



Effect Of Ladder Training In Different Sports - A Review Study

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<i>Abstract</i>	
	<p>Introduction: Human behaviour-related activities have undergone long-term development. The extent to which a motor task is completed and the outcome of the activities is referred to as performance. Sports training focuses on improving motor abilities associated with a certain sport discipline. Assumed performance is determined by motor ability and motor skill. This study focus on investigating the effect of ladder training in different sports in promoting the physical components.</p> <p>Materials and Methods: A review study was conducted. The data was collected from the various databases and search engines like pub med, google scholar and research gate etc. The articles were included fixing a criterion according to the needs to rule out the effectiveness of ladder training in various others sports.</p> <p>Conclusions: Training with the ladder has shown immense improvement in performance in sports by promoting the physical parameters required in ever sports including speed, quickness, power, stability of body, coordination, response time as well as can be further implemented in long run to increase injury prevention.</p> <p>Keywords: Ladder training, sports, physical parameters, athletes, speed, agility, strength, power, balance, coordination</p>
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Background

Sport is the activity in which we play using our physical capabilities. Sports are significant in other ways as well since a person's brain and body are intertwined and when one is physically healthy, the other is as well. Regardless of other demands in one's life, sports allow one to let off steam, temporarily forget about their troubles, and go out and have a good time. One strategy to become physically fit is to engage in physical exercise, such as sports. Exercise is a habit that affects how people live their daily lives. Because of the sport's connection to motion and the fact that motion cannot be isolated from human activity.

Motion in sporting activities is purposeful. Human exercise has four primary goals: a) Recreational sports are played for the goal of enjoying one's daily activities. b) The sports that are instructional in nature indicates they are conducted according to the standards and program. c) The sports aimed in improving one's overall health demonstrates they are performed with a specific objective and under the care or control of a qualified professional. d) Achievable sports require meticulous planning, systematic and progressive training regimens that are repeated and related disciplines.

Every individual requires exercise since exercising effectively and appropriately can increase physical fitness. Every individual requires physical fitness to undertake daily activities. Aside from fitness, physical condition is crucial in sticking with a workout and achieving a goal. There are around ten components that must be developed in order to improve an athlete's physical condition which consists of endurance, strength, flexibility, speed, muscular power, coordination, agility, reaction time, balance and accuracy.

The most recent form of diverse training program is the ladder exercise because motor component characteristics including power, strength, stability, quickness, integration, articulation competence, leg speed, coordination of the hands and eyes, and speed of response is constantly increasing. A ladder workout entails doing one or more exercises in an ascending and descending repetition pattern. It is a sort of sports and strength training. Ladder exercises for muscular endurance and conditioning are designed to help players improve their overall training volume while maintaining proper form and technique. Michele (2019 M. Howard)

In many team sports, ladder drill is a crucial component of the practice. To perform them players must move their feet swiftly and correctly to execute tasks. It necessitates the synchronization of numerous muscle groups in order to maintain the exercise's perfectly regulated and cyclic moves. It is also thought to be important for improving fast COD, foot motions, coordination, balance, and speed. It has also been highlighted that because it improves stabilisation, power, and postural stability, it may be able to positively contribute to injury prevention programs. Drills for ladder training aid in the development of a variety of movement skills. These exercises strengthen the body and improve its balance while also utilizing hip power to control foot movement. So, this study main focus is on the impact of the ladder workouts on several athletic characteristics across a variety of sports.

The players engaged in various sports activity needs to work on their physical parameters to maintain their physical condition in order to achieve good performance. It is predicted that by adopting a range of simple motion patterns, athletes' fitness levels would develop as a result of the trainer's work on their agility, speed, and lower leg power. Considering the accessibility of ladder exercises, there is a question prevailing, if exercising with ladder drills can improve the quality of physical parameters. In addition, ladder exercises are thought to be employed as a choice of beneficial and proficient exercise model in training and as exercise options for a variety of sports in this study.

METHODOLOGY

Eligibility Criteria

To ensure the accuracy of this research, this review focused on studies that utilized real data and presented original results. A combination of different designs of studies has been included to give a more comprehensive overview of the existing evidences. The search method included pertinent search terms and compiled to the population, intervention, comparison and outcome (PICO) framework. The included studies were published between the year 2015 and 2023 and conducted in various Asian countries mainly India, Indonesia and China. The studies involved subjects of population of students and athletes and the age equal or more than 10 years, including both genders [Table 1]

Table 1: Inclusion Criteria of the review study

Sr. No.	Variables of Consideration	Criteria
1	Age	>10
2	Gender	Both
3	Population	Students and athletes
4	Population or Respondent	>=10

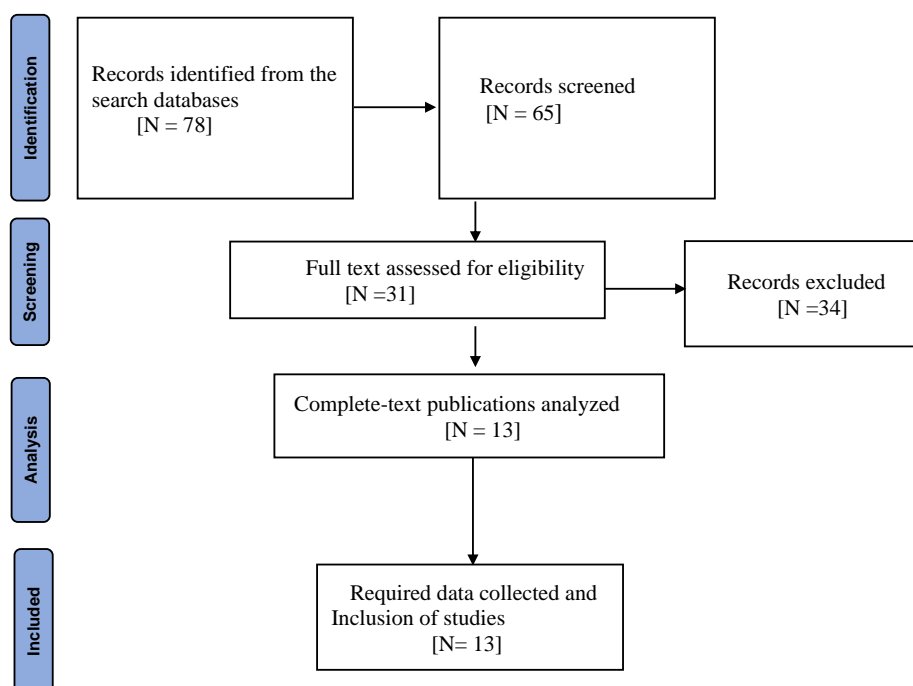


Fig 1. PRISMA flow chart of Search of Literatures

Search strategy

The published databases were searched electronically on web sciences such as Pub Med, Goggle Scholar, Pedro, Scopus and the various search engines such as research gate with the following: “Ladder Training” “Sports” “Strength” “Agility” “Power” “Balance” “coordination” “Speed”. The full description of articles was exported to end note to allow for exclusion of duplicates and assessment of titles and abstract of articles. The articles were from worldwide population.

Data collection and analysis

Studies selection:

After identifying a total of 78 records, one reviewer screened 65 records by reading their abstracts and titles. Out of these 31 were deemed relevant, 34 were excluded. The remaining 13 records were selected according to the eligibility criteria for study characteristics and quality. Additionally, the author manually screened the reference lists of these 13 articles for any other relevant sources.

Data extraction

The extraction of data has been completed. This process involved examining various trial characteristics such as country and year in which it was conducted, as well as design and duration of the trial. Any article that had incomplete or unclear data were excluded from consideration.

RESULTS

Study characteristics

Data extraction shows overview of all the studies included for the systematic review. Studies from India (7), Indonesia (3) and China (3), total of 13 were included. All the studies were published from the year 2015 to 2023.

Characteristics of Ladder Training in Sports

Sports training, which is commonly referred a method of preparing sportsmen to perform at their best. Athletic conditioning is no longer simply a concept; it is a significant matter benefiting everyone who engages in strenuous activity or athletics, either for physical well-being or competitiveness at different levels of play. As a result, we can define athletic preparation as sport-related activities that prepare a player on multiple levels, including cognitive, physical, technical skills, mental, and ethical. Maintaining or enhancing one's physical

condition requires regular physical training. In other words, if their physical condition improves, so will their activity.

Ladder agility workouts are an effective way to develop numerous physical parameters needed for an athlete to flourish. Ladder training is the most recent type of multi-directional training. Numerous team sport workouts must include ladder exercises. Players must quickly and perfectly execute a defined action with their feet. They are used to enhance athletic performance by improving footwork. Multi-directional exercise enhances muscular endurance, strength, equilibrium, quickness, integration, orientation, abdominal and joint equilibrium, feet pace, coordination between the eyes and hands, response time, and movement. The brain and body pick up numerous foot movements via practice. Exercises involving the lower extremities movement are typically done on a ladder. As a teaching and learning progression for greater success, the ladder training starts with basic growth and advances to elite abilities enhancement from complete range movement to smaller, quicker, and more intense motions. Benefits of ladder exercises include faster lower limbs, which athletes require to change direction quickly, as well as injury prevention, stability, coordination, and explosiveness. They are a magical tool that can make anyone faster and more agile. They are essential components of many speed, agility, and quickness regimes and provide support for a variety of amateur and athletic sports. To maintain the workout's accurately timed and synchronized actions, ladder training requires a coordinated effort of several muscle groups. The ability of these muscle groups to work together enhances an athlete's dynamic equilibrium, or the capability to keep their balance while executing difficult, powerful, and expansive activities.

During the process of review study, it was seen that the implication of Ladder Training alone or in combination with other modernised techniques and trainings have shown significant improvement in certain physical parameters such as agility, speed, power, strength, balance and reaction time.

Results of Individual studies

Results of 13 included studies in the systematic review are described in the Table 2. the parameters such as speed, agility, leg explosive power, endurance, dynamic balance, coordination and reaction time in various types of sports were evaluated to rule out the results of ladder training in both students and athletes.

I conducted the review to evaluate the impact of ladder drill training in enhancing the physical parameters. The study included both students and athletes, were the result showed that the implementation of ladder training showed positive effects on increasing physical parameters such as agility, speed, power, strength, balance and reaction time. And this training individually or in combination with other training is an upcoming and promising technique to be used in the field of sports in uplifting the athletes as well as students' physical wellbeing.

Table 2: Results of various researches considered for the article

Sr. No	Author (Year & Place)	Title	Participants	Results
1.	N Chandrakumar et al, 2015 (India)	Agility and quickness of the badminton players after training with the ladder-style activity and SAQ exercises	30	The effect of ladder training along with SAQ training produced a significant improvement in agility and quickness in badminton players of a sports club
2.	Ketut Chandra Adinata Kusuma et al, 2017 (Indonesia)	Exercise with a Ladder Drill: Effects on Leg Muscle Rate, Circulation and Power	30	The findings show that the training with the ladder affects futsal players' speed of running, responsiveness, as well as leg muscular power (a significant score = 0.000, then $p < 0.05$).
3.	Smurti Bhisaji Pawar et al, 2018 (India)	Effect of training with ladder drills on female kabaddi players	45	The experimental group's agility performance had a p-value of 0.0001, which is thought to be very significant. Thus experimental group's agility performance significantly improved when compared to the control group among female semi-professional kabaddi players. Training using ladder workouts increased their performance level.

4.	Dr. Murugavel K et al, 2022 (India)	An experimental examination of the loop band with ladder training	30	The effects of an eight-week combination of loop band and ladder training on handball players' performance variables suggested that ladder training along with loop band were more effective in producing desired changes in handball players' passing and throwing accuracy.
5.	Dr. Kumaravelu, P. 2019 (India)	The Influence of Specific Ladder Drills on Inter-Collegiate Badminton Players' Performance on Selected Skill Tests	10	Six weeks of ladder agility exercise training improved badminton playing abilities in male college Badminton players significantly. A comparison of pre and post-test mean values on playing ability highlights the differences in a good way.
6.	ROBERT S.K NG et al, 2017 (China)	The impact of a six-week quickness ladder intervention during leisure for reactive equilibrium skills	71	After 6-weeks of training, participants in the experimental group increased their individualized NSEBT results as well as aggregate NSEBT results on each of the legs. Before vs after training NSEBT results in each group demonstrated an improvement in the total value following the six week training phase. The experimental group improved their after training NSEBT results from 6.1% to 19.1% in every order. They ended up with a score higher than the other group in both legs. In six-week agility ladder tasks, the school boys' changing balancing skill increased considerably after recess intervention. Improving their dynamic balance skill not only enables students to participate in a broad range of athletic activities involving motion of the body, however promotes injury avoidance in the long run.
7.	Nanda Eriko Pratama et al, 2018 (Indonesia)	The Impact of the Jump Rope Workout and the ladder Exercises on Limb Muscle, Rapidity, Quickness, and Strength.	30	Exercises like the ladder have a significant impact on agility as well as speed because of the muscles of legs engage consistently during the activity. The Hop-Scotch Drill of ladder workout has a huge impact on speed, agility, and limb muscle strength. Rope jump exercise has a considerable influence on the strength of limbs, quickness and rapidity. Rate, quickness, and the strength of the leg muscles are affected differently by the rope jump and the Hop-Scotch Drill exercise. To enhance speed and agility, the Hop-Scotch Drill exercise outperforms rope jump training. Furthermore, when it comes to increasing leg muscular power, rope jump workouts outperform the Hop-Scotch Drill.
8.	Jing Zhou et al, 2022 (China)	The Effects of Ladder Training on Volleyball Player's Mobility	20	After 8 weeks of testing, it was determined that the ladder training had a beneficial impact on the athletes' capacity to move quickly and had the potential to

				significantly increase it. Through methodical ladder training, players' reflex arc excitatory conduction time was dramatically shortened, resulting in a quicker reaction to varied signal inputs, better preparing their central nervous system for sports activity. Students' interest and knowledge of training are fostered by ladder training.
9.	Xuefei Liu, 2022 (China)	Ladder Training's impact on Basketball player's motor coordination.	20	Adolescent basketball participants' motor control was enhanced by ladder training by including both basic and athletic quickness. It is advised to combine it with structured training to further enhance adolescent basketball participants' motor skills.
10.	Thesya Alda Nia et al, 2023 (Indonesia)	The Impact of Sprint and Speed Ladder Modification Training on Mawashi Geri Women's Kempo Professional Athletes' Kick Speed	30	The impact of training on Mawashi Geri kick speed differed significantly across the sprint and speed ladder modification groups. When compared to the average increase in the final test of the two groups, speed ladder training is significantly more influential in agility, which aids enhancing a variety of fundamental sports motions, including equilibrium, reactions, power of muscles, reaction time, and body part coordination., and implications of this study can educate trainers that these two training models can have a positive impact on Mawashi Geri kicks.
11.	Pramod Ravi et al, 2023 (India)	Circuit workouts and ladder workout prospective consequences on the performance of males' students in terms of stamina and physical fitness.	45	The results of the study showed that, compared to ladder training, a year's worth of circuit conditioning increased core power and durability output by 48.3%, whereas of ladder training increased it by 28.4%. The circuit training method and the ladder training method can boost physical strength and endurance in comparison to the pre-test data, as seen by the improvement in post-test results. However, the outcome is significantly different in both circumstances. Circuit training strategies considerably outperform ladder training techniques after 12 weeks of involvement in terms of endurance and abdominal strength.
12.	Pramod Ravi et al, 2023 (India)	The potential role of ladder training and circuit training in facilitating the growth of glycolytic capacity and rapid performance in school students.	45	Following a 12-week training schedule, both the conditioning and assessment methods were beneficial in boosting pace and explosiveness. After 12 weeks of ladder training, the boys' pupils' 5.3% speed gain acts as proof of the training's short-term effectiveness. Explosive performance increases by 8.2% with the usage of circuit training. Both the

				sequential training approach and the ladder conditioning approach can improve speed as well as explosiveness, as evidenced through an increase in following the test data when compared to the prior test data.
13.	C.Selvakannan et al, 2023 (India)	Enhancing male engineering college athletes' speed performance using Ladder training and plyometric training capsules	45	The study's findings demonstrates a huge disparity between ladder exercise and plyometric exercises in all of the experimental groups. Additionally, the outcomes demonstrated that the group provided with ladder drill exercises had an advantageous effect on the subject group in terms of improving speed performance than the Plyometric Training and Control groups.

Discussion

According to reports and studies, the players implemented with ladder drill training were seen with improvement in the parameters such as speed, agility, leg explosive power, endurance, dynamic balance, coordination and reaction time in various types of sports.

- The ladder drill was proposed as a more effective means of training speed and agility. Graydon L. Gains., (2010) did a study and discovered that ladder drills significantly enhances college racquet game athletes rapidity, versatility, and vitality after twenty four weeks.
- Kabaddi being a fast-paced sport, ladder drills training assist the player in catching, striking, blocking, or tackling the component by improving their performance level more. Each player's speed and endurance grew dramatically, which enhanced their total performance level in the game.
- Runs through the ladder, skips, shuffles, and jump/hops of ladder training combined with loop band training improved performance characteristics in handball players. The findings of this study suggested that loop band and ladder training were more effective in producing desired changes in handball players' passing and throwing accuracy.
- After recess intervention, the school boys' dynamic balancing skill improved dramatically within six week of ladder conditioning. In the future, developing their balance skills not only motivates individuals to engage in a variety of body-movement-based physical activities, but also improves the likelihood of injury control. (Claxton, Troy, & Dupree, 2006).
- Young basketball players' general and special agility can be fully developed through soft ladder training, and their regular and specialized speed can be increased through the combination of traditional basketball training and soft ladder training.
- Ladder drills improve players' foot speed and reaction time (Ravi, 2023). In order to sustain the precisely scheduled and repetitive moves that are essential to the exercise, ladder training necessitates the synchronization of several muscles sections. (Mickle et al., 2011). Core power and stamina improve by 28.4% after ladder exercise is employed, following a similar period of duration devoted to ladder training with a typical period of rest in between rounds and sessions.
- The effect of ladder workouts on speed among Mawashi Geri kicks was much greater. The function is to train foot speed, foot agility, balanced motion synchronization, coordination, and step frequency.

Conclusion

Ladder training is a wonderful technique for raising overall training volume. It can be applied to almost any exercise and provides a terrific opportunity to expose the trainee to a considerably higher amount of work than would ordinarily be available when training in a more traditional manner. Every element needs to be used in every training program on a daily training session. They are crucial to many speed, agility, and quickness training initiatives as well as a wide range of sports and events. The muscles must be in good condition to achieve high-quality movement. Athletes should also perform a certain amount of remonstrance or endurance conditioning after them, because the training does not lead the muscles to fatigue.

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