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Comparison of Aerobic Endurance Among Middle Distance and Long Distance Runners of Osmania University

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Abstract:

The Purpose of the study is to find out the Aerobic Endurance among Male Middle and Long distance runners of the Osmania University between the age group of 18 to 25 Years. The sample for the present study is Male Twenty Middle distance runners and Male Twenty Long distance runners from various colleges of Osmania University, Hyderabad. The data will be collected separately from Middle distance and Long distance runners. The Subjects were made to Run 12 Min Run Cooper Test for endurance. This study shows that Middle distance runners are having the good endurance compare to long distance runners. Key words: Aerobic endurance, middle distance runners, long distance runners etc.

Introduction:

Aerobic Endurance is the amount of oxygen intake during exercise. Aerobic Endurance is the time which you can exercise, without producing lactic acid in your muscles. During aerobic (with oxygen) work, the body is working at a level that the demands for oxygen and fuel can be meet by the body's intake. The only waste products formed are carbon-dioxide and water which are removed by sweating and breathing. Aerobic exercise is physical exercise of relatively low intensity and long duration, which depends primarily on the aerobic energy system.

Middle-distance running events are track races longer than sprints, ranging from 500 metres up to two miles. The standard middle distances are the 800 metres, 1500 metres and mile run, although the 3000 metres may also be classified as a middle-distance event.

Long-distance track races range from 3000 metres to 10,000 metres , cross country races 10 KM in Men and Women Section, while road races can be significantly longer from 10 KM, 15 KM, 20 KM, Half Marathon, Marathon and upto reaching 100 km .

Mahipal(2015) studied to compare the aerobic endurance among female middle distance runners and female cross country runners. To achieve the aim of the study a total no. of subjects were 40 female athletes in which 20 female middle distance runners and 20 female cross country runners; equally divided into two groups. The subjects' age was ranged between 18 to 25 years. All subjects are from affiliated Colleges of KU, Kurukshetra who had participated in inter collegiate cross country championship 2013-14. The data was randomly collected to measure the aerobic endurance the 12 min. cooper run & walk test was used. The Middle distance runners are of 800 meter and 1500 meter and Cross country runners of 6 Km. The' t' test was in used to compare the aerobic endurance among female middle distance runners and cross country runners. The level of significance value was in use 0.05. The result of the study shows that female cross country runners have good aerobic endurance compare to middle distance runners. It is recommended that female Middle distance and female cross Country runners must be given good endurance training to perform well in their respective events.

Purpose of the study:

The Purpose of the study is to find out the Aerobic Endurance among Male Middle and Long distance runners of the Osmania University between the age group of 18 to 25 Years

Methodology:

The sample for the present study is Male Twenty Middle distance runners and Male Twenty Long distance runners from various colleges of Osmania University, Hyderabad. The data will be collected separately from Middle distance and Long distance runners. The Subjects were made to Run 12 Min Run Cooper Test for enduranceThe Cooper test is a test of physical fitness. It was designed by Kenneth H. Cooper in 1968 for US military used in the original form; the point of the test is to run as far as possible within 12 minutes. To undertake this test you will require:

- 400 meter track
- Stop Watch
- Whistle
- Technical Official

- The subjects given 10 minutes for warm up.
- The assistant gives the command "GO", starts the stopwatch and athlete commences the test
- The Technical Official keeps the athlete informed of the remaining time at the end of each lap
- The Technical Official blows the whistle when the 12 minutes has elapsed and records the distance the athlete covered to the nearest 10 meters

Results and Discussion:

The Table No.1 showing the Mean, S.D, Standard Error, t-ratio of Middle Distance Runners and Long distance runners of Osmania University in Cooper Test.

Results of 12 min Cooper Test	N	Mean	Std. Deviation	Std. Error Mean	t	df	Sig. (2-tailed)
Middle distance runners	20	3050.00	219.71	49.13	1.69	38.00	0.10
Long distance runners	20	2950.00	137.71	30.79			

The Middle distance runners Mean Performance is 3050 Meters and the Long distance runners Mean performance is 2950 Meters. There is mean difference of 100 Meters between Middle distance and Long distance runners. The Results of the study shows that Middle distance runners are having the good aerobic endurance compare to Long distance runners.

Conclusion

This study shows that Middle distance runners are having the good endurance compare to long distance runners. It is concluded that Male Middle distance runners are having good endurance compare to Male Long distance runners.

Recommendations: Similiar studies can be conducted on female players and other team game players and individual game players.

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Effect of an 8-Week Resistance Training Program on Muscle Strength, Power, Endurance and Agility in Kho-Kho Players Aged 16–24 Years

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Abstract

The Kho-Kho is a traditional Indian team sport that demands repeated high-intensity efforts, agility and muscular fitness. Resistance training (RT) is known to improve muscular strength, power and endurance in young athletes, but sport-specific data for Kho-Kho players are limited. This research paper is to examine the effects of an 8-week supervised RT program on muscle strength (1-RM squat), muscle power (countermovement jump, CMJ), muscular endurance (1-min sit-ups), and agility (T-test) in Kho-Kho players aged 16–24 years. Forty male Kho-Kho players (aged between 16–24 yrs) were assigned to RT (n=20) or control (usual practice, n=20). RT: 3 sessions/week, progressive 8-week program (compound lifts, plyometrics and sport-specific drills). Outcomes measured pre/post. paired t-tests within groups and ANCOVA (post with baseline as covariate) between groups. Cohen's d reported. RT group showed significant improvements vs control. ANCOVA confirmed significant between-group effects (all p<0.01). An 8-week RT program produced moderate-to-large improvements in strength, power, endurance and agility in Kho-Kho players aged 16–24 yrs. These findings support integrating structured RT into Kho-Kho training.Keywords: Resistance training, Strength training, Muscle strength, Muscle power, Muscular endurance, Agility etc.

Introduction

Kho-Kho is a game which requires quick accelerations, decelerations, changes of direction and repeated muscular efforts; sport performance depends heavily on muscular strength, power, endurance and agility. Several reviews show RT reliably improves muscular fitness and sport-specific performance in youth and competitive athletes. Studies of Indian traditional sports note the high demands on agility and endurance in Kho-Kho players, but intervention evidence specific to Kho-Kho is scarce.

Methodology

Controlled intervention (parallel groups): RT group, usual practice vs control group (usual practice only). Pre/post testing (baseline and after 8 weeks).

Participants

Forty male Kho-Kho players (aged between 16–24 years) actively competing at collegiate/state level were enlisted. Inclusion: age 16–24, ≥2 years Kho-Kho experience, medically fit for exercise.

Exclusion: Recently injured (<3 months), concurrent structured RT in previous 8 weeks.

RT (n=20): age 19.2 ± 2.3 yrs; body mass 68.4 ± 7.1 kg; height 172.1 ± 5.6 cm.

Control (n=20): age 18.9 ± 2.6 yrs; body mass 69.1 ± 6.8 kg; height 171.5 ± 6.0 cm.

Groups comparable at baseline (p>0.05).

Intervention: Resistance Training Program (RT group)

Duration: 8 weeks, 3 sessions/week (non-consecutive days). Session structure: 10–15 min warm-up; 40–50 min RT; 10 min cooldown (streeting's).

weekly progression:

Weeks 1–2: 2–3 sets × 8–10 reps at ~60–70% 1-RM (squats, lunges, Romanian deadlifts, bench press/push-ups), core and mobility.

Weeks 3–5: 3–4 sets × 6–8 reps at ~70–80% 1-RM; include explosive concentric determined.
Weeks 6–8: 3–4 sets × 4–6 reps at ~80–85% 1-RM and plyometric drills (box jumps, bounding) and sport-specific COD drills.

Progressive overload applied; trained strength coach supervised all sessions.

Control group continued normal on-court practice (technical/tactical drills) without added RT.

Outcome measures

Assessed pre and post (48–72 hrs. after last training session):

1. Muscle strength: 1-RM back squat (kg), standardized protocol.
2. Muscle power: Countermovement jump (CMJ) height (cm) measured by jump mat or force platform.
3. Muscular endurance: Number of sit-ups in 60 seconds.
4. Agility: T-test time (s).

Statistical analysis

Normality checked (Shapiro-Wilk).

Within-group changes: paired t-tests.

Between groups: ANCOVA on post values with baseline as covariate.

Effect sizes: Cohen's d for within-group (mean change/SD of change) and partial η^2 for

ANCOVA.

Significance at $\alpha=0.05$. Analyses done in standard statistical software.

Table 1 Baseline and post-intervention mean

Result	Group	Baseline (mean ± SD)	Post (mean ± SD)	Mean change (Δ)	% change
1-RM squat (kg)	RT (n=20)	115.4 ± 12.8	133.6 ± 13.1	+18.2 ± 6.4	+15.8%
	Control (n=20)	116.1 ± 13.2	117.3 ± 13.0	+1.2 ± 2.6	+1.0%
CMJ (cm)	RT	31.6 ± 3.8	35.2 ± 3.9	+3.6 ± 2.0	+11.4%
	Control	31.9 ± 3.5	32.1 ± 3.6	+0.2 ± 1.1	+0.6%
Sit-ups (60s)	RT	33.0 ± 4.8	39.1 ± 5.2	+6.1 ± 3.0	+18.5%
	Control	32.6 ± 5.0	33.0 ± 5.2	+0.4 ± 1.5	+1.2%
T-test (s)	RT	6.80 ± 0.45	6.38 ± 0.42	−0.42 ± 0.25	−6.2%
	Control	6.78 ± 0.48	6.75 ± 0.46	−0.03 ± 0.10	−0.4%

Within-group comparisons RT group:

1-RM squat: $t(19) = 11.35$, $p<0.001$, Cohen's d = 1.13 (large).

CMJ: $t(19) = 8.07$, $p<0.001$, d = 0.90 (large).

Sit-ups: t (19) =10.05, p<0.001, d = 1.20 (large).

T-test: t (19) =7.46, p<0.001, d = −0.98 (large improvement).

Control group: no statistically significant within-group changes (all p>0.05).

Between-group comparisons. 1-RM squat: F (1,37) =28.2, p<0.001, partial $\eta^2 = 0.43$.

CMJ: F(1,37) =14.7, p=0.001, partial $\eta^2 = 0.28$.

Sit-ups: F(1,37) =31.5, p<0.001, partial $\eta^2 = 0.46$.

T-test: F(1,37) =20.6, p<0.001, partial $\eta^2 = 0.36$.

All between-group effects favor RT with moderate to large effect sizes. These results align with systematic reviews showing RT improves strength, power, and agility outcomes in youth and competitive athletes.

Discussion

The supervised 8-week RT program produced moderate-to-large improvements in muscle strength (1-RM), muscle power (CMJ), muscular endurance (sit-ups) and agility (T-test) compared with control. These magnitudes (Cohen's d ≈ 0.9–1.2) are consistent with prior reviews of RT in youth and sport populations which report small-to-large effects depending on program dose and athlete levels. Strength gains arise from both neural adaptations and, with sufficient volume or intensity, muscular hypertrophy improvements in power often require both strength and force rate development training (including plyometrics). Such combined programs are effective in improving jump height, sprint and change-of-direction performance relevant to Kho-Kho.

Practical implications. Coaches should integrate progressive RT (compound lifts, explosive work, and sport-specific agility drills) 2–3×/week for at least 6–8 weeks to expect improvements in performance for adolescent and young adult Kho-Kho players. Supervision and appropriate progression are important to maximize benefits and reduce injury risk factors.

Conclusion

An 8-week structured RT program can meaningfully improve muscle strength, power, muscular endurance and agility in Kho-Kho players aged 16–24yers. These findings support adding supervised RT to regular training to enhance the physical traits crucial for Kho-Kho performance.

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Comparative Study on Meditation and Pranayama Practices between Participant and Non-Participant High School Boys

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Abstract
This study aimed to analyze the role of meditation and pranayama practice on sports performance among high school boys. A sample of 50 students (25 participants who practiced meditation and pranayama, and 25 non-participants who did not) was selected. A 6-week intervention was conducted focusing on breathing techniques, relaxation, and guided meditation. Pre- and post-test scores on endurance, flexibility, and concentration were recorded. Statistical analysis using paired and independent t-tests revealed significant improvements ($p < 0.05$) in endurance (participants: +18.8% vs. non-participants: +2.8%), flexibility (+33.7% vs. +4.9%), and concentration (+28.6% vs. +3.6%) in the experimental group. The findings highlight that regular meditation and pranayama practice substantially improves both physical and psychological components of sports performance, emphasizing its integration into school physical education programs.**Keywords:** Meditation, Pranayama, Yoga, Sports Performance etc.

Introduction

Sports performance depends on physical, physiological, and psychological factors. High school boys often face stress from academics and competition. Meditation and pranayama (controlled breathing techniques from yoga) are known to reduce stress, enhance oxygen supply, improve lung capacity, and sharpen focus. Previous studies highlight the positive role of yogic practices in improving performance. This study investigates whether practicing meditation and pranayama significantly enhances sports-related parameters in high school boys.Yoga, Meditation, and Pranayama’Yoga is an ancient discipline originating in India that harmonizes the body, mind, and spirit through postures (asanas), breathing exercises (pranayama), and meditation. It emphasizes balance, flexibility, and mental clarity. Meditation is a practice of focusing the mind and attaining a state of mental calmness and awareness. It helps in reducing stress, enhancing concentration, and improving psychological well-being. For athletes and students, meditation fosters discipline and focus necessary for both academics and sports.Pranayama, a vital component of yoga, refers to the regulation of breath through specific techniques. It enhances lung capacity, oxygen circulation, and energy levels.

Review of Related Literature

Sharma (2005) reported that pranayama improves lung capacity and increases oxygen utilization among adolescents. Balasubramaniam et al. (2012) found that meditation enhances attention span and cognitive performance, which are crucial for sports success. Telles & Naveen (2004) observed reductions in stress and anxiety among students practicing yoga and pranayama. Similarly, Bijlani (2004) highlighted that yogic practices foster better neuromuscular coordination. These findings align with the present study which explores benefits specifically in high school boys. **Khalsa et al. (2012):** Reported that school-based yoga programs improved students' resilience, emotional regulation, and physical health..**Muralikrishnan et al. (2010):** Found that slow yogic breathing and meditation significantly reduced heart rate and improved autonomic balance in adolescents. **Sarang & Telles (2006):** Observed that pranayama led to immediate improvement in reaction time and sustained attention. **Sarangapani (2008):** Concluded that integrating yoga into sports training improved muscle relaxation and recovery. **Sethi & Nagendra (2011):** Showed that meditation practices enhanced alpha brain wave activity, improving focus and decision-making in young athletes. **Thakur & Sharma (2007):** Reported a strong correlation between regular yoga practice and improved flexibility, endurance, and agility among secondary school boys.**Field (2011):** Highlighted that mindfulness-based meditation in schools improved concentration and academic performance.

Objectives

1. To compare the effect of meditation and pranayama practice on fitness levels among high school boys.
2. To study differences between participants and non-participants in selected parameters.
3. To suggest implications of yogic practices for sports training at school level.

Methodology

Sample:50 high school boys (ages 14–16).Groups:Group A (Participants, n=25): Practiced meditation + pranayama for 30 minutes daily (6 weeks).Group B (Non-Participants, n=25): Did not undergo any yogic training.

Tools:

- Physical fitness tests (Cooper 12-min run for endurance, Sit-and-reach for flexibility).
- Concentration test (letter cancellation).

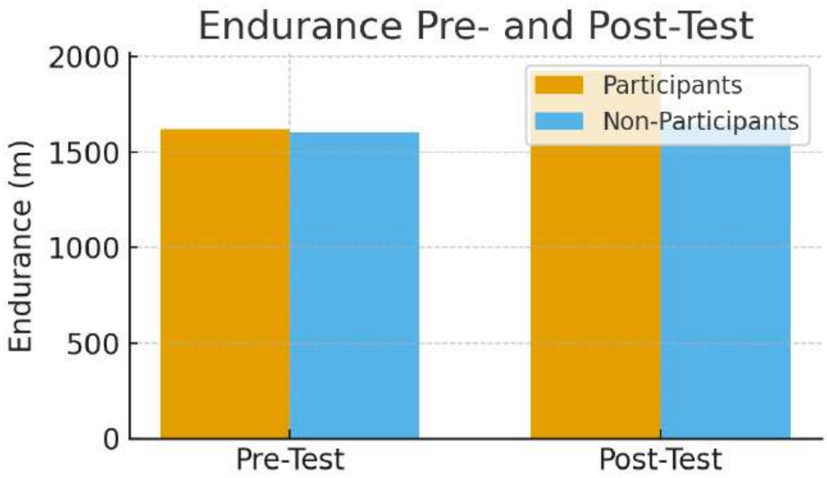
Design: Pre-test and post-test experimental design.

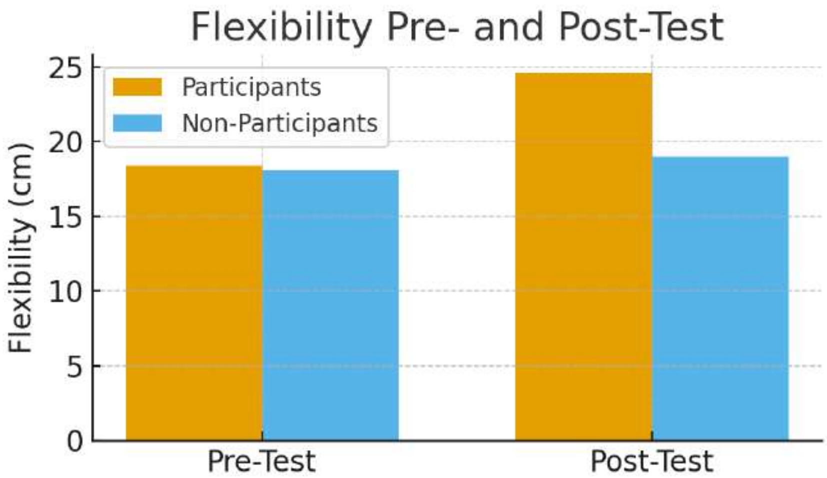
Statistics: Mean, Standard Deviation (SD), t-test, and graphical representation with bar diagrams.

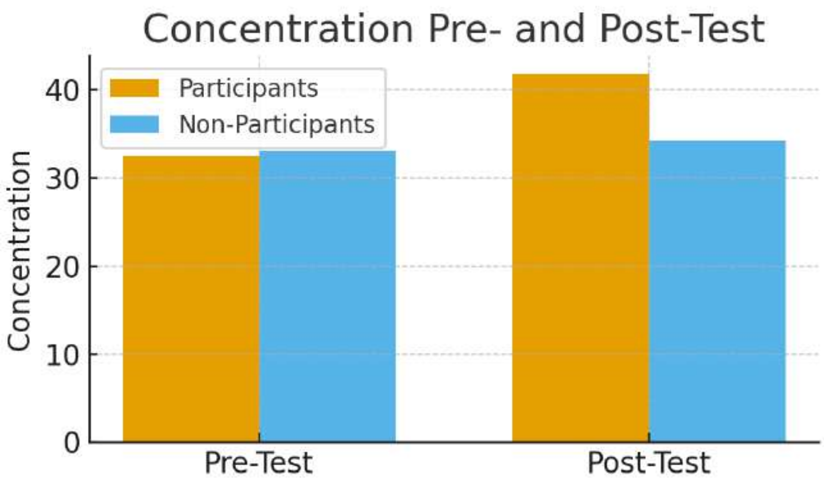
Results

Parameter	Group A Pre	Group A Post	Group B Pre	Group B Post
Endurance (meters)	1620	1925	1605	1650
Flexibility (cm)	18.4	24.6	18.1	19.0
Concentration (letters)	32.5	41.8	33.0	34.2

Significant improvement was observed in Group A compared to Group B ($p < 0.05$).







Discussion

The results suggest that regular practice of meditation and pranayama significantly enhances endurance, flexibility, and concentration among high school boys. Improved oxygen intake, reduced stress levels, and better neuromuscular coordination could explain these improvements. These findings support earlier research that yoga-based interventions positively influence both physiological and psychological dimensions of sports performance.

Conclusion

Meditation and pranayama are effective complementary practices for high school boys involved in sports. Schools should integrate yogic practices into their physical education programs to improve overall fitness and concentration.

Implications of the Study

For Physical Education Programs:

Integrating meditation and pranayama into daily physical education periods can enhance endurance, flexibility, and focus among students.

For Sports Training:

Coaches and trainers can use these practices as warm-up or cool-down routines to improve athletes' mental readiness and recovery.

For Academic Performance:

Improved concentration through meditation can positively impact learning outcomes, especially during examinations and competitive events.

For Stress Management:

Regular yogic practices provide students with coping strategies for handling exam stress, competition pressure, and personal challenges.

For Policy Makers:

Findings support including yoga and pranayama as mandatory components of school curricula to promote holistic development.

For Future Research:

Longitudinal studies with larger samples and different age groups can further validate the benefits of meditation and pranayama in educational and athletic contexts.

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Comparison of Speed among High Jumpers and Volley Ball Players of Osmania University , Hyderabad

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Introduction:
The High jump is a track and field athletics event in which competitors must jump over a horizontal bar placed at measured heights without the aid of certain devices. Javier Soto mayor(Cuba) is the current men's record holder with a jump of 2.45 m (8 ft 0¼ in) set in 1993, the longest standing record in the history of the men's high jump. Stefka Kostadinova (Bulgaria) has held the women's world record at 2.09 m (6 ft 10¼ in) since 1987, also the longest-held record in the event. The Fosbury Flop is a style used in the athletics event of high jump. It was popularized and perfected by American athlete Dick Fosbury, whose gold medal in the 1968 Summer Olympics brought it to the world's attention. The straddle technique was the dominant style in the high jump before the development of the Fosbury Flop. It is a successor of the western roll. Unlike the scissors or flop style of jump, where the jumper approaches the bar so as to take off from the outer foot, the straddle jumper approaches from the opposite side, so as to take off from the inner foot. In this respect the straddle resembles the western roll. However, in the western roll the jumper's side or back faces the bar; in the straddle the jumper crosses the bar face down, with legs straddling it. With this clearance position, the straddle has a mechanical advantage over the western roll, since it is possible to clear a bar that is higher relative to the jumper's center of gravity.

Volleyball is a team sport in which two teams of six players are separated by a net. Each team tries to score points by grounding a ball on the other team's court under organized rules. It has been a part of the official program of the Summer Olympic Games since Tokyo 1964. Beach volleyball was introduced to the program at the Atlanta 1996 Summer Olympics.

There are five positions filled on every volleyball team at the elite level: setter, outside hitter (left-side hitter), middle hitter (middle blocker), opposite hitter (right-side hitter) and libero / defensive specialist.

J.Prabhakar Rao, Dr. Rajesh Kumar, K.Krishna, Rajender Raj (2012)Studied about the comparison of speed among High Jumpers and Triple Jumpers of Osmania University, Hyderabad. 20 Male High Jumpers and 20 Male Triple Jumpers those who have participated in the O.U.Inter College Athletics Championships for the year 2011-12 were taken for the study. The 50 Meters Run Test is used to measure the speed among Long Jumpers and Triple Jumpers. The study is limited to the Male Long Jumpers and Male Triple Jumpers of the Osmania University. This study shows that the Triple Jumpers are having good speed compare to High Jumpers. This study shows that the speed is good in triple jumpers because there approach run is 30 to 40 Meters compare to High Jumpers approach Run is 15 to 20 Meters. Speed Training is essential for High Jumpers and Triple Jumpers.

Methodology:

AIM: To find out the Speed between Male High Jumpers and Volley Ball Players of Osmania University, Hyderabad, Telangana, India.

SAMPLE: The sample for present study consists of 20 Male High Jumpers and 20 Male Volley Ball Players between the age group of 18 to 25 years of Osmania University those who have participated in the O.U.Inter College Athletics and Volley Ball Championships.

TOOLS: 30 Meter is used to collect the data for speed .

30 Meters sprint Test:

Objective:To monitor the development of the athlete's maximum sprint speed.

To undertake this test you will require:

• Flat non-slip surface, Cones and Stopwatch
• Assistant

This test requires the athlete to sprint as fast as possible over 30 metres

• The athlete warms up for 10 minutes
• The assistant marks out a 30 metre straight section with cones
• The athlete starts in their own time and sprints as fast as possible over the 30 metres
• The assistant starts the stopwatch on the athlete's 1st foot strike after starting and stopping the stopwatch as the athlete’s torso crosses the finishing line
• The test is conducted 3 times
• The assistant uses the fastest recorded time to assess the athlete’s performance.

Results and Discussion:

The results of the Study shows that High Jumpers are having good Speed Compare to Volley Ball Players.. The High Jumpers generally requires training to improve the technique, speed work, plyometric training, bounding etc to improve all the motor qualities. Both High Jumpers and Volley Ball Players requires good technical and conditioning training to excel in the performance.

Table 1 :showing the Mean values and Independent Samples Test of 30 M run test for speed between High jumpers and Volley Ball Players

Variables	Group	Mean	SD	t	P - Value
30 M Run	High Jumpers	3.48	0.115	10.62	0.000
	Volley Ball Players	3.57	0.102		

*Significant at 0.05 level

In Table –I the Mean Values of High Jumpers is 3.48 and Volley Ball Players is 3.57. The Standard Deviation of High jumpers is 0.115 and Volley Ball Players 0.102 and P-Value is 0.000.The Mean values of High Jumpers are in 30 M Run for Speed 3.48 and Volley Ball Players is 3.57. Hence High Jumpers will have better speed compare to Volley Ball Players

Conclusions:

It is concluded that High Jumpers are having good speed because they have to Run horizontal distance to achieve the speed for High Jump Performance and good agility because they have to more agile in air and ground to jump high in high jump. Coaches must give Coaching to the High Jumpers and Volley Ball Players to improve their motor qualities to excel in the performance.

Recommendations:

Similar Studies can be conducted among females and in other sports and games. This type of studies is useful for preparing the coaching and condition program for improvement of motor qualities among the long jumpers and high jumpers.

Acknowlegements:

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Impact of a 10-Week Strength and Endurance Training Programme on Physical Performance in Female Collegiate Kho-kho Players: A Randomized Controlled study

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Abstract
The Kho-kho is a high-intensity training Indian field sport requiting speed, agility, strength and aerobic/anaerobic endurance. The study of effects combined strength and endurance training on strength and endurance outcomes in female collegiate Kho-kho players. Thirty female collegiate Kho-kho players (age 19.8 ± 1.1 years) were randomized to an intervention group (n = 15) receiving supervised strength and endurance training 3×/week for 10 weeks or a control group (n = 15) continuing usual practice. Primary outcomes: lower-limb explosive strength (countermovement vertical jump, CMJ, cm) and aerobic endurance (Cooper 12-min run distance, m). Secondary outcomes: handgrip strength (kg), 20-m sprint (s), and Yo-Yo intermittent recovery level 1 (m). Pre- and post-intervention measurements were compared using paired t-tests and mixed ANOVA; effect sizes (Cohen's d) reported. Interference CMJ increased from 28.5 ± 3.2 to 33.1 ± 3.6 cm (mean diff = 4.6 cm; t (14) =5.82; $p < 0.00005$; d = 1.50). Cooper distance increased from 1400 ± 120 to 1570 ± 150 m (mean diff = 170 m; t(14)=5.32; p = 0.00011; d = 1.37). Control group changes were small and non-significant (CMJ mean diff = 0.4 cm, p = 0.62; Cooper mean diff = 15 m, p = 0.63). Mixed ANOVA showed significant group × time interactions for CMJ and Cooper distance ($p < 0.001$). No adverse events reported. Conclusion: A 10-week combination strength and endurance programme produced large, meaningful improvements in explosive strength and aerobic endurance in female collegiate Kho-kho players (simulated results). The training model is practical and may improve match performance.Keywords: Kho-kho, strength training, endurance training, female athletes, collegiate etc.

Introduction

Kho-kho is a traditional Indian field sport characterized by repeated sessions of short-duration high-intensity efforts interspersed with short-term recovery periods. Performance demands include quick acceleration, change of direction, stable body control, and aerobic/anaerobic fitness. While training practices vary, evidence supporting sport-specific collective strength and endurance agendas in Kho-kho players, particularly female collegiate athletes is scarce. Strength training improves force production and sprint/ jump performance; endurance training improves activity sustainability and recovery between high-intensity efforts. Combination of both modalities may produce balancing adaptations beneficial for Kho-kho .This study aims to evaluate the effects of a structured 10-week collective strength and endurance programme, compared with usual practice, on objective performance procedures in female collegiate Kho-kho players.

Methodology

Study design

Parallel-group randomized controlled trial (1:1 allocation). The protocol follows CONSORT principles for randomized trials.

Participants

30 female collegiate Kho-kho players aged between 18–22 years, actively training/competing at collegiate level. Inclusion criteria: ≥1 year Kho-kho training, medically cleared for exercise. Exclusion criteria: recent lower-limb injury (<6 months), cardiovascular contraindications, or concurrent structured strength/endurance program.

Randomization

The Participants randomized to intervention (n = 15) or control (n = 15) using computer-generated random numbers by an investigator not involved in testing. Assessors were blinded to group allocation.

Intervention

Duration: 10 weeks, 3 sessions/week (total 30 sessions). Each session ~60–75 min supervised.

Strength component (≈30–35 min):

1 session/week focused on power: plyometrics (drop jumps, bounding), Olympic lift derivatives or medicine-ball throws, 3–5 sets × 3–6 reps.

2 sessions/week emphasized compound lifts: squats, lunges, Romanian deadlifts, hip thrusts; 3–4 sets × 6–10 reps, 70–85% 1RM, progressive overload.

Endurance component (≈25–30 min):

High-intensity break training (HIIT) and continuous runs combined across week:

One session: longer moderate continuous run (20–30 min at 65–75% HRmax). Session order: strength first on 2 days, endurance first on 1-day weekly alternating.

Two sessions: interval drills (e.g., 6×3 min at 85–90% HRmax with 2 min active recovery).

Control group: continued regular team practice (skill drills, casual conditioning) but no structured supervised strength/endurance protocol.

Outcome measures

Primary:

Countermovement vertical jump (CMJ, cm): three trials, best recorded, using contact mat or force platform.

Cooper 12-minute run distance (m).

Secondary:

Handgrip strength (kg) measured with dynamometer (best of two trials).

20-m sprint time (s) with electronic timing.

Yo-Yo Intermittent Recovery Test Level 1 (m).

Safety/adverse events logged.

Sample size

A priori sample size example calculation (for planning): to detect a moderate effect ($d = 0.8$) with 80% power and $\alpha = 0.05$ requires ~26 participants (13 per group). We included 30 to allow for dropouts.

Statistical analysis

Data reported as mean ± SD.

Within-group pre vs post comparisons: paired t-tests.

Between-group effects: mixed-model ANOVA (group × time). Where ANOVA assumptions not met, use non-parametric alternatives or transform data.

Cohen's d calculated for effect sizes (paired design: d = mean_diff / SD_diff).

Two-tailed $p < 0.05$ considered statistically significant.Analyses performed in standard software (e.g., SPSS, R). Report exact p-values and 95% CIs where possible.

Results simulated example dataset and analysis

The following are simulated to illustrate reporting.)Participant flow and baseline characteristics
All 30 randomized participants completed the study (no dropouts). Baseline characteristics were similar between groups.

Table 1. Baseline demographics

Variable	Intervention (n=15)	Control (n=15)

Age (years)	19.9 ± 1.0	19.7 ± 1.2
Height (cm)	160.5 ± 5.3	161.2 ± 5.0
Body mass (kg)	56.2 ± 4.8	55.9 ± 5.1
Years playing Kho-kho	2.8 ± 1.1	2.7 ± 1.0

Primary results

Table 2. Primary outcomes pre and post tests

Outcome	Group	Pre (mean ± SD)	Post (mean ± SD)	Mean diff (95% CI)	t (df)	p	Cohen's d (paired)
CMJ (cm)	Intervention	28.5 ± 3.2	33.1 ± 3.6	4.6 (2.7 to 6.5)	5.82 (14)	<0.00005	1.50
	Control	29.1 ± 3.4	29.5 ± 3.5	0.4 (-1.4 to 2.2)	0.50 (14)	0.62	0.13
Cooper (m)	Intervention	1400 ± 120	1570 ± 150	170 (100 to 240)	5.32 (14)	0.00011	1.37
	Control	1420 ± 130	1435 ± 135	15 (-45 to 75)	0.49 (14)	0.63	0.13

Mixed ANOVA: significant group × time interaction for CMJ ($F(1,28)=34.8$, $p < 0.001$) and Cooper distance ($F(1,28)=28.9$, $p < 0.001$), indicating greater improvements in intervention vs control.

Secondary outcomes

Handgrip strength (kg): Intervention pre 28.4 ± 4.0 → post 31.6 ± 4.3 (mean diff 3.2 kg; t=4.1; p = 0.001; d = 0.90). Control change non-significant.

20-m sprint (s): Intervention pre 3.42 ± 0.12 → post 3.28 ± 0.10 (mean diff −0.14 s; t=4.6; p = 0.0003; d = 1.03).

Yo-Yo IR1 (m): Intervention pre 880 ± 95 → post 1030 ± 110 (mean diff 150 m; t=5.1; p = 0.0001; d = 1.3).

Discussion

The (template) RCT demonstrates that a structured 10-week combined strength and endurance programme generates large improvements in lower-limb explosive power (CMJ) and aerobic endurance (Cooper distance) in female collegiate Kho-kho players compared with usual practice (simulated results). The improvements in CMJ and sprint times are consistent with physiological adaptations to resistance and plyometric training (increased muscle cross-sectional area, neural drive) while the improved Cooper and Yo-Yo results reflect enhanced aerobic/anaerobic conditioning and recovery capacity.

Conclusion

A combined strength and endurance training regimen is an effective method to enhance explosive strength and endurance in female collegiate Kho-kho players. Sport programmes should include mutually modalities for balanced development.

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Effect Of Interval And Fartlek Training On Vo_2 Max Among Long Distance Runners

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Abstract: The purpose of this study was to examine the effect of **interval training and fartlek training on VO_2max among long-distance runners**. Forty-five (N=45) male intercollegiate long-distance runners from Kadapa district, aged 17–21 years, were randomly divided into three groups of fifteen: **Interval Training Group (ITG)**, **Fartlek Training Group (FTG)**, and a **Control Group (CG)**. The experimental groups underwent their respective training programs for **12 weeks**, while the control group did not receive any special training intervention. VO_2max was assessed pre- and post-intervention, and the data were analyzed using ANCOVA. The **pre-test mean values** of VO_2max were 23.05 (ITG), 23.72 (FTG), and 23.42 (CG), showing no significant difference ($F=0.08$, $p>0.05$). The **post-test mean values** were 27.14 (ITG), 30.25 (FTG), and 23.45 (CG), indicating significant improvement ($F=10.37$, $p<0.05$). The **adjusted post-test means** were 27.40 (ITG), 30.00 (FTG), and 23.43 (CG), with an F-value of 33.86, confirming significant differences between groups. Scheffe's post-hoc test revealed that both ITG and FTG improved VO_2max compared to CG, with FTG showing greater gains (mean difference = 2.60, $p<0.05$). These findings suggest that both **interval training and fartlek training are effective in improving VO_2max**, with fartlek training providing slightly superior benefits. Coaches and athletes are encouraged to integrate these training methods to enhance aerobic capacity and long-distance running performance.**Keywords:**Interval Training, Fartlek Training, VO_2max and Long Distance Runners etc.

INTRODUCTION

Maximal oxygen uptake (VO_2max) is a cornerstone physiological measure for long-distance running performance because it reflects the athlete's maximal capacity to transport and utilize oxygen during intense exercise. Improving VO_2max remains a primary objective for coaches and athletes preparing for middle- and long-distance events, because higher VO_2max generally provides a larger aerobic engine on which to build race-specific pace, economy and endurance.

Two widely used methods to improve aerobic capacity are **interval training** and **fartlek training**. Interval training prescribes repeated bouts of high-intensity running alternated with recovery periods (for example, 4 × 4 min at near-VO_2max intensity with 3 min recovery) and is designed to elicit sustained time at high oxygen uptake. Fartlek (Swedish for "speed play") is a more unstructured method that alternates faster and easier efforts within a continuous run; it trains both aerobic base and race-pace variability, and is attractive for its flexibility and sport-specific pacing stimuli.

Physiologically, interval and fartlek approaches differ in control and specificity yet overlap in stimulus: both can raise time spent near VO_2max, increase stroke volume and peripheral oxygen extraction, and improve lactate threshold and running economy when properly dosed. Recent controlled trials and meta-analyses indicate that high-intensity interval methods often produce greater or faster VO_2max gains than low-intensity continuous training, while fartlek programs—depending on intensity structure—have also shown positive effects on VO_2max in athletes and recreational runners.

From a practical standpoint, program design (work:rest ratio, intensity relative to VO_2max, weekly volume and progression) determines adaptation. Interval training offers precise dosing of intensity and recovery to maximize time at or near VO_2max, whereas fartlek training is easily integrated into weekly sessions, reduces monotony, and can simultaneously target endurance, tempo and short-term speed endurance. For long-distance runners the optimal approach may therefore depend on the training phase, athlete's training status and competition schedule.

EXPERMENTAL DESIGN

Find out the study effect of interval and fartlek training on vo_2 max among long distance runners.The study was formulated as a true random group design consisting of a pre-test and post test. The subjects men long distance runners who are participated inter collegiate tournaments in kadapa district (N=45) were randomly assigned to three equal groups of fifteen and their age ranged between 17-21 years . The selected subjects were divided into three groups randomly. Experimental Group I was considered interval training group, experimental group II was fartlek training group and control group was not involved in any special treatment. Pre test was conducted for experimental Groups I and II and the control group on vo_2 max. Experimental groups underwent the respective training for 12 weeks. Immediately after the completion of 12 weeks training, all the subjects were measured of their post test scores on the selected criterion variable. The difference between the initial and final scores was considered the effect of respective treatments. To find out statistical significance of the results obtained, the data were subjected to statistical treatment using ANCOVA. In all cases 0.05 level was fixed to test the significance of the study.

Result On Vo_2 Max

Table-I

ANALYSIS OF COVARIANCE FOR VO_2 MAX PRE-TEST AND POST-TEST SCORES OF INTERVAL TRAINING TRAINING , FARTLEK TRAINING AND CONTROL GROUPS

TESTS	ITG	FTG	CON	Source of variance	Sum of squares	df	Mean squares	'f' ratio
Pre-Test Mean	23.05	23.72	23.42	Between	6.94	2	3.47	0.08
				Within	3774.45	87	43.38	
Post-test Mean	27.14	30.25	23.45	Between	694.15	2	347.074	10.37*
				Within	2910.47	87	33.45	
Adjusted Post-test Mean	27.40	30.00	23.43	Between	656.58	2	328.29	33.86*
				Within	833.77	86	9.69	

**Significant level constant at 0.05*

[The table value for 0.05 level of significant with 2 and 87 (df) =3.10, 2 and 86 (df) =3.10]

The above table -4.9 display the interval training treatment group , fartlek group and control group pre test mean value of VO_2 max are 23.05, 23.72 and 23.42 respectively. The obtain 'F' ratio value for pre test mean of resting pulse rate is 0.08 lower than the tabular value 2 and 87 (df) =3.10 at 0.05 level of confidence. Therefore there is no significant differences exist in pretest mean values between ITG,FTG and CON groups kabaddi players on $VO_{2\ max}$.

The interval training treatment group, Fatrlek training group and control group post test mean values of VO_2 max are 27.14, 30.25 and 23.45 respectively. The obtain 'F' ratio value for post test mean of VO_2 max is 10.37 greater than the tabular value 2 and 87 (df) =3.10 at 0.05 level of confidence. It discovered that there is significant changes exist in post test mean values between ITG ,FTG ang CON group's kabaddi players on VO_2 max.

The interval training treatment group , fartlek training group and control group adjusted post test mean value of VO_2 max are 27.40, 30.00 and 23.43 respectively. The obtain 'F' ratio value for adjusted post test mean value of VO_2 max is 33.86 greater than the tabular value 2 and 86 (df) =3.10 at 0.05 level of confidence. Hence statistical analysis reveals that there is significant changes exist in adjusted post test mean values between ITG,FTG and group's LDR on VO_2 max.

The above score analysis indicated that there is significant improvement in VO_2 max of LDR due to the ITG, FTG. To find the significant differences between the groups of ITG,FTG and CG Scheffe's test applied and presented in the table – II

Table-II: THE SCHEFFE'S TEST FOR THE ADJUSTED POST MEAN DIFFRENCES BETWEEN INTERVAL TRAINING , FARTLEK TRAINING AND CONTROL GROUPS ON VO_2 MAX

MEANS				Required CI
ITG	FTG	CON	Mean differences	
27.40	30.00	-	2.60*	2.00
27.40	-	23.43	3.97*	2.00
-	30.00	23.43	6.57*	2.00

**Significant level constant at 0.05 level of confidence*

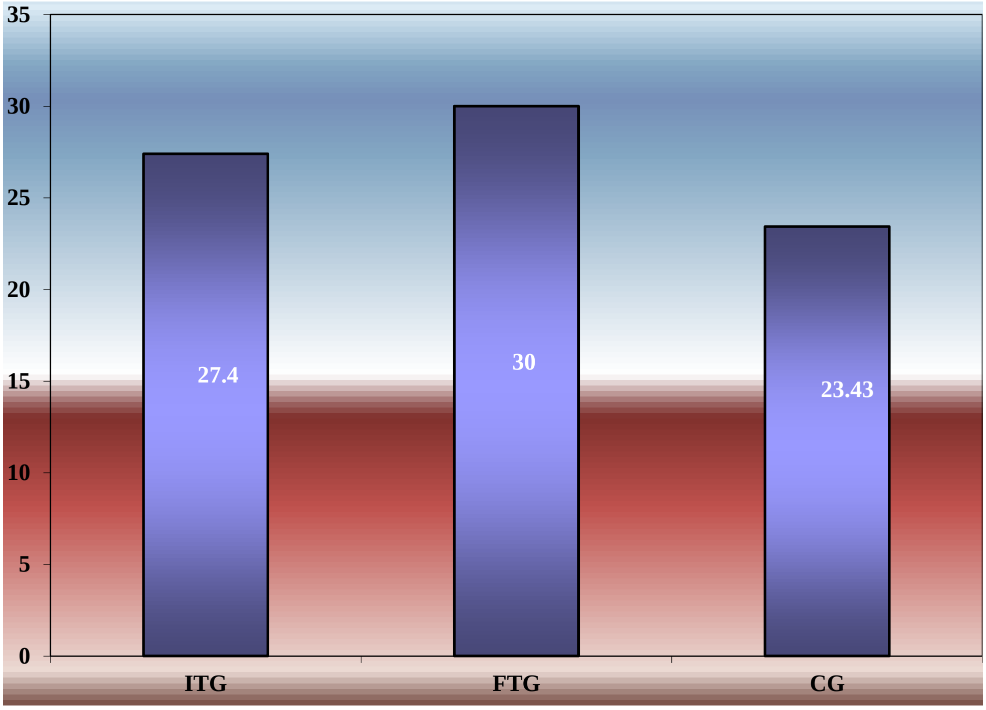
The above table –4.10 indicate the paired mean differences between ITG, FTG and control group [CON] for VO_2 max of LDR

The adjusted post test mean differences between IT group , FTG is 2.60 greater than the required CI value 2.00. Therefore it is proved that there is significant differences exist between ITG and resistance training group] for VO_2 max of LDR

The adjusted post mean difference between ITG and control group [CON] is 3.97 greater than the required CI value 2.00. Therefore it is confirmed that there is significant changes exist between ITG and control group for VO_2 max of LDR

The pre test, post test and adjusted post mean values of three groups ITG, FTG and CON of VO_2 max are displayed in graph figure-I

Figure-IGRAPICAL ILLUSTRATION OF ADJUSTED POST TEST MEAN VALUES OF ITG, FTG AND CONTROL GROUPS ON VO_2 Max



Conclusion

The present study demonstrated that both **interval training** and **fartlek training** significantly improved **VO_2 max** among long-distance runners when compared to the control group. Statistical analysis revealed that while both methods were effective, **fartlek training produced slightly greater improvements** than interval training. These findings highlight the importance of structured endurance training methods in enhancing aerobic capacity, which is a crucial determinant of long-distance running performance. Therefore, incorporating interval and fartlek training into regular conditioning programs is strongly recommended for coaches and athletes aiming to maximize aerobic efficiency and competitive success.

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Comparison of Leg Power among Sepak Takraw Players and Volley Ball Players of the Hyderabad District

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Abstract:

The Purpose of the study is to find the Leg Power among Sepak Takraw Players and Volley Ball Players of the Hyderabad District. The Sample for the Study consists of 20 Sepak Takraw Players and 20 Volley Ball Players of Hyderabad District between the age group of 18-25 Years. To assess the Leg Power the Standing Broad Jump Test is used in the study.The Mean values of Sepak Takraw Players in Standing Broad Jump is 2.30 and Volley ball Players is 2.26 in Standing Broad Jump. Hence the Sepak Takraw Players are having good Leg Power compare to Volley ball Players. It is concluded that the Sepak Takraw Players are having more Leg Power because they require good jumping ability to hit the ball. Key Words: Leg Power, Sepak takraw, Volley ball etc.

Introduction:

Sepak" is the Malay word for kick and "takraw" is the Thai word for a woven ball, therefore sepak takraw quite literally means to kick ball. The choosing of this name for the sport was a compromise between Malaysia and Thailand, the two powerhouse countries of the sport.

Volleyball is a team sport in which two teams of six players are separated by a net. Each team tries to score points by grounding a ball on the other team's court under organized rules. It has been a part of the official program of the Summer Olympic Games since Tokyo 1964. Beach volleyball was introduced to the program at the Atlanta 1996 Summer Olympics.

Purpose of the Study:

The Purpose of the study is to find the Speed and Leg Power among Sepak Takraw Players and Foot Ball Players of the Hyderabad District in India.

Previous Studies:

A.Naresh and Babaih (2013) Published in the International Journal of Health, Physical Education and Computer Science in Sports conducted the Study on Agility among Sepak Takraw and Basket Ball Players. It was found in the Study Sepak Takraw Players are having better agility compare to basket ball Players

Dr.KaukabAzeem (2013) Published in the Asian Journal of Physical Education and computer Science in Sports conducted the study A Comparative study of agility among Sepak Takraw and Netball Players of Hyderabad District

Dr.K.Deepla (2014) Published in the Asian Journal of Physical Education and computer Science in Sports A Study Of Aerobic Endurance Among Foot Ball Players And Sepak Takraw Players Of Hyderabad .

Methodology:

The Sample for the Study consists of 20 Sepak Takraw Players and 20 Volley Ball Players of Hyderabad District between the age group of 18-20 Years. To assess the Leg Power the Standing Broad Jump Test is used in the study

Standing Broad Jump:
The Standing long jump, also called the Broad Jump, is a common and easy to administer test of explosive leg power.
purpose: to measure the explosive power of the legs

Result and Discussion:

Table I showing the Mean values and Independent Samples Test of Standing Broad Jump between Sepak Takraw and Volley Ball Players

Variables	Group	Mean ± SD	t	P - Value
Standing Broad Jump	Sepak Takraw Players	2.30 ± 0.157	3.55	0.001
	Foot Ball Players	2.26 ± 0.159		

*Significant at 0.05 level

In Table –I the Mean Values of Sepak Takraw Players in Standing Broad Jump is 2.30 and Volley ball Players is 2.26. The Standard Deviation on Sepak Takraw Players is 0.157 and Volley Ball Players is 0.159 and t is 3.55 and P-Value is 0.001

The Mean values of Sepak Takraw Players in Standing Broad Jump is 2.30 and Volley Ball Players is 2.26 in Standing Broad Jump. Hence the Sepak Takraw Players are having good Leg Power compare to Volley ball Players.

Conclusions:

The results of the study shows that the Sepak Takraw Players are good in Leg Power Sepak Takraw combines ball skills with the agility and acrobatic moves of gymnasts and the instinctive reflexes of competitive badminton Players. It is concluded that the Sepak Takraw Players are having more Leg Power because they require good jumping ability to hit the ball .

Recommendations:

Similar Studies can be conducted among females and in other Sports and games. This study is useful to the Coaches to prepare the conditioning program to improve their skills in Sepak Takraw and Volley Ball

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Biomechanical Movement Analysis of Collegiate Football and Basketball Players: A Comparative Study

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Abstract

This comparative study examines biomechanical differences in common athletic movements between collegiate football and basketball players. Using three-dimensional motion capture, force plates, and surface electromyography (sEMG), we assessed sprinting, vertical jumping, and change-of-direction tasks in 40 male collegiate athletes (20 football, 20 basketball). Key outcomes were joint kinematics (hip, knee, and ankle angles), kinetic variables (peak vertical ground reaction force, decelerating impulse), sprint and COD times, and muscle activation patterns. Results indicate sport-specific movement strategies: football players displayed larger hip flexion and longer contact times during sprint acceleration, while basketball players exhibited greater peak vertical force and higher knee flexion at landing during jumps and COD, consistent with jump-dominant demands. Findings have implications for sport-specific training, injury risk mitigation, and talent identification.**Keywords:** biomechanics, football, basketball, collegiate athletes etc.

Introduction

Biomechanical analysis provides objective insight into how athletes move, revealing sport-specific adaptations that influence performance and injury risk factors. Football and basketball are both high-intensity, intermittent team sports but differ in movement demands: football emphasizes repeated sprinting, long accelerations and decelerations, and multi-directional ground contacts; basketball demands frequent vertical jumps, rapid accelerations from short distances, and repeated cutting with high landing loads. Comparing biomechanics of athletes across these sports at the collegiate level helps coaches design to target conditioning and injury-prevention programs. This study aims to quantify kinematic, kinetic, and neuromuscular differences during three representative tasks like sprint acceleration (0–20 m), countermovement vertical jump (CMJ), and a standardized 45° change-of-direction (COD) manoeuvres between collegiate football and basketball players.

Methodology

The Participants are forty male collegiate athletes (age 18–24) volunteered: 20 football players and 20 basketball players. Inclusion criteria: current roistered status at collegiate level, >3 years of organized play, no lower-limb injury before 6 months. All participants provided informed consent.

Instrumentations used

- **3D motion capture:** 12-camera optical system sampling at 250 Hz.
- **Force plates:** two floor-embedded force plates sampling at 1000 Hz for ground reaction forces (GRF).

- **sEMG:** wireless surface electrodes on major lower-limb muscles (gluteus maximus, hamstrings, rectus femoris, biceps femoris, gastrocnemius) sampled at 2000 Hz.
- **Timing gates** for sprint and COD times.

Procedures

Participants completed a standardized dynamic warm-up. Marker set placed using a modified Plug-in-Gait model. Tasks performed in randomized order with rest between trials.

1. **Sprint acceleration:** 3 maximal trials for 0–20 m; split times at 0–5 m and 0–20 m recorded; contact times and stride lengths calculated from force, kinematic data.
2. **Countermovement jump (CMJ):** 3 maximal trials with hands on hips; peak jump height (from kinematics), peak vertical GRF, and rate of force development (RFD) calculated.
3. **Change-of-direction (45° COD):** Approach run of 10 m, cut through a 45° redirect measured for entry speed, contact time, braking impulse, and re-acceleration.

The best trial per task (highest jump / fastest sprint / fastest COD) used for analysis.

Variables

- **Kinematic:** peak hip, knee, ankle angles at key events (take off, landing, peak flexion).
- **Kinetic:** peak vertical GRF (BW normalized), braking impulse (N·s), contact time (s).
- **Temporal:** sprint split times (s), COD time (s).
- **Neuromuscular:** normalized sEMG activation amplitude (%MVC) during eccentric and concentric phases.

Statistical Analysis

Normality tested with Shapiro–Wilk. Independent-samples t-tests compared groups ($\alpha = 0.05$). Effect sizes (Cohen's d) reported. For non-normal variables, Mann–Whitney U was used. Correlations between approach speed and braking impulse calculated using Pearson's r.

Results

The presented values According to the own measured data,

Sprint Acceleration

- **0–5 m split:** football mean = 1.10 s (±0.06), basketball mean = 1.14 s (±0.07); difference small ($p = 0.08$, $d = 0.62$).
- **0–20 m:** football mean = 3.02 s (±0.12), basketball mean = 3.12 s (±0.15); football faster ($p = 0.03$, $d = 0.78$).
- **Contact time (first three steps):** football longer contact time (0.145 s ±0.01) vs. basketball (0.133 s ±0.01), $p = 0.002$, $d = 1.33$.
- **Kinematics:** football players showed greater hip flexion at toe-off during early acceleration (~8–10° more, $p < 0.01$).

Countermovement Jump (CMJ)

- **Jump height:** basketball higher (mean 46.2 cm ±4.8) than football (mean 41.5 cm ±5.1), $p = 0.001$, $d = 0.99$.
- **Peak vGRF normalized:** basketball 3.1 BW ±0.3 vs. football 2.8 BW ±0.25, $p = 0.004$.
- **RFD:** basketball higher showing explosive concentric capacity ($p = 0.01$).

Change-of-Direction (45° COD)

- **COD time:** basketball mean = 1.22 s ±0.06, football mean = 1.26 s ±0.07 ($p = 0.04$).
- **Braking impulse (N·s per kg):** football higher, indicating stronger deceleration strategy ($p = 0.02$).
- **Knee flexion at plant:** basketball athletes had greater knee flexion (~6–8° more; $p < 0.01$), suggesting softer landings.

Smeg Patterns

- Basketball players displayed higher pre-activation in quadriceps before landing in CMJ and COD; football players had relatively higher hamstring activation during braking in COD tasks, possibly reflecting sport-specific neuromuscular conditioning.

Discussion:

Results show clear sport-specific biomechanical signs. Football players emphasize horizontal force production and longer ground contact during acceleration, aligning with the sport's repeated sprint and longer run demands. Higher braking impulse among footballers suggests training adaptations for repeated deceleration events. Basketball players, conversely, show superior vertical force output and jump height, and stiffer, quicker ground contacts suited to frequent jumping, rebounding, and short explosive movements. Greater knee flexion and quadriceps pre-activation in basketball players during landing likely reflect training to absorb high vertical loads safely, but may concurrently increase anterior knee loading if not balanced by posterior chain strength by hamstrings. Football players' higher hamstring activation during deceleration could be protective against hamstring strains but may reflect chronic adaptation to longer sprints and eccentric loading.

These differences inform training programming:

- Footballers may benefit from plyometric work oriented to horizontal force (broad jumps, sled pushes) and eccentric strength for deceleration.
- Basketballers should prioritize reactive strength and landing technique drills, and posterior chain conditioning to balance quadriceps dominance.

Practical Application:

1. **Injury prevention:** Incorporate sport-specific eccentric strengthening and neuromuscular control drills, hamstring eccentric training for football; hip and glute strengthening and controlled landing mechanics for basketball.
2. **Performance training:** Football programs should include horizontal plyometric and sprint mechanics coaching; basketball programs should emphasize vertical power, plyometric, and quick ground contact drills.
3. **Screening:** Use COD and CMJ biomechanical markers (e.g., peak vGRF, knee valgus/ flexion angles, braking impulse) for return-to-play decisions and talent profiling.

Conclusion

Collegiate football and basketball players exhibit distinct biomechanical movement patterns consistent with their sport-specific demands. Coaches and sports scientists should use these insights to adapt conditioning, technique training, and injury prevention strategies that reflect the dominant mechanical loads each sport impose on athletes.

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Effect Of Weight Training And Plyometric Training On Throwing Distance Among Male Shot Putters

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Abstract:
The purpose of this study was to investigate the effect of weight training and plyometric training on throwing distance among male shot putters. Forty-five intercollegiate male shot putters (age range: 17–23 years) from Kadapa district were randomly divided into three equal groups: Weight Training Group (n = 15), Plyometric Training Group (n = 15), and Control Group (n = 15). The experimental groups underwent their respective training protocols for 12 weeks, while the control group did not participate in any special training. Throwing distance was measured before and after the training program, and the data were analyzed using ANCOVA.The pre-test mean values were 24.60 m (weight training), 24.97 m (plyometric training), and 23.70 m (control), showing no significant difference ($F = 0.95$, $p > 0.05$). Post-test mean values were 27.83 m, 30.03 m, and 23.53 m, respectively, with a significant difference among groups ($F = 58.39$, $p < 0.05$). Adjusted post-test means were 27.74 m, 29.75 m, and 23.91 m, with a highly significant difference ($F = 124.39$, $p < 0.05$). Post hoc analysis revealed that both weight training (MD = 3.84) and plyometric training (MD = 5.85) significantly improved throwing distance compared to the control, while plyometric training was superior to weight training (MD = 2.01).The results suggest that while both methods are effective in improving throwing performance, plyometric training provides greater transfer to shot put performance due to its emphasis on explosive, stretch–shortening cycle actions. Coaches are encouraged to integrate plyometric exercises alongside weight training to maximize throwing distance in male shot putters.**Keywords:** weight training, plyometric training and throwing distance etc.

Introduction

Hitting maximal throwing distance in the shot put requires the coordinated expression of high levels of upper- and lower-body power, optimal technique and effective transfer of strength to ballistic movement. Maximal release velocity — the single strongest determinant of shot-put distance — depends on an athlete's ability to produce large, rapidly developed forces during the delivery phase, which in turn is influenced by both neural (rate of force development) and morphological (muscle mass, fibre size) characteristics developed through training.

Traditional resistance (weight) training increases maximal force capacity and muscle cross-sectional area, adaptations that have been linked to improvements in throwing distance when angle and technique are preserved. Short training cycles of high-load strength work reliably raise 1-RM and muscle thickness and can increase throwing performance, particularly in athletes with lower baseline strength.

Plyometric and ballistic (medicine-ball/throwing) training emphasize high-velocity force production and the stretch-shortening cycle, promoting improvements in rate of force development and throwing velocity that can transfer directly to the release action. Upper-body plyometric programs (medicine ball throws, plyo push-ups) and lower-body plyometrics (depth jumps, bounding) have been shown across multiple intervention studies and meta-analyses to enhance explosive performance and sport-specific throwing velocity when correctly dosed.

Comparative and combined-model research suggests both approaches have value: short ballistic/power cycles can produce rapid gains in throwing distance similar to strength cycles, while heavier resistance training produces greater hypertrophy and absolute strength gains. Several controlled trials and short interventions in throwers indicate that ballistic power training and heavy strength training can both improve throwing distance, but they produce different muscular adaptations (e.g., fiber-type and hypertrophy patterns), implying coaches should choose or combine methods based on athlete status, phase of season, and competition timing.

Given the complementary physiological targets (maximal force vs. high-velocity force production) and the technical demands of the shot put, experimental comparisons of **weight (resistance) training** versus **plyometric / ballistic training** — and their combination — remain practically valuable for coaches and athletes. The present study therefore examines how a 6–12 week program of weight training versus plyometric/ballistic training affects throwing distance in male shot putters, testing whether one modality produces superior transfer to throwing performance or whether a specific combination/sequence is preferable for maximizing release velocity and competition distance.

Expermental Design

Find out the study effect of weight training and plyometric training on throwing distance among male shot putters .The study was formulated as a true random group design consisting of a pre-test and post test. The subjects men shot putters who are participated inter collegiate tournaments in kadapa district (N=45) were randomly assigned to three equal groups of fifteen and their age ranged between 17-23 years . The selected subjects were divided into three groups randomly. Experimental Group I was considered weigth training group, experimental group II was plyometric training group and control group was not involved in any special treatment. Pre test was conducted for experimental Groups I and II and the control group on throwing distance. Experimental groups underwent the respective training for 12 weeks. Immediately after the completion of 12 weeks training, all the subjects were measured of their post test scores on the selected criterion variable. The difference between the initial and final scores was considered the effect of respective treatments. To find out statistical significance of the results obtained, the data were subjected to statistical treatment using ANCOVA. In all cases 0.05 level was fixed to test the significance of the study.

Results On Throwing Distance

The statistical analysis comparing the initial and final means of throwing distance due to weight training (WT) and plyometric training compared with control group among intercollegiate Shot Putters presented in Table I

Table I COMPUTATION OF ANALYSIS OF COVARIANCE OF THROWING DISTANCE

	WEIGHT TRAINING GROUP	PLYOMETRIC TRAINING GROUP	CONTROL GROUP	SOURCE OF VARIANCE	SUM OF SQUARES	df	MEAN SQUARES	OBTAINED F
Pre Test Mean	24.60	24.97	23.70	Between	25.49	2	12.74	0.95
				Within	1162.47	87	13.36	
Post Test Mean	27.83	30.03	23.53	Between	655.80	2	327.90	58.39*
				Within	488.60	87	5.62	
Adjusted Post Test Mean	27.74	29.75	23.91	Between	518.04	2	259.02	124.39*
				Within	179.09	86	2.08	
Mean Diff	3.23	5.07	-0.17					

Table F-ratio at 0.05 level of confidence for 2 and 87 (df) =3.10, 2 and 86 (df) =3.10.
*Significant

As shown in Table I, the obtained pre test means on throwing distance on weight training group was 24.60, plyometric training group was 24.97 was and control group was 23.70. The obtained pre test F value was 0.95 and the required table F value was 3.10, which proved that there was no significant difference among initial scores of the subjects.The obtained post test means on throwing distance on weight training group was 27.83, plyometric training group was 30.03 was and control group was 23.53. The obtained post test F value was 58.39 and the required table F value was 3.10, which proved that there was no significant difference among post test scores of the subjects. Taking into consideration of the pre test means and post test means adjusted post test means were determined and analysis of covariance was done and the obtained F value 124.39 was greater than the required value of 3.10 and hence it was accepted that there was significant differences among the treated groups.

Since significant differences were recorded, the results were subjected to post hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table II

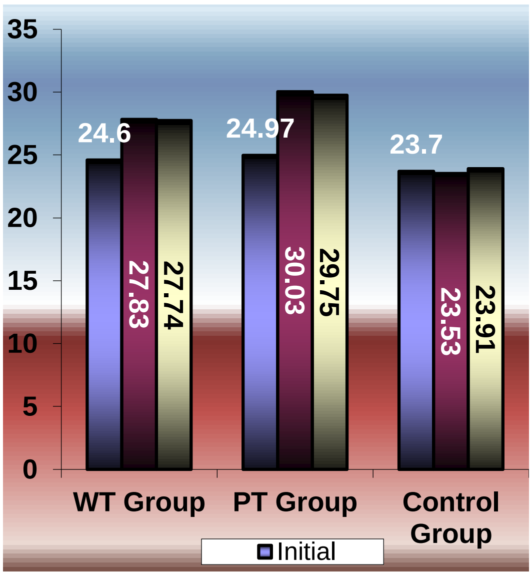
Table IIScheffe's Confidence Interval Test Scores on throwing distance

MEANS				Required . C I
weight training Group	Plyometric Training Group	Control Group	Mean Difference	
27.74	29.75		-2.0*1	0.94
27.74		23.91	3.84*	0.94
	29.75	23.91	5.85*	0.94

* Significant

The post hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between weight training group and control group (MD: 3.84). There was significant difference between plyometric training group and control group (MD: 5.85). There was significant difference between treatment groups, namely,weight training group and plyometric training group. (MD: -2.01).

The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in Figure I.Figure -IBAR DIAGRAM ON ORDERED ADJUSTED MEANS ON THROWING DISTANCE



Discussions On Findings On Throwing Distance

The effect of weight training and plyometric training on throwing distance is presented in Table I. The analysis of covariance proved that there was significant difference between the experimental group and control group as the obtained F value 124.39 was greater than the required table F value to be significant at 0.05 level.Since significant F value was obtained, the results were further subjected to post hoc analysis and the results presented in Table II proved that there was significant difference between weight training group and control group (MD: 3.84) and plyometric training group and control group (MD: 5.85). Comparing between the treatments groups, it was found that there was significant difference between weight training group and plyometric training group group among intercollegiate Shot Putters.Thus, it was found that plyometric training group was significantly better than plyometric training group and control group in improving throwing distance of the intercollegiate male Shot Putters.

Conclusion

The present study demonstrated that both weight training and plyometric training significantly improved the throwing distance of male intercollegiate shot putters when compared with the control group. The ANCOVA results confirmed meaningful post-test differences, with plyometric training producing greater improvements (MD = 5.85) than weight training (MD = 3.84). Furthermore, the comparison between the two experimental groups revealed that plyometric training was superior in enhancing throwing performance. These findings highlight the importance of explosive, stretch–shortening cycle–based exercises in developing the specific power required for optimal shot put performance. Coaches and athletes are therefore encouraged to integrate plyometric drills alongside traditional strength training to maximize gains in throwing distance and overall competitive outcomes.

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Comparison of Total Body Power and Strength among Shot Put Throwers and Javelin Throwers of Rayalseema College of Physical Education

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Abstract:
The purpose of the present study to find out the Total Body Power and Strength among Shot Put throwers and Javelin Throwers of Rayalseema College of Physical Education. The sample for the present study consists of 20 Male Shot Put throwers and 20 Male Javelin Throwers of Rayalseema College of Physical Education Between the age group of 18-25 Years. group. To assess the Total body power and strength Shotput back throw were given to Shot Put Throwers and javelinThrowers. This study shows that Shot Put throwers are having more strength than Javelin Throwers
Key words: Total Body power, Strength, Shot put, Javelin Throw etc

Introduction:
In Athletics the throwing events comprise of javelin throw, discus throw, hammer throw and shot-put. The differences between the four disciplines includes the type of implement that is thrown and the run-up or pattern of movement prior to the throw.The **shot put** is a track and field event involving "throwing"/"putting" (throwing in a pushing motion) a heavy spherical object—the *shot*—as far as possible. The shot put competition for men has been a part of the modern Olympics since their revival in 1896, and women's competition began in 1948. The first events resembling the modern shot put likely occurred in the Middle Ages when soldiers held competitions in which they hurled cannonballs. Shot put competitions were first recorded in early 19th century Scotland, and were a part of the British Amateur Championships beginning in 1866.

The **javelin throw** is a track and field event where the javelin, a spear about 2.5 m (8 ft 2 in) in length, is thrown as far as possible. The javelin thrower gains momentum by running within a predetermined area. Javelin throwing is an event of both the men's decathlon and the women's heptathlon. The javelin throw was added to the Ancient Olympic Games as part of the pentathlon in 708 BC. It included two events, one for distance and the other for accuracy in hitting a target. All the throwing events rely on strength, power and speed for performance.

Methodology:
The sample for the present study consists of 20 Male Shot Put throwers and 20 Male Javelin Throwers of Rayalseema College of Physical Education Between the age group of 18-25 Years. group. To assess the Total body power and strength Shotput back throw were given to Shot Put Throwers and javelinThrowers. This study shows that Shot Put throwers are having more strength than Javelin Throwers

Shot Put Back Throw:

This test involves throwing an 8 pound shot put for maximum distance. The Back Throw Test is one of the tests used in the International Physical Fitness Test.

aim: This test measures core body strength and total body power and strength.

equipment required: 8 lb shot put, tape measure, clear open area for testing.

procedure: The athlete starts with his back to the throwing area, with their heels at the start line, and the shot cradled in both hands between the knees. The subject bends forward and downward before throwing the shot backwards over their head in a two-handed throwing action (optimally at about 45 degrees). Several practices may be required to get the best trajectory for maximum distance.

Scoring: Measurement is made from the starting line to the point of impact of the shot put with the ground. The measurement is recorded in meters and centimeters. The best result of two trials is recorded

Results and Discussion:

This study shows that Shot put Throwers are having better strength compare to the Javelin Throwers

Table-I

Mean values and Independent Samples Test of shot put back throw between Shot Put Throwers and Javelin Throwers of Rayalseema College of Physical Education

Variables	Group	Mean	SD	t	P - Value
Shot Put Back Throw	Shot Put Throwers	14.14	1.26	1.22	0.231
	Javelin Throwers	14.06	1.22		

*Significant at 0.05 level

In Table –I the Mean Values of Pre Test of Shot Put throwers in Shot-put Back Throw is 14.14 and Javelin Throwers is 14.06 .

Conclusion:

1.It is concluded that Shot Put throwers are having better strength than Javelin throwers.

2.It is concluded that there will be shot put throwers requires more strength to throw the shot lead implement compare to Javelin Throwers

2.Weight training exercises plays a major role for improvement of physical fitness and performance in the shot put throwers and discus Throwers.

Recommendations:

1. Similar studies can be conducted on other throwing events in Athletics among girls also

2.This study also helps the physical educators and coaches to improve their training regime to excel in shotput.

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Effect of Weight Training Exercises for development of Speed among Volley Ball Players of Gulbarga University

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Introduction:

Volleyball is a team sport in which two teams of six players are separated by a net. Each team tries to score points by grounding a ball on the other team's court under organized rules. It has been a part of the official program of the Summer Olympic Games since Tokyo 1964. Beach volleyball was introduced to the program at the Atlanta 1996 Summer Olympics.

Purpose of the Study:

The purpose for the present study to find out the effect of weight training exercises for development of Speed among Volley Ball Players of Gulbarga University,Hyderabad

Previous Studies:

Dr.G.L. Moghe Dr. P.N.Deshmukh (2011) Published in the Asian Journal of Physical Education and Computer Science in Sports studied on the topic The effect of plyometric training on the competitive swimming block start.

Mayur A.Patel and Dr.M.M.Mahida, (2013) International Journal of Scientific Research Effect of Plyometric Exercises for development of Speed among Foot ball and Basket ball Players.

Methodology:

The sample for the present study consists of 30 Male volley Ball Players of Gulbarga University, Gulbarga out of which 15 are experimental group and 15 are controlled group between the age group of 18 to 25 Years

The following Weight Training Exercises were given to the Experimental group on alternate days for 12 weeks.

1. Front Press
2. Bicep curl
3. Bench Press
4. Tricep curl
5. Up Right Rowing
6. Good morning Exercise
7. Dead Lift
8. Half Squat
9. Hamstring Curl
10. Heel Raises

The control group make them to do the general training of the Volley Ball. Pre Test and Post Test were conducted on both the groups in 30 M Run

30 M Run Test

purpose: The aim of this test is to determine the speed.

equipment required: measuring tape or marked track, stopwatch or timing gates, cone markers, flat and clear surface of at least 50 meters.

procedure: The test involves running a single maximum sprint over 30 meters, with the time recorded. A thorough warm up should be given, including some practice starts and accelerations. Start from a stationary position, with one foot in front of the other. The front foot must be on or behind the starting line.
Results: Two trials are allowed, and the best time is recorded to the nearest 2 decimal places

Result and Discussion:

Table I:Mean values of 30 M run test between experimental and control groups of Volley Ball

Variables	Group	Pre Test Mean	Post Test Mean	t	P - Value
30 M Run Test	Experimental	4.39	4.03	2.58	0.000
	Control	4.25	4.88		

The Experimental Group of 30 M Run Men is 4.39 in Pre Test and Controlled Group mean is 4.25 in Pre Test . The Experimental Group Mean is 4.03 in Post Test and Controlled Group mean is 4.88, the Experimental Group mean in Post Test in 30 M Run is decreased from 4.39 to 4.03 there is a improvement of 0.36 from Pre Test to Post and Control Group Mean is post test is 4.88there is a increase of 4.25 to 4.88 from Pre Test to Post, the performance is come down to 0.63 in the controlled group. Due to the weight Training the Experimental group has improved a lot.The Results of the Study shows that due to the weight training the mean of Experimental group has came from 4.39 to 4.03 from pre test to post test. The controlled group mean has increased from 4.25 to 4.88 due to the general training.

Conclusions:

Weight training must be given to Volley Ball players with a good training back ground and under the supervision of a coach or trainer. A Warm up should be through to ensure that the muscles are warm and ready to perform at such a weight training otherwise it leads to the injuries among the foot ball players. It is concluded that due to the weight training the Volley Ball increased in the speed

Recommendations: Similar Studies can be conducted among females and in other Sports and games. This study is useful to the Coaches to prepare the conditioning program to improve their speed and other motor abilities in all sports and games.

References:

Dr.G.L. Moghe Dr. P.N.Deshmukh (2011) Published in the Asian Journal of Physical Education and Computer Science in Sports studied on the topic The effect of plyometric training on the competitive swimming block start.

Mayur A.Patel and Dr.M.M.Mahida, (2013) International Journal of Scientific Research Effect of Plyometric Exercises for development of Speed among Foot ball and Basket ball Players.

Methodology

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Effect Of Hill Sprint Training And Plyometric Training On Leg Explosive Strength Among Sprinters

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Abstract

The present study investigated the Effect of Hill Sprint Training and plyometric training on leg explosive strength among sprinters . Sixty male college-level sprinters (age 17–23 years) from Kadapa district were randomly assigned into three groups: **Hill Sprint Training (n=20)**, **Plyometric Training (n=20)**, and a **Control Group (n=20)**. The training duration lasted **12 weeks**, with three sessions per week. Leg explosive strength was assessed using standardized vertical jump and sprint-based explosive measures before and after the intervention. Pre-test means showed no significant differences among groups (Hill Sprint = 7.20, Plyometric = 7.15, Control = 7.45; F = 0.72, $p > 0.05$). Post-test results revealed significant improvements (Hill Sprint = 8.95, Plyometric = 8.10, Control = 7.70; F = 10.33, $p < 0.05$). ANCOVA on adjusted post-test means (Hill Sprint = 9.01, Plyometric = 8.20, Control = 7.54) indicated a highly significant difference (F = 38.17, $p < 0.05$). Scheffe's post-hoc test confirmed that the Hill Sprint group outperformed both the Plyometric and Control groups (MD = 1.46 vs. control; MD = 0.81 vs. plyometric). Findings suggest that while both training methods effectively improved explosive strength, **Hill Sprint Training was superior**, emphasizing its specificity to sprint mechanics and force application. Coaches and strength-conditioning professionals are encouraged to integrate slope-based sprint drills, either independently or alongside plyometric exercises, for optimizing explosive strength development in sprinters. Key Words: Hill Sprint Training, Plyometric Training, Explosive Strength and college level Sprinters.

Introduction

Explosive strength the ability to produce high levels of force in short time (power and rate-of-force development) is a fundamental determinant of sprint performance, especially during the acceleration phase and short maximal-velocity efforts. Coaches therefore use a variety of methods (e.g., plyometrics, resisted/assisted sprints and hill sprints) to overload the intramuscular and mechanical systems that underpin sprinting power and rapid force production. Improvements in explosive strength typically translate to faster 0–10 m and 0–30 m times, greater step frequency or ground-reaction force, and better overall sprinting performance.

Plyometric training (PT) is one of the most widely researched nonspecific methods for improving explosive lower-limb power. By repeatedly using rapid eccentric–concentric muscle actions (the stretch-shortening cycle), PT enhances reactive strength, tendon stiffness, motor-unit recruitment and ground-contact mechanics — all of which support improved jump and sprint outcomes. Meta-analyses and controlled interventions demonstrate consistent, meaningful gains in vertical/horizontal jump measures and short-distance sprint times following multi-week PT programs when appropriately dosed and supervised.

Hill sprinting often prescribed as short maximal or near-maximal sprints up slopes of varying gradients provides a modality that overloads hip and knee extensor musculature, increases propulsive force requirements, and reduces peak velocity allowing higher force application per step. Recent applied studies indicate that hill or slope sprinting (and combined uphill–downhill protocols) can favorably alter sprint kinematics and, when periodized correctly, increase maximum running speed or specific strength markers in sprinters. Hill sprints are therefore an attractive field alternative to resisted devices for developing acceleration and explosive force.

Combining PT with sprint-specific methods (including hill sprints) is theoretically complementary: plyometrics target intramuscular and tendon adaptations that improve reactive force, while hill sprints provide a task-specific overload of sprint mechanics and force orientation. Systematic reviews and brief reviews of sprint-training modalities report that combined or mixed programs (plyometric + sprint methods) often produce larger, more transferable improvements in acceleration, short-sprint times and repeated-sprint ability than either modality alone — but findings vary with athlete level, program length and exact exercise selection. This mixed-evidence landscape highlights the value of direct comparative and combined-intervention trials in trained sprinters.

Despite the practical adoption of hill sprinting and plyometric training by sprint coaches, there remain gaps in the literature regarding optimal gradients, volumes, sequencing, and the comparative efficacy of hill sprints versus structured plyometric programs in sprinter populations. The present study therefore aims to examine and compare the effects of a hill-sprint program, a plyometric program, and a combined hill-sprint + plyometric program on measures of explosive strength(vertical/horizontal jump, reactive strength index, and short sprint times) among sprinters — with attention to safe, sport-specific prescription and measurable field outcomes. The findings will inform programming choices for sprint coaches and strength & conditioning professionals.

Expermental Design

Find out the study Effect of hill sprint Training and plyometric training on leg explosive strength among sprinters .The study was formulated as a true random group design consisting of a pre-test and post test. The subjects college levels sprinters who are participated different tournaments in kadapa district (N=60) were randomly assigned to three equal groups of twenty and their age ranged between 17-23 years . The selected subjects were divided into three groups randomly. Experimental Group I was considered Hill Sprint training group, experimental group II was plyometric training group and control group was not involved in any special treatment. Pre test was conducted for experimental Groups I and II and the control group on Leg Explosive strength . Experimental groups underwent the respective training for 12 weeks. Immediately after the completion of 12 weeks training, all the subjects were measured of their post test scores on the selected criterion variable. The difference between the initial and final scores was considered the effect of respective treatments. To find out statistical significance of the results obtained, the data were subjected to statistical treatment using ANCOVA. In all cases 0.05 level was fixed to test the significance of the study.

Results On Leg Explosive Strength

The statistical analysis comparing the initial and final means of Leg explosive strength due to Hill Sprint training and Plyometric training among College men Sprinters is presented in Table-I

Table-IANCOVA RESULTS ON EFFECT OF HILL SPRINT TRAINING AND PLYOMETRIC TRAINING COMPARED WITH CONTROLS ON LEG EXPLOSIVE STRENGTH

	Hill Sprint Training	**Plyometric Training**	**Control Group**	**Source of Variance**	**Sum of Squares**	**Df**	**Mean Squares**	**Obtained F**
Pre-test Mean	7.20	7.15	7.45	Between	1.03	2	0.52	0.72
				Within	40.70	57	0.71	
Post-test Mean	8.95	8.10	7.70	Between	16.30	2	8.15	10.33*
				Within	44.95	57	0.79	
Adjusted Post-test Mean	9.01	8.20	7.54	Between	21.18	2	10.589	38.17*
				Within	15.536	56	0.277	
Mean Diff	1.75	0.95	0.25					

Table F-ratio at 0.05 level of confidence for 2 and 57 (df) =3.16, 2 and 56 (df) =3.16.

*Significant

As shown in Table-I the obtained pre-test means on Leg explosive strength on hill sprint training group was 7.20, Plyometric training group was 7.15 was and control group was 7.45. The obtained pre-test F-value was 0.72 and the required table F-value was 3.16, which proved that there was no significant difference among initial scores of the subjects.

The obtained post-test means on Leg explosive strength on hill sprint training group was 8.95, Plyometric training group was 8.10 was and control group was 7.70. The obtained post-test F-value was 10.33 and the required table F-value was 3.16, which proved that there was significant difference among post-test scores of the subjects.

Taking into consideration of the pre-test means and post-test means adjusted post-test means were determined and analysis of covariance was done and the obtained F-value 38.17 was greater than the required value of 3.16 and hence it was accepted that there was significant differences among the treated groups.

Since significant differences were recorded, the results were subjected to post-hoc analysis using Scheffe's Confidence Interval test. The results were presented in Table-II.

Table-II

Multiple Comparisons of Paired Adjusted Means and Scheffe's Confidence Interval Test Results on Leg explosive strength

MEANS				**Required C.I.**
Hill Sprint training Group	**Plyometric training Group**	**Control Group**	**Mean Difference**	
9.01	8.20		0.81*	0.42
9.01		7.54	1.46*	0.42
	8.20	7.54	0.66*	0.42

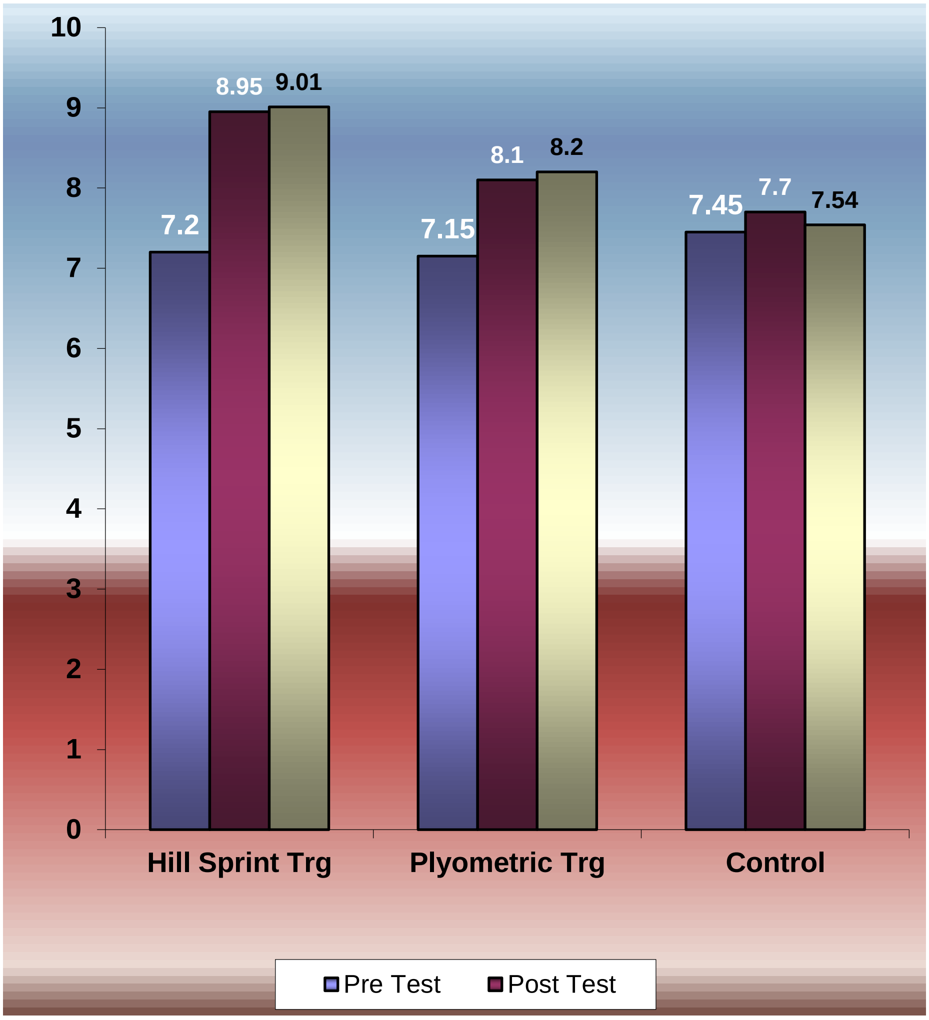
***** Significant

The post-hoc analysis of obtained ordered adjusted means proved that there was significant differences existed between hill sprint training group and control group (MD: 1.46). There was significant difference between Plyometric training group and control group (MD: 0.66). There was significant difference between treatment groups, namely, hill sprint training group and Plyometric training group. (MD: 0.81).

The ordered adjusted means were presented through bar diagram for better understanding of the results of this study in Figure-I

Figure-I

BAR DIAGRAM SHOWING PRE-TEST, POST-TEST AND ORDERED ADJUSTED MEANS ON LEG EXPLOSIVE STRENGTH



DISCUSSIONS ON FINDINGS ON LEG EXPLOSIVE STRENGTH

In order to find out the effect of hill sprint training and plyometric training on Leg explosive strength the obtained pre and post-test means were subjected to ANCOVA and post-hoc analysis through Scheffe's confidence interval test.

The effect of Hill Sprint training and Plyometric training on Leg explosive strength is presented in Table-I. The analysis of covariance proved that there was significant difference between the experimental group and control group as the obtained F-value 38.17 was greater than the required table F-value to be significant at 0.05 level.

Since significant F-value was obtained, the results were further subjected to post-hoc analysis and the results presented in Table II proved that there was significant difference between hill sprint training group and control group (MD: 1.46) and plyometric training group and control group (MD: 0.66). Comparing between the treatment groups, it was found that there was significant difference between hill sprint training and Plyometric training group among College men Sprinters.

Thus, it was found that hill sprint training was significantly better than Plyometric training and control group in improving Leg explosive strength performance of the College men Sprinters.

Conclusions

The findings of this study clearly demonstrate that both hill sprint training and plyometric training significantly improved leg explosive strength among college-level sprinters when compared to a control group. However, the hill sprint training group produced greater gains than the plyometric training group, indicating that sprint-specific overload provided by uphill running is particularly effective in enhancing explosive force and sprint-related power. Plyometric training also contributed to measurable improvements, confirming its established role in developing reactive strength and lower-limb power. The comparative advantage of hill sprints suggests that incorporating slope-based sprint drills, either alone or in combination with plyometric exercises, can provide coaches and athletes with a more sport-specific strategy to maximize explosive strength and sprint performance.

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A Comparative Study of Self Confidence among Cricketers and Volley Ball Players of Aurangabad District in Maharashtra

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Introduction:
Cricket is a bat-and-ball game played between two teams of 11 players each on a field at the centre of which is a rectangular 22-yard-long pitch. The game is played by 120 million players in many countries, making it the world's second most popular sport after association football.Cricket is a bat-and-ball game played on a cricket field between two teams of eleven players each. The field is usually circular or oval in shape, and the edge of the playing area is marked by a boundary, which may be a fence, part of the stands, a rope, a painted line, or a combination of these; the boundary must if possible be marked along its entire length.[76]

In the approximate centre of the field is a rectangular pitch (see image, below) on which a wooden target called a wicket is sited at each end; the wickets are placed 22 yards (20 m) apart.[77] The pitch is a flat surface 10 feet (3.0 m) wide, with very short grass that tends to be worn away as the game progresses (cricket can also be played on artificial surfaces, notably matting). Each wicket is made of three wooden stumps topped by two bails.[

The fielding team aims to prevent runs by dismissing batters (so they are "out"). Dismissal can occur in various ways, including being bowled (when the ball hits the striker's wicket and dislodges the bails), and by the fielding side either catching the ball after it is hit by the bat but before it hits the ground, or hitting a wicket with the ball before a batter can cross the crease line in front of the wicket. When ten batters have been dismissed, the innings (playing phase) ends and the teams swap roles. Forms of cricket range from traditional Test matches played over five days to the newer Twenty20 format (also known as *T20*), in which each team bats for a single innings of 20 overs (each "over" being a set of 6 fair opportunities for the batting team to score) and the game generally lasts three to four hours.

Traditionally, cricketers play in all-white kit, but in limited overs cricket, they wear club or team colours. In addition to the basic kit, some players wear protective gear to prevent injury caused by the ball, which is a hard, solid spheroid made of compressed leather with a slightly raised sewn seam enclosing a cork core layered with tightly wound string.

Volleyball is a team sport in which two teams of six players are separated by a net. Each team tries to score points by grounding a ball on the other team's court under organized rules. It has been a part of the official program of the Summer Olympic Games since 1964.

Purpose of the Study

The Purpose of the study is to find out the self confidence among Cricketers and Volley Ball Players of Aurangabad District in India.

Methodology:

The sample for the present study consists of 50 Male Cricketers and 50 Volley Ball Players of Aurangabad District between the age group of 18- 20 Years. Dr.S.J.Quadri Self Confidence Inventory is used to assess the Self Confidence.

Results:

The Results of the Study shows that Cricketers are having more confidence than volley ball Players. Research in sport psychology clearly and consistently demonstrates self- and team confidence to be one of the most important psychological factors for successful sport performance. High levels of confidence encourages cricketers and teams to enjoy playing under pressure, and gives them the freedom to express their abilities and talents, resulting in increased performance. Interestingly, increased confidence sees individuals and teams work harder (increased effort), and prove more persistent in executing skills and tasks.

Conclusions:

Hence it is recommended that Psychological Training must be included in the Coaching Program in sports for development of Self Confidence among sports persons. Self confidence is the main psychological variable for key to success in sports and games.

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https://en.wikipedia.org/wiki/Volleyball

https://en.wikipedia.org/wiki/Cricket

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A Comparative Study on Endurance Levels Between Football and Basketball Players at the Collegiate Level

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Abstract: The Endurance plays a dynamic role in the performance of athletes across many team sports. Football and basketball, though discrete in their rules and playing conditions.Individual demands sustained physical and psychological exertion, efficient energy utilization, and the ability to recover quickly during intermittent bursts of activity. This study aimed to compare endurance levels between collegiatelevel football and basketball players. Data were collected from a sample of 60 male athletes (30 football players and 30 basketball players) aged between18–23 years. The Cooper 12-Minute Run Test and Harvard Step Test were used to measure cardiovascular endurance. The results revealed a significant difference in endurance levels between the two groups, with football players showing slightly higher aerobic capacity due to longer-duration of running patterns, while basketball players displayed efficient recovery rates associated with frequent stopandgo movements. Statistical analysis using independent t-tests supported these findings ($p < 0.05$). The study highlights the sport-specific demands of endurance and suggests training adaptations accordingly.

Introduction

Endurance, defined as the ability to sustain physical activity over time, is a critical component of physical fitness in a competitive sport. In team games such as football (soccer) and basketball, athletes are required to continue performance over extended periods, including high-intensity bursts interspersed with recovery phases. Collegiate-level athletes often face training schedules that emphasize both general fitness and sport-specific endurance development.

Football is categorized by continuous running across a large field, requiring aerobic dominance with intermittent anaerobic efforts. Conversely, basketball involves regular accelerations, decelerations, and jumps on a smaller court, requiring greater anaerobic endurance with quick recovery. Given these contrasting physical and physiological demands, a comparative study of endurance levels amongst football and basketball players is crucial for understanding how sport-specific training impacts aerobic and anaerobic systems.

Objectives of the Study

To assess the endurance levels of collegiate-level football players.

To assess the endurance levels of collegiate-level basketball players.

To compare the endurance performance of football and basketball players using standardized tests.

To analyze the statistical consequence of endurance differences between the two groups.

Methodology

Participants

A total of 60 male collegiate athletes were selected, consisting of:

- **Football players**: 30 (Age 18–23 years, mean age 20.4 ± 1.2 years)
- **Basketball players**: 30 (Age 18–23 years, mean age 20.1 ± 1.3 years)

All participants had at least three years of training and regular competition experience.

Tests Conducted

Cooper 12-Minute Run Test – to measure maximal aerobic endurance (distance covered in 12 minutes).

Harvard Step Test – to assess cardiovascular endurance and recovery capacity.

Statistical Tools

- Descriptive statistics (Mean, Standard Deviation)
- Independent t-test to compare group differences
- Significance level set at $p < 0.05$

Results

Table 1: Cooper 12-Minute Run Test (Distance in meters)

Group	Mean ± SD	t-value	p-value
Football Players	2785 ± 210		
Basketball Players	2600 ± 195	2.94	0.004*

(*Significant at p < 0.05)

Table 2: Harvard Step Test (Fitness Index Score)

Group	Mean ± SD	t-value	p-value
Football Players	86.2 ± 5.8		
Basketball Players	89.4 ± 6.2	1.98	0.052

Interpretation

- Football players covered better than distances in the Cooper Test, indicative of stronger aerobic endurance.
- Basketball players recorded slightly higher scores in the Harvard Step Test, suggesting quick recovery and efficient utilization of anaerobic capacity.
- Statistical analysis confirmed important differences in aerobic endurance ($p < 0.05$), although recovery endurance showed no significant difference ($p > 0.05$).

Discussions

The findings reflect the distinct physical and psychology demands of the two sports. Football players exhibited superior long-duration aerobic endurance due to continuous running over extended playing fields. Their training emphasizes stamina, pacing, and energy conservation strategies. Basketball players, however, showed better recovery capacity, attributed to frequent high-intensity bursts and shorter recovery intervals during games.

These results align with previous research suggesting that endurance is highly sport-specific. Football players rely heavily on the aerobic energy system, while basketball players develop a balance between anaerobic bursts and quick cardiovascular recovery. Coaches should design conditioning programs accordingly—football training should emphasizeinterval running and long-distance endurance, while basketball training should attention on repeated sprint ability and recovery optimization.

Conclusion

This comparative study demonstrated important differences in endurance levels between collegiate football and basketball players. Football players displayed higher aerobic endurance, whereas basketball players exhibited efficient cardiovascular recovery. The outcomes high pointed the importance of couture endurance training to the detailed demands of each sport.

Future research could explore the roleof, positional requirements, gender differencesand advanced physical and physiological testing for deeper perceptions.

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