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## Effectiveness of “Strong by Zumba” on performance-speed, power, agility, quickness and reaction time of professional kickboxing individuals at the end of 4 weeks: An experimental study

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### Abstract

The aim of this study was to find the improvement in the performance of the Kickboxing Individuals by assessing Speed, Power, Agility, Quickness and Reaction time. This study was carried out on 40 Professional Kickboxing individuals age ranging between 20- 30 years. Prior to the study performance testing of the all the individuals of Experimental and Control group were noted. A 4 week Strong by Zumba training program was given at their respective training centers. Post program all the performance tests were done of Experimental and Control group. The results were analyzed using Paired and Unpaired sample ‘t’ test. Results obtained showed there was significant improvement in Speed and Power ( $p < 0.009$ ), Agility and Quickness ( $p < 0.0002$ ) and not significant for Reaction time ( $p < 0.4$ ).

**Keywords:** strength and conditioning, body weight, fitness, sports, athletic performance

### Introduction

Kickboxing is a combat sport involving competitors directing full-force strikes with the hands, elbows, knees, shins and feet at each other <sup>[1]</sup>. Kickboxing is a dynamic, high-intensity intermittent striking combat sport that requires complex and tactical skills for success where athletes are classified by gender, BMI and age categories <sup>[1]</sup>. From the strength and conditioning perspective, the main goal of kickboxing training is to prepare the kick boxers to effectively manage both the technical-strategic and the physiological demands of combat <sup>[1]</sup>. To be effective, kickboxing techniques should be applied with accuracy, within a good ‘window of opportunity’, with strength, velocity and power <sup>[1]</sup>.

Particularly, physiological characteristics of athletes are generally measured through testing their components of fitness and skill <sup>[2]</sup>. The fitness components include cardio respiratory endurance, muscular strength, muscular endurance, flexibility and body composition <sup>[2]</sup>. Skill related components include speed, agility, power, balance, coordination and reaction time <sup>[2]</sup>.

Kick boxers have been studied for competitive performance improvements over the past thirty years, contributing to increased knowledge of sports research methods <sup>[3]</sup>.

“Strong by Zumba” a total body workout combining bodyweight, resistance style, muscle conditioning, cardio, high intensity interval training and plyometrics with Reverse Engineered Music without any equipment requirement like no other fitness program. The Program was launched in 2016. It is designed for participants looking to increase their intensity levels of training, maximize workout benefits and see faster result from their efforts.

Benefits of Strong by Zumba program involves increase in Cardiovascular endurance and stamina.  $Vo_2$  and stroke volume at a higher level than steady state programs. The size and the number of mitochondria, increasing energy production. Overall muscular endurance, muscle tone and definition. Muscle fiber recruitment and efficiency. Fat loss and weight management. Bone density, Intrinsic tensile strength of connective tissue, improving joint strength. Functional core strength, Joint mobility, Balance, Coordination and agility. Potential health benefits and intervention: Lowering the risk of Lifestyle Diseases.

There are various studies showing different Training Protocols for conditioning of the Kickboxing players. Various outcomes have been drawn from various training protocols.

High intensity sport like Kickboxing requires High intensity training program for best performance. “Strong by Zumba” is a fitness program which involves moves inspired from Kickboxing and various unique exercises recruiting as many muscles as possible. Very few studies present between Kickboxing and “Strong by Zumba”.

### Methods

This study was conducted in Pune, Maharashtra, India. Total 40 Professional Kickboxing Athletes were selected by convenient sampling method both male and female age ranging from 18-35 years, training for a year or more and competed at least once at zonal level. Male participants exceeded female participants. Before commencement of the experiment ethical clearance was taken from the ethical committee. The athletes were explained about the study before starting the procedure and written informed consent was taken. In the sequence of enrollment of subject, even numbered i.e. half the subjects were categorized as Group ‘A’- the experimental group. The other half odd numbered subjects were categorized as Group ‘B’- the control group. Before starting the program Physical Activity Readiness

Questionnaire was recorded for both groups. Outcome measures: 60 meter speed test ICC (0.96) <sup>[4, 5]</sup>, Illinois agility test ICC (0.94) <sup>[6, 7, 8]</sup> and Ruler drop test ICC (0.92) <sup>[9]</sup> were noted pre and post the experiment.

### Results

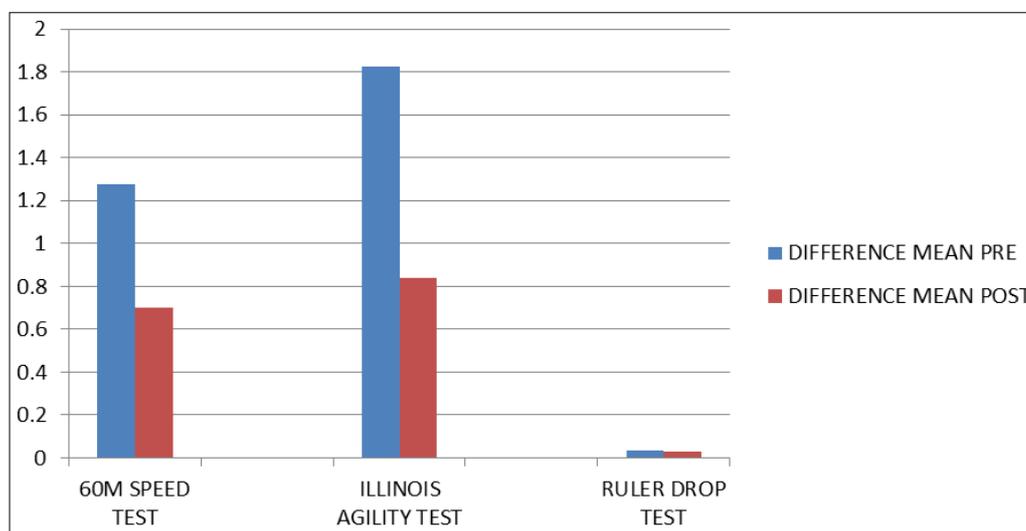
The present experiment was conducted to study the effectiveness Strong by Zumba on performance – Speed, Power, Agility, Quickness and Reaction time of Professional Kickboxing Individuals after 4 weeks. The Statistical Analysis for 60M Speed Test shows that  $p < 0.0096$  which is statistically significant hence Strong by Zumba is effective to improve Speed and Power in Professional Kickboxing Individuals. The Statistical Analysis for Illinois Agility Test shows that  $p < 0.0002$  which is extremely statistically significant hence Strong by Zumba is effective to improve Agility and Quickness in Professional Kickboxing Individuals. The Statistical Analysis for Ruler Drop Test shows that  $p < 0.4031$  which is not statistically significant hence Strong by Zumba and Physical Training is equally effective to improve Reaction Time in Professional Kickboxing Individuals.

**Table 1:** Significance of mean difference of outcome measures of experimental and control group post ‘Strong by Zumba’.

		60m Speed Test		Illinois Agility Test		Ruler Drop Test	
		EX	CO	EX	CO	EX	CO
Difference of Pre Post (Both Groups)	SD	0.7405	0.5869	0.8334	0.6397	0.0211	0.0271
	mean	1.277	0.701	1.824	0.8405	0.034	0.0275
	t value	2.7263		4.1863		0.8456	
	p value	0.0096		0.0002		0.4031	

95% of confidence interval of this difference with 38 degrees of freedom for 60M speed test: 0.14-1.0037, Illinois Agility

test: 0.50-1.41 and Ruler Drop Test: -0.0091- 0.0221.



**Graph 1:** Graphical representation of significance of mean difference between experimental and control groups after the ‘strong by zumba’ program.

### Discussion

A typical kickboxing competition contains 3 to 12 rounds of 2 to 4 min each with a rest period of 1 to 2 min in between. Typically, kickboxing medalists perform five to seven matches during international competitions, with each match having an 8-min time limit. Moreover, as kickboxing athletes have to perform a great number of actions during each match, the physical and physiological demands are high <sup>[10]</sup>.

In a study conducted by Reidar Lystd in 2015, Kickboxing injury incidence rates were 390.1 injuries (95% CI, 351.9-

431.4) per 1000 Athlete Exposure and 39.7 injuries (95% CI, 35.8-43.9) per 1000 minutes of exposure. The most commonly injured anatomic regions were the head (57.8%) and lower extremity (26.1%), while the most common types of injury were laceration (70.6%) and fracture (20.6%). Professional fighters were 2.5 times more likely to get injured compared with amateurs (rate ratio, 2.51; 95% CI, 1.39-4.55), while defeated fighters were 3.5 times more likely to get injured compared with winners (rate ratio, 3.48; 95% CI, 2.73-4.44) <sup>[11]</sup>.

The present experiment was conducted to study the effectiveness Strong by Zumba on performance – Speed, Power, Agility, Quickness and Reaction time of Professional Kickboxing Individuals after 4 weeks.

In this study, total 40 participants (both male and female) were included with age group of 18-30 years old with mean age of 20.5. The number of male subjects were more than female subjects in this study. The participants were divided as even numbered Experimental and odd numbered Control group.

The Experimental group was given Strong by Zumba for and hour 3days/week for 4 weeks whereas the control group continued with their physical training.

When pre and post analysis were done for Experimental Group for which Strong by Zumba was given, data was analysed using paired t-test within the group for Speed, Power, Agility, Quickness and Reaction time which showed statistical difference in all three outcome measures that is 60 meter speed test, Illinois Agility test and Ruler drop test.

Juan Carlos *et al.* conducted a study in 2008 on “Conditioning strategies for competitive Kickboxing”, In conjunction with sport-specific skills development, sufficient nutrition, rest, and psychological readiness, a kick boxer’s success is contingent upon his or her level of conditioning. On the basis of the metabolic demands of competitive kickboxing, training should tax both the anaerobic and aerobic systems extensively. In tandem with proper conditioning, injury may be prevented through Prehabilitative exercises and adherence to safety measures <sup>[1]</sup>.

The conditioning methods in Strong by Zumba involves High intensity moves, Cardio shuffles in multidirections, open and close kinetic moves, multiplanar movements (side ways, rotational, up and down), Spatial movements utilizing floor space travelling orientation in relation to space, ability to move through ROM, Bodyweight exercise which increase the biomechanical advantage and Pyometric moves including explosive speed and recoil in eccentric phase of exercise. Hence due to underlying strategies the study showed significance in performance of Professional Kickboxing individuals.

When pre and post analysis were done for Control Group for which Strong by Zumba was given, data was analysed using paired t-test within the group for Speed, Power, Agility, Quickness and Reaction time which showed statistical difference in two outcome measures that is 60 meter speed test and Ruler drop test whereas Illinois agility test showed no improvement.

Intergroup analysis was done using unpaired t-test for 60 meter speed test, Illinois agility test and Ruler drop test. When pre and post intervention values difference were compared of both groups, showed significant difference in values of 60 meter speed test, Illinois agility test on the other hand Ruler drop test showed no significance statistically.

### Practical Applications

The result of this study can be used to include Strong by Zumba program to improve Speed, Power, Agility and Quickness in Professional Kickboxing Athletes. This study can be used for further analysis of performance using advanced testing methods. The difference of power output between male and females were not considered can be used for further research. The HIIT training used in ‘Strong by Zumba’ has shown improvements in endurance as well which can be used on athletes for improving the performance. <sup>[12]</sup> There are studies showing that music induced workout

programs have shown improvements in high intensity workout performance than in those who workout without music.

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