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Effectiveness Of Fartlek Training In Anaerobic Performance Of Ultimate Frisbee Players

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Abstract

In various sports, including ultimate Frisbee, an athlete's physical condition significantly impacts their performance. Developing specific training plans to enhance sports skills is crucial for player improvement. The success of ultimate Frisbee players is greatly influenced by anaerobic performance, defined by high-intensity, brief physical activity. Fartlek training, a popular interval training method, enhances athletic performance. This study investigates how Fartlek training affects Running Anaerobic Sprint Test (RAST)- measured anaerobic performance in ultimate Frisbee players. It aims to guide training strategies and reveal Fartlek's impact. Using experimental methods, data collection followed these steps: Participants were enlisted after providing informed consent and completing the Physical Activity Readiness Questionnaire (PAR-Q). Initial testing established the baseline anaerobic performance using RAST. Subsequently, a Fartlek training regimen was implemented over a specified duration (e.g., 6 weeks). Following the training, a post-test was conducted to evaluate alterations in anaerobic performance utilizing RAST. The collected pre- and post-test data underwent analysis to identify noteworthy differences. Findings reveal diverse fitness levels, emphasizing tailored training for ultimate Frisbee's demands, highlighting aerobic and anaerobic fitness. Post-training, most players improved anaerobic capacity, with positive fatigue index changes. Some players, however, showed reduced fatigue tolerance. Fartlek training notably raised anaerobic capacity, with limited fatigue index impact. This research offers insights into optimizing ultimate Frisbee player performance through focused training and underscores Fartlek training's potential in enhancing anaerobic performance.

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INTRODUCTION

The performance of athletes in various sports, including ultimate Frisbee, is heavily influenced by their physical condition. Enhancing overall player capabilities requires targeted training regimens that focus on specific sports skill [4]. The Running Anaerobic Sprint Test (RAST) serves as a widely used method for evaluating anaerobic performance, encompassing both anaerobic capacity and fatigue index. Fartlek training, a form of interval training, has demonstrated its efficacy in enhancing athletic performance [12]. This study delves into the impact of Fartlek training on RAST-assessed anaerobic performance in ultimate Frisbee players, with the aim of informing future training strategies and shedding light on the effects of Fartlek on the anaerobic performance of young athletes.

Fartlek, a Swedish term translating to "speed play," represents an exercise approach that seamlessly combines elements of continuous and interval training [20].This adaptable method entails activities such as alternating between jogging and sprinting or incorporating walking with intermittent jogging phases, catering to individuals' varying fitness levels. Characterized by bursts of rapid running interwoven with slower periods, Fartlek training challenges both aerobic and anaerobic systems, offering a dynamic alternative to traditional interval training [11]. While Fartlek training accommodates a variety of exercises, running is commonly associated with its practice.

The fatigue index, a measure of the rate of power decline during anaerobic activities, is indicative of both aerobic stamina and lactate tolerance. Elevated fatigue index scores suggest enhanced lactate tolerance, translating to quicker recovery from muscle fatigue [25].Targeting lactate tolerance training, often initiated midway through the preseason once aerobic foundations are established, can contribute to performance enhancement. Conversely, anaerobic capacity pertains to the maximum adenosine triphosphate generated by the body during short bursts of intense activity. Metrics like peak power, time to achieve peak power, fatigue index, total work output, and time to exhaustion collectively contribute to assessing anaerobic performance [1].

The practical significance of this study extends to the integration of its outcomes into the actual training regimen of PUP Ultimate and the broader athletic community. Collaborative efforts with coaches and trainers will ensure the incorporation of evidence-based training techniques derived from the study's insights. Furthermore, these findings can be extrapolated to other sports programs within the institution, thereby fostering an environment of improved athletic performance for both Frisbee players and fellow athletes.

LITERATURE REVIEW

EXPERIMENTAL METHOD/S

Description of Method of Research

Experimental research was studied using a quantitative method. The study used the scientific approach to determine the cause-and-effect relationship between the many study-related factors. The study's variables are in particular, how training and anaerobic performance relate. Any research in which a deliberate effort is made to identify and control all variables except for one is categorized as an experiment or experimental research. An independent variable is manipulated to determine the effects on the dependent variables [26]. The experimental study is focused on anaerobic performance, which includes fatigue index and anaerobic capacity. The Fartlek training session was the independent variable. Because it can be controlled, experimental research has been determined to be the most dependable of all the research techniques utilized in the past [30]. Researchers employ quantitative methodologies to investigate conditions or events that influence athletes. Quantitative research generates unbiased data that can be thoroughly clarified through the utilization of statistics and graphical representations [14].

Description of the Participants

Participants in this study will be active Ultimate Frisbee players of all ages and genders from different Ultimate Frisbee clubs and organizations. Both PUP athletes and non-PUP athletes fall under this category. To properly participate in the demands of Ultimate Frisbee, participants need to achieve the necessary fitness criteria. The Physical Activity Readiness Questionnaire (PAR-Q) is a widely used method to identify potential health and

lifestyle concerns prior to commencing an exercise regimen [5], was used by the researchers to make this assessment. Both PUP and non-PUP members were eligible to participate, provided they were physically fit for the experiment and were athletic.
To observe accurate results and relationships between the variables, researchers anticipated that the participants would be 20 Frisbee players. A sample size of 20 participants has been determined as suitable for the present study, drawing from prior relevant research studies that employed similar sample sizes to explore the impacts of fartlek training on athletic performance. Dr. Palanisamy (2020) [24] study examined how fartlek training affected the muscular endurance of 30 male cross-country runners, whereas Neethu (2022) [23] concentrated on the impact of fartlek and circuit training on muscular strength and endurance among 20 runners.
Players of ultimate Frisbee were chosen as study participants for various reasons. First, the researchers are particularly interested in the sport of ultimate Frisbee and want to look at how Fartlek training affects its participants. A second reason why ultimate Frisbee is a good sport is to study the impact of Fartlek training on anaerobic performance because it calls for high levels of anaerobic performance. Finally, compared to other sports, ultimate Frisbee provides more straightforward access to a group of players, making it a more practical choice for study.
Dependent sampling, often referred to as repeated measures or within-subjects design, was used as the sampling method for this investigation. Using the same individuals' measurements taken before and after an intervention, this sampling technique tracks changes over time [13]. Before and after implementing the fartlek training intervention, the researchers employed the Running Anaerobic Sprint Test (RAST) to assess the participants' anaerobic capacity. Dependent sampling is used in this study so that pre-and post-test results for each participant can be directly compared. This allows for a more accurate assessment of how the intervention affected anaerobic capacity.

Description of Research Instrument
Fartlek Training

Over six weeks, participants in a study investigating the impact of fartlek training on a specific performance outcome will engage in four sets of the following sequence: 1-minute jog, 30-second run, 1-minute walk, 45-second run, and 30-second jog. Based on the research suggestions currently accessible from professionals in the industry, a twice-weekly Fartlek training schedule was selected for the study. It is a typical frequency for high-intensity interval training, including fartlek training, and is thought to be secure and efficient for enhancing anaerobic performance without overtraining or running the risk of injury. A twice-weekly schedule would not overburden participants or interfere with their other training sessions because they have other competitions and training to attend.

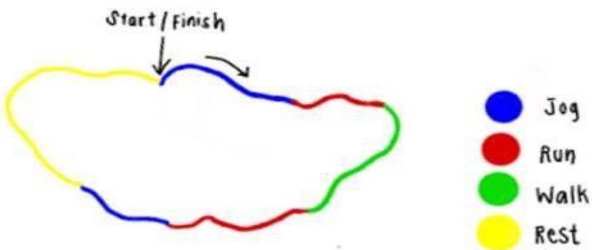

Fig. 1. Set of Fartlek Training

Running Anaerobic Sprint Test

The Running Anaerobic Sprint Test (RAST) was utilized as a research instrument to assess the anaerobic capacity and endurance of the study participants who will undergo Fartlek training and undergo pretest and posttest evaluations. The RAST involves six sprint intervals, covering a 35-meter distance, interspersed with 10-second rest intervals between each sprint [2]. The sprints must be completed as quickly as possible by the participants, and each sprint's completion time will be recorded. To evaluate changes in the participants' anaerobic performance and endurance, the test was given prior to the Fartlek training program (pretest) and after the program (posttest). Research investigations examining the impact of diverse training protocols on athletic performance often utilize the RAST as a dependable and credible measure for assessing anaerobic capacity and endurance.

When evaluating the fatigue index and anaerobic capacity, researchers calculated the peak power output as part of the analysis process. Peak Power Output (PPO), which quantifies the highest level of power exertion achievable during a specific activity, holds significance in the computation of both fatigue index (FI) and anaerobic capacity (AC). Fatigue Index and Anaerobic Capacity are gauged through the disparity between the maximum and minimum power outputs and the cumulative work accomplished. Therefore, figuring out PPO is crucial since it gives us the numbers to compute these two factors appropriately.

A. Anaerobic Capacity = Total of peak power outputs (PPO) from all six sprints Peak Power Output = Body mass * Distance ^{2} ÷ Time ^{3}
B. Fatigue Index = (Maximum Power – Minimum Power)/ Total time of six sprints From the six sprint times and PPOs, you can then identify the following: Maximum power output (i.e., the highest value) Minimum power output (i.e., the lowest value)

Fig. 2. Test Configuration for the Running Anaerobic Sprint Test

Research utilizing the Running Anaerobic Sprint Test (RAST) encompasses a wide range of participant groups, including college students from various disciplines [29] and athletes representing different sports [22]. These studies highlight variations in anaerobic capacity and fatigue index among different groups. To assess intervention impact, pre-test and post-test designs are employed, enabling evaluation of individual baseline performance and improvements following training (aquatic plyometric training study and football players study). This approach provides valuable insights into anaerobic capacity and performance effects, allowing the interpretation of data based on baseline comparisons and individual progress.

Only the baseline measurements from the Running Anaerobic Sprint Test (RAST) were included in the pre-test interpretation of the data. This would serve as the starting point for each participant's anaerobic capacity and fatigue index. Researchers analyzed and presented the baseline data in a table format to show the initial performance of the participants before intervention.

In the post-test interpretation, researchers included both the post-test measurements and whether there were improvements in anaerobic capacity and fatigue index. This allowed the researchers to assess the impact of the intervention or training program on each participant's performance. After the intervention, the post-test results can be compared to the baseline measurements to determine if there were significant changes in anaerobic capacity and fatigue index.

By including the baseline and post-test measurements, researchers identified individual progress and improvements in anaerobic capacity and fatigue levels. This individual baseline comparison provided valuable insights into the effectiveness of the intervention and its impact on each participant's athletic performance.

Data Gathering Procedure

To collect data for this study, the researchers employed an experimental methodology. The operations listed below were carried out:

1. Participant recruitment: Participants were enlisted through multiple avenues, including social media platforms and personal networks. They were provided with comprehensive information about the study's

objectives, methodologies, and potential advantages and drawbacks. Each participant's informed consent and completion of the Physical Activity Readiness Questionnaire (PAR-Q) were obtained before their inclusion in the study.
2. Pre-Testing: Prior to the commencement of the study, all participants underwent a pre-test utilizing the RAST in order to establish a baseline measurement of their anaerobic performance.
3. Intervention: The participants underwent the Fartlek training program for a predetermined period of time (6 weeks).
4. Post-testing: Upon the completion of the training period, all participants underwent a post-test employing the Running Anaerobic Sprint Test (RAST) to evaluate any alterations in their anaerobic performance and endurance.
5. Data analysis: The data gathered from both the pre-and post-testing phases were subjected to analysis in order to ascertain whether there exist any striking differences in the anaerobic performance among the participants

Statistical Treatment of Data

Researchers employed a paired sample t-test to analyze the collected data. The statistical analysis utilized a paired sample t-test to compare the means of two related groups. The anaerobic performance scores of the individuals before and after the far tlek training intervention was compared using the paired sample t-test in this study. Because the measurements were taken from the same individuals before and after the intervention, the paired sample t-test is an appropriate statistical method. The fact that the data is paired ensures that any changes observed in anaerobic performance scores are a result of the intervention (fartlek training) rather than individual differences. The study can use a paired sample t-test to determine if there is a significant difference between the mean anaerobic performance scores before and after the intervention. It may be said that the fartlek training intervention had an impact on anaerobic performance if a substantial difference is discovered. In conclusion, the paired sample t-test is an appropriate statistical method for this study as it enables the comparison of means within related groups and facilitates the evaluation of the intervention's impact on anaerobic performance.

The formula for the paired t-test involves calculating the sum of the differences between each pair, dividing it by the square root of n times the sum of the squared differences minus the sum of the squared differences divided by n-1. The formula for the paired t-test is as follows:

$$t = \frac{\Sigma d}{\sqrt{\frac{n(\Sigma d^2) - (\Sigma d)^2}{n-1}}}$$

Where ∑d is the sum of the differences between paired observations.

RESULTS AND DISCUSSION

1. **Baseline measurement of the participants' anaerobic performance before the intervention in terms of Anaerobic Capacity and Fatigue Index**

Table 1. Baseline Measurement of Frisbee Players' Anaerobic Capacity

ID CODE	Anaerobic Capacity (W)
1	5122.33
2	3086.57
3	3918.9
4	2583.86
5	2256.76
6	3185.3
7	2870.22
8	3195.22
9	4083.91

10	**3225.23**
11	**2072.65**
12	**2708.53**
13	**2944.04**
14	**4088.47**
15	**1554.13**
16	**3985.88**
17	**2380.28**
18	**1843.96**
19	**4612.83**
20	**3784.53**

The baseline assessment of the participants' anaerobic capacity before the intervention is shown in the table and is expressed in watts (W). The anaerobic capacity levels among frisbee players range from 1554.13 W to 5122.33 W.

The article by Kajiki (2021) [17] emphasizes the need for aerobic and anaerobic fitness in this sport while highlighting the physical challenges of Ultimate Frisbee. The baseline anaerobic capacity measures of the frisbee players are consistent with the idea that good frisbee players must be able to do high-intensity movements and maintain activity for long periods. The varied fitness levels and racial origins of participants in the sport are reflected in the vast range of anaerobic capacity values in the baseline measures of the frisbee players.

Anaerobic fitness is essential in Ultimate Frisbee, according to a study by Anbalagan (2017) [3]. The participants' baseline anaerobic capacity measures serve as a starting point for determining their readiness and potential for anaerobic performance during the intervention. Adapting training regimens to improve players' anaerobic capabilities is possible by knowing their baseline anaerobic capacity levels for the sport of frisbee. This could result in better performance during high-intensity movements during play.

Roopchand-Martin et al. (2019) [27] study aims to assess the lower limb strength and agility in rugby and soccer players following water plyometric training. Although the study relates to various sports, the use of baseline tests, such as RAST, is in keeping with the methodology of the current study. To interpret the results and evaluate the efficacy of the training program, baseline measures are crucial for spotting any changes in anaerobic capacity after the intervention.

Table 2. Baseline Measurement of Frisbee Players' Fatigue Index

ID CODE	Fatigue Index (%)
1	7.26
2	17.01
3	17.62
4	10.54
5	4.72
6	6.52
7	15.28
8	11.1
9	11.04
10	18.66
11	3.78
12	5.04
13	7.72
14	9.22
15	3.18
16	9.75
17	5.91
18	2.06

19	9.19
20	7.38

The baseline evaluation of the participants' fatigue index before the intervention is shown as a percentage (%) in the table.
The frisbee players' fatigue indices range from 2.06% to 18.66%.

Understanding the frisbee players' initial ability to handle tiredness during the game depends heavily on the baseline measures of their fatigue index. These findings are consistent with the research by Krustrup and Mohr (2015) [18], highlighting the significance of adjusting training to the metabolic requirements of ultimate frisbee. Researchers can create personalized training programs to address inevitable fatigue-related issues faced by the players by considering individual baseline fatigue index levels, potentially improving overall performance while playing.
Additionally, Bieuzen et al. (2018) [6] and Jacobs et al. (2017) [16] investigate how anaerobic performance, which is closely related to fatigue index, is impacted by exercise and muscle metabolism. Understanding the frisbee players' initial capacity to maintain high-intensity motions throughout the game begins with analyzing baseline fatigue index readings. Researchers can determine whether the intervention positively impacted the players' fatigue tolerance and anaerobic performance by comparing post-test fatigue index data with the baseline.

1. **Post-test measurement of the Participants' Anaerobic Performance after the Intervention in terms of Anaerobic Capacity and Fatigue Index**

Table 3. Post-Test Measurement of Frisbee Players' Anaerobic Capacity

ID CODE	Post-Test	Diff. + / -	Interpretation
1	5654.31	531.98	IMPROVED
2	4014.3	927.73	IMPROVED
3	3801.64	-117.26	NOT IMPROVED
4	2708.36	124.5	IMPROVED
5	2617.58	360.82	IMPROVED
6	3425.13	239.83	IMPROVED
7	3236.69	366.47	IMPROVED
8	INJURED	-	-
9	4578.42	494.51	IMPROVED
10	4803.59	1578.36	IMPROVED
11	3465.14	1392.49	IMPROVED
12	3916.42	1207.89	IMPROVED
13	INJURED	-	-
14	4862.4	773.93	IMPROVED
15	1583.72	29.59	IMPROVED
16	4589.54	603.66	IMPROVED
17	2922.69	542.41	IMPROVED
18	2573.53	729.57	IMPROVED
19	INJURED	-	-
20	4629.88	845.35	IMPROVED

The post-test measurements of the subjects' anaerobic capacity following the intervention are shown in the table. According to the statistics, most frisbee players showed increased anaerobic capacity following the intervention. The majority showed favourable differences in their post-test measurements compared to their baseline values. This suggests that the intervention had a favorable effect on their anaerobic performance because the positive differences indicate an improvement in anaerobic capacity. These participants can be categorized as "IMPROVED," depending on the interpretation.

However, due to injuries unrelated to the intervention, three participants with IDs 3, 8, and 13 could not complete the post- test. Their post-test measures are therefore labeled "INJURED," and no "Diff. + / -" is computed for them.
The results are consistent with previous studies. The function of tendon stiffness in enhancing athletic performance was highlighted by Kubo et al. (2005) [19] research, which may explain why frisbee players' anaerobic capacity has increased. Understanding how the intervention affected tendon properties may shed more light on the mechanisms underlying the improved anaerobic performance.
The Davis et al. (2016) [9] study also showed how muscle metabolism affects anaerobic performance. According to research by Chapman and Levin (2016) [7], endurance training increases the muscles' ability to use stored energy, which improves anaerobic performance and lessens fatigue. The majority of the frisbee players in this study showed gains in anaerobic capacity, which these mechanisms may have influenced.

Table 4. Post-Test Measurement of Frisbee Players' Fatigue Index

ID CODE	Post-Test	Diff. + / -	Interpretation
1	8.85	-1.59	NOT IMPROVED
2	8.54	8.47	IMPROVED
3	7.44	10.18	IMPROVED
4	8.61	1.93	IMPROVED
5	4.71	0.01	IMPROVED
6	11.04	- 4.52	NOT IMPROVED
7	6.99	8.29	IMPROVED
8	INJURED	-	-
9	16.67	- 5.63	NOT IMPROVED
10	14.61	4.05	IMPROVED
11	11.68	-7.9	NOT IMPROVED
12	14	-8.96	NOT IMPROVED
13	INJURED	-	-
14	6.14	3.08	IMPROVED
15	3.85	- 0.67	NOT IMPROVED
16	6.78	2.97	IMPROVED
17	17.44	-11.53	NOT IMPROVED
18	6.6	- 4.54	NOT IMPROVED
19	INJURED	-	-
20	16.48	- 9.1	NOT IMPROVED

After the intervention, the frisbee players' fatigue index post-test assessments produced various results. Participants with IDs 2, 3, 4, 5, 7, 10, 14, and 16 showed positive differences in their post-test readings compared to their baseline results, showing a decline in their fatigue index and possibly an improvement in their capacity to control fatigue during the game. These participants fit the "IMPROVED" description, consistent with research findings [12],that high-intensity training can improve anaerobic adaptations and increase an athlete's quick glycolytic energy system.
The post-test measurements, however, revealed negative differences in the participants with IDs 1, 6, 9, 11, 12, 15, 16, 17, and 18, showing a rise in the fatigue index following the intervention. This suggests that the intervention might not have adequately addressed these people's issues connected to fatigue, leading to a decline in their ability to tolerate fatigue. These participants can be categorized as "NOT IMPROVED," which is consistent with Pavlovic (2016) [25] research on physical education and sports students, who found that some participants had lower lactate tolerance and weaker anaerobic abilities despite participating in sports.
According to the post-test data, the fatigue index increased following the fartlek exercise, which may imply that the intervention had a negative effect. However, according to Dambroz (2022) [8], it is essential to consider that the fatigue index is just one measure of fatigue, and individual responses to training can vary. Fartlek training has been shown in the literature to increase anaerobic capacity by boosting muscle metabolism. However, not all individuals may have noticed an improvement in fatigue. Participants' responses to the intervention can depend on various variables, including their level of fitness, past training experience, and high-intensity training adaptability.

3.Significant difference in the anaerobic performance between the pre-test and post-test in terms of anaerobic capacity and fatigue index

Table 5. Statistical Analysis of Anaerobic Capacity Before and After Interventio

Anaerobic Capacity	Weighted Mean	t-value	p-value	Decision	Remarks
Pre-Test	3103.03	-5.5252	0.0000	Reject Ho	Significant
Post Test	3728.43				

**If the p-value is greater than the level of significance (0.05), we reject the null hypothesis; otherwise, we do not reject it.*

Examining the statistical analysis of the study allows us to comprehend the impact of the intervention on the participants' anaerobic performance. The idea was that participants would perform much better anaerobically if they had a lower fatigue index and a higher anaerobic capacity.

Using statistical analysis, anaerobic capacity and fatigue index were compared before and after the fartlek training intervention. Anaerobic capacity had a pre-test mean of 3103.03 and a post-test mean of 3728.43. The t-value of -5.5252 and the associated p-value of 0.0000 indicate a significant difference between the pre-test and post-test results regarding anaerobic capacity. Given the rejection of the null hypothesis, which suggested no significant difference, it can be inferred that the intervention likely led to a notable increase in anaerobic capacity.

These results are consistent with the research on the benefits of training methods, including fartlek training, on anaerobic capacity. Sarmidi (2018) [28] showed that 800-meter runners' VO2max was raised by customized fartlek training paired with various exercise types. This implies that the intervention used in this study, which probably included parts of fartlek training, improved the anaerobic capacity seen in the post-test. Naharudin (2013) [21] emphasized the value of anaerobic capacity for improving overall performance and fatigue resistance. The anaerobic exercise technique known as fartlek training enhances fast-twitch muscular strength and lactic acid tolerance. This lends credence to the idea that the intervention in the current study, which probably included fartlek training components, helped improve the participants' anaerobic capacity.

Table 6. Statistical Analysis of Fatigue Index Before and After Intervention

Fatigue Index	Weighted Mean	t-value	p-value	Decision	Remarks
Pre-Test	9.12	-0.5658	0.5794	Do not Reject Ho	Not Significant
Post Test	10.03				

**If the p-value is greater than the level of significance (0.05), we reject the null hypothesis; otherwise, we do not reject it.*

The comparison of the pre-test and post-test means for the fatigue index revealed that they were 9.12 and 10.03, respectively. However, the observed t-value of -0.5658 and the corresponding p-value of 0.5794 indicate that the fatigue index did not exhibit a statistically significant difference between the pre-test and post-test conditions. As a result, the null hypothesis was not proven incorrect, indicating that the fartlek exercise had little to no effect on fatigue levels. According to the research by Humbelton (2021) [15], quicker intervals added to fartlek training can help runners develop better-running form and increase their speed while preserving their efficiency. According to the literature, the intervention may have improved running performance. However, it may not have specifically addressed the demands of frisbee, which would explain why our study showed no discernible improvement in the fatigue index.

Dr. Dhurgham (2022) [10] also examined how anaerobic effort affected athletes' fatigue index across various sports. Although basketball, volleyball, and handball were not particularly examined in the current research, the results indicate that the fatigue index varies across different sports due to each activity's unique demands and physiological requirements. This range in fatigue index values could be why the intervention had little effect on the frisbee players' fatigue index.

As a result of the intervention, the findings demonstrate a significant improvement in anaerobic capacity, whereas the fatigue index only slightly increased. The study's observation has considerably increased anaerobic capacity, suggesting that the participants' capacity to produce energy during high-intensity exercises has improved. This increase in anaerobic capacity means they can exercise for shorter periods with more intensity, such as sprinting or using explosive motions. On the other hand, despite not being statistically significant, the minor increase in the fatigue index implies that more research is necessary to understand the variables affecting fatigue levels in this situation thoroughly.
Although the fatigue index did not alter significantly, it is crucial to remember that it is only one type of fatigue measurement and might not accurately reflect other aspects of participant exhaustion. The participants may feel more tired overall due to additional factors, including psychological ones, muscle tiredness, or unique demands of the frisbee sport. Therefore, the possibility of the intervention's benefits on anaerobic performance is not necessarily ruled out by the lack of a significant improvement in the fatigue index.

CONCLUSION AND RECOMMENDATIONS

SUMMARY OF FINDINGS

1. Diverse levels of fitness were found among individuals when anaerobic capacity and fatigue index were measured at baseline. The fatigue index ranged from 2.06% to 18.66%, whereas the anaerobic capacity was between 1554.13 W and 5122.33 W. The literature stressed the necessity to develop training plans that are specific to the metabolic demands of ultimate frisbee and emphasized the significance of both aerobic and anaerobic fitness for the sport.
2. Most frisbee players saw gains in their anaerobic capacity after the intervention, according to the post-test assessments, demonstrating the intervention's beneficial effects on anaerobic performance. The idea that high-intensity training can increase anaerobic adaptations and energy system performance is supported by the fact that participants with favorable differences in their post-test fatigue index had enhanced fatigue control. However, more participants showed adverse variations in their post-test tiredness index, which could indicate that improvements in fatigue tolerance were not made.
3. The application of the fartlek training intervention resulted in a significant impact on the anaerobic capacity of frisbee players, demonstrating a significant increase from the initial mean value of 3103.03 to a post-intervention mean of 3728.43. However, the intervention did not show a significant impact on the fatigue index, with the pre-test mean of 9.12 only slightly increasing to 10.03 in the post-test.

CONCLUSION

1. The results of the anaerobic capacity and fatigue index baseline tests show the wide range of fitness among frisbee players. Participants showed a wide range of fatigue index values, which suggests that they had different levels of ability to handle fatigue during the game. Anaerobic capacity assessments revealed significant variation in the participants' abilities to carry out vigorous exercises. These findings highlight the significance of developing training plans that are specific to the metabolic requirements of ultimate frisbee and the necessity of addressing both the aerobic and anaerobic fitness requirements of the game.
2. The majority of frisbee players reported improvements in their anaerobic capacity after the intervention, according to the post-test assessments. The findings that high-intensity training can have a good effect on anaerobic adaptations and energy system performance are supported by the positive variations in post-test fatigue index readings that indicate improved fatigue control for some participants. It is important to note that not all participants showed an improvement in their ability to tolerate tiredness, suggesting that the intervention may not have entirely addressed each participant's unique fatigue-related issues.
   These findings compel more studies by researchers into how each person responded to the intervention and the necessity of individualized training methods.
3. The anaerobic capacity of frisbee players significantly improved from the pre-test mean to the post-test mean as a result of the fartlek training intervention. This demonstrates how well the intervention worked to improve participants' anaerobic performance. However, the intervention did not have a meaningful effect on the fatigue index. The marginal improvement in post-test tiredness index scores raises the possibility that the intervention may not have adequately addressed issues associated with weariness. These findings

justify a closer look at the training program's elements and the potential addition of new tactics to improve ultimate frisbee players' ability to tolerate fatigue and overall performance.

RECOMMENDATIONS

1. Future studies should think about performing a more thorough analysis of the elements influencing the various fitness levels seen among frisbee players. Other pertinent factors, such as aerobic capacity, muscle strength, and agility, could be measured at baseline in addition to anaerobic capacity and fatigue index. Understanding the full range of fitness traits will help to create individualized training programs and give a complete picture of each player's physical potential. Furthermore, studies that follow participants' fitness development over time would provide insightful data on the efficiency of training programs in enhancing particular fitness components.
2. It is essential to undertake a more thorough analysis of the variables impacting the fartlek training intervention's effectiveness on anaerobic capacity and fatigue index for future research. Investigating participant adherence to the training program, maintaining intensity levels throughout training sessions, and keeping an eye on any concurrent physical activity or lifestyle choices that might have affected the intervention's results are some possible steps in this process. Researchers may want to change the training protocol to target particular components of tiredness experienced in ultimate frisbee in order to maximize the intervention's effect on fatigue tolerance. Possible modifications to the training procedure include changing the intensity distribution or adding recovery periods.
3. It is advised that the institution add organized fartlek training sessions to the frisbee/sport team's normal training schedule in light of the fartlek training intervention's beneficial effects on the anaerobic capacity of the players. It has been shown that fartlek training has the ability to boost anaerobic performance and help athletes perform better on the field. However, it is critical that the institution understand that each player will respond to the intervention differently, and customized training schedules should be created to suit the specific fitness requirements and fatigue-related issues of each player. The university can assist its frisbee players in realizing their full potential and excelling in the sport by strategically combining fartlek training and taking into account individualized techniques.

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