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Effect of selected training method on speed, agility and reaction time of senior Indian soccer players

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Abstract
Athletic performance is significantly correlated with SAQ, plyometric training, and strength training. Previous research has shown that SAQ, Plyometric Training, and Strength Training, as well as any combination of these three forms of training, may have a favourable effect on soccer players' motor skills and performance. The purpose of this research was to examine the effect of eight weeks of strength training and a combination of speed, agility, and plyometric training on the response time and speed and agility of the participants. The results of this study indicated that after 8 weeks of training, the group that got a combination of SAQ and Plyometric training had improved agility performance compared to the group that received strength training and the control group.

Keywords: SAQ, plyometric training, strength training and soccer

Introduction
Soccer is played worldwide for enjoyment and competition. Fans and players enjoy soccer games. Soccer is intense and draws young people worldwide. Soccer's past is unknown. But soccer has always been popular worldwide. England invented modern soccer. England's Soccer Association created the rules in 1863. Soccer's popularity has spurred requests for games in all higher scientific theories. An appropriate assessment method is needed to assess their soccer talent and predict their performance.

Young athletes' training specialization has improved greatly. Young athletes no longer kick balls on fields. Young soccer academies have a specific development plan that changes by year and club. Today's youngsters should be taught on when and how players gain new skills. "Timing matters," they say. A player's training should focus on the traits that distinguish outstanding players from ordinary ones. Top players did 28% more high-intensity exercises and % more sprinting than average players [8]. Off-season strength training for soccer focuses on functional strength, early pre-season on maximisation, late pre-season on muscular power and endurance, and in-season on maintenance. Muscular strength and power training may improve a young soccer player's vertical jump, shooting power, and 30m sprint, as well as aerobic endurance [5]. Strength training impacts the first phase. 100 days of resistance training increases muscular cross-sectional area by 23% and peak strength by 91.7%. Cross-sectional muscle area directly affects strength per unit. [6] Strength training is time-sensitive for athletes. Players should start strength training at 16 but must first learn proper techniques and motor control. Strength training helps athletes become world-class. Strength training with SAQ and/or plyometrics yields the best results. Soccer fitness training should include SAQ (speed, agility, and quickness) training. Baechle (1994) defined speed as "the velocity of movement". Agility is quick physical movement in reaction to a stimulus [1]. Soccer demands strength, power, speed, agility, balance, stability, flexibility, and endurance [2]. SAQ sessions incorporate explosive movements to evolve from basic to highly location specialized motions. Speed, agility, and quickness training improves speed and explosiveness (SAQ) SAQ teaches fundamental movement methods.

Rösch *et al*. found that top soccer players, but not amateurs, could change their body postures to improve balance, strength, and control without losing speed after SAQ training. [3] Thus, coaches must effectively train players to enhance sport-specific skills and prepare them for competition [4]. Ronnestad *et al*. found no performance benefits from combining strength and plyometric training in professional soccer players who play 6-8 sessions per week compared to strength training alone. Professional soccer players get strength and power via extensive strength training. Shane McDermott examined how plyometric, SAQ, and normal training affected young soccer players' speed, agility, jumping, and shooting.

According to study, strength training, plyometrics, and SAQ would improve soccer players' performance. The research examined the effects of strength and SAQ/plyometric training on senior soccer players' speed, agility, and reaction time.

Selection of Subject

One Twenty men football player of age between 18 to 25 years were selected randomly The ICFAI University, Tripura, Holy Cross College, Juba tara. Ram Thakur college, badharghat Agartala M.B.B College, College tila, Agartala. The selected subjects were divided into three equal groups consisting of 40 each. Experimental Group I (n=40) acted as control group as not given any sort of specific training Group II (n=40) underwent Strength training and Group III (n=40) underwent combination of SAQ and Plyo metric training.

Study Design: Plyometric training sessions included a combination of maximum and explosive strength training for both lower limbs. 2-4 sets of 6-8 repetitions were performed in each session. 6 plyometric exercises, 3 slow (>0.25) SSC-type activities like squat jumps, hurdle jumps, and so on and three SSC-type plyometric activities that are rapid (0.25), such as the 2-footed ankle hoop, single leg jump, and so on. Jumps were done in a single direction (upwards/downwards, forwards/backwards). Until week 6, the number of contacts climbed from 72 to 128 and then began to drop down. Traditional core exercises will be included, since they are a standard element of all athletes' training plans.

Multidirectional sprints and diagonal motions were used in SAQ training sessions. There were 4-8 repetitions of 3-6 exercises in each of these sessions. 15-yard (triangle) turn drill, z-pattern run, Mirroring player, and other exercises were included. The experimental groups were given the same amount of time off.

Control group preformed traditional soccer training such as technical skills and moves (easy/difficult), position games (small/big, 2 vs. 2 offensive and 2 vs. 2 defensive and tactical games with various objectives.

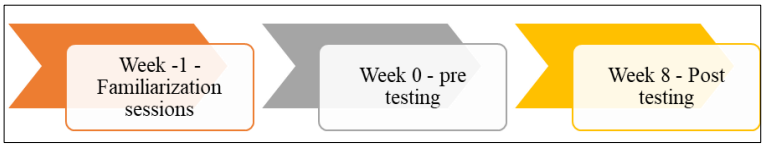

Fig 1: Intervention schedule

Result

The collected data were analyzed statistically through analysis of covariance (ANCOVA) to find out the significance difference, if any between the groups. The 0.05 level of confidence was fixed to test the level of significance difference, if any between groups.

Table 1: Levene's test of equality of error variances for speed agility and reaction time

Variables	F	df1	df2	Sig.
Speed	1.382	2	117	.115
Agility	0.375	2	117	.688
Reaction Time	.005	2	117	.995
Tests the null hypothesis that the error variance of the dependent variable is equal across groups				

Table 1 represents the value of Levens test. The Levens is an assumption for ANCOVA test for determining homogeneity of group. The obtained value for Levens test was 0.115, 0.688 and 0.995 respectively for Speed Agility and Reaction Time which is more than 0.05 and hence the assumption of equality of variance is not violated. Thus the null hypothesis of equality of population means of three groups is rejected and it may be concluded that the Speed Agility and Reaction Time performance of control and experimental groups are different.

Table 2: Descriptive Statistics of Bio-Motor Variable i.e., Speed in Seconds

Variables	Groups	Mean	Std. Deviation
Speed_pre	Control	4.8978	.76553
	Strength Training Group	4.8477	.67495
	Combination of Plyometric and SAQ	4.6728	.47691
Speed_post	Control	4.9878	.76553
	Strength Training Group	4.7228	.53107
	Com.00bination of Plyometric and SAQ	4.6480	.42079

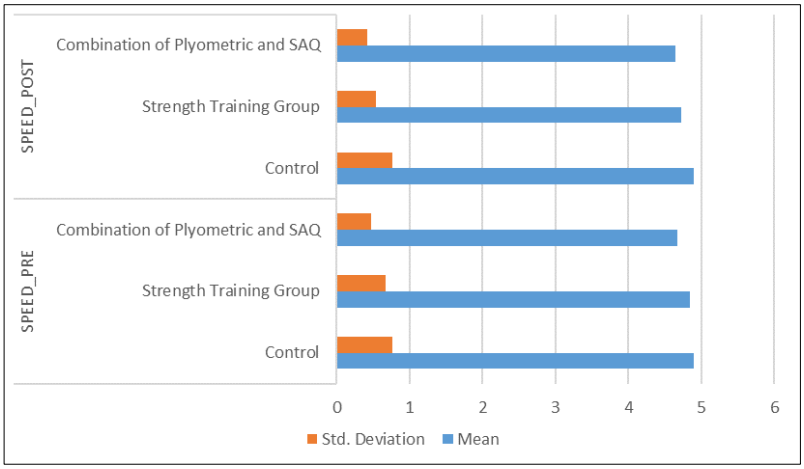

Fig 2: Bar chart for descriptive statistics of Bio-Motor Variable i.e., Speed in Seconds

Table and Fig No. 1 represents the descriptive statistics i.e., mean and standard deviation of speed before and after selected training intervention. The mean and standard deviation of speed for control group before and after intervention was 4.89±0.76 sec and 4.98±0.77 sec respectively.

The mean and standard deviation of speed for strength training group before and after intervention was 4.84±0.67 sec and 4.72±0.53 sec respectively. The mean and standard deviation of speed for Combination of Plyometric and SAQ group before and after intervention was 4.67±0.47 sec and 4.64±0.42 sec respectively.

Table 3: Descriptive Statistics of Bio-Motor Variable i.e., Agility in Seconds

Variables	Groups	Mean	Std. Deviation
Agility_pre	Control	10.2990	.72543
	Strength Training Group	10.3490	.82256
	Combination of Plyometric and SAQ	10.6990	.80536
Agility_post	Control	10.3303	.73981
	Strength Training Group	10.2990	.72543
	Combination of Plyometric and SAQ	9.5353	.69023

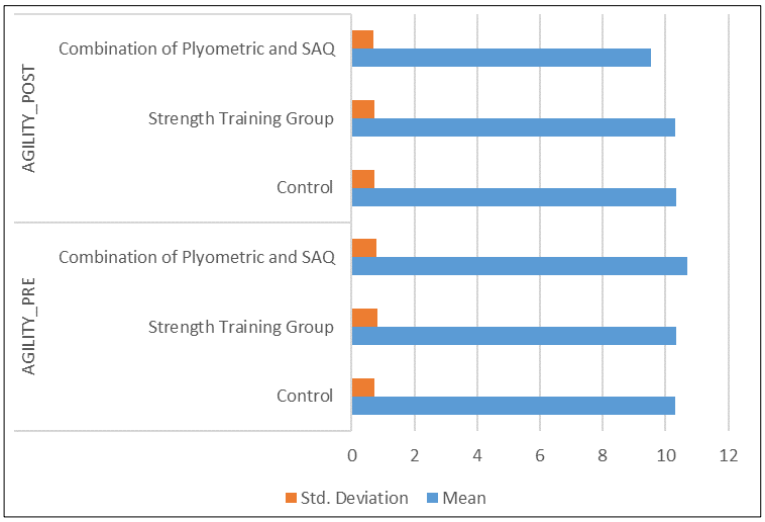

Fig 3: Bar chart for descriptive statistics of Bio-Motor Variable i.e., Agility in Seconds

Table and Fig No. 3 represents the descriptive statistics i.e., mean and standard deviation of agility before and after selected training intervention. The mean and standard deviation of agility for control group before and after intervention was 10.29±0.72 sec and 10.33±0.73 sec respectively. The mean and standard deviation of agility for strength training group before and after intervention was 10.34±0.82 sec and 10.29±0.72 sec respectively. The mean and standard deviation of agility for Combination of Plyometric and SAQ group before and after intervention was 10.69±0.80 sec and 9.53±0.69 sec respectively.

Table 4: Descriptive Statistics of Bio-Motor Variables i.e., Reaction Time in sec

Variables	Groups	Mean	Std. Deviation
RT_PRE	Control	.9995	.17903
	Strength Training Group	1.0145	.19474
	Combination of Plyometric and SAQ	.9975	.17923
RT_POST	Control	.9975	.17923
	Strength Training Group	1.0015	.17822
	Combination of Plyometric and SAQ	.9993	.17899

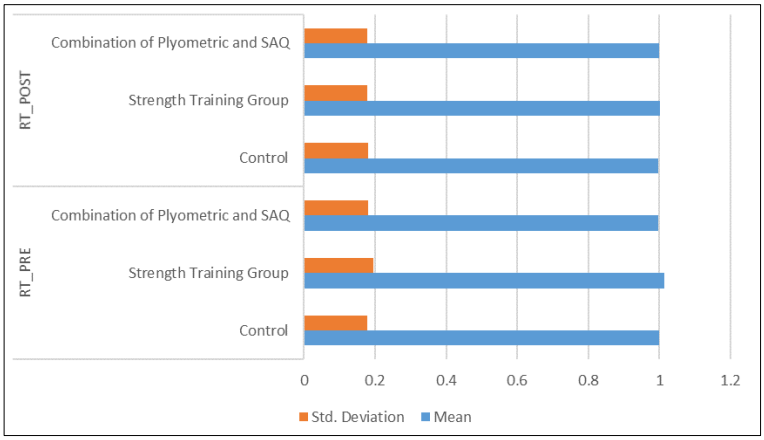

Fig 4: Bar chart for descriptive statistics of Bio-Motor Variable i.e., Reaction Time in sec

Table and Fig No. 4 represents the descriptive statistics i.e., mean and standard deviation of reaction time before and after selected training intervention. The mean and standard deviation of reaction time for control group before and after intervention was 0.99±0.17 sec and 0.99±0.17 sec respectively. The mean and standard deviation of reaction time for strength training group before and after intervention was 1.01±0.19 sec and 1.00±0.17 sec respectively. The mean

and standard deviation of reaction time for Combination of Plyometric and SAQ group before and after intervention was 0.99±0.17 sec and 0.99±0.017 sec respectively.

Table 5: Tests of Between-Subjects Effects

Variables	Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Speed	Pre-Test	22.597	1	22.597	144.314	.000
	Groups	.417	2	.208	1.331	.268
	Error	18.164	116	.157		
	Corrected Total	42.075	119			
Agility	Pre-Test	.021	1	.021	.039	.843
	Groups	15.664	2	7.832	15.034	.000
	Error	60.429	116	.521		
	Corrected Total	76.667	119			
Reaction Time	Pre-Test	.002	1	.002	.052	.820
	Groups	.000	2	.000	.004	.996
	Error	3.739	116	.032		
	Corrected Total	3.741	119			

Table 5 shows the F-value for comparing the adjusted means of the criterion variable (Speed Agility and Reaction Time) in three groups (Control Group, Strength Training Group, and Combination of Plyometric and SAQ Training Group). The F-statistic computed for selected groups was insignificant for Speed and Reaction Time because p-value associated with it is 0.268 and 0.996 respectively which is more than 05. Thus, the null hypothesis of no difference among the adjusted means for the data on criterion variable (Speed and Reaction Time) in three treatment groups may be accepted at 5% level. The F-value for comparing the adjusted means of the criterion variable (Agility) in three groups (Control Group, Strength Training Group, and Combination of Plyometric and SAQ Training Group). The F-statistic computed for selected groups was significant for Agility because p-value associated with it was 0.00 is less than 05. Thus, the null hypothesis of no difference among the adjusted means for the data on criterion variable (Agility) in three treatment groups may be rejected at 5% level.

Since F-statistic is significant, post hoc comparison has been made for the adjusted means of the three treatment groups, which is shown in Table 4. It may be noted here that p-value for the mean difference between Control group and Strength training group as well between Control group and Combination of Plyometric and SAQ training group is .000. Since p value is less than .05, both these mean differences are significant at 5% level.

Table 6: Pair wise Comparisons for Agility

(I) Groups	(J) Groups	Mean Difference (I-J)	Std. Error	Sig.[b]
Control	Strength Training Group	.032	.161	1.000
	Combination of Plyometric and SAQ	.802*	.165	.000
Strength Training Group	Control	-.032	.161	1.000
	Combination of Plyometric and SAQ	-.770*	.164	.000
Combination of Plyometric and SAQ	Control	-.802*	.165	.000
	Strength Training Group	.770*	.164	.000
Based on estimated marginal means				
*. The mean difference is significant at the .05 level.				
b. Adjustment for multiple comparisons: Bonferroni.				

Table 6 represents post hoc analysis, for selected groups. There was significant ($p<0.05$) value obtained for all the pair wise comparison. There was significant difference between means of selected groups. Combination of Plyometric and SAQ training group mean was least (9.53 sec) when compared to control and Strength Training Group which was 10.33 sec and 10.29 respectively.

Discussion

The purpose of the experiment was to determine the most efficient technique of training for a group of senior soccer players. Previous research (Milanovi, *et al*. 2013) has shown that further training in SAQ may increase a performance in agility tests. However, the findings of this research showed that the SAQ group's performance in terms of agility increased but their sprint speed did not improve to the predicted degree. Plyometric training has been shown to increase performance in areas such as speed and agility (Sohnlein *et al*. 2014 & Saez de Villarreal *et al*. 2012). This is supported by research that has been gathered in the past. According to the findings of certain research (Sohnlein *et al*. 2104), a period of eight weeks may not be sufficient for seeing an improvement in the 30 meter sprint time. Nevertheless, the plyometric group and the SAQ group both saw improvements in their 30-meter sprint times during the course of this research. Although the training methodology adopted does improve reaction time, the athletes in the present study were already close to elite performers, so there was not a discernible improvement in their performance.

Conclusion

Thus, the following conclusions can be drawn:

1. There was insignificant effect of Strength training and combination of plyometric and SAQ training on Speed and Reaction Time
2. There was a significant difference between the adjusted means of criterion variable (Agility performance) in Combination of Plyometric and SAQ group and Control group.
3. There was a significant difference between the adjusted means of criterion variable (Agility performance) in Combination of Plyometric and SAQ group and Strength Training group.

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