

MMA (Mixed Martial Arts), a Boon for Physical Fitness

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ABSTRACT

MMA (Mixed Martial Arts) has become one of the most popular emerging sport across the globe. Hand-to-hand fighting began as old battle strategies. Contingent upon the structure, they include performing specialized and regularly dangerous moves, for example, kicks, punches, takedowns and locks. Similarly significant as the battling and specialized parts of the hand-to-hand fighting are the psychological and profound segments, which centre around improving mental perseverance, strength, and fixation; controlling feelings and negative reasoning; and even, eventually, rising above the personality and its psychological snares.

The objective of this cross-sectional study was to find out the potential benefits of the MMA, so to achieve this there was a comparison of push up test, crunches test, plank test, squat test, sit and reach test, two-minute curl-up test, punch test, kick test and reaction time test conducted on trainee martial artist (trained in MMA) was compared with those of the untrained (control) individuals. 50 trainee martial artist and 30 control individuals were recruited for the study; the control group bore a close resemblance in all the other physical features with the trainee martial artists. The results suggested that the MMA trained individuals performed comparatively better in the entire test and also had a better reaction time as compared to the untrained individuals.

Keywords:

MMA, strength, physical fitness and reaction time

1.Introduction

Physical inactivity and sedentary lifestyle are closely linked with adverse health-related consequences like metabolic syndrome. [1] According to the WHO, good health is not only having a body free of any diseases and disability but also about a state of complete physical, mental and social welfare i.e. the wellbeing [2]. Research has also shown that active individuals rarely indulge in negative behaviours like drinking alcohol and smoking cigarettes. They are comparatively fitter, are less prone to cardiovascular diseases and have good bone health with respect to the inactive people [3]. Physical activity is therefore a boon for good health and wellbeing. One way in which people can stay physically active is by getting involved in martial arts. Modern research also concerns the problem of treating martial arts not only as a sport, self-defence or a means to spend free time, but also as a therapy for physical and mental fitness [4,5]. There are numerous forms of martial arts that have various origins across the globe. Some include grappling (i.e., wrestling, Jiu-Jitsu, Judo etc.), while others are striking oriented: Boxing, Kickboxing, Muay Thai, Karate, and Taekwondo etc. In modern days we can see that various forms of martial arts have been combined and it has given birth to what is called the Mixed Martial arts (MMA) [25].

According to the data from the American College of Sports Medicine (ACSM), 60% of the Americans are not regularly physically active and it's reported that 20% are completely sedentary [6]. There are many risk factors associated with the inactive lifestyle like an increased fat deposition, weight gain, decreased bone density and mass as well as metabolic disorders [6].

A recent review of few studies conducted suggests that martial arts training is generally conducive to psychological growth [7], also a review of the existing evidence shows that martial arts training (like Taekwondo) are associated with fat reduction, increase in flexibility and reaction time but seems to have very little effect in improving the muscular strength [8,9].

Contemporary scientific literature shows that martial arts are effective in monitoring the behaviour of children with ADHD, they provide controlled and less aggressive strategies and techniques than the other forms of sports [10,11]. Martial arts training emphasizes self-discipline, self-control, mental strength and mental acuity, relaxation and balance of the body and the mind, the teaching process focuses on the ways of energy management, both physical and physiological [12].

Martial arts provide the opportunity to discover the strengths and weaknesses of individuals such as courage-cowardice, bravery-aggressiveness, pride-vanity [13]. The aim of the study was to find out the various benefits of martial arts on physical fitness and its role on the reaction time, its findings might inspire the applications of martial arts in improving the health and wellness of the individuals.

2. Methods

2.1 Participants

Fifty participants from the Sikkim Armed Police (special forces of Sikkim, India) who were involved in various forms of martial arts were taken for the study. Being a certified trainer and a nutritionist, there were two criteria that were taken into account for the sampling 1) Inclusion criteria which were a) The soldiers were aged between 18-35 years and b) The involvement of the participants in the martial arts for 5 days (half an hour- 1hour/day) 2) Exclusion criteria which were a) Any form of genetic, cardiovascular, pulmonary and muscular disorders and b) Involvement in other sports activities apart from martial arts.

Another 30 individuals from the Sikkim Armed Police were taken as controls, who fulfilled all the inclusion and exclusion criteria apart from the 5 days of martial arts training.

This study lasted for a year (It was conducted, when I was working as a MMA trainer of the Sikkim Armed Police from December 2018-December 2019). The, Special Director General of the Sikkim Police granted the permission for the study. The participants performed various types of test during the research study period, which is mentioned below in detail.

2.2 Warm up activity

It is widely accepted that warming-up before exercise is significant for the attainment of optimum performance. Both passive and active warm-up can evoke temperature, metabolic, neural and psychology-related effects, including increased anaerobic metabolism, elevated oxygen uptake kinetics and post-activation potentiation [14].

So various warm-up activity was conducted prior to the MMA training, like running, rotations of head, shoulder and hips, leg stretches and arm stretches etc.

2.3 Push-ups test

Legitimate push-ups are the best workout for creating quality and control of the upper body. It is a successful upper body workout that employs the body's own weight to construct a wellness establishment. They advance strength, balance and stability by developing various important muscles like the pectoralis major in the chest, deltoid or shoulder muscles, scapular and rotator cuff, triceps found on the back of the upper arm and upper back muscles [15].

3 sets of push-ups were included in the training, each set lasted for 1 minute and the best set was taken into account.

2.4 Crunches test

In the recent years abdominal muscle training has picked up expansively, and workout like crunches have ended up a necessary portion of both wellness and recovery programs. Abdominal training serves to progress centre solidness, which is the capacity to reinforce the lumbopelvic complex and exchange powers from the upper to the lower appendages of the body whereas keeping up the spine in a neutral position [16]. Crunches should be performed correctly to avoid injuries, correct breathing is the key as it includes the respiratory muscles because these are the muscles that are specifically involved during core stability exercises [17].

3 sets of crunches were included in the training, each set lasted for 1 minute and the best set was taken into account.

2.4 Planks test

The core muscles are the profound and shallow muscles of the trunk; they stabilize the spinal column, adjust the body, and upgrade execution when the limits move. Shortcomings in the core muscles can cause changes in the body set up and compress the back joints of the lumbar spine. Furthermore, intemperate front or back inclining of the pelvis went with by the pressure of the thoracolumbar sash may result in expanded stuns on the flanks and lower limits [18,19].

3 sets of planks were included in the training, each set lasted for 1 minute and the best set was taken into account.

2.5 Squats test

The squat is a well-known workout to reinforce the muscles of the lower appendage. Conditioning pros all around concur the squat is among the best three endorsed works out for sports preparing, restoration and rehabilitation [20]. The squat moreover is getting to be progressively prevalent in clinical settings as it implies to fortify lower-body muscles and connective tissue after joint-related damage. It has been utilized broadly for restorative treatment of tendon injuries, patellofemoral dysfunctions, adds up to joint substitution, and lower leg instability [21, 22].

3 sets of squats were included in the training, each set lasted for 1 minute and the best set was taken into account.

2.6 Sit and reach test

The sit and reach test was utilized to evaluate the participant's lower back and hamstring adaptability since such flexibility is fundamental to execute the high kicks required in martial arts [23,24]. Amid this test, the embers sat barefoot in the long sitting position with the soles of their feet squeezed level against the sit-and-reach box. They were instructed to gradually reach forward with both hands in parallel as distant as conceivable with their knees in full expansion.

The respective fingertips of their centre fingers had to cover and stay in contact with the measurement portion of the sit- and reach the box. The foremost far off point (in centimeters) come to with the fingerprints was recorded. The members performed three trials for one minute each and their best score was taken for examination [23].

2.7 Two-Minute Curl-Up Test

The two-minute curl-up test may be a commonly utilized field evaluation for strong perseverance. The members expected a crook-lying position on a tangle with their knees flexed at 90 degree and their arms lying by the side of their trunk. They were at that point teaching to perform as numerous curl-ups as possible (i.e., to lift their scapulae off the tangle, with their trunk shaping at 30-degree point with the tangle) in one miniature. The number of curl-up redundancies performed represented the participant's stomach muscle perseverance and was utilized for analysis [23,24].

2.8 Punch Test

It has appeared that higher impact powers move forward an athlete's chance of victory in striking martial arts. Also, examining the affected drive of a strike, the individuals punching control ought to be considered a pertinent calculate to the result. Since power is the item of force and velocity, at that point the relative contributions of both strength and speed to affect force are of intrigue [25].

1 minute was given to record the number of punches, the members performed three trails and their best score was taken for examination.

2.9 Kick Test

The martial arts disciplines of Muay Thai, Karate and Taekwondo have evolved in relative segregation, with their roots emerging from Thailand, Japan and Korea [26]. All three disciplines take after the same essential battling and self-defence standards and are based on core skills, hand and elbow striking and various types of kicks [27].

A kicking technique that is common in all these three martial is the roundhouse kick. This kick is which is used frequently during the competition [28]; as a result, it can be used to find out the similarities and differences between these prevalent martial arts. Another characteristic of the roundhouse kick is that it is highly adaptable enabling the martial arts trainees to make petty changes in the technique to target the thigh, torso, head and across multiple distances [29].

1 minute was given to record the number of kicks, the members performed three trails and their best score was taken for examination.

2.10 Reaction time test

A simple reaction time was evaluated by inquiring the participants to capture a falling ruler. They were welcomed to sit on a chair with their overwhelming hand kept within the mid inclined position, elbow flexed to 90 degrees, and lower arm backed on a table. The assessor held the ruler

vertically, with its lower end between the participant's thumb and index finger (i.e., web space). The participants were then advised to catch the ruler using a pinch grasp as soon as the assessor released it at an unannounced time. The reaction time (in seconds) of each member was calculated with the following equation.

$$\text{Reaction time} = \sqrt{2 \cdot \text{distance} / 9.18}$$

Distance (m) was calculated by the difference between the initial and final grasping height of the ruler, and 9.81 (m/s) represents the gravity constant [30]. A familiarization trial was carried out before the actual test. Three testing trails were at that point performed, with the average reaction time recorded for investigation [31].

2.11 Statistical Analysis

SPSS 23 was used for the analysis of the information. Descriptive statistics were used to get the demographic data and the outcome variables, and also to get the histogram for the reaction time test between the control group and the trainee martial artist.

3. Results

There were no significant differences between the trainee martial artist and the control groups with respect to age, weight and body height (Table 1). However there was a significant difference in the overall physical fitness performance between the two groups, this is highlighted by the different types of test that were conducted for the two groups (Push up test, Crunches test, Squat test, Sit and reach test, Two-minute curl-up test, punch test, kick test and Reaction time test). The numbers showed that in general, the person involved in martial arts were better in all the test as compared to the control (not involved in martial arts) groups (Table 2 and Table 3).

The participants involved in the martial arts activity were much faster than that of the control counterparts as reflected in the reaction time test (fig 1 and fig 2).

4. Discussion

The statistical analysis indicated that martial arts training is closely associated with the increased fitness levels of the individuals and faster reaction time.

Also, to the best of my knowledge, this is the first study that has investigated the physical fitness and reaction time of the Sikkim armed police, the elite state force of Sikkim, India. It has also me put forward that the trunk (core) muscle strength and endurance are essential factors for the enhanced sports performance [32] and for the

injury prevention [33] in the individuals. The various tests that were conducted for the martial artist and the control group validated the statement (reflected through the difference in mean). This finding is also in line with the previous research studies showing a faster reaction time in mentally retarded youths after they were exposed to the Taekwondo training [34]. The association between the increase in the performance level of the various test increases with the increase in the years of martial arts training (Table 2 and Table 3). The insignificant difference in the results between the study groups was due to the individual's inadequate training and low intensity and frequency of the training by the control group.

The major limitation of this study was that only males were recruited for the study, so I am unsure about the results that would be generated from the study including the females (only males are recruited in the Sikkim Armed Police).

The researchers can take a larger sample size and analyze the results of male and females separately to come to a conclusion.

5. Conclusion

Martial arts trainees demonstrated an enhanced physical fitness as well as a faster response in the reaction time test, as compared to their untrained counterparts. So, martial arts training may be a suitable platform for boosting physical fitness and the overall wellbeing of an individual.

6. Acknowledgement

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Table 1: Demographic Data of the Participants

	Age in year	Height, ft.	Weight in kg.	Martial Arts experience, year
N Valid	80	80	80	80
Missing	0	0	0	0
Mean	26.04	6.2250	68.4546	1.0375
Std. Deviation	5.912	5.41438	3.38305	1.02245
Minimum	18	5.10	58.00	.00
Maximum	35	54.00	75.00	3.50

Table 2: Statistics of the control

	N		Mean	Std. Deviation
	Valid	Missing		
Push-up test	30	0	14.8000	2.05779
Crunches test	30	0	28.1333	5.04281
Plank test in seconds	30	0	28.7333	4.29059
Squat test	30	0	28.9333	4.46390
Sit and reach test	30	0	9.3000	1.17884
Two minute curl-up test	30	0	29.2000	5.44819
Punch test	30	0	34.8333	5.56518
Kick test	30	0	29.0000	7.67890
Reaction time test	30	0	.2730	.00988
Martial Arts experience, year	30	0	.0000	.00000

Table 3: Statistics of the Trainee martial artist

	N		Mean	Std. Deviation
	Valid	Missing		
Push-up test	50	0	28.1000	8.20465
Crunches test	50	0	33.4000	7.91795
Plank test in seconds	50	0	39.1800	6.19641
Squat test	50	0	36.0800	5.18176
Sit and reach test	50	0	12.0200	1.81254
Two minute curl-up test	50	0	36.0800	6.96299
Punch test	50	0	46.0400	6.84809
Kick test	50	0	30.9600	6.10105
Reaction time test	50	0	.2158	.02508
Martial Arts experience, year	50	0	1.6600	.79437

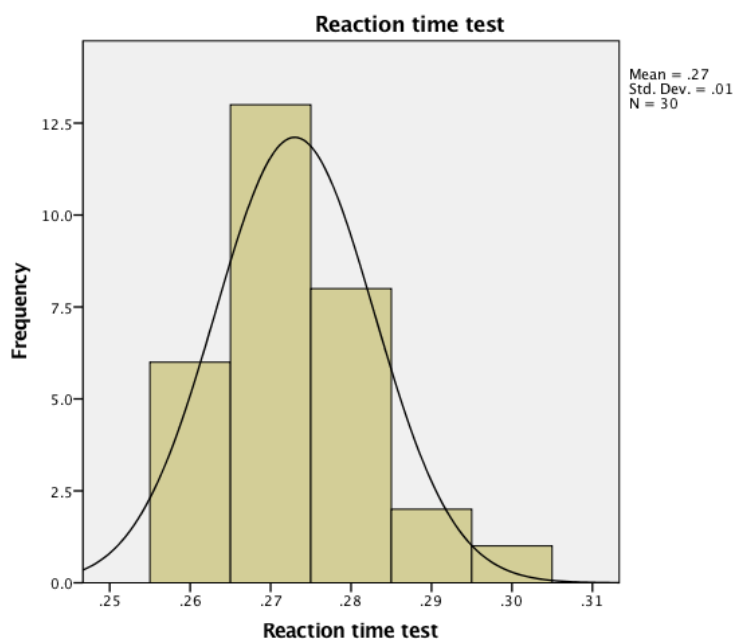


Fig.1: Histogram showing the reaction time tests of the control group.

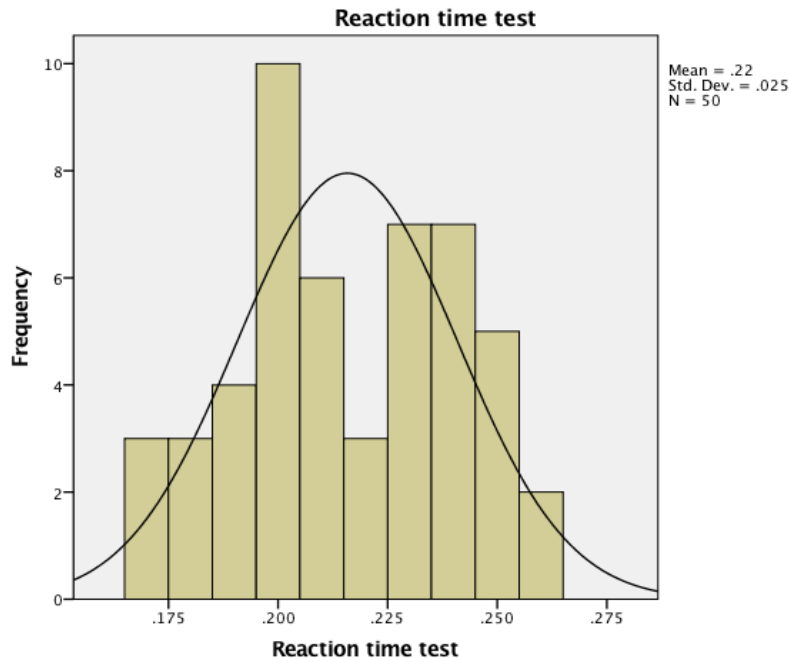


Fig. 2: Histogram showing the results of the reaction time tests of the Trainee martial artist.

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