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EXAMINE THE IMPACT OF CROSS TRAINING ON PHYSIOLOGICAL PROFILE OF CRICKET PLAYERS OF MAHARASHTRA STATE

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ABSTRACT
Physical fitness is an important factor in cricket performance, since physically fit players perform better, more consistently, & with fewer injuries. The goal of this study was to look at the impact of cross-training and cricket training workouts on selected physiological variables in male University cricket players in Maharashtra. To meet the current study's goal, 45 university cricket players from Maharashtra were chosen at random as participants. Their ages ranged from 18 to 27 years. The individuals were sorted into three equal groups of fifteen each using the matching process based on their initial performance test scores. Systolic blood pressure, diastolic blood pressure and resting pulse rate, were the variables chosen. The conclusion of the training, individuals from all three groups was evaluated on the criteria measures that had been measured during the original test. The obtained data on criteria measures were subjected to analysis of covariance to determine the significance of mean differences in performance and performance-related characteristics across the three groups. Furthermore, its significance was determined using schefee's test as a post-hoc test.
Keywords: cross-training, physiological variables, Systolic blood pressure, diastolic blood pressure and resting pulse rate, university cricket players

INTRODUCTION
Cricket has a documented history that dates from 16th century to current day. Although international matches have been held since 1844, formal history of international test cricket began in 1877. This game evolved from its beginnings in England into a game that is now professionally played across the majority of Commonwealth of Nations. Nobody knows when or where cricket originated, but there is a body of evidence, much of it circumstantial, that strongly suggests game was invented by children living in wealth, a region of dense woodlands & clearings in South-East England that includes Acroeskent & Sussex, during Saxon or Norman times. Cricket is claimed to have been popular among youngsters for many centuries. Around the beginning of the 17th century, adults began to take up cricket. It is conceivable that cricket was evolved from bows. Assuming that bows are the elder sport, the involvement of a batter attempting to prevent the ball from reaching its goal by striking its paths. The original tools for this game, which was played on sheep-grazed fields or in clearings, might have been a matted lump of sheep's wool as ball, a stick or crook or another farm toot as bat, & a stool, actual stump, or a gate as wicket.
A variety of terms or ideas have been proposed as probable origins for the term "cricket" in first documented mention to sport in 1598. It's known as cricket. The name might have come from the center. The Dutch krick, which means "stick," or the ancient English cricket or cryle, which

means "crutch or staff." Another probable origin is the Middle Dutch term krickstoel, which refers to a long low stool used for kneeling in church & is similar to long low wicket with two stumps used in early cricket.

It is more probable that cricket language was based on terms in use in South East England at time &, given trade relations with Handess. Many middle Dutch terms found their way into Southern English dialects, particularly under the Duchy of Burgundy's reign in the 15th century.

Cricket was brought to North America in 17th century by English colonies. Probably before it got to north of England. It spread to other regions of the world in the 18th century. In the first part of the century, colonists brought it to the West Indies, and British East India Company sailors brought it to India. It came in Australia nearly immediately after colonisation began in 1788. In the early nineteenth century, New Zealand & South Africa followed.

Despite efforts by an imperial-minded elite to promote game as a way of connecting with British Empire, cricket never caught on in Canada, which, unlike Australia & West Indies, had a steady fall in popularity from 1866 to 1960. The game, which was associated with upper-class British and Canadian elites, never proved popular with ordinary people, and it had to compete with baseball during summer season. During World War I, Canadian forces stationed in the United Kingdom played baseball rather than cricket.

Only England, Australia, & South Africa were members of the Imperial Cricket Conference when it was created in 1909; India, the West Indies, & New Zealand became Test countries before WWII, & Pakistan soon after. The international game expanded with the involvement of numerous "affiliate nations," including Sri Lanka, Zimbabwe, and Bangladesh in the last years of the twentieth century.

Throughout the twentieth century, Test cricket remained sport's top level of excellence, but it had problems, most notably in notorious 'Bodyline' series of 1932-33, when DouglasJardines England adopted so-called "leg theory" to attempt and neutralise Australia's Don Bradman's run-scoring ability.

Cricket appears to be a game that requires minimal muscular power. From a distance, cricket appears to be such a mild sport that concept of strength training & workouts appears to have limited relevance. Cricket, like many other games that feature relatively long periods of low activity interspersed by times of intense muscle attention, is deceptively tough and provides major physical training obstacles for players, particularly at the elite level. The anaerobic lactic and alactic processes are the principal energy systems used by batters, bowlers, and fielders during competition. The intervals of action required energy generation to power players' muscles will very definitely be less than fourty seconds in the activities of bowling, batting, and fielding. Because all cricket players are called upon to bat and field at some point during a game, much fundamental fitness training will be shared by all players. Cricket training is not entirely anaerobic. For lengthy periods of time, players are usually stationed on field or at bat. Cricket, as both a traditional English summer sport and a year-round competition played in hot, humid locales like India, Australia, & West Indies, places environmental demands on players. Improved aerobic fitness & a strong cardiovascular system help players manage with fatigue & its impact on their concentration over a long match.

BOWLER

Because of nature of the position, a bowler must move explosively in lead up to delivery; a quick run up translates into a faster delivery of ball; arm, shoulder, & core body strength and stamina are necessary to deliver ball frequently.

FIELDER

The fielder must be prepared to respond to a hit ball, as well as go to a ball, field, & throw, all while playing a game that can last six hours or more at a time. This position necessitates quick mobility and agility.

BATSMAN

Although brute physical force is not a disadvantage in this position, response speed, batting technique, and crease balance are crucial. A batsman may be needed to stay in place for several hours. The batting stroke in cricket is heavily reliant on core strength, notably in abdominal and oblique muscular groups, gluteal muscles, and upper arms and shoulders. A cricket strength & conditioning programme must incorporate anaerobic, aerobic, and weight training, as well as agility and reaction time workouts. Aerobic conditioning is not essential to help a player maintain strength & fight fatigue throughout a long match. A weekly training regimen should include two 45-minute to one-hour bouts of moderately paced jogging, cycling, or other activity at 50-60 percent of the player's maximum heart rate. The purpose is to enhance stamina and recovery periods under the largely anaerobic demands of cricket competition.

Cricket's anaerobic features are apparent in the requirements of all positions. Cricket players benefit from plyometrics exercises that involve jumping repetitions and other explosive actions. Similarly, interval running workouts that require brief explosive runs of b/w 32.8 ft & 164 ft (10-50 m) at a segment would tend to benefit in enhancing fielder's sprinting ability in chasing down a ball to be collected & delivered back to wickets. These drills can be repeated with player starting from a standing, sprinting, or prone position, as if fielder had dove for & missed a ball, to simulate sorts of beginnings the fielder would experience in a game situation. Foot speed exercises, in which the player must negotiate his way through a sequence of squares as rapidly as possible, are variations of interval training that develop the lateral speed of the fielder to respond to a hit ball.

Cricketers have no physical height or weight restrictions; the nature of sport and its "all-around" attributes tend to favor individuals with quickness over muscle. Muscle growth, on the other hand, is a crucial component of effective cricket training programs. High-repetition, low-weight workouts are often regarded as most effective technique to balance contrast b/w muscular bulk & quickness. The triceps (essential for both throwing and batting), upper chest muscles (for batting & bowling), & abdominal and oblique muscles of the torso are the primary muscular structures that should be strengthened for increased cricket play (stability in all aspects of the game).

CROSS-TRAINING

Most people have heard of cross-training, but what exactly does it entail? Cross-training is commonly understood to be partaking in anything other than the primary sport or fitness activity. Let's look at why cross-training is crucial, especially in sports. The most essential factor is that it

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assists in injury prevention. When you engage in cross-training activities, you use muscles that are not particular to your activity and maintain a healthier overall muscular balance in your body. For example, if you are a runner who also works in an office, you most likely have weak gluteal muscles (muscles of the buttocks). As a runner, weak gluteals can cause knee and back pain and damage.

However, by crossing one's legs, one may balance the body. Train with activities that require lateral (side to side) mobility and gluteal activation. Whole-body muscular balance results in less stress on the joints and surrounding musculature, as well as increased movement efficiency. The second benefit of cross-training is that it aids with recuperation. Incorporating modest cross-training activities in between your rigorous sport-related workouts allows the sport-specific muscles to recuperate while increasing blood supply to all muscles. These modest workouts also raise the body's demand for recuperation, leading it to work harder.

IMPORTANCE OF CROSS-TRAINING

It is a truth that in order to do successfully in sports, training is essential. A runner can run, a swimmer can swim, and a dancer can dance, but he must learn to fine-tune the talents that are specifically relevant to the specific chosen sport. Cross-training, on the other hand, is an activity that is not particular to a sport but will supplement training. Cross-training strengthens muscles that might not be used during specialised training. Cross-training can then enhance our general condition by strengthening muscle to assist harder-working regions and creating more efficient muscles across the body.

Including a variety of activities in our training routine can help us avoid fatigue and the dreaded plateau. When your body, both emotionally and physically, is "over it," you may no longer have an interest, desire, or incentive to perform, or, worse, you may observe a loss in performance despite greater training effort. If you have even a smidgeon of a competitive streak, you will constantly want to achieve better, whether in comparison to others or to your own previous performance. Cross-Training might be precisely what he needs to rekindle his interest, revive his enthusiasm, and get him back on track.

Adaptability is unavoidable, and we all know that repeating the same strain on the same muscles will result in a performance plateau. Muscles are cognitive in the sense that they can create memories. Cross training is important because it helps one to activate the muscle in a different way, allowing one's body to push past a plateau and keep one's body guessing by rotating between many other activities.

Due to an injury, an player may be forced to participate in cross training. As a runner, I've had stress fractures and tendinitis. So, what should you do if you are a runner who is unable to run? Well, anything that is prescribed by a doctor. It was advised that I look for a pool. Swimming and water jogging are excellent alternatives for me to maintain my training while minimizing the pressure on my feet. Fortunately, you don't have to wait for an injury to try new things.

PHYSIOLOGICAL VARIABLE

Physiology is the study of how all of an organism's organs and systems work. To be fit, the body's physiological systems must function well enough to support the specific activity that individual is performing. Different activities place different demands on organism in terms of circulatory, respiratory, metabolic, & neurologic processes that are specific to activity.

Physiology teaches students how organs, systems, tissues, cells, & molecules inside cells operate & how these actions are coordinated to maintain internal environment. Physiology is science that studies functioning of the human body. Exercise physiology is study of how exercise alters structures & functioning of body. It uses the notion of exercise physiology to train players and improve their sports performance. Exercise physiology is scientific study of physiological changes in an player's body caused by effects of exercise, which can be long or short term. Different environmental variables, such as altitude, climate, temperature, humidity, nutritional state, and so on, have a tight relationship with an player's ideal performance. To be fit, the physiological systems of the body must work well enough to sustain the individual's scientific activity. Furthermore, different activities place distinct demands on the player in terms of the circulatory, pulmonary, metabolic, & neurologic systems that are unique to activity.

High levels of performance in sports & games may be dependent on physiological make-up, & physiological proficiency has been established as a need for high level performance. Training and other adjustments produced by the athlete determine the amount of athletic ability present in a certain individual. Certain physical shapes are better suited to specific athletic roles and tasks. The Rift Valley of Africa, which includes nations like as Kenya & Ethiopia, has produced more world- & Olympic-champion distance runners than any other area on Earth because to thin, often long-striding populace who dwell at heights above 6,562 feet (2,000 m). These physical characteristics have resulted in a superior human shape for long-distance running. People that reside near Baltic Sea in northeast Europe, such as Lithuanians & Russians, have tall, slender, muscular builds that are suitable for sports like basketball. These two examples are based on the extensive expertise and athletic accomplishment that these clubs have had in the aforementioned sports.

The conflict between genetically determined athletic ability and the influence of training & other circumstances is frequently referred to as nature against nurture. Although precise attribution b/w athletic nature & nurture is impossible, it is a widely accepted sport science proposition that genes account for approximately fifty percent of athletic performance variation, with the remaining 50 percent attributable to both individual player's response to training and social factors, such as player's support in pursuing his or her goals.

A extremely tall northern European guy with a height of seven ft. (2 m) would appear to be a considerably more appealing recruit to sport of basketball than a person with a height of 5 ft. 10 in (1.7 m). The taller male's gene-governing height is a potentially dominant physical determinant, but it is never decisive, because height is only one component of basketball success. Coordination, agility, spatial sense, resolve, resistance, and intelligence are all required. The fact that a runner is1from Africa's Rift Valley, 1with genetic makeup that has served as the foundation for a plethora of successes1for similar players in middle distances and marathon, does not guarantee elite athletic status, as training and determination to compete against similarly endowed & talented runners will make difference. A range of crucial training components based on underlying individual physical characteristics will influence sports performance.

Extensive, long-term endurance training modifies the ratio of fast-twitch, explosive muscle fibres to slow-twitch, endurance fibres present in musculoskeletal structure, producing more useful sport-specific muscles, according to studies with elite endurance athletes such as cyclist Lance Armstrong. It is also clear that role of genetics in predicting athletic performance is less obvious when activity involves development of a specific set of technical abilities. By emphasizing efficient technique and error-free qualities, we have built a superior human form for distance running. People that reside near Baltic Sea in northeast Europe, such as Lithuanians & Russians, have tall, slender, muscular builds that are suitable for sports like basketball. These two examples are based on the extensive expertise and athletic accomplishment that these clubs have had in the aforementioned sports.

A variety of key training aspects based on underlying individual physical attributes will impact sports achievement. One such element is the capacity to improve one's maximal oxygen intake, defined as VO2 max. A greater VO2 max suggests a substantially better ability to transform physiological fuel sources into energy. VO2 max is a genetic feature that may be increased by training by ten % to 15 percent; exceptional players have had VO2 max gains of thirty %. It is also obvious that genetics have a less influence in predicting athletic success when activity requires development of a specific set of technical abilities, with a focus on efficient technique.

Specific physiological systems of body must be fit in order to support specific game that participant is playing. Because various sports have distinct demands on the player's neurological, pulmonary, circulatory, & temperature-regulating processes, physiological fitness is activity-specific. Exercise has a great adaptability in physiological systems.

SYSTOLIC BLOOD PRESSURE

Blood pressure (BP), often known as arterial blood pressure, is pressure imposed by circulating blood on walls of blood arteries. When used without additional qualification, blood pressure typically refers to systemic circulation's arterial pressure. The variation in blood pressure between a maximum and a minimum during each pulse is known as systolic blood pressure. Blood pressure is a measure of pressure in brachial artery, primary artery in upper arm, and is commonly used to refer to systemic arterial pressure measured at a person's upper arm. Blood pressure is generally expressed as sum of systolic and diastolic pressures & is measured in millimetres of mercury (mm/Hg), for example, 120/80.

DIASTOLIC BLOOD PRESSURE

Blood pressure swings between a minimum and a maximum throughout each pulse. This is known as diastolic blood pressure.

STATEMENT OF THE PROBLEM

The researcher examined a number of scientific publications, books, and journals and discovered that certain physical, physiological, anthropometrical, & performance factors were detected in male university cricket players. Predicting the cricket playing ability of university cricket players using specified physical, physiological, anthropometrical, and performance factors was of interest. As a result, the researcher chose the study "Combined & Individualised Effect of Cross Training & Game Specific Exercises on Selected Physiological Variables of Male University Cricket Players in Maharastra."The investigator subjectively judged the cricket playing abilities of the university cricket players and Mean systolic blood pressure, diastolic blood pressure, & resting pulse rate were chosen as physiological variables. Hence the purpose of this study is to examine the impact of cross training on physiological profile of cricket players of Maharashtra state.

LITERATURE REVIEW

Stone (2007) looked at the physiological reactions of high school male basketball players to sport-specific aerobic interval training. The purpose of the study was to determine how effective a basketball-specific endurance circuit was in improving aerobic fitness markers. Ten male high school basketball players were ranked by fitness level and randomly assigned to one of two groups: training (N=6) or control (N=4). Sport-specific aerobic endurance training replaced fitness component of normal training during the competitive season.

Gabbet (2010) investigated and compared physiological demands of women's field hockey competition to those experienced during game-based training activities. The participants in this study were fourteen top female Field Hockey players (mean + SD; age, 23.3 + 3.2 years; maximal oxygen consumption, 53.5 + 4.3 ml x kg (-1) x min (-1). A GPS system analysis was conducted during 19 training appearances & 32 Australian Hockey League (AHL) appearances. Game-based exercises were included in all training sessions (small-sided training games performed on a smaller-sized surface).

Indranil et al. (2010) investigated the effect of training on the anthropometric, physiological, & biochemical features of elite field hockey players. This study comprised 30 Indian male field hockey players aged 23 to 30 years. The training sessions were divided into two parts: (a) the preparatory phase (PP, 8 weeks), & (b) the competition phase (CP, 4 weeks). Given lack of data on Indian field hockey players, the new study might assist coaches construct training regimens.

Gabbet (2010) researched and compared physiological demands of women's field hockey competition to those encountered during game-based training exercises. This study included fourteen elite female Field Hockey players (mean + SD; age, 23.3 + 3.2 years; maximum oxygen consumption, 53.5 + 4.3 ml x kg (-1) x min (-1)). During 19 training appearances and 32 Australian Hockey League (AHL) outings, a GPS system study was done. All training sessions included game-based exercises (small-sided training games performed on a smaller-sized surface). A global positioning satellite unit sampling at five Hz recorded movement.

Johnstone (2017) revealed in-match physiological features of professional fast-medium bowlers from England across multiple versions of competitive matches using a multivariable wearable monitoring system. Heart rate (HR) & acceleration (ACC) were compared among match types (OD, MD) and activity phases during the match (Bowling, Between over bowling, Fielding). Higher HR & ACC in OD matches suggest that the physical loads are greater than in MD versions. As a result, the utilisation of wearable technology & insights provided give a considerable knowledge of differences in match loads, as well as the physiological preparation and recuperation required for fast-medium bowlers.

Hassane Zouhal et al. (2020) discovered the benefits of physical training on anthropometric features, physical performances, & physiological capacity in those who are overweight or obese. From its commencement until June 2019, a systematic literature search method was used, with four electronic databases yielding 2,708 results. We included 116 studies in our final analysis after screening for titles, abstracts, & full texts.

Dirk Thiele et al. look at the effects of strength training (ST) on many aspects of physical fitness in rowers, such as lower/upper limb maximum strength, muscular endurance, jump performance, and sport-specific performance (2020). Studies that looked at how ST influenced at least one

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proxy of physical fitness and/or sport-specific performance in rowers and included an active control group were only included. Using random-effects models, weighted and summed standardised mean differences were determined (SMD). In order to better understand how ST type or degree of competence affect performance in a particular sport, subgroup studies were conducted.

Yaira Barranco-Ruiz et al. (2020) conduct a systematic review to investigate the prevalence of injuries occurring in training based on CrossFit®, Cross Training, or High-Intensity Functional Training modalities, as well as to assess the methodological quality of included studies. We followed PRISMA protocol's suggestions. We used the National Institute of Health's method to assess the quality of the research (United States).

In their study published in 2020, Webster, Comfort, and Jones look at the connections between fast bowlers' 50-over physical match performance and physical quality tests. These findings show the importance of long-distance intermittent running speed, vertical leap, and sprint performance in predicting the running efficiency of top one-day cricket fast bowlers. Strength and conditioning coaches should utilise this information to create training plans that guarantee fast bowlers are fit enough to meet the demands of match-running performance.

Feifei Wang et al. (2021) conducted a thorough review of the last eight years of publications. Between January 2010 and June 2018, relevant studies were found using the search terms'sleep quality' AND'physical activity' in PubMed & Scopus. All of the papers presented were properly vetted and studied. The moderate and strong PA thresholds were used to compare physical intensity and sleep quality.

Marcus V.L.dos Santos QuaresmaM.Sc. et al. (2021) looked for clinical trials that recruited CF athletes in an intervention utilizing nutrition, dietary supplements, or performance-enhancing chemicals using particular Medical Subject Headings and keywords. The major goal was to improve athletic performance. There were no additional filters used. 219 studies were discovered, including grey literature searches, however only 14 satisfied the qualifying requirements.

Weldon A, Clarke ND, Pote L, and Bishop C. (2021) create a physical profile of international cricketers and study whether or not there are positional distinctions between bowlers and hitters. This research looks at the physical characteristics of international cricketers. Batters outperformed bowlers in lower-body power, and other physical test scores were comparable across positions. Individual results for each physical test, on the other hand, indicated that there are disparities amongst players. Strength and conditioning coaches should consider this when using physical profile data to guide program design and assessment.

Abhishek Kumar, Manish Shukla, and Jayashree Acharya (2021) used the Five-Factor Model to analyze the personality attributes of cricket players at the national, state, and district levels. Materials and Procedures A total of 120 male participants (60 batters and 60 speed bowlers) were recruited from Indian cricket academies training facilities competition locations. To assess personality dimensions, the Big-Five Personality Inventory (BFI-44) was used. One-way MANOVAs were used to examine differences in personality factors across batters and speed bowlers at various competition levels.

RESEARCH METHODOLOGY

To meet the current study's goal, forty-five male university cricket players from Maharashtra state were chosen at random as subjects. Their ages varied from 18 to 27 years. The research scholar studied the available scientific literature relevant to the subject from books, journals, magazines, websites, and research papers, and the following variables and tests were chosen based on feasibility on criteria and availability.

PHYSIOLOGICAL VARIABLES

S.NO.	VARIABLES	EQUIPMENT
1	Systolic blood pressure	Digital Blood Pressure Monitor
2	Diastolic blood pressure	Digital Blood Pressure Monitor
3	Resting pulse rate	Digital Blood Pressure Monitor

The study was designed as a genuine random group design with a pre-test and post-test. The subjects (N=45) were divided into three equal groups of fifteen each. In a comparable fashion, the groups were classified as cross–training, cricket training exercises, and cross–training plus cricket training activities. The three groups took part in the training for a total of twelve weeks in order to determine the outcome of the training packages. The paired 't' test was employed to determine the difference between each group's before and post-test results. Because the individuals were chosen at random, analysis of covariance (ANACOVA) was performed because the groups were not equivalent in reference to the factors to be evaluated. As a result, the difference in means between the three groups in the pre-test had to be considered during the analysis of post-test mean differences. This was accomplished through the use of covariance analysis, in which the end means were adjusted for differences in the original means and the modified means were assessed for significance. When the adjusted post-test means were determined to be significant, the scheffe's post-hoc test was used to determine the paired means difference. A level of significance of 0.05 was used and regarded sufficient for the investigation.

ADMINISTRATION OF TEST ITEMS

SYSTOLIC BLOOD PRESSURE

PURPOSE

The purpose of this test is to measure the higher blood pressure per minute.

EQUIPMENT REQUIRED

Digital blood pressure monitor

PROCEDURE

All individuals' systolic blood pressures were measured while laying supine. The individuals were instructed to lie down on a bed and unwind. The blood pressure monitor's input chord was wrapped around the subject's left arm, and the electric chord of the digital blood pressure monitor was placed into the play point before the switch was turned on.

SCORING

The systolic blood pressure recorded on the monitor's board was accounted for as the subject's systolic blood pressure per minute.

DIASTOLIC BLOOD PRESSURE

PURPOSE

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The purpose of this test is to measure the lower blood pressure per minute.

EQUIPMENT REQUIRED

Digital blood pressure monitor

PROCEDURE

All individuals' diastolic blood pressures were measured while laying supine. The individuals were instructed to lie down on a bed and unwind. The blood pressure monitor's input chord was wrapped around the subject's left arm, while the digital blood pressure monitor's electric chord was placed into the play point. For operation, the switch was turned on.

SCORING

The diastolic blood pressure recorded on the monitor's board was accounted for as the subject's diastolic blood pressure per minute.

RESTING PULSE RATE

PURPOSE

The purpose of this test is to measure the number of pulse rate per minute.

EQUIPMENT REQUIRED

Digital blood pressure monitor

PROCEDURE

All participants' pulse rates were recorded in a laying supine posture between 8 and 9 hours before the pulse rate was taken. Before the pulse rate was measured, the individuals were requested to lie on a bed and rest for 20 minutes. The pulse monitor's input chord was wrapped around the subject's left arm, while the pulse monitor's electric chord was plugged into the play point. For operation, the switch was turned on.

SCORING

The recorded pulse rate on the monitor's board was an account of the subject's resting pulse rate per minute.

DATA ANALYSIS AND INTERPRETATIONS

The impact of each independent variable on each criteria variable was examined and reported below:

TABLE 1 SIGNIFICANCE OF MEAN GAINS & LOSSES BETWEEN PRE AND POST TEST SCORES ON SELECTED VARIABLES OF GROUP A

S.No	VARIABLES	PRE-TEST MEAN	POST-TESTMEAN	MEAN DIFFERENCE	'T'RATIO
1	Systolic Blood Pressure	111.076	120.934	9.858	5.669*
2	Diastolic Blood Pressure	81.273	83.138	1.865	6.783*
3	Resting Pulse Rate	79.479	78.532	0.947	7.896*

*Significant at 0.05 level of confidence. The table values required for significance at 0.05 level of confidence for df 15 is 2.14, respectively).

The obtained 't' ratios for systolic blood pressure, diastolic blood pressure, and resting pulse rate were 5.669, 6.783 and 7.896 respectively. The resulting 't' ratios on the specified variables were discovered to be larger than the needed table value of 2.140 at the 0.05 level of significance for 15 degrees of freedom. As a result, it was discovered to be substantial. The findings of this investigation were statistically significant and favorably described its effects.

TABLE 2 SIGNIFICANCE OF MEAN GAINS & LOSSES BETWEEN PRE AND POST TEST SCORES ON SELECTED VARIABLES OF GROUP B

S.NO	VARIABLES	PRE-TEST MEAN	POST-TEST MEAN	MEAN DIFFERENCE	'T' RATIO
1	Systolic Blood Pressure	108.275	116.739	8.464	5.788*
2	Diastolic Blood Pressure	79.604	80.934	1.330	7.329*
3	Resting Pulse Rate	78.602	77.933	0.669	5.120*

According to table 2, the acquired 't' ratios for systolic blood pressure, diastolic blood pressure, and resting pulse rate were 5.788, 7.329 and 5.120 respectively. The resulting 't' ratios on the specified variables were determined to be larger than the needed table value of 2.14 for 15 degrees of freedom at the 0.05 level of significance. As a result, it was discovered to be substantial. The findings of this investigation were statistically significant and favourably described its effects.

TABLE 3 SIGNIFICANCE OF MEAN GAINS & LOSSES BETWEEN PRE AND POST TEST SCORES ON SELECTED VARIABLES OF GROUP C

S.NO	VARIABLES	PRE-TEST MEAN	POST-TEST MEAN	MEAN DIFFERENCE	'T' RATIO
1	Systolic Blood Pressure	111.601	111.675	0.074	1.974
2	Diastolic Blood Pressure	77.408	73.338	4.070	1.423
3	Resting Pulse Rate	75.679	73.473	2.206	1.592

*Significant at 0.05 level of confidence. The table values required for significance at 0.05 level of confidence for df 15 is 2.14 respectively).

The acquired 't' ratios were 1.974, 1.423 and 1.592 systolic blood pressure, diastolic blood pressure, and resting pulse rate. At the 0.05 level of significance for 15 degrees of freedom, the obtained 't' ratios on the specified variables were determined to be larger than the needed table value of 2.140. As a result, it was discovered to be substantial. The findings of this investigation were statistically significant and favorably described its effects.

RESULTS OF ANALYSIS OF CO-VARIANCE

The table below depicts the statistical findings of the combined and personalised effect of group A and cricket training workouts on selected physiological, male university cricket players in Maharashtra.

TABLE 4 SYSTOLIC BLOOD PRESSURE OF GROUP C AND GROUPS (A&B) (IN mm. Hg)

TEST	GROUP C	GROUP A	GROUP B	SOV	SS	DF	MS	F-RATIO
Post-test								
Mean	111.603	111.078	108.272	**B.M.**	96.186	2	48.091	0.553
SD(±)	8.474	7.783	11.421	**W.G.**	3681.479	42	87.654	
Post-test								
Mean	111.672	120.936	116.733	**B.M.**	645.914	2	322.967	4.967*
SD(±)	8.573	8.842	7.408	**W.G.**	2889.209	42	68.791	
Adjusted Post-test								
Mean	111.084	120.592	117.661	**B.S.**	708.963	2	354.487	6.819*
				W.S.	2133.342	41	52.035	

*Significant at 0.05 level of confidence.

*(The table values required for significance at 0.05 level of confidence for 2 & 42 and 2 & 41 are 3.22 and 3.23 respectively).

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CG-GROUP C, DF-DEGREES OF FREEDOM, W.G. WITHIN GROUPS
SOV- SUM OF VARIANCE, MS-MEANSQUARE,B.S.-BETWEEN SET
SS-SUM OF SQUARES, B.M-BETWEEN MEAN, W.S.-WITHIN SET

The pre-test mean values for the group C, group A, and group B are 111.603, 111.078, and 108.272, respectively, according to table 5.14. The resulting 'F' ratio of 0.553 for pre-test scores was smaller than the table value, 3.22 for degrees of freedom 2 and 42 for significant at the 0.05 level of confidence for systolic blood pressure. The group C, group A, and group B post-test mean values are 111.672, 120.936, and 116.733, respectively. The computed 'F' ratio of 4.697 for post-test scores was higher than the table value of 3.22 for degrees of freedom 2 and 42 necessary for significance at the 0.05 level of confidence for systolic blood pressure. Group C, group A, and group B adjusted post-test averages are 111.084, 120.592, and 117.661, respectively. The 'F' ratio of 6.819 achieved for adjusted post-test means was more than the table value of 3.23 for degrees of freedom 2 and 41 necessary for significant at 0.05 level of confidence for systolic blood pressure. The study found a significant difference in the adjusted post-test means of the group C, group A, and group B on systolic blood pressure. Because the acquired 'F' ratio value was significant, the Scheffe's test was used to determine the paired mean difference, which is shown in table 5.

TABLE 5 THE SCHEFFE'S TEST FOR THE DIFFERENCE BETWEEN PAIRED MEANS ON SYSTOLIC BLOOD PRESSURE

GROUP C	GROUP A	GROUP B	MD	CI
-	120.592	117.661	2.931	3.668
111.084	120.592	-	9.508*	
111.084	-	117.661	6.577*	

*Significant at 0.05 level of confidence.

The mean difference values between group A and group B, group C & cross training, and group C & group B are 2.931, 9.508, and 6.577, respectively, which are greater than the confidence interval value of 3.668 at the 0.05 level of confidence, according to table 5.15. The study's findings revealed a significant difference in systolic blood pressure between the group C and group A and the group C and group B. Figure 1 depicts the pre, post, and adjusted post-test means values of the group C, group A, and group B on systolic blood pressure.

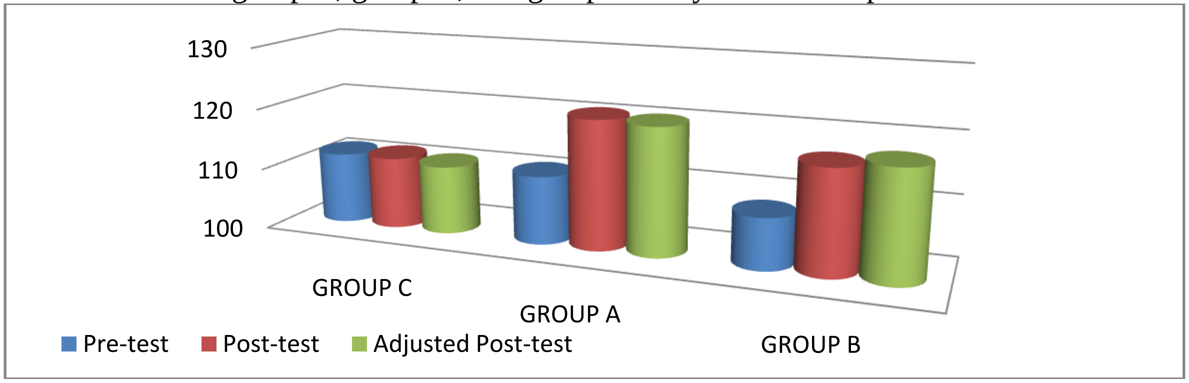

FIGURE 1 THE PRE, POST AND ADJUSTED MEAN VALUES OF SYSTOLIC BLOOD PRESSURE ON GROUP C, GROUP A AND GROUP B

TABLE 6 DIASTOLIC BLOOD PRESSURE OF GROUP C AND GROUPS (A&B) (in mm. Hg)

TEST	GROUP C	GROUP A	GROUP B	SOV	SS	DF	MS	F-RATIO
Pre-test								
Mean	77.404	81.272	79.601	**B.M.**	112.846	2	56.427	1.073
SD(±)	8.578	6.559	6.372	**W.G.**	2200.134	42	52.385	
Post-test								
Mean	73.337	83.134	80.932	**B.M.**	793.209	2	396.602	11.976*
SD(±)	4.493	6.195	6.381	**W.G.**	1391	42	33.143	
Adjusted Post-test								
Mean	74.745	81.853	80.814	**B.S.**	423.056	2	211.533	26.335*
				W.S.	329.32	41	8.03	

*Significant at 0.05 level of confidence.

*(The table values required for significance at 0.05 level of confidence for 2 & 42 and 2 & 41 are 3.22 and 3.23 respectively).

The pre-test mean values for the group C, group A, and group B are 77.404, 81.272, and 79.601, respectively, according to table 6. The resulting 'F' ratio of 1.073 for pre-test scores was smaller than the table value, 3.22 for degrees of freedom 2 and 42 for significant at the 0.05 level of confidence for diastolic blood pressure. The post-test mean values for the group C, group A, and group B are respectively 73.337, 83.134, and 80.932. The computed 'F' ratio of 11.976 for post-test scores was more than the table value of 3.22 for degrees of freedom 2 and 42 needed for significance at the 0.05 level of confidence for diastolic blood pressure. Group C, group A, and group B adjusted post-test averages are 74.745, 81.853, and 80.814, respectively. The calculated 'F' ratio for adjusted post-test averages of 26.335 was more than the table value of 3.23 for degrees of freedom 2 and 41 necessary for significant at 0.05 level of confidence for diastolic blood pressure. The study found a significant difference in diastolic blood pressure adjusted post-test averages between the group C, group A, and group B. Because the acquired 'F' ratio value was significant, the Scheffe's test was used to determine the paired mean difference, which is shown in table 7.

TABLE 7 THE SCHEFFE'S TEST FOR THE DIFFERENCE BETWEEN PAIRED MEANS ON DIASTOLIC BLOOD PRESSURE

GROUP C	GROUP A	GROUP B	MD	CI
-	81.853	80.814	1.039	1.446
74.745	81.853	-	7.108*	
74.745	-	80.814	6.069*	

*Significant at 0.05 level of confidence.

The mean difference values between group A and group B, group C & group A, and group C & group B are 1.039, 7.108, and 6.069, respectively, which are greater than the confidence interval value of 1.446 at the 0.05 level of confidence, according to table 7. The study's findings revealed a significant difference in diastolic blood pressure between the group C and group A and the group C and group B. Figure 2 depicts the pre, post, and modified post-test means values of the group C, group A, and group B on diastolic blood pressure.

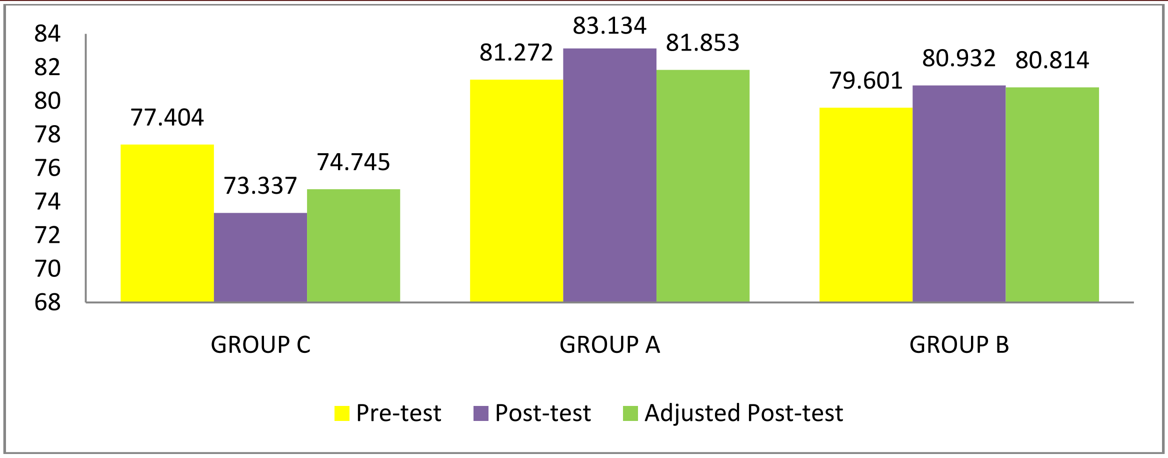

FIGURE 2 THE PRE, POST AND ADJUSTED MEAN VALUES OF DIASTOLIC BLOOD PRESSURE ON GROUP C, GROUP A AND GROUP B

TABLE 8 RESTING PULSE RATE OF GROUP C AND GROUPS (A&B) (IN COUNTS)

TEST	GROUP C	GROUP A	GROUP B	SOV	SS	DF	MS	F-RATIO
				Pre-test				
Mean	75.674	79.473	78.604	**B.M.**	118.982	2	59.491	2.082
SD(±)	3.663	7.384	4.222	**W.G.**	1200.671	42	28.596	
				Post-test				
Mean	73.478	78.535	77.934	**B.M.**	229.917	2	114.962	4.558*
SD(±)	3.373	4.475	6.667	**W.G.**	1060.402	42	25.241	
				Adjusted Post-test				
Mean	75.363	77.210	77.351	**B.S.**	33.723	2	16.875	3.487*
				W.S.	198.636	41	4.854	

*Significant at 0.05 level of confidence.

*(The table values required for significance at 0.05 level of confidence for 2 & 42 and 2 & 41 are 3.22 and 3.23 respectively).

The pre-test mean values for the group C, group A, and group B are 75.674, 79.473, and 78.604, respectively, as shown in table 8. The calculated 'F' ratio of 2.082 for pre-test scores was smaller than the table value, 3.22 for degrees of freedom 2 and 42 for significant at the 0.05 level of confidence for resting pulse rate. The group C, group A, and group B post-test mean values are 73.478, 78.535, and 77.934, respectively. The computed 'F' ratio of 4.558 for post-test scores was higher than the table value of 3.22 for degrees of freedom 2 and 42 needed for significance at 0.05 level of confidence for resting pulse rate. Group C, group A, and group B adjusted post-test averages are 75.363, 77.210, and 77.351, respectively. The calculated 'F' ratio of 3.487 for adjusted post-test means was higher than the table value of 3.23 for degrees of freedom 2 and 41 necessary for significant at the 0.05 level of confidence for resting pulse rate. The study found a significant difference in the adjusted post-test means of the group C, group A, and group B on resting pulse rate. Because the acquired 'F' ratio value was significant, the Scheffe's test was used to determine the paired mean difference, which is shown in table 9.

TABLE 9 THE SCHEFFE'S TEST FOR THE DIFFERENCE BETWEEN PAIRED MEANS ON RESTING PULSE RATE

GROUP C	GROUP A	GROUP B	MD	CI
-	77.210	77.351	0.141	1.403
75.363	77.210	-	1.847*	
75.363	-	77.351	1.990*	

*Significant at 0.05 level of confidence.

The mean difference values between group A and group B, group C and group A, and group C and group B are 0.141, 1.857, and 1.990, respectively, which are more than the confidence interval value of 1.403 at the 0.05 level of confidence. The study's findings revealed a substantial difference in resting pulse rate between the group C and group A and the group C and group B. Figure 3 depicts the pre, post, and modified post-test mean values of the group C, group A, and group B on resting pulse rate.

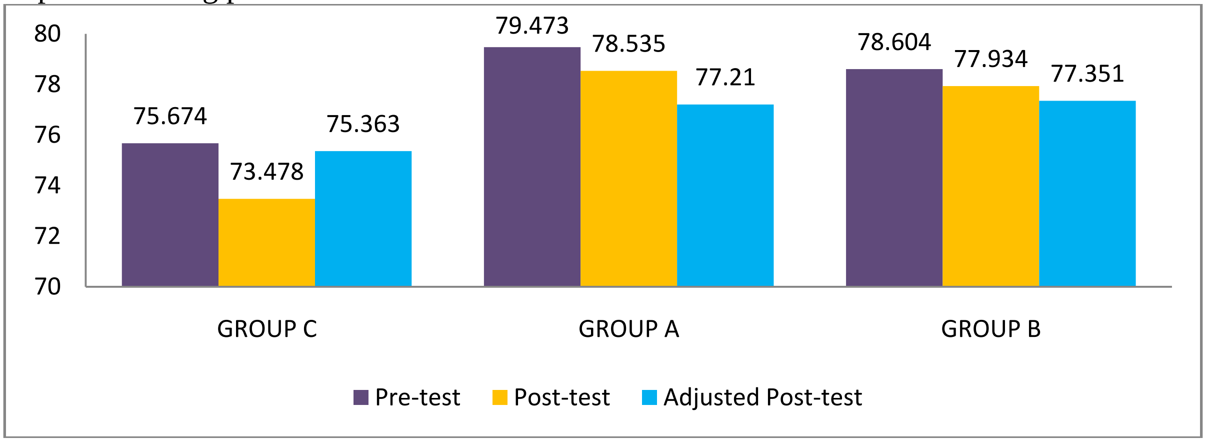

FIGURE 3 THE PRE, POST AND ADJUSTED MEAN VALUES OF RESTING PULSE RATE ON GROUP C, GROUP A AND GROUP B

CONCLUSIONS

1. After twelve weeks of cross-training, the experimental group 'A' showed considerable improvement in all of the specified physiological variables.
2. After twelve weeks of cricket training workouts, the experimental group 'B' showed considerable improvement in all of the specified physiological variables.
3. After twelve weeks of combining cross-training with cricket training activities, the experimental group 'C' showed considerable improvement in all of the specified physiological variables.
4. The cross-training group improved much more than the cricket training workouts group in all of the specified physiological variables.
5. All performance metrics improved significantly in the group that did cricket training workouts.
6. The combined cross-training with cricket training exercises group improved much more than the personalized groups in all of the assessed physiological variables.
7. The findings of this study show that cross-training with cricket training exercises can improve the performance of university cricket players in virtually all of the physiological variables. As a result, it is advised that coaches and physical educators in the game of university cricket players prioritize cross training alongside cricket training activities in their schedules.

8. It is also advised that cricket players at any level have knowledge of cross-training in order to coach the players to improve their performance.

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