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Impact of various training modules on the agility of male students

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Abstract
The aim of the research was to assess the impact of various training packages on the agility of school boys. To fulfill this objective, 60 school boys were randomly chosen from Govt. Senior Secondary School, Nagpur, Maharashtra, aged between 13 to 15 years. Group-I engaged in Circuit Training, Group-II underwent speed, agility, and quickness training, Group-III practiced yoga, while Group-IV served as the Control Group, abstaining from any training program. The data collected from all five groups before and after the experiment underwent statistical analysis using analysis of covariance (ANCOVA). Given the involvement of four distinct groups, significant "F" ratios for adjusted post mean prompted the application of Scheffe's Test as a post hoc measure to discern paired mean differences. The findings revealed a marked enhancement in agility among the groups undergoing different training packages when contrasted with the control group.

Keywords: Circuit, speed, agility and quickness training, yoga practice and agility

Introduction
Numerous sports, such as football and track, primarily emphasize linear speed and quickness, aiming to propel athletes from a stationary position to full speed along a straight path. However, the dynamics of soccer differ significantly, where the majority of movement occurs within a confined space of 6–10 yards. Soccer demands quick, explosive bursts and frequent changes of direction, involving nuanced front-to-back and side-to-side movements that integrate acceleration, deceleration, changes of pace, and direction, collectively termed as Soccer Speed, Agility, and Quickness (SAQ).

Agility is a critical component in various sports, encompassing a blend of speed, coordination, balance, power, and reflexes. It refers to an athlete's ability to swiftly change direction, accelerate, decelerate, and move with precision and control. In sporting contexts, agility is often synonymous with quickness and nimbleness, key attributes that can determine success in competitive settings.

Sports demand a range of agility skills. In football (soccer), players must swiftly change direction while dribbling the ball, evade opponents, and quickly react to changes in play. Basketball requires agility for rapid changes in direction, defensive maneuvers, and fast transitions between offense and defense. Tennis players exhibit agility when swiftly moving across the court to reach shots from various angles. Moreover, sports like American football, rugby, and hockey rely heavily on agility for quick movements and changes in strategy during gameplay.

The training for agility in sports involves a multifaceted approach. Agility drills and exercises focus on enhancing an athlete's ability to change direction efficiently, accelerate rapidly, and maintain control while performing quick movements. These drills often involve ladder drills, cone drills, shuttle runs, and plyometric exercises that mimic the specific movements required in a given sport.

Furthermore, agility training doesn't only concentrate on physical attributes but also encompasses cognitive aspects. Athletes need to anticipate and react swiftly to changing situations on the field or court. This cognitive agility involves decision-making, spatial awareness, and the ability to process information rapidly, which are essential for success in many sports.

An athlete's agility isn't solely about raw physical capabilities; it's also influenced by technique, experience, and mental acuity. Through consistent practice and repetition, athletes can improve their agility, refining their movements and reactions to become more efficient and effective in their respective sports.

Agility is an important aspect of many sports, and it refers to the ability to change direction quickly and efficiently. Here are some reasons why agility is needed in sports:

- **Improved performance:** By agility training, athletes may move more rapidly and effectively on the field or court, which can help them perform better.
- **Injury prevention:** By enhancing an athlete's capacity to land, pivot, and change direction without putting undue strain on their joints, agility training can also assist lower the chance of injury.
- **Tactical advantage:** Agile players can outmanoeuvre their opponents and gain a tactical advantage on the field or court by using their agility.
- **Better coordination:** Athletes' coordination can be enhanced by agility training, which is beneficial for many sports that call for precise movements and hand-eye coordination.
- **Mental preparedness:** Sportsmen and women who practise agility can improve their mental toughness and flexibility on the field or court.

Agility Vs change of direction

Agility and change of direction are both important in sports, but they refer to slightly different abilities.

- **Change of direction,** refers to the ability to change the direction of movement while maintaining speed and control. It involves deceleration, reacceleration, and redirection of the body. Change of direction is particularly important in sports like tennis, hockey, and basketball, where players need to be able to change direction quickly to keep up with the ball or the opponent.
- **Agility** has been traditionally considered as the ability of an athlete to start (accelerate), stop (decelerate), and change the direction of the whole body rapidly. Agility consists of two components: speed of changing direction (also explained above) and cognitive abilities (Sheppard, *et al*., 2006) Cognitive abilities are the ability to rapidly change direction in response to a sport-specific stimulus.
  Agility = Change of Direction + Reactive Ability
  While agility and change of direction are related, they require slightly different type of training. It can also be said that change of direction is part of agility.

Planning for Agility

The underline demand of the agility is to lower ground contact time and produce ground reaction forces. Further, requirement for the agility component will also be the ability to produce braking forces and to improve reactive ability.

Visual scanning, anticipation, pattern recognition, situation knowledge, decision-making time and accuracy, and reaction time are all components of perceptual-cognitive ability (Serpell, B.G., *et al*., 2011), (Sheppard, J.M., *et al*., 2006), (Spiteri, T, *et al*., 2014), and (Young, W, *et al*., 2013). (Young, W *et al*., 2011).

There are many different programming approaches that can be used to improve agility in sports. Here are a few examples:

- **Ladder drills:** Ladder drills are a popular way to improve agility. They involve a series of quick footwork movements that challenge an athlete's coordination, speed, and reaction time. Some examples of ladder drills include the basic ladder drill, the lateral shuffle, and the icky shuffle.
- **Cone drills:** Cone drills are another effective way to improve agility. They involve setting up a series of cones in different patterns and then quickly moving around them. Some examples of cone drills include the figure eight, the T- drill, and the box drill.
- **Plyometric exercises:** Plyometric exercises are explosive movements that can help improve agility. They involve jumping, hopping, and bounding movements that help develop power and explosiveness. Some examples of plyometric exercises include box jumps, broad jumps, and lateral bounds.
- **Sport-specific drills:** It's also important to include sport-specific drills in your agility programming. For example, basketball players might work on dribbling and changing direction quickly, while soccer players might work on quick changes of direction while running with the ball.

Overall, an effective agility training program should include a variety of exercises that challenge an athlete's coordination, speed, and reaction time, and should be tailored to the specific demands of their sport. It's also important to gradually increase the intensity and complexity of the exercises over time to continue to challenge the athlete and promote improvement.

Coaches and trainers often design sport-specific agility training regimens tailored to the demands of the game. These drills not only enhance physical attributes but also contribute to injury prevention by improving body control and coordination.

Agility plays a pivotal role across numerous sports. It's a combination of physical prowess, mental agility, and technical proficiency that allows athletes to swiftly navigate the dynamic and unpredictable nature of competitive sports, giving them a crucial edge on the field or court.

Agility drills hold immense potential to benefit athletes, especially when these drills closely mimic or incorporate cutting actions, reinforcing and refining the athlete's specific sports skills, thereby enhancing their speed and agility. The crux lies in replicating the fundamental actions intrinsic to executing agility in sports. Success in these drills hinges upon their frequent execution, enabling a seamless transfer of refined skills from drill practice to actual gameplay on the field or court. Notably, for agility drills to significantly enhance sports performance, they must include cutting actions, as emphasized by Verkhoshansky and Mel (2006) [5].

The origins of yoga trace back to ancient Indian traditions, potentially predating the Vedic era.

The earliest documented yoga practices are found in the Buddhist Nikayas. Around 400 CE, the Yoga Sutras of Patanjali emerged, amalgamating pre-philosophical reflections and diverse ascetic practices from the preceding millennium BCE with the philosophical underpinnings of Samkhya.

Hatha yoga, rooted in tantra, blossomed by the advent of the first millennium (Burley, 2000).

These practices and developments underscore the intricate historical and philosophical tapestry woven into sports training methodologies and the ancient roots that underpin the holistic discipline of yoga.

The benefits of yoga are extensive and extend beyond the physical realm. Regular practice can reduce stress, improve mental clarity, boost mood, enhance flexibility, and increase strength. Moreover, it has been shown to have positive effects on conditions like hypertension, anxiety, and depression.

Yoga isn't confined to a specific age group or fitness level; it's adaptable and inclusive. There are various styles of yoga, from gentle and restorative to more dynamic and challenging forms. Each style offers something unique, catering to different needs and preferences.

Yoga has transcended cultural boundaries and gained global popularity due to its profound effects on overall well-being. Its integration of physical postures, breathing exercises, meditation, and philosophical teachings provides a holistic approach to health and self-awareness, making it a valuable practice for modern-day living.

Methodology

The purpose of the study was to find out the effect of different training packages on agility of school boys. To achieve the purpose of this study, 60 school boys were randomly selected from Govt. Senior Secondary School, Nagpur, Maharashtra.

The age of the subjects ranged from 13 to 15 years. Group-I Circuit Training, Group-II underwent SAQ training, Group-III underwent yoga practice, and Group-IV acted as control who does not participate in any training program. The experimental group's subjects were participated in their respective training program 3 days/week for 12 weeks, duration of the training program on 40 min (including warm up and warm down) per day. Once in 2 weeks, the training load was increased. Agility was measured by shuttle run test. The data collected from the four groups before and post experimentation was statistically analyzed by analysis of covariance (ANCOVA). Since five different groups were involved whenever, the "F" ratio for adjusted post mean was found to be significant, the Scheffe's Test followed as a post hoc test to determine the paired means difference.

Table 1: Analysis of Covariance on Agility of Experimental and Control Groups

	Circuit Training	SAQ Training	Yoga Practice	Control Group	SOV	Sum of Squares	df	Mean Squares	"F" Ratio
Pre-test Mean	17.89	17.81	17.82	17.84	B	0.072	3	0.024	0.065
SD	0.58	0.61	0.62	0.61	W	20.82	56	0.37	
Post-test Mean	17.41	17.16	17.63	17.72	B	2.95	3	0.98	4.18*
SD	0.57	0.30	0.34	0.63	W	13.16	56	0.23	
Adjusted post-test	17.38	17.17	17.65	17.75	B	3.07	3	1.026	8.07*
Mean					W	6.98	55	0.12	

The required table value for significance at 0.05 level of confidence with degrees of freedom 3 and 55 is 2.77 and degree of freedom 3 and 56 is 2.77.

*Significant at 0.05 level of confidence.

Table 2: Scheffe's Test for the Difference between the Adjusted Post-test Paired Means of Agility

Adjusted Post-test Means				DM	CI
Circuit Training	SAQ Training	Yoga Practice	Control Group		
17.38	17.17			0.21	0.25
17.38		17.65		0.27*	0.25
17.38			17.73	0.35*	0.25
	17.17	17.65		0.48*	0.25
	17.17		17.73	0.56*	0.25
		17.65	17.73	0.08	0.25

*Significant

Results

The adjusted post-test means for agility in circuit training, SAQ training, yoga practice, and control groups were 17.38, 17.17, 17.65, and 17.75, respectively. The calculated "F" ratio of 8.07 for agility surpassed the critical table value of 2.77 at a 0.05 confidence level, indicating significant differences among the adjusted post-test means of experimental and control groups.

Given the significance of the adjusted post-test "F" ratio, Scheffe's test was employed as a post hoc analysis to discern the paired mean differences, as outlined in Table 2.

Table 2 displays Scheffe's test results, indicating significant disparities in adjusted post-test means between circuit training and yoga practice groups, circuit training and control groups, SAQ training and yoga practice groups, and SAQ training and control groups concerning agility. Additionally, the study revealed no significant differences between the circuit training and SAQ training groups, or the yoga practice and control groups in terms of agility.

Discussion and Findings

The study demonstrated that the 12-week training programs had a notable impact on enhancing the agility of school boys. Significant disparities were observed among the circuit training and yoga practice groups, circuit training and control groups, SAQ training and yoga practice groups, and SAQ training and control groups concerning agility. Moreover, the study highlighted no significant differences between the circuit training and SAQ training groups, or the yoga practice and control groups in terms of agility. These findings align with prior studies.

Muneer (2016) investigated the impact of SAQ training on selected biomotor variables, including SAQ, among female Kho-Kho players. The study concluded a substantial enhancement in agility among female Kho-Kho players due to SAQ training compared to the control group. Trecroci *et*

al. (2016) [4] examined the effects of SAQ training on acceleration (5 and 20 m), change of direction speed (CODS), and reactive agility in preadolescent soccer players. The findings indicated significant improvements due to SAQ training could positively affect cognitive skills and initial sprint acceleration through the middle childhood, offering useful guidance to soccer coaches. Arjunan (2015) [1] found out the effect of SAQ training on selected physical fitness variables among school soccer players. The result of the study stated that SAQ training has significantly contributed to improve agility of soccer players. Prasad *et al*. (2014) [3] investigated the effect of 8 weeks SAQ training program on selected physical fitness variables. Significant effect of SAQ training was found on reaction time, explosive strength, and flexibility. Significant effect of SAQ training was found on speed agility and quickness. Zoran and others (2013) determined the effects of a 12-week conditioning program involving SAQ training and its effect on agility performance in young soccer players. This suggests that SAQ training is an effective way of improving agility, with and without the ball, for young soccer players and can be included in physical conditioning programs.

Conclusion

The conclusion of the study stated that there was a significant improvement on agility of the different training packages groups when compared to the control group. Moreover, among the experimental groups, the SAQ training group had better improvement on agility.

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