

Beyond The Game: Exploring Team Cohesion and Mental Health in Student Table Tennis Players

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ABSTRACT

This study aimed to examine the relationship between team cohesion and mental health outcomes specifically stress, anxiety, and depression among inter-university table tennis players, and to explore gender-specific patterns within these associations. A total of 65 inter-university table tennis players (male and female) participated in the study. Team cohesion was measured using the "Group Environment Questionnaire (GEQ)", which evaluates four dimensions: "Individual Attraction to the Group – Task" (AT-G), "Individual Attraction to the Group – Social" (AT-S), "Group Integration – Task" (GI-T), and "Group Integration – Social" (GI-S). Mental health variables- depression, anxiety, and stress were assessed using the "Depression, Anxiety, and Stress Scale-21 (DASS-21)". Correlation analyses were conducted to determine the associations between team cohesion factors and mental health outcomes. A significant negative correlation was found between team cohesion and depression in both male and female athletes. In male players, all four dimensions of team cohesion (AT-G, AT-S, GI-T, and GI-S) were significantly and negatively associated with depression. In female athletes, three dimensions i.e. AT-G, AT-S, and GI-T showed significant negative correlations with depression, while GI-S was also negatively correlated but not significant. Task cohesion (particularly GI-T) was more strongly emphasized by athletes than social cohesion (GI-S), indicating a performance-oriented team focus. There were no significant relationships found between team cohesion and stress or anxiety for either gender. The findings underscore the protective role of team cohesion especially task-focused cohesion-against depression in student-athletes. Enhancing team climate through structured, task-oriented team-building activities may not only improve athletic performance but also support the mental well-being of inter-university table tennis players. Coaches and sports psychologists are encouraged to integrate strategies that foster both team cohesion and psychological resilience in their training environments.

Keywords: Team Cohesion, Mental Health, Depression, Anxiety, Stress, Table Tennis, Athletes

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INTRODUCTION

In competitive sports, success is influenced not only by physical ability but also by psychological and social factors. Among the psychological components, mental health and social dynamics within teams play a crucial role in determining athletic performance (Hardy, 1992; Carron et al., 2002). In a sport like table tennis, which is often viewed as an individual competition, success at the inter-university level still heavily depends on team-based dynamics, such as emotional support, communication, and collective resilience. In such settings, athletes are exposed to high-performance pressure, which can contribute to mental health challenges such as stress, anxiety, and depression.

A vital psychological variable in the team sports context is team cohesion, defined as the tendency of a group to stick together and remain united in the pursuit of its objectives (Carron et al., 2002). Team cohesion has been associated not only with improved athletic performance but also with enhanced psychological well-being (Sabin & Szabo, 2015). It comprises both task-oriented cohesion (working together toward goals) and social cohesion (interpersonal attraction among members). Although previous studies have explored aspects of mental health in sports, there is limited empirical research that specifically examines the relationship between team cohesion and mental health outcomes among inter-university table tennis players in the Indian context. Most research in this area focuses on either elite athletes or team sports with high visibility, such as football or basketball, thereby neglecting lesser-studied individual-team hybrid sports like table tennis.

There is a notable gap in understanding how the four dimensions of team cohesion “Individual Attraction to the Group–Task” (AT-G), “Individual Attraction to the Group Social” (AT-S), “Group Integration–Task” (GI-T), and “Group Integration–Social” (GI-S) relate to specific mental health challenges, particularly stress, anxiety, and depression, in the context of inter-university competitions. Addressing this gap is critical, as student-athletes often face unique academic and performance-related pressures that can affect their mental health and in turn, their performance.

This study investigates the association between team cohesion and mental health among inter-university table tennis players. Team cohesion is assessed using “the Group Environment Questionnaire” (Whitton & Fletcher, 2014; Carron et al., 1985), measuring individual attraction (task and social) and group integration (task and social). Psychological outcomes i.e. Depression, Anxiety, and Stress are measured using the “Depression, Anxiety, Stress Scale 21 (DASS-21)” (Henry & Crawford, 2005). The study used data from 65 athletes from the 2024 East Zone Inter-University Table Tennis Tournament. Preliminary findings suggest that team cohesion is negatively correlated with mental health, particularly depression, indicating that stronger cohesion may alleviate negative effects. This highlights the need for coaches and sports psychologists to prioritize team-building strategies. This research will contribute to sports psychology by exploring the influence of team cohesion on mental health and offers recommendations for enhancing athlete care and promoting well-being and success.



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Research Questions

How does the level of team cohesion perceived by student table tennis players at the inter-university level relate to their reported mental health outcomes (specifically stress, anxiety, and depression)?

This study has several limitations that we considered when interpreting the results. First, the cross-sectional design limits the ability to establish causal relationships between team cohesion and mental health variables; it only provides a snapshot of associations at a single point in time. Second, the use of self-report measures may introduce bias due to social desirability and feasibility of probable data, especially in responses related to group cohesion and psychological well-being. Lastly, the study did not control for external stressors such as academic pressure, which could have influenced participants' stress and anxiety levels independently of team dynamics.

The results of the study will provide insights into the extent of team cohesion i.e. "task-oriented cohesion" (AT-G, GI-T) and "social cohesion" (AT-S, GI-S), and its relationship with stress, anxiety, and depression. The findings may provide information to coaches, trainers, therapists, and administrators to develop and improve effective team-building strategies to reduce depressive symptoms of the players and maximize their performance.

METHODS

The selected sample consisted of student-athletes representing various universities in eastern India. Participants voluntarily took part in the study after being informed about its purpose and informed consent was obtained from all respondents. So, the convenience sampling method was used to recruit participants only from the East Zone Inter-University Table Tennis Tournament 2024, organized by the Association of Indian Universities (AIU) and hosted by Royal Global University, Guwahati, Assam, India. Data were collected directly from players present at the tournament site.

Table 1. Selection of University-level Subjects

Category	Details
Participants	65 University Level Table Tennis Players
Location	East Zone Inter-University Table Tennis Tournament 2024
Venue	Royal Global University, Guwahati, Assam
Gender	29 Females, 36 Males (both)-Age- 18-25 years.
Inclusion	Enrolled University Athletes Participating in Table Tennis Teams
Exclusion	Athletes Receiving Treatment for Mental Health Conditions

Measurement of Team Cohesion:

The "Group Environment Questionnaire" (GEQ) was used to assess team cohesion (Whitton & Fletcher, 2014) (Carron et al., 1985). The "GEQ" questionnaire has four subscales: AT-G ("Individual Attractions to the Group – Task"), AT-S ("Individual Attractions to the Group – Social"), GI-T ("Group Integration – Task"), GI-S ("Group Integration – Social") (Whitton & Fletcher, 2014) (Carron et al., 1985).

Measurement of Mental Health Outcomes:



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The “Depression, Anxiety, and Stress Scale” (DASS-21) was incorporated to measure the players' levels of depression, anxiety, and stress. It's a widely used and validated psychological instrument (Henry & Crawford, 2005) that provides a reliable measure of these three distinct, yet often interrelated, negative emotional states. Using the DASS-21 allows researchers to quantify and analyze the athletes' self-reported experiences of these mental health variables.

GEQ was chosen for its specific focus on measuring task and social dimensions of team cohesion, aligning closely with the study's objectives. Similarly, DASS-21 offers a concise yet comprehensive assessment of core mental health indicators—depression, anxiety, and stress making it practical for athletic populations. However, instruments like Profile of Mood States (POMS), which assess broader mood states including tension, fatigue, and vigor, could offer complementary insights. Future research may benefit from integrating such tools to capture a more nuanced emotional profile of athletes.

Table 2. Criterion Measures

NO	SCALE	SUBSCALES	RESPONDS KEY
01	Team Cohesion	GI-T GI-S AT-G AT-S	“The Group Environment Questionnaire (GEQ)”
02	Mental Health Outcomes	Depression Anxiety Stress	“The Depression, Anxiety, and Stress Scale (DASS-21)”

The data were collected intentionally just before matches. Participants were informed about the study and their consent was taken before filling the questionnaires. Questionnaires were handed over to the participants and they were given 10 to 15 minutes to fill the forms.

In order to assess relationships between variables descriptive statistics and Pearson’s correlation matrix were done with the help of Jamovi statistical software. Independent t-test was applied for the gender comparison.

RESULTS

Descriptive Statistics:

Female:

The descriptive statistics (*Table 3*) reveal that female inter-university table tennis players reported the highest team cohesion in “Group Integration–Task” (GI-T) ($M = 33.8$, $SD = \pm 8.37$), followed by “Individual Attraction to Group–Social” (AT-S) ($M = 32.1$, $SD = \pm 6.72$). “Individual Attraction to Group–Task” (AT-G) scored 28.5 ($SD = \pm 9.01$), while “Group Integration–Social” (GI-S) was lowest at 23.8 ($SD = \pm 5.73$), indicating a stronger emphasis on task over social cohesion. For mental health, average scores were stress 6.76 ($SD = \pm 2.96$), anxiety 6.38 ($SD = \pm 3.89$), and depression 4.72 ($SD = \pm 2.94$), suggesting moderate levels of stress and anxiety, with relatively lower symptoms of depression.



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Male:

Male inter-university table tennis players showed variations in team cohesion dimensions. Among the four components, “Group Integration–Task” (GI-T) recorded the highest mean score of 32.3 (SD = ± 7.37), indicating a strong collective focus on team goals and performance. This was followed by “Individual Attraction to the Group–Social (AT-S)” with a mean of 30.8 (SD = ± 9.22), reflecting positive individual perceptions of social connections within the team. “Individual Attraction to the Group–Task” (AT-G) had a mean of 28.7 (SD = ± 9.64), while “Group Integration–Social” (GI-S) recorded the lowest mean at 23.1 (SD = ± 7.08), suggesting comparatively weaker social bonding at the team level. These results suggest that male athletes also tend to prioritize task cohesion over social cohesion in competitive settings.

Table 3: Descriptive Statistics of male and female table tennis players on both scales

Descriptive Statistics								
Variable	Gender	N	Mean	S. D	Std. E	Median	Min	Max
AT-S	Male	36	30.8	9.22	1.54	31.0	16	45
	Female	29	32.1	6.72	1.25	32	20	43
AT-G	Male	36	28.7	9.64	1.61	33.5	4	36
	Female	29	28.5	9.01	1.67	31	4	36
GI-S	Male	36	23.1	7.08	1.18	21.0	9	36
	Female	29	23.8	5.73	1.06	25	9	34
GI-T	Male	36	32.3	7.37	1.23	32.5	18	44
	Female	29	33.8	8.37	1.55	34	18	45
STRESS	Male	36	5.08	3.89	0.648	4.00	0	16
	Female	29	6.76	2.96	0.550	6	2	15
ANXIETY	Male	36	4.42	2.99	0.498	3.00	0	11
	Female	29	6.38	3.89	0.722	5	0	15
DEPRESSION	Male	36	3.61	3.17	0.529	3.00	0	16
	Female	29	4.72	2.94	0.546	5	1	10

Correlation Analysis:**Female:**

The correlation analysis presented in *Table 4* highlights the relationship between team cohesion dimensions and mental health outcomes among female inter-university table tennis players. Significant negative correlations were observed between depression and three dimensions of team cohesion. Specifically, “Individual Attraction to the Group – Social” (AT-S) showed a strong negative correlation with depression ($r = -0.453, p < 0.01$), followed by “Individual Attraction to the Group – Task” (AT-G) ($r = -0.360, p < 0.05$), and “Group Integration – Task” (GI-T) ($r = -0.413, p < 0.05$). These findings suggest that



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higher levels of task- and socially-oriented cohesion are associated with lower levels of depression in female athletes.

However, "Group Integration – Social" (GI-S) was not significantly correlated with depression ($r = -0.205$, $p > 0.05$), indicating that overall social bonding at the group level had a weaker and statistically insignificant relationship with depressive symptoms. Furthermore, no significant correlations were found between any of the team cohesion dimensions and stress or anxiety, suggesting that team cohesion may play a more targeted role in buffering depression rather than affecting all aspects of mental health uniformly.

Male:

Male inter-university table tennis players revealed significant negative correlations between depression and all four dimensions of team cohesion. Specifically, AT-S ($r = -0.418$, $p < 0.01$), AT-G ($r = -0.290$, $p < 0.05$), GI-S ($r = -0.335$, $p < 0.05$), and GI-T ($r = -0.354$, $p < 0.05$) were all significantly associated with lower levels of depression, supporting the hypothesis (H1) that higher team cohesion relates to better mental health. In contrast, no significant correlations were found between any cohesion dimension and stress or anxiety, as all p -values were greater than 0.05. These findings suggest that while team cohesion may not directly impact stress or anxiety, it plays a notable role in reducing symptoms of depression among male athletes.

Table 4. Correlation matrix of male and female table tennis player

	Variable	Female (N=29)	Male (N=36)
STRESS	AT-S	$r=-0.308$, $p=0.052$	$r=-0.208$, $p=0.112$
	AT-G	$r=0.006$, $p=0.512$	$r=-0.252$, $p=0.069$
	GI-S	$r=0.031$, $p=0.563$	$r=-0.101$, $p=0.279$
	GI-T	$r=-0.246$, $p=0.099$	$r=-0.049$, $p=0.389$
ANXIETY	AT-S	$r=-0.039$, $p=0.420$	$r=-0.016$, $p=0.464$
	AT-G	$r=0.158$, $p=0.793$	$r=-0.014$, $p=0.468$
	GI-S	$r=-0.038$, $p=0.422$	$r=0.060$, $p=0.635$
	GI-T	$r=-0.093$, $p=0.316$	$r=0.015$, $p=0.534$
DEPRESSION	AT-S	$r=-0.453^*$, $p<0.05$	$r=-0.418^*$, $p<0.05$
	AT-G	$r=-0.360^*$, $p<0.05$	$r=-0.290^*$, $p<0.05$
	GI-S	$r=-0.205$, $p=0.143$	$r=-0.335^*$, $p<0.05$
	GI-T	$r=-0.413^*$, $p<0.05$	$r=-0.354^*$, $p<0.05$

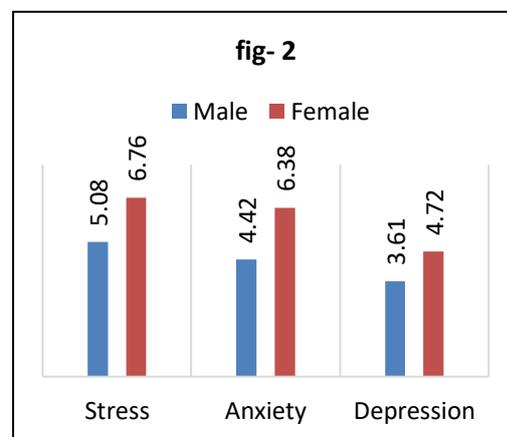
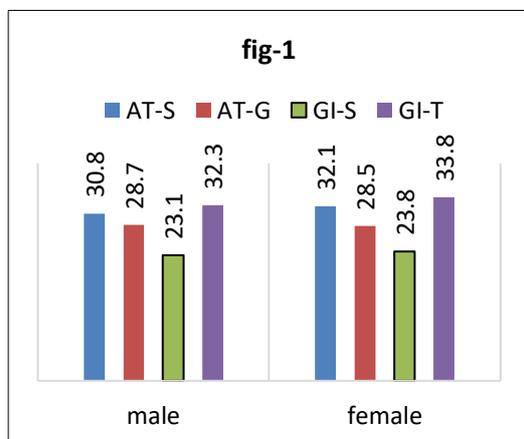
Note. H_1 is negative correlation, Note. * $p < .05$, one-tailed



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Gender comparison

The results of the study provide a comprehensive overview of the relationship between team cohesion and mental health outcomes among inter-university table tennis players, with notable differences and similarities across genders. Both male and female athletes exhibited a stronger emphasis on task-oriented cohesion, particularly "Group Integration-Task" (GI-T), with mean scores of 32.3 (SD = ± 7.37) for males and 33.8 (SD = ± 8.37) for females, compared to social cohesion ("Group Integration-Social", GI-S), which recorded the lowest means (23.1, SD = ± 7.08 for males; 23.8, SD = ± 5.73 for females). This suggests a performance-driven focus in competitive table tennis settings for both genders. Correlation analyses revealed significant negative associations between team cohesion and depression across both genders, with all four cohesion dimensions (AT-S, AT-G, GI-S, GI-T) significantly linked to lower depression levels in males, and three dimensions (AT-S, AT-G, GI-T) significantly associated in females, with GI-S showing a non-significant negative correlation. However, no significant correlations were found between team cohesion and stress or anxiety for any gender, indicating that team cohesion may have a more targeted protective effect against depression rather than broadly impacting all mental health outcomes. Descriptive statistics highlighted differences in mental health outcomes, with female athletes reporting higher mean scores for stress (6.76, SD = ± 2.96), anxiety (6.38, SD = ± 3.89), and depression (4.72, SD = ± 2.94) compared to males (stress: 5.08, SD = ± 3.89 ; anxiety: 4.42, SD = ± 2.99 ; depression: 3.61, SD = ± 3.17). The gender comparison via independent samples t-tests (Table 5) showed a significant difference only in anxiety ($t = 2.302$, $df = 63$, $p < 0.05$), with females reporting higher levels, while differences in stress and depression were not statistically significant.



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Table 5: Gender comparison of male and female table tennis players

Independent Samples Test						
	t	df	P	Mean Difference	Std. Error Difference	
AT-S	.617	63	.539	1.263	2.047	
AT-G	-.079	63	.937	-.184	2.336	
GI-S	.454	63	.652	.738	1.625	
GI-T	.790	63	.433	1.543	1.954	
STRESS	1.91	63	.060	1.675	.875	
	5					
ANXIETY	2.30	63	<.05*	1.963	.853	
	2					
DEPRESSION	1.45	63	.151	1.113	.766	
	2					

Note: $H_a \mu_{Male} \neq \mu_{Female}$, Note: *. Significant difference at the 0.05 level(2-tailed)

This study aimed to explore the relationship between team cohesion (i.e. AT-S, T-G, GI-S, and GI-T) and mental health outcomes (i.e. depression, anxiety, and stress) among inter-university level table tennis players. The findings revealed insights into this relationship, especially the strong relationship between team cohesion and depression among both male and female players.

Team Cohesion and Depression

Team cohesion demonstrated a strong negative association with depression across both genders in this study. For males, all four aspects of team cohesion significantly negatively correlated with depression, and in females Individual Attraction to the “Group – Social (AT-S)”, “Individual Attraction to the Group – Task (AT-G)”, and “Group Integration – Task (GI-T)” were significantly negatively correlated with depression, whereas GI-S (“Group Integration – Social”) is also negatively correlated but it’s non-significant.

Competitive table tennis athletes with higher levels of team cohesion especially task-oriented team cohesion showed a consistent pattern that may protects them against depressive symptoms. The study by Terry et al. (2000) demonstrated that athletes who showed higher team cohesion exhibited positive mood states according to their findings. Also, according to the research by Henderson et al. (1998) Female basketball players have shown team cohesion works as a depression-preventing factor by creating supportive environments that promote membership feelings.

Task-oriented cohesion (AT-G and GI-T) shows a strong negative relationship with depression according to these findings. This suggests when a team unites to achieve common performance goals or tasks, they may undergo fewer depressive symptoms. So, this finding backs Carron et al.'s (2002) statement that Task-oriented cohesion is important for both individual well-being as well as team performance. Carron’s model (2002) revealed task cohesion supports mental health by fostering a goal-driven, structured, and achievement-oriented environment, which can significantly buffer against depressive symptoms. In contrast, social cohesion, while important for emotional support, may not offer the same protective mechanisms related to purpose and self-worth that influence depression.



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Stress, Anxiety, and Team Cohesion

Interestingly, although the study observed a negative relationship between stress, anxiety, and team cohesion, these associations were statistically non-significant for either gender. This contrasts with earlier research, such as Henderson et al. (1998), which reported significant links between group cohesiveness and mood disturbances particularly anxiety in female athletes. Several potential factors may explain this discrepancy:

- i. **Sport-Specific Characteristics:** Inter-university table tennis presents a unique hybrid of individual and team dynamics. The match format a best-of-five series of individual games requires athletes to balance personal performance with team outcomes. This dual structure may alter the role of cohesion, making it less directly influential on psychological states like stress and anxiety than in purely team-based sports where collective performance is constant and synchronized.
- ii. **Dominance of External Stressors:** Athletes in this context may be more affected by external stressors, such as academic workloads, personal life pressures, and the competitive demands of tournament play. These factors could overshadow the buffering effects of team cohesion on mental health, diluting its apparent influence.
- iii. **Sample Size & Statistical Power:** The study involved a modest sample of 65 participants (29 females and 36 males), which presents a limitation in terms of statistical power. A smaller sample size reduces the ability to detect subtle or moderate effects, increasing the likelihood of Type II errors (failing to identify real relationships). This limitation is particularly relevant to the non-significant correlations observed between cohesion and stress or anxiety, as these results may be due to insufficient power rather than a true absence of association. Future studies with larger, more balanced samples are recommended to validate these findings and to enhance the reliability of statistical inferences.

In this study, while stress and anxiety showed a negative but non-significant relationship with team cohesion, while stress and anxiety are known to influence athlete well-being and performance, their relationship with team cohesion may be masked by sport-specific dynamics, adaptation to competitive pressure, and the limitations of general assessment tools. Addressing these factors through more targeted measurement and study designs could yield a deeper understanding of mental health in athletic contexts.

7.3 Gender Differences in Mental Health Outcomes

The descriptive statistics revealed higher levels of stress, anxiety, and depression among female table tennis players compared to their male counterparts. This gender disparity in mental health outcomes is consistent with findings by Eys et al. (2015), who observed that female athletes often experience different psychological responses to team dynamics than males. However, this discussion could be strengthened by further exploring gender-specific mechanisms such as socialization patterns, emotional expressiveness, and coping styles. For instance, females may be more likely to internalize stress or rely on emotion-focused coping strategies, which could make them more vulnerable to anxiety and depression in competitive environments. Future research is recommended to investigate these underlying psychosocial mechanisms and how they interact with team cohesion and performance demands, potentially leading to more gender-responsive mental health interventions in sports settings. Several factors may contribute to these gender differences:



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- i. Female athletes may experience additional pressures related to gender stereotypes in sports (Chalabaev et al. 2013).
- ii. Different socialization patterns or coping strategies may affect how male and female athletes cope with competitive stress (Nicholls et al. 2007).

Despite these differences, the beneficial association between team cohesion and reduced depression was consistent across both genders, highlighting the need to create cohesive team cultures regardless of gender.

Task vs. Social Cohesion

The research data indicated that athletes of both genders consistently scored higher on “Group Integration–Task” (GI-T) than on “Group Integration–Social” (GI-S). This suggests that in inter-university table tennis teams, fluctuations in performance goals are prioritized over social relationships. This indicates that the “task cohesion” is likely driven by the performance-oriented nature of inter-university sports competitions, where success is primarily measured by outcomes rather than interpersonal dynamics.

Depression was experienced less when teams focused on shared objectives rather than social connections at a greater rate in competitive sports environments. Task cohesion stands as a crucial physical requirement for both team success and athlete wellness according to Sabin and Alexandru (2015).

CONCLUSION

There was a significant negative association between team cohesion and depression in both male and female inter-university table tennis players. For male athletes, all four factors of team cohesion (AT-S, AT-G, GI-S, and GI-T) were negatively correlated with depression. Three dimensions (AT-S, AT-G, and GI-T) were inversely significantly associated with depression in female athletes, and that of GI-S was insignificant although it was in the negative direction. Team cohesion scores showed that athletes prioritized “task cohesion (GI-T)” over “social cohesion (GI-S)”, reflecting the performance-driven nature of competitive table tennis. There were no significant associations were identified between stress and team cohesion; and anxiety and team cohesion for males or females. Results emphasize the need to enhance team climate in university table tennis, especially task-oriented team-building efforts. It is important that coaches and sports psychologists focus on building team cohesion for both athletic performance and mental health.

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