threshold = 3.84). This seems to confirm the fact that the coaches of group value the technical skills of significantly higher comparing to the athletes.

Teaching skills (D):

The test has no interest in this comparison because no coach has chosen this skill as competence 1, unlike athletes, including 19.9% rank this skill as the most important of the five proposed items.

This reinforces the idea of a disagreement between athletes and coaches on the importance of the teaching skills of the coach in the profile.

Relational competence (E):

CHI.2: 2.27 indicating no significant difference between these two categories, for 1 degree of freedom, at p.05 threshold (p.05 threshold = 3.84).

Organizer and management skills (A):

CHI.2: 5.19 indicating a significant difference between these two categories, for 1 degree of freedom, at p.05 threshold (p.05 threshold = 3.84) .20% of coaches feel that this skill is the most important of the five items proposed.

Managerial skills (C):

As for the skill D, CHI.2 test has no interest in this comparison because no coaches selected this skill as competence 1, unlike athletes, 16% ranked this competence as the most important of the five suggested items.

Analysis of the skills' choices n° 1: Comparative representation:

The most significant differences are in comparison ATH / COA, and concerning the technical and pedagogical skills.

Conclusion

The points of convergence and divergence between the various actors: We will analyze here, mainly, similarities and differences between athletes and coaches who are the most numerous and which maintain the most important relationships groups.

Consensus: the coach, "Field Specialist" (Leveque, 1992), in direct contact with athletes.

There seems to be a broad consensus among athletes and coaches in the valuation of certain skills and tasks. For example, it is essential for a majority of the population study that the coach is a reliable "outsider" and "target ", able to observe and analyze in performance (Hameline, 1979). There must be also a good teacher, able to animate the sessions, interesting trainings, explains and clearly conveys his analysis by showing methods, rigor in the organization and running of these sessions (Cotteaux, 1997). Finally, it is widely expected that it is equitable with all members of the team (Boterf G., 2000), understanding and listening to the athletes. The tasks that are considered to be the most important reinforce the contours of this competency profile (JOHSUA S. 1994). It is, overwhelmingly, the tasks of designing and conducting trainings (Bourdeault, 2005).

However, it appears according to the results, less important than the coach who has high skills in the areas of management (Lévy-Leboyer, 1997), organizational or management or that perform tasks accounting or institutional relations (Jolis, 1997).

It is not surprising that this agreement amounted to a "classical" representation of the coach: an expert and educator technician performing land business, in direct contact with athletes and focused on performance optimization sportsmen.

However, a closer analysis of the results also appears significant differences between athletes and coaches. **Technician / educator:** a disagreement between athletes and coaches (Parrington, 1988).

Coaches value more than the athletes technical knowledge (CHAUVIER 1988). It seems the most important example for coaches and athletes; the coach knows assay the training at the optimum level, or that he knows "the advanced technical solutions."

Conversely, such as skills, varied training situations (Boterf G., 2004), adapted to the level of athletes situations and external conditions, as is the ability to individualize the training are more valued by athletes rather than by coaches (Gasparini, 1996).

This disagreement is confirmed at the level of the coach tasks (Delbos G. & P. Jorion, 1985). Athletes favour trainings, driving tasks, whereas the coaches give the highest importance to the design tasks. In short, beyond the consensus, it seems that the coaches feel that they must, first, be experts and technicians (Lichtenberger, 2003), as athletes especially await as good pedagogues (without underestimating the technical skills).

References:

1. BOSC. (1983). *approche psychosociologique de la relation entraineur-entrainé dans les équipes sportives in THOMAS La relation au sein des APS*. Paris: vigot.
2. Bourdeault, H. (2005). *Le savoir-être, un référentiel professionnel d'excellence Alain Labruffe*. Paris: Afnor.
3. Bruant(G). (1989). *les savoirs de l'entraineur, élément d'épistémologie de l'homme de terrain*. Paris: A.F.R.A.P.S-STAPS.
4. Cardinet, J. (1988). *Evaluation scolaire et pratique*. Bruxelles: De Boeck.
5. CHAUVIER, R. (1988). *l'entraineur et les phénomènes de relations, Mémonto de l'éducateur sportif deuxième degré*. Paris: I N S E P.
6. Cotteaux, v. (1997). *Analyse de la construction de l'expertise des entraîneurs d'athlètes de haut niveau. Perspectives pour la conception des formations de cadres sportifs*. Paris: Mémoire pour le diplôme de l'INSEP.
7. Danvers, F. (1992). *700 mots-clefs de l'éducation*. Paris: Métiers et pratiques de formation.
8. G. Delbos & P. Jorion. (1985). La Transmission des savoirs, L'Homme, 1985. *vol. 25, n 96*, pp. 151-153.
9. Gasparini, W. (1996). Thèse de doctorat: Sociologie. *Enjeux de l'engagement associatif, Contribution à une sociologie de l'organisation sportive locale*. Strasbourg 2: n 96STR20006.
10. Gillet, P. (1991). *Construire la formation: outils pour les enseignant et les formateurs*. Paris: ESF.
11. Hameline, D. (1979). *Les objectifs pédagogiques. En formation initiale et en formation*. Paris: entreprise moderne d'edition.
12. HELAL. (1986). *téchnologie de la preparation sportive 'Mémonto de l'éducateur sportif deuxiéme degré I N S E P*. Paris: Mémonto de l'éducateur sportif.
13. JOHSUA. (1996). Au-delà des didactiques, le didactique, le concept de transposition didactique n'est-il propre qu'aux mathématiques ? Paris, Bruxelles. *De Boeck Université*, 61-73.
14. Johsua, S. (1994). *La Didactique des Sciences et des Mathématiques : une praxéologie ouun modèle théorique?* Aix-en-Provence.
15. JOHSUA, S. (1994). *La place de la technologie dans l'enseignement général et les recherches actuelles sur son enseignement*. France: INRP, Lyon (FRA).
16. Jolis, N. (1997). *Piloter les compétences: de la logique de poste à l'atout-compétence*. Paris: d'Organisation Réflexion sur l'origine du concept de compétence et son impact sur l'organisation.
17. Le Boterf, G. (2000). *L'ingénierie des compétences*. paris: Edition d'organisation.
18. Le Boterf, G. (2004). *Construire les compétences individuelles et collectives: les réponses à 90 questions*. Paris: Éditions d'Organisation.
19. LEVEQUE, M. (1992). *La relation entraineur-entrainé, perspective clinique sur sa dynamique affective*. Paris: Science et motricité n 17.
20. Lévy-Leboyer. (1997). *La gestion des compétences*. Paris: Editions d'Organisation.
21. Lichtenberger, Y. (2003). *Compétence, compétences, in J. Allouche (éd.), Encyclopédie des Ressources Humaines,* Paris: Vuibert.
22. Malglaive, G. (1990). *Enseigner à des adultes*. Paris: P.U.F.
23. Mialaret, G. (1979). *le vocabulaire de l'éducation*. Paris: P U F.
24. Parlebas Pierre, C. B. (1992). *Statistique appliquée aux activités physiques et sportives*. paris: Broché.
25. PARTIGNTON. (1988). «Devenir un entraineur complet». *Revue science du sport*, 60.
26. PIERON, M. (1992). *Pédagogie des APS*. Paris: édition revue EPS.
27. PLATONOV. (1988). *L'entrainement sportif, théorie et méthodologie*. Paris: Edition revu EP.

28. RAGNI, P. (1996). *la relation entraineur-entrainé en athlétisme: une demande d'amour à transférer à la technique.*

29. Salmela John H., D.-B. N. (1994). La détection des talents ou le développement de l'expertise en sport. *In: Enfance. Tome 47 n°2-3*, 233-245.

30. WEINECK. (1990). *Manuel de l'entrainement.* Paris: Vigot.

31. Wittorski, R. (2008). *Formation, travail et professionnalisation.* Paris: L'Harmattan.

32. Zarifian, P. (1995). *Le modèle de la compétence: une démarche inachevée.* paris: Le Monde.

33. Zarifian, P. (2001). *Le modèle de la compétence-Trajectoire historique, enjeux actuels et propositions.* Paris: Editions Liaisons.

Published in the Russian Federation
European Journal of Physical Education and Sport
Has been issued since 2013.
ISSN: 2310-0133
Vol. 8, Is. 2, pp. 90-96, 2015

DOI: 10.13187/ejpe.2015.8.90
www.ejournal7.com

UDC 79

The Reciprocal Relationship between Training with Weights and the Bliometrical Training and Their Effect on the Muscles Capacities Growth for Basketball Players

[1] Mokrani Djamel
[2] Benzidane Houcine
[3] Sebbane Mohammed & Tahar Tahar

[1-3] University of Mostaganem, Algeria
Institute of Sports and Physical Education
Laboratory of Applied Sciences in Human Movement
E-mail: sebbane2006@yahoo.fr

Abstract

The research aims to determine the effect of each of the training with weights and biometry in muscle capacity and jump for the basketball players development, and also reciprocal relationship of the impact of the three training types in the development of muscle ability and improve upon the research sample groups. The researchers used the experimental method to design three experimental groups, and the control group the results showed the extent of the progress made with the experimental groups, especially the mixed training group, which confirms that the proposed mixed training style has a distinctive effectiveness of the force development characterized by the speed as indicated by Talha Hossam El-Din (2008) where he shows the necessity to use a mixed training throughout the training season. This consist with Yasser Dabour's study (1996) which confirms that the mixed training (weights and bliometric) is more effective than training separately.

Keywords: training with weights, Bliometrical Training, Muscle Ability.

Introduction

Sports training has widespread its area towards Science by the use of various sciences to build its operations and plans, Ahmed Abdel rahman and Azzedine Bakri (2004) say that sports training is the overall process of improving aiming for sporty performance which is achieved through the scheme for the preparation and competition program, it is the process of the exercise of organization characterized by a dynamic and continuous change (Ahmed abderahmane & Azzedine bakri 2004)

The basketball is one of the collective games which has been practiced for a quite long time and no soon it has occupied a position among the other games due to its enthusiasm (Mouawad, 2009).

Like other activities, basketball game has become a keep pace with technology using the sciences to find effective ways and modern methods in order to achieve the highest form by obtaining the highest scores in physical performance and skill outstanding and good preparation

for the physical characteristics of the game, mainly distinctive strength speed, which is a prerequisite to reach higher level.

The training with weights has an important role in the development of muscle strength of the basketball player as the nature of the performance skills in the this sport requires a force characterized by the speed and then the training with weights is necessary among the contents of training programs (Kamel darrouich & all 1999)

For many researchers, bliometrical training becomes one of the methods more commonly used in the development of the distinctive force as fast as many of the sporting activities that require the integration of the maximum speed with maximum force muscle where this method contributes to overcome the problems that the development of the distinctive strengths characterized by the speed r faces (bastawisi Ahmed 1999)

Abdel-Maksoud(1997) mentioned that an attempt is made to reach a maximum degree of efficiency through the use of force with methods which are different or opposite in the direction inside the module or within a range of exercises, and it's possible to reach the contrast across the exchanging between weight either by using the explosive manner/method or by changing the load level or by changing the kind of contraction and muscle tension or from weight to bliometric. (Abdelmaksoud1997)

According to previous studies, the researchers concluded that the use of bliometrical training has utmost importance in the development of the physical characteristics and so does the training with weight. These studies agreed on the necessity of using both methods to develop the muscle power, especially the lower limbs and the process of upgrading, in correspondence a study of Sylva Sohak(2000), and a study Toplica stojanovié. Radmila kostié (2002),Vladan milié. Dragan nejié.radomir kostié (2008), and of Imad Sarssy (2006).

The problem of the study rose while observing the training sessions concerning the national championship teams of basketball. It was obvious that there was a lack of diversification and combining modern method of training, particularly about special physical attributes development. Referring to this point of view the current study focus on the use of both weight and bliometrical training to know the exchanging relationship between both methods in muscle and acclivity development for the basketball players.

This study aims to find out the reciprocity relationship between the weight and bliometrical training and its impact on the muscle capacity and the acclivity for the basketball players through a proposed training program to identify:

1. The effect or the impact of weight and bliometrical training on the muscle capacity and accession for the basketball players
2. Differences indication between the effect of training with weights and training with bliometric and weight and bliometrical training on the muscle capacity for the basketball players.
3. The reciprocity relationship impact between the effect of training with weights and training with bliometric and weight and bliometrical training on the muscle capacity for the basketball players.

Methods

1. Methodology: researchers used the experimental method by choosing four groups, three of them experimental and one static.

2. The Research sample:

The sample included 64 basketball cadet category players exercising in four teams from the West regional championship divided into equal four groups, with 16 players for each group.

The first group t using weight training, the second group using bliometrical training, the third group using both kind of training and the fourth group is the static sample.

Physical tests:

1- Three partridge with right leg.
2- Three partridge with left leg.
3- Push medical ball (3kgs).
4- Vertical jump test fixture.

5-'peacefully' scoring test.

The Main experiment:

The fundamental experiment was applied for twelve weeks at a rate of three training sessions per week. The duration of each session was 90 mn taking into account the training load principals. The first group used weight training program, the second team Bliometrical training while the third group applied a mixed training program combining training with weights and bliometric, while the fourth group receive an ordinary training program.

Results

Table (01): shows the parity homogeneity between the four groups in the variable under research.

Tests	Source of variation	Total square deviations	Degree of freedom	Average squares	P value calculated	Level significance
Three (3) partridge with right leg	Between groups	0.28	03 60	0.09	0.45	Non significant
	Within groups	12.01		0.20		
Three (3) partridge with right leg	Between groups	0.04		0.01	0.16	Non significant
	Within groups	4.02		0.06		
push medical ball (3kgs).	Between groups	0.89		0.29	0.78	Non significant
	Within groups	22.44		0.37		
vertical jump test fixture.	Between groups	0.25		0.08	1.60	Non significant
	Within groups	3.59		0.05		
"peacefully" scoring test	Between groups	0.55		0.18	0.08	Non significant
	Within groups	129.69		2.13		

P tabular value at the significance level 0.05=2.76

It's obvious from the table that there were not statistical significant differences between the four groups (experimental & controlled) which confirmed parity before starting the basic study.

Table (02): shows the differences between the tests averages under research for all the groups.

Statistical study	Tests	Pas-test		Post-test		T value calculated
Samples		X	Y	X	Y	
Training with weights group	Three partridge with right leg	3.66	0.18	4.79	0.10	20.06
	Three partridge with right leg	3.23	0.07	4.46	0.5	18.16
	Push medical ball 3kgs.	8.12	1.26	11.18	1.60	9.02
	vertical jump test fixture	3.04	0.33	3.67	0.25	6.30
	Peaceful scoring	03	1.52	07	1.57	8.38
training with bliometric group	Three partridge with right leg	3.51	0.11	4.47	0.21	17.04
	Three partridge with right leg	3.21	0.06	4.18	0.20	19.41
	Push medical ball 3kgs.	8.06	1.28	12.18	1.42	7.77
	vertical jump test fixture	3.12	0.22	3.92	0.27	6.41
	Peaceful scoring	03	1.49	07	1.58	16.35
Mixed training group (weight & Plyometric)	Three partridge with right leg	3.52	0.12	4.92	0.22	23.51
	Three partridge with right leg	3.15	0.211	4.55	0.30	19.97
	Push medical ball 3kgs.	8.00	1.25	12.31	1.29	10.26
	vertical jump test fixture	3.14	0.24	4.02	0.37	6.67
	Peaceful scoring	04	1.52	08	1.48	17.39
The control group	Three partridge with right leg	3.49	0.36	4.41	0.29	7.75
	Three partridge with right leg	3.19	0.39	3.58	0.36	7.81
	Push medical ball 3kgs.	8.25	1.38	10.06	1.33	8.24
	vertical jump test fixture	2.98	0.40	3.34	0.56	4.50
	Peaceful scoring	03	1.26	05	1.35	14.66

Tabulated T value at 63 degree of freedom and significant level 0.05= 2.13.

Through the results obtained and mentioned in the above table, it's clear that the differences were statically significant compared to the Tabular T value 2.13 in all tests for all the groups in favor of post-measurement.

Table (03): shows the contrast analysis between the four groups for the physical tests under study.

Tests	Variation Source	Total square deviations	Degree of freedom	Average squares	P value calculated	Level of significance
Three (3) partridge with right leg	Between groups	6.27	03 60	2.09	41.8	Significant
	Within groups	3.43		0.05		
Three (3) partridge with right leg	Between groups	9.18		3.06	38.25	Significant
	Within groups	4.95		0.08		
push medical ball 3kg	Between groups	52.39		17.46	8.15	Significant
	Within groups	128.68		2.14		

Vertical jump test fixture	Between groups	4.39		1.64	8.58	Significant
	Within groups	10.52		0.17		
"peacefully" scoring test	Between groups	351.68		117.22	46.33	Significant
	Within groups	151.80		2.53		

Tabular P value at the significance level 0.05=2.76.

From the results illustrated in table (03), it's obvious that there are statistical significant differences; tabular P with 2.76 is lesser than calculated P for all the tests. This needs to use "Tioki" method to find out the accurate moral difference.

Discussion

- Table (02): it's clear that there were no moral differences between the four groups (experimental &controlled) which mean that there was a case of homogeneity.

- Table (03) shows the presence of statistically significant differences between pre and post measurements for each group in favor to post-measurement in the test under research. The presence of statistically significant differences for the controlled group in favor to post test is due to the effect of the executed training but this was slight improvement.

- For the bliometrical training group also the statistically significant differences were in favor of the post test things which confirm the study held by Ibtissam Djabara (1998) concerning the force development characterized by the fastness, the same results obtained by the weight training group and this also agreed with Islam Toufik Mohammed study (1998).

But in the opposit, the results of the mixed training group were the best. This means that the mixed training which combine both weights and bliometric is better than the training with each one of them separately and its use is necessary for the players muscles force development.

It's clear from what has been said above that there are a great progress which confirm, also, that the mixed training method has a huge effectiveness in the power development characterized by speed and this what Talha Hossam-eddine (1999) mentioned inviting to use this kind of training throughout the training season.

- In the test of three partridge with right and left leg, we notice the superiority of the weight training group on the bliometrical training group, this is due to the motor performance nature of basketball game than long jump.

- Concerning the push of medical ball test the differences were not statistically significant between weight and bliometrical training and mixed training in favor to the mixed training. Hence the differences were statistically significant between the mixed training group and the controlled group in favor to the mixed training. These results are conforming to studies held by Mohammed Abdel Aal and others.

- Through the results obtained by the mixed training group which were the best, we are convinced that the diversity in the use of both weight and bliometrical training is very important to obtain the best results in the force development characterized by fastness (muscle capacity) for basketball players.

- For the vertical jump, the differences were statistically significant between all the groups so found Mahmoud Hamdi Abdelkarim, Imad Abdelfattah Sarssy and Toplica stojanovié. Radmila kostié (2002) in their study.

The researcher attributed this that the vertical jump was the best for the bliometrical training because of the quick muscle strength use. In other hand the researcher explained this by noticing that the biometrical training consisted on high jump exercises which increase muscles fibers

excitability that lead to the involvement of a large number of them giving birth to a strong and fast contraction increasing exploding performance, this is in conformity with what Abouela Abdel-Fattah said (2003), Rahman rahimi, naser behpur (2005), and so did Vladan milié. Dragan nejié.radomir kostié (2008).

In other hand the mixed training group was the best among all the experimental groups proving the study held by Mohammed Abdel Aal and others which mentioned That the differences between weight training with bliometric has more effect than training separately.

The researcher also believes that the jump is necessary in the basketball game. This is clear through the results obtained during the "peacefully" scoring test which reflects how the jump is linked to the execution (scoring).

Conclusion

Nowadays we're facing a great scientific progress concerning the players physical preparation, many of problems were solved in this field. To ensure continuity of progress in games and sports activities, a tight layout training is needed.

In order to raise the level of the basketball game, we have to focus on the best preparation of the training program which take in account the requirement of efficiency by the use of the most appropriate and most successful training methods. This study tried to show that the use of weight and bliometrical training methods together and knowing the presence of reciprocity in the relationship between them in muscle capacity and jump development for the basketball players.

The research aims to determine the impact of the use of the weight training and bliometrical training in muscle capacity development and jump for basketball players. Also this research aims to check the reciprocal relationship of the three types of training impact in the muscle capacity progress for the group sample of the research. The researchers used the experimental method by choosing three groups and a controlled group. The results showed the progress held by the experimental groups especially those who used mixed training which is in conformity with a study of Rahman rahimi, naser behpur (2005),Vladan milié.Dragan nejié.radomir kostié(2008) and Yasser Debbour (1996) who focus that the mixed training (weights & bliometric) has a great impact instead of using each one of them separately. The results obtained are in conformity, also, with the results obtained by Mohammed Abdel Aal and others in their study (2006). And it remains to mention that there is reciprocal relationship of the impact of the three groups in some muscle capacity development for the basketball players.

References:

1. Abuzaid Imadeddine (2005). *Plans and scientific basis to built a team in collective games*. Alexandria. Knowledge center.
2. Gambita V. (1989). *Plyometric for beginners*. Rome. basic n.s.a .by i.a.a.f . magazime.
3. Jacques Mariot & Pouet. F. (2008). *Handball*. Paris: Ed vigot.
4. Abdel Fattah abu ela. (1997). *Sports training, physiological bases*. Cairo. Dar al fikr arabi. P. 79.
5. Abdelmaksoud. A. (1997). *sports training theories*. Cairo. the book publishing center. p. 131.
6. Abdelnassif. Q.h. (1998). *principles of sports training*.Baghdad. The higher education press.
7. Abdul azziz alnamr (1991). *The effect of a training program with weights on the growth rates of muscle strength*. Cairo. Sports science and arts journal. Volume 3. p. 68.
8. Ahmed abderahmane & Azzedine bakri.(2004). *sports training system*. Cairo. Dar al fikr arabi. p. 132.
9. Bastawisi Ahmed (1999). *The basis of sports training theories*.cairo. Dar alfir al arabi. pp. 50-64.
10. Brikci (1992). *Physical brisance of children*. Algeria.Olympic comity.
11. Kamel darrouich & all.1999. *The physiological basis to train handball*. Cairo. Book publishing center, pp. 30-40.
12. Vladan milié. Dragan nejié.radomir kostié (2008). *The effect of plyometric training on the explosive strength of leg muscles of volleyball players on single foot and two-foot takeoff jumps*. Physical education and sport. Vol.6 no 2. Pp. 169-179.

13. L ambert.G. (2005). *Training guide of building*. Paris. Ed Vigot.

14. Mohamed abdel aal & all. (2000). *The effect of the use of sports training with weights, Plyometric training and the mixed train on the dynamic development of the muscle ability and the level of digital achievement of the long jump*. Alexandria faculty of physical education. Published research, the scientic journal, theories and applications n0 9.

15. Mohamed hossam allawi (1992). *The science of sports training*. Cairo. Knowledge house. pp. 308-312.

16. Mohamed Hussein zaki (2004). *For a better muscular ability*. Alexandria. Egyptian publishing library. P. 16.

17. Rahman rahimi. naser behpur (2005). *The effects of plyometric, weight and plyometric-weight training on anaerobic power and muscular strenght*. Physical education and sport. Vol 03. N°1. Pp. 81-91.

18. Talha husam & all. (1999). *Scientific encyclopedia in athletic training*.cairo.The book publishing center.

19. Toplica stojanovié. Radmila kostié (2002). *The effects of the plyometric sport training mode! on the development of the vertical jump of volley ball players*. Physical education and sport.Vol.01. No9. p. 11.

Published in the Russian Federation
European Journal of Physical Education and Sport
Has been issued since 2013.
ISSN: 2310-0133
Vol. 8, Is. 2, pp. 97-101, 2015

DOI: 10.13187/ejpe.2015.8.97
www.ejournal7.com

UDC 79

Putting: the Accuracy of the Movement Auditory Perception

Aleksei N. Korolkov

Moscow city pedagogical university, Russian Federation
E-mail: korolkov07@list.ru

Abstract

The article argues that the targeted development of auditory perception actions, the formation and quantification of sound images, performed technical actions seem to be one of the perspective directions of the further training and mastering the kinesthetic sensitivity in golf. It discusses the opportunities for increasing the efficiency of training impacts in developing the kinesthesia of athletes on the basis of a well-targeted development and the improvement of the ability to analyze sound images of sports movements, training not only traditional methods of the visual, neuromuscular and vestibular systems

Keywords: athletes, auditory perception, auditory sensations, the kinematic parameters, sound, ball.

Introduction

Auditory sensations of movements along with tactile, proprioreceptive, visual and vestibular sensations arise in various types of sports activities. Auditory sensations usually perform an additional supporting anticipating and controlling role in the target oriented movement. The difference of the sound image while taking a movement from the usual "reference" sound contains information about any errors made in it. If a purposeful action is performed at high speed, its auditory sensation is often the only way that allows the sportsman to evaluate its effectiveness. The perception of kinematic trajectory parameters by sound that internalizes in the relevant departments of the Central nervous system usually occurs in sports associated with moving sports equipment, moving on and inside sport devices and with shock interactions.

In golf in the conscious of athletes there are also formed sound patterns of actions in the form of the characteristic sound when a club struck the ball. According to the volume and the pitch of the impact interaction sound of the club and the ball, an experienced player confidently evaluates the quality of the movement: how exact he was to reach the target, how far the ball will move after a strike. However, many studies [2, 3, 4, 5, 7, 8, 9, 10, 11, 13] have established that the more different receptive organs and systems are involved in the assessment and simulation of a purposeful movement, the more different images of the action are internalized in the mind in a quantity, the more effective the action is. This statement opens up opportunities for increasing the efficiency of training impacts in developing the kinesthesia of athletes on the basis of a well-targeted development and the improvement of the ability to analyze sound images of sports movements, training not only traditional methods of the visual, neuromuscular and vestibular systems [9, 10, 12].

Materials and methods

In this regard, we have conducted an experimental study of the peculiarities of the movement auditory perception in golf. In the experiment there participated 12 sportsmen of mass degrees in golf aged from 15 to 20. The studies were carried out at the Department of Golf Theory and Methods of RSUPhCSYT in February 2014. With closed eyes athletes alternately perceived aurally the volume of the token sound that appears when hitting the ball. Then using the same club and ball they tried to reproduce the sound of the same volume. The researchers used golf clubs-putters and balls with the same acoustic properties. Strikes were made on the artificial covering imitating the surface of the green at the distance from 1 to 6 meters. With a measuring tape they measured the distance how far the ball moved with accuracy to a centimeter and with a stopwatch they measured the time of the ball rolling with accuracy to 0.01 second. They calculated the average speed of the ball rolling and the initial velocity of the ball on the assumption that its movement was uniformly decreasing. Each sportsman did 30 strokes having a task to reproduce the volume of the token sound as precisely as possible. Using canonical statistical procedures they defined the type of distribution of differences in distances passed by the token sound ball and by the reproduced by an athlete impact sound volume, the distribution type of the variations of the initial velocity of the ball and the statistical significance of their differences.

The accuracy of the performed estimations and measurements of the auditory perception of the volume of hitting the ball and its comparison with the kinematic parameters of the ball movement cannot be higher than random errors of measurements. In our case these errors are defined by the heterogeneity of the playing surface at different trajectories of the ball, its microrelief, differences in the mutual position of the mass centers of the club head and the ball from stroke to stroke, the impact on the trajectory by the eccentricity of the ball and other random reasons. To assess the impact of these random factors we did measurements of the variations of the rolling ball range under the same medium speed of its movement. It was found that the distribution type of variations of the rolling ball range is subject to the normal distribution law (Fig.1.) that indicates their random nature. The standard deviation in the rolling ball range with the same initial velocity was ± 0.17 m, and the standard deviation in the initial velocity with the same rolling range was ± 0.15 m/s. Thus, the limits of the accuracy for further measurement of accuracy of the auditory perception of golf movements kinematic parameters were defined.

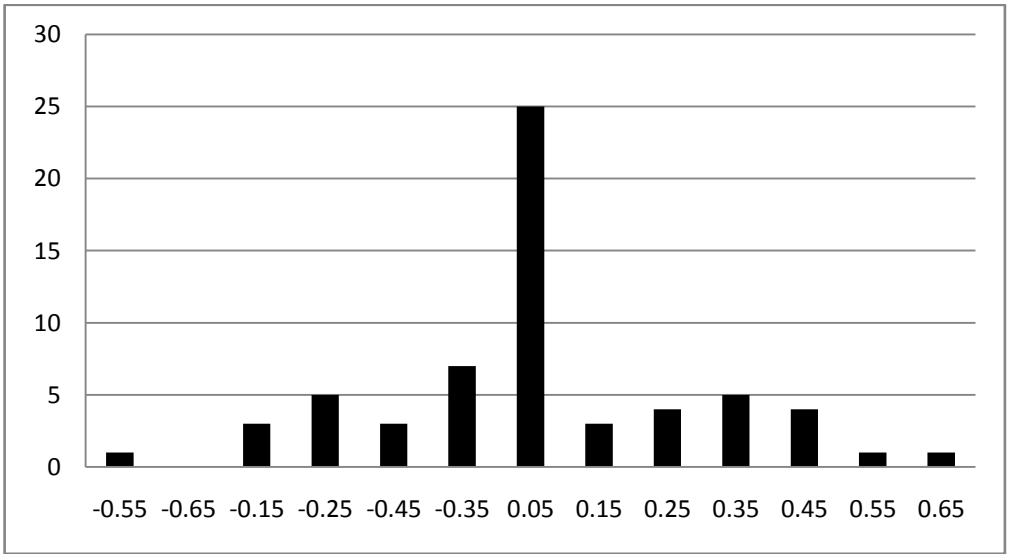

Figure 1. The distribution of variations of the rolling ball range with the constant initial velocity (the x - axis is the variation range, m)

For all players there was established the statistical significance (p=0.05) of the indistinction in the reference and performed range of the ball rolling on the criteria Fisher, Student's t-test and Student's paired t-test. It should indicate the adequate perception and imitating the token sound by golf players within the specified accuracy.

Results and discussions

Based on their subjective estimations of the sound volume the players confidently distinguished 4-5 grades of the stoke volume of the ball rolling on the distance from 0.8 to 6 m. That is, subjective tangible differences in the sound volume (about 10 DB at the sound frequency in 3500 Hz) correspond to the distance difference in the ball rolling of 1.2 m and the initial velocity increment of 0.48 m/s. When comparing the accuracy of the distance simulation, the differences of double measurements relative to the given sample, it turned out that the players implement better the token sound than interiorize it in their mind: the standard deviation range became 0.53 m and the initial velocity became 0.34 m/s. Apparently, this is due to the transfer effect of elastic vibrations due to the bone-tissue conductivity and both athlete's acoustic organs and affect-effect proprioreceptive system participation in the image formation of the movement [1, 5, 6, 9, 10].

The distributions difference between the playing and the model range rolling ball differs individually (Fig.2). For players with a low skill level (2-3 degrees) the distribution has negative excesses and a wider range of variable difference change. For first degree athletes and candidate masters the distribution is more peaked with a smaller range of variable change. Regardless of the players' skill, distributions differ in their asymmetry: the number of players underestimate the volume of the token sound and they often do not roll the ball far enough to the model range (Fig. 2a); and on the contrary, the other group overestimates the volume of the token signal and their impact range is often farther than the model one (Fig.2b).

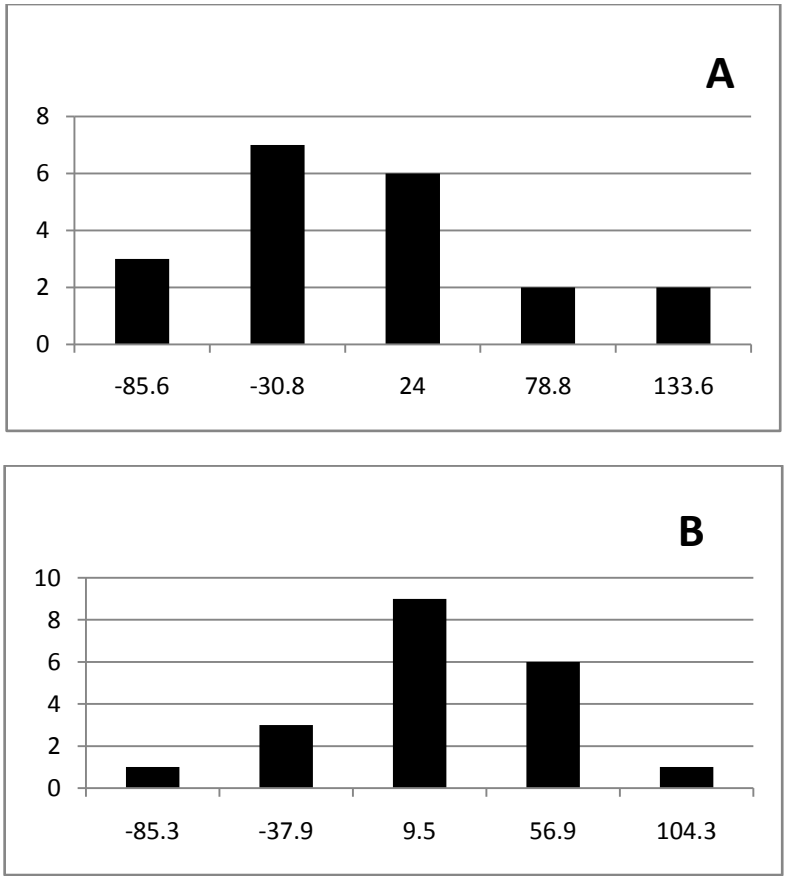

Figure 2. Examples of distribution difference in distances of the rolling ball performed based on the token sound volume (the x-axis is the variation range, cm)

Distribution variations of the initial velocity of the ball are the same as in Fig. 2.

In addition to assessing the perception and imitating accuracy of the kinematic parameters of game actions, a separate pedagogical task is the task of developing their auditory perception of the sound intensity when striking the ball. For this purpose, we carried out three training sessions (one per week) during which the players had to do two jobs. The first was: the players estimated the range of the rolling ball based on striking sound and then they compared it with the actual

distance; the latter was: the players had to imitate the token sound by striking the ball with the club. During the trainings there were carried out three series of such jobs, 30 shots each, to evaluate and imitate.

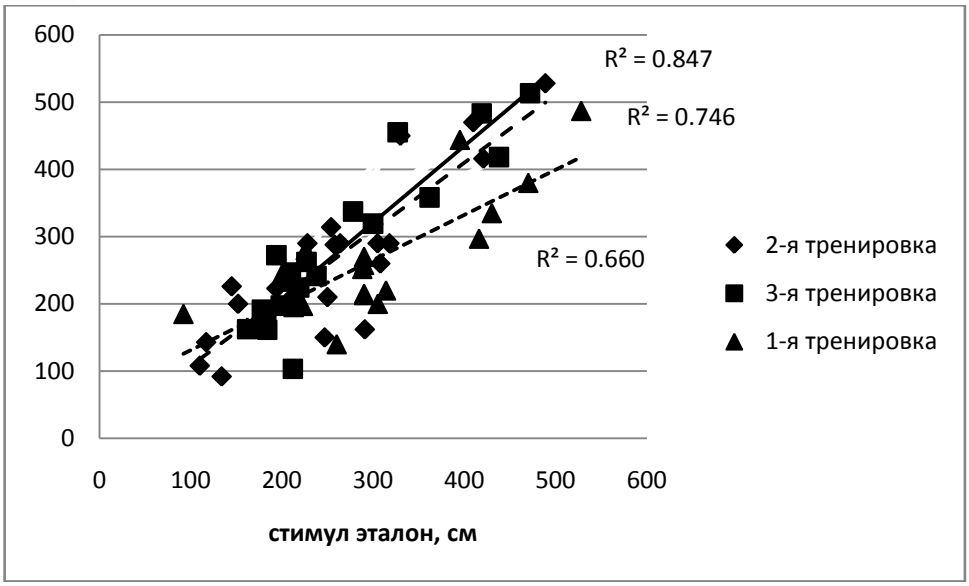

Figure 3. The dependence in imitating the token sound volume of a stroke in golf on the value of the token sound

Fig. 3 shows dependency changes of the performed specified sound from the token sound value for one player that occurred as a result of training effects. In quantity, these changes can be evaluated by the spread of values from the approximating straight line (the determination coefficient R2) and the angle of trend slope to the x-axis. As it follows from Fig. 3, the development of the ability to perform the golf actions on the basis of the auditory perception is very confident: the determination coefficients increased from 0.66 to 0.84. It shows a fast formation in the central nervous system of sound images of performed actions having in mind the quantitative assessment of the impact volume in the form of a range of the ball rolling.

Conclusion

Thus, the targeted development of auditory perception actions, the formation and quantification of sound images, performed technical actions seem to be one of the perspective directions of the further training and mastering the kinesthetic sensitivity in golf. Further studies in this direction are promising in terms of increasing the volumes of representative samples of respondents, increasing the impact range and studying their sound images with help of the special acoustic equipment allowing to record the spectral intensity of the shock interaction sound at short intervals.

Generally speaking, not only a club and a ball can be represented as impact tool, but the athlete himself with some accuracy is often a biomechanical model composed of a finite number of links driven with elastic elements of agonist and antagonist muscles. While performing any action muscles contract and stretch making frequency-determining oscillations. In this sense, the human body itself represents a string instrument that produces oscillations with a frequency of several Hertz that is in the audible low-frequency range and that is not perceived by the human ear.

References:

1. Aldoshina, I. Fundamentals of psychoacoustics. / I. Aldoshina. M: Oborongiz., 2000. 154 p.

2. Bogen, M.M. Training motive actions / M. Bogen. M: FiS, 1985. 192 p.

3. Gellerstein, S.G. The Sense of time and speed motor reaction. M: Medgiz, 1958. 148 p.

4. Golomazov, S.V. Kinesiology of human actions accuracy. / Golomazov S.V. M: Sportakadempress, 2003. 227 p.

5. Karaseva, M.V. Solfeggio as a musical ear development psychotechnique (third edition). M: Compositor, 2009. 360 p.

6. Kikoin, A.K. Energy and sound volume //Quant. 1983. № 12. pp. 28-30.

7. Korolkov A.N. Analysis of the efforts feelings in mini golf / A.N. Korolkov // Theory and practice of physical culture. 2012. № 1. pp. 54-56.

8. Korolkov A.N. Some didactic features of learning game action in golf / A.N. Korolkov // Physical culture: upbringing, education, training: children coach: journal in journal. 2012. № 6. pp. 40-43.

9. Korolkov A.N. Increasing the golf effectiveness by the method of the sensory isolation of receptive systems / A.N. Korolkov, V.G. Nikitushkin, I.V. Kulkova // Sports psychologist. 2013, № 3, pp. 36-39

10. Korolkov A.N. Solfeggio and temps lié in the golf didactics: development prospects of kinesthesia actions / A.N. Korolkov // 2nd All-Russian branch scientific internet-conference of sport universities teachers "Traditions and innovations in the training system of athletes" in the online mode. M: RSUPhCSYT, 4-6 March 2014, in press.

11. Korolkov A.N. Training kinesthetic efforts in putting and mini-golf / A.N. Korolkov // "Scientific Notes of the University named after P.F Lesgaft". 2013. № 4. pp. 58-62.

12. Korolkov A.N. Physical training in golf. Monograph. / A.N. Korolkov // LAMBERT Academic Publishing. - Saarbrücken, Germany, 2013, 167 p. ISBN 978-3-659-37503-3 13. Farfel V.S. Motion control in sport / V.S. Farfel. [2nd publishin, the stereotype.]. M: Soviet sport, 2011. 202 p.: Il., table.

Published in the Russian Federation
European Journal of Physical Education and Sport
Has been issued since 2013.
ISSN: 2310-0133
Vol. 8, Is. 2, pp. 102-106, 2015

DOI: 10.13187/ejpe.2015.8.102
www.ejournal7.com

UDC 79

Adaptive Physical Training as a Means of Rehabilitation of Patients With Cerebral Palsy: a Literature Review

Elena F. Legkaya

Sochi state university, Russian Federation
Sochi, Sovetskaya Str., 26 a 354000
Graduate student
E-mail: lightfamily@mail.ru

Abstract

The literature review considers available means and methods of adaptive physical training in the treatment and rehabilitation of cerebral palsy (CP). The use of therapeutic physical training, manual therapy, and various training devices is one of the promising directions of movement correction for cerebral palsy. Despite the fact that it is impossible completely cure the disease, however, in the course of rehabilitation we can develop a child's motor, speech, thinking skills, ability to study and communicate with others.

Keywords: cerebral palsy, adaptive physical education, physical rehabilitation, therapeutic physical training.

Relevance

Adaptive physical education (APE) is a set of actions of a sports nature, aimed at rehabilitating and adapting to a normal social environment of people with disabilities, overcoming the psychological barriers, that interfere to feel a full sense of life and realizing of the need for his personal contribution to the social development of society [1]. Thanks to the fact that APE includes at least three fields of knowledge - physical culture, medicine and correctional pedagogy, it is a much more capacious and broad concept in comparison with medical physical culture (physical therapy) and physical education of children with deviation in development.

The term cerebral palsy (CP) represents a group of non-progressive disorders of poses and movements, caused by damage to the central nervous system of the fetus or child occurred in the antenatal, intrapartum and neonatal periods. These motor disorders are often accompanied by sensitivity defects of cognitive and communicative functions, perception and / or behavioral and / or convulsive disorders" [2, 3]. Cerebral Palsy is considered the main cause of child disability, which for this reason is 2-2,5 cases per 1000 children. [4]

Depending on the type of movement disorder, severity of associated neurological disorders, there are various classifications of the disease. They are based on the prevailing movement disorders in the form of the presence of the main types of cerebral palsy (spastic, athetoid, atactic and mixed) or categories of motor disorders (spastic, dyskinetic, ataxic) [5, 6].

Cerebral Palsy is characterized by a variety of clinical manifestations, for overcoming of which for many years with greater or lesser degrees of success, the efforts of specialists in various fields have been directed. Treatment begins with the first months of a child's life, right after diagnosis. Throughout the child's life rehabilitation played a leading role, which uses a set of measures that reflect different aspects of the problem: drug [7-10], physical [11-13], neuroorthopedic [13-16], physical therapy [17-20], psychological [11, 21], the pedagogical [11, 22] and others.

Methods of physical rehabilitation

One of the most important method in the physical rehabilitation of cerebral palsy is a physical therapy that begins immediately after diagnosis. At the same time a complex of exercises that prevent the weakening and atrophy of muscles, the development of contractures and promotion of child's motor development [23, 24]. Physical rehabilitation includes both active and passive treatments as hydrotherapy, mechanotherapy, massage, manual therapy, reflexology with a good therapeutic effect [11, 13, 18].

AFC means are widely used in rehabilitation activities for cerebral palsy. Analysis of the results of research conducted on the basis of department of rehabilitation treatment "Rosinka" Surgut, showed that the use of exercise in rehabilitation of patients with cerebral palsy is effective. So, after going through a series of classes, improvement in children's musculoskeletal system, muscle tone, posture, decreasing of contractures, increasing of motor skills were noted [25].

In the case of this disease, physical therapy sessions with special trainers are used. The complex rehabilitation of children for the development of coordination abilities successfully used the simulator «Bosu» [26]. "Mioneyroton-bike" and "Akorda-Multimiostim" are reported to be high efficiency functional electrical stimulation devices for patients with cerebral palsy in the form of spastic diplegia [27]. A method for comprehensive rehabilitation was developed, including physical therapy with newly created and enhanced simulators [28, 29], allowing to work in a vertical position with patients and to develop their new motor skills by increasing the range of motion in the joints of the upper and lower extremities [23, 24].

Such means of APE as fitball gymnastics [29, 30], the simulator "Gross" [31], medical suits "Gravistat" and "Adele" [32], neuro-orthopedic rehabilitation jumpsuit "Phaeton" [33] found the widespread use. N.A. Gross notes that the feature of the proposed system of physical rehabilitation is a priority use of physical culture as a form of motor activity, which allows in the best way to form a vital motor skills, to ensure the normal functioning of body systems, to enhance mental abilities, optimize health and performance [31]. That is why he offers to use training devices as wide as it possible, which allow to increase the range of motor skills.

"Simulator Gross" is widely used in many rehabilitation centers for several years, which gradually adapts to the child with cerebral palsy to rehabilitation activities, particularly in the absence of skills of independent walking. As a rule, in conjunction with the "simulator Gross" method of dynamic proprioceptive movement correction using the therapeutic loading costumes such as "Adele", "Gravistat", "DC", "Spiral" is used, contributing to the normalization of posture and movements of a child with cerebral palsy. Such suits are the product of space technology and can create the dynamic longitudinal load on the axis of the body using the special rod-shock [34].

Y. Kovaleva said that the greatest efficiency and safety of the resulting effect can be expected when the classes in costume "Adele" in a comprehensive system of gradual rehabilitation, individually adapted to each individual child, taking into account his age, shape and degree of severity of the disease, leading pathological link, and emotional state intellectual spheres. The use of costume "Adele" leads not only to significant improvement in the test results, but also to changes in the factor structure of the functional abilities of children, indicating that the process of differentiation occurring in the central nervous system under the influence of training [34].

In addition, special classes are held with the help of functional bicycle equipment, which has the positive effect on the correction of abnormal movement patterns. Using a special function of bicycle equipment in complex sanatorium treatment of children with cerebral palsy contributes to early recovery of motor activity, a rapid adaptation and formation of a new more physiological correct movement pattern [35].

Hardware method of functional rehabilitation, submitted therapeutic exercise equipment brand MOTOmed® (RECK Medizintechnik GmbH, Germany) are used. Such simulators are " combined simulators that help electronically metered mechanical stress when performing cyclic motions and simulate acts locomotor movements of upper and lower extremities" [36].

An analysis of the scientific and methodological literature indicates widespread use of methods of "motor re-education," such as Vojta Therapy and Bobath therapy. The Voigt-based therapy is the so-called reflex locomotion in which the therapist has focused on certain zone pressure of the patient, resulting in a coordinated, rhythmic activation of the entire skeletal muscles and reacting different levels of integration of the central nervous system. An alternative to this method is usually considered Bobath therapy. The first school Bobath therapy was opened in London (UK), the founders of the concept are Karel and Berta Bobath. As a professor of neurology and psychiatry, K. Bobath scientifically proved the practical experience of his wife, who worked as a physiotherapist in a rehabilitation center with adult patients with stroke or injury to the central nervous system [37].

In the physical rehabilitation of patients with cerebral palsy the procedure of massages is used, which differs in variety of techniques of implementation. There are classic, pinpoint, relaxing massage stimulus antagonist muscles, as well as author's techniques such as deep therapeutic massage reflex muscle that are used to prevent the consequences of perinatal lesions of the nervous system [16]. It is reported that fixation massage developmental gymnastics, beneficial effect on lung function in children with cerebral palsy are used [17]. For patients with speech disorders such as dysarthria erased form, a flow chart is developed for the differentiated speech therapy massage [38]. Special massage techniques allow to choose adequately the techniques that will be effective against spasticity articulation muscles, mixed type or hypotension.

Conclusion

Taking everything into account the means and methods of the APE are selected individually, as the clinical picture of cerebral palsy depends on the location of the damage, and pathological processes, affecting different areas of the brain, determine the form of motor disorders of cerebral palsy and related diseases. The effectiveness of physical rehabilitation is largely determined by regular employment, a positive emotional attitude and desire to achieve results. Permanent, comprehensive treatment can achieve the best results.

Примечания:

1. Евсеев С.П., Курдыбайло С.Ф., Малышев А.И. Физическая реабилитация инвалидов с поражением опорно-двигательной системы. М.: Советский спорт, 2010; 488 с.

2. Bax M., Goldstein M., Rosenbaum P., Leviton A., Paneth N., Dan B., Jacobsson B., Damiano D.. Proposed Definition and Classification of Cerebral Palsy. Journal of Developmental Medicine and Child Neurology 2005; 47: 571-576.

3. Miller F. Cerebral palsy. Springer Science and busi ness media inc., 2005; 1070 p.

4. Johnson Ann. Prevalence and characteristics of children with cerebral palsy in Europe. Developmental med. child neurol. 2002; 44: 9: 633–640.

5. Батышева Т.Т., Быкова О.В., Виноградов А.В. Детский церебральный паралич – современные представления о проблеме (обзор литературы). Русский медицинский журнал 2012; 20: 8: 401-405.

6. Батышева Т.Т., Быкова О.В., Тюрина Е.М., Виноградов А.В. Детский церебральный паралич – актуальное обозрение. Доктор. Ру 2012; 5: 73: 40-44.

7. Бадалян Л.О., Журба Л.Т. Детские церебральные параличи. Киев, 1988.

8. Орлова О.Р., Яхно Н.Н. Применение Ботокса (токсина ботулизма типа А в клинической практике: руководство для врачей. М.: Каталог, 2000; 208 с.

9. Кислякова Е.А. Влияние комплексной реабилитации с применением ботулистического токсина типа А на показатели физического и моторного развития детей и подростков с детским церебральным параличом. Педиатрическая фармакология 2006; 2: 70-74.

10. Scott A.B. Botulism toxin injection into extraocular muscles as an alternative to strabismus surgery. Ophthalmology 1980; 87: 1044-1049.

11. Физическая реабилитация как метод лечения при детском церебральном параличе. [Электронный ресурс]. Режим доступа: http://www.medknow.ru/healtharticles/38-detskij-czerebralnyj-paralich/51-fizicheskaya-reabilitacziya-kak-metod-lecheniya-pri-detskom-czerebralnom-paraliche.html (дата посещения 05.01.2013 г.)

12. Использование Бобат-терапии при детском церебральном параличе: Обучение и воспитание детей в условиях центра коррекционно-развивающего обучения и реабилитации. Минск, 2007; 95-106.

13. Лильин Е.Т., Степанченко О.В., Бриль А.Г. Современные технологии восстановительного лечения и реабилитации больных с детским церебральным параличом. [Электронный ресурс]. Режим доступа: http://medi.ru/doc/6590206.htm/ (дата посещения 05.01.2013 г.)

14. Никитина М.Н. Детский церебральный паралич. М.: Медицина, 1979; 120 с.

15. Цукер М.Б. Клиническая невропатология детского возраста. М.: Медицина, 1986; 464 с.

16. Шабалов В.А., Декопов А.В., Томский А.А., Трошина Е.М. Дифференцированный подход к нейрохирургическому лечению двигательной патологии при ДЦП. Детская и подростковая реабилитация 2008; 2: 5-10.

17. Аксенова А.М., Аксенова Н.И. Миотерапия детей с церебральным параличом. Лечебная физкультура и спортивная медицина 2012; 3: 31-37.

18. Кравцевич П.В., Бруйков А.А., Гулин А.В., Петкевич А.И. Сравнительная характеристика влияния различных средств восстановления на функцию внешнего дыхания у детей с детским церебральным параличом. Вестник ТГУ 2013; 18: 4: 1362-1364.

19. Барбаева С.Н., Кулишова Т.В., Елисеева В.В., Радченко Н.В. Сравнительная эффективность различных методов электростимуляции мышц у больных с детским церебральным параличом. Вопросы курортологии, физиотерапии и лечебной физической культуры 2014; 91: 4: 43-46.

20. Кравцова Е.Ю., Щеколова Н.Б., Мудрова О.А., Новикова Е.А., Обухов А.С. Синусоидальные модулированные токи в комплексной реабилитации больных с детским церебральным параличом в течение учебного года. Вопросы курортологии, физиотерапии и лечебной физической культуры 2013; 90: 2: 38-41.

21. Чеснокова, Л. С. Иппотерапия в процессе психолого-педагогической реабилитации детей с церебральным параличом. Коррекц. педагогика 2007; 1: 16-23.

22. Graham J.V., Eustace C., Brock K., Swain E., Irwin-Carruthers S. Bobathconcept in contemporary clinical practice. Top Stroke Rehabil. 2009; 16: 1: 57-68.

23. Рогов А.В. Реабилитация больных детским церебральным параличом со спастической диплегией: Автореф. … дисс. канд. мед. наук. Томск, 2014; 22 с.

24. Рогов А.В., Левицкий Е.Ф., Пашков В.К., Нечаева Е.И. Барабаш Р.З., Коршунов С.Д. Непосредственные и отдаленные результаты комплексной реабилитации больных детским церебральным параличом в виде спастической диплегии. Вестник Ивановской медицинской академии 2014; 19: 2: 19-23.

25. Степанова Г.А., Буркова Н.Г., Булатова О.В., Демчук А.В. Реабилитация детей с церебральным детским параличом средствами адаптивной физической культуры. Вестник волгоградского института бизнеса 2013; 1: 22: 238-240.

26. Максимов А.Е. Применение тренажера Bosu в комплексной физической реабилитации детей с детским церебральным. Вестник спортивной науки 2011; 6: 65-66.

27. Барбаева С.Н., Кулишова Т.В., Елисеева В.В., Радченко Н.В. Сравнительная эффективность различных методов электростимуляции мышц у больных с детским церебральным параличом. Вопросы курортологии, физиотерапии и лечебной физической культуры 2014; 91: 4: 43-46.

28. Пат. 89402 Российская Федерация, МПК A 63 B 23/035. Тренажер Рогова / Рогов А. В., Власов А. Ю. № 22009130204/22; заявл. 05.08.2009; опубл. 10.12.2009.27, Бюл. № 34.

29. Пат. 89967 Российская Федерация, МПК A 63 B 23/025. Тренажер Власова / Рогов А. В., Власов А. Ю. № 2009130205/22; заявл. 05.08.2009; опубл. 27.12.2009.27, Бюл. № 36.

30. Камманн С. Тренировка с использованием фитбола. Лечебная физкультура и спортивная медицина 2014; 5: 125: 35-40.

31. Гросс Н.А. Современные комплексные методики физической реабилитации детей с нарушением опорно-двигательного аппарата. М.: Советский спорт, 2005; 235 с.

32. Ильин В.А., Тельнов Ю.В., Полиевский С.А. Новое в методике применения лечебных костюмов "Адели" (из опыта реабилитационной работы с детьми больными ДЦП). [Электронный ресурс]. Режим доступа: http://lib.sportedu.ru/ (дата посещения 05.01.2013 г.).

33. Нейро-ортопедический реабилитационный комбинезон РК «ФАЭТОН». [Электронный ресурс]. Режим доступа: http://medtechnics.ru/ (дата посещения 05.01.2013 г.).

34. Ковалева Ю.А. Оценка эффективности разработанной методики с использованием костюма «Адели» для детей младшего школьного возраста с церебральным параличом. Адаптивная физическая культура 2009; 1: 37: 28-31.

35. Дерябин А.В., Ненько А.М. Коррекция патологической позы и ходьбы пациентов с детским церебральным параличом с помощью функционального велоустройства. Ортопедия, травматология и протезирование 2009; 2: 54–56.

36. Диль В. Активно-пассивная MOTOmed®-терапия в реабилитации с церебральным параличом. Международный неврологический журнал 2011; 3: 41 [Электронный ресурс]. Режим доступа: http://www.mif-ua.com/ (дата посещения 05.01.2013 г.).

37. Graham J.V., Eustace C., Brock K., Swain E., Irwin-Carruthers S. Bobathconcept in contemporary clinical practice. Top Stroke Rehabil. 2009; 16: 1: 57-68.

38. Науменко О.А., Веренич Э.А. Дифференцированный логопедический массаж в системе коррекционной работы по преодолению дизартрии. «Минск, Белоруссия» [Электронный ресурс]. Режим доступа: http://scilance.com/library/book/41877/ (дата посещения 20.05.2015 г.).

References:

1. Evseev S.P., Kurdy'bajlo S.F., Maly'shev A.I. Fizicheskaya reabilitaciya invalidov s porazheniem oporno-dvigatel'noj sistemy'. M.: Sovetskij sport, 2010; 488 s.

2. Vax M., Goldstein M., Rosenbaum R., Leviton A., Paneth N., Dan V., Jacobsson V., Damiano D.. Proposed Definition and Classification of Cerebral Palsy. Journal of Developmental Medicine and Child Neurology 2005; 47: 571-576.

3. Miller F. Cerebral palsy. Springer Science and busi ness media inc., 2005; 1070 p.

4. Johnson Ann. Prevalence and characteristics of children with cerebral palsy in Europe. Developmental med. child neurol. 2002; 44: 9: 633–640.

5. Baty'sheva T.T., By'kova O.V., Vinogradov A.V. Detskij cerebral'ny'j paralich – sovremenny'e predstavleniya o probleme (obzor literatury'). Russkij medicinskij zhurnal 2012; 20: 8: 401-405.

6. Baty'sheva T.T., By'kova O.V., Tyurina E.M., Vinogradov A.V. Detskij cerebral'ny'j paralich – aktual'noe obozrenie. Doktor. Ru 2012; 5: 73: 40-44.

7. Badalyan L.O., Zhurba L.T. Detskie cerebral'ny'e paralichi. Kiev, 1988.

8. Orlova O.R., Yaxno N.N. Primenenie Botoksa (toksina botulizma tipa A v klinicheskoj praktike: rukovodstvo dlya vrachej. M.: Katalog, 2000; 208 s.

9. Kislyakova E.A. Vliyanie kompleksnoj reabilitacii s primeneniem botulisticheskogo toksina tipa A na pokazateli fizicheskogo i motornogo razvitiya detej i podrostkov s detskim cerebral'ny'm paralichom. Pediatricheskaya farmakologiya 2006; 2: 70-74.

10. Scott A.B. Botulism toxin injection into extraocular muscles as an alternative to strabismus surgery. Ophthalmology 1980; 87: 1044-1049.

11. Fizicheskaya reabilitaciya kak metod lecheniya pri detskom cerebral'nom paraliche. [E'lektronny'j resurs]. Rezhim dostupa: http://www.medknow.ru/healtharticles/38-detskij-czerebralnyj-paralich/51-fizicheskaya-reabilitacziya-kak-metod-lecheniya-pri-detskom-czerebralnom-paraliche.html/ (data poseshheniya 05.01.2013 g.)

12. Ispol'zovanie Bobat-terapii pri detskom cerebral'nom paraliche: Obuchenie i vospitanie detej v usloviyax centra korrekcionno-razvivayushhego obucheniya i reabilitacii. Minsk, 2007; 95-106.

13. Lil'in E.T., Stepanchenko O.V., Bril' A.G. Sovremenny'e texnologii vosstanovitel'nogo lecheniya i reabilitacii bol'ny'x s detskim cerebral'ny'm paralichom. [E'lektronny'j resurs]. Rezhim dostupa: http://medi.ru/doc/6590206.htm/ (data poseshheniya 05.01.2013 g.)

14. Nikitina M.N. Detskij cerebral'ny'j paralich. M.: Medicina, 1979; 120 s.

15. Cuker M.B. Klinicheskaya nevropatologiya detskogo vozrasta. M.: Medicina, 1986; 464 s.
16. Shabalov V.A., Dekopov A.V., Tomskij A.A., Troshina E.M. Differencirovanny'j podxod k nejroxirurgicheskomu lecheniyu dvigatel'noj patologii pri DCP. Detskaya i podrostkovaya reabilitaciya 2008; 2: 5-10.
17. Aksenova A.M., Aksenova N.I. Mioterapiya detej s cerebral'ny'm paralichom. Lechebnaya fizkul'tura i sportivnaya medicina 2012; 3: 31-37.
18. Kravcevich P.V., Brujkov A.A., Gulin A.V., Petkevich A.I. Sravnitel'naya xarakteristika vliyaniya razlichny'x sredstv vosstanovleniya na funkciyu vneshnego dy'xaniya u detej s detskim cerebral'ny'm paralichom. Vestnik TGU 2013; 18: 4: 1362-1364.
19. Barbaeva S.N., Kulishova T.V., Eliseeva V.V., Radchenko N.V. Sravnitel'naya e'ffektivnost' razlichny'x metodov e'lektrostimulyacii my'shc u bol'ny'x s detskim cerebral'ny'm paralichom. Voprosy' kurortologii, fizioterapii i lechebnoj fizicheskoj kul'tury' 2014; 91: 4: 43-46.
20. Kravcova E.Yu., Shhekolova N.B., Mudrova O.A., Novikova E.A., Obuxov A.S. Sinusoidal'ny'e modulirovanny'e toki v kompleksnoj reabilitacii bol'ny'x s detskim cerebral'ny'm paralichom v techenie uchebnogo goda. Voprosy' kurortologii, fizioterapii i lechebnoj fizicheskoj kul'tury' 2013; 90: 2: 38-41.
21. Chesnokova, L. S. Ippoterapiya v processe psixologo-pedagogicheskoj reabilitacii detej s cerebral'ny'm paralichom. Korrekc. pedagogika 2007; 1: 16-23.
22. Graham J.V., Eustace C., Brock K., Swain E., Irwin-Carruthers S. Bobathconcept in contemporary clinical practice. Top Stroke Rehabil. 2009; 16: 1: 57-68.
23. Rogov A.V. Reabilitaciya bol'ny'x detskim cerebral'ny'm paralichom so spasticheskoj diplegiej: Avtoref. … diss. kand. med. nauk. Tomsk, 2014; 22 s.
24. Rogov A.V., Levickij E.F., Pashkov V.K., Nechaeva E.I. Barabash R.Z., Korshunov S.D. Neposredstvenny'e i otdalenny'e rezul'taty' kompleksnoj reabilitacii bol'ny'x detskim cerebral'ny'm paralichom v vide spasticheskoj diplegii. Vestnik Ivanovskoj medicinskoj akademii 2014; 19: 2: 19-23.
25. Stepanova G.A., Burkova N.G., Bulatova O.V., Demchuk A.V. Reabilitaciya detej s cerebral'ny'm detskim paralichom sredstvami adaptivnoj fizicheskoj kul'tury'. Vestnik volgogradskogo instituta biznesa 2013; 1: 22: 238-240.
26. Maksimov A.E. Primenenie trenazhera Bosu v kompleksnoj fizicheskoj reabilitacii detej s detskim cerebral'ny'm. Vestnik sportivnoj nauki 2011; 6: 65-66.
27. Barbaeva S.N., Kulishova T.V., Eliseeva V.V., Radchenko N.V. Sravnitel'naya e'ffektivnost' razlichny'x metodov e'lektrostimulyacii my'shc u bol'ny'x s detskim cerebral'ny'm paralichom. Voprosy' kurortologii, fizioterapii i lechebnoj fizicheskoj kul'tury' 2014; 91: 4: 43-46.
28. Pat. 89402 Rossijskaya Federaciya, MPK A 63 B 23/035. Trenazher Rogova / Rogov A. V., Vlasov A. Yu. № 22009130204/22; zayavl. 05.08.2009; opubl. 10.12.2009.27, Byul. № 34.
29. Pat. 89967 Rossijskaya Federaciya, MPK A 63 B 23/025. Trenazher Vlasova / Rogov A. V., Vlasov A. Yu. № 2009130205/22; zayavl. 05.08.2009; opubl. 27.12.2009.27, Byul. № 36.
30. Kammann S. Trenirovka s ispol'zovaniem fitbola. Lechebnaya fizkul'tura i sportivnaya medicina 2014; 5: 125: 35-40
31. Gross N.A. Sovremenny'e kompleksny'e metodiki fizicheskoj reabilitacii detej s narusheniem oporno-dvigatel'nogo apparata. M.: Sovetskij sport, 2005; 235 s.
32. Il'in V.A., Tel'nov Yu.V., Polievskij S.A. Novoe v metodike primeneniya lechebny'x kostyumov "Adeli" (iz opy'ta reabilitacionnoj raboty' s det'mi bol'ny'mi DCP). [E'lektronny'j resurs]. Rezhim dostupa: http://lib.sportedu.ru/ (data poseshheniya 05.01.2013 g.).
33. Nejro-ortopedicheskij reabilitacionny'j kombinezon RK «FAE'TON». [E'lektronny'j resurs]. Rezhim dostupa: http://medtechnics.ru/ (data poseshheniya 05.01.2013 g.).
34. Kovaleva Yu.A. Ocenka e'ffektivnosti razrabotannoj metodiki s ispol'zovaniem kostyuma «Adeli» dlya detej mladshego shkol'nogo vozrasta s cerebral'ny'm paralichom. Adaptivnaya fizicheskaya kul'tura 2009; 1: 37: 28-31.
35. Deryabin A.V., Nen'ko A.M. Korrekciya patologicheskoj pozy' i xod'by' pacientov s detskim cerebral'ny'm paralichom s pomoshh'yu funkcional'nogo veloustrojstva. Ortopediya, travmatologiya i protezirovanie 2009; 2: 54–56.
36. Dil' V. Aktivno-passivnaya MOTOmed®-terapiya v reabilitacii s cerebral'ny'm paralichom. Mezhdunarodny'j nevrologicheskij zhurnal 2011; 3: 41 [E'lektronny'j resurs]. Rezhim dostupa: http://www.mif-ua.com/ (data poseshheniya 05.01.2013 g.).

37. Graham J.V., Eustace C., Brock K., Swain E., Irwin-Carruthers S. Bobathconcept in contemporary clinical practice. Top Stroke Rehabil. 2009; 16: 1: 57-68.

38. Naumenko O.A., Verenich E'.A. Differencirovanny'j logopedicheskij massazh v sisteme korrekcionnoj raboty' po preodoleniyu dizartrii. «Minsk, Belorussiya» [E'lektronny'j resurs]. Rezhim dostupa: http://scilance.com/library/book/41877/ (data poseshheniya 20.05.2015 g.).

Published in the Russian Federation
European Journal of Physical Education and Sport
Has been issued since 2013.
ISSN: 2310-0133
Vol. 8, Is. 2, pp. 109-117, 2015

DOI: 10.13187/ejpe.2015.8.109
www.ejournal7.com

UDC 79

Reliability of the DESK 3-6 for 3-Years Old Children

[1] Miltiadis Proios
[2] Vasilios Tsimaras
[3] Maria Sidiropoulou
[4] Despina Arzoglou
[5] Kosmas Christoulas
[6] Theofilos Pillianidis

[1] Aristotle University of Thessaloniki, Greece
Department of Physical Education and Sport Science
E-mail: mproios@phed.auth.gr
[2] Aristotle University of Thessaloniki, Greece
Department of Physical Education and Sport Science
E-mail: tsimaras@phed.auth.gr
[3] Aristotle University of Thessaloniki, Greece
Department of Physical Education and Sport Science
E-mail: sidiropo@phed.auth.gr
[4] Aristotle University of Thessaloniki, Greece
Department of Physical Education and Sport Science
E-mail: desarz@yahoo.gr
[5] Aristotle University of Thessaloniki, Greece
Department of Physical Education and Sport Science
E-mail: kchristo@phed.auth.gr
[6] Democritus University of Thrace, Greece
Department of Physical Education and Sport Science
E-mail: thpillian@phyed.duth.gr

Abstract

An early detection of possible disorders mainly in preschool children could help the prediction of disorders relating to learning disabilities and problems in school performance. For this reason in the present study investigated the reliability of DESK 3-6 for children 3-years old of age through the use of methods such are internal consistency reliability, test-retest and Cronbach's alpha, as well as check its suitability on a different sample. Participants were 383 preschool children (207 boys and 176 girls) with ages ranging from 36 to 47 months. The Dortmund Developmental Screening for Preschools was used. Results revealed that the original version of DESK 3-6 for children 3-years olds of age shows problems in internal consistency, adequate Cronbach alpha and test-retest coefficients.

Keywords: DESK 3-6, Reliability, Internal consistency reliability, Cronbach alpha, Test-retest reliability.

Introduction

The appearance of developmental disorders in children is an often phenomenon that continuously rise throughout the years (Fombonne, Zakarian, Bennett, Meng, & McLean-Heywood, 2006; Chakrabarti & Fombonne, 2001). An early detection of possible disorders mainly in preschool children could help the prediction of disorders relating to learning disabilities and problems in school performance (Esser, 1993). For this the instrument Dortmund Developmental Screening for Preschools (DESK 3-6; Tröster, Flender, & Reineke, 2004) was developed.

DESK 3-6 is an instrument developed to identify 3, 4, and 5-6 years old children with developmental disorders (Tröster et al., 2004). It is partly composed of monitoring tasks completed by the teacher based on his/her daily observations and performance tasks also applied by the teacher. DESK 3-6 includes developmental fields such are: fine and gross motor skills, linguistic and cognitive skills as well as social skills. The above are divided in four groups of tasks (factors). Structural validity of the four factors was checked by the subjectivity and reliability of the DESK 3-6 measurements (Troster et al., 2004). In order to check subjectivity for DESK 3-6 the criterion of matching assessments among teachers, while for reliability coefficient alpha Cronbach's and test-retest were used.

To assess reliability there are different ways such as internal consistency methods, test-retest, and Cronbach alpha (Anastasi & Urbina, 1997; Cortina, 1993).

Internal consistency reliability: This method contributes to the check of the reliability of the instrument by estimating how well the items that reflect the same construct yield similar results. There is a wide variety of internal consistency measures that can be used, such are for example the intercorrelations of items within a scale (average inter-item correlation) and the correlations with item-to-scale (average item-total correlation) (DeVellis, 2003). The average inter-item correlation compares correlations between all pairs of questions that test the same construct by calculating the mean of all paired correlations, while average item-total correlation takes the average inter-item correlations and calculates a total score for each item, then averages these (Priest, McColl, Thomas, & Bond, 1995).

Test-retest reliability: The Standards for Educational and Psychological Testing state that test-retest reliability is 'a reliability coefficient obtained by administering the same test a second time to the same group after a time interval and correlating the two sets of scores' (AERA, 1999). In order to measure the test-retest reliability, we have to give the same test to the same test respondents on two separate occasions. We can refer to the first time the test is given as T1 and the second time that the test is given as T2. The scores on the two occasions are then correlated. This correlation is known as the test-retest-reliability coefficient or the coefficient of stability. Stability is an aspect of reliability and many researchers report that a highly reliable test indicates that the test is stable over time (AERA, 1999).

Cronbach alpha: Cronbach's alpha measures the internal consistency of a group of items by measuring the homogeneity of the group of items—"it is an indication of how well the different items complement each other in their measurement of different aspects of the same variable or quality" (Litwin, 2003, p. 22). Cronbach's alpha ranges in value between zero and one. Cronbach's statements (1947, 1951) about reliability, suggest that the reliability of a multidimensional measure can only be estimated by correlating scores on parallel forms of a test that each represent the same factor structure.

As already mentioned for the estimation of structural validity of DESK 3-6 Cronbach alpha was used to check reliability of measurements. Cronbach alpha though, is not the only estimate of reliability (Cortina, 1993). The particular estimate of reliability that one may use depends on the particular error-producing factor that one seeks to identify (Cronbach, Gieser, Nanda, & Rajaratnam, 1972). The importance of the present study is found within the use of other methods of testing the reliability of measures of the DESK 3-6.

The purpose of the present study is to further investigate the reliability of DESK 3-6 and moreover the edition for 3-years old children, through the use of methods such are internal consistency reliability, test-retest and Cronbach's alpha. Additionally, the present study will make an effort to examine the reliability of this instrument at a different sample than that initially used.

Method

Participants

Participants were 383 preschool children (207 boys and 176 girls) ages ranging from 36 to 47 months (M = 42.93, SD = 3.17). These children were recruited from 22 private and public preschool classes. Initially classes were selected and the relevant license was acquired by the Ministry of Education for the conducting of measurements. The next step was to ask for the parents' consent for the participation of their children at the study.

Instrument

DESK 3-6 for 3 years old children (Tröster et al., 2004) was used. Standardized back-translation procedures were used to develop a Greek version of the DESK using three independent bilingual translators (Brislin, 1986). The back-translation procedure was repeated iteratively until the original and back-translated German versions of the questionnaires were identical. DESK includes four developmental fields: *fine motor skills* including screening tests (10 items) for fine hand motor skills that identify the coordination of eyes-hands and hand skills, *gross motor skills* including screening tests (10 items) for body-balance coordination, *linguistic and cognitive skills* including screening tests (15 items) for the development level of speech and cognition and *social skills* including tests (10 items) for the ability of child to deal with everyday issues with no help as well as the kid follows social rules. Screening should be conducted by school teachers. In the present study school teachers were trained to perform developmental screening.

Data analysis

For the test of internal consistency reliability of the DESK 3-6 for 3 years old children, correlations (average inter-item and item-total correlation) were used. Correlation coefficients whose magnitude was between .9 and 1.0 indicate variables that can be considered as very highly correlated. Correlation coefficients whose magnitude was between .7 and .9 indicate variables that can be considered as highly correlated. Correlation coefficients whose magnitude was between .5 and .7 indicate variables that can be considered as moderately correlated. Correlation coefficients whose magnitude was between .3 and .5 indicate variables that have a low correlation. Correlation coefficients whose magnitude was less than .3 have little if any (linear) correlation. We can readily see that $.9 < |r| < 1.0$ corresponds with $.81 < r^2 < 1.00$; $.7 < |r| < .9$ corresponds with $.49 < r^2 < .81$; $.5 < |r| < .7$ corresponds with $.25 < r^2 < .49$; $.3 < |r| < .5$ corresponds with $.09 < r^2 < .25$; and $.0 < |r| < .3$ corresponds with $.0 < r^2 < .09$. The r^2 provides a measure of how well observed outcomes are replicated by the model, as the proportion of total variation of outcomes explained by the model (Draper & Smith, 1998; Glantz & Slinker, 1990; Steel & Torrie, 1960). Regarding homogeneity of each group of items Cronbach alpha coefficient was used, while for the control of stability of measure over time the test-retest-reliability coefficient was used.

Discussion

In the present study the reliability of a version of DESK 3-6 for 3-years old children was examined. For this reason a series of methods such are internal consistency reliability, Cronbach's alpha and test-retest were used.

The findings of the present study on the internal consistency reliability revealed that the inter-item and corrected item-total correlations were low to moderate. A large number of items in all four scales showed lower scores than those considered as adequate (Kline, 1986). This means that while internal consistency is certainly necessary-but not sufficient- for homogeneity (Schmitt, 1996), the specific items with low correlation do not reflect the same construct to other items of the corresponding scale (Kline, 1979). Beavers, Lounsbury, Richards, Huck, Skolits, and Esquivel (2013) report that if an item is not significantly correlated to any of the factors (generally considered to be less than .30) and does not provide a conceptually vital dimension to the measure, the item should be removed. However, Hayes, Nelson, and Jarrett (1987, p. 972) supported that "a measure could readily have treatment utility without internal consistency… high internal consistency should not necessarily be expected."

In contrast, the results of the analyses in this study showed very good internal reliability (high coefficients alpha and test-retest). Similar results for Cronbach alpha are reported in the manual for DESK 3-6 (Tröster et al., 2004). Nevertheless, the finding related to high reliability in the present study was linked to low items' homogeneity. This is a finding enhanced by findings of other researchers that have shown either high or low item homogeneity that can be associated to

either high or low reliability despite classical itemetric opinion (Allen & Potkay, 1983; Lachar & Wirt, 1981; McDonald, 1981). High coefficients alpha does not reflect the degree that a scale is homogeneous (e.g., Cortina, 1993; Green, Lissitz, & Mulaik, 1977; Miller, 1995; Schmitt, 1996). Even though coefficient alpha is sensitive to the internal consistency of a scale, the revealing of high alpha coefficients in the present study contrary to internal consistency coefficients, is probably due to the affect of the large number of items in the each scale (Cortina, 1993; Yang & Green, 2011).

The findings of the present study show that the original version of DESK 3-6 for 3-years old children appears to be problematic in internal consistency, that is homogeneity among items of each scale. Cattell (1973, 1978, 1982) has argued that generally there is an optimally *low* level of item homogeneity. He also provided a conceptual demonstration of high item validity in the context of zero item homogeneity. Another conclusion is the sufficient degree of instrument reliability of DESK 3-6 for 3-years old coming from the high Cronbach alpha and test-retest coefficients.

Results

Fine motor skill

Fine motor skill was assessed by eleven items (FM1 to FM10). The results of the inter-item correlation indicated low to medium relation among items (Table 1). An average inter-item correlation of .30 or higher indicates acceptable reliability (Robinson, Shaver, & Wrightsman, 1991). Tabachnick and Fidell (2001) suggest that correlations exceeding .30 provide enough evidence to indicate that there is enough commonality to justify comprising factors. Low to medium were also the values of the squared multiple correlation on almost all items (Table 2).

Table 1: Average Inter-Item Correlation for Fine Motor Skill Children 3-year

Variable	FM1	FM2	FM3	FM4	FM5	FM6	FM7	FM8	FM9
FM1	-	-	-	-	-	-	-	-	-
FM2	.58	-	-	-	-	-	-	-	-
FM3	.49	.53	-	-	-	-	-	-	-
FM4	.12	.07	.15	-	-	-	-	-	-
FM5	.36	.28	.23	.09	-	-	-	-	-
FM6	.22	.18	.21	.11	.22	-	-	-	-
FM7	.21	.23	.27	.07	.28	.29	-	-	-
FM8	.35	.29	.35	.19	.20	.15	.25	-	-
FM9	.33	.32	.34	.10	.17	.17	.18	.31	-
FM10	.32	.33	.37	.01	.18	.15	.25	.25	.19

Note: $p < .01$

Table 2: Item-Total Statistics for Fine Motor Skill Children 3-year

Variable	Item-Total Correlations	Squared Multiple Correlations (r^2)	Cronbach's Alpha* if Item Deleted
FM1	.590	.426	.725
FM2	.576	.431	.729
FM3	.601	.392	.724
FM4	.167	.056	.777
FM5	.370	.159	.758
FM6	.315	.131	.763
FM7	.382	.191	.756
FM8	.463	.231	.746
FM9	.419	.193	.752
FM10	.406	.198	.753

Note: * Cronbach's alpha = .769; Standardised Cronbach's alpha = .760

Moreover, the item-total correlation coefficient values were examined and found to alter from .167 to .601. Values for an item-total correlation (point-biserial) between 0 and .19 may indicate that the question is not discriminating well, values between .2 and .39 indicate good discrimination, and values .4 and above indicate very good discrimination. In item analysis, in order to protect the summability aspect of the scale, it has to be higher than .30 (Kline, 1993), or at least .40 (Gliem & Gliem, 2003).

Cronbach's alpha and standardized Cronbach's alpha were .769 and .760 respectively showing acceptable alpha coefficient ($\alpha > .70$; Kline, 2005). Details of reliability statistics are shown in table 2. Test-retest reliability for the stability of measured scores over time was used. For this, 30 children were used who completed the DESK 4 and were then retested 2 weeks later. The subscale demonstrated adequate stability with test–retest coefficient of .91 score.

Gross motor skills

Gross motor skill was assessed by eleven items (GM1 to GM10). The results of the inter-item correlation, just as in fine motor skills, indicated low correlation among items (Table 3). Low were also the values of the squared multiple correlation on almost all items (Table 4). The item-total correlation coefficient values were found to alter from .307 to .598. Cronbach's alpha and standardized Cronbach's alpha were .786 and .801 respectively showing acceptable alpha coefficient. Details of the reliability statistics are shown in table 4. Test–retest coefficient was .90 proving adequate stability.

Table 3: Average Inter-Item Correlation for Gross Motor Skill Children 3-year

Variable	GM1	GM2	GM3	GM4	GM5	GM6	GM7	GM8	GM9
GM1	-	-	-	-	-	-	-	-	-
GM2	.31	-	-	-	-	-	-	-	-
GM3	.42	.42	-	-	-	-	-	-	-
GM4	.47	.27	.41	-	-	-	-	-	-
GM5	.42	.27	.30	.36	-	-	-	-	-
GM6	.22	.25	.22	.12	.10	-	-	-	-
GM7	.41	.27	.33	.42	.38	.20	-	-	-
GM8	.34	.18	.20	.24	.29	.09	.29	-	-
GM9	.24	.34	.30	.20	.10	.27	.17	.11	-
GM10	.43	.34	.28	.44	.38	.21	.34	.13	.36

Note: $p < .01$

Table 4: Item-Total Statistics for Gross Motor Skill Children 3-year

Variable	Item-Total Correlations	Squared Multiple Correlations (r^2)	Cronbach's Alpha* if Item Deleted
GM1	.598	.400	.764
GM2	.492	.271	.765
GM3	.557	.334	.755
GM4	.525	.358	.760
GM5	.453	.296	.769
GM6	.307	.130	.789
GM7	.510	.305	.761
GM8	.318	.170	.783
GM9	.387	.223	.778
GM10	.564	.375	.755

Note: * Cronbach's alpha = .786; Standardised Cronbach's alpha = .801

Cognitive skills - linguistic

Cognitive and linguistic skills were measured by twelve items SK1 to SK15. As in previous scales the inter-item correlation among items of this scale was low to medium (Table 5). Low to

medium were also the values of the squared multiple correlation on almost all items (Table 6). The item-total correlation coefficient values were found to alter from .380 to .675. Cronbach's alpha and standardized Cronbach's alpha were .873 and .877 respectively showing acceptable alpha coefficient. Details of the reliability statistics are shown in table 6. Test–retest coefficient was .91 showing adequate stability.

Table 5: Average Inter-Item Correlation for Cognitive Skills-Linguistic Children 3-year

Variable	SK 1	SK 2	SK 3	SK 4	SK 5	SK 6	SK 7	SK 8	SK 9	SK10	SK11	SK12	SK13	SK14
SK1	-	-	-	-	-	-	-	-	-	-	-	-	-	
SK2	.39	-	-	-	-	-	-	-	-	-	-	-	-	
SK3	.39	.56	-	-	-	-	-	-	-	-	-	-	-	
SK4	.26	.28	.26	-	-	-	-	-	-	-	-	-	-	
SK5	.36	.37	.36	.38	-	-	-	-	-	-	-	-	-	
SK6	.38	.50	.50	.26	.31	-	-	-	-	-	-	-	-	
SK7	.37	.57	.55	.22	.30	.54	-	-	-	-	-	-	-	
SK8	.19	.21	.20	.17	.26	.18	.16	-	-	-	-	-	-	
SK9	.44	.54	.64	.19	.33	.48	.57	.18	-	-	-	-	-	
SK10	.30	.39	.36	.39	.38	.22	.38	.25	.35	-	-	-	-	
SK11	.35	.28	.36	.34	,39	.30	.34	.27	.32	.33	-	-	-	
SK12	.37	.40	.30	.19	.18	.26	.35	.16	.35	.24	.23	-	-	
SK13	.34	.50	.51	.18	.29	.55	.60	.19	.46	.34	.33	.31	-	
SK14	.25	.29	.27	.13	.22	.18	.27	.77	.21	.27	.30	.19	.27	-
SK15	.29	.30	.27	.26	.31	.28	.22	.16	.30	.26	.31	.21	.24	.51

Note: $p < .01$

Table 6: Item-Total Statistics for Cognitive Skills-Linguistic Children 3-year

Variable	Item-Total Correlations	Squared Multiple Correlations (r^2)	Cronbach's Alpha* if Item Deleted
SK1	.547	.334	.865
SK2	.675	.511	.858
SK3	.667	.535	.859
SK4	.380	.244	.872
SK5	.502	.344	.867
SK6	.591	.460	.862
SK7	.667	.545	.858
SK8	.387	.627	.871
SK9	.647	.535	.859
SK10	.502	.303	.866
SK11	.503	.316	.867
SK12	.435	.241	.873
SK13	.624	.478	.860
SK14	.431	.646	.870
SK15	.407	.207	.871

Note: * Cronbach's alpha = .873; Standardised Cronbach's alpha = .877

Social skills

Social skills were measured by eleven items SE1 to SE10. Similar to the results of all other scales were for this one as well. Specifically, the inter-item correlation among items was low to medium (Table 7). Low to medium were also the values of the squared multiple correlation on almost all items (Table 8). The item-total correlation coefficient values were found to alter from .111 to .555. Cronbach's alpha and standardized Cronbach's alpha were .734 and .757 respectively,

showing acceptable alpha coefficient. Details of the reliability statistics are shown in table 8. Test–retest coefficient was .97 showing adequate stability.

Table 7: Average Inter-Item Correlation for Social Skills 3-year

Variable	SE1	SE2	SE3	SE4	SE5	SE6	SE7	SE8	SE9
SE1	-	-	-	-	-	-	-	-	-
SE2	.31	-	-	-	-	-	-	-	-
SE3	.33	.33	-	-	-	-	-	-	-
SE4	.31	.07	.36	-	-	-	-	-	-
SE5	.09	.39	.21	.18	-	-	-	-	-
SE6	.28	.12	.32	.39	.20	-	-	-	-
SE7	.21	.29	.34	.32	.29	.43	-	-	-
SE8	.06	.02	.08	.04	.06	.12	.11	-	-
SE9	.57	.34	.36	.25	.20	.31	.26	.05	-
SE10	.27	.20	.41	.26	.12	.24	.22	.05	.46

Note: $p < .01$

Table 8: Item-Total Statistics for Social Skills 3-year

Variable	Item-Total Correlations	Squared Multiple Correlations (r^2)	Cronbach's Alpha* if Item Deleted
SE1	.443	.371	.709
SE2	.412	.301	.714
SE3	.533	.337	.715
SE4	.399	.253	.720
SE5	.342	.207	.732
SE6	.464	.308	.706
SE7	.498	.297	.699
SE8	.111	.022	.751
SE9	.555	.457	.692
SE10	.409	.286	.716

Note: * Cronbach's alpha = .734; Standardised Cronbach's alpha = .757

Conclusion

In conclusion it can be stated that DESK 3-6 for 3-years old children appears to carry adequate data to justify the existence of its possible use to another sample of population than the one initially used, such is the Greek population. According to Kline (1986, p. 3) "maximum validity…is obtained where test items do not all correlate with each other, but where each correlates positively with the criterion. Such a test would have only low internal-consistency reliability."

Finally, it is suggested for future studies to further examine item homogeneity of DESK 3-6 for 3-years old children. Factor analysis is one statistical technique that can be used to determine the constructs or domains within the developing measure and contribute to establish construct validity (Boyle, 1991; Tate, 2003).

References:

1. Allen, B. P., & Potkay, C. R. (1983). Just as arbitrary as ever: Comments on Zuckerman's rejoinder. *Journal of Personality and Social Psychology, 44*, 1087-1089. doi: 10.1037/0022-3514.44.5.1087

2. American Education Research Association APA, and The National Council on Measurement in Education. 1999. *Standards for Educational and Psychological Testing*. Washington, DC: American Educational Research Association.

3. Anastasi, A., & Urbina, S. (1997). *Psychological Testing* (7th ed.). New Jersey: Prentice-Hall International.

4. Beavers, A. S., Lounsbury, J.W., Richards, J. K., Huck, S.W. Skolits, G. J., & Esquivel, S.L. (2013). Practical considerations for using exploratory factor analysis in educational research. *Practical Assessment, Research & Evaluation, 18*(6), 1-13. Retrieved from http://pareonline.net/getvn.asp?v=18&n=6

5. Brislin, R.W. (1986). The wording and translation of research instruments. In W. J. Lonner & J. W. Berry (Eds.) *Field methods in educational research* (pp. 137-164). Newbury Park, CA: Sage.

6. Cattell, R. B. 1973. *Personality and mood by questionnaire*. San Francisco, CA: Jossey-Bass.

7. Cattell, R. B. (1978). *Scientific use of factor analysis in behavioral and life sciences*. New York: Plenum Press.

8. Cattell, R. B. (1982). The psychometry of objective motivation measurement: A response to the critique of Cooper and Kline. *British Journal of Educational Psychology, 52*, 234-241. doi: 10.1111/j.2044-8279.1982.tb00831.x

9. Chakrabarti, S., & Fombonne, E. (2001). Pervasive Developmental Disorders in Preschool Children. *Journal of the American Medical Association, 285*(24), 3093-3099.

10. Cortina, J. M. (1993). What is coefficient alpha? An examination of theory and applications. *Journal of Applied Psychology, 78*, 98-104. doi: 10.1037/0021-9010.78.1.98

11. Cronbach, L. J. (1947). Test reliability: Its meaning and determination. *Psychometrika, 12*, 1-16. doi: 10.1007/BF02289289

12. Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16*(3), 297-334. doi: 10.1007/BF02310555

13. Cronbach, L. J., Gleser, G. C., Nanda, H., & Rajaratnam, N. (1972). *The dependability of behavioral measurements: theory of generalizability for scores and profiles*. New York: Wiley.

14. DeVellis, R. F. (2003). *Scale development: Theory and applications* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.

15. Draper, N. R., & Smith, H. (1998). *Applied Regression Analysis*. New York: Wiley.

16. Fombonne, E., Zakarian, R., Bennett, A., Meng, L., & McLean-Heywood, D. (2006). Pervasive developmental disorders in Montreal, Quebec, Canada: Prevalence and links with immunizations. *Petiatrics, 118*(1), 139-150. doi: 10.1542/peds.2005-2993

17. Glantz, S. A., & Slinker, B. K. (1990). *Primer of Applied Regression and Analysis of Variance*. New York: McGraw-Hill.

18. Gliem, J. A., & Gliem, R. R. (2003). *Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales*. Midwest Research to Practice Conference in Adult, Continuing, and Community Education, retrieved January 10, 2008 from http://www.alumni-osu.org/midwest/midwest%20papers/Gliem%20&%20Gliem-Done.pdf.

19. Green, S. B., Lissitz, R. W., & Mulaik, S. A. (1977). Limitations of coefficient alpha as an index of test unidimensionality. *Educational and Psychological Measurement, 37*, 827-838. doi: 10.1177/001316447703700403

20. Hayes, S. C., Nelson, R. O., & Jarrett, J. B. (1987). The treatment utility of assessment: a functional approach to evaluating assessment quality. *American Psychologist, 42*, 963-974. doi: 10.1037/0003-066X.42.11.963

21. Kline, P. (1986). *A handbook of test construction: Introduction to psychometric design*. New York: Methuen.

22. Kline, R. B. (2005). *Principles and practice of structural equation modeling* (2nd ed.). New York: The Guilford Press.

23. Litwin, M. S. (2003). *How to assess and interpret survey psychometrics* (2nd ed.). Thousand Oaks, CA: Sage Publications, Inc.

24. McDonald, R. P. (1981). The dimensionality of tests and items. *British Journal of Mathematical and Statistical Psychology, 34*, 110-117. doi: 10.1111/j.2044-8317.1981.tb00621.x

25. Miller, M. B. (1995). Coefficient alpha: A basic introduction from the perspectives of classical test theory and structural equation modeling. *Structural Equation Modeling, 2*, 255-273. doi: 10.1080/10705519509540013

26. Priest, J., McColl, B. A., Thomas, L., & Bond, S. (1995). Developing and refining a new measurement tool. *Nurse Researcher, 2*, 69–81.

27. Robinson, J. P., Shaver, P. R., & Wrightsman, L. S. (1991). *Measures of personality and social psychological attitudes*. San Diego, CA: Academic Press.

28. Schmitt, N. (1996). Uses and abuses of coefficient alpha". *Psychological Assessment, 8*(4), 350-353. doi: 10.1037/1040-3590.8.4.350

29. Steel, R. G. D., & Torrie, J. H. (1960). *Principles and Procedures of Statistics with Special Reference to the Biological Sciences*. New York: McGraw Hill Book Company.

30. Tabachnick, B. G., &Fidell, L. S. (2001). *Using multivariate statistics*. Boston: Allyn and Bacon.

31. Tröster, H., Flender, J., & Reinke, D. (2005). Dortmunder Entwicklungsscreening für den Kindergarten (DESK 3-6) [Dortmunder Development Screening for Kindergarten (DESK 3-6)]. Bern: Göttingen.

32. Yang, Y., & Green, S. B. (2011). Coefficient Alpha: A reliability coefficient for the 21st century? *Journal of Psychoeducational Assessment, 29*(4), 377-392. doi: 10.1177/0734282911406668

Published in the Russian Federation
European Journal of Physical Education and Sport
Has been issued since 2013.
ISSN: 2310-0133
Vol. 8, Is. 2, pp. 118-126, 2015

DOI: 10.13187/ejpe.2015.8.118
www.ejournal7.com

UDC 79

Effect of Selected Training Programmes on Health Related Physical Fitness Components of Obese Children

[1] Rani Sangeeta
[2] Dhadwal Manoj Kumar

[1] Hamaya University, Ethiopia
M.P.E and PhD in Physical Education, Assistant Professor
E-mail: sangeetabhatt2003@yahoo.co.in
[2] SGGSWU, Fatehgarh Sahib, Punjab, India
M.P.E, M.Phil and PhD in Physical Education, Assistant Professor
E-mail: dhadwal2005@gmail.com

Abstract

The present study is mainly concerned with obese children. The purpose of the study was to check the effects of selected training programme on health related physical fitness components of obese children. The subjects were taken from Mussoorie International School aged between 10 to 14 years in the year 2004-2005. The data was collected by administering the fit youth today test to the obese children before and after giving the training programme to them in term of pre-test and post-test. Eighty (80) obese students were selected as the subjects in this study. In each group for each programme twenty (20) students were taken as the subjects. In order to find out the significance difference between the various training programmes, analysis of covariance was used and the level of significance was chosen at .05 level. Analysis of covariance was computed by the ANCOVA test. To find out the (LSD) least significance difference among the groups LSD was used. The results of the study reveals that there were highly significance differences between the three groups that is Brisk Walking, Jogging and Circuit training programme. Circuit training seems to be more effective than other groups. There was no improvement in control group participants as they did not take part in any of the training program. Obesity is not a disease but sick rate increase in this. So for good health obesity should be prevented and this study shows that the Circuit training is more effective training program as comparison of other program to reduce the fats from the body.

Keywords: obesity, health related physical fitness, fit youth test.

Introduction

Obesity and overweight constitute two of the most significant medical and health problems in the world today. The effects appear to be as much psychological as physiological. It has been estimated that as ten million teenagers are overweight, representing approximately 20 percent of total teenage population in the United States. Thus we must consider the obesity as a big problem for the society and some good method should be adopted to reduce this problem. In the last decade, there have been a number of studies focusing on obesity reduction and the use of best method for it. (Beard, 1988) has conducted the study to see the effect of a Physical Fitness Program on Obese Children Ages Six to Eleven. He conducted investigation of the effects of a 10- week

physical training (aerobics) and nutrition education/counselling program on body fat of 443 children attending Tarrant Elementary School. He concluded that aerobics program was more effective than the regular physical education program for fat reduction. (Cooper, 1988) examined the effect of obesity on skill attainment in twelve year old children as measured by performance on three novel manipulative skills. The study was to determine if obesity was a significant, negative factor in the ability of children to learn manipulative, non locomotors skills, three novel manipulative skills were chosen for this study: jogging, flip sticks, and the chinese yo-yo. The two groups were compared to each other on the amount of time to learn the three skills. T–test was used to test the groups statistically for significance between the group means, at the .05 level of significance. It should be noted that in some instances the obese subjects had a lower group composite time than their non- obese counterparts. The obese group of subjects and the obese girls sub group had lower times on the Chinese yo-yo skill. (Ladda & Mo Suwan, 1998) evaluated that exercise has been found to be effective for prevention of weight gain and maintenance of a stable weight in adults. The objective of this study was to evaluate the effect of a school based aerobic exercise program on the obesity indexes of pre-school children. (Humphrey & Reed, 1987) conducted study to check the effect of diet and cycle exercise on body composition and metabolic measures in obese children. The effect of cycle exercise and dietary caloric restriction on resting metabolic rate, body composition, and cardiovascular fitness were examined in young obese males. It was concluded that at a level of moderate caloric restriction, significant reductions in total body weight, body fat, and body weight, body fat, and LBM may be expected, and additional weight loss associated with aerobic exercise can be reasonably predicated. (Robert Paul, 1992) investigated the role of exercise and diet protocols on body composition in obese women. The results of this investigation demonstrated that a weight control program of diet alone, diet plus exercise, or exercise alone will have similar effects on weight and lean body weight in obese women. It also appears that a weight control program of diet plus exercise or exercise alone will result in lower percentage of body fat than will a weight control program of diet alone. (Judith S. et al., 2000) investigated the influence of three types of aerobic exercises class (aerobics dance, water aerobics, and general fitness conditioning) on exercise self efficiency and perceived competence in overweight women (n - 214). The results of the study further shows that overweight women enrolled in the water aerobics class had lower perceptions of competence in physical fitness than those enrolled in aerobic dance and fitness conditioning. Individual who scored high in perceived competence also scored high in self-efficacy the results are limited by the non randomized nature of the study design. (Lee, 1995) examined the degree of body fatness and the developmental trends of body composition of Korean youth. The goal of this study was to compare the body composition of Korean and American youth and to establish body fat standards of Korean youth. The result shows that prevalence of obesity in Korean girls was lower than U.S girls.

Selection of subjects

Eight (80) female subjects were selected for the study. Their ages ranged from 10 to14 years. These subjects belonged to Mussoorie International School, Mussoorie. The research scholar chose 20 female subjects for the brisk walking programme, 20 female subjects for the jogging programme, 20 female subjects for the circuit training programme and 20 female subjects for control group programme.

Experimental design

Random group design was adopted for this study. Subjects as well as the experimental treatment were randomly assigned to the three experimental groups and one control group which consisted of twenty subjects each.

Collection of Data

The scholar had taken the permission from the principal of the school in order to conduct the health related physical fitness test and also for giving the training schedule to the obese subjects. The research scholar had explained each and every item in details with the demonstration by explaining the purpose of the study and its importance to the subjects. After explaining all necessary points in details subjects were asked to do warming up exercise to avoid the injuries. Some practice trials were given about the testing items to become familiar with the test. The name

and age were procured from the school documents with the permission of concerned authority. The separate stations were setup for different items and the subjects moved from one station to another. The steady state jog test was conducted on the play field.

Selection of Test Batteries/Variables

The fit youth today test was conducted to check the health related physical fitness components. Test consisted of the following items; steady states jog, bent knee curl-up, sit and reach test and body composition. To start with the actual experiment of 16 weeks the subjects were divided into four groups. Brisk walking group A, Jogging group B, Circuit training exercise group C and Control group D. Fit youth today test was administered to the subjects before starting the training and after sixteen weeks of training programme.

Statistical Technique

For the study analysis of co-variance was used. Analysis of covariance was computed by the ANCOVA test. To find out the (LSD) least significance difference among the groups LSD was used. The purposed hypothesis was tested at .05 level of confidence.

Analysis of Data

Subjects participated in physical activity program and completed the pre-test and post-test programme testing. They met the necessary participation requirement of at least 5 days/week. For Fit Youth Today Test body fat was measured by applying the formula by slaughter i.e. %fat = (0.610x sum of skin fold) +5.0. In order to investigate and test the significance of difference if any, analysis of covariance was computed. The hypothesis was tested at .05 level of confidence.

Table 1: Analysis of Covariance of Steady State Jog Test

Sources of variance	**d.f**	**Ssx**	**ssy**	**Ssxy**	**ssyx**	**Mssyx**
Treatment group	4-1=3	370.199	437	400.836	1.02	0.34
Means						
Error	80-4 - =75	364.11	427.4	399.17	10.3	0.137
Total	78	734.30	864.4	800.006	11.3	

* Significant at 0.05 level of confidence. Tab $F_{.05}$ (3, 75) 2.73 F_{yx} =2.48

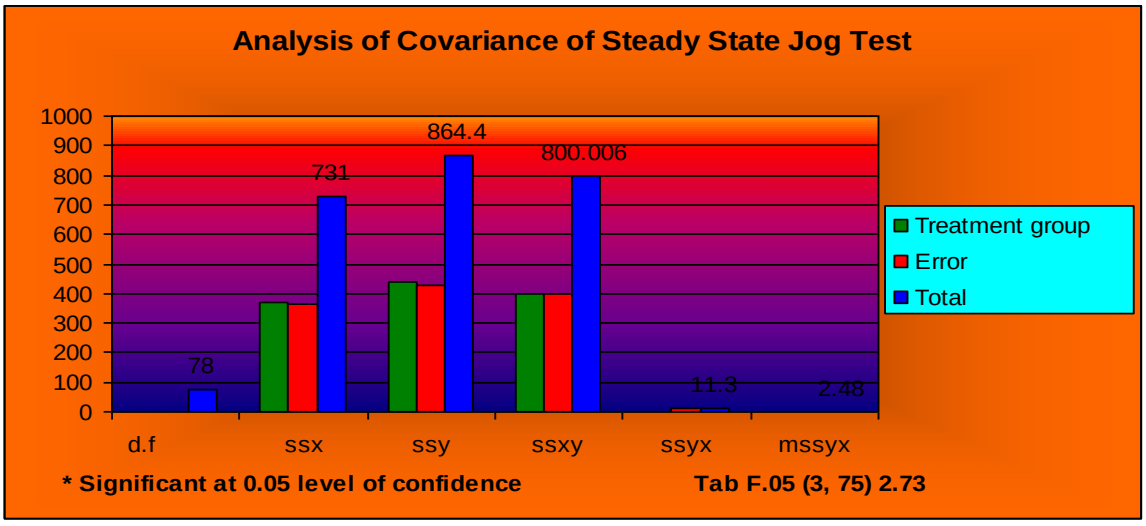

Figure 1

Table 1 and Graph 1 shows that F_{yx} 2.48 is less than Tabulated $F._{05}$ 2.73. It is concluded that all the treatments are not equally effective. It may be concluded that there was a significance difference in the training programme on health related physical fitness components of obese

children. In order to find out which treatment is more effective, pair wise comparative analysis on adjusted means of post test had been computed by applying LSD.

Table 2: Comparative Analysis of Adjusted Means of Steady State Jog Test

Brisk Walking	Jogging	Circuit Training	Control
Group-A	Group-B	Group- C	Group-D
2.44	2.47	2.56	2.06

* Significant at 0.05 level of confidence. **Tab F $_{.05}$ (3, 75) 2.73**

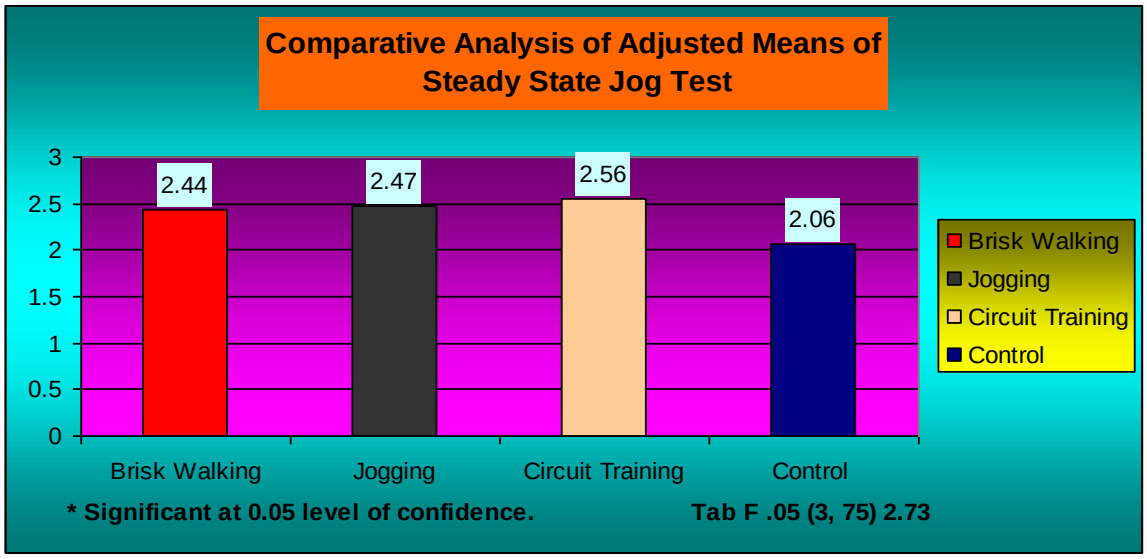

Figure 2.

Table 2 and Graph 2 shows that if a choice has to be made out of three treatments A, B and C, treatment C should be preferred. In other words circuit training programme is the best way to see the effect on health related physical fitness components (STEADY STATE JOG TEST) of obese children.

Table 3: Analysis of Covariance of Sit and Reach Test

Sources of Variance	d.f	Ssx	ssy	ssxy	ssyx	mssyx
Treatment group	4-1= 3	1233.3	179.0	1531.25	232.5	77.5
Means						
Error	80-4-1= 75	1003	15.26	1377	364.5	4.86
Total	78	2236.3	3316	2908.25	596.9	

* Significant at 0.05 level of confidence. **Tab F $_{.05}$ (3, 75) 2.73**

F_{yx} =15.95

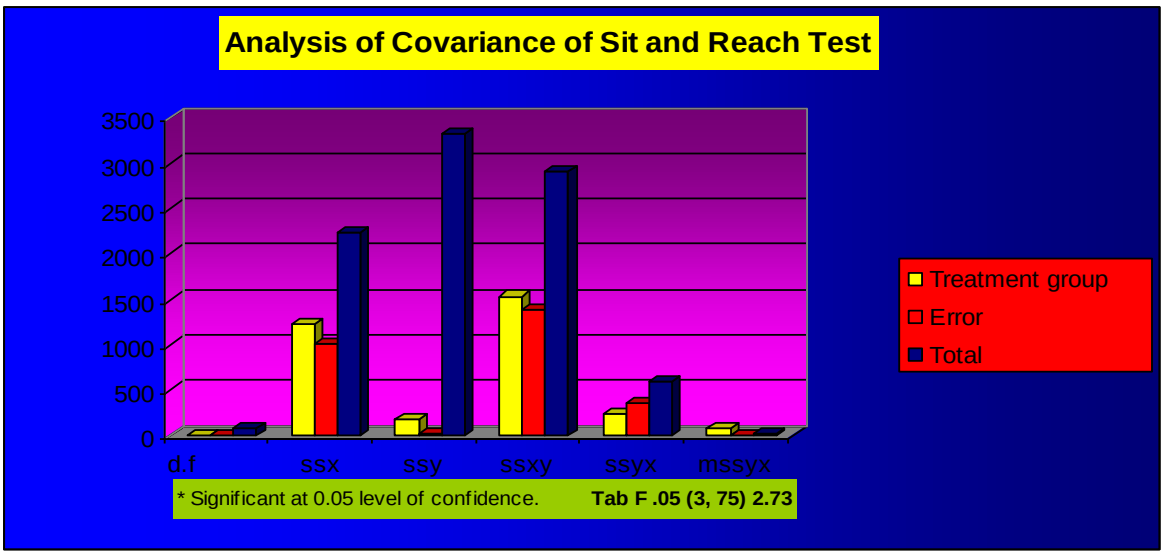

Figure 3.

On the basis of Table 3 and graph 3 it may be concluded that there was a significant difference in the training program. To find out which training program is better on health related physical fitness components of obese children pair wise comparative analysis on adjusted means of post test had been computed by applying LSD.

Table 4: Comparative Analysis of Adjusted Means of Sit and Reach Test

Brisk walking	**Jogging**	**Circuit Training**	**Control**
Group-A	Group-B	Group- C	Group-D
4.151	5.583	5.662	4.19

* Significant at 0.05 level of confidence. **Tab F $_{.05}$ (3, 75) 2.73**

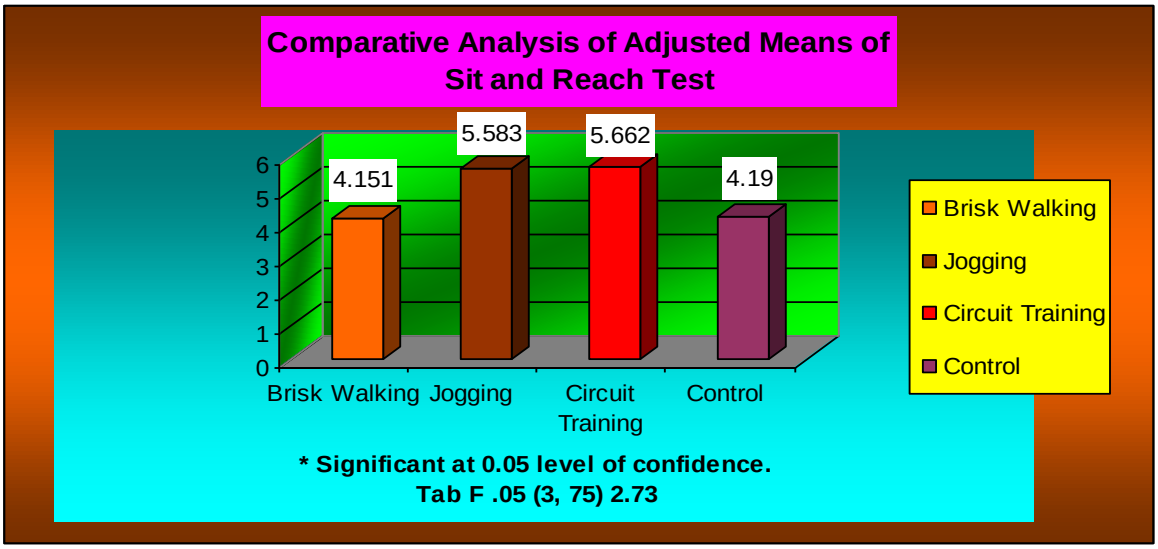

Figure 4.

Table 4 and Graph 4 reveals that treatment C and B are equally effective and also treatment B and A are equally effective whereas treatment D is least effective. It is therefore concluded that if a choice has to be made out of three treatments A, B, and C, treatment C should be preferred.

In other words circuit training program is more effective on health related physical fitness components (Sit and Reach) of obese children.

Table 5: Analysis of Covariance of Bent knee Curl-ups

Sources of variance	**d.f**	**Ssx**	**ssy**	**ssxy**	**ssyx**	**Mssyx**
Treatment group	4-1 =3	221156	30910	25370.79	24710.19	8236.73
Means						
Error	80-4-1=75	219144	28790	24178.09	26122.79	81.64
Total	78	440301	59701	49548.87	50832.98	

* Significant at 0.05 level of confidence. **Tab F $._{05}$ (3, 75) 2.73**

F_{yx} =100.9

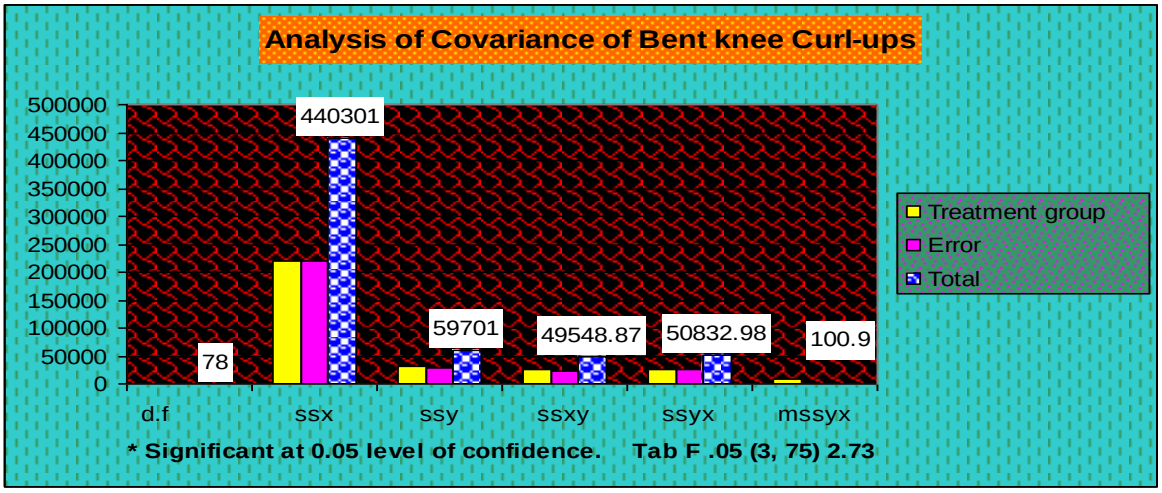

Figure 5.

Table 5 shows that there was a significant difference in the training program on health related physical fitness components of obese children age 10 to 14 years. To find out which training program is more effective on health related physical fitness components of obese children pair wise comparison analysis on adjusted means of post test had been computed by applying LSD.

Table 6: Comparative Analysis of Adjusted Means of Bent knee Curl-ups

Brisk walking	**jogging**	**Circuit training**	**Control**
Group-A	Group-B	Group- C	Group-D
18.37	21.62	22.95	17.2

* Significant at 0.05 level of confidence. **Tab F $._{05}$ (3, 75) 2.73**

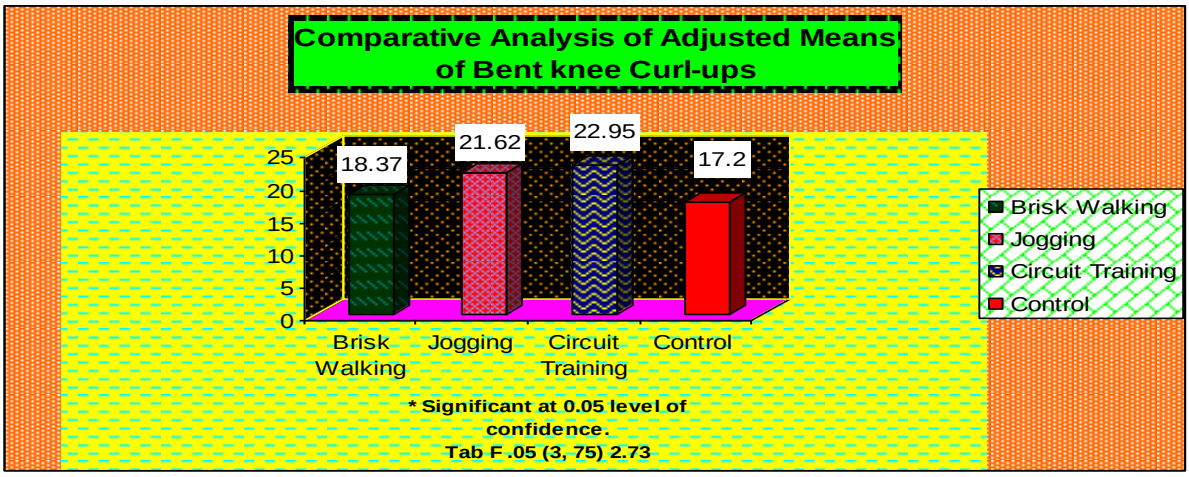

Figure 6.

It is evident from Table 6 and Graph 6 that treatment B and C are equally effective and also treatment A and B are equally effective whereas treatment D is least effective. It is therefore concluded that if a choice has to be made out of three treatments A, B and C treatment C should be preferred. In other words circuit training program is more effective on health related physical fitness components (bent knee curl ups) of obese children.

Table 7: Analysis of Covariance of Skinfold Thickness

Sources of variance	**d.f**	**Ssx**	**ssy**	**ssxy**	**ssyx**	**Mssyx**
Treatment group	4-1 =3	67134.5	57434.5	16994.2	52479.5	17493.2
Means						
Error	80-4-1=75	66802.8	57049.7	16842.5	52800.33	704
Total	78	133937.4	114483.3	33842.8	10527.83	

* Significant at 0.05 level of confidence. **Tab F $_{.05}$ (3, 75) 2.73**

F_{yx} =24.84

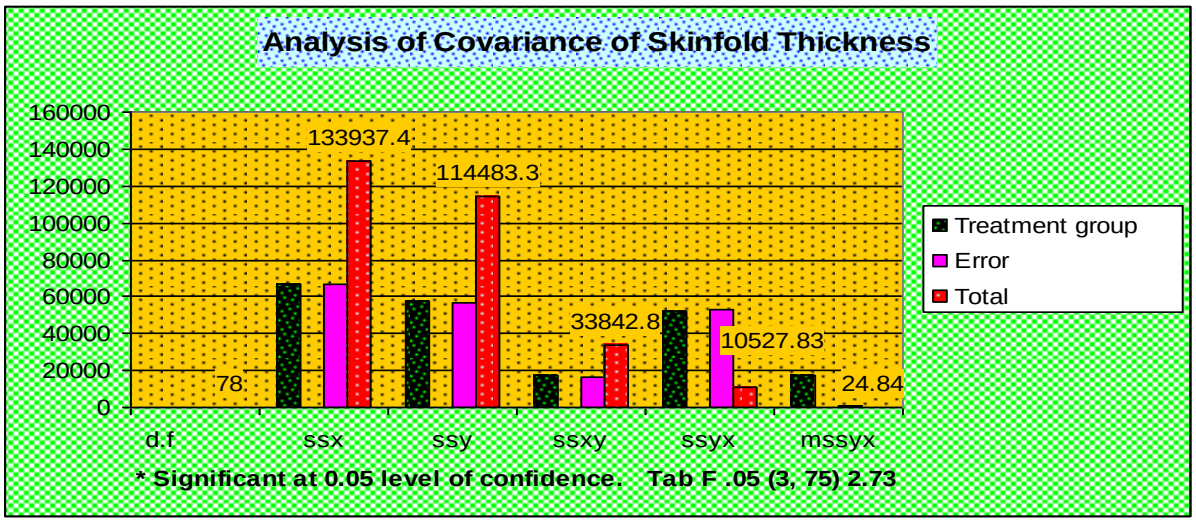

Figure 7.

The analysis of covariance for the above Table 7 and Graph 7 reveals that F_{yx} 24.84 is greater than $F._{05}$ 2.73 which concluded that all the treatments are not equally effective to see the effect on health related physical fitness components of obese children. Therefore, on the basis of Table -7 it

may be concluded that there was a significant difference in the training program on health related physical fitness components of obese children age 10 to 14 years.

Table 8: Comparative Analysis of Adjusted Means of Skinfold Thickness

Brisk walking	**Jogging**	**Circuit training**	**Control**
Group-A	Group-B	Group- C	Group-D
26.93	26.64	26.04	30.13

* Significant at 0.05 level of confidence. **Tab F $_{.05}$ (3, 75) 2.73**

Graph-8

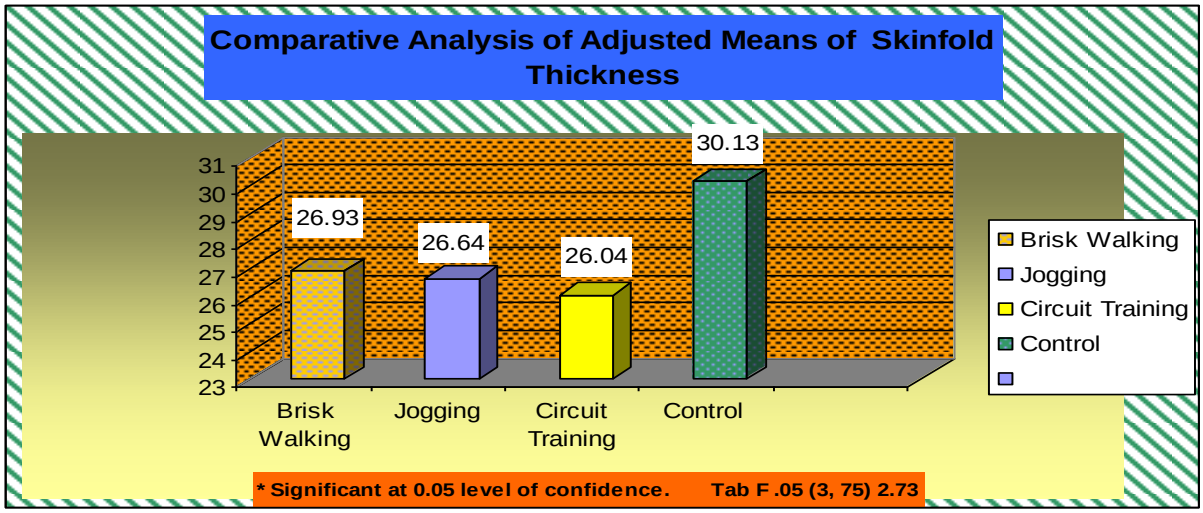

Table 8 and Graph 8 shows that treatment B and C are equally effective and also treatment A and B are equally effective whereas treatment D is least effective. Therefore it is concluded that if a choice has to be made out of three treatments A, B and C treatment C should be preferred. In other words circuit training program is more effective on health related physical fitness components of obese children, and also to reduce the fat percentage from the body.

Discussion of Findings

The findings reveal that there was a significant difference in all three training programme that is brisk walking, jogging and circuit training. The significant difference show that circuit training programme is better than jogging and brisk walking programme to reduce the body fat percentage from the body and to increase the cardio respiratory efficiency, muscular strength and muscular endurance and flexibility.

Conclusions

The results showed that there were highly significance difference between the three groups that is Brisk Walking, Jogging and Circuit training programme. Circuit training seems to be more effective than other groups. The participants of circuit training program reduced their body fat and improved their cardio respiratory efficiency, muscular strength and endurance and flexibility as a result of their participation five times per week in circuit training programme that emphasized inclusive participation and a positive atmosphere. Jogging programme was less effective than circuit training programme but participation of jogging programme also reduced their body fat and increases their cardio respiratory efficiency, muscular strength and muscular endurance and flexibility as a result of their participation five times per week in jogging training programme but it was less than circuit training programme. Brisk walking group also reduced their body fat and increase the cardio respiratory efficiency, muscular strength and muscular endurance and flexibility but improvement was less than circuit training and jogging training programme. Participants of control group programme increased their body fat and decreased their cardio respiratory efficiency, muscular strength and muscular endurance and flexibility as they did not take part in any of the training program. They were continuing with their regular routine.

Practical Applications

a. The findings of the study will help to understand the best exercise programme to reduce the fats.

b. The findings of the present study will help the coaches and physical education teachers for the formation and recommendation of best exercises for obese children.

Acknowledgement

Authors would reminiscent to express gratitude the Administration Mussoorie International School, Mussoorie (Uttrakhand) for providing assistance in collecting the pertinent information for undertaking quality research.

References:

1. Beard, L. Effect of a Physical Fitness Program on Obese Children Ages Six to Eleven. Dissertation Abstracts International, v. 48:9, p. 2272-A, March, 1988.

2. Cooper, A. S. The Effect of Obesity on Skill Attainment in Twelve Year Old Children as measured by Performance on Three Novel Manipulative Skills. Dissertation Abstracts International, v. 48:8, p. 2015-A, February 1988.

3. Humphrey, D.; Reed, H. Effect of Diet and Cycle Exercise on Body Composition and Metabolic Measures in Obese children. Dissertation Abstracts International, v. 47, p. 3695. A, April 1987.

4. Judith S. et. al. The Influence of Different Aerobic Exercises Class on Exercise Self-Efficacy and Perceived Competence in Overweight Women. Dissertation Abstracts International, v. 60-7, p. 2857-A-2858-A, January 2000.

5. Lee, H. D. Developmental Trends of Body Composition, Degree of Body Fatness and Body Fat Standards of Korean Youth. Dissertation Abstracts International, v. 7, p. 1869-A, 1995.

6. Robert, P; Gustafson. The Role of Diet and Exercise in Weight Control in Obese Women. Dissertation Abstracts International, v.52 n.8, p. 2856-A-2857-A, February 1992.

7. Ladda, H. ; Suwan, M. et al. Effects of a Controlled Trial of a School Based Exercise Program on the Obesity Indexes of Preschool Children. American Journal of Clinical Nutrition, v. 68, p. 1006, 1998.