

## Coaching Applications

# Attitudes and Beliefs of Division II Collegiate Swimmers on the Adoption of a Whole-Foods, Plant-Based Diet

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## Abstract

*Plant-based diets are increasing in popularity, especially among college students and athletes. This may be attributed to the considerable attention given to the adoption of plant-based diets by high-profile athletes. Research suggests that supplementing an athlete's diet with plant-based foods can lead to alleviating effects on markers of oxidative stress, reduced symptoms of exercise-induced muscle damage, and the maintenance of greater functional performance. There is, however, limited research on the feasibility and benefits of a plant-based diet for the collegiate swimmer. This two-part study was conducted on a Division II collegiate men and women's swim team to explore the attitudes and beliefs of collegiate swimmers on the adoption of a plant-based diet. The initial phase included completion of a nutrition knowledge questionnaire, a nutrition lecture, virtual plant-based supermarket tour, and a cooking workshop. Analysis indicated swimmers believed nutrition was "important" for athletic performance, but demonstrated a mixed understanding of nutrition in general, citing cost and accessibility as barriers in consuming a predominately plant-based diet. A follow-up study, removing barriers of cost and accessibility by provision of plant-based breakfasts after weekday practices was conducted. Follow-up analysis revealed swimmers continued to have doubts about the sufficient availability of protein in a plant-based diet but believed eating a plant-based diet can be easy and affordable. Swimmers indicated convenience as a major factor on food choices, and will gravitate towards foods that are most readily available to them, justifying the need for future studies on the accessibility to foods most appropriate for athletic recovery.*

## Introduction

Vegetarian and Vegan diets are increasing in popularity, especially among college students and athletes. This may be attributed to considerable attention in recent years of the plant-based diets of high-profile athletes, thanks in large part to the public's ability to access celebrity nutritional regimens through social media. From power athletes like Kendrick Farris, US Olympic weightlifter, to ultramarathon runners like Scott Jurek, winner of seven consecutive Western States 100 Mile Endurance Runs, anecdotal claims include enhanced performance and recovery. A nationwide poll conducted in 2016 reported approximately 3.3 % of American adults follow a vegetarian diet with 45% of all vegetarians following a vegan diet. A vegetarian diet excludes consumption flesh foods, and may or may not include fish, eggs or dairy products; a vegan diet excludes all forms of animal products including eggs and dairy products. Definition of variations of the vegetarian diet that can

be found in Table 1. The term “whole-food, plant-based” (WFPB) is increasing in popularity and is being used to replace the severity and often negative connotation of the terms “vegetarian” and “vegan.” A WFPB diet can be defined as an eating pattern comprised of minimally processed plant foods, including fruits, vegetables, whole grains, nuts, seeds, and legumes with few or no animal products. The term WFPB will be used in the paper representing the vegetarian and vegan eating patterns.

**Table I. Types of Vegetarian Diets**

<b>Classification</b>	<b>Nature of Diet</b>
Vegetarian	Omits all flesh foods. May or may not include eggs or dairy products.
Lacto-Ovo-Vegetarian	Omits all flesh foods but includes eggs and dairy products.
Lactco-Vegetarian	Omits all flesh and eggs; includes dairy products.
Ovo-Vegetarian	Omits all flesh foods and dairy products; includes eggs.
Pescatarian	Omits all flesh foods with the exception of fish. May or may not include eggs or dairy products.
Vegan	Excludes all flesh foods, eggs, and dairy. May exclude honey.
Raw Vegan	75-100% uncooked food including vegetables, fruit, nuts and seeds, legumes, and sprouted grains.

The joint position statement of The Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance recognizes the necessity to personalize nutrition eating patterns to meet the specific needs of the athlete, including but not limited to basic energy requirements, performance goals, logistical challenges and personal preferences. The position supports a vegetarian diet as being “nutritionally adequate containing high intakes of fruits, vegetables, whole grains, nuts, soy products, fiber, phytochemicals, and antioxidants.” The joint position delineates carbohydrate as the nutrient of choice for athletic performance, acting as the primary fuel for the brain and central nervous system (8). Carbohydrate stores in the body are limited but can be easily manipulated by dietary intake and recovery practices. The WFPB diet is

predominately carbohydrate making it conducive to support athletic performance. Prolonged, sustained, or intermittent high-intensity exercise can be enhanced by strategies that maintain high carbohydrate availability. This includes pre and post exercise carbohydrate fueling in addition to a high carbohydrate diet, that can be achieved by a WFPB diet. Carbohydrate recommendations for athletic performance range from 5-12 g/kg per day. Table 3 outlines levels of carbohydrate recommendations

**Table 3. Carbohydrate Recommendations for Athletic Performance**

Activity Level	Light	Moderate	High	Very High
	Low intensity or skill-based activities	~ 1h/day	1-3 h/d of moderate to high intensity	>4-5 h/d of moderate to high intensity
<b>Carbohydrate</b>	3-5 g/kg/d	5-7 g/kg/d	6-10g/kg/d	8-12/kg/d

It is a common misconception that a WFPB diet do not provide sufficient amounts of protein. Approximately 40% consume protein supplements. Regular consumption of plant foods, nuts, beans, legumes and soy foods will provide adequate amounts of dietary protein. Protein guidelines are no longer solely categorized to the “strength” or “endurance” athlete, but should be based on adaptation specific training, energy and nutrient needs, personal goal, and dietary preferences. More important is adequate energy consumption, especially from carbohydrate, which spare amino acids from oxidation, allowing them to be readily available for protein synthesis. General recommended dietary protein intake to support athletic performance ranges from 1.2 to 2.0 g/kg/day.

## Methods

Participants (N=31) completed a nutrition knowledge questionnaires pre and post intervention. Focus groups exploring the perceptions of a WFPB diet to support athletic performance were conducted pre and post intervention. At the start of the initial phases of the study, subjects attended a nutrition education lecture led by a Board-Certified Sports Specialist in Sports Dietetics (CSSD) that included a WFPB breakfast and a virtual supermarket tour. The breakfast included and oatmeal buffet with various plant protein toppings, tofu scramble, fresh fruit, 100% fruit/vegetables juices, and an assortment of whole grain breads and nut butters. The virtual supermarket tour highlighted the economic and nutrient properties of various forms of fruits, vegetables, and plant-based proteins. This was followed by a three-hour, hands-on plant-based culinary instruction. Subjects prepared and tasted recipes that could easily be re-created in student housing. Subjects were given a take-home box that included recipes of foods prepared and an assorted of food items for re-creation of recipes. A post intervention nutrition knowledge questionnaire and focus group were completed at the end of the academic swim season.

A follow-up study was conducted at the start of the following academic swim season. Swimmers (N=36) participated in focus group prior to the start and at the end of the academic swim season the year following the initial study. The first focus group of the follow-up study discussed the emerging theme extracted from the initial study of cost concerns of a WFPB, and lack of good tasting plant-based foods on campus. It was determined that these barriers still existed, prohibiting the adoption and consumption of a WFPB eating pattern by subjects. This led to the provision of WFPB breakfast foods for subjects at the end of weekday practices throughout the academic season. The breakfast consisted of oatmeal, bagels, toppings of nuts and seeds, peanut and almond butters, soy and almond milks, 100% fruit jam, dried fruit, and spices. The campus Board Certified Specialist in Sports Dietetics (CSSD) was in attendance for three breakfasts each week providing casual nutrition education, shopping and cooking tips, and observation of consumption patterns. Observational field notes were recorded. In addition to the weekday breakfast meals, a WFPB pre-competition meal was provided at a home meet during the season. A second focus group was held at end of the academic swim season to analyze the acceptance of the study, and to evaluate if removal of barriers of cost and access of WFPB foods impacted the attitudes and perception of a WFPB diet on athletic performance.

## **Discussion**

In his book, *The Science of Winning: Planning, Periodizing and Optimizing Swim Training*, Dr. Jan Olbrecht details a four-phase principle of adaptation known as “super-compensation”, the key to athletic improvement. In phase one (the work phase), the swimmer completes a large volume of training, becomes physically tired, leading to an eventual decline in performance. The second phase (the recovery phase) is induced by low-intensity training or “active rest”. In the third phase (the super-compensation phase), the swimmer is now able to handle the initial training load with relative ease and may even be able to approach a greater challenge with the same effort. And in the fourth phase (the detraining phase), improvements are progressively lost in the absence of appropriate training. Chief among Dr. Olbrecht’s requirements for successful super-compensation is a healthy body. “Inflammation, overtraining, and mental stress strongly reduce the possibility for super-compensation”.

It’s our contention that successful collegiate athletes in the United States have long benefited from training variety. For example, a swimmer who spent his or her formidable years in a high-volume program may achieve success with a low-volume, high-intensity training scheme in college. And within the context of a single season, swimmers may also benefit from a traditional macrocycle in which the athlete spends the early training phase building an aerobic capacity before reducing the volume in favor of more intensive work to specifically prepare them for a priority competition. In both of these scenarios, the athletes may be getting exactly what they need from a training perspective—plenty of variety on their “training plates”. Coaches often go to painstaking efforts to ensure these needs are being met, but we also believe that American collegiate athletes may not be maximizing

their super-compensation potential due the lack of variety on their breakfast, lunch, and dinner plates, which often consists primarily of animal-based products. We've now gathered over 100 years of scientific and epidemiological evidence that a plant-based diet does indeed promote health while preventing and in some cases, reversing chronic conditions like heart disease, diabetes, and certain types of cancer. Americans have found it difficult, however, to distance ourselves from processed meats which the World Health Organization recognizes as a class one carcinogen, dairy, eggs, and cheese, the very foods associated with our most prevalent chronic diseases.

While all of the athletes in our study indicated that nutrition was either "important" or "very important" to athletic performance, they also demonstrated a mixed understanding of nutrition in general. It would appear as though college swimmers want to approach training with a healthy body, Olbrecht's first requirement for successful super-compensation, but they're also being inundated with conflicting messages (ketogenic vs. vegan, protein vs. carbohydrate, supplementation vs. natural, etc.) and inferior food choices (especially in college where beer and pizza are ubiquitous). The supplement industry counts on this confusion, selling billions each year to Americans often based on claims that have not been evaluated by the FDA. Athletes cite health improvement and compensation for a poor diet as reasons they consume supplements, not realizing that plant foods—whole grains, legumes, fruits, and vegetable—may be all they need to maintain the healthy body required for super-compensation. In our discussions with this Division II swim team, we've discovered that athletes often associate protein with recovery, perhaps the reason why 40% of college students use protein powders or supplements and so many fill up on chicken and dairy.

## **Conclusion**

Our study has revealed that despite the health-promoting qualities of a plant-based diet, perhaps the most appropriate dietary pattern for super-compensation, athletes will continue to gravitate towards the foods that are most accessible. This has never been more apparent than at the 2018 Division II NCAA Swimming and Diving Championship Meet, where we observed athletes opting for the junk foods available in the athlete hospitality room including chips, candies, and sugary beverages. Our study removed the burden choice by providing plant-based breakfasts after each morning workout. While it wasn't the intent of the study, we did observe a correlation between behavior and success. Not all of athletes chose to eat the plant-based breakfasts, but each of the athletes who qualified for NCAAs in 2018 regularly took advantage of the offerings. Of course, there are many factors that contribute to an athlete's success and we're by no means attributing their achievements to oatmeal alone, but the observation is certainly worth noting. As educators first and foremost, we feel it's important to continue exploring ways to make healthy food choices more readily available to student-athletes, not only in an effort to promote recovery for improved performance before graduation, but to equip our student-athletes with the knowledge and skills they'll need to outpace disease after graduation when the stakes are higher.