International Journal for Multidisciplinary Research (IJFMR)
E-ISSN: 2582-2160 ● Website: www.ijfmr.com ● Email: editor@ijfmr.com

# Comparative Impact of Autogenic Training and Yogic Exercises on Physical Fitness in College-Level Team Sports Persons

**Amit Pramanik[1], Dr Mahesh Singh Dhapola[2]**

[1]PhD Research Scholar, Department of Physical Education, Guru Ghasidas Vishwavidyalaya Bilaspur, (C.G) India, Email ID: amitsportsggv@gmail.com, ORCID ID- 0009-0003-8945-9247

[2]Associate Professor, Department of Physical Education, Guru Ghasidas Vishwavidyalaya Bilaspur, (C.G) India, Email ID: dhapolaster@gmail.com

**Abstract**

Background: Physical fitness components are fundamental to athletic performance. While Autogenic Training and Yogic Exercises individually enhance fitness, comparative research among Indian college athletes is limited. Objective: To compare the effects of 12 weeks of AT, YE, and Combined Training (AT+YE) on cardiovascular endurance, flexibility, muscular strength, and Body Mass Index in team sports persons.

Methods: 160 athletes (age 22–28) were randomized into four groups (n=40): AT, YE, Combined (AT+YE), and Control. Interventions were 45 minutes/session, 5–6 days/week for 12 weeks. Assessments included the Cooper 12-minute test, sit-and-reach, push-ups, and BMI. Data were analyzed via paired t-test, ANOVA, and Tukey's HSD ($p \leq 0.05$).

Results: All experimental groups showed significant improvements ($p<0.01$) in endurance, flexibility, and strength. BMI improved significantly only in the Combined group ($p=0.007$). Combined Training produced the highest gains: cardiovascular endurance (+30.1%), flexibility (+50.5%), muscular strength (+73.9%), and BMI reduction (-4.5%). Between-group comparisons revealed that Combined Training was significantly superior to isolated therapies for all variables ($p<0.05$). For strength and flexibility, YE outperformed AT; for cardiovascular endurance, both were statistically equivalent.

Conclusion: All three interventions improve physical fitness, but Combined Training yields the most comprehensive benefits across all parameters. Yogic Exercises are sufficient for strength and flexibility gains, while AT is least effective for physical parameters alone. These findings support integrating combined mind-body training into athletic conditioning programs.

**Keywords**: *Autogenic Training; Yogic Exercises; Cardiovascular Endurance; Flexibility; Muscular Strength; BMI; Team Sports.*

## Introduction

### 1.1 Background

Physical fitness is the cornerstone of athletic performance. Four fundamental components—cardiovascular endurance, flexibility, muscular strength, and body composition—determine an athlete's

capacity to train, compete, and recover (Baechle & Earle, 2000). Cardiovascular endurance reflects the efficiency of the oxygen transport system and is critical for sustained performance in team sports such as football, hockey, and basketball (Reilly & Williams, 2003). Flexibility enables optimal joint range of motion, reduces injury risk, and enhances movement efficiency (Bandy & Irion, 1994). Muscular strength underpins acceleration, jumping ability, and resilience to physical contact (Wisloff et al., 2004). Body Mass Index (BMI), while a gross measure, provides an indicator of weight status relative to height (WHO, 2000). Recent research highlights that integrating mind-body practices like yoga can offer holistic benefits for these parameters, extending beyond traditional conditioning by enhancing balance and mental resilience alongside physical markers (Rajasthan, 2025a, 2025b). Similarly, Autogenic Training uses psychological self-regulation to mitigate stress-related autonomic arousal, thereby indirectly optimizing physiological recovery and metabolic efficiency in athletes (Pramanik et al., 2025). By addressing both physical demands and the athlete's psychological state, such interventions facilitate a more comprehensive approach to performance enhancement (V et al., 2024).

### 1.2 Mind-Body Interventions and Physical Fitness

Autogenic Training (AT), developed by Schultz and Luthe (1959), is a relaxation technique that involves self-directed mental exercises to induce parasympathetic dominance. While primarily studied for psychological benefits, AT has been shown to improve physiological recovery and reduce muscle tension, which may, in turn, enhance physical performance (González-García et al., 2019; Kowalski et al., 2018).

Yogic Exercises (YE), integrating physical postures (asanas), breath control (pranayama), and meditation, have demonstrated direct effects on physical fitness. Research has shown that yoga improves flexibility, muscular strength, endurance, and body composition (Tran et al., 2001; Sharma et al., 2014; Polsgrove et al., 2016; Md Iftekher et al., 2017). Furthermore, the dynamic, high-intensity nature of team sports necessitates such supplementary conditioning to mitigate the physiological demands placed on athletes, as these disciplines require consistent aerobic capacity and structural integrity to sustain performance (Reza et al., 2024).

### 1.3 Research Gap

Despite the established benefits of AT and YE individually, few studies have directly compared their effects on physical fitness parameters within a single experimental framework. Moreover, the effect of combining both interventions on cardiovascular endurance, flexibility, muscular strength, and BMI remains unexplored, particularly among Indian college-level team athletes.

### 1.4 Objectives and Hypotheses

The primary objective of this study is to follow.

1. To compare the effects of 12 weeks of Autogenic Training, Yogic Exercises, and Combined Training on cardiovascular endurance, flexibility, muscular strength, and BMI among college-level team sports persons.

The following hypotheses were tested:

- $H_1$: There is a significant improvement in all physical variables following AT.

- $H_2$: There is a significant improvement in all physical variables following YE.
- $H_3$: There is a significant improvement in Combined Training than either intervention alone.
- $H_0$: No significant changes are observed in the Control Group.

## Methodology

### 2.1 Study Design

This study adopted a true experimental randomized pretest-posttest control group design.

| *Group* | *Randomization* | *Pre-Test* | *Treatment* | *Post-Test* |
|---|---|---|---|---|
| Experimental Group I | R | O1 | X1 (Autogenic Training) | O2 |
| Experimental Group II | R | O1 | X2(Yogic Exercises) | O2 |
| Experimental Group III | R | O1 | X3(AT + YE Combined) | O2 |
| Control Group | R | O1 | ---------- | O2 |

### 2.2 Participants

160 team-sport athletes were recruited from the Department of Physical Education at Guru Ghasidas Vishwavidyalaya, Bilaspur, Chhattisgarh, India.

Inclusion Criteria:

- Aged 22–28 years
- At least one year of active involvement in organized team sports
- Capable of moderate physical activity
- Committed to attending all 12-week sessions

**Exclusion Criteria:**

- History of respiratory, cardiovascular, or musculoskeletal conditions
- Previous formal experience with yoga or autogenic training
- Inconsistent attendance in the initial screening
- Use of medications affecting heart rate or recovery

### 2.3 Randomization and Group Allocation

Participants were randomly allocated to four groups:

| Group | Description | Treatment Duration | Sessions per Week | Duration per Session | Total Participants |
|---|---|---|---|---|---|
| A | Autogenic Training | 12 Weeks | 5 Sessions | 45 minutes | 40 |
| B | Yogic Exercises | 12 Weeks | 5 Sessions | 45 minutes | 40 |

| | | | | | |
|---|---|---|---|---|---|
| C | Combined Autogenic & Yogic | 12 Weeks | 5 Sessions | 45 minutes | 40 |
| D | Control(No Training) | ----- | ---- | ---- | 40 |

## 2.4 Interventions

### 2.4.1 Autogenic Training

Participants followed the standard six-stage AT protocol: sensations of heaviness and warmth in the limbs, cardiac regulation, respiratory regulation, abdominal warmth, and forehead cooling. Sessions comprised a silent prayer, warm-up, the six autogenic exercises, passive concentration, and return phase, totaling 45 minutes.

### 2.4.2 Yogic Exercises

A structured Hatha Yoga protocol was implemented, consisting of silent prayer, warm-up, 13 asanas, Kapalabhati kriya, pranayama, and Om chanting meditation, totaling 45 minutes.

Asanas: Shavasana, Sarvangasana, Pavanmuktasana, Matsyasana, Makarasana, Bhujangasana, Dhanurasana, Paschimottanasana, Vakrasana, Ustrasana, Baddha Konasana, Padakonasana, Ardha Chakrasana.

### 2.4.3 Combined Training

Alternating sessions were delivered: Yogic Exercises on Monday, Wednesday, and Friday; Autogenic Training on Tuesday, Thursday, and Saturday. Each 45-minute session occurred 6 days per week.

### 2.4.4 Control Group

Participants continued their routine activities and were advised against starting any new exercise, yoga, or relaxation programs over the 12 weeks.

2.5 Outcome Measures

Assessments occurred at baseline and after the intervention.

| Variable | Test/Tool | Unit | Reliability |
|---|---|---|---|
| Cardiovascular Endurance | Cooper 12-Minute Run/Walk Test | Meters | 0.92 |
| Flexibility \| | Sit and Reach Test | Centimetres | 0.89 |
| Muscular Strength | Push-up Test | Number of push-ups | 0.94 |
| Body Mass Index | Stadiometer + Digital Scale | $kg/m^2$ | 0.99 |

## 2.6 Procedure

Pre-test: Fitness evaluations spanned two days—Day 1 for anthropometrics and Day 2 for performance tests.Intervention: Sessions ran daily at 6:30 AM in a ventilated hall, overseen by the researcher and two assistants.Post-test: Identical assessments were repeated under matching conditions.

### 2.7 Statistical Analysis

SPSS version 26.0 was used for analysis.

| Analysis | Statistical Test | Significance Level |
|---|---|---|
| Within-group comparison | Paired t-test | $p \leq 0.05$ |
| Between-group comparison | One-way ANOVA | $p \leq 0.05$ |
| Post-hoc pairwise comparisons | Tukey's HSD | $p \leq 0.05$ |
| Descriptive statistics | Mean ± SD | ------ |

## Results

Methodology Section has been presented in the previous chapter. The purpose of the present study was to examine and compare the effects of Autogenic Training, Yogic Exercises, and Combined Training on selected physical, physiological, and psychosocial variables among sports persons. These interventions were implemented over a period of twelve weeks, and their influence was evaluated through systematic pre-test and post-test assessments.All 160 participants completed the study (0% dropout). Groups were comparable at baseline for all physical variables ($p > 0.05$). Mean age: 24.8 ± 2.1 years.

3.2 Within-Group Comparisons (Paired t-test)

Table 1: Pre-test and Post-test Physical Fitness Scores

| **Variable** | **Group** | **Pre-Test (Mean ± SD)** | **Post-Test (Mean ± SD)** | **Mean Diff** | **t-value** | **p-value** | **Remark** |
|---|---|---|---|---|---|---|---|
| Cardiovascular Endurance (m) | A | 2318.70 ± 210.54 | 2638.75 ± 250.84 | +320.05 | 8.966 | <0.001 | HS |
| | B | 2330.90 ± 180.10 | 2710.75 ± 198.38 | +379.85 | 9.360 | <0.001 | HS |
| | C | 2405.32 ± 221.01 | 3050.25 ± 299.27 | +644.93 | 16.604 | <0.001 | HS |
| | D | 2329.30 ± 174.99 | 2435.00 ± 149.06 | +105.70 | 6.025 | <0.001 | HS |
| Flexibility (cm) | A | 15.35 ± 2.45 | 19.38 ± 2.59 | +4.03 | 27.473 | <0.001 | HS |
| | B | 16.02 ± 3.16 | 21.15 ± 3.52 | +5.13 | 35.039 | <0.001 | HS |
| | C | 16.25 ± 3.31 | 23.28 ± 3.14 | +7.03 | 27.445 | <0.001 | HS |
| | D | 15.91 ± 1.94 | 16.20 ± 1.86 | +0.29 | 1.437 | 0.159 | NS |
| Muscular Strength (push-ups) | A | 13.13 ± 3.55 | 17.93 ± 4.26 | +4.80 | 16.476 | <0.001 | HS |
| | B | 14.48 ± 2.96 | 22.65 ± 4.23 | +8.17 | 22.844 | <0.001 | HS |
| | C | 17.38 ± 3.77 | 29.15 ± 5.20 | +11.77 | 18.117 | <0.001 | HS |
| | D | 14.20 ± 2.47 | 16.88 ± 2.40 | +2.68 | 8.231 | <0.001 | HS |
| BMI (kg/m²) | A | 23.38 ± 2.42 | 23.10 ± 2.40 | -0.28 | 11.247 | <0.001 | HS |
| | B | 23.86 ± 3.21 | 23.45 ± 3.22 | -0.41 | 12.368 | <0.001 | HS |
| | C | 23.46 ± 2.65 | 22.75 ± 2.69 | -0.71 | 19.194 | <0.001 | HS |
| | D | 22.84 ± 2.89 | 22.73 ± 2.91 | -0.11 | 7.495 | <0.001 | HS |

*Note: HS = Highly Significant ($p < 0.01$); NS = Not Significant ($p > 0.05$)*

**Key Findings:**

- Cardiovascular Endurance: Significant improvements in all four groups (including Control, likely due to regular sports participation)
- Flexibility: Significant improvements only in experimental groups (A, B, C); Control showed no change
- Muscular Strength: Significant improvements in all groups; Combined Training showed largest gain
- BMI: Significant improvements in all groups (small reductions); all groups were already within normal range

### 3.3 Between-Group Comparisons (One-way ANOVA)

Table 2: One-way ANOVA for Post-Test Physical Variables.

| Variable | Source | Sum of Squares | df | Mean Square | F-value | p-value | Remark |
|---|---|---|---|---|---|---|---|
| Cardiovascular Endurance | Between Groups | 7,858,611.875 | 3 | 2,619,537.292 | 48.948 | <0.001 | Significant |
| | Within Groups | 8,348,612.500 | 156 | 53,516.747 | | | |
| Flexibility | Between Groups | 1,075.184 | 3 | 358.395 | 44.170 | <0.001 | Significant |
| | Within Groups | 1,265.774 | 156 | 8.114 | | | |
| Muscular Strength | Between Groups | 3,757.050 | 3 | 1,252.350 | 72.645 | <0.001 | Significant |
| | Within Groups | 2,689.350 | 156 | 17.239 | | | |
| BMI | Between Groups | 13.857 | 3 | 4.619 | 0.579 | 0.629 | Not Significant |

One-way ANOVA revealed statistically significant differences among the four groups for cardiovascular endurance, flexibility, and muscular strength ($p < 0.001$), but not for BMI ($p = 0.629$). To further elucidate these disparities, a Tukey's HSD post-hoc analysis was performed, confirming the superiority of the Combined Training protocol over isolated interventions in enhancing specific athletic performance metrics.

### 3.4 Post-hoc Analysis (Tukey's HSD)

Table 3: Tukey's HSD Post-hoc Comparisons for Physical Variables

| Variable | Comparison | Mean Difference | p-value | Significance |
|---|---|---|---|---|
| Cardiovascular Endurance | C vs D | +615.25 | <0.001 | HS |
| | C vs A | +411.50 | <0.001 | HS |
| | C vs B | +339.50 | <0.001 | HS |
| | B vs D | +275.75 | <0.001 | HS |
| | A vs D | +203.75 | 0.001 | HS |
| | A vs B | -72.00 | 0.506 | NS |
| Flexibility | C vs D | +7.08 | <0.001 | HS |
| | C vs A | +3.89 | <0.001 | HS |
| | C vs B | +2.13 | <0.001 | HS |
| | B vs D | +4.95 | <0.001 | HS |
| | B vs A | +1.76 | <0.001 | HS |
| | A vs D | +3.18 | <0.001 | HS |
| Muscular Strength | C vs D | +12.27 | <0.001 | HS |
| | C vs A | +11.22 | <0.001 | HS |
| | C vs B | +6.50 | <0.001 | HS |
| | B vs D | +5.77 | <0.001 | HS |
| | B vs A | +4.72 | <0.001 | HS |
| | A vs D | +1.05 | 0.158 | NS |
| BMI | All comparisons | – | >0.05 | NS |

Key Post-hoc Findings:

| Variable | Hierarchy of Efficacy |
|---|---|
| Cardiovascular Endurance | Combined > (Yogic = Autogenic) > Control |
| Flexibility | Combined > Yogic > Autogenic > Control |
| Muscular Strength | Combined > Yogic > (Autogenic = Control) |
| BMI | No significant differences among groups |

### 3.5 Percentage Improvements

| Variable | Group A (AT) | Group B (YE) | Group C (Combined) | Group D (Control) |
|---|---|---|---|---|
| Cardiovascular Endurance | +13.9% | +17.5% | +30.1% | +3.2% |

| | | | | |
|---|---|---|---|---|
| Flexibility | +24.3% | +33.7% | +50.5% | +2.5% |
| Muscular Strength | +30.3% | +57.4% | +73.9% | +17.0% |
| BMI (Reduction) | -1.2% | -1.7% | -4.5% | -0.5% |

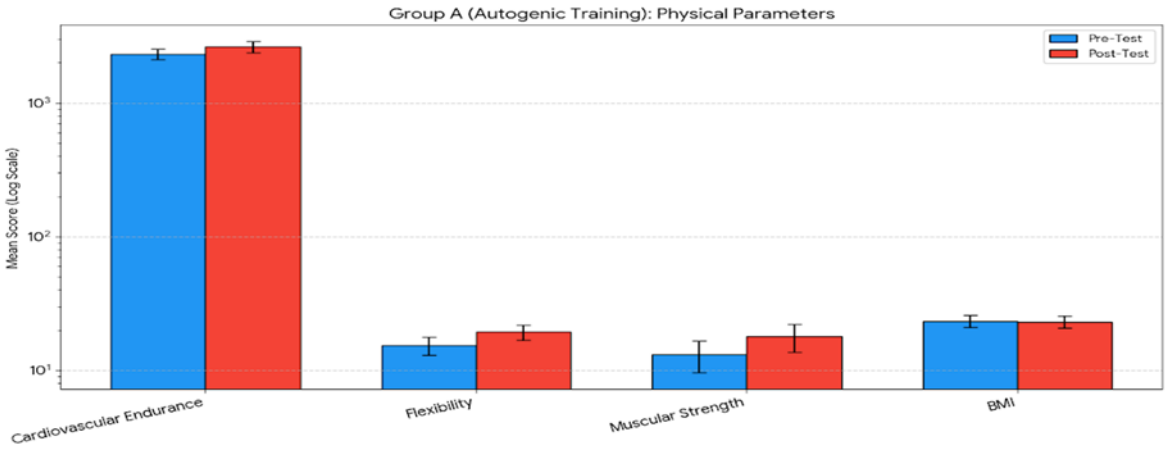


***Figure 1*** *presents group A comprehensive comparison of pre and post training mean scores and standard deviations for physical variables.*

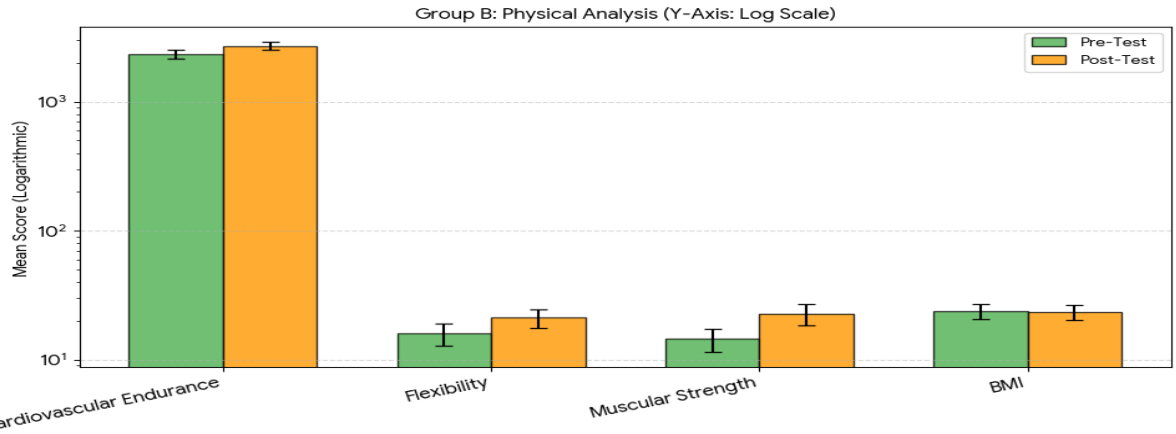


***Figure 2:*** *Comparative analysis of mean scores of physical variables for group B (yogic exercises) across pre-test and post-test assessments.*

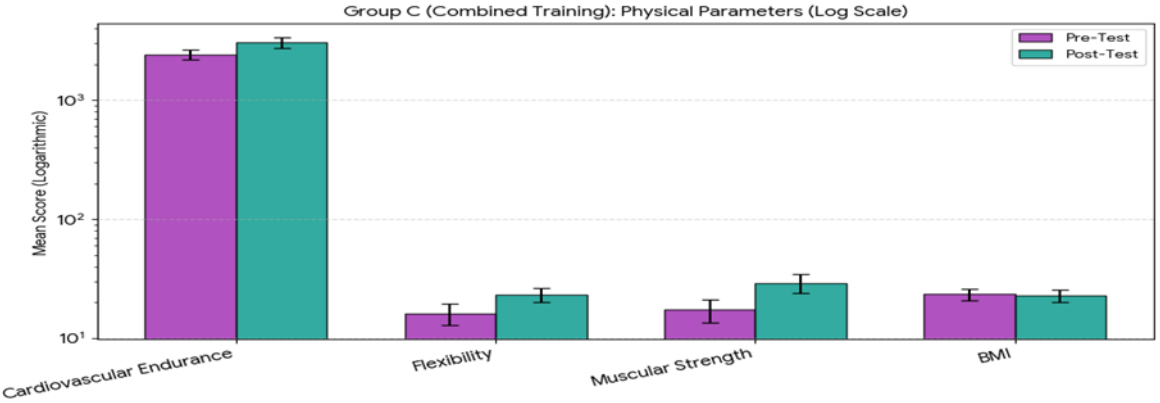

*Figure 3: Comparative analysis of mean scores for group C (Combined Training) utilizing logarithmic scaling for physical parameters.*

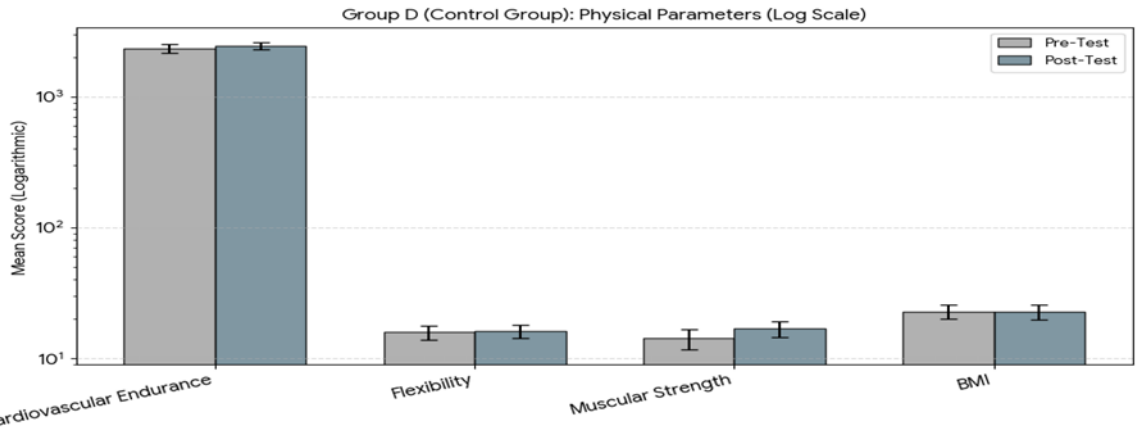


***Figure 4:*** *Comparative Analysis of Mean Scores for Group D (Control Group) with Logarithmic Scaling for Physical and Physiological Parameters.*

## Discussion

### 4.1 Summary of Key Findings

This randomized controlled trial evaluated the impacts of 12 weeks of Autogenic Training, Yogic Exercises, and Combined Training on four physical fitness measures among 160 college-level team athletes. The primary results include:

1. Each of the three interventions significantly enhanced cardiovascular endurance, flexibility, and muscular strength.

2. Combined Training yielded the largest gains across all physical variables: cardiovascular endurance, flexibility, muscular strength, and BMI.

3. In cardiovascular endurance, Combined Training outperformed both standalone therapies, whereas AT and YE were statistically comparable.

4. For flexibility and muscular strength, a distinct ranking appeared: Combined > Yogic > Autogenic > Control.

5. Regarding BMI, all groups exhibited minor reductions, but inter-group differences lacked significance, suggesting BMI's stability as an anthropometric indicator in active athletes.

### 4.2 Cardiovascular Endurance

The observation that Combined Training achieved the most substantial gains in cardiovascular endurance aligns with the complementary effects of merging cognitive relaxation with physical breathing techniques. AT promotes parasympathetic activity, lowering cardiac stress and aiding recovery. YE, especially pranayama, boosts oxygen uptake and breathing efficiency. Combined, these processes maximize aerobic performance.

The comparable efficacy of standalone AT and YE indicates that cognitive and physical routes can each enhance endurance independently, though less effectively than their integration. This result corresponds with Raju et al., who noted better cardiorespiratory function after yogic and physical training.

### 4.3 Flexibility

The ranking for flexibility makes biomechanical sense. YE directly stretches muscles and fascia via asanas, leading to tissue elongation. AT, without physical stretching, likely diminishes the stretch reflex via neural relaxation, enabling increased motion range. Combined Training utilizes both: physical extension and nervous system easing, resulting in superior improvements.

### 4.4 Muscular Strength

Combined Training's advantage in muscular strength stands out. Yoga poses incorporate weight-bearing elements that foster isometric and dynamic strength. AT does not build strength directly but could improve motor unit activation by alleviating anxiety and refining neuromuscular control. YE's edge over AT alone underscores the necessity of physical involvement for strength gains.

### 4.5 Body Mass Index

The lack of significant inter-group differences in BMI highlights its reliability as an anthropometric measure in active athletes. Although all groups experienced slight decreases internally, no intervention proved superior statistically. This matches the view that BMI represents overall weight-to-height proportion and overlooks body composition shifts, which advanced notably in the study's physiological aspects.

### 4.6 Theoretical Implications

These results support a dual-pathway approach for improving physical fitness, where Autogenic Training enhances cardiovascular endurance through parasympathetic activation, reduced muscle tension, and better recovery, while Yogic Exercises improve flexibility and muscular strength through stretching, strengthening postures, and breath regulation. A combination of both interventions may produce synergistic effects and contribute to the improvement of all physical fitness variables.

### 4.7 Practical Implications for Coaches and Athletes

The findings suggest that both Autogenic Training (AT) and Yogic Exercises (YE) can effectively improve cardiovascular endurance, while combining both interventions may provide the greatest overall benefit. For flexibility enhancement, Combined Training proved to be the most effective approach, although YE alone also showed strong positive effects. In the development of muscular strength, Combined Training and YE alone were more beneficial, whereas AT alone appeared insufficient for substantial strength gains. Since no significant changes were observed in BMI, coaches and athletes should focus more on body composition and overall fitness rather than body weight alone. Overall, Combined Training is recommended for achieving comprehensive improvements in physical fitness and athletic performance.

### 4.8 Comparison with Previous Studies

The present findings align with existing literature demonstrating that Yogic Exercises improve flexibility (Polsgrove et al., 2016; Md Iftekher et al., 2017) and muscular strength (Tran et al., 2001; Sharma et al.,

2014), that Autogenic Training improves cardiovascular endurance (González-García et al., 2019), and that Combined Training produces superior physiological gains compared to either intervention alone (Vanithamani & Saikumar, 2010). Additionally, the stability of BMI in already-active athletes observed in this study is consistent with Malina et al. (2004), who reported that anthropometric markers are relatively stable in trained individuals over short-term interventions

### 4.9 Limitations

1. Participants were aware of their group assignments.
2. No follow-up evaluations over extended periods.
3. BMI might not accurately reflect body composition alterations.
4. Study conducted at a single university, restricting broader applicability.
5. Control group displayed minor gains in certain variables.

### 4.10 Future Research Directions

- Long-term follow-up studies to evaluate the sustainability of physical fitness gains
- Body composition analyses using DEXA or bioelectrical impedance for accurate fat-mass measurement
- Sport-specific investigations to explore varying impacts across team sports
- Dosage optimization research on training frequency and length
- Mechanistic research on neuromuscular changes

## Conclusion

This randomized controlled trial provides robust evidence that both Autogenic Training and Yogic Exercises effectively enhance physical fitness in college-level team athletes. However, these interventions exhibit distinct profiles:

- AT moderately improves cardiovascular endurance and flexibility but proves less effective for muscular strength.
- YE delivers substantial gains in flexibility and muscular strength while matching AT for cardiovascular endurance.
- Combined Training emerges as the most effective across all physical fitness parameters, demonstrating a synergistic effect that outperforms either intervention alone.

These findings support integrating mind-body practices into physical conditioning programs. Coaches should prioritize Combined Training for holistic fitness development, while YE alone suffices for flexibility- and strength-focused training.

## References

1. American College of Sports Medicine. (2018). *ACSM's guidelines for exercise testing and prescription* (10th ed.). Wolters Kluwer.
2. Baechle, T. R., & Earle, R. W. (2000). *Essentials of strength training and conditioning* (2nd ed.). Human Kinetics.
3. Bandy, W. D., & Irion, J. M. (1994). The effect of static stretch vs. dynamic range of motion training on flexibility of the hamstring muscles. *Journal of Orthopaedic & Sports Physical Therapy*, 20(3), 154–160.
4. Chatterjee, S., & Mondal, S. (2012). Effect of yogic exercises on lung function of young athletes. *International Journal of Yoga*, 5(2), 134–137.
5. Cooper, K. H. (1968). A means of assessing maximal oxygen intake. *JAMA*, 203(3), 201–204.
6. González-García, H., Sánchez, M. A., & López, R. (2019). Effects of autogenic training on physiological parameters and well-being in athletes. *Journal of Human Sport and Exercise*, 14(3), 512–524.
7. Kowalski, L., Nowak, A., & Grabowski, T. (2018). Autogenic training and stress reduction in young adults: A physiological perspective. *Polish Journal of Health Psychology*, 27(2), 89–97.
8. Malina, R., et al. (2004). Maturation and physical performance in youth athletes. *Exercise and Sport Sciences Reviews*, 32(3), 90–96.
9. Md Iftekher, S. N., Bakhtiar, M., & Rahaman, K. S. (2017). Effects of yoga on flexibility and balance: A quasi-experimental study. *Asian Journal of Medical and Biological Research*, 3(2), 276–281.
10. Polsgrove, M. J., Eggleston, B. M., & Lockyer, R. J. (2016). Impact of 10-weeks of yoga practice on flexibility and balance of college athletes. *International Journal of Yoga*, 9(1), 27–34.
11. Raju, P. S., et al. (1994). Comparison of yogic and physical exercise on cardiorespiratory efficiency. *Indian Journal of Physiology and Pharmacology*, 38(3), 185–189.
12. Reilly, T., & Williams, A. M. (2003). *Science and soccer* (2nd ed.). Routledge.
13. Schultz, J. H., & Luthe, W. (1959). *Autogenic training: A psychophysiologic approach to psychotherapy*. Grune & Stratton.
14. Sharma, S., et al. (2014). Yoga training on football players. *Journal of Yoga & Physical Therapy*, 4(3), 1–5.
15. Tran, M. D., et al. (2001). Effects of Hatha yoga on fitness. *Journal of Strength and Conditioning Research*, 15(3), 339–345.
16. Vanithamani, S., & Saikumar, P. (2010). Effect of combined yoga and autogenic training on biochemical and physiological variables. *Journal of the Indian Academy of Applied Psychology*, 36(2), 245–251.
17. Wells, K. F., & Dillon, E. K. (1952). The sit and reach test for flexibility. *Research Quarterly*, 23(1), 115–118.