A LOOK INSIDE NUTRITION IN COLLEGIATE ATHLETICS

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Abstract

Sports nutrition is a blossoming profession and continues to grow. Within the daily functions of a sports nutrition department, working as a sports dietitian is more than providing food and hydration sources. Sports nutrition includes educating athletes about the benefits of food and teaching them life-long skills such as, cooking and grocery shopping that they may use for the rest of their lives. Being successful in the sports nutrition profession requires excellent communication, organization, dedication, and hard work. Nutrition can help an athlete in creating an advantage for improving performance and recovery. Within sports nutrition, sports dietitians are being called on to provide appropriate education for athletes.

The purpose of this review is to examine the various aspects of a sports nutrition department and the skills necessary for a sports dietitian to be successful at the Division I Collegiate level. This review will cover the regulatory, financial, staffing, athlete, environmental, and technological aspects of sports nutrition. The following review may be beneficial for those who are interested in pursuing sports nutrition as a career, as it aims to elucidate expectations regarding the day to day job requirements.

Table of Contents

List of Figures

Chapter 1 - Review of Nutrition in Collegiate Athletics

How could one characterize the role of a sports dietitian? These nutrition experts advise athletes as well as coaches on ways to modify diets to enhance performance, increase stamina, optimize nutrition status, and decrease the risk of injuries or illness.[4] They also work closely with foodservice employees to develop menus.[4] In this always changing, fast-paced, on-the-go career, a sports dietitian wears many hats. One minute could be providing nutrition education or performing a body composition test, the next minute could be preparing a weight gain shake, and the next could be planning meals for a team preparing to travel. Through my experience, working as a sports dietitian takes dedication, organization, motivation, and confidence to be successful. Sports nutrition practice requires combined knowledge in multiple areas: clinical nutrition, nutrition science, exercise physiology, as well as the application of evidence-based research.[18]

Working as a sports dietitian is a very rewarding position. When the direct impact being made on an athlete is seen, it is a reminder of why many hours were spent learning numerous aspects of food and nutrition in school. Student-athletes are eager to learn, but more importantly, want to do everything possible to improve athletic performance and recovery.[18] Nutrition is one piece of the puzzle for an athlete to achieve the level they want to compete. Athletes have begun to seek out nutrition counseling in hopes of enhancing performance, helping to clarify supplement use, obtain information on how to reduce or gain weight, and helping to manage eating disorders.[4]

Education provided by sports dietitians is not only about an athlete's current needs, but also considering life after their collegiate career ends. Teaching athletes how to prepare basic meals and grocery shop on a budget are skills they may use the rest of their lives.[18] Taking the

time to interact with athletes on a daily basis shows an athlete the sports dietitian is there to support and encourage, as well as provide nutrition education to help improve performance and aid recovery.

The following sections will review the regulatory, financial, staffing, athlete, environmental, and technological aspects of sports nutrition at the Division I collegiate level. Do you have the dedication and work ethic it takes to be a sports dietitian? This insight could help calm apprehensions about pursuing sports nutrition in collegiate athletics.

Regulatory Aspects of Sports Nutrition

The National Collegiate Athletic Association (NCAA) has mandated rules and regulations that each sports nutrition department must abide by.[12] When it comes to supplements, all products provided at fueling stations or to individual athletes must be allowable within these regulated guidelines. Meaning any food item can be provided as long as the compliance office deems the item within the allowable guidelines.[12] The purpose of fueling stations is to provide snacks for athletes as they are preparing for a workout or leaving a workout. Products each program can provide vary as each compliance office interprets these NCAA rules differently. For example, currently the protein rule states any food item providing more than 30% of total calories from protein is not allowable.[12] However, the Southeastern Conference (SEC) interprets this rule as the total food product cannot provide more than 30% of total calories from protein (Personal communication April 12, 2016). For example, a weight gain shake (Personal communication April 12, 2016). As long as all ingredients together are not providing more than 30% of total calories from protein, the shake is allowable (Personal communication April 12, 2016). On the other hand, the Big 12 interprets this rule as an individual food item cannot provide more than 30% of calories from protein (Personal communication April 12, 2016). Therefore, if one ingredient of the weight gain shake provides more than 30% of total calories from protein, such as protein powder, the item is not allowable (Personal communication April 12, 2016).

Along with food products provided at fueling stations, universities are now adding a training table which allows student-athletes to come together for meal times. Training table can be described as a dining facility for student athletes. Each meal offers a variety of options to aid athletes in achieving their health and performance goals. Per deregulation of the meal rule set by

the NCAA, which previously only allowed universities to provide one meal per day[11], now allows unlimited meals and snacks.[12] Through observation and personal experience, how each university chooses to implement this rule, varies. At Kansas State University, athletes are provided with dinner and an enhanced morning snack five days each week. These meal plans are included in an athlete's scholarship.[12] Prior to deregulation, only scholarship athletes were able to receive the benefit of training table, whereas now, non-scholarship athletes are also able to receive this benefit.[12]

Depending on the size of the sports nutrition department, some staff a full-time fueling station manager.[9] Through a survey conducted by the University of South Carolina, these managers vary from a student worker to a full-time registered dietitian.[9] Most fueling stations are managed by the sports dietitians, graduate assistants, and student volunteers as well as support staff who aid with cleaning and notifying the dietitians when food items are deficient.[9] Some fueling stations have set hours, whereas at Kansas State University, fueling stations are open all day, as long as a staff member is present.[9]

Through personal job experience and working with athletes, athletes have busy schedules and at times come directly from class; having not eaten since leaving their house at 6:00 am or before. Being able to provide athletes with adequate fuel prior to workouts is key to improving their performance. Following a workout, recovery is vital as athletes prepare for their next workout. The proper intake of fluids, electrolytes, energy, carbohydrates, and protein aid to restore muscle glycogen and build and repair muscle tissue.[18] If a meal is not feasible in adequate time post-workout, the fueling station is a convenient stop to refuel. Prior to deregulation, athletes were only allowed to receive fruit, bagels, nuts, and shakes.[11] As previously stated, since deregulation, the items provided at fueling stations are unlimited and can be provided at any

time, within set guidelines.[12] The nutrition supplement rule states: an institution may provide permissible nutritional supplements to a student athlete for the purpose of providing additional calories and electrolytes.[12] Common fueling station items include: energy bars, shakes, bread, bagels, peanut butter, jelly, yogurt, and fresh fruit.

Lastly, the NCAA also has a list of banned substances (Figure 1) which athletes must abide by.[12] At the beginning of each school year, athletes at Kansas State University complete a supplement form providing information about what supplements they are currently or thinking about taking, amount being taken, and the reason for use. These forms are then reviewed by the sports dietitian and graduate assistant at Kansas State University. Following review of the supplement, education on whether the supplement should or should not be used and when, is provided to the athlete by the sports dietitian or graduate assistant.

Figure 1 NCAA Banned Substance List

THE NCAA BANS THE FOLLOWING CLASSES OF DRUGS:

a. Stimulants
b. Anabolic Agents
c. Alcohol and Beta Blockers (banned for rifle only)
d. Diuretics and Other Masking Agents
e. Street Drugs
f. Peptide Hormones and Analogues
g. Anti-estrogens
h. Beta-2 Agonists

Note: Any substance chemically related to these classes is also banned.
The institution and the student-athlete shall be held accountable for all drugs within the banned drug class regardless of whether they have been specifically identified.

Drugs and Procedures Subject to Restrictions:

a. Blood Doping.
b. Local Anesthetics (under some conditions).
c. Manipulation of Urine Samples.
d. Beta-2 Agonists permitted only by prescription and inhalation.
e. Caffeine if concentrations in urine exceed 15 micrograms/ml.

NCAA Nutritional/Dietary Supplements Warning: Before consuming any nutritional/dietary supplement product, student athletes should review the product with the athletics department staff.

Not an all-inclusive list. From NCAA.com.

Reviewing each supplement can be a learning process for the sports dietitian. For example, if an athlete is taking an unfamiliar supplement, this creates an educational opportunity to learn the product and see if there is evidence to support its use. It is likely more than one student-athlete is taking or looking to take the same product. When dealing with supplements, it is the role of the sports dietitian to build rapport with their athletes and provide the credible, evidence-based information on a supplements' correct dosage and appropriateness.[18]

It is not uncommon to have a new athlete come in with a list of supplements they have been taking during high school. Most of the time they have walked into a supplement or nutrition store and told the worker what they are wanting to accomplish (i.e.: weight gain, weight loss, gain muscle mass, etc.). Based on their stated goals, the store sold them a product advertised to help meet their needs. Likely, these workers are not familiar with NCAA regulations, therefore, it is important to review all supplements taken to prevent student-athletes from failing a drug test.[20] All student-athletes are subject to random drug tests conducted throughout the year. These tests can come from one of three institutions during each semester; the Conference, the University, and the NCAA.[12]

All supplements recommended by the sports dietitian or graduate assistant at Kansas State University are tested by a third party testing company such as NSF (The Public Health and Safety Organization),[17] Informed Choice,[7] or the Banned Substance Control Group,[2] to ensure they are free of banned substances as indicated on their websites. Through a food first philosophy which is encouraged by the Collegiate and Professional Sports Dietitians Association, education on the benefits of eating a balanced and varied diet is always provided first.[5] When an athlete comes to the sports dietitian or graduate assistant requesting to take a supplement, their current daily intake is first assessed and then recommendations are made

appropriately. Continuous education on the benefits of food first is important to athletes. Through experience of working with athletes, several revert back to wanting a supplement because they are easy to take. Therefore, continuing to encourage a consistent eating pattern with balance and variety will aid the athlete in learning to choose food over supplements.

Each athlete is different and has different goals. Supplements are not appropriate for all athletes to take and are recommended by the sports dietitian or graduate assistant based on individual goals and needs, following an assessment and evaluation of the athlete's nutrition needs and performance goals. When a supplement is recommended, education is provided about how to incorporate the supplement appropriately within their daily meal and snack intake.

Financial Aspects of Sports Nutrition

For sports dietitians, not only are sound nutrition education skills needed, but so are business skills in order to manage large budgets, complete ordering and receiving of shipments, and dealing with vendors to name a few. Unfortunately, money is a determining factor in how much food is able to be provided to student-athletes. When looking at Division I collegiate conferences, there are the power-five conferences (Atlantic Coast Conference, Big 10 Conference, Big 12 Conference, Pac-12 Conference, and Southeastern Conference) which bring in more revenue than the rest, as shown in the college athletics finance report.[3] The increase in revenue can equate to having a larger budget for the sports nutrition department. Within these conferences, there are also the established sports nutrition programs and the new and developing programs, such as the program at Kansas State University.

From an overall budget standpoint, there is a sports nutrition budget line for all sports in which the director of sports nutrition manages. These budgets vary based on the number of athletes per team. At Kansas State University, throughout the year, all expenses are billed to the appropriate teams. In order to manage a large nutrition budget and inventory, at Kansas State University, the director of sports nutrition relies on a graduate assistant to aid in inventory and notifying when items are low. The director is in charge of ordering items as needed. The graduate assistant is in charge of managing the budget line for their individual sports, however, these lines are also overseen by the director of sports nutrition.

Each time a new shipment of product arrives, the sports dietitian and/or director of sports nutrition charges teams accordingly. Expenses can easily be tracked by the director of sports nutrition or graduate assistant using an excel spreadsheet to see how much of the allotted budget has been used throughout the year. Along with the billing aspects, a director of sports nutrition or

sports dietitian may have to negotiate contracts with future employers, or public relations agencies to market special nutritional products via public speaking, writing, or media events to promote their sports nutrition program.[4]

In my personal experience, to keep items separated and see where the most money is being spent, classifying each distributor separately has helped. For example, if food is purchased at a local grocery store for the week, when recording, it would be classified under the name of the store, followed by the amount spent and the invoice number (Figure 2). Additional items such as chocolate milk, pretzels, and trail mix may be purchased from a foodservice company such as Sysco and would be reflected on the spreadsheet. Besides the local grocery store, common distributors providing products include: Clif, Honeystinger, Cheribundi, Okio's, Chobani, Right Stuff, and Cytosport to name a few.[5] The list of distributors is continuing to grow and will only grow with the profession as evidenced by the latest partnerships released by the Collegiate and Professional Sports Dietitians Association (CPSDA).[5]

Table 1 Sports Nutrition Team Budgets

M GOLF	Hiland Dairy	Chocolate Milk	5021371	$64.00	
M GOLF	Hiland Dairy	Chocolate Milk	5021450	$5.16	
M GOLF	HY-VEE	Fruit, deli meat, bagels	433796608	$91.21	
M GOLF	Sysco	Trail mix, pretzels		$32.53	
					$572.61
W GOLF					
W GOLF	Hiland Dairy	Chocolate Milk	5020605	$3.44	
W GOLF	Hiland Dairy	Chocolate Milk	5020669	$3.44	

Snapshot of a team budget spreadsheet tracking expenses through the year.

Along with meals provided at training table, teams may choose to have meals catered when traveling. The expense for this comes from each individual team budget rather than directly from the sports nutrition department budget. At Kansas State University, the sports dietitian is in charge of ordering meals, within a set price, and the team covers the meal expenses.

Most schools are sponsored by company's such as Gatorade which provide an abundance of products such as: food items including, energy bars, energy chews, protein powders, electrolyte replacement, water bottles, and coolers.[6] The items purchased from these allotments are a separate part of the sports nutrition budget. In other words, the sponsorship allotment is part of the overall sports nutrition budget, but is only used for products ordered from these sponsors. As rules continue to change, the products these companies can provide will also change.

Lastly, the sports nutrition department may have a budget line of their own to spend on supplies needed for the day-to-day operations. Simple items such as bowls for fruit, toasters, plastic containers for granola and office supplies must be paid for and are a necessity. Other appliances such as blenders are also essential to fueling stations. Along with paying for supplies and appliances, other fees may be for sports dietitians to attend conferences which help to increase their knowledge in sports nutrition, expand their networking, and be exposed to the newest products on the market. Lastly, covering membership fees to groups such as the Academy of Nutrition and Dietetics (AND), Collegiate and Professional Sports Dietetic Association (CPSDA), and local dietitian groups allow sports dietitians to have access to handouts and webinars that aid in staying up-to-date on research.

Staffing Aspects of Sports Nutrition

Every sports nutrition department will be staffed differently based on the student-athlete population, number of athletic teams, and the budget allotted for salaries. These factors can also dictate the number of Registered Dietitian's on staff. Established programs may have five to six Registered Dietitians plus graduate assistants.[5] New and developing programs may only have one Registered Dietitian and possibly one graduate assistant, as observed through personal experience. As the profession continues to grow, job opportunities, internship opportunities, and graduate assistant positions are becoming available from the collegiate level and now into the professional level.[5]

Credentials commonly seen in sports dietitians are foremost, Registered Dietitian (RD) with additional credentials being a Certified Sports Dietitian (CSSD) to a Certified Strength and Conditioning Specialist (CSCS). A master's degree or PhD is also not uncommon. Most job opportunities may not have these requirements listed, however, may be requested to obtain upon employment. The CSSD certification is obtained through supervised practice hours followed by an exam and certifies having specialized experience in sports dietetics.[16] CSSD certification provides assurance for evidence-based nutrition assessments, counseling and guidance for health and performance of athletes.[1] CSCS certification is obtained through passing an exam and certifies having specific knowledge for training athletes for the primary goal of improving athletic performance.[13]

Based on observation and personal experience, graduate assistants may be in charge of the student internship program, which can range from five to 10 undergraduate students volunteering daily. Managing student interns includes coordinating schedules and putting together a weekly schedule for shifts. To ensure the student interns complete all tasks each day,

at Kansas State University, a daily task list is provided, listing tasks and times to be completed. For example, by 10:00 am, all deliveries to fueling stations should be completed or by 3:00 pm a locker room needs set up for game day. Each day is laid out based on times as shifts overlap and student interns can mark off what is completed; next intern can pick-up where the previous intern left off. Student interns may help with deliveries to various fueling stations throughout campus, making shakes for weight gain or weight maintenance, inventory, and stocking each fueling station on a daily basis. Deliveries usually consist of energy bars, fruit, bread, bagels, peanut butter, and jelly. From time-to-time, larger deliveries with cases of product are made.

As student interns progress through the program, they may also be responsible for developing educational materials on a variety of nutrition-related topics to provide to student-athletes. These education materials may consist of handouts to be posted in fueling stations or PowerPoint presentations to be shown on the television's in training table. Without the student internship program, meeting with individual student-athletes would be minimal, based on staff size. There is nothing glamourous about the student internship tasks; it is a lot of behind-the-scenes work, however, vital to athlete performance and recovery.

Individual Athlete Needs in Sports Nutrition

Athletes competing at the collegiate level are a very diverse group consisting of strength-athletes and endurance-athletes, as well as, a combination of strength and endurance. Educating athletes accordingly on proper nutrient intake is necessary to ensure top performance and proper recovery. Nutrition education can be provided at the individual level or the team level. As nutrition goals and requirements are not static, every athlete metabolizes nutrients at a different rate, therefore, what is recommended for one athlete may not be appropriate for another[1,18]. An athlete's energy intake is vital to supporting optimal body function, determining the intake of macronutrients and micronutrients, and assisting in manipulating body composition.[1,18]

In addition to individual metabolic differences, each collegiate athlete goes through a cycle of training; off-season and in-season. Some sports such as; football, men's and women's basketball, volleyball, and baseball also have a summer training cycle. With that being said, an athlete's individual meal plan varies throughout the year and changes as training schedules and workout intensities vary. When actual loss of body weight is desired or requested, it should occur well out of competition or in the base phase of training.[1,18] This helps to decrease loss of performance and should be achieved in ways that will maximize loss of body fat while at the same time preserve muscle mass.[1,18] A drastic change in body weight can have a negative impact on performance levels, therefore is not recommended during competition season.[1,18] Low energy availability in athletes may compromise athletic performance not only in the short-term, but also long-term.[1,18]

Off-season conditioning and lifting can be more demanding than in-season training.[8] Recommendations for nutrient intake may increase based on intensity and duration of workouts being longer versus maintenance workouts during season, between competitions. Maintenance

workouts are usually lite and short in duration. For example, recommendations for carbohydrate intake typically range from 3-10 g/kg body weight per day. As workouts increase in intensity or duration, this range could increase to 12 g/kg body weight per day.[18] An athlete's energy requirements are dependent upon the period of training or competition cycle, and vary from day-to-day throughout the yearly training plan.[1] When an athlete is serious about body weight or body composition changes, an individual meal plan can be provided to aid in food choices and appropriate intake. Meal plans should be personalized to each athlete, taking into consideration performance goals, practical challenges, food likes and dislikes, sport demands, and responses to various strategies.[18]

It is important to note, body weight may increase and body composition may decrease or body weight may not change and body composition fluctuates.[18] Following periods of intense training, these changes likely occur following each training cycle, such as at the conclusion of off-season training. Body composition can be assessed using one of the following methods: dual energy x-ray absorptiometry (DXA), hydro densitometry, air displacement plethysmography, skinfold measurements, and bioelectrical impedance analysis.[1,18] Body composition testing should be conducted at times which are appropriate to the athlete's performance and training while at the same time being cautious of the athlete's sensitivity.[1,18]

The off-season and summer workout schedules are more conducive to providing nutrition education in ways that are not possible during season due to time constraints. Cooking classes are one way to provide this education. Working in sports nutrition, it is advantageous to provide the immediate education needs, as well as providing education athletes can use following their collegiate career. Through personal experience, athletes living off campus ask for recipes and simple meals they can prepare at home. Teaching athletes how to prepare simple meals at home

is a skill they may utilize for the rest of their lives. Providing this education to athletes while they are still competing allows them the ability to ask questions and continue to improve their cooking skills, preparing them for life following their collegiate career.

This past summer, I had the opportunity to provide the first series of cooking classes to the student-athletes at Kansas State University on campus during the summer. Through a series of classes, athletes were taught how to handle a knife properly, cut fresh fruits and vegetables, cook meat to proper internal temperatures, and assemble quick and easy meals. Along with the basic cooking skills, our student interns and myself educated athletes on how to read a recipe and use appropriate measuring utensils. Following these classes, it was rewarding to hear athletes talk about the meals they had made at home after learning the basic skills. Much to their surprise a majority enjoyed cooking and didn't realize how fun it could be.

Another beneficial skill for student athletes is being able to grocery shop for healthy options, on a budget. Taking groups of athletes through the grocery store, showing them how to pick out fresh fruits and vegetables, and label reading are skills athletes may utilize following college. In addition, these tours can be done individually to help an athlete shop for items specific to their dietary needs.

Educating does not stop with the athlete. There is constant communication with head coaches, assistant coaches, graduate assistants, strength and conditioning coaches, and athletic trainers on how sports nutrition can best help each athlete and team. Communication can occur in person, through e-mail, or over the phone. Sometimes communication is daily, other times weekly, depending on the issue at hand. This communication is not always about nutrition. It may also entail information on if an athlete is dealing with increased stress related to an injury or change in workout schedules. Everyone works together keeping the athletes best interest in mind.

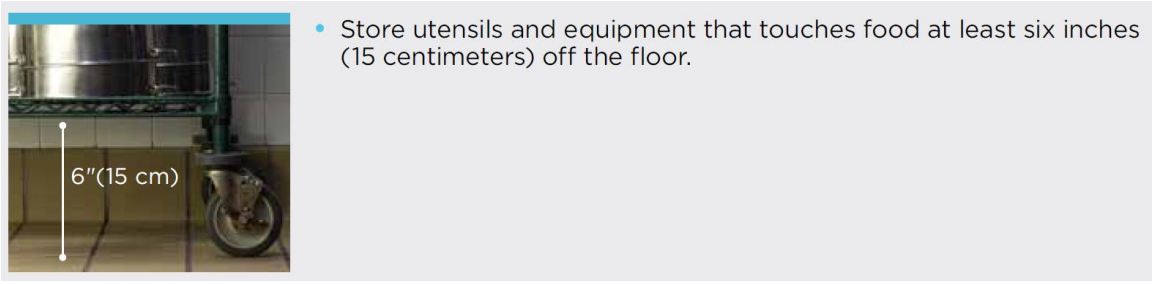
Whether it is increasing an athlete's stamina or enhancing performance, optimizing nutrition status, or helping reduce the risk of injuries or illness, sports dietitians work with support staff to help a student athlete achieve their goals.[4] Each team dynamic is different with regard to coach interaction. Some coaches are very involved with their athletes on a daily basis and some coaches talk to their athletes every couple of days. In terms of education to teams, some coaches will request specific nutrition topics to be discussed, while other coaches ask that the education most appropriate to their team be provided.

When providing education, whether at the team or individual level, determining how each individual learns best determines the most effective education method. Some learn better hands-on, while others prefer handouts they can refer back to, as learned through my observations and experience. Being able to provide education in a variety of ways allows information to be relayed to several athletes at one time.

Environmental Aspects of Sports Nutrition

Dealing with food on a daily basis means there has to be storage for a large inventory of products. When it comes to feeding ~500 plus people through various fueling stations on campus, a large storage area is a necessity. At Kansas State University, there is currently one large dry storage closet to keep non-perishable food. Keeping a large inventory has its challenges, such as making sure products are stored correctly to ensure freshness. Therefore, the first in, first out inventory method is used.[14] This means storing items with the earliest use-by or expiration dates in front of items with later dates.[14] Items stored in front should be used first.[14] At Kansas State University, the first in, first out inventory method is implemented during the initial orientation and training of the student interns. This inventory method is demonstrated and practiced with the director of sports nutrition or graduate assistant before orientation is completed. Keeping in mind most items are stored in cases, having a good idea of what is in storage also helps to ensure freshness. Not only are inventory methods important, but so is food safety; ensuring items are stored off the floors (Figure 3).[14]

Figure 2 Proper Storage Height



Acquired from ServSafe Manager 6th Ed.

Along with non-perishable food items; perishable items are provided too. These items are stored in a large walk-in cooler. Storing perishable items is the same as the non-perishable in terms of first in, first out. Again, keeping in mind food safety and storage to prevent any juices

from dripping down on other foods causing cross contamination (Figure 4).[14] With cooler storage, it is vital to monitor temperatures daily to prevent food items from entering the temperature danger zone.[14]

Figure 2 Proper Storage Order

Order (top to bottom): ready-to-eat food, Seafood, Whole cuts of beef and pork, Ground meat and ground fish, Whole and ground poultry. Acquired from ServSafe Manager 6th Ed.

Having fueling stations spread across campus means food is delivered daily. As often as possible, at Kansas State University, deliveries are made using a Gator which is similar to a golf cart. This is the most convenient method as Gators are able to be driven on sidewalks and prevent items from being carried long distances.

Technological Aspects of Sports Nutrition

As we continue to enter into a world of ever changing technology, utilizing the latest trend in technology to get information and education to student-athletes can be fun but also challenging. Determining the most effective way in which athletes respond to education can help in deciding which technology method to utilize the most. Some sports nutrition departments may choose to disseminate information on tablets that are accessible at fueling stations. Others may choose to use handouts that are placed in fueling stations or are provided during team presentations. Presenting nutrition information in a variety of ways helps athletes better understand how the foods they eat may have a positive effect on health and performance.[19]

Some fueling stations have televisions which are effective ways to display various nutrition-related topics during the week. While an athlete is at the fueling station, waiting on a shake, preparing a snack to take, or consuming a pre-workout or post-workout snack, the nutrition information can be viewed. If a television is not available, posters or education areas with different graphics can be used. Training table is another place nutrition information can be displayed. Utilizing table tents or displaying informational PowerPoints on the televisions throughout the dining area, are places where nutrition information can be seen as athletes consume their meal. From observation and personal experience, the more information athletes are exposed to, the more interested by become about specific nutrition topics and how they relate to health and performance. At Kansas State University, one of the most frequently asked for pieces of information are nutrition facts for foods served at training table. At the request of the athletes, each food item at training table at Kansas State University has a nutrition label consisting of nutrition facts and allergy information. All of these labels are made and provided by the training table staff.

Other resources that can be used and promoted are applications on cell phones. Some sports nutrition departments have an app of their own which includes the training table menu with nutrition facts as well as healthy options to choose at local restaurants near campus. Outside of the school having their own app, there are several apps available to aid student-athletes in achieving their nutrition goals. There are numerous apps to aid in tracking nutrient intake such as MyFitness Pal, Fitbit, Calorie King, and Calorie Counter to name a few. Other apps which aid in grocery shopping are Shopwell, Fooducate, Foodle, and Grocery Pal.

Social media is another way of promoting nutrition education today. As athletes are always checking their phone for information, education can be implemented through common sites such as Twitter, Facebook, or Instagram. Through observation, multiple sports nutrition departments utilize social media by posting education tips, daily training table menus, and activities or changes happening at fueling stations. Having competitions to get individuals and teams involved is one way for athletes to show what they have learned through the nutrition education provided to them. One example of a competition may be utilizing Twitter and answering a simple question such as: how much fluid an athlete should aim to consume daily? Athletes then respond with an answer in the most creative way, using the education they were provided. As different social media sites become available, staying in tune on what athletes are using may serve as a beneficial education tool.

Chapter 2 - Conclusion

Working as a sports dietitian is very rewarding, however, takes hard work and dedication to be successful. Some may look at it as a simple job of providing food and hydration or arranging meals at training table. Looking at the regulatory, financial, staffing, athlete, environmental, and technological aspects, it is clear to see the different areas of a program and the challenges they present. Having an understanding of each of these areas will aid in building or being part of a successful program.

One of the top priorities for a sports dietitian is a student-athlete's nutrition needs which can aid in performance and recovery. Care should be taken to preserve an athlete's health and long-term performance by avoiding practices that create unacceptably low energy availability.[18] Providing nutrition education, whether to a team or individual may have a lasting impact on student-athletes. Every athlete is different.

Sports nutrition is a growing profession and will continue to grow as top athletes realize the importance nutrition plays on performance. As with every profession there are rules and regulations to abide by. The NCAA regulations on allowable foods and supplements is always changing. With these regulations continuing to change, sports dietitians continue to adapt to these changes and provide the most beneficial food products available. Staying up on rule changes and the latest trends in sports nutrition help sports dietitians provide the most up to date research and nutrition information to athletes.

In this very fast-pace career, each day presents a new challenge. Through hard work, anything is possible and athletes are always hungry for information. From educating on a good snack option or helping to understand a disease process to teaching the basics of cooking

and how to grocery shop on a budget, sports dietitians have the opportunity to make a life-long impact on student-athletes.

Reliable Sources of Information in Sports Nutrition

As sports nutrition continues to grow, there are new research studies published daily on various aspects of the profession. From nutrients, vitamins, or minerals and the effects they have on performance, to different supplements and the appropriate amount needed to aid in performance, the opportunity to gain knowledge is endless. Some beneficial resources available for reliable information are: The Collegiate and Professional Sports Dietitian Association (CPSDA), the Sports, Cardiovascular, and Wellness Nutrition (SCAN) practice group within the Academy of Nutrition and Dietetics, and the Gatorade Sports Science Institute (GSSI). The CPSDA website contains handouts with information related to specific sports as well as different aspects of nutrition. Job postings and education opportunities are also listed on this website. SCAN provides handouts and webinars on a variety of nutrition topics related to sports. GSSI is a large database of individual studies and recommendations related to performance and recovery. Not only are these great resources, attending the annual CPSDA or SCAN conferences provide some of the newest and latest topics in sports nutrition presented by some of the top professionals in the industry.

Reliable research articles can be found through search engines such as PubMed and Google Scholar as well as numerous journals. Through the over 25 million citations and abstracts available on PubMed, an abundance of articles specific to sports nutrition, health, and behavioral sciences can be found.[15] As sports nutrition ties in with sports medicine, the American College of Sports Medicine also provides viable information.

Research does not stop with website availability. There are several handbooks available with valuable information. From Nancy Clark's "Sports Nutrition Guidebook" to "Sports Nutrition – A Practice Manual for Professionals" by the Academy of Nutrition and Dietetics and

everything in between, information is readily available. As topics become more specialized, resources are available. There are numerous books available on specific topics such as nutrient timing as well as supplements.

Reflection

The path I followed has not always been easy, but helped me move tremendously in my professional career. When one door closed for me, I didn't let it stop me. I found a way to where I am now. I would not change the path I took for anything, as I know my hard work, experience as a student-athlete, and determination has helped me succeed as a graduate assistant.

Working in sports nutrition at the Division I Collegiate level is not a normal 8:00 am to 5:00 pm job. Most days are thirteen or fourteen-hour work days, depending on workout schedules and needs of the athletes, as well as staff. Yes, the hours are long, but there is always something happening which makes time fly. I learned a great deal from everyone I work with about how hard work pays off and how to be successful at the Division I level. I was unsure of the challenge I faced coming from a clinical position.

Being a former Division I athlete definitely helped me along the way. Having to manage my time as an athlete has helped me manage my time as a graduate assistant between school and working 70-80 hours each week, sometimes more. I have learned to prioritize and take care of the most important issues first; the rest will always be there and can be picked up at any time. I have always been a very organized person, which is very helpful when it comes to managing the nutrition needs for two hundred plus student-athletes.

For anyone considering sports nutrition; it takes work, but is rewarding. Each day is a new challenge, a new adventure. No two days have ever been the same. I challenge you to try it. It is the most rewarding job I have been a part of. Seeing young adults make changes to improve their health and performance indicates that I am making a life-changing impact on their health.

What I wish I would have known?

There are things I wish I would have done differently to get to where I am today. The biggest regret I have is not completing my Master's degree directly after my Bachelor's degree. At that point, I was tired of school, I wanted to be done. I went on to complete my dietetic internship, take the Registration Exam and work as a Clinical Registered Dietitian for two and a half years before returning to school to complete a Master's degree in Human Nutrition.

Looking back, I would have kept a minor in Exercise Science. The knowledge of the protein requirements for exercise and building muscle; the carbohydrate requirements for optimizing muscle and liver glycogen; the role of fats for athletes; how to measure body composition and assessing an appropriate level of body fat would have been very beneficial to me.[2] At the time I did not see how exercise science was going to be helpful to me in the clinical setting.

When I was in school, sports nutrition was just on the horizon. Therefore, job options were: clinical dietitian, food service, or a community dietitian. I had my mind set on being a clinical dietitian, but knew I always wanted to try sports nutrition as I have been active in athletics all of my life. While practicing as a clinical dietitian, I read articles related to sports and attended any continuing education opportunities related to sports nutrition to stay in tune with the sports nutrition profession.

Sports nutrition includes all areas of dietetics. Every day may consist of practicing each area, therefore, the experiences I gained as a clinical dietitian have helped me tremendously when educating athletes on various disease processes. I have used my knowledge from food service in organizing meals for travel and at training table. Lastly, my community experience has been helpful when teaching cooking classes and leading grocery store tours.

I have learned the field of dietetics provides many job opportunities. Each experience I have had has helped to make me better in each position I have held. I encourage everyone considering dietetics to get experience in all areas of the profession prior to becoming specialized in one area and later realizing the area they chose is not the right match for them.

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Appendix A - Success Tips

- Willing to work early mornings and late nights
- Excellent time management skills
- Working in a fast pace environment
- Confidence
- Dedication
- Excellent communication skills
- Organization
- Problem solving skills
- Multi-tasking
- Clinical nutrition, foodservice, and community nutrition knowledge
- Non-conventional work days
- Willing to work weekends and holidays
- Able to utilize Microsoft Office
- Technologically sound