



Research article

Efficacy of Plyometric Training on the Agility in Police Cadets

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ABSTRACT

Agility have been defined by the capacity to retain or determine the location of body by shifting its direction rapidly in a sequence of movements. Agility, speed and explosive power are qualifying components of physical fitness and desirable athletic performance, and play a key role in most sports. Agility can enhance the coordination and regulation of locations of the body throughout movement. Objective: To study the efficacy of the 6-weeks and 12-weeks Plyometric training on the agility in police cadets. Method: 40 Cadets aged above 18 years were grouped into two. A group continued their regular activities while rest underwent 2 sessions of plyometric training every week for 6 weeks, along with their daily activities. Analysis was then carried out with assessment of T-test Agility test, Illinois Agility Test, Edgren Side Step Test. Study duration is 6 months and intervention duration is 12-weeks, hence participants will be enrolled during first 3-months of study so 12 week intervention has been completed successfully. Assessment will be done on 1st day of visit then at the end of 6th week and again at the end of 12th week. Participants would have to perform 2 session of Plyometric Training per week in other group. Result: The results show that there is improvement the agility of the police cadets through the outcomes measures taken as a instrument to measure the difference in 1st day, 6th week and 12th week. There is decrease in time period of Agility T-test from 14.04±1.64 to 10.96±1.39 in group A and from 14.16±1.43 to 13.53±1.52 in group B. There is increase in steps of Edgren Side Step test from 34.95±4.84 to 40.93±4.17 in group A and from 34.97±4.17 to 36.31±4.34 in group B. There is decrease in time period of Illinois Agility test from 20.61±4.36 to 18.33±4.14 in group A and from 20.73±4.45 to 20.47±4.42 in group B. Conclusion: This study concludes that plyometric training intervention have improved the agility among the police cadets and it can be implemented among personnel's from law enforcement agencies.

Keywords: Plyometric training, Agility, Agility Test, Sports Rehabilitation.

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INTRODUCTION

Physical fitness is one of the most important component of the human life. As we grow up, our roles in life changes so does the body structure. AS we age, there are many transformational changes that occurs in our body. These changes needs change in human behavior accordingly so that all the functions of the human body is performed in synchronized manner^[1,2]. Physical fitness is one of them. Almost all the jobs needs physical fitness and therefore one has to work accordingly. Certain jobs or work profile need more physical fitness than others these includes, athletes, sports person, law enforcement agencies and so on. The level of physical fitness among these people must be at par with issued norms. Along with physical fitness, the need of agility is equally important. Many a times, strength is considered as the sole parameter of the physical fitness, which is extremely wrong. Agility keeps the body movement such that a person can swiftly

change direction of motion, have sprinting capabilities, balance and self-control^[3-5]. In case of police cadets which is also our topic of research, the need of agility is high due to job profile. Patrolling all-around the day, catching absconders and culprits can be very taxing. There might be a need to run to catch the culprit. In many case these law breakers are fit and agile as they foresee their future requirements. Therefore police cadets needs to be extremely aware and agile.

Along with agility, mental composure and intellectual response in least amount of time in precarious situations is also necessary. Agility helps in developing the mental composure and health. Various studies have found that physical fitness and agility considerably influences the intellectual outcome among person as agile person is more alert. Various training protocols have been used round the world to increase the physical fitness^[6,7].

Plyometric training is one of the training methods which are

used in sports training among athletes to increase their agility. Plyometric as a training method was adopted by the then soviet Russia which was included in athletes training methods in early 1970's. After superior performances of the Soviet Union athletes in various Olympics, many countries along with USA adopted this training to increase their athlete's performance. Unlike other training methods involving weight training and slow movements plyometric training involve fast movement which are quick and explosive. These are aimed at contracting the muscle fiber as fast as you can so that the reaction time is slow giving you greater power with agility. Plyometric training methods have various benefits including fast twitching muscles, efficient neuromuscular system and strengthened tendon [8].

Although it has been shown that plyometric training enhances performance variables, i.e. agility training targets for visual orientation, retain a good position yet little empirical evidence is present to establish whether the plyometric training actually increases agility. The current training methods used among police training centers does not include plyometric. The need of agility among law enforcement personnel's is more than ever. Therefore there must be some empirical backing to the claim of applying the plyometric to the police cadets. This research is a step in that direction. The aim of the study is to assess efficacy of the effect of 6-week and 12-week plyometric training program on agility of the Police cadets. The objectives included to determine the effect of 6-week plyometric training program on agility of the cadet and to determine the effect of 12-week plyometric training program on agility of the cadet.

METHODOLOGY

This study will be carried out at training camp which are in the vicinity of Wardha District, Wardha, Maharashtra, India only after approval by the Datta Meghe Institute of Medical Sciences Institutional Ethics Committee, Deemed University. It was an experimental study for the duration of 6 months. The inclusion criteria included participants over 18 years of age, free from lower extremity injuries and at the time of the analysis, they did not engage in any form of plyometric training. The exclusion criteria included history of injuries to the lower limb in recent times, fractures in the lower limb in near past, past history of lower limb surgery and non-cooperative participants.

Data source measurement

1. T-test Agility test - Agility is measured with $r=0.98$, $p<0.05$.^[9] that designates the reliability and validity of the T-test.
2. Illinois Agility Test – It is a reliable and valid velocity change tool with $r=0.77$, $p<0.0001$ ^[10].
3. Edgren Side Step Test- Another valid as well as reliable tool for changing in duration and speed with $r=-0.640$, $p = 0.046$ ^[11].

Study size

Group A: 20 participants must undergo 2 sessions of plyometric

training every week for 6 weeks, along with their daily activities.

Group B: 20 participants will continue their regular activities.

Procedure

The institutional ethics committee clearance was obtained before the start of the study. The permission was obtained from the head of institute for cadets and after meeting the criteria for inclusion and exclusion, the informed consent taken from the participants. Participants were classified into two categories, i.e. Plyometric Training Group and Control Group. Several tests were developed in order to measure agility, but few were defined for young adult males as effective or legitimate measures and no connection between the tests was established ^[12]. Demonstration of agility tests would be given to both groups. And plyometric training would be demonstration only to experimental group.

During the time period of training, all participants had told not to alter their current physical activities. The participants in plyometric training group was receive plyometric training for 6 week which consists of range of plyometric exercise designed for the lower extremity, whereas no plyometric exercises was performed by the control group. During the 12th -weeks duration, all subjects had continue normal daily living activities. The Plyometric training program consists of 2 training programs in a week. The training depends on intensity as well as volume, using similar exercises, sets, and replays ^[1].

Intervention

During the time period of training, participant will be told not to alter their current physical activities. The participant will receive plyometric training for 12 week which consists of range of plyometric exercise designed for the lower extremity. The plyometric exercise is Squat jump, Reverse lunge knee-ups, Box jumps, Stairway hops, Tuck jump, Lateral bounds. The Plyometric training program consists of 4 training programs in a week. The training depends on intensity, sets, and replays.

Phase 1

Phase 1 consist from First day of rehab up to 4 weeks. It consists of basic training program for the Police Cadet. Squat Jump Exercise will be given for the 3-4 days per week. There must be 3 sets for 10 replays is given. Reverse Lunge Knee-Ups exercise training for three sets and 30 seconds for each lower limb for 3-4 days per week.

Phase 2

Phase 2 starts from fifth week to eighth week. Moderate exercise is given with few other exercises. Box Jumps are started with three sets and twelve replays. This exercise must be carrying with previous exercise. Three – Four days per week exercise should be done.

Along with Box Jumps, Stairways hops are started with 3 sets and replays must be ten times.

Phase 3

Phase 3 is the last phase of the training program. Its starts from 9th week and end up at 12th week. During this phase Tuck Jumps program is given for 3 sets and repetitions are 10 times. Along with this, Lateral Bound program is started with 5 sets with 8 times repetitions. All the sets and replays must be progressively increase after every week of exercise by moderately or according to cadet's efficiency.

Pre and Post 6th week and 12th week-training assessments was used to analysis the agility results. The T-test gives the measure of the speed of variation in direction. The Illinois agility test assesses the preparedness to increase, decrease, rotate in various directions and move in various angles.

RESULTS

Statistical analysis was done by using descriptive and inferential statistics using student's unpaired t test and software used in the analysis was SPSS 27.0 version and $p < 0.05$ is considered as level of significance.

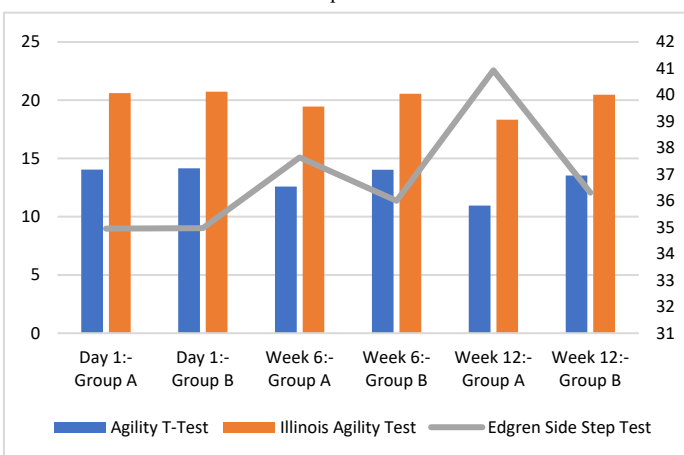
Table 1, 2, and 3 shows the comparison between Agility T -Test, Illinois Agility Test, Edgren Side Step Test respectively

Agility T-Test				
	Group A	Group B	t-value	p-value
Day 1	14.04±1.64	14.16±1.43	0.21	0.83, NS
Week 6	12.59±1.66	14.03±1.45	2.59	0.015, S

Illinois Agility Test				
	Group A	Group B	T-Value	P-Value
Day 1	20.61±4.36	20.73±4.45	0.07	0.94, NS
Week 6	19.45±4.27	20.55±4.37	0.72	0.47, NS

Edgren Side Step Test				
	Group A	Group B	t-value	p-value
Day 1	34.95±4.84	34.97±4.17	0.01	0.99, NS
Week 6	37.64±4.72	36±4.27	1.03	0.31, NS

Figure 1. Comparison of Agility T-Test, Illinois Agility Test and Edgren Side Step Test



DISCUSSION

According to a study by Taylor et al, Cognitive ability is adversely affected due to fatigue generated by irregular duty hours.

These duty house which are not fixed converge in to lack of proper training exercise. Without proper and adequate exercise, the agility is not maintained. This can affects the prompt response in physical, mental as well as intellectual ways and also it is risky to have non agile person behind the wheel during patrols as high speed chases needs law enforcement personnel skilled in driving. The tactical maneuvers needs fast thought process and agile physique so as to nab the offender and prohibit him or her from wreaking more havoc [6].

According to the study done by Dawes et.al. , there has been a correlation among physical fitness and agility and occupational outcome. This study was done among police cadets and law enforcement personnel's. The study found out that the more physically fit the person is, occupational outcome of concerned personnel or cadet is significantly better than the personnel or police cadets which are comparatively less physically fit and agile. In this test, physical agility was tested by performing various tasks and jobs without giving the cadet any break between them. This has proven to be an easy test for agile candidates while same was somewhat difficult for their non-agile counterpart [2].

Three tests were employed to check the improvement or change in the performance in the police cadets in both the groups. Police cadets were checked on first day, at 6th week and at 12th week. The tests used to check were T-Test, Illinois agility test, Edgren side step test. The outcome of T-Test, Illinois agility test was measured in seconds while the last test that is Edgren side step test was measured in steps.

Marins et al showed the difference between normal training and training with load carriage among police personnel's. Two groups were administered the test. Before that one of the group got the training with no load carriage while other group was made to perform the exercise with load carriage. It was found out that there was a significant occupational performance improvement among police personnel involved with load carriage along with exercise. The agility was found to be improved and aerobic fitness was shown by the police personnel which was administered the load carriage training [13].

Agility T-Test explains the measurement readings were taken in seconds. On day 1, both the groups recorded almost same reading. Later on, Group A outperformed Group B by considerable amount of margin, indicating the improvement in performance post training. The t value was on increase in all the three instances. But the p value was non-significant for Group A on day 1, thought it was in significant range of 0.015 and 0.001 respectively for week 6 and 12. Graphical Representation given below. The Illinois agility test score showed similar result as previous test. The group A again outperformed the Group b by significant points. On day 1, both the groups were at same level. But on week 6, Group A police cadets

recorded an average of 19.45 ± 4.27 seconds which was lower than Group B. The trend continued on Week 12 also. The p value for all the three instances was non-significant. The Edgren side step test is assessed by measuring steps during given task. On day 1, both the groups shown similar number of steps on an average. But Group A, which was administered the plyometric training got improvement in their performance on week 6 and 12. Especially on week 12, Group A police cadets recorded an average of 40.93 ± 4.17 steps which was more by 4 steps than group B. The p value was non-significant for first two instances on day 1 and week 6, but it was significant on week 12.

CONCLUSION

Thus, this study concludes that plyometric training intervention have improved the agility among the police cadets and it can be implemented among personnel's from law enforcement agencies.

REFERENCES

1. Miller mg, herniman jj, ricard md, cheatham cc, michael tj, 2006. "The effects of a 6-week plyometric training program on agility". *J sports sci med.* 5(3), 459-65.
2. Dawes jj, lindsay k, bero j, elder c, kornhauser c, holmes r, 2017. "Physical fitness characteristics of high vs. Low performers on an occupationally specific physical agility test for patrol officers". *J strength cond res.* 31(10), 2808-15.
3. Can sh, hendy hm, 2014. "Behavioral variables associated with obesity in police officers". *Ind health.* 52(3), 240-7.
4. Alghamdi as, yahya ma, alshammari gm, osman ma, 2017. "Prevalence of overweight and obesity among police officers in riyadh city and risk factors for cardiovascular disease". *Lipids health dis.* 16(1), 79.
5. B. Vs, pasha g, r. Vks, 2018. "Prevalence of obesity and its associated risk factors among policemen of chitradurga district, karnataka, india". *Int j adv med.* 5(5), 1280.
6. Taylor y, merat n, jamson s, 2019. "The effects of fatigue on cognitive performance in police officers and staff during a forward rotating shift pattern". *Saf health work.* 10(1), 67-74.
7. Mackenzie-shalders, k., matthews, c., dulla, j. Et al., 2020. "Law enforcement personnel are willing to change, but report influencing beliefs and barriers to optimised dietary intake". *Bmc public health.* 20, 1638.
8. Fekedulegn d, burchfiel cm, ma cc, andrew me, hartley ta, charles le, et al., 2017. "Fatigue and on-duty injury among police officers: the bcops study". *J safety res.* 60, 43-51.
9. Fessi ms, makni e, jemni m, elloumi m, chamari k, nabli ma, padulo j, moalla w, 2016. "Reliability and criterion-related validity of a new repeated agility test. *Biol sport*". 33(2), 159-64.
10. Hachana y, chaabène h, ben rajeb g, khelifa r, aouadi r, chamari k, et al., 2014. "Validity and reliability of new agility test among elite and subelite under 14-soccer players. *Kapoula z, editor*". *Plos one.* 9(4), e95773.
11. Brian t. McCormick, 2014. "The reliability and validity of various lateral side-step tests". *Ijassinternational j appl sports sci.* 26(2), 67-75.
12. Raya ma, gailey rs, gaunaud ia, jayne dm, campbell sm, gagne e, et al., 2013. "Comparison of three agility tests with male servicemembers: edgren side step test, t-test, and illinois agility test". *J rehabil res dev.* 50(7), 951-60.

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