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## Effect of plyometric training and SAQ training followed by detraining on selected bio-motor abilities of school level kabaddi players

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### Abstract

The purpose of the study was to examine the effect of Plyometrics training and SAQ training followed by detraining on selected Bio-motor abilities of school level kabaddi players. The investigator selected a total of thirty (N=30) male kabaddi players between the age group of 12-18 years from CMS high school Olassa Kottayam Districts. 10 subject of them, as SAQ training (N=10), Plyometric training (n=10) and control group (n=10) were selected as subjects. Total duration was for 8week All the subjects were tested on selected criterion variables prior to and immediately after the six weeks of Kabaddi training programme. The de training effect had measured after the two weeks of training. The study aimed at mainly to find out the impact of Plyometric training and SAQ training followed by detraining on selected Bio-motor abilities of school level kabaddi players. The bio motor variables (dependent variables) selected for the study were explosive strength and agility. Thus data collected on the above variables from thirty kabaddi players were fit into three equal groups. Hence Analysis of covariance (ANACOVA) was applied for find out the significance level. The result indicates that there was significant difference in explosive strength Hence the research hypothesis first stated has been accepted in the case of explosive strength Further it was hypothesized that there would be a significant improvement on bio-motor abilities due six weeks of SAQ training. The pretest scores and post test scores were compared to find out effect of the training. The result indicates that there was significant difference in agility.

**Keywords:** Plyometric training, SAQ training, detraining, bio-motor abilities

### Introduction

The aim of education should be to teach us rather how to think, than what to think-rather to improve our minds, so as to enable us to think for ourselves, than to load the memory with the thoughts of other men. (Bill Beattie, 2007) [3].

Physical education (PE) is the interdisciplinary study of all areas of science relating to the transmission of physical knowledge and skills to an individual or a group. The application of these skills, and their results, included, among other subjects, are aspects of anthropology, biology, chemistry, physics, psychology, and sociology. Some treatments of the discipline also include spirituality as an important aspect. (Pangrazi, 2004) [5].

The pursuit of physical education and sport is a fundamental right for all. Physical education and sport form an essential element of lifelong education in the overall educational system. Physical education and sport programmers must meet individual and social needs. Research and evaluation are indispensable components of the development of physical education and sport. (Kelly E. Duell, 2007) [6].

The game of Kabaddi consists of 14 players (seven per side) without equipment and is supervised by a referee, two umpires and a scorer. The team that wins the toss has the option of choosing a particular side or fielding the raiders first. Repeatedly chanting 'Kabaddi', the rider moves to the other side with maximum possible motivation and tries to touch one of the defending players. The defenders try to catch the rider inside their territory and the rider tries to return to their own side without stopping the spell. A point is credited to the raider's group if the raider is able to return to his area after touching a defender and the touched person is ejected from the game.

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### Objectives of the study

The purpose of the study was to find out the Effect of Plyometric training and SAQ training followed by detraining on selected Bio-motor abilities of school level kabaddi players.

### Hypothesis

1. There would be a significant improvement on bio-motor abilities due to Plyometrics and SAQ training.
2. There will not be any significant differences on bio-motor abilities due to De training of Plyometrics and SAQ training group.

### Methodology

The purpose of the study was to examine the effect of Plyometrics training and SAQ training followed by detraining on selected Bio-motor abilities of school level kabaddi players. To achieve this purpose, thirty male kabaddi players from Kottayam Distracts, Kerala states were selected as subjects. Kerala State. The selected subjects were studying at CMS high school Olassa Kottayam Districts. The investigator explained to them about the purpose and nature of the study and requested the kabaddi players to volunteer for the study. Only male kabaddi players aged between 12 and 18 years were contacted and around thirty-five players gave their voluntary consent to work as subjects for the study. Only thirty of them, as SAQ training (n=10), Plyometric training (n=10) and control group (n=10) were selected as subjects.

They were also informed that they were free to opt out of the study at any time if they felt any discomfort or difficulty in continuing with the training programme. All the subjects revealed that they had no ailments of any sort and were taking medicines for treatment after a general medical checkup done on them. All the subjects were tested on selected criterion variables prior to and immediately after the six weeks of kabaddi training programme. The de training effect had measured after the two weeks of training. The study aimed at mainly to find out the impact of Plyometric training and SAQ training followed by detraining on selected Bio-motor abilities of school level kabaddi players. The bio motor variables (dependent variables) selected for the study were explosive strength, agility. Thus data collected on the above variables from thirty kabaddi players were fit into three equal groups. The warm up session lasted for 10 minutes. The warm up started slowly with dynamic stretching. The stretching exercises involving for all muscles.

Each work out session was lasted for 60-75 minutes. After the first half of the training five minutes were given as the rest period.

**Table 1:** Tests Selection

S. No	Criterion variable	Test items	Unit of Measurements
1	Explosive strength	Vertical jump	Centimeter
2	Agility	Shuttle run	Seconds

**Table 2:** SAQ training exercise

Exercises	Low intensity	Medium intensity	High intensity
1	butt-kicks	high knee forward	ladder speed run
2	high knee forward	high knee side ward	run over micro hurdle
3	high knee side ward	ladder speed run	-----
4	falling starts	run over micro hurdle	partner resisted run
5	zigzag run forward	zigzag run forward	ladder zigzag cross over
6	zigzag run side ward	zigzag run side ward	figure eight
7	zigzag run back ward	ladder zigzag cross over	z- pattern run
8	s- drill	s- drill	-----
9	rope skipping	single leg rope skipping	-----
10	in place angle jump	cross lateral skaters	cross lateral skaters
11	scissors jump	scissors jump	-----
12	lateral skaters	lateral skaters	single leg hop

**Table 3:** Plyometric training exercises

Exercises	Low intensity	Medium intensity	High intensity
1	butt-kicks	double leg hop	single leg hop
2	double leg hop	double leg jump side ward	Medicine ball throw in single hand
3	double leg jump side ward	Medicine ball throw sitting	single leg hop side ward
4	Medicine ball throw sitting	Medicine ball scoop toes	z- pattern cuts
5	Galloping	single leg rope skipping	single leg stride jump
6	in place angle jump	cross lateral skaters	cross lateral skaters
7	scissors jump	scissors jump	tuck jump
8	lateral skaters	lateral skaters	star jump

### Analysis of the data

The bio motor variables (dependent variables) selected for the study were explosive strength, agility Thus data collected on the above variables from thirty school level kabaddi players were fit into three equal groups. Hence Analysis of covariance (ANACOVA) was applied for find out the significance level. In all conditions the significant level was fixed at 0.05 levels, which was considered to be appropriate since the nature of this study does not demand more stringent level of significant. and standard derivation values of 30 meter sprint in control group was 4.31±.13. The pre-test mean and standard

derivation values of 30 meter sprint in SAQ group was 4.28±.7, The post-test mean and standard derivation values of 30 meter sprint in SAQ group was 4.27±.14, and the detraining test mean and standard derivation values of 30 meter sprint in SAQ group was 4.28±.14. The pre-test mean and standard derivation values of 30 meter sprint in plyometrics group was 4.36±.14, The post-test mean and standard derivation values of 30 meter sprint in plyometrics group was 4.26±7.9, and the detraining test mean and standard derivation values of 30 meter sprint in plyometrics group was 4.24±7.18.

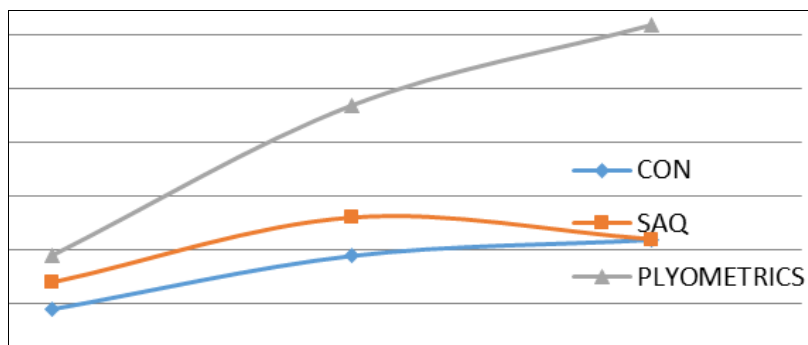



Fig 1: Graphical representation of Pre test, Post test and Detraining mean of explosive strength

Source of variation	df	SSx	SSy	SSxy	SSyx	MSSyx	F
Between	2	56.6	14.86667	25.7	2.894089	1.447044	*13.0044
Within	26	-55.5943	-13.8636	-24.6961	-2.89311	-0.11127	
Total	28						

		<b>John Ninan Settlement</b> Olassa Kottayam-686014 Acacio smokeless oven Cash bill				
Invoice NO: 588 State: Kerala		Transportation mode: Road Invoice Date:20-12-2022 Stae Code: 32			Vehicle Number: KLO5AT 3654 Date of supply:26-12-2022 PLACE OSUPPLY: KOOVA\ PALLY,KANJIRAPALLY	
Dtailsof Recever-Billed To Name: S.M.R.Planntation Pvt Ltd Adres: Koovapally Po Kanjirapally				Details of consignee –shipped to Name: John Ninan Puhiyaveedu Olassa, PO Kottayam Phone number 9446984827		
SL. No	Name of production/description	UDM	Qty.	Rate	Total	
	Cast iron smockless oven 14” 18” 24” fire clay back box shutter transportation fitting charge			19500		
Total					19500	
Total bill amount in words Nineteen thousand five hundred ruppies only				certified that the particulars given above are true &correct		
Bank Details Name of bank: Canra Bank Account no:1140101002451 Branch: PARIPPU IFSC: CNRB 0001140		Terms & Conditions 1) Bricks, Cement, Steel Bar, Mettil, Ac Pipe, Top: Extra 2) Delivery: Immediate 3) Above rate including labour charge		For John Ninan Settlement  Authorised signatory		

Significant at .05 level of confidence  
 'F' value required at 0.05 level=3.37

The data collected from pretest, posttest and after the detraining test on SAQ training group, Plyometrics training group and the control group have been statistically analyzed and presented in Table 1.

**Explosive strength**

The data collected from pre test, post test and after the detraining test on SAQ training group, Plyometrics training group and the control group have been statistically analyzed and presented in Table 2.

Table 4: Analysis of covariance of control group, SAQ training group and the plyometrics training group on post test and detraining test of Explosive strength

Source of variation	df	SSx	SSy	SSxy	SSyx	MSSyx	F
Between	2	42.46667	106.6667	65.33333	5.856141	2.928071	*13.0029
Within	26	-41.4646	-105.664	-64.3314	-5.85483	-0.22519	
Total							

\*Significant at .05 level of confidence  
 F' value required at 0.05 level=3.37

The adjusted post test mean of control group is 20.88116, SAQ group is 21.9672 and the plyometrics group 21.2253, resulting in an 'F' ratio of 13.0029 which indicates a

statistical significant difference at .05 level of confidence. The above statistical analysis indicates that there was significant variation among the three groups after the training

period further, to determine which of the paired means has a significant difference; LSD test was applied. The result of the LSD test is presented in Table 5.

**Table 5:** Mean Difference among control group, SAQ training group and the plyometrics training group on post test and detraining test of Explosive strength

Control	SAQ	Plyometric	MD	CD(5% Level)
20.88116		21.2253	-0.44414*	0.44269
20.88116	21.9672		-1.08603*	
	21.9672	21.2253	0.741897*	

Table 5 shows the adjusted post test mean difference between SAQ group and control group as -1.08603 which was statistically significant at .05 level of confidence. The adjusted post test mean difference in Plyometrics group and control group -0.34414 which was also statistically significant at .05 level of confidence. Since the adjusted post test mean of SAQ and Plyometrics group 0.741897, which was not statistically significant at .05 level of confidence.

**Agility**

The data collected from pre test, post test and after the detraining test on SAQ training group, Plyometrics training group and the control group have been statistically analyzed and presented in Table 6.

**Table 6:** Analysis of covariance of control group, SAQ training group and the plyometrics training group on post test and detraining test of Agility

Source of variation	d f	SSx	SSy	SSxy	SSyx	MSSyx	F
Between	2	1.816347	2.72394	2.21928	-0.09732	-0.04866	* 12.9962
Within	26	-0.81545	-	-	0.097352	0.003744	
Total			1.72291	1.21833			

\*Significant at .05 level of confidence  
F' value required at 0.05 level=3.37

The adjusted post test mean of control group is 4.964, SAQ group is 4.863175 and the plyometrics group is 5.033661, resulting in an 'F' ratio of 12.9962 which indicates a statistical significant difference at .05 level of confidence. The above statistical analysis indicates that there was significant variation among the three groups after the training period further, to determine which of the paired means has a significant difference; LSD test was applied. The result of the LSD test is presented in Table 7.

**Table 7:** Mean Difference among control group, SAQ training group and the plyometrics training group on post test and detraining test of Agility

Control	SAQ	Plyometric	MD	CD (5% level)
4.964		5.033661	-0.06966*	0.057084
4.964	4.863175		0.100825*	
	4.863175	5.033661	-0.17049*	

Table 7 shows the adjusted post test mean difference between SAQ group and control group as 0.100825 which was statistically significant at .05 level of confidence. The adjusted post test mean difference in Plyometrics group and control group -0.06966 which was also statistically significant at .05 level of confidence. Since the adjusted post test mean of SAQ and Plyometrics group -0.17049, which was also statistically significant at .05 level of confidence.

**Agility**

The data collected from pre test, post test and after the detraining test on SAQ training group, Plyometrics training group and the control group have been statistically analyzed and presented in Table 8.

**Table 8:** Analysis of covariance of control group, SAQ training group and the plyometrics training group on Agility

Source of variation	d f	SSx	SSy	SSxy	SSyx	MSSyx	F
Between	2	1.149147	1.816347	1.350107	-0.00739	-0.00369	*12.8648
Within	26	-0.1482	-0.81545	-0.34922	0.007466	0.000287	
Total	28						

\*Significant at .05 level of confidence  
'F' value required at 0.05 level=3.37

The adjusted post test mean of control group is 16.24705, SAQ group is 16.47804 and the plyometrics group is 16.84746, resulting in an 'F' ratio of 12.8648, which indicates a statistical significant difference at .05 level of confidence. The above statistical analysis indicates that there was significant variation among the three groups after the training period further, to determine which of the paired means has a significant difference; LSD test was applied. The result of the LSD test is presented in Table 9.

**Table 9:** Mean Difference among control group, SAQ training group and the plyometrics training group on Agility

Control	SAQ	Plyomtrc	MD	CD(5% Level)
16.24705		16.84746	-0.60041*	0.015808
16.24705	16.47804		-0.23099*	
	16.47804	16.84746	-0.36942*	

Table 9 shows the adjusted post test mean difference between SAQ group and control group as 0.23099 which was statistically significant at .05 level of confidence. The adjusted post test mean difference in Plyometrics group and control group as 0.60041 which was also statistically significant at .05 level of confidence. Since the adjusted post test mean of SAQ and Plyometrics group is 0.36942, which was also statistically significant at .05 level of confidence.

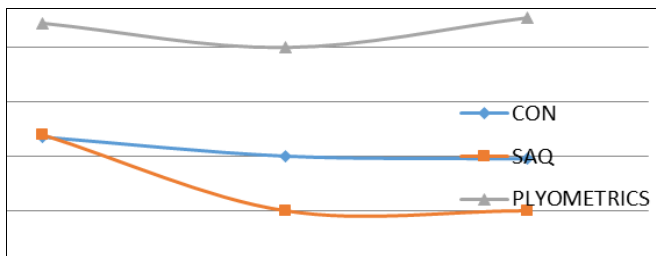
**Table 10:** Descriptive statistics of agility

Groups		pre test	post test	De training	No
CON	Mean	14.47	14.40	14.39	10
	SD	.33	.27	.26	
SAQ	Mean	14.48	14.20	14.20	10
	SD	0.23	0.13	0.13	
PLMTS	Mean	14.89	14.80	14.91	10
	SD	.61	.58	.58	

Table -10 indicates that the pre-test, post test, detraining mean and standard deviation value of Agility test. The pre-test mean and standard derivation values of agility test was in control group was 14.7±.33, The post-test mean and standard derivation values of the agility test in control group was 14.40±.27, and the detraining test mean and standard derivation values of the agility test in control group was 14.39±.26. The pre-test mean and standard derivation values of agility test in SAQ group was 14.48±.23, The post-test mean and standard derivation values of the agility test in SAQ group was 14.20±.13, and the detraining test mean and standard derivation values of the agility test in SAQ group was 14.20±.13. The pre-test mean and standard derivation



values of agility test in plyometrics group was  $14.89 \pm 0.61$ , The post-test mean and standard deviation values of the agility test in plyometrics group was  $14.80 \pm 0.58$ , and the detraining test mean and standard deviation values of the agility test in plyometrics group was  $14.91 \pm 0.58$ .



lower the value better the performance

**Fig 2:** Graphical representation of Pre test, Post test and Detraining mean of Agility test

## Results

It was hypothesized that there would be a significant improvement on bio-motor abilities due to six week Plyometrics training. The pre test scores and post test scores were compared to find out effect of the training. The result indicates that there was significant difference in explosive strength. Hence the research hypothesis first stated has been accepted in the case of explosive strength. Further it was hypothesized that there would be a significant improvement on bio-motor abilities due six weeks of SAQ training. The pre test scores and post test scores were compared to find out effect of the training. The result indicates that there was significant difference in agility.

Hence the research hypothesis second stated has been accepted in the case of agility.

It was hypothesized that there will not be any significant difference in bio-motor abilities due to two weeks of detraining on SAQ training group. The post test scores and detraining test scores were compared to find out effect of the detraining. The result indicates that there was significant difference in the SAQ training group on agility.

Hence the research hypothesis third stated has been rejected in the case of SAQ training group on agility.

1. The study was hypothesized that there will not be a significant difference on bio-motor abilities due to two weeks detraining of Plyometrics training group. The post test scores and detraining test scores were compared to find out effect of the detraining. Based on the test. There was significant difference in the Plyometrics training group on explosive strength after the two weeks of detraining.
2. Hence the research hypothesis fourth stated has been rejected in the case of Plyometrics training group on explosive strength after the two weeks of detraining.
3. Training group. The post test scores and detraining test scores were compared to find out effect of the detraining. Based on the test. There was significant difference in the Plyometrics training group on explosive strength after the two weeks of detraining.

## Conclusions

From the analysis of the data the following conclusions were drawn

1. When compare the pre and post test score of the SAQ group and plyometrics group in the Explosive strength test there was significant improvement in the plyometrics group than the SAQ group.

2. The comparison of pre and post test score of the SAQ group and plyometrics group in the strength endurance test there is a significant improvement in the plyometrics group than the SAQ group.
3. After the two weeks of detraining, the plyometrics group improved in explosive strength.

## Recommendations

Based on the findings of the study the following recommendations were given.

1. It is recommended to the coaches, trainers and physical educators to adopt Plyometrics Training and SAQ training to improve bio-motor abilities.
2. Adequate recovery should be given after the power training to improve the performance quality.
3. A similar study may be conducted by selecting other physiological and psychological parameters as criterion variables.
4. A similar study may be conducted by selecting state / national / international level soccer players as subjects.
5. Similar studies may be undertaken by increasing the duration, intensity of training programme and the detraining procedure.

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