The Influence of Omega-3 Supplementation on Athletic Performance, Grip Strength, and Body Composition in NCAA Division I Collegiate Track and Field Athletes

Original Research

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Abstract

Introduction: NCAA track and field (T&F) athletes hold one of the longest competitive seasons, making adequate nutrition and supplementation critical. Studies suggest that omega-3 polyunsaturated fatty acids (n-3 PUFA) supplementation may benefit athletic performance, strength, and body composition. This study examined the effects of n-3 PUFA supplementation on sport performance, hand grip strength, and body composition in NCAA Division I T&F athletes.
Methods: Twenty-five NCAA Division I T&F athletes (14 females, 11 males) were recruited. In a single-blind randomized controlled trial, participants consumed either: 4.0 grams of fish oil (FO) or 4.0 grams of placebo (i.e., coconut oil) daily for eight weeks, starting at the beginning of their outdoor season competitions. Body composition, hand grip strength, sport performance, and omega-3 indexes were sampled prior to in-season competition and following the 8-week supplementation. Data were analyzed using a two-way repeated measures ANOVA ($p < 0.05$).
Results: FO group saw a significant increase in omega-3 index ($p = 0.004$, but no significant differences in body composition, hand grip strength, or performance. Despite improvement in omega-3 index, all participants still possessed levels below current recommendations.
Conclusions: No changes in body composition, hand grip strength, or sport performance were found, despite improvements in omega-3 status with supplementation.

Key Words: Fish oil, Sport performance, n-3 PUFA

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Introduction

Track and field (T&F) holds one of the longest competitive seasons of any collegiate sport, with the season lasting as long as six months.[1] Often, elite competitors in collegiate T&F will go on to represent their respective countries through international competitions that could prolong their competitive seasons by approximately two months.[2] To recover from these lengthy competitive seasons and training routines, adequate nutritional intake is of utmost importance for T&F athletes.[3,4] Common benefits of maintaining a proper nutrition regimen typically include replenishing lost glycogen stores, repairing muscle tissue, and increasing lean muscle mass.[4,5] The nutritional needs for these athletes can vary considerably based on their designated events (e.g., throwers, sprinters, distance runners), though they all typically carry similar goals.[5,6] T&F athletes commonly aim to reduce fat mass (FM) while increasing or maintaining lean muscle mass (LMM) to improve athletic performance (e.g., running speed, throwing/jumping distance, mechanical efficiency) during competition.[7,8] It has also been well-documented that many collegiate athletes do not consume adequate nutrition, so the use of dietary supplements (e.g., fish oil, iron, caffeine, nitrates, medium-chain triglyceride oil) by athletes has become more prevalent in an attempt to optimize performance and mitigate inadequate nutritional intake.[9–12]

Omega-3 (n-3) polyunsaturated fatty acids (PUFA) are essential nutrients that must be consumed from dietary sources.[13,14] The human body has a limited ability to produce certain types of PUFA [e.g., Eicosapentaenoic Acid (EPA), Docosahexaenoic Acid (DHA)] that are primarily found in fatty fish and fish oil products.[13] Some studies have demonstrated that long-term fish oil supplementation containing n-3 PUFAs provide benefits (e.g., improved vascular function, cognitive performance) for cardiovascular and neurological health.[14,15] Additionally, new research has been examining how n-3 PUFAs could improve athletic performance in athletes across a variety of sports.[16–19] Levels of n-3 PUFA consumed by collegiate athletes have been shown to be extremely low, with the majority of athletes showing some level of deficiency.[15,20,21] In a study examining a similarly active population (e.g., army cadets), Heileson et al. demonstrated that cadets with lower Army Combat Fitness Scores tend to have lower levels of n-3 PUFAs.[22] This may suggest a need to supplement fish oil in other active populations that are experiencing deficiencies in n-3 PUFAs.

In T&F athletes, improvements in body composition (e.g., increased LMM, decreased FM) are commonly primary goals for numerous events (e.g., running, jumping, throwing). More recently, there has been speculation about the relationship between body composition and PUFAs. Heileson et al. identified associations between n-3 PUFA levels and body composition metrics in a sample of Army cadets.[22] However, the LMM growth and muscle mass retention properties of PUFA are still unclear in young healthy athletes. Further examinations of this relationship have the potential to identify optimal PUFA intake to improve performance.[23] Currently, most research on n-3 PUFA and body composition metrics have been done on mice, diseased individuals, older populations, or injured athletes.[23–26] While there are indications n-3 PUFAs may improve body composition by reducing FM and retaining or increasing LMM, studies have yet to address body composition changes in healthy NCAA athletes.[25,27,28] Additionally, n-3 PUFA supplementation was recently approved as a supplement for NCAA student athletes in 2019, allowing for new populations to be studied.[29] Thus, with the limited research done on supplementing n-3 PUFA in NCAA Division I athletes, the purpose of this study was to assess the impact of n-3 PUFA supplementation on athletic performance, handgrip strength, and body composition metrics in NCAA Division I T&F athletes.

Methods

This randomized, single-blind, placebo-controlled study assessed the efficacy of fish-oil derived n-3 PUFA supplementation in NCAA Division I T&F athletes over an 8-week period coinciding with their outdoor competition season. Daily supplementation began the week prior to the first outdoor T&F competition and concluded following the final regular season competition, spanning a period of eight weeks. Upon enrollment into the study, all participants were randomized into two groups [Fish oil (FO) and Placebo (PL)]. Participants consumed either 4.0 g of FO (Nordic Naturals, Ultimate Omega) or 4.0 g of PL (coconut oil) per day for the 8-week study period with evening meals. The amount of FO (3840mg FO) and the ratio of EPA and DHA (1950mg EPA:1350mg DHA) utilized in this study has been supported by previous literature completed on resistance training studies in college-aged athletes and older adults.[30,31] The FO supplements provided to participants were third party certified to ensure quality and safety for athlete consumption.

Participants were given a two-week supply of supplement and asked to consume a total of six capsules per day for the FO group or four capsules per day for the PL group. For eight weeks, participants returned every two weeks with their provided supply of capsules and provided researchers with any remaining capsules they had not consumed. This was done to determine an adherence rate to the consumption of the capsules over the course of the study protocol. Participants were then provided with a new container, which contained another 2-week supply of capsules. Omega-3 index, body composition, and hand grip strength were all sampled at baseline and following the cessation of the 8-week study period. Athletic performance was assessed utilizing individual event marks at the first and last regular season outdoor competitions.

Throughout the study, athletes completed the prescribed team training and had access to all athletic health and wellness resources (e.g., medical services and mental health services, nutrition counseling, dining facility and fueling station access). While diet was not strictly monitored, all participants were encouraged to follow their usual dietary intake and similar dietary strategies given by team registered dietitians, based on sports nutrition recommendations. Moreover, to encourage adherence and active participation in this study, all participants were provided a $25 gift card following the cessation of the study. Participant adherence to the consumption of the total number of capsules was 80.3%.

Participants

Athletics trainers at the NCAA Division I institution where this study was being conducted were contacted for assistance in recruiting T&F athletes. Participants were recruited from the 87-person roster of the Division I T&F team. A recruitment meeting was held with representatives of the research team prior to the beginning of their outdoor season competitions. 33 athletes volunteered to participate in this study. From these, eight participants dropped out, and 25 participants (11 males, 14 females) completed the study. To be eligible for the study, participants needed to be: 1) apparently healthy according to the guidelines set by the American College of Sports Medicine[32], 2) between the ages of 18 to 25 years old, 3) no current injuries or illnesses that prevent them from training, and 4) not currently pregnant. Any participants that did not meet this criterion were excluded from the study. A detailed representation of participant demographics can be seen on Table 1.

Prior approval for this study was obtained from the university Institutional Review Board (IRB) for research involving human subjects (project # 1994931). The study protocol agrees with the ethical guidelines of the 1975 Declaration of Helsinki as specified in approval permitted by the institution's human research committee. Eligible individuals were provided with verbal and written information regarding the study prior to their consent. Participants signed and returned an informed consent document and completed an additional health screening form before admission to the study.

Protocol

Body Composition: Participants height and weight were measured using a stadiometer and a dual-beam balance scale (Detecto, Bridgeview, IL). Recorded measurements were rounded to the nearest 0.10cm or 0.01kg. Furthermore, body composition parameters [i.e., fat-mass (FM), fat-free mass (FFM), body fat percentage (BFP)] were taken using an InBody 570 (InBody USA, Cerritos, CA) bioimpedance analyzer (BIA). Participants were asked to stand barefoot on the BIA with their hands down at their sides, while gripping the mounted hand electrodes. BIA has been shown to be an acceptable measure of body composition in previous research.[33,34]All measurements were taken at the same time of day prior to practice for each pre- and post-measurement.

Hand Grip Strength: Participants completed a handgrip strength assessment with three bouts for each hand using a handgrip dynamometer (Hydraulic Hand Dynamometer, Baseline® Evaluation Instruments). When prepared, participants squeezed the dynamometer with maximum isometric force, which was maintained for approximately five seconds. Participants then performed this on the opposite hand and the process was repeated until three total values were obtained for each hand. The average of the three values for each hand was utilized as the average grip strength.

Event Marks: All participants competed in their corresponding event at the first and last regular-season outdoor competition. These competitions coincided with the beginning and end of the 8-week supplementation period. Marks that were recorded for each athlete varied based on the event completed (e.g., sprint, throwing, jumping). Based upon the differences in the events, a percent change between pre- and post-supplementation of either the fish oil or placebo was utilized as the determinant of improved athletic performance. Only those participants that had a valid mark in the same event at the first and last regular season outdoor competition were included in the analysis of event marks. Prior to the analysis, scores were standardized so positive values represented improvement in performance. More specifically, all time values that decreased in time would represent a negative percent change. However, in terms of T&F performance a decrease in time would represent a positive percent change. All other values for distances remained the same for the subsequent comparisons because longer distances thrown or jumped would be considered positive.

Omega-3: Omega-3 index (EPA/DHA level) was obtained by trained personnel utilizing a pressure activated, safety lancet (Med Lancet I, Carelife, USA) on the non-dominant index finger of T&F athletes. The non-dominant index finger was first swabbed with an alcohol wipe, then the lancet was firmly pressed onto the side of the finger to displace a drop of blood. This drop of blood was then pressed onto a sample collection card. A small bandage was placed over the location where the lancet pierced the skin. All sample cards were designated into an appropriate biohazard sample bag and then sent to OmegaQuant Analytics, LLC for analysis.

Statistical Analysis
All data collected from this study were analyzed using SPSS Version 28 (IBM SPSS, Chicago, IL, USA). An a-priori power analysis was performed using an effect size of f = 0.5, power set at 90%, with two groups - over previous differences seen in hand grip strength from krill oil supplementation.[35] From the power analysis, the sample size needed for this study was determined to be 28 participants. Data were assessed for normality and homogeneity prior to the conduct of any statistical tests. Interactions between groups were analyzed using a two-way repeated measures ANOVA. Estimated marginal means with a Bonferroni adjustment was then used to assess mean differences of the significant interactions. Data that were deemed to be not normal, were analyzed using the Related-Samples Wilcoxon Signed Rank Test. Moreover, an independent samples t-test was used to assess baseline differences between males and females and differences in the percent change between groups for performance events. Level of significance was set at $\alpha = 0.05$.

Results
Baseline demographic and anthropometric measurements can be seen in Table 1. There were significant differences seen for baseline weight (p = 0.017) and BMI (p = 0.012) between male and female T&F athletes. A post-hoc power analysis was conducted following completion of the data collection and found to be adequate for statistical analyses conducted.

Table 1. Participant Baseline Demographics

	All Athletes (*n* = 25)	**Male (*n* = 11)**	**Female (*n* = 14)**	**P-value (sex)**
Age (yrs)	20.1 ± 1.6	20.6 ± 1.74	19.6 ± 1.3	0.378
Height (cm)	173.5 ± 10.1	182.8 ± 3.7	166.1 ± 6.9	0.089
Weight (kg)	71.7 ± 19.0	85.6 ± 20.7	60.8 ± 6.3	0.017*
Body Fat (%)	14.6 ± 5.5	12.3 ± 6.6	16.4 ± 3.9	0.293
BMI (kg/m²)	23.5 ± 4.1	25.5 ± 5.4	22.0 ± 1.7	0.012*

Data reported as Mean ± SD
Significance (*) = p < 0.05

All results for assessments of body composition (e.g., BMI, lean body mass, body fat percent), hand grip strength, and event performance can be found in Table 2 and Table 3. No significant differences were identified by time (all p>0.05) or group x time (all p>0.05) for any measure of body composition, hand grip strength, or event performance following eight weeks of supplementation with FO or placebo.

Omega-3 index for both groups (FO and PL), along with EPA and DHA, are displayed in Table 4. There were significant time interactions seen for EPA [F (23) = 8.616, ηp2 = 0.273], DHA [F (23) = 11.907, ηp2 = 0.341] and Omega-3 indexes [F (23) = 12.972, ηp2 = 0.361]. From pre- to post-supplementation, there was a decrease in EPA% (p = 0.007), DHA% (p = 0.002), and Omega-3 index (p = 0.002). Additionally, there were significant group by time interactions for EPA [F (23) = 11.491, ηp2 = 0.333], DHA [F (23) = 6.245, ηp2 = 0.214), and Omega-3 indexes [F (23) = 9.936, ηp2 = 0.302]. An increase in EPA% (p < 0.001), DHA% (p < 0.001), and Omega-3 index (p < 0.001) was seen in those consuming FO, while the placebo showed no significant change.

Table 2. Pre- and Post-intervention Interactions for Body Composition Metrics and Grip Strength

Variable	Group	Pre- and post-intervention	Mean ± SD	P-value (time)	P-value (g x t)	Partial eta squared
(kg) Weight	CON	PRE	67. 61 ± 12.57	0.675	0.912	0.001
		POST	67.40 ± 12.87			
	FO	PRE	75.51 ± 23.26			
		POST	77.13 ± 23.92			
(kg/m²) BMI	CON	PRE	22.70 ± 2.33	0.735	0.863	0.001
		POST	22.73 ± 2.28			
	FO	PRE	24.28 ± 5.24			
		POST	24.36 ± 5.81			
(%) Body fat	CON	PRE	13.00 ± 5.30	0.463	0.301	0.046
		POST	13.13 ± 5.02			
	FO	PRE	16.04 ± 5.47			
		POST	15.32 ± 6.52			
(kg) Fat mass	CON	PRE	8.83 ± 4.16	0.865	0.632	0.010
		POST	8.94 ± 3.90			
	FO	PRE	12.67 ± 8.34			
		POST	12.44 ± 9.89			
(kg) Lean body mass	CON	PRE	58.92 ± 11.45	0.738	0.463	0.024
		POST	58.60 ± 11.46			
	FO	PRE	63.00 ± 16.67			
		POST	63.12 ± 15.67			
(kg) Lean muscle mass	CON	PRE	33.53 ± 7.00	0.893	0.491	0.021
		POST	33.37 ± 6.94			
	FO	PRE	35.97 ± 10.19			
		POST	36.07 ± 9.53			
(kg) Grip strength right hand	CON	PRE	43.78 ± 9.78	0.321	0.995	0.000
		POST	42.97 ± 9.67			
	FO	PRE	47.46 ± 9.56			
		POST	46.67 ± 9.92			
(kg) Grip strength left hand	CON	PRE	39.00 ± 15.82	0.319	0.370	0.035
		POST	42.81 ± 10.52			
	FO	PRE	45.77 ± 11.50			
		POST	45.97 ± 13.16			

Table 3. Differences between the Percent Change of Event Marks for Athletes Pre- and Post-intervention

	Control (*n* = 6)	Fish Oil (*n* =11)	f-value	p-value	Partial eta squared
Improvement in event mark (%)	-1.59 ± 2.01	0.71 ± 2.99	2.815	0.114	0.158

Data expressed as Mean ± SD
Significance (*) = $p < 0.05$

Table 4. Pre-and Post-intervention Interactions for Omega-3 Index, EPA, and DHA

Variable	Group	Pre- and post-intervention	Mean ± SD	P-value (time)	P-value (g x t)	Partial eta squared
(%) Omega-3 index	CON	PRE	4.70 ± 0.11	**0.002***	**0.004***	0.302
		POST	4.82 ± 0.97			
	FO	PRE	3.90 ± 0.88			
		POST	5.73 ± 0.16			
(%) EPA	CON	PRE	0.52 ± 0.40	**0.007***	**0.003***	0.333
		POST	0.48 ± 0.27			
	FO	PRE	0.28 ± 0.14			
		POST	0.92 ± 0.64			
(%) DHA	CON	PRE	2.45 ± 0.70	**0.002***	**0.020***	0.214
		POST	2.61 ± 0.64			
	FO	PRE	1.99 ± 0.67			
		POST	2.95 ± 0.86			

Data reported as Mean ± SD
Significance (*) = $p < 0.05$
Omega-3 Index = %EPA + %DHA within red blood cells
Abbreviations: CON = control; FO = fish oil; EPA = eicosapentaenoic acid; DHA = docosahexaenoic acid; kg = kilogram; % = percent; m = meters; g x t = group x time

Discussion

Following eight weeks of fish oil supplementation, participants had a significant increase in all n-3 indices (i.e., omega 3 index, EPA %, DHA %), but saw no changes in body composition, hand grip strength, or event performance. It has been well-established that dietary consumption of n-3 PUFA by collegiate athletes is below current recommendations, leading to prevalent deficiencies.[15,20] Although dietary intake was not analyzed in this study, low levels of n-3 PUFAs were confirmed in this sample of T&F athletes. However, with eight weeks of supplementation, participants consuming fish oil experienced a significant increase in n-3 indices. This finding further supports the efficacy of n-3 PUFA supplementation among athletic populations who may have low dietary intake.

Omega-3 index has previously been shown to be an important predictor of cardiovascular disease and cognitive function.[14,15] An ideal target range of 8-11% has been identified for omega-3 index for its protective status.[36,37] Our sample averaged well below this recommendation (PL = 4.70 ± 0.11, FO = 3.90 ± 0.88). Following supplementation, the FO group had a significant 46.92% increase in omega-3 index (5.73 ± 0.16, $p = 0.004$), but was still far below the recommended guideline of 8%.[36,37] Similar omega-3 indexes have been identified among a variety of athletic populations, with one large multi-university study identifying an average omega-3 index 4.33 ± 0.81%.[21] Per guidelines applied to collegiate athletes by Anzalone et al.[15], on average our athletes would be identified as high risk (< 4%) or intermediate risk (4-8%) for future cardiovascular disease. Following supplementation, the average omega-3 index improved to intermediate risk for the FO group. Despite this significant increase in omega-3 index, participants still remained at a level considered to be intermediate risk for cardiovascular disease, an important factor to consider as athletes transition out of their athletic careers. This is important for athletes to note as following the conclusion of their athletic career physical activity levels often drop, and diets may change, potentially increasing the risk of cardiovascular disease. Thus, athletes with a substantially low omega-3 index (indicating high risk), may benefit from supplementation to lower their risk of cardiovascular disease. Evidence evaluating the relationship between omega-3 index and performance is limited. One study found that individuals with higher omega-3 indexes experienced significantly less pain and had lower blood lactate and C-reactive protein levels following eccentric exercise.[38] These factors can all positively impact performance, particularly in subsequent days of activity as often seen in collegiate T&F competitions.

Body composition and sport performance are both key factors within T&F. T&F athletes across events generally aim to increase LMM and maintain or decrease FM based on individual goals. Following supplementation, participants did not experience any significant body composition changes (e.g., BMI, fat mass, lean mass). Overall, participants consuming FO experienced a 2.15% increase in weight and a 4.49% decrease in body fat percentage, but neither of these were statistically significant, indicating a potential positive impact on body composition that should continue to be explored. Studies in non-athlete populations have shown promising results on the ability of n-3 PUFAs to improve body composition by reducing fat mass and maintaining or increasing lean mass.[25,27,28] Though minimal literature is available on the impact of n-3 PUFA supplementation in athletic populations, especially regarding body composition changes, some studies have found improvements[30], while others have found no impact from the utilization of fish oil supplements.[39] One systematic review of the impact of n-3 PUFA supplementation found that supplementation aids with the maintenance of strength, not necessarily strength gains, as seen in this study with minimal changes in event performance and hand grip strength (Event: 0.71%; R: -1.88%; L: 0.44%).[30] Despite a lack of positive change in event performance and hand grip strength, no significant decreases in these metrics were identified either, potentially supporting the role of n-3 PUFA in maintenance of body composition, strength, and performance. Changes in body composition metrics are understood to impact certain aspects of athletic performance.[40] Small, potentially non-statistically significant changes in body composition, such as found in this study, may have substantial impacts on performance and should continue to be explored. While the T&F athletes in this study did not experience body composition changes, it is an area that still presents a large gap and warrants further investigation in diverse athletic populations.

Omega-3 PUFA supplementation has been proposed to positively impact physical activity, including cardiovascular and muscular performance. To analyze performance changes in the multi-event sport of T&F, a standardized percentage of improvement was utilized. This method was utilized to assess whether n-3 PUFAs may elicit changes in cardiovascular (e.g., sprints, distance runners), muscular strength, and/or power performance (e.g., field events, jumps). Multiple authors have investigated the impact of n-3 PUFA on cardiovascular performance, with mixed findings ranging from significant improvements in running economy (i.e., oxygen cost)[18], to no improvement in VO2max in high-level cyclists.[17] Additionally, Heileson et al. found improvements in strength assessments (e.g., 1RM bench press) following ten weeks of fish oil supplementation and resistance training in a similar aged active population.[31] The length of supplementation in these studies varies widely, ranging from three to twelve weeks, indicating a continued need to examine the ideal supplementation protocol for performance improvement. The current study was conducted during the competitive season (i.e., eight weeks) during which training demands typically shift away from weight room activities and increase focus on sport-specific training. This may have also impacted the adaptations regarding LMM among our sample. Over the course of the study, which coincided with the outdoor collegiate T&F season, participants did not experience a significant improvement in performance (0.71%) or hand grip strength (R: -1.88%; L: 0.44%). The variety of events included in collegiate T&F allowed for multiple potential mechanisms for n-3 PUFA to influence performance. The current state of literature surrounding n-3 PUFA supplementation in athletes varies widely in the findings focused on physical activity. The findings of this study indicate a continued need to examine this relationship in athletic populations.

There were severable limitations in this article. The first limitation of this study was the inadequate sample size to be adequately powered for some measurements taken. While this study failed to meet the appropriate sample size, this was primarily a result of the participation and attrition rate. Although, even with a small sample size, this study holds meaningful results towards the usage of fish oil as a supplement, because it has not yet been done in NCAA Division I T&F athletes. Another limitation of this study is the training programs the athletes completed during the 8-week study period. Participants completed individualized training based on event, leading to potential differences in the specific training protocols completed. Due to the highly competitive nature of NCAA Division I athletics, coaching staff would not allow this information to be disclosed within this publication. Additionally, participants were only asked to maintain supplementation protocol over one outdoor T&F season and a single-blind protocol was utilized for medical reporting purposes if needed. Positive results were seen in regards to omega-3 status, but not other measures (e.g., body composition, event performance) that may see stronger results with longer term supplementation.

The usage of a BIA as a method of collecting body composition metrics may also be considered a limitation of this study. Traditionally, the usage of a dual-energy x-ray absorptiometry (DEXA) scanner has been considered the gold standard. Due to time constraints with the athletes and the location of where measurements were taken, the utilization of a DEXA was not possible. However, previous literature has demonstrated a strong agreement for the reliability of using a BIA when compared to utilizing a DEXA, which supports our usage of a BIA.[41] As the purpose of this study was to assess changes in body composition, previous work has shown BIA to be a reliable tool when comparing findings to itself.[33] Finally, dietary monitoring was not incorporated as an aspect of this study in an effort to decrease burden on student athletes during their competitive season. Student athletes consume the majority of their meals at the athletics dining facility or through team-catered meals during season, therefore eliminating some variation in participant diets.

Future studies should seek to conduct more research in NCAA Division I athletics to determine if fish oil supplementation is a viable method of improving body composition and/or performance in this population. Additionally, future studies should examine longer-term supplementation and larger sample sizes to determine the impacts over a full training cycle both in and out of the competitive season. Finally, future studies should aim to monitor and/or control the diet of participants to enhance the strength of recommendations resulting from the studies. Fish oil supplementation has seen more usage as an ergogenic aid to potentially enhance performance and improve body composition. This study demonstrated no beneficial changes from eight weeks of fish oil supplementation in NCAA Division I T&F athletes when compared to a coconut oil placebo. However, this may be a result of participant attrition, adequate adherence to the placebo, or a small sample size. Despite no impact on body composition or athletic performance, this sample was found to possess very low levels of omega-3. Those consuming fish oil supplements experienced a significant increase in omega-3 index in just 8 weeks. Collegiate student athletes are believed to consume low levels of n-3 PUFAs and would likely benefit from omega-3 supplementation to increase their omega-3 index and help protect them from future cardiovascular disease.

Conclusions

Despite no changes in body composition, hand grip strength, or sport performance, NCAA division I T&F athletes were found to possess very low omega-3 PUFA index. Omega-3 status improved with eight weeks of supplementation, but still remained well-below current recommendations. Omega-3 PUFA are vital nutrients for long-term health of student athletes and should be a focus for dietary education and supplementation.

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