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Effect of sand surface and kettlebell exercises in combination with drill training on playing abilities of shuttle badminton players

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Abstract
The study was to examine the isolated and combined sand surface and kettle bell exercises in combination with drill training on playing abilities of shuttle badminton players. Total recruited randomly N=80 (eighty) men badminton players their age period ranged from 18 years to 25 years as per subject's secondary board of education certificate and, who at least participated inter collegiate level badminton games. The chosen men badminton players was randomly recruited into four groups each group n=20 men badminton players i.e. empirical groups I men badminton players underwent: sand-surface exercises in combination with drill training (SEDT = 20), empirical group II men isolated kettle bell exercises in combination with drill training (KEDT = 20), empirical group III underwent: combined sand surface and kettle bell exercises in combination with drill training program (SKDT = 20) and control group badminton players (NTGP = 20) . NTGP was practiced only their respective specialization game. The training period was fixed for 12- week's duration and four sessions in a week. The measurement of badminton playing abilities scores was collected through Judgment by experts (rating 1to10) before and after the completion of specific training. The collected score's were analyzed through ANCOVA and level of significant was restricted at 0.05 levels. The study found that isolated, combined sand surface and kettle bell exercises in combination with drill training program had positive significant impact to improve the playing abilities performance of badminton players of three empirical group's players comparative to control group.

Keywords: Sand, kettle bell, exercises, combination and playing abilities

Introduction
Strength training is not just about bulging muscles and heavy weights. Its impact on overall health is profound and far-reaching. Beyond enhancing athletes physical appearance, engaging in regular strength training exercises offer an array of benefits that can improve athletes well being, from increased muscle strength to disease prevention and mental health.

The kettle bell swing blends both training techniques in a single move. Kettle bell swings work whole body primarily develops strength in legs and lower body. So, regularly doing kettle bell swings helps build a stronger core section of mid –body muscles that includes abs which has several benefits for improving balance, stability and posture and promotes circulation and boosts metabolism. Kettle bell swings avoid pain in lower back.

Statement of the Research Problem
To analyze the "isolated and combined sand surface and kettle bell exercises in combination with drill training on playing abilities of badminton players".

Research Hypothesis
- There will be a significant increase in score of playing abilities performance of empirical group's badminton players after the twelve weeks impact of isolated and combined sand surface and kettle bell exercises in combination with drill training when compared with control group badminton players.
- The combined sand surface and kettle bell exercises in combination with drill training will be more effective than the isolated training program.

Methodology
The study was to measure the isolated, combined sand surface and kettle bell exercises in combination with drill training on playing abilities of badminton players. Total recruited randomly N=80 (eighty) men badminton players their age period ranged from 18 years to 25 years as per subject's secondary board of education certificate and, who at least participated inter collegiate level badminton games. The chosen men badminton players was randomly recruited into four groups each group n=20 men badminton players i.e. empirical groups I men badminton players underwent: sand-surface exercises in combination with drill training (SEDT = 20), empirical group II men isolated kettle bell exercises in combination with drill training (KEDT = 20), empirical group III underwent: combined sand surface and kettle bell exercises in combination with drill training program (SKDT = 20) and control group badminton players (NTGP = 20) . NTGP was practiced only their respective specialization game. The training period was fixed for 12-

week's duration and four sessions in a week. The measurement of badminton playing abilities scores was collected through Judgment by experts (rating 1to10) before and after the completion of specific training. The collected scores were analyzed through ANCOVA and level of significant was restricted at 0.05 levels.

Table I: Analysis of Covariance for Badminton playing abilities - Judgment by experts (Rating 1 to 10) of the SEDT, KEDT, SKDT and NTGP groups for badminton players

Groups	SEDT	KEDT	SKDT	NTGP	SOV	Sum of squares	df	Mean Square	F' Ratio
Pre-test mean	6.550	6.275	6.100	6.350	B	2.084	3	0.695	0.610^{NS}
SD	1.346	1.057	0.940	0.859	W	86.537	76	1.139	
Post test mean	7.600	7.350	7.925	6.200	B	33.784	3	11.261	17.053 *
SD	0.867	0.859	0.544	0.923	W	50.187	76	0.660	
Adjusted mean	7.471	7.374	8.047	6.183	B	36.629	3	12.210	39.280 *
					W	23.313	75	0.311	
Mean difference	+1.05	+1.075	+0.10	-0.150	-	-	-	-	-

Note: Table F-ratio value at 0.05 level of confidence for 3 and 76 (df) =2.68, 3 and 75 (df) =2.68 *Significant & NS: Not significant.

SEDT: Sand-surface exercises in combination with drill training badminton players group.
KEDT: Kettle bell exercises in combination with drill training badminton players group.
SKDT: Combined sand surface and kettle bell exercises in combination with drill training program badminton players group.
NTGP: Non-training group players.

The above table-I shows that there is a significant difference on badminton playing abilities performance among the four groups such as SEDT: Sand-surface exercises in combination with drill training badminton players group, KEDT: Kettle bell exercises in combination with drill training badminton players group, SKDT: Combined sand surface and kettle bell exercises in combination with drill training program badminton players group and NTGP: Non-training group players. Since the 'F' value required being significant at 0.05 level for 3, 76 d/f and 3, 75 are 2.68, but the computation values of badminton playing abilities post and adjusted posttest 'F' values are 17.053 and 39.280 respectively. Which are greater than the tabulated value, it shows that training is effective for positive changes in badminton playing abilities. Since the obtained 'F' ratio is found significant.

Table 2: The Badminton Playing Abilities Results of Scheffe's Method Test Mean Differences Between Sedt, Kedt, Skdt And Ntgp Groups of Badminton Men Players

SEDT	KEDT	SKDT	NTGP	MD	CI
7.471	7.374	-	-	0.097^{NS}	0.499
7.471	-	8.047	-	0.576*	
7.471	-	-	6.183	1.288*	
-	7.374	8.047	-	0.673*	
-	7.374	-	6.183	1.191*	
-	-	8.047	6.183	1.864*	

Note: Significant & NS: No significant

SEDT: Sand-surface exercises in combination with drill training badminton players group.
KEDT: Kettle bell exercises in combination with drill training badminton players group.
SKDT: Combined sand surface and kettle bell exercises in combination with drill training program badminton players group.
NTGP: Non-training group players.

In above table 2 presented the adjusted final mean variations between the Sand-surface exercises in combination with drill training badminton players group [SEDT] and Combined sand surface and kettle bell exercises in combination with drill training program badminton players group [SKDT], Sand-surface exercises in combination with drill training badminton players group [SEDT] and non training group badminton players [NTGP], Kettle bell exercises in combination with drill training badminton players group [KEDT] and Combined sand surface and kettle bell exercises in combination with drill training program badminton players group [SKDT], Kettle bell exercises in combination with drill training badminton players group [KEDT] and non training group badminton players [NTGP] & Combined sand surface and kettle bell exercises in combination with drill training program badminton players group [SKDT] and non training group badminton players [NTGP] are 0.576, 1.288, 0.673, 1.191 and 1.864. These computations adjusted final mean variations values are larger than calculated formula CI value 0.499. Hence investigator recorded significant variations resulted between training groups and control groups & isolated and combined training group badminton players after completion of empirical period.

The adjusted final mean variations between the Sand-surface exercises in combination with drill training badminton players group [SEDT] and Kettle bell exercises in combination with drill training badminton players group [KEDT] is 0.097. This computation adjusted final mean variation value is lower than calculated formula CI value 0.499. Hence investigator noted insignificant differences resulted between two isolated training groups' badminton players after twelve weeks completion of empirical period.

The prior, final and adjusted post scores results mean of the SEDT, KEDT, SKDT and NTGP badminton player groups for shuttle badminton game performance – three coaches judgment rated scale (rating scale 1 to 10 points) clearly represented in bar diagram figure: 1.

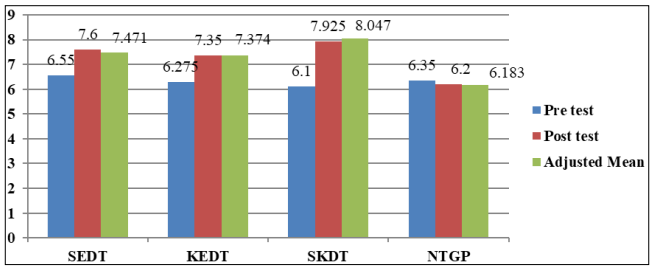

Figure: 1: The Badminton Playing Abilities Pre-Post and Adjusted Post Test Mean Numbers of Sedt, Kedt, Skdt And Ntgp Groups of Badminton Men Players Presented in Bar Graph

SEDT: Sand-surface exercises in combination with drill training badminton players group.
KEDT: Kettle bell exercises in combination with drill training badminton players group.
SKDT: Combined sand surface and kettle bell exercises in combination with drill training program badminton players group.
NTGP: Non-training group players.

Discussion on Hypothesis

- The first hypotheses stated that there will be significant increase in score of playing abilities performance of empirical group's badminton players after the twelve weeks impact of isolated and combined sand surface and kettle bell exercises in combination with drill training program when compared with control group badminton players. The statistical analysis proved that isolated, combined sand surface and kettle bell exercises in combination with drill training program significantly improved the playing abilities performance. Hence research first hypothesis accepted.
- The second hypotheses stated that combined sand surface and kettle bell exercises in combination with drill training will be more effective than the isolated training program. The statistical analysis proved combined training is superior to isolated training method. Hence research second hypotheses accepted.

Discussion and Findings

The approach of isolated and combined sand-surface exercises and kettle bell exercises in combination with drill training is better for upraise the long serve – Scott and French test (number), short serve – Scott and French test (number) and shuttle badminton game performance – three coaches judgment rate scale (rating scale 1 to 10 points) than non-training group badminton players. The list of empirical studies results that covers the shuttle badminton skill related performance are Sajeed (2020) [1] results confirmed that 16-weeks of sand and aquatic training are potential for greater enhancement of Jump Smash, drop shot and clear skill performance of of Lakshadweep badminton players. Srinivasan (2012) [2] statistical findings study shows that influence of conventional training combined with ladder training and conventional training combined with plyometric training significant improvement in short serve, long serve and forehand clear performance of Coimbatore city badminton players. Praveen (2019) [3] study confirmed that 12 weeks of SAQ drills training significantly greater enhanced the badminton skill performance namely overhead clear shot and serving abilities of the male badminton players and during the detraining period no significant decline level found in overhead clear shot and serving abilities was found over the first cessation period of ten days there after it was gradually started declining towards the base line. Ganesh (2019) [4] study confirmed there was a significant positive improvement on badminton skill related parameters such as short serve, long serve, forehand clear, back hand clear and volleying ability due to 12-weeks impact of specific skill training and neuromuscular training of players. Hari Prasad (2020) [5] study observed that 12 weeks treatment of core stability and periodised resistance circuit training packages is effective for improving the overall playing abilities of inter collegiate male badminton players.

Conclusions

Analyzer, divulged that the 12-weeks treatments of isolated and combined sand-surface exercises and kettle bell exercises in combination with drill training out come with positively uplift the shuttle badminton game performance – three coaches judgment rate scale (rating scale 1 to 10 points). Accordingly, combined sand-surface exercises and kettle bell exercises in combination with drill training outcome is more than isolated training group badminton players for upgrade the shuttle badminton game performance of players. As a result, both isolated training sand-surface exercises and kettle bell exercises in combination with drill training outcome produce identical effect for refine shuttle badminton game performance of players.

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