

CALIFORNIA STATE UNIVERSITY, NORTHRIDGE

NUTRITION MADE EASY: A BROCHURE OF NUTRITION EDUCATION TO
ENHANCE ATHLETIC PERFORMANCE OF THE CSUN ATHLETE

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DEDICATION

To Papi and Mami (Fausto and Maricela): Thank you for always being my greatest supporters and pushing me to excel. I'm so appreciative of your encouragement, love, and support. Siempre estan en mi corazón!

To Riccardo, my husband, who is the gravitational force that keeps me in orbit. My heart stretches daily with my love for you. Thank you for being so supportive, cooperative, and patient.

To my friends who are my constant cheerleaders and my greatest inspirations.

To my beautiful daughter, Livia, who motivates me to be a better mother, wife, friend, leader, and individual. My heart is with you always.

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ABSTRACT

NUTRITION MADE EASY: A BROCHURE OF NUTRITION EDUCATION TO ENHANCE ATHLETIC PERFORMANCE OF THE CSUN ATHLETE

By Daneivys Rodriguez

Master of Science in

Family and Consumer Sciences

The purpose of this graduate project is to develop nutrition education materials for the California State University, Northridge (CSUN) athletes to enhance their nutritional knowledge and dietary intake. Most athletes have many questions regarding what to eat, when to eat, and which nutritional supplements to take to maximize their performance (Hoffman, 2011). Theoretically, collegiate athletes should be knowledgeable about the nutrients vital to maintain a healthy competitive state in their individual sports. However, research tells us differently. This nutrition brochure is based on the collected findings of Ray Burigo (2006), addressing the areas of nutritional interest expressed by the CSUN varsity athletes. Burigo's study surveyed the CSUN varsity athletes and concluded that they would benefit from additional nutrition education. This brochure, based on the latest sports nutrition research, will be made available to coaches, athletic trainers, and nutrition practitioners for the purpose of supporting the dietary goals of the CSUN athletes.

CHAPTER I

INTRODUCTION

Nutrition forms the foundation for physical performance (Benardot, 2000; Hoffman, 2011; Hornstrom, Friensen, Ellery, & Pike, 2011; Skolnick & Chernus, 2010). It has long been established through numerous research studies that optimal nutrition has a strong correlation between athletic performance and recovery (American Dietetics Association [ADA], 2009; Burke, Hawley, Wong, & Jeukendrup, 2011; Ferguson-Stegall et al., 2011; Hoffman; Hornstrom et al.). Selecting adequate amounts of fluids and foods at the appropriate times can maximize an athlete's performance and provide an advantage over competitors. Likewise, inadequacies and inappropriate use of dietary supplements can hinder performance. Proper nutrition is the one factor that benefits all competitors, regardless of sex, age, or sport.

The majority of athletes today understand that proper fueling through proper nutrition is an integral part of training and may even provide that competitive edge over competitors (Hornstrom et al., 2011). Although interest in nutrition information and dietary supplements appears to have increased among most athletes, research indicates that the athlete's nutrition knowledge continues to remain minimal (Abood, Black, & Birnbaum, 2004; Burigo, 2006; Dunn, Turner, & Denny, 2007; Hinton, Sanford, Davidson, Yakushko, & Beck, 2004; Rosenbloom, Jonnalaggadda, & Skinner, 2002; Walsh, Cartwright, Corish, Sugrue, & Wood-Martin, 2011). Most collegiate athletes remain poorly educated about reliable and sensible nutrition practices and are in many ways unprepared to make appropriate dietary choices (Abood et al.; Burigo; Hornstrom et al.). One of the biggest problems faced by collegiate athletes is lack of access to easily

prepared, convenient, and more nutrient-dense foods. The average college athlete has limited time or space to prepare a healthy meal within their dormitories, apartments, or shared housing (Dunn et al.; McDowall, 2007). In addition, there is a concern regarding the athletes' understanding of nutrition and how it determines which food items to select and when (Dunn et al.).

Burigo's 2006 study highlighted the fact that California State University, Northridge (CSUN) varsity athletes were not immune to these misconceptions and were, in fact, interested in gaining more in-depth knowledge on optimal nutrition for *enhanced performance*, techniques for surviving college campus life through healthy meal selections and basic cooking skills in order to incorporate proper nutrition into their lifestyle. The general consensus is that young athletes' nutritional knowledge and dietary practices would benefit from appropriate nutrition education material (Burigo; Dunn et al., 2007; Hinton et al., 2004; McDowall, 2007; Walsh et al., 2011).

Purpose

The purpose of this project is to develop nutrition education materials for the CSUN varsity athletes that incorporate current research findings in sports nutrition as well as topics of interest demonstrated in the survey conducted by Burigo (2006). Collegiate athletes are vulnerable to nutritional deficits because of their rigorous training schedules, the demands of their sport, and the realities of college life. Athletes often adopt rigid training regimens that predispose them to compromised nutritional status, fatigue, and injury (Heaney, O'Connor, Naughton, & Gifford, 2008; Quatromoni, 2008). It has been generally shown that athletes with an understanding of nutrition make healthier food choices resulting in better health, well-being, and athletic performance.

This brochure is intended for CSUN collegiate athletes as well as athletic trainers, strength and conditioning coaches, sports coaches, and other exercise professionals who strive to safeguard their players and maximize an athlete's performance.

Definitions

1. *Athlete* - A person who participates in a sport (Dunford & Doyle, 2012, p. 2).
2. *Collegiate/student athlete* – A student whose enrollment was solicited by a member of the athletics staff or other representative of athletics interests with a view toward the student's ultimate participation in the intercollegiate athletics program. Any other student becomes a student-athlete only when the student reports for an intercollegiate squad that is under the jurisdiction of the athletic department (NCAA Division I Manual, 2011).
3. *Professional athlete* – One who receives any kind of payment, directly or indirectly, for athletic participation, except as permitted by the governing legislation of the Association for the participation in athletics (NCAA Division I Manual, 2011).
4. *Sports nutrition* – Integration and application of scientifically-based nutrition and exercise physiology principles that support and enhance training, performance, and recovery (Dunford & Doyle, 2012, p. 2).
5. *Macronutrient* – Nutrient needed in relatively large amounts. The term includes energy, carbohydrates, proteins, fats, cholesterol, and fiber but frequently refers to carbohydrates, proteins, and fats (Dunford & Doyle, 2012, p. 11).
6. *Micronutrient* – Nutrient needed in relatively small amounts. The term is frequently applied to all vitamins and minerals (Dunford & Doyle, 2012, p. 11).

7. *Dietary supplement*–The Dietary Supplement Health and Education Act [DSHEA] of 1994, provides definition as a “vitamin, mineral, herb, botanical, amino acid, metabolite, constituent, extract, or a combination of any of these ingredients” (Dunford & Doyle, 2012, p. 16).
8. *Ergogenic substances* –Used to improve exercise and athletic performance by improving the production of energy (Manore, Meyer & Thompson, 2009).
9. *Muscle glycogen* – The storage polysaccharide found in mammalian muscle, consisting of large irregular shaped, branched polysaccharide polymer (similar to amylopectin in plant starch) (Dunford & Doyle, 2012, p. 101).

Assumptions

The project and resulting brochure, *Nutrition Made Easy: A Brochure of Nutrition Education to Enhance Athletic Performance of the CSUN Athlete*, is based on the following assumptions:

- The subjects in the Burigo (2006) study were representative of the athletes attending California State University, Northridge (CSUN).
- The questionnaire used in the research conducted by Burigo (2006) was a suitable means of collecting information in regard to the knowledge, behaviors, and concerns of the CSUN athlete.
- Subjects responded truthfully and honestly to the questions in the Burigo study (2006) and these answers continue to be relevant to current CSUN athletes.
- Participants will complete the formative evaluation survey completely and honestly.

- The participants will have the initial motivation and desire to want a brochure with sports nutrition education and tools for the college athlete to implement the recommendations.
- The participants will participate in the formative evaluation without pressure from others.

Limitations

This brochure is intended for use as nutrition education material provided to CSUN athletes, coaches, and trainers to enhance their understanding of nutrition and its role in athletic performance. However, certain limitations do exist:

- The current brochure is based on the cross-sectional assessment done in 2006. Results do not take into account possible changes in athletes' nutritional knowledge and understanding since that time.
- Responses of collegiate athletes at CSUN cannot be generalized to other universities or other athletes in general; therefore educational materials may only be effective for CSUN athletes.
- The 2006 study done by Burigo was limited to the number of athletes who completed the questionnaire.
- Different experts and/or members of the target population may have differing views.

CHAPTER II
REVIEW OF LITERATURE

Overview of Sports Nutrition

The relatively young field of sports nutrition is expanding rapidly, with more researchers focusing on the link between nutrition and athletic performance (Benardot, 2000; Dunford & Doyle, 2012). Making sound nutritional choices does not guarantee that an athlete or team will win a competition, but consistently making poor choices is certain to hinder performance. Specifically, sound nutritional choices are essential for effective training and in order to take advantage of training stimuli (Dunford & Doyle; Wolinsky & Driskell, 2008). Sports nutrition is defined as “the integration and application of evidenced based nutrition and exercise physiology principles that support and enhance training, performance, and recovery” (Dunford & Doyle, p. 2).

Researchers from as early as the 1920s have shown that the composition of a diet can alter performance and adaptations to training (Hoffman, 2011; Wolinsky & Driskell, 2008). Position papers from the Academy of Nutrition and Dietetics (formerly the American Dietetic Association) to the American College of Sports Medicine have become much more specific in their dietary recommendations and their respective impact on an athlete’s performance. Recently, some studies have evaluated the benefits of nutritional supplementation for assisting in the recovery and adaptation processes after strenuous physical activity (Ferguson-Stegall et al., 2011; Gilson, Saunders, Moran, Moore, Womack, & Todd, 2010). Following sound nutritional advice could have a positive impact on an athlete’s capacity to adapt to training and successfully compete while maintaining health and preventing injury.

It is important for the athlete to establish nutritional goals, both long-term and short-term, in order to support their training and improve performance (Maughan, 2002). Examples of long-term sports nutrition goals can include an adequate intake of energy to meet training demands, adequate hydration, as well as adequate intake of carbohydrates and protein for replenishment of glycogen stores and for growth and repair of muscle tissue, respectively (Maughan). Short-term sports nutrition goals can focus on intake to support recovery, consumption of food and beverages for delaying fatigue during competition and training, and the use of dietary strategies known to benefit performance (Maughan).

Collegiate Athletes

Nutrition Knowledge of the Collegiate Athlete

What they need and want to know. Poor nutritional knowledge combined with poor dietary practices continues to be observed in many players (Abood et al., 2004; Burigo, 2006; Fox, McDaniel, Breitbach, & Weiss, 2011; Rosenbloom et al., 2002; Walsh et al., 2011). In the 2006 study done by Burigo, it was found that CSUN varsity athletes had inadequate knowledge of nutrition. Based on this, the author recommended that the CSUN athletes would benefit from having easy-to-follow nutrition education materials. Quatromoni (2008) and other researchers demonstrated that it is not uncommon for college athletes to have misinformed beliefs about their nutritional needs, intake a limited variety of foods, and have limited access to healthier options.

The survey conducted by Burigo (2006) on the CSUN athletes highlighted the areas of sports nutrition where the athletes were most in need of further education and

guidance. The CSUN varsity athletes had the most difficulty answering questions pertaining to the function of protein in the diet, the optimal content of pre-exercise meals, and the role of vitamins/minerals as it pertains to their performance. The survey also indicated that the CSUN athletes would be receptive to further nutrition education with 67% selecting “improved performance” as an area of most interest (Burigo). CSUN athletes in the study also indicated they would be interested in “recipe ideas” selected by 53% of the athletes, followed by “tips on eating out” (51%), “cooking tips” (47%), and “shopping tips” (39%) (Burigo). Results from the questionnaire suggested that there was a definite need for the development of nutrition education.

The nutritional element of a young athlete’s training is particularly critical as there are many connections between nutritional deficiencies, development, growth, injury prevention, and athletic performance (Petrie, Stover, & Horswill, 2004). In research done by Walsh, Cartwright, Corish, Sugrue, & Wood-Martin (2011), the authors noted that many young athletes who reported using nutrition supplements had levels of nutrition knowledge comparable to those who did not use supplements, highlighting the fact that many of the athletes who reported using supplements lacked a basic understanding of the supplements’ physiological impact. Clearing up misunderstandings regarding the role of nutritional supplements in the diet, health maintenance, their role in athletic performance and how best to obtain adequate nutrients from a balanced diet are the key concepts that need to be emphasized with the collegiate athlete (Fox et al., 2011; Hinton et al., 2004; McDowall, 2007; Petrie et al.; Walsh et al.). Similar to the findings from previous research (Dascombe, Karunaratna, Cartoon, Fergie, & Goodman, 2010; Erdman, Fung, & Reimer, 2006; Fox et al.; Lun, Erdman, Fung, & Reimer, 2012; Rosenbloom et al., 2002)

there appears to be a need for enhanced nutrition education.

What they know. Today most athletes understand the vital role nutrition plays on their athletic performance during training and competition. Research indicates that collegiate athletes generally have a positive attitude toward the importance of eating a sport-enhancing diet (Hornstrom et al., 2011). Hornstrom et al. reported that 78% of the Mid-American Conference college softball players were either in agreement or strongly agreed with the statement that a sport-enhancing diet would help them become more successful softball players. Many studies have found that the more positive the attitude toward a sport-enhancing diet, the higher the player's nutrition knowledge tended to be (Hornstrom et al.; Walsh et al., 2011). In the study done by Walsh et al., over 40% of the rugby players believed they were following a sport-enhancing diet. Despite this belief, approximately 37.4% of the rugby players described difficulty knowing what to eat. Nearly 65% of the CSUN athletes correctly answered that carbohydrates and fats are the main source of energy for muscles. This knowledge is particularly critical for collegiate athletes who are known to follow intense training regimens (Burigo, 2006).

In Burigo's study (2006), it was highlighted that athletes who chose "classes" or "books" as their main source of nutrition information had the highest nutrition knowledge scores. Burigo also found that 99.0% of the CSUN athletes were aware that fluids should be replaced before, during, and after athletic events, with their reported behavior of water intake corresponding to this knowledge. Whether an athlete could rely on thirst to ensure proper fluid replacement during and after an athletic competition, responses from the athletes were relatively split, with 53.3% answering correctly and 46.7% answering incorrectly (Burigo). Similar findings were reported in other research studies evaluating

athletes' knowledge on the importance of hydration (Rosenbloom et al., 2002; Walsh et al., 2011). Hydration is especially critical for the CSUN athletes who train and compete in the warmer climates of Southern California.

The Gap. In the recent study done by Hornstrom, Friesen, Ellery, and Pike (2011), a direct correlation was found between the collegiate players' nutrition knowledge and their nutrition practices. In other words, the lower their nutrition knowledge scores on an assessment test, the poorer their eating habits tended to be. Athletes are often bombarded with nutrition information making it difficult for them to distinguish between myth and fact. Their sources of information range from the Internet to popular press, and to their athletic trainers, coaches, and teammates. Only a select few collegiate associations have utilized the expertise of dietetic professionals to enhance their team's knowledge and performance (Hornstrom et al.).

There is a definite divide between collegiate athletes' understanding of the importance of nutrition on their performance and their actual knowledge base and ability to put knowledge into practice, leaving many athletes at increased nutritional risk and unable to discern between all the nutrition propaganda. In addition, many of these collegiate athletes are living on their own for the first time without basic cooking and domestic skills. Fortunately, according to many studies, athletes wish to learn more about nutrition, especially as it relates to enhancing their athletic performance (Hornstrom et al., 2011). Although there are dietary guidelines published and distributed for athletes, collegiate athletes remain susceptible to misinformation and often do not have the sufficient nutrition knowledge to make the necessary dietary changes (Nichols, Jonnalagadda, Rosenbloom, & Trinkaus, 2005).

Areas of Sports Nutrition Relevant to the Collegiate Athlete

Energy Nutrients and Nutritional Supplementation

The supplement industry is an international market worth billions of dollars annually. While many individuals use supplements, those engaged in sports and physical activity represent the most substantial portion of the population purchasing these supplements (Maughan, King, & Lea, 2004). Much of the marketing aims to target young impressionable athletes looking for a competitive edge (Burigo, 2006). Although it is generally believed that intense exercise and athletic training increase an athlete's nutrient needs, a balanced diet with adequate caloric intake should, in fact, provide all the necessary nutrients (American Dietetic Association, 2009; Maughan et al.). However, in the cases where athletes are unable to consume an adequate diet to meet their nutritional needs, many look to nutritional supplements in order to prevent deficiencies and even enhance performance (Erdman et al., 2006; Froiland, Koszweski, Hingst, & Kopecky, 2004; Maughan et al.).

Albeit limited, the use of nutritional supplements by collegiate athletes have shown a steady increase over time (Dascombe et al., 2010; McDowall, 2007). In the study done by Burigo (2006), 91.4% and 60.5% of the CSUN varsity athletes say they consume sports drinks (e.g., Gatorade®, Powerade®) and energy bars (e.g., Power Bar®, Cliff Bar®) respectively. An astounding 25.9% of the CSUN athletes say they use protein powders, drinks, or amino acid supplements, and 14.8% say they used high-protein meal replacement drinks (e.g., Met-Rx®, Myoplex®) (Burigo). Through previous investigations it has been reported that athletes believe that a higher intake of nutritional supplementation is required in order to maximize recovery, improve training adaptations,

intensity, and performance, and/or to avoid illness and maintain health (Dascombe et al.; Froiland et al., 2004; McDowall; Rosenbloom, 2002). An adequate intake of energy is important in order to support training, avoid a long-term energy shortage or excess intake, and to maintain good health (Dunford & Doyle, 2012).

Macronutrients

Carbohydrates. The basic functions of carbohydrates are to provide energy and muscular fuel, to aid in digestion and control cholesterol and fat via dietary fiber, and to assist in nutrient and water absorption from sugars (Benardot, 2000; Burke, Kiens, & Ivy, 2004; Burke et al., 2011; Hoffman, 2011; Karelis, Smith, Passe, & Peronnet, 2010; Vandenbogaerde & Hopkins, 2011). As a macronutrient, carbohydrates play a critical role as a primary energy source providing the necessary fuel for training and competition. Studies have consistently demonstrated the importance of and increased need for carbohydrates with greater exercise intensity and duration for enhanced performance (American Dietetics Association [ADA], 2009; Benardot; Burke et al.; Coyle, Jeukendrup, Wagenmakers, & Saris, 1997; Ferguson-Stegall et al., 2011; Karelis et al.; Vandenbogaerde & Hopkins).

Athletes should aim for a carbohydrate intake that meets their fuel requirements for their particular training regimen and that optimizes replenishment of muscle glycogen stores between workouts (Burke et al., 2004; Ferguson-Stegall et al., 2011; Hoffman, 2011; Karelis et al., 2010; Vandenbogaerde & Hopkins, 2011). A study done by Coyle et al., (1997) established that 50% to 60% of energy during 1-to-4 hours of continuous exercise (at 70% maximal oxygen capacity) is derived from carbohydrates. Although

years of research have pointed to carbohydrates as a key player in maintaining muscular endurance, many athletes continue to believe that protein is the critical macronutrient for achieving success (Benardot, 2000).

There are well-supported principles that provide the strategies for counseling athletes on their everyday diet and refueling after exercise. Some of these principles include: carbohydrate-rich foods with moderate-to-high glycemic index aid in glycogen synthesis, which can be beneficial in the hours following an exercise session; nutrient-rich carbohydrate foods consumed post-workout should also provide a good source of protein; and early refueling may be enhanced by a higher rate of carbohydrate intake, especially helpful when intake is in the form of small, frequent meals (Burke et al., 2011). It is also crucial to have a regimen of small, frequent eating of carbohydrate-rich foods in order to ingest adequate amounts of carbohydrates before and during exercise, with a recommended intake up to 4 hours prior to commencing exercise (Vandenbogaerde & Hopkins, 2011). The timing of carbohydrate consumption is very important as well as recommendations for carbohydrate intake before, during, and after exercise (Dunford & Doyle, 2012).

Recommendations for carbohydrate intake in athletes range from 6 to 10 g/kg body weight per day (ADA, 2009; Dunford & Doyle, 2012), approximately 60% to 70% of total energy intake (Burke et al., 2004). The actual amount required by an individual athlete varies based on the athlete's total daily energy expenditure, type of sport, gender, and environmental conditions (ADA; Dunford & Doyle). In the study done by Ferguson-Stegall et al. (2011), it was found that chocolate milk was an effective post-exercise recovery drink primarily because of the carbohydrate and protein content ratio. They

found more effective subsequent improvements in training as compared to when carbohydrate was supplemented alone post-exercise (Ferguson-Stegall et al., 2011; Gilson et al., 2010; Vandenbergaeerde & Hopkins, 2011). Overall, an ergogenic effect has been shown in the majority of research looking at the impact of carbohydrate and carbohydrate-protein supplements (Vandenbergaeerde & Hopkins).

Protein. Proteins provide essential amino acids, which the body cannot produce. Protein is required in developing new tissues, maintaining existing tissue, assisting in fluid balance, and as a carrier of substances in the blood (Benardot, 2000; Fox et al., 2011; Hoffman, Ratamess, Tranchina, Rashti, Kang, & Faigenbaum, 2010; Moore et al., 2009). Protein is only an energy source when carbohydrates have been depleted due to inadequate intake or prolonged physical activity. To most collegiate athletes, the physiological role of protein continues to remain unclear. Critical concepts to convey to collegiate athletes include that protein is necessary as a fuel source during exercise and it plays a role in building muscle (Fox et al.; Rosenbloom, 2002). However, athletes on high-protein diets are at a greater risk for developing health complications, such as kidney disease (Dunford & Doyle, 2012).

In the study done on CSUN varsity athletes, more than 75% of respondents incorrectly believed that the main source of energy for muscles was protein (Burigo, 2006). Past studies have highlighted the fact that many athletes believe protein to be a primary energy source for muscle, and believe it to be necessary to supplement with protein in order to build muscle (Rosenbloom, 2002). In fact, protein recommendations can generally be met through dietary intake alone (ADA, 2009). A caloric intake that is adequate to maintain body weight is also necessary for optimal protein use and

performance (ADA). Protein or amino acid supplementation has not been shown to enhance athletic performance and therefore recommendations should remain conservative (ADA).

Timing of protein intake is very important. Due to limitations in the digestion, protein is generally recommended to be consumed over time rather than in large quantities at any particular time (Skolnick & Chernus, 2010). Among athletes, dietary protein intake and supplementation has routinely been excessive (Fox et al., 2011). These same authors also showed that although collegiate athletes were aware that their protein needs were higher than the general population, they were unclear as to the recommendations for intake, generally perceiving their needs as much higher. Assuming that the athlete's energy intake is adequate, the general recommendation for protein intake is between 1.2 to 1.7 grams per kg of body weight per day (Dunford & Doyle, 2012). This recommendation can vary depending on the sport, type of training regimen, and the athlete's physical goals, whether to increase or maintain muscle mass.

Fat. Fats play a vital role in the delivery of fat-soluble vitamins (i.e. vitamins A, D, E, and K) and essential fatty acids, assist in satiety control, are part of substance in many hormones, and provide energy and muscular fuel for low-intensity activity (ADA, 2009; Benardot, 2000; Dunford & Doyle, 2012). Generally, it is advisable to have a total fat intake between 20%-to-35% of total caloric intake (ADA; Dunford & Doyle). Fats are a highly concentrated fuel with limited water solubility and also have been shown to be a source of energy during prolonged exercise (Hoffman, 2011). As exercise duration is extended, carbohydrate reserves are depleted and there is a greater reliance on fat, primarily in the form of free fatty acids released from adipose sites around the body

(Hoffman). Recent research studies have investigated the impact of high fat diets with restricted carbohydrate intake to enhance training, but there currently remains no evidence for this recommendation (Burke et al., 2004).

A low fat intake below 20% of total calories can impair performance and be detrimental to health; high-fat diets are also not suitable for the competitive athlete and therefore not recommended (ADA, 2009; Dunford & Doyle, 2012). For the collegiate athlete, controlling fat intake can be quite difficult when they have limited availability of home-cooked meals. In a study by Hinton et al. (2004), it was found that a diet primarily composed of foods prepared outside of the home increased the chances of an athlete exceeding the recommended amounts of fat, saturated fat, cholesterol, and sodium.

Fluids and Electrolytes

Hydration. Dehydration (water deficit in excess of 2% to 3% body mass) can compromise performance, thus making it critical to take in an adequate amount of fluid before, during, and after a bout of physical activity (ADA, 2009; Dunford & Doyle, 2012; Hoffman, 2011; Shirreffs, Casa, & Carter, 2007). Measuring pre- and post-exercise body weight is a valid and simple method of assessing sweat rates in order to estimate losses and determine fluid replacement needs (American College of Sports Medicine, 2007). Prevention of dehydration during exercise or competition is the primary goal of drinking a sufficient amount of fluids. A person's detection of thirst does not typically occur until water loss reaches 1-2% of body mass (Hoffman, 2011). Collegiate athletes are a highly vulnerable group highlighting the importance of providing them with education regarding proper hydration and its impact on performance (Nichols et al., 2005).

Dehydration with a loss of greater than 3% of one's body mass can lead to harmful effects on mental status, mood, and cognition during exercise and at rest (Dunford & Doyle, 2012; Shirreffs et al., 2007). After exercise, the athlete should replace sweat losses during physical activity, approximately 16 to 24 oz fluid for every pound (0.5 kg) of body weight lost during exercise (ADA, 2009; Shirreffs et al., 2007). The goal of drinking during exercise is to avoid a water deficit in excess of 2% of body weight (ADA). Although there are guidelines available, many athletes continue to be susceptible to misinformation which can lead to inadequate replenishment of fluids and electrolytes (Nichols et al., 2005).

For proper hydration, it is recommended that an athlete should drink 5-to-7 mL/kg body weight of water or sport beverage at least 4 hours prior to exercise (American College of Sports Medicine, 2007; ADA, 2009). This should allow for adequate hydration status and for proper excretion of excess fluids from the body (ADA). During exercise, fluid recommendations vary depending on environmental conditions and duration of competition or training. Therefore the amount and frequency of fluid replacement will differ based on the athlete's sweat rate, exercise duration, and chances to drink (American College of Sports Medicine; ADA; Dunford & Doyle, 2012; Shirreffs et al., 2007).

Supplements and Ergogenic Aids

Many athletes seek a competitive edge in their quest to increase strength, endurance, and performance and to achieve a desired body composition. The two biggest questions surrounding supplements are whether they actually work and whether there is

any danger in taking them. Collegiate athletes should be made aware of the regulations that govern supplements or the lack thereof and all the risks and benefits regarding the supplement. The Dietary Supplement Health and Education Act (DSHEA), which passed in 1994, provides the legal definition for dietary supplements in the United States. The Food and Drug Administration [FDA] (1994) defined a dietary supplement as a “vitamin, mineral, herb, botanical, amino acid, metabolite, constituent, extract, or a combination of any of these ingredients” (Dunford & Doyle, 2012, pg 16). This legislation also provided guidelines for labeling, but it is more important to know what is not covered under the law. DSHEA (1994) does not guarantee the safety or effectiveness of dietary supplements (Dunford & Doyle). The Food and Drug Administration (FDA) does not have the authority to require proven safety or effectiveness before marketing a dietary supplement. In other words, most dietary supplements currently being sold are presumed safe until proven otherwise. Good Manufacturing Practices (GMP) are mandated standards for supplements developed by the FDA (2007) in order to ensure accuracy in labeling and a contamination-free product. Despite these standards there is still evidence that many dietary supplements contain ingredients that are intentionally added but not labeled (Maughan, 2005).

Dietary supplements can be broken down into three subcategories: (1) vitamins, minerals, and amino acids; (2) herbs and (3) botanicals (Dunford & Doyle, 2012). In surveys done on athletes, vitamins are among the most frequently used supplements (Dunford & Doyle). The second most common supplement used by athletes are herbs for the purpose of improving their health and to prevent illness, with ginseng and echinacea being the most widely used (Dunford & Doyle). In general, collegiate athletes are

particularly prone to using energy drinks, calorie replacement beverages, multivitamins, and vitamin C; and male collegiate athletes are more likely to use creatine, protein powders, and protein drinks (Dunford & Doyle). Some of the reasons frequently given by athletes for consuming these supplements include intake of a poor diet, the physical demands of their respective sport, the fact that their teammates are taking supplements, and following the recommendations of coaches, parents, and physicians (Dunford & Doyle).

The current literature demonstrates that most dietary supplements currently sold over the counter are not effective for improving performance, increasing muscle mass, or decreasing body fat. In fact, in an analysis done on 12 brands of over-the-counter supplements by Green, Catlin, and Starcevic (2001), it was found that the products' labels were misleading, with 11 of the 12 brands not meeting the requirements of the DSHEA (1994). Athletes need to be made aware of the potential for medical consequences and positive urine test results that can impact their ability to participate in their respective sports (Green et al.). The National Collegiate Association of Athletes (NCAA) publishes a yearly list of banned substances that athletes are expected to be aware of (Appendix D). These substances consist of stimulants (including caffeine exceeding a urinary concentration of 15 micrograms/ml), anabolic agents, diuretics, street drugs such as marijuana or heroin, and peptide hormones and analogues (NCAA Division I Manual, 2011). There are over twenty-five to thirty different substances that can be categorized under each classification, possibly making it much more difficult for the collegiate athlete to understand the importance of being cautious about taking over-the-counter supplements. Since the laws are currently not stringent in terms of supplement

manufacturing and labeling, tainted and contaminated products are a real concern.

According to some studies, there are a few supplements that may be effective and safe at recommended doses, such as caffeine, creatine, protein, and vitamins and minerals. For example, according to Manore, Meyer, & Thompson (2009), creatine is a naturally occurring compound found in skeletal muscle and its functions include providing fuel supply in the muscle. Some suggest that creatine may act like naturally occurring creatine, and enhance muscle growth. Numerous studies have suggested that creatine may be beneficial for repetitive short bouts of high-intensity exercises, such as resistance training, swimming or sprinting but the long-term effects still remain unknown (Manore, Meyer, & Thompson). As well, some studies suggest that multivitamins-minerals can provide important micronutrients needed for physiological function. The use of these supplements may be warranted under certain conditions, such as athletes who restrict caloric intake, eat a limited variety of foods, or eat few fruits, vegetables, and whole grains. However caution should be used to avoid exceeding recommended daily intake (Manore, Meyer, & Thompson). In addition, caution must be taken when selecting supplements, as their quality vary greatly. There are very few products used by athletes that are actually supported by reliable research and may even prove harmful. For that reason, it is recommended that all athletes use caution and carefully consider the risks and benefits of individual supplements.

When evaluating supplements, it is important for collegiate athletes to understand both the risks and benefits, and be provided with tips for choosing quality supplements. Most importantly, nutritional supplements should be assessed with consultation of a qualified, health professional to ensure legitimacy of the product, financial practicality,

and to minimize the likelihood of using an NCAA banned substance (see Appendix D for updated list of banned substances) (Dascombe et al., 2010). The following classes of drugs are included on the banned list: (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, and (h) Beta-2 Agonists. The NCAA considers any substance that is chemically related to these classes as also banned from use (NCAA Division I Manual, 2011), holding not only the student-athlete responsible but also the institution.

Unfortunately, for an athlete, the perceived benefits may outweigh the possible associated risks of using nutritional supplements. Therefore, athletes need to be made aware that it is critical to seek advice on nutritional supplements from sports nutritionists, medical practitioners and/or exercise scientists as well as be cautioned that supplements will not make up for a poor-quality diet (Dascombe et al.; Rosenbloom et al., 2002). At present, there are no guarantees of the purity of any commercial supplement.

Timing of Meals

Timing is everything in sports, from a marathon runner crossing the finish line in record time to an elite swimmer winning by a fraction of a second. Timing is everything from a nutritional standpoint as well. The timed consumption of the macronutrients (carbohydrate, protein, and fat) may significantly affect the adaptive response to exercise thus optimizing health and performance among athletes (Burke, Kiens, & Ivy, 2004; Hoffman, 2011; Kerksick et al., 2008; Moore et al., 2009; Skolnick & Chernus, 2010). To optimize performance, athletes must ensure that their metabolic needs are managed.

Education on the best food and fluid choices along with the optimal timing and volume would further increase an athlete's understanding of how carbohydrates and fluids can help optimize performance (Abood et al., 2004; Hoffman; Nichols et al., 2005; Rosenbloom et al., 2002).

Benardot (2000) and Hoffman (2011) state that it is not only about what you eat that is so crucial; it is also the “dynamic relationship” between exercise and time of ingestion. For example, the delivery of the right amount of carbohydrates at the right time can optimize limited carbohydrate stores, ensure better carbohydrate delivery to the brain, and improve overall endurance and performance (Benardot; Kerksick et al., 2008; Burke et al., 2009). The strategic approach to how much, what, and when you eat before, during, and after training and competition can maximize training results (Skolnick et al., 2010; Benardot; Kerksick et al.; Burke et al.).

Training. Before exercise, a meal or snack should be low in fat and fiber to facilitate gastric emptying and minimize gastrointestinal discomfort. It should provide sufficient fluid to maintain hydration, be high in carbohydrate to maximize maintenance of blood glucose, be moderate in protein, and be a familiar food that has been proven by the athlete to be well tolerated (ADA, 2009; Kerksick et al., 2008). During moderate to high intensity exercise glycogen stores may only last 90 min to 3 hours (Kerksick et al.). Due to the body's limited glycogen stores, the athlete is largely dependent on his/her nutritional intake to supplement energy reserves. As the glycogen is depleted, exercise intensity and work output decreases, increasing levels of muscle breakdown and immune system suppression (Kerksick et al.). The research done by Burke et al. (2011), established that the availability of carbohydrates for optimum performance is dependent

on the consumption of carbohydrates in the hours or days before training, during exercise, and while refueling between sessions.

Pre-exercise meals should have an optimal level of carbohydrate and protein, which is dependent on the duration of the exercise and fitness level of the athlete. General guidelines recommend an intake of 1-2 grams of CHO/kg and 0.15 to 0.25 grams PRO/kg 3-4 hours before competition (Hoffman, 2011; Kerksick et al., 2008). To prevent fatigue related to a hypoglycemic response, a low glycemic carbohydrate prior to training or competition for prolonged energy is normally recommended (Hoffman). The intake of a pre-exercise meal with protein and carbohydrate has been shown to promote muscle protein synthesis, stimulate increases in strength, and favorably impact body composition (Kerksick et al.; Ferguson-Stegall et al., 2011). Hoffman et al. (2010) found that protein supplementation immediately before and after resistance training enhances performance recovery in subsequent days of exercise.

Competition. During competition, an athlete's primary nutritional focus should be to replace lost fluids and consume carbohydrates (approximately 30 to 60 g per hour) for maintenance of blood glucose levels (ADA, 2009; Hoffman, 2011). Many studies have shown that during competition, carbohydrate ingestion, particularly in liquid form, may be the best route of delivery to improve performance (Hoffman). These guidelines are primarily essential during endurance events lasting more than an hour, when an athlete has not consumed adequate food or fluids before commencing the physical activity, or if exercising in an extreme environment (e.g., heat, cold, or high altitude) (ADA).

In the 2011 study done by Walsh et al., rugby athletes were unaware that during

exercise lasting longer than 1 hour, such as a rugby game (80 minutes), additional carbohydrates can be beneficial to avoid utilization of protein stores for energy and reduce the incidence of hypoglycemia. Thus a readily digested carbohydrate, such as a sports drink, would be beneficial to consume during competitions lasting long periods of time (Nichols et al., 2005; Walsh et al.). Athletes should develop a program to replace fluids that is customized to their individual program and sport in order to prevent excessive fluid losses during competition (American College of Sports Medicine, 2007).

Recovery. Full recovery after training entails adequate replenishment of energy, fluids, carbohydrates, proteins, and/or vitamins and minerals that have been depleted during training and/or competition (Dunford & Doyle, 2012; Hoffman, 2011). Limited recovery can lead to fatigue during the next training, and consistent lack of replenishment can eventually impact the athlete's health (Maughan, 2002). To guarantee rapid recovery after training or competition, dietary goals should be to provide sufficient fluids, calories, and carbohydrates to restore muscle glycogen (American College of Sports Medicine, 2007; ADA, 2009; Dunford & Doyle). Carbohydrate intake of 1.0 to 1.5 g/kg bodyweight during the first 30 minutes post-exercise and again every 2 hours for 4 to 6 hours should be sufficient to replenish glycogen stores (ADA, 2009).

It is generally recommended that post-competition, high glycemic carbohydrates be consumed for greater muscle glycogen replenishment (Hoffman, 2011). Glycogen stores are replenished more efficiently during the first hour after exercise thus providing a window of opportunity to optimize glycogen stores for future competitions (Walsh et al., 2011). These authors found that even among athletes that were aware of the benefits of having carbohydrates immediately following exercise there was still poor demonstration

of applied knowledge, with 62.1% incorrectly believing that a steak and salad, which provides a minimal amount of carbohydrate, is an adequate refueling meal.

It is also advisable to have a small amount of protein (0.15 to 0.25 g/kg body weight) (Kerksick et al., 2008) in a refueling snack post-exercise to aid in muscle glycogen storage (Burke et al., 2004). Ingestion of protein during recovery will function to provide amino acids for building and repairing muscle tissue (ADA, 2009). Numerous studies have looked at chocolate milk as a post-recovery nutritional supplement. Its widespread availability, low cost, good taste, and convenience make chocolate milk a popular alternative to other popular sports beverages (Ferguson-Stegall et al., 2011; Gilson et al., 2010). Individuals looking to replenish fluids lost during exercise are advised to drink approximately 1.5 L of fluids for each kilogram of body weight lost (American College of Sports Medicine, 2007). It is further recommended to seek the counsel of a sports nutritionist or qualified, health professional for individualized guidance and goals.

Sport-Specific Diet: Endurance versus Strength-trained Athletes

Basic sports nutrition provides the guidelines for a starting point in providing nutrition counseling for both endurance and strength-trained athletes, but any advice must be individualized to meet an athlete's particular sport's demands (Dunford & Doyle, 2012). Research reveals that athletes have a generally positive attitude toward the importance of eating a sport-enhancing diet but are unaware of the specific demands of their individual sport (Hornstrom et al., 2011; Walsh et al., 2011). Very large and muscular builds are typically associated with strength-and-power athletes, while smaller

and leaner frames are usually linked with endurance-based athletes (Nevill, Holder, & Watts, 2009). As sports have become much more competitive, athletes have increased in size during the last century leading to new dietary demands and health concerns among healthcare professionals. Athletes may feel an increased pressure to obtain and maintain their sports idealized optimal physique and be tempted to follow unbalanced or restrictive diets (Heaney, O'Connor, Naughton, & Gifford, 2008).

Endurance athletes. The consumption of adequate energy, predominantly in the form of carbohydrates, to replenish those exhausted through prolonged stretches of exercise, is vital in the preservation of amino acids for protein production (ADA, 2009). The increase in protein oxidation during endurance exercise, in conjunction with nitrogen balance studies, provide the foundation for advising endurance athletes to increase their protein intake during recovery from long bouts of intense training (ADA). The protein recommendation for endurance athletes ranges from 1.2 to 1.4 g/kg/day, primarily due to nitrogen balance studies that suggest a higher protein intake is necessary to maintain nitrogen balance in these athletes (ADA). It remains unclear whether these recommendations should vary based on an athlete's gender.

Strength-trained athletes. Resistance exercise may require higher amounts of protein than generally recommended, more so than for endurance athletes, primarily because amino acids, in conjunction with adequate energy intake is required to support muscle growth (ADA, 2009; Fox et al., 2011; Hoffman et al., 2010). Strength-trained athletes are normally advised to have a protein intake ranging from 1.2 to 1.7 g/kg/day (ADA, 2009), which is significantly greater than the Recommended Daily Intake (RDI)

of 0.8 g/kg/day for protein (Fox et al.). For the most part, this is especially true during the initial phase of strength training when the most considerable gains in muscle size occur (ADA). According to Fox et al. and Hoffman et al., protein requirements are elevated in strength-trained athletes primarily due to:

1. Enhanced oxidation rates of endogenous amino acids during exercise,
2. The need for increased substrate to repair damaged muscle tissue,
3. The capacity to maintain elevated protein synthesis for greater amounts of muscle tissue.

There are also long-term health concerns among strength-trained collegiate athletes that focus on increasing body size through excess energy intake without associated strength training leading to increases in body adiposity (Walsh et al., 2011). Collegiate athletes must understand that the short-lived athletic benefits of having a larger body mass do not outweigh the long-term health effects.

Eating Out/Domestic Skills

Tailoring nutrition education materials. Concerns regarding nutritional status can easily be amplified among collegiate athletes, when financial resources are limited and life skills are not fully developed (Quatromoni, 2008). A lack of time for food preparation, inadequate cooking skills, financial limitations, and difficulty with living arrangements were among the common barriers to healthy eating listed by athletes (Heaney et al., 2008). Budgeting, purchasing, planning and preparing are all skills that many collegiate athletes living on their own for the first time are lacking. Unable to plan ahead and prepare meals leaves many purchasing most meals at convenient, fast food

restaurants. Educational materials provided to collegiate athletes should take these barriers into consideration and assist athletes in overcoming these obstacles and providing them accessible ways to incorporate a healthier diet. The research on athletes' food choices is limited, but one study found that their food choices were influenced by their environment and availability, quality, quantity, convenience, and perceived healthfulness of the food (Lewis, Long, Perry, Stanek-Krogstrand & Unruh, 2011).

Burigo's 2006 survey found that 39.3% of females and 34.6% of males frequently skipped meals. When asked regarding topics they wished to learn more about, more than half surveyed (51.4%) wanted "tips on eating out", "cooking tips" (46.8%), and "shopping tips" (39.4%). Another percentage wanted "tips on reading the food label" (30.3%), "cooking demonstrations" (22.9%), and a small percentage even wanted a grocery store tour (17.4%). These findings imply that domestic skills such as purchasing and preparing should be an essential component of nutrition information provided to the collegiate athletes.

The survey results also highlighted the eating establishments chosen most frequently by the CSUN athletes. This valuable information aided in the development of nutrition education materials with integration of popular food establishments, tailored to the needs of the CSUN athletes. The most popular choice was Subway® (43.2%), most likely due to its convenient location on the CSUN campus, followed by Chipotle® and McDonald's® (Burigo). This information assisted in the development of nutrition education tailored to the CSUN athletes and their respective choices in food establishments.

Summary

The research done by Burigo (2006) provided the foundation for the development of a nutritional brochure to increase the CSUN athletes' nutrition knowledge to enhance their athletic performance. Ultimately, developing education materials that are appropriate, easy to understand and implement should improve the overall dietary intake of the CSUN varsity athletes and clear up any misconceptions they have regarding sports nutrition. Burigo's 2006 survey findings illuminated the fact that the CSUN athletes have inadequate nutrition knowledge and the development of nutrition education materials is warranted. Primarily, CSUN athletes expressed high levels of interest in health topics that impacted their athletic performance and in those pertaining to meal preparation and selection (Burigo).

These findings led to the development of an evidence-based educational brochure that highlighted all the current findings in sports nutrition as they pertain to athletic performance. Providing accessible and personalized education materials may increase the likelihood that CSUN athletes will incorporate the recommendations and in the future seek dietary guidance from knowledgeable health professionals.

CHAPTER III

METHODOLOGY

Formative Evaluation

The objective of this formative evaluation was to assess whether the intended audience of the brochure, the collegiate athlete, found the brochure's content informative, easily understood, and applicable to their individual sport. Both experts and participants were interviewed to establish strengths and weakness of the brochure. As it was a formative evaluation, the evaluation was designed to contribute to the development of the brochure and assess for any deficiencies in the education provided regarding sports nutrition for the college level athlete. The evaluation was intended to judge how well the brochure met the instructional goals, objectives, and educational needs of the collegiate athlete. Both experts and the target population were provided the same survey to assess their overall impression of the brochure.

Because this brochure is primarily designed for the collegiate athlete, current California State University, Northridge (CSUN) coaches, athletic trainers, and a sports nutrition expert were interviewed to ensure that the content was applicable and easily understood for its intended audience. Experts surveyed and interviewed were involved with athletes from different sports teams, for example the soccer, tennis, water polo, basketball, and volleyball teams. An expert in sports nutrition holds an MS, RD, and CDE. The kinesiology experts' credentials include PhD, MS, MA, ATC (Certified Athletic Trainer), PES (Performance Enhancement Specialist) and CSCS (Certified Strength and Conditioning Specialist). The experts work with the target population on various facets of their training regimens. The appraisal by these experts was primarily

part of a building process in the final development of an educational tool for the college athlete.

Expert Evaluation Procedures

Upon reviewing the brochure, experts were given an evaluation survey to complete (Appendix B). Surveys were conducted at the campus of California State University, Northridge (CSUN) between April 12, 2012 through April 18, 2012, via telephone and on the sports fields, team meeting rooms, and the athletic training room in which the experts were typically located. The evaluation was conducted in an informal setting to accommodate the availability of the respective survey participants. Prior to commencing the evaluation, the experts were presented with a brief introduction to the development of the brochure, its purpose and intended population. They were provided with a color copy of the brochure and the evaluation survey. There was an open discussion as they reviewed the brochure and experts were encouraged to voice questions, suggestions, or comments regarding the brochure content. Experts completed the survey, noted suggestions on the backside of the survey, and returned all materials at that time. They did not receive any compensation for their evaluations.

Expert Evaluation Measurement

The purpose of the evaluation survey was to validate or ensure that the goals of the brochure were being achieved and to improve upon the nutrition education materials. If necessary, areas that were seen as problematic or lacking could be identified and altered. The evaluation survey contained general information questions including sport involvement of participant, age, and gender. A Likert scale was used for measuring

attitudes of participants in response to a series of statements regarding the brochure whereby, 1= strongly disagree, 2= disagree, 3= neutral, 4= agree, and 5= strongly agree. There were two open-ended questions, which asked for content that the expert would like to see added or removed from the brochure and a section to write any additional comments or suggestions (Appendix B).

Expert Characteristics

The experts included athletic trainers and coaches as well as a registered dietitian who work with the collegiate athletes at California State University, Northridge (CSUN). The first expert was a white, non-Hispanic female, with a background in public health and dietetics. Two athletic trainers, male and female, have Master's degrees in sports medicine and hold various certifications such as Athletic Trainer Certified [ATC] and PES [Performance Enhancement Specialist]. The four assistant coaches surveyed, three males and 1 female, work closely with the target population and have extensive backgrounds in collegiate sports.

Evaluation by Members of the Target Population

Target Population Evaluation Procedures

A convenience sample of the target population was chosen based on athletic participation at California State University, Northridge (CSUN). Upon reviewing the brochure, participants were given an evaluation survey to complete (Appendix B). Surveys were conducted at the campus of CSUN between April 12, 2012 through April 18, 2012 on the sports fields, team meeting rooms, and athletic training room in which the participants were typically located. The evaluation was conducted in an informal

setting to accommodate the availability of the respective survey participants. Prior to commencing the evaluation, the participants were presented with a brief introduction to the development of the brochure, its purpose and intended audience. They were provided with a color copy of the brochure and the evaluation survey. There was an open discussion as they reviewed the brochure and participants were encouraged to voice questions, suggestions, or comments regarding the brochure content. Participants completed the survey, noted suggestions on the backside of survey, and returned all materials at that time. They did not receive any compensation for their evaluations.

Target Population Evaluation Measurement

The purpose of the evaluation survey was to validate or ensure that the goals of the brochure were being achieved and to improve upon the nutrition education materials. If necessary, content that was seen as unclear or areas that were lacking could be identified and altered. The evaluation survey contained general information questions including sport involvement of participant, age, and gender. A Likert scale was used for measuring attitudes of participants in response to a series of statements regarding the brochure whereby 1= strongly disagree, 2= disagree, 3= neutral, 4= agree, and 5= strongly agree. There were two open-ended questions, which asked for content that the participant would like to see added or removed from the brochure and a section to write any additional comments or suggestions.

Members of the Target Population Characteristics

Participants included a sample of CSUN collegiate athletes from different sports teams, including soccer and water polo. Athletes who participated in the survey included

twelve females with ages ranging from 18-to-22 years of age in the women's soccer club, fifteen males with ages ranging from 18-to-22 years of age in the men's soccer club, and fourteen females with ages ranging from 19-to-22 years of age in the women's water polo team. Those selected as participants were representative of the final intended audience of the brochure. One hundred percent were current CSUN students participating in an athletic sport.

CHAPTER IV

RESULTS

Results from the Evaluation by Experts

The seven experts were asked if the brochure covered all topics a typical collegiate athlete would be interested in on a 1-5 scale (1 = strongly disagree; 5 = strongly agree). The average score for the experts regarding the value of the content was 4.9. The experts were also asked if they believed the brochure was thorough and accurate, on the same scale, the average score was 4.6. The experts were asked whether the brochure format was easy to follow, content was easy to understand, and if they would recommend all athletes to read the brochure. The respective average scores were 4.0, 5.0, and 5.0. The experts were asked if the brochure offered valuable suggestions and if it was missing information, they responded with an average score of 5.0 and 3.4, respectively.

Six of the seven experts provided additional comments and suggestions regarding the brochure. Five of the six had some of the same recommendations focusing on specifics such as eating while on the road, practical suggestions for eating the calories collegiate athletes need on a budget, and cooking and food preparation tips. Three of the experts wanted to add a section on how to calculate energy needs in order for the athlete to assess which meal plan best fit their caloric needs. Four of the seven experts believed that athletes would benefit from an extensive list of pre- and post-game meal suggestions. One expert wanted to see the addition of more “facts, statistic, and quotes to make it more attractive.” This expert also felt that there was “too much information” and suggested a summary section to be added at the end.

All seven experts agreed that there was valuable content in the brochure that was

needed by the collegiate athletes. One expert wrote, “Visual appearance is great! I like the explanation of carb, protein, and fat. Love the example meals, very helpful.” Another expert wrote, “Very helpful information - covers a lot of different topics!” All the experts concluded the brochure was a great idea and were happy to have nutrition education materials being developed specifically addressing the needs of the collegiate athlete.

Results from the Evaluation by Members of the Target Population

The athletes evaluated the brochure using a quality scale survey with ten statements that they were asked to rate on a 1-5 scale (1 = strongly disagree; 5 = strongly agree). The results of the survey given to the target population were as follows, and depicted in Table 1:

	MEN (n=14) Agree or Strongly Agree %	MEN (n=14) Disagree or Strongly Disagree %	WOMEN (n=23) Agree or Strongly Agree %	WOMEN (n=23) Disagree or Strongly Disagree %
1. Brochure covers all topics I am interested in learning about.	88	12	91	9
2. Brochure is thorough and accurate.	77	23	92	8
3. I would be interested in having a copy.	80	20	97	3
4. Brochure is not useful to me.	46	54	8	92
5. The format is easy to follow.	77	23	87	13
6. Brochure offers great suggestions.	83	17	93	7
7. Would recommend all athletes read brochure.	80	20	96	4
8. Brochure is missing information.	46	54	36	64
9. Brochure has unnecessary information.	46	54	26	74
10. The text is easy to understand.	73	27	86	14

Table 1: Results of quality scale survey conducted by target population.

The first statement regarding whether the brochure covers all topics the athlete was interested in learning about, 91% of the female athletes and 88% of the male athletes were either in agreement or strongly agreed. For the statement regarding the brochure being thorough and accurate, 92% of the female and 77% of the men agreed. There was an overwhelming majority, 97% of the women and 96% of the men, who wished to have a copy of the brochure. When asked regarding the format of the brochure, 77% of the men and 87% of the women were in agreement or strongly agreed that it was easy to follow. In another statement athletes were asked if they would recommend all athletes read the brochure, 96% of the women strongly agreed they would while 80% of the men said they strongly agreed.

The majority of the target population members provided additional comments about the brochure.

Specifically, their comments were as follows:

- This is like the nutrition bible for athletes! I want it!!
- I genuinely like everything on the brochure. I wish I had constructive criticism but I really like it! I really like the daily menus!
- Looks great!!
- I appreciate the use of CSUN pictures rather than typical internet pictures.
- I like how the days for meals are planned out based on how many calories you want to take in, that was awesome!
- I really liked the brochure and it provided me with knowledge that I had no idea about.
- Very helpful for athletes!
- Very nice! I want a copy! I really like the menu.
- I really enjoyed this brochure and I would really enjoy a copy.

- I felt it covered all necessary nutrition topics. I learned many new things. I liked the healthy snack list and examples of meals during the day.
- All around it's really great, athletes need this. I really like that there are examples of what to eat for an entire day, very cool. I really like the "plan, purchase, and prepare" section.
- I like the advice on what to eat during practice.
- I really like this brochure. I really want a copy and think it would be beneficial for each member of my team to have one. It's nice to have the tips on paper, not just being said to you! Great!!
- This is really cool, it's thorough and I could really benefit from the tips and guidance.
- Great brochure!
- Good job on putting together the brochure!
- I liked the tips on what we could eat as an athlete.
- Good job!
- Very thought out!
- I like it, very useful information. Wish I had more time to look it over.
- Make this brochure available for athletes to view! Great info! Must know for all athletes.
- Wouldn't change anything. I like it! It is really well informed. Good job. Keep up the work.

Specifically, their suggestions for additions were as follows:

- More protein information.
- A list of substances that are commonly used but unknown, to be on the banned substances. Maybe adding a list of stores where eating healthy is cheaper.
- I would have liked a section about losing fat and no muscle, with weight loss.
- Cooking and on the road tips would be great.
- More of the sample meals and what to eat when traveling.
- Add what kinds of vitamins to take.

- I would add more healthy snack ideas. Also, I would add good restaurants to eat at.
- “On the road” snacks to eat and what to do about over-eating.
- Instead of 1% milk, I recommend almond milk and instead of 100% whole wheat, sprouted grain wheat is much healthier because it is unprocessed.
- Would add suggestions from specific restaurants,
- Supplements for working out: protein, glutamine, creatine, etc.
- Add some example of food we shouldn’t eat.
- Tips on the road (food) and before game food.
- I would add what we could eat when we are on the road to a soccer game.
- Maybe add substitutes for people with allergies (ex. Walnuts). Provide easy to digest info for people to read.
- Calorie menu in conjunction with particular types of workouts or sports.
- You can add alternate foods.
- The profound physiological and psychological effects of unhealthy or lack of eating might have on an athlete. The calorie diets 2,000; 3,000, 4,000 should have a weight suggestion. Like a person from 100 -115 pounds should do a certain program.
- Add more post- and pre-game meals. Less calorie meal examples.
- Examples for everyday; grocery list.
- Sample meal (pre-game; after game)

CHAPTER V

DISCUSSION

The purpose of this project was to develop a brochure of nutrition education for the California State University, Northridge (CSUN) collegiate athletes. It was designed with their educational needs and areas of interest in mind. By developing this nutrition education material for distribution among the collegiate athletes, coaches, athletic trainers, and staff, the intent is to increase awareness of the vital role nutrition plays in the performance and training adaptations of the athletes.

Discussion of the Findings and Modifications

Discussion of the Expert Evaluation

Most of the experts pointed out similar areas of education they wanted to see addressed in the brochure. The brochure author agrees with the experts regarding the addition of eating tips while traveling, cooking tips, and expansion of the meal examples. These are all valid suggestions that would be useful to the typical collegiate athlete. After carefully reviewing the brochure, the decision was made to make the necessary additions to reflect the needs of the target population.

All of the experts were in agreement regarding the quality of the brochure, its useful content, and the need for an educational tool such as the brochure to address all the nutritional questions from collegiate athletes. This was critical in the development of the brochure as an education tool to provide accessible information to the collegiate athlete regarding nutrition basics with a focus on their particular nutritional needs. Based on the responses from the experts, this goal was accomplished. All seven experts were in

agreement that the brochure would be an important tool to provide all collegiate athletes across different sports disciplines, regardless of age, gender, or level of competition.

Discussion of the Target Population Evaluation

The target population was unanimous in their opinion that the brochure was a useful tool full of valuable nutrition information and applicable to their individual needs. The majority of the participants surveyed found the information useful, were interested in the different nutrition topics covered, and saw the value in having a brochure addressing their nutritional needs. The layout and design were both valued for their ease in following the content flow and its ability to focus in on key areas of interest.

Recommendations provided by athletes such as the addition of eating while on the road and cooking tips were also supported by the expert evaluators and therefore were valuable additions to the brochure. Suggestions for increased focus on protein supplementation were noted but no change was made to this particular section. The author of the brochure felt that the topic was covered in sufficient detail and wishes to have the general focus of the brochure be on healthy, balanced meal planning rather than continuing the misconception regarding the increased importance of protein over other macronutrients.

Another suggestion provided by several participants was for increased information regarding supplementation of popular athletic supplements, such as creatine and glutamine. Although this was a valid suggestion and of interest to many collegiate athletes, the author of the brochure felt the topic was presented in compliance with NCAA regulations and did not wish to imply approval or support the use of any particular supplement among the collegiate athletes. The author wished for the brochure

to spotlight the importance of dietary intake on athletic performance and increase the participants' awareness of nutrition related topics.

Implications

In the study done by Nichols et al. (2005), the author noted that despite the abundance of advertising and sponsorship, athletes not only continue to lack knowledge, but also do not implement the necessary dietary behaviors. The implications of this type of brochure are to meet the nutrition education needs of the California State University, Northridge (CSUN) athlete and ultimately provide them with the tools to improve their dietary intake and enhance their athletic performance. The CSUN athletes were very interested in the brochure and its content as it pertained to their dietary needs. The brochure attempted to encompass the fundamental areas of sports nutrition as well as the areas of interest previously noted in research on collegiate athletes. These areas were primarily focused on nutrition and its impact on athletic performance and teaching basic domestic skills related to meal preparation. Without proper awareness of sports nutrition recommendations, many collegiate athletes can fall short of appropriate dietary practices leaving them at nutritional risk (Nichols et al., 2005).

Further research is recommended to assess whether the brochure increases the nutrition knowledge of the athlete and correlates with actual changes in dietary intake. Modifications should be considered based on assessment of an athlete's nutrition knowledge after thorough evaluation of brochure content. Many athletes lack a basic understanding of the role nutrition plays on their performance and overall health. They require education materials that address their particular concerns and needs, and provide a guide that is user friendly and applicable to their college lifestyle. If athletes begin to

understand the vital role nutrition plays and become knowledgeable regarding food choices, coaches may in turn become better advocates for healthy eating and proper fueling. Perhaps this may lead to future support for increased nutrition education materials, “training tables”, and sports nutrition experts on staff to address the needs of the collegiate athlete.

There is currently not an available informational brochure provided to the athletes by the CSUN athletic department regarding basic nutrition, a “How to” on meeting their dietary needs, or meal preparation tips for those on the go. There was a definite consensus both among the experts and participants that there was a specific need for this type of education material to be provided to all athletes, regardless of their individual sport. The athletic trainers are currently a predominant resource of nutrition information for the majority of collegiate athletes and among trainers many are in agreement that there is lack of a universal nutrition education tool to provide the answers to frequently asked questions. Hornstrom et al. (2011) noted that it was typical for collegiate athletes to seek nutrition advice from their athletic trainers, strength and conditioning staff, or coaches, many of whom provide limited factual information regarding sports nutrition. It is recommended that future nutrition education tools be developed specifically with the athletic trainers in mind to better aid them in providing valid nutrition information and addressing concerns from athletes.

Research should also look to assess whether the brochure is an effective method of disseminating nutrition education information and also evaluate the most effective approach to distributing this tool to the intended population. There are many methods of dispensing nutrition information other than a brochure that might be equally if not more

effective in leading to dietary changes. Other methods might include PowerPoint presentations, required courses or textbooks, newsletters, or sessions with a sports nutrition expert. Regardless of method used, the findings of many studies support the need for and the effectiveness of nutrition education interventions to increase nutrition knowledge and increase the athlete's ability to make dietary changes (Abood et al., 2004; Hornstrom et al., 2011; Nichols et al., 2005; Rosenbloom et al., 2002).

Conclusion

The goal of the Nutrition Made Easy Brochure project was to develop nutrition education materials to help the CSUN athletes understand the importance of healthy eating and its impact on their athletic performance. The project was shown to be successful in incorporating the various aspects of sports nutrition and personalizing it to the needs of the California State University, Northridge athletes. Whether the brochure will prove to be a successful tool in educating the athletes and leading to effective dietary changes, remains to be seen. Future research might evaluate the effectiveness of the brochure as an education tool and assess the most effective way of distributing it to the target population.

A flaw of the brochure is that it provides general guidelines for all athletes, regardless of their individual needs. Perhaps future nutrition education tools can be personalized for particular sports, training outcomes such as weight gain or loss, differences between sexes, or focusing on the education needs of the coaches and athletic trainers. Other suggestions might include a more comprehensive manual of sports nutrition education for those seeking more in depth knowledge regarding the impact of

their dietary intake. By making this brochure easily accessible and understandable, colorful, and personalized for the CSUN collegiate athletes; the goal of increasing the nutrition knowledge base and impacting dietary behaviors may be achieved.

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Nutrition Made Easy: A Brochure for CSUN Athletes to Enhance Athletic Performance



Sports nutrition is a blend of nutrition and exercise physiology, helping us to understand the energy expenditure that is required by a particular sport as well as the energy and nutrient intake that is vital to support excellent

training and performance. Eating the right diet supports the demands of training. The field of sports nutrition emerged to help athletes train, perform, and recover to the best of their abilities. Sports nutrition

plays an integral role in promoting athletic success by helping athletes stay healthy and optimally fuel

The key is to meet nutrient needs and support training and performance while maintaining dietary flexibility.

themselves so they can maximize training and conditioning.

An often over-looked component in many programs, smart nutrition planning can equate to greater gains in lean body mass, minimized fatigue related to poor hydration and under-fueling, and enhanced recovery which supports all future training and competition.



Source: jessieboy.com

10 Nutrition Habits of Champions:

RULE 1: Eat a breakfast everyday that contains carbohydrates and protein!

RULE 2: Eat a minimum of 4 meals a day, 5-6 would be best and eat every 2-3 hours.

RULE 3: Carry a water bottle and drink even when not thirsty.

RULE 4: Sleep a minimum of 8 hours a night. Give the body time to repair/recover.

RULE 5: Eat protein, carbohydrates, healthy fats and vegetables at every meal.

RULE 6: Eat more vegetables At least 5 servings.

RULE 7: Eat a complete meal 15-45 minutes after practice, conditioning, or weights. Eat a small meal 30-60 minutes before training.

RULE 8: Limit to one of the following per week: fast food, fried foods, pizza, cheeseburgers, sweet snacks.

RULE 9: Do NOT take any supplements without first knowing the risks and benefits, and validating with a qualified professional that it does not contain any banned substances.

RULE 10: Understand that all recommendations given are general guidelines. See a qualified health professional for personalized recommendations.

EAT LIKE A CHAMPION....

To be the best, you need to eat differently than the rest!





FUEL THE

*What you eat affects YOUR performance!
Find an eating strategy to support your training, performance,
& overall health.*

In the position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine physical activity, athletic performance, and recovery from exercise are enhanced by optimal nutrition.

CARBOHYDRATE

Carbohydrates are arguably the most important source of energy for athletes. No matter what sport you play, carbs provide the energy that fuels the muscle contractions. Athletes should aim for a carbohydrate intake that meets their fuel requirements for their particular training regimen and that optimizes replenishment of muscle glycogen stores between workouts. Research has established that 50% to 60% of energy during 1-to-4 hours of continuous exercise (at 70% maximal oxygen capacity) is derived from carbohydrates. It is crucial to have a regimen of small, frequent eating of carbohydrate rich foods in order to ingest adequate amounts of carbohydrates before and during exercise, with a recommended intake up to 4 hours prior to commencing exercise.

CARBOHYDRATE:

6 to 10 g/kg (2.7 to 4.5 g/lb) body weight per day.

Amount required depends upon the athlete's total daily energy expenditure, type of sport, sex, and environmental conditions.



PROTEIN:

Strength-trained athletes 1.4 to 1.6 g/kg

(2.2 lbs) of body weight per day.

Endurance athletes 1.3 to 1.4 g/kg (2.2 lbs) of body weight per day.

Research remains unclear on the precise protein recommendations for athletes. There is no evidence that these high daily protein intakes enhance the response to training or increase the gains in muscle mass and strength.



FATS:

Intake should range from 20% to 35% of total energy intake.

Consuming <20% of energy from fat does not benefit performance. Fat, which is a source of energy, is important in the diets of athletes. High-fat diets, however, are not recommended for athletes and can be detrimental.



The actual amount required by an individual athlete varies based on the athlete's total daily energy expenditure, type of sport, sex, and environmental conditions. For specific recommendations contact a registered dietitian specializing in sports nutrition.

PROTEIN

Proteins provide essential amino acids, which the body cannot produce. Protein is required in developing new tissues, maintaining existing tissue, assisting in fluid balance, and as a carrier of substances in the blood. Proteins are often referred to as the building blocks of the body. However critical proteins may seem to the body, high-protein diets can lead to many health complications, including kidney disease. Protein is not an ideal source of fuel for exercise. An adequate energy intake is important in promoting protein balance or increasing protein retention. Timing of protein intake is very important as well. Due to limitations in the digestion of protein it is generally recommended to be consumed over time rather than in large quantities at any particular time.

FAT

Fats plays a vital role in the delivery of fat-soluble vitamins (i.e. vitamins A, D, E, and K) and essential fatty acids, assist in satiety control, and provide energy and muscular fuel for low-intensity activity. Generally, it is advisable to have a total fat intake between 20%-to-35% of total calorie intake. Fats are a highly concentrated fuel with limited water solubility and also have been shown to be a source of energy during prolonged exercise.

A low fat intake below 20% of total calories can impair performance and be detrimental to health; high-fat diets are also not suitable for the competitive athlete and therefore not recommended. For the collegiate athlete, controlling fat intake can be quite difficult when they have limited availability of home-cooked meals. A diet primarily composed of foods prepared outside of the home increases the chances of an athlete exceeding the recommended amounts of fat, saturated fat, cholesterol, and sodium.



Source: Microsoft Office Tool Clipart

BODY



ENERGY

Websites such as ShapeUpAmerica.org and MyPlate.gov have online calculators available to estimate energy intake and expenditure.

Adjustments to energy intake should be made slowly and started during the off-season. For specific recommendations see a qualified professional in sports nutrition. An athlete's energy requirements will vary based on sport, age, gender, position on team, and body composition goals.

Sample 2000 Calories Menu

Day 1

BREAKFAST

1 egg, 2 slice of 100% whole wheat bread, 2 tsp margarine
1 small orange, 8 oz cup of 1% or skim milk

LUNCH

3 oz lean beef, 1 mini corn on the cob, 1 whole wheat tortilla (6-inch diameter), 2 cup of sautéed bell peppers and onions
1 tsp olive oil, 1 small plum

AFTERNOON SNACK

1 small pear, 1 string cheese low fat

DINNER

4-5 oz baked chicken breast, 1 small whole wheat roll
1 medium corn on the cob, 1 cup of cooked spinach, broccoli, cauliflower, 1 tsp margarine, 1 small apple (2-1/2" diameter)

EVENING SNACK

5 sweet bell peppers with 3/4 cottage cheese

Day 2

BREAKFAST

3 egg whites, 1 English muffin, 2 oz Canadian bacon,
1/2 banana (4" length), 8 oz cup of 1% or skim milk

LUNCH

3 oz turkey breast, 2 slices of whole wheat bread, 1 tomato
2 cup mixed vegetable sticks, 1 tsp avocado, 1 small peach

AFTERNOON SNACK

1 small apple, 4 oz plain low fat yogurt

DINNER

4 oz salmon, 5 oz potato baked with skin, 3 cups of zucchini, 2 tsp light sour cream, 1/4 cup of blueberries

EVENING SNACK

1/4 cup granola cereal mixed in 6 oz low fat plain yogurt

Day 3

BREAKFAST

1 tsp reduced fat peanut butter, 1 whole wheat bagel,
4 oz light yogurt, 1/2 banana (4" length),
8 oz cup of 1% or skim milk

LUNCH

3 oz chicken breast, 2 slices of whole wheat bread,
3 cups mixed vegetables, 1 tsp butter, 1 cup of raspberries

AFTERNOON SNACK

1 small orange, 4 oz light yogurt

DINNER

4 oz shrimp, 1/2 cup of peas, 3 cups of sautéed mushrooms,
onions, bell peppers, 1 tsp olive oil, 2 small plum

EVENING SNACK

Celery with 2 tsp reduced-fat peanut butter

Sample 2500 Calories Menu

Day 1

BREAKFAST

1/2 cup bran flakes, 1 cup 1% milk, 1 medium peach,
1 whole wheat toast, 1 tsp peanut butter

MORNING SNACK

1 cup strawberries, 1 cup low fat Greek yogurt

LUNCH

3 oz skinless turkey breast, 1/2 cup snow peas, 1 cup cooked rice,
2 cup of salad, 1/2 tsp virgin olive oil, 1 small orange

AFTERNOON SNACK

1 peach, 3/4 cup 1% cottage cheese,
1 English muffin, 1 tsp peanut butter

DINNER

4-5 oz baked chicken breast, 1 small whole wheat dinner roll
1 medium corn on the cob, 1 cup of cooked spinach, broccoli,
cauliflower, 1 tsp margarine, 1 small apple (2-1/2" diameter)

EVENING SNACK

1 fat-free vanilla pudding, mix in 1 cup berries and 1 tsp nuts

Day 2

BREAKFAST

2 packets instant oatmeal mixed with 1/2 cup skim milk and
1 cup of blueberries

MORNING SNACK

1/4 cup of almonds, 1 banana, 16 crackers with hummus

LUNCH

tuna salad on 2 slices rye bread made with 3oz of tuna, 2 tsp
mayonnaise, celery, lettuce, and topped with tomato slices, 1 medium
pear, 16 wheat thin crackers dipped in 1 tsp hummus

AFTERNOON SNACK

16 oz 1% chocolate milk

DINNER

4 oz grilled fish, 1 large baked sweet potato with 1 tsp brown
sage and 1 tsp margarine, 2 cups zucchini and/or broccoli,
1 whole wheat dinner roll

EVENING SNACK

2 pieces mozzarella string cheese, 3 cups of reduced-fat popcorn

Day 3

BREAKFAST

1 tsp reduced fat peanut butter, 1 whole wheat bagel, 4 oz light
yogurt, 1/2 banana (4" length), 8 oz cup of 1% or skim milk

LUNCH

Sandwich on whole wheat bread w/ 3 oz meat, 1 slice of cheese,
lettuce, tomato, 1 tsp light sauce, 15 pretzels,
1 fat free Greek yogurt, 1 small fruit

AFTERNOON SNACK

1 small orange, 4 oz light yogurt,

DINNER

1 cup pasta w/ marinara meat sauce and 2 cups mixed vegetables,
1 whole wheat dinner roll, 1 tsp reduced-fat butter, 1 small fruit

EVENING SNACK

1 cup of 1% or skim milk (8 oz)



CAL STATE NORTHRIDGE ATHLETICS

MENU SAMPLE (cont.)

Sample 3000 Calories Menu

Day 1

BREAKFAST

1 cup bran flakes, 1 cup 1% milk, 1 banana, 1/2 cup berries,
1 whole wheat toast, 1 tbsp peanut butter

MORNING SNACK

1 cup strawberries, 1 cup low fat Greek yogurt

LUNCH

3 oz skinless turkey breast, 1/2 cup snow peas, 1 cup cooked rice,
2 cups of salad, 1/2 tsp virgin olive oil, 1 small orange

AFTERNOON SNACK

1 peach, 3/4 cup 1% cottage cheese, 1 English muffin,
1 tbsp peanut butter

DINNER

5 oz baked chicken breast, 2 small whole wheat dinner roll
1 medium corn on the cob, 2 cups of cooked spinach, broccoli,
cauliflower, 1 tsp margarine, 1 small apple (2-1/2" diameter)

EVENING SNACK

4 oz light yogurt, 15 whole wheat crackers w/ 2oz spreadable cheese

Day 2

BREAKFAST

Spinach Wrap scramble 4 egg whites, 1 whole egg, 2 cups spinach,
1 oz feta, 1 tsp butter in a 10" whole wheat tortilla,
1/2 cup orange juice, 1 apple

MORNING SNACK

1 Greek yogurt, 1 cup of raspberries, 12 walnut halves

LUNCH

Turkey Burger on whole wheat bun with lettuce, tomato,
1/4 avocado, 1 slice of red onion, 1 cup of mixed vegetables, 2 cups
side salad, 1 small fruit

AFTERNOON SNACK

1/2 whole wheat bagel with 1 tbsp peanut butter, 1 orange

DINNER

5 oz grilled fish, 1 cup of spaghetti squash baked with 1 tsp butter
and garlic, 2 cups sautéed carrots and asparagus,
2 slices of whole wheat bread

EVENING SNACK

1/4 cup granola, 6 oz low-fat plain yogurt, 1 cup strawberries

Day 3

BREAKFAST

2 hardboiled eggs, 1 whole wheat bagel, 1/2 cup cottage cheese,
1 cup mixed fruit, 1 cup smoothie: 8 oz cup of 1% milk,
3/4 cup strawberries, 1/2 banana, 6 crushed walnut halves)

MORNING SNACK

10 almonds, 1 apple, 1 mozzarella string cheese, 16 oz 1% milk

LUNCH

2 fish tacos with cabbage, tomatoes, peppers on 2 small whole wheat
tortillas (6 inch), 4 cups of santitas salad with 1/4 cup of corn,
1/4 cup black beans, cilantro dressing on the side, 1 small fruit

AFTERNOON SNACK

1 cup of reduced-fat chocolate milk, 1/2 banana

DINNER

5-6 oz chicken breast, 2 cups lentils soup, 2 small whole wheat rolls,
2 cups spinach salad with 1 tbsp dried cranberries, 6 pecans,
1 oz cheese and 1 tbsp vinaigrette, 1 small fruit

EVENING SNACK

2 pieces mozzarella string cheese, 3 cups of reduced-fat popcorn

Please contact a sports nutrition expert such as a Registered Dietitian
for additional nutritional guidance and individualized dietary plans.
Klotz Health Center (818) 677-3666 or
visit website : <http://www.csun.edu/athlethealthcenter/>

Sample 4500 Calories Menu

Day 1

PRE-WORKOUT SNACK

Energy bar (200-250 calories)

BREAKFAST

1 whole wheat bagel with 2 tbsp peanut butter, 3-5 scramble eggs
whites, 2 cups of 1% milk

MORNING SNACK

8 oz orange juice, 1 banana, 15 walnut halves, 4 oz
low-fat yogurt, 8 oz 1% milk

LUNCH

5-6 oz lean beef or turkey, 1 cup beans, 1 cup corn, 2 cups of salad with
dressing on side, 2 slices of whole wheat bread or rolls

AFTERNOON SNACK

8 baby carrots with 2 tbsp hummus, 8 oz cup of 1% milk,
15 wheat thin crackers

DINNER

Omelet made with 2 whole eggs plus 4 egg white, 1/4 cup of cheese,
non-starchy vegetables of choice (cook w/ cooking spray), 3 oz lean
ham, 2 slices whole wheat toast w/ 1 tsp all natural jelly on each slice,
1 and 1/2 cups of chopped fruit

EVENING SNACK

4 graham crackers with 8 oz cup 2% milk

Day 2

PRE-WORKOUT SNACK

Energy bar (200-250 calories)

BREAKFAST

2 packets instant oatmeal mixed with 1/2 cup skim milk and 1 cup of
blueberries

MORNING SNACK

15 almonds, 1 banana, 2 pieces mozzarella string cheese

LUNCH

6-8 oz baked chicken breast, 2 small whole wheat dinner rolls, 1 baked
potato, 1 tsp butter, 2 cups of cooked spinach/okra, 1 apple

AFTERNOON SNACK

1/2 whole wheat bagel with 1 tbsp peanut butter, 1 pear

DINNER

6 oz sirloin steak, 1 large baked sweet potato with skin and 1 tsp mar-
garine, 2 cups salad with 1 oz feta cheese, tomatoes, cucumbers,
2 whole wheat dinner roll

EVENING SNACK

1 whole wheat tortilla with 1 oz of cheese, 8 oz cup of 1% milk

Day 3

PRE-WORKOUT SNACK

Energy bar (200-250 calories)

BREAKFAST

3/4 cup cottage cheese, 1 tsp honey, 2 whole grain waffles, 2 tsp
sugar-free syrup, 1 cup smoothie: 8 oz cup of skim milk, 3/4 cup blue-
berries, 6 crushed walnut halves)

MORNING SNACK

1 cup strawberries, 1 cup low fat Greek yogurt

LUNCH

8 oz large bean and cheese burrito on whole wheat tortilla,
4 cups of salad (mixed greens, tomatoes, cucumbers),
4 tsp light Italian dressing, 1 orange

AFTERNOON SNACK

16 oz 1% chocolate milk

DINNER

3 oz reduced-fat feta cheese, 5 falafel patties, 1 whole wheat pita, 2 tsp
hummus, 2 cups of Greek salad with 1 tsp vinaigrette, 1 cup of straw-
berries

EVENING SNACK

1/4 cup granola, 6 oz low-fat plain yogurt, 1 cup blueberries



ENERGY BALANCE

A balanced diet will benefit all athletes, regardless of their individual sport, age, sex or level of competition. Nutrition levels the playing field and provides the competitive edge!

Remember that all recommendations in this brochure are general guidelines, individuals goals will be different!



STRATEGIES FOR DINING OUT

- Breaded, batter-dipped, and tempura all mean fried food and therefore high in fat. Select items that say steamed, poached, roasted, or baked.
- Order a baked potato instead of French fries or have a side salad, steamed vegetables or a cup of broth-based soup.
- Get familiar with a restaurant's nutrition information, either on-site or online.
- Skip the mayonnaise and special sauces that raise the fat content. Ask for extra lettuce, tomatoes, onions and mustard on sandwiches.
- If ordering pizza, ask for extra vegetable toppings and forget the meats and extra cheese. Vegetable pizzas can have half the calories of the "works" type.
- Avoid mindless munching, remove the bread basket, focus on a balanced plate.
- Alcohol is very high in calories and can prevent us from making healthy food choices.
- Trim the fat from broiled meat and order without gravy or sauces.
- Be careful about potato and pasta salads, bacon bits, marinated vegetables, heavy syrup at the salad bar.
- Choose items with large portions of vegetables.
- Pasta with red sauce is a great choice. Avoid cream sauces such as Alfredo or butter sauce as well as parmigiana, pesto, carbonara, sausage dishes and garlic bread.
- At fast food chains choose BBQ or broiled and grilled chicken sandwiches as well as regular hamburgers or roast beef sandwich instead of jumbo burgers and fried sandwiches.
- Choose appetizers that feature healthy vegetables, fruits, or fish.
- Substitute an appetizer for an entrée or split a meal with a companion, add a small salad.
- You can add vegetables to just about everything (salad, pasta, soup, hamburger, etc.) if you just ask.
- Bottom line: try to never dine out without at least one vegetable on your plate.
- Choose unsweetened fruit juice, sparkling water, or fat-free milk instead of soft drinks.
- For dessert, try fresh fruit or sorbet instead of pies, cakes, or cookies.
- Carry a food reference, such as The CalorieKing Calorie Fat, & Carb Counter or phone applications like MyFitnesspal.com or Restaurant Nutrition app.
- Avoid "all-you-can-eat" places.
- Any restaurant with a mascot is probably bad news!



HYDRATION



A good hydration strategy is an essential part of every athlete's preparation for competition. Dehydration (water deficit in excess of 2% to 3% body mass) can compromise performance, thus making it critical to take in an adequate amount of

fluid before, during, and after a bout of physical activity.

Dehydration with a loss of greater than 3% of one's body mass can lead to harmful effects on mental status, mood, and cognition during exercise and at rest. After exercise, the athlete should replace fluids lost, 16 to 24 oz fluid for every pound (0.5 kg) of body weight lost during exercise. Recovery after exercise is part of the preparation for the next exercise session, and replacement of sweat losses is an essential part of this process. Similarly, an excessive amount of water intake that exceeds fluids lost can put the athlete at risk for developing a fatal condition, known as hyponatremia, due to low blood sodium.

STAY HYDRATED:

Dehydration can

- Raises your body temperature
- Makes you work harder at lower exercise intensities
- Causes headache, dizziness, and fatigue
- Leads to muscle cramping

TIPS

- Aim to drink about 5 to 7 ml/kg body weight of water or sport drink at least 4 hours prior to exercise.

TIP Carry a water bottle around with you for a reminder. Drink even when not thirsty.

- Sports drinks that contain electrolytes are helpful, but many foods can also supply the salt that is needed (e.g. bread, cereals, cheese, crackers.)

TIP Select a sports drink during endurance exercise/competition over water if you are a salty sweater or exercising for longer than an hour.

- Weigh yourself before and after practice allows you to estimate fluids lost in sweat. Replace each pound with 2 cups of fluid

TIP Add 2 more cups of water or sports drink for each pound lost during exercise.

Muscle cramping may be associated with dehydration, electrolyte losses, and/or altered nervous system control of the muscle due to fatigue.

HIGH WATER CONTENT

Worried you are not getting enough fluids in the day? High water content foods can help an athlete stay well-nourished and well-hydrated! Virtually all food has some water in it. Natural, whole foods have the highest water content. Fruit and vegetables contain 80 to 98 percent water. Eating dense vegetables such as cucumbers, tomatoes, jicama, beets, carrots or celery with a meal or snack is one of the easiest ways to improve your hydration. Below are images of just a few high water content foods:



Supplementation



SUPPLEMENTS AND ERGOGENIC AIDS

2011-12 NCAA Division I Manual: List of Banned Substances

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.

Below are some Examples of NCAA Banned Substances in Each Drug Class.

Stimulants: amphetamine (Adderall), caffeine (guarana), cocaine, ephedrine, fenfluramine (Fen), methamphetamine, methylphenidate (Ritalin), phenamine (Pron), synephrine (bitter orange), etc.	Anabolic Agents: (includes both oral and injectable forms, such as 1,17-androstano) boldenone, clenbuterol, DHEA, nandrolone, oxandrolone, testosterone, methasterone, androstanothione, norethandrolone, methandienone, ethiocholone, trenbolone
Diuretics (water pills) and other Masking Agents: bumetanide, chlorothiazide, furosemide, hydrochlorothiazide, probenecid, spironolactone (lasixone), triacetamide, tri-chloromethiazide, etc.	Peptide Hormones and Analogues: growth hormone (hGH), human chorionic gonadotropin (hCG), erythropoietin (EPO), etc.
Anti-Estrogens: anastrozole, tamoxifen, formestane, 3,17-dioxo-etioclol-1,4,6-trione (ATD), etc.	Beta-2 Agonists: bambuterol, formoterol, salmeterol, salmeterol

NOTE: There is no complete list of banned drug examples!
Check with your athletics department staff before you consume any medication or supplement.

The Dietary Supplement Health and Education Act (DSHEA) passed in 1994, provides the legal definition for dietary supplements in the United States. The Food and Drug Administration (FDA) (1994) defined a dietary supplement as a "vitamin, mineral, herb, botanical, amino acid, metabolite, constituent, extract, or a combination of any of these ingredients". This legislation also provided guidelines for labeling, but it is more important to know what is not covered under the law. DSHEA does not guarantee the safety or effectiveness of dietary supplements. The Food and Drug Administration (FDA) does not have the authority to require proven safety or effectiveness before marketing a dietary supplement. In other words, most dietary supplements currently being sold are presumed safe until proven otherwise.

The current literature demonstrates that most dietary supplements currently sold over the counter are not effective for improving performance, increasing muscle mass, or decreasing body fat. In fact, in an analysis done on 12 brands of over-the-counter supplements it was found that the products' labels were misleading, with 11 of the 12 brands not meeting the requirements of the DSHEA.

Some studies suggest that multivitamins-minerals can provide important micronutrients needed for physiological function. The use of these supplements such as a multivitamin may be warranted under certain conditions, such as athletes who restrict calorie intake, eat a limited variety of foods, or eat few fruits, vegetables, and whole grains. However caution should be used to avoid exceeding recommended daily intake. In addition, caution must be taken when selecting supplements, as their quality vary greatly. There are very few products used by athletes that are actually supported by reliable research and may even prove harmful.



BANNED

Supplements will NOT
make up for a poor-quality diet!

Timing of Meals



TRAINING

Before exercise, a meal or snack should be low in fat and fiber to facilitate gastric emptying and minimize gastrointestinal discomfort. It should provide sufficient fluid to maintain hydration, be high in carbohydrate to maximize maintenance of blood glucose, be moderate in protein, and be a familiar food that has been proven to be well tolerated. During moderate to high intensity exercise glycogen stores may only last 90 min to 3 hours. Due to the body's limited glycogen stores, the athlete is largely dependent on his/her nutritional intake to supplement energy reserves. As the glycogen is depleted, exercise intensity and work output decreases, increasing levels of muscle breakdown and immune system suppression. Availability of carbohydrates for optimum performance is dependent on the consumption of carbohydrates in the hours or days before training, during exercise, and while refueling between sessions.



Source: CSUN Matador Sports Athletic Website

PRE-GAME/EXERCISE MEAL

- Meal timing: 3-4 hours before exercise
- Recommended to have an intake of 1-2 grams of CHO/kg and 0.15 to 0.25 grams PRO/kg 3-4 hours before competition
- Meal composition: High in low-glycemic carbohydrates and lean protein, low in fiber and fat
- Pre-game meal should allow for optimal digestion and energy supply (between 500 to 1,000 calories).
- Avoid meals high in fat, it takes longer to digest as does fiber and lactose containing meals.
- Take in adequate fluids during pre-game time.
- Avoid caffeine (cola, coffee, tea) as it may lead to dehydration.
- Example of meal: Turkey sandwich (2 servings of bread, 2 ounces of turkey, lettuce, tomato) with a piece of whole fruit, such as an apple or orange.
- Meal hydration: 4 hours before activity, consume 5 mL/kg to 7 mL/kg (2 mL/lb to 3 mL/lb) or 17 oz to 20 oz water or sports drink.
- Snack timing: 30 minutes to 1 hour before exercise
- Snack composition: High in carbohydrate, moderate in protein, low in fat and fiber
- Snack hydration: 5 oz to 10 oz water or sports drink.



Source: CSUN Matador Sports Athletic Website

COMPETITION

During competition, the primary nutritional focus should be to replace lost fluids and consume carbohydrates (approximately 30 to 60 g per hour) for maintenance of blood glucose levels. During competition, carbohydrate intake, particularly in liquid form, may be the best route of delivery to improve performance. These guidelines are primarily essential during endurance events lasting more than an hour, when an athlete has not consumed adequate food or fluids before starting the physical activity, or if exercising in an extreme environment (e.g., heat, cold, or high altitude).

A readily digested carbohydrate, such as a sports drink, would be beneficial to consume during competitions lasting long periods of time (more than 90 minutes). Athletes are advised to develop a program for replenishing fluids.



RECOVERY

Full recovery after training involves adequate replenishment of energy, fluids, carbohydrates, proteins, and/or vitamins and minerals that have been depleted during training and/or competition. Limited recovery can lead to fatigue during the next training, and consistent lack of replenishment can eventually impact the health. To guarantee rapid recovery after training or competition, dietary goals should be to provide sufficient fluids, calories and carbohydrates to restore muscle glycogen. A carbohydrate intake of 1.0 to 1.5 g/kg bodyweight during the first 30 minutes post-exercise and again every 2 hours for 4 to 6 hours to replenish glycogen stores is recommended.

Glycogen stores are replenished more efficiently during the first hour after exercise thus providing a window of opportunity to optimize glycogen stores for future competitions. It is also advisable to have a small amount of protein 0.15 to 0.25 g/kg body weight in a refueling snack post-exercise to aide in muscle glycogen storage. Consuming protein during recovery will function to provide amino acids for building and repairing muscle tissue.

Low-fat chocolate milk has been shown to be an optimal refueling drink post-exercise.



Source: CSUN Master Sports Athletic Website

DURING-EXERCISE MEAL

- ⇒ Carbohydrate intake should begin shortly after the onset of activity
- ⇒ Timing: Consume 30g to 60g carbohydrate/hr spaced every 15-20 minutes
- ⇒ Composition: High-glycemic carbohydrate such as sports drinks/gels/blocks/beans, fruit, high carbohydrate bars with moderate protein
- ⇒ Hydration: Dependent on sweat rate:
- ⇒ Average fluid replacement is 5 oz to 10 oz water or sports drink every 15 to 20 minutes
- ⇒ Sports drinks should contain 6% to 8% carbohydrate
- ⇒ Replace electrolytes lost via sports drink or foods high in sodium/potassium

POST-GAME/EXERCISE MEAL

- ⇒ Carbohydrate intake of 1.0 to 1.5 g/kg bodyweight during the first 30 minutes post-exercise and again every 2 hours for 4 to 6 hours
- ⇒ Snack timing: within 30 minutes post-exercise
- ⇒ Snack composition: 4 to 1 ratio of high-glycemic carbohydrate to lean protein
- ⇒ Meal timing: 2 hours post-exercise
- ⇒ Meal composition: high in low to moderate glycemic carbohydrate and lean protein, low in fiber and fat
- ⇒ Carbs you can drink that contain protein are typically the easiest option. The classic option is chocolate milk.
- ⇒ If that is difficult, fruit (e.g. oranges, bananas, melon, or apple slices) or bagels, are quick alternatives.
- ⇒ Protein/amino-acid supplementation in the form of powders or pills are unnecessary and have been linked to dehydration, weight gain, and stress on the kidneys and liver.
- ⇒ Drink approximately 16 oz to 24 oz water or sports drink for every pound lost during exercise.

Where do I find reliable information about diet, exercise, and health?

www.choosemyplate.gov
www.heart.org
www.nstright.org
www.acsm.org

www.nlm.nih.gov/medlineplus/ency/article/002458.htm

How to Succeed?



Plan

- ⇒ Find quick and easy recipes online
- ⇒ Make a grocery list
- ⇒ Plan meals and snacks for the week based on budget and schedule
- ⇒ Check for sales and coupons in the local paper or online. Try discount stores and buy in bulk
- ⇒ Consider sharing the cost of groceries with roommates, teammates, or family members
- ⇒ Check online at the nutrition information of the food establishments visited frequently.

Purchase

- ⇒ When at the grocery store, focus on the perimeter of the store, this is usually where most of the fresh food is located
- ⇒ Avoid highly processed foods and those that provide little benefit to a balanced diet
- ⇒ Learn to read the nutrition facts label (see below). Where are the things to look for?
- ⇒ Purchase fruits & vegetables in season
- ⇒ Good low-cost items available all year include:
 - Protein—beans (garbanzo, black, kidney)
 - Vegetables—carrots, greens, potatoes
 - Fruit—apples, bananas

Prepare

- ⇒ Make some meals items in advance; pre-cook on days when you have more time.
- ⇒ Cook larger portions and store/freeze for a later meal.
- ⇒ Have snacks prepared in advance and ready to go, for days when time is limited.
- ⇒ Try new recipes, incorporate new vegetable dishes, experiment with various herbs and spices to add flavor.
- ⇒ Learn to save money by preparing most meals at home.

MARKETPLACE

How to Buy Food and Eat Cheaply:

Learn to cook. It's your best defense against poverty. It's usually much cheaper to cook stuff yourself, and it's almost always better.

Don't eat out. At least not often. That sandwich you just paid \$3.00 for is worth about fifty cents, maybe. And it wouldn't take very long to make either.

Stay away from processed foods. When someone else shreds up cheese for you, or cuts up lettuce, you will pay a little more.

Cook a whole chicken. Really! Eat it with pasta the first night, in a sandwich the next day, stir-fried in rice, and add it to soup another day.

Eat beans. They're cheap, they're nutritious! Canned beans are the easiest. Perhaps you can even try cook-it-yourself dried beans.

Cruise the markdown area of the supermarket. Every store has a shelf or basket full of stuff that has been ripped or bruised. There is usually nothing wrong with these items. Avoid dented cans, though, may be spoiled.

Buy big. When you have the money and it makes sense. Consider sharing the cost of a huge bag of something (flour, onions, carrots) with friends.

Grocery List

Fruit	Cans & Bottles	◊ Peas
◊ Oranges	◊ Beans	◊ Brussels sprouts
◊ Apples	◊ Tomatoes	◊ Blueberries
◊ Bananas	◊ Tuna	◊ Raspberries
◊ Melons	◊ Olive Oil	◊ Mixed Vegetables
◊ Strawberries	◊ Vegetable Oil	
◊ Grapes	◊ Peanut butter	
	◊ Jam	
Vegetables	◊ Spaghetti Sauce	Meat or Fish
◊ Mix greens		◊ Chicken
◊ Carrots		◊ Pork Chops
◊ Broccoli	Cheese	◊ Turkey
◊ Potatoes	◊ Parmesan	◊ Beef
◊ Onions	◊ Mozzarella	◊ Salmon
◊ Baby spinach	◊ Cheddar	◊ Shrimp
◊ Peppers		
Dairy	Bread & Grains	Spices
◊ Milk	◊ Whole grain bread	◊ Salt
◊ Yogurt	◊ Whole wheat tortillas	◊ Pepper
◊ Eggs	◊ Pitas	◊ Garlic
◊ Cheese	◊ English Muffins	◊ Cinnamon
◊ Butter	◊ Rice	◊ Bouillon cubes or powder
Baking	◊ Oatmeal	
◊ Flour	◊ Cereal	
◊ Sugar	◊ Pasta	
◊ Cornmeal		
◊ Baking powder	Frozen	
	◊ Corn	



Healthy Snack List:

- Apple or banana slices and peanut butter
- Baked potato with cheese melted on top
- Carrot and celery sticks with dressing
- Dry cereal with dried fruit
- Energy bars, breakfast bars or granola bars
- Granola with low fat milk and a banana
- Instant oatmeal made with low fat milk and dried fruit
- Crackers and hummus (garbanzo bean dip)
- Pudding and graham crackers
- Yogurt and canned fruit
- Peanut butter, crackers and vegetable juice
- Sandwiches (made with peanut butter, turkey, lean roast beef, or tuna)
- Slice of leftover vegetable pizza
- Small bowl of hot soup
- Smoothies made with milk or juice and fresh or frozen fruit
- Trail mix with nuts and dried fruit

- Whole grain bagel with peanut butter and a yogurt
- Whole grain crackers and cheese
- Whole grain, low-fat muffin with low-fat milk
- Cottage cheese with fresh or canned fruit
- 1 cup plain low-fat yogurt with 1/4 cup granola
- Small handful of walnuts or almonds with 1 medium size fruit
- Whole wheat tortilla with reduced-fat cheese
- Frozen yogurt with strawberries
- Bran flakes cereal with low-fat milk and banana
- 1/2 whole wheat bagel with tbsp of peanut butter or slice of cheese
- Handful of pretzels with cheddar cheese
- 1/2 whole wheat pita with tomato and mozzarella
- English muffin with honey and low-fat yogurt
- Pasta with tomato sauce, whole grain bread
- Edamame

* Athletes may not get enough calories/nutrients without adding healthy snacks to their diet. High fat, high sugar snacks are low in healthy nutrients. They may not provide the energy needed to do well during training or a sports competition.

NUTRITION FACTS

Learning to read the nutrition facts label should be a priority for an athlete looking to eat nutritiously and fuel his/her body for training and completion. Check the image to the right of a sample nutrition facts label. Start with reviewing the serving sizes. Look to see which nutrients need to be limited and which should be increased (highlighted in yellow). *Note: *% Daily Values based on a 2,000 or 2,500 calorie diet, therefore percentages may not apply to you as stated.*

Remember If the serving size is one cup, and you eat 2 cups, you are getting twice the calories, fat, and other nutrients listed on the label.

Questions to ask when reading a label

How many servings?

How much fat?

What are the ingredients?

How much fiber?

How much added sugar and sodium?



For ideas regarding healthy eating while on CSUN campus, please visit this great resource: www.csun.edu/tuc/healthy-eating.pdf

Learn to read the Nutrition Facts

Nutrition Facts	
Serving Size 1 slice (47g) Servings Per Container 8	
Amount Per Serving	
Calories 160	Calories from Fat 90
Check the total calories per serving	% Daily Value*
Total Fat 10g	20%
Saturated Fat 2.5g	5%
Trans Fat 0g	
Limit these nutrients	
Cholesterol 0mg	0%
Sodium 300mg	12%
Total Carb 15g	5%
Dietary Fiber less than 1g	2%
Get enough of these nutrients	
Sugars 1g	
Protein 3g	
Vitamin A 0%	Vitamin C 4%
Calcium 4%	Iron 8%
Thiamin 6%	Riboflavin 6%
Niacin 8%	
Quick Guide to % Daily Values:	*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs.
5% or less is low	
20% or more is high	

Source: www.fda.gov



RECIPE CORNER

MARGHERITA PITA PIZZA

This recipe is both easy and quick.

INGREDIENTS:
 4 Whole Wheat Pita
 1 Spoonful Sauce (See Shepherd's Marmoseta or Pesto)
 1 Tomato
 Garlic powder (optional)
 Black Pepper (optional)

DIRECTIONS:
 1. Preheat oven to 400 degrees.
 2. Place pita on pan or baking sheet.
 3. Spread very thin layer of sauce over pita, sprinkle with garlic powder.
 4. Cut tomato into 1/4 inch slices.
 5. Sprinkle with few dashes of marmoseta and black pepper.
 6. Bake for 10-12 min or until edges are light brown.

MAKES 4 SERVINGS

PROTEIN-RICH QUINOA SALAD

Quinoa yields the highest amount of protein (18 grams per cup) of any grain.

INGREDIENTS:
 1 cup quinoa (some better cooking)
 2 pinch tomatoes, chopped
 1 pinch fresh parsley
 1/2 cucumber, chopped
 1/2 cup finely chopped and dried Mediterranean extra virgin olive oil
 Juice of 1/2 lemon (for 1/2 lemon or 1/4 lemon)
 Pesto to taste

DIRECTIONS:
 1. Cook the quinoa according to the package directions. Let it cool in a large bowl for about 10 minutes.
 2. Add the remaining ingredients. Mix. Eat cold or at room temperature.
TIP: Add herbs (parsley, dill) or the amount of vegetable for added nutrition. Top with dash of avocado.

MAKES 6 SERVINGS

TOMATO ZUCCHINI PASTA

Great cold or hot.

INGREDIENTS:
 1/2 cup Vinaigrette dressing
 1 pound of favorite shaped pasta
 2 medium sized zucchini
 1 cup chopped cauliflower
 3-4 ripe Roma tomatoes, chopped
 1 tablespoon dried parsley
 Salt and pepper to taste

DIRECTIONS:
 1. Boil pasta according to package directions. Drain and store in cold water.
 2. Toss the pasta together in a large bowl with the dressing and the rest of the ingredients. Salt and pepper to taste.
 3. Serve immediately or if you cannot do this serve with chilled.

MAKES 4 SERVINGS

2-MINUTE CHICKEN SALAD PITA

In just three daily meals, you can whip up the best-tasting sandwich ever...

INGREDIENTS:
 1 yolk (100% whole egg)
 1 can (1 1/2 oz) chunk chicken, flaked and drained to remove excess moisture
 1 cup fat free mayonnaise
 1 tsp fat free plain yogurt
 1 tsp garlic powder (optional)
 1/2 tsp minced onion, splash of lemon juice
 Salt and pepper to taste

DIRECTIONS:
 1. Put the yolk in the blender first and lightly pulse to break.
 2. In a bowl, mix together the chicken, mayonnaise, yogurt, mustard, and all remaining items.
 3. Cut the yolk in half and mix with mayo. This will be chicken salad.
TIP: There are small benefits of omega, dairy, antioxidants, or grapes into the mix.

MAKES 1 SERVING

TRAVEL TIPS

- ⇒ Take responsibility for your own success. Plan ahead. Bring nutritious snacks.
- ⇒ Bat and drink well while on the move, but be careful not to overeat. Plan a meal schedule before leaving.
- ⇒ Be wary of food and water hygiene on the road.
- ⇒ Traveling with a small cooler allows you to keep food and drinks cold.
- ⇒ Order vegetarian or low fat meals.
- ⇒ Long hours of travel can upset the digestive system. To avoid constipation, drink plenty of fluids and eat fiber-rich foods such as fresh fruit.
- ⇒ Drink water with occasional fruit juice, to stay hydrated.
- ⇒ Talk to a sports dietitian for personalized recommendations regarding travel.

SNACK LIST:

- Breakfast cereal and powdered milk
 - Rice cakes
- Spreads— honey, jam, peanut butter
 - Cereal or breakfast bars
- Dried fruit and nuts—trail mix
- Fresh fruit or canned fruit in fruit juice
 - Sandwiches, bread rolls
 - Low fat flavored milk
 - Whole grain crackers
- Pretzel sticks and peanut butter
 - Reduced-fat popcorn
 - Yogurt
 - Plenty of Water

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CAL STATE NORTHRIDGE ATHLETICS

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APPENDIX B

Expert and Participant Survey

QUALITY Scale Survey

Sport:
Age:
Gender:

For each item identified below, circle the number to the right that best fits your judgment of its quality. Use the scale below to select the quality number.

<i>Description/Identification of Survey Item</i>	Scale				
	1	2	3	4	5
1= Strongly Disagree 2=Disagree 3=Neutral 4= Agree 5=Strongly Agree					
1. Brochure covers all topics I am interested in learning about.	1	2	3	4	5
2. Brochure is thorough and accurate.	1	2	3	4	5
3. I would be interested in having a copy.	1	2	3	4	5
4. Brochure is not useful to me.	1	2	3	4	5
5. The format is easy to follow.	1	2	3	4	5
6. Brochure offers great suggestions.	1	2	3	4	5
7. Would recommend all athletes read brochure.	1	2	3	4	5
8. Brochure is missing information.	1	2	3	4	5
9. Brochure has unnecessary information.	1	2	3	4	5
10. The text is easy to understand.	1	2	3	4	5

What would you add or remove from the brochure?

Additional Comments

(Use Back space for additional comments).

Appendix C

Table 1: Results of quality scale survey conducted by target population.

	MEN (n=14) Agree or Strongly Agree %	MEN (n=14) Disagree or Strongly Disagree %	WOMEN (n=23) Agree or Strongly Agree %	WOMEN (n=23) Disagree or Strongly Disagree %
1. Brochure covers all topics I am interested in learning about.	88	12	91	9
2. Brochure is thorough and accurate.	77	23	92	8
3. I would be interested in having a copy.	80	20	97	3
4. Brochure is not useful to me.	46	54	8	92
5. The format is easy to follow.	77	23	87	13
6. Brochure offers great suggestions.	83	17	93	7
7. Would recommend all athletes read brochure.	80	20	96	4
8. Brochure is missing information.	46	54	36	64
9. Brochure has unnecessary information.	46	54	26	74
10. The text is easy to understand.	73	27	86	14

Appendix D

2011-12 NCAA Division I Manual: List of Banned Substances

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.

Some Examples of NCAA Banned Substances in Each Drug Class

NOTE: **There is no complete list of banned drug examples!!**

Check with your athletics department staff before you consume any medication or supplement.

Stimulants:

amphetamine (Adderall); caffeine (guarana); cocaine; ephedrine; fenfluramine (Fen); methamphetamine; methylphenidate (Ritalin); phentermine (Phen); synephrine (bitter orange); etc.

exceptions: phenylephrine and pseudoephedrine are not banned.

Anabolic Agents – (sometimes listed as a chemical formula, such as 3,6,17-androstenetrione)

boldenone; clenbuterol; DHEA; nandrolone; stanozolol; testosterone; methasterone; androstenedione; norandrostenedione; methandienone; etiocholanolone; trenbolone; etc.

Alcohol and Beta Blockers (banned for rifle only):

alcohol; atenolol; metoprolol; nadolol; pindolol; propranolol; timolol; etc.

Diuretics (water pills) and Other Masking Agents:

bumetanide; chlorothiazide; furosemide; hydrochlorothiazide; probenecid; spironolactone (canrenone); triameterene; trichlormethiazide; etc.

Street Drugs:

heroin; marijuana; tetrahydrocannabinol (THC) – no other substances are classified as NCAA street drugs.

Peptide Hormones and Analogues:

growth hormone(hGH); human chorionic gonadotropin (hCG); erythropoietin (EPO); etc.

Anti-Estrogens :

anastrozole; tamoxifen; formestane; 3,17-dioxo-etiochol-1,4,6-triene(ATD), etc.

Beta-2 Agonists:

bambuterol; formoterol; salbutamol; salmeterol; etc.

**Any substance that is chemically related to the class of banned drugs is also banned!
(unless otherwise noted)**

Last Updated: Jan 26, 2012

Source: Retrieved February 18, 2012 from <http://www.NCAA.org>