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A descriptive overview of the importance of sports nutrition for former athletes

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Abstract
Nutrition is an important aspect of young athletes' sports performance since it allows for normal growth and development. Macronutrients, micronutrients, and fluids in sufficient quantities are required to supply energy for development and activity. Young players must learn what, when, and how to eat and drink before, throughout, and after-action to boost performance. Nutritional requirements for high sports performance comprise proper calorie consumption, fluid intake, and mealtime. Student-athletes and their counselors are frequently misled about nutritional supplements. This paper identifies the nutritional demands of youth sports, discusses common misunderstandings, and investigates athletes' nutritional understanding and nutritional relevant information. Nutrition for youth sports is essential not just for sports achievement, but also for development, progress, and general health. Dietary advice should be based on the most recent scientific research; when counseling student-athletes, administrators, and guardians.

Keywords: Athletic nutrients, youth sports, nutrition intake, dietary suggestions

1. Introduction
Nutrition is essential for sports performance irrespective of the athlete's age. Decent sports nourishment helps to maintain energy throughout the activity, maintains normal glucose levels, reduces hunger, preserves muscular mass, and speeds recuperation. Despite greater energy requirements, the suggested main ingredients for student-athletes do not depart much from overall health requirements. Aside from providing energy requirements, these healthy food options can include vitamins and minerals that are necessary for controlling energy, development, and repair mechanisms.

Players and coaches should encourage their children to consume enough energy from fruits and vegetables, full-grain carbs, and moderate animal and vegetable protein, including beans and lentils. Players should be given accurate nutrition information so that they may make healthy eating choices. Players have special demands, such as proper calorie intake for sports, fluid intake, and mealtime timing for peak efficiency; however, they are frequently ignored or have misunderstandings about these matters. Those who engage with sportsmen who may be able to affect the nutrient status, including trainers, guardians, and nursing programs, may also require a current knowledge of the athlete's nutrient requirements. It is critical that professionals who give dietary advice to athletes have the necessary depth of knowledge and provide credible data. The aim of this review paper is to highlight the nutritional experiences of vulnerable players, to review nourishment and athletics myths, and to give information on the following materials for the healthcare professional to use when consulting not just players, but also their coaches and staff.

2. Athletes' Nutrition Requirements
Nutrition is critical for peak performance throughout all sorts of activities. As a sportsman, the foods you eat are designed to give your body adequate energy and appropriate nutrients to sustain exercise and maximize performance. Performers have distinct dietary demands than the overall population to maintain their high levels of exercise in practitioners (Meyer *et al*., 2007) [1].

2.1 Energy Requirements
Basic nourishment is vital for development, better health academic accomplishment, and energy production (Hannon *et al*., 2020) [2].

Nutrition science improves athletic performance by decreasing tiredness and the incidence of illness and injury; it also allows athletes to manage workouts and speed up recovery (Litt, 2004) [3]. To avoid an energetic deficit or surplus, it is critical to balance calorie consumption and expenditure. Energy deficiency can result in low height, late adolescence, menstrual irregularity, muscular mass loss, and a high vulnerability to tiredness, accident, or sickness. Overeating and being overweight can be caused by an excess of calories (Lemon, 1998) [4]. During maturity, males and girls have identical minimal dietary and energy demands (caloric demands). Adolescence energy demands vary greatly based on age, level of physical activity, rate of growth, and phase of physical development (Torun, 2005) [5]. These suggested energy intakes are the very minimum required for normal development and body functioning. Excess energy is required throughout development spikes and to restore energy spent when participating in physical activities (Walker *et al*., 2009) [6]. A 30 kg female playing soccer for 60 minutes would burn an aggregate of 370 calories, whereas a 60 kg boy playing ice hockey for 60 minutes would burn an aggregate of 950 calories. Athletes' power requirements rise in proportion to their energy consumption. The quantity of energy consumed during regular exercise is determined by its strength, time, and regularity (Wierniuk and Wlodarek 2013) [7].

2.2 Macronutrients: Carbohydrate, Protein, and Fats

Carbohydrates, protein, and fat are all energy-producing components. Carbohydrates seem to be the most significant energy resource for sportsmen since they supply glucose, which is needed for energy. One gram of carbohydrate has around four kilocalories of energy (Baker *et al*., 2014) [21]. Glucose is stored in the body (muscle) and liver as glycogen. Muscle glycogen is by far the most easily accessible form of energy for exercising muscles and may be supplied faster than other power sources (Nuttall and Gannon 1991) [9]. Carbohydrates should account for the majority of an individual's calorie consumption (at least 45-50%) (Burke *et al*., 2001) [10]. Athletes must ingest sufficient carbohydrates to fulfill high-intensity energy requirements, regulate blood glucose levels, and replenish glycogen replenishment reserves (Smith *et al*., 2015) [11].

Proteins are essential for the growth and repair of muscle, hair, and skin. Proteins do not serve as a major source of power during modest or brief activity. Proteins, on the other hand, aid to regulate blood glucose via liver gluconeogenesis as workout endurance rises (Thompson, 1998) [12]. Additionally, it is essential for hormonal and enzyme synthesis, nutrition transmission in the blood, connective tissue support, and tissue repair in reaction to the activity. A gram of protein has four kilocalories of energy (Tipotn and Wolfe 2004) [13]. Performers have slightly greater protein requirements than the general population. Most sportsmen should consume 1.2-2.0 g of protein per kilogram of body weight each day (Moore, 2021) [14]. Protein synthesis has a limit; consequently, protein consumption over certain levels is unnecessary. Protein requirements may be met entirely via food and must not necessitate supplements (Duellman *et al*., 2008) [15]. If you consume too much protein, you will make additional urea, raise your risk of dehydration, and lose calcium. Protein must account for 10-30% of total calorie consumption by sportsmen (Tarnopolsky *et al*., 1992) [16].

Fat is required for the absorption of fat-soluble vitamins (A, D, E, K), the provision of important fatty acids, the protection of key organs, and the provision of insulation. Fat also gives you a sense of fullness. It is a calorically source of energy (one gram contains nine kilocalories), but it is far more challenging to assimilate (Malina and Geithner 2011) [17]. Additionally, fat consumption is necessary for energy production, organ protection, bodily insulation, and the absorption of fat-soluble vitamins and vital fatty acids. Fat consumption should account for 20-35% of total calorie consumption. Athletes have no advantage from fat consumption which is less than 15% or higher than 30% of caloric intake. Lean meat and poultry, fish, nuts, seeds, dairy products, and olive and canola oils are all great sources of fat (Kruschitz *et al*., 2013) [18].

2.3 Micronutrients

Micronutrients (vitamins and minerals) are also vital for sportsmen's well-being. Although numerous vitamins and minerals are essential for optimum health, sportsmen should pay special attention to consuming enough amounts of calcium, vitamin D, and iron. Calcium is essential for the body, enzyme function, and movement of the muscles (Papadopoulou, 2020) [19]. They have important roles in energy generation, hemoglobin synthesis, bone density, immunological function, and antioxidant action (Aerenhouts *et al*., 2011) [20]. Micronutrient requirements are often satisfied by athletes who consume highly energetic consumption and sensible nutrition. As a result, mineral and vitamin supplement is frequently unneeded (Baker *et al*., 2014) [21]. Calcium consumption should be 1000 mg/day for children aged four to eight, and 1300 mg/day for children aged nine to eighteen. Calcium may be found in many foods and beverages, especially milk, yogurt, cheese, broccoli, spinach, and fortified grains and beans (Tenforde *et al*., 2010) [22].

Vitamin D is required for healthy bones and teeth and is implicated in calcium absorption and metabolism. For children aged four to eighteen, current standards indicate 600 IU per day (Koundourakis *et al*., 2016) [23]. Healthy vitamin D levels vary according to geographic region and ethnicity (Constantini *et al*., 2010) [24]. Professionals that exercise inside or in northern climates are more prone to be vitamin D deficient. Fortified foods, such as milk, and sun exposure are forms of vitamin D. Vitamin D is not found in dairy products other than dairy, such as yogurt (Organ and Pritchett 2013) [25].

Iron is necessary for the supply of oxygen to human tissues. Increased iron is necessary throughout adolescence to maintain development, and also spike in blood quantity and lean muscle (Rowland 1990) [26]. Boys and girls aged nine to thirteen should take 8 mg per day to prevent anemia and exhaustion of iron reserves. Youth ages 14 to 18 require additional iron, up to 11 mg per day for men and 15 mg per day for females (Koehler *et al*., 2012) [27]. Iron deficiency is frequent among sportsmen due to low meat, fish, and poultry consumption or increased iron losses in urine, feces, perspiration, or menstrual blood (Clenin *et al*., 2015) [28]. As a result, athletes, particularly female athletes, vegans, and endurance athletes, should indeed be evaluated for iron stores on a regular basis. Eggs, leafy green vegetables, fortified whole grains, and lean meat are all iron-rich diets (Sim *et al*., 2019) [29].

2.4 The sequence of eating before, during, and after a sports game

Food consumption should be timed to coincide with a competitive or workout session. Dietary consumption prior to, throughout, and after an event can have an impact on one's capacity to execute and recuperate from activity. The pre-event breakfast should be low in fat, fiber, and caffeine, but rich in complex carbohydrates and liquids. Meals should be had at least 3-4 hours prior to the performance to avoid stomach upset, nausea, diarrhea, cramping, and slowness (Convertino *et al*., 1996) [30]. It is important to sustain blood sugar throughout training, particularly during lengthy stamina activities, by eating 30-60 g/hr of carbohydrates via sports drinks (Kersick *et al*., 2017) [31]. Immediately after the event, sufficient carbohydrates fuel should be ingested to replace glycogen reserves. Protein must also be ingested in moderation for muscle repair. As a consequence, a combined carbohydrate and protein diet should indeed be had directly following an exercise, with proper meals followed each 2-4 hours (Paul, 2009) [32].

2.5 Water requirement

Hydration is a critical aspect of sports nourishment that should be properly maintained. Fluids aid in the regulation of body temperature and the replacement of perspiration lost during activity (Shirreffs, 2009) [33]. Humidity and temperature in the environment influence how much a sportsman sweat and how much hydration intake is recommended (Ratcliffe 1992) [34]. Warmer temperatures and humidity levels cause a person to sweat more, requiring more liquids to stay hydrated. Dehydration can result in unstable and increase the risk of heat exhaustion or heat stroke in sports (Hillyer *et al*., 2015) [35]. Dehydration and low sodium content are examples of water and electrolyte equilibrium abnormalities (Maughan and Shirreffs 2010) [36]. Players sweat throughout the activity to assist manage core body rising temperatures that induce loss of fluid and may induce salt, iron, and calcium loss through perspiration (Davis *et al*., 2016) [37].

Athletes who shed too much water as a of thirst may have lower performance and an increased risk of heat illness. Fluids are required for hydrating and electrolytes equilibrium maintenance. To prevent dehydration, drink ten to twelve cups (80-96 ounces) of water every day. It is advisable to consume 12-20 oz of drink 2-3 hours prior to exercising (Stephens-Brown and Davis 2018) [38]. 6-12 oz of fluids should be drunk every 15-20mins while activity. Carbohydrate and electrolyte beverages, often known as sports drinks, with 4-8 percent carbohydrate content are good for distance runners to ingest throughout the competition to maintain blood sugar and hydration, however, simple water is also acceptable (Armstrong and Casa 2009) [39]. Throughout rehabilitation, a fluid intake of 16-24 oz per pound loss is adequate. Players must eat sufficient liquids during the day, through activity, and after recuperation from times of exertion to ensure appropriate hydration (Charlton, 2015) [40].

3. Differences in Nutrition Intake by Age and Gender Group

Athletes have different dietary demands irrespective of age, ethnicity, athletic level, sport, and weight. It is essential to comprehend athletes' features since they influence energy, macronutrient, micronutrient, and hydration requirements. Caloric intake for the young athlete should have been sufficient to maintain development and development while also giving adequate energy and water for the extra physical exercise.

3.1 Age

The nutritional requirements of kid sportsmen under the age of 11 differ from those of adult competitors. Caloric intake for the young athlete should be sufficient to maintain development and differentiation while also giving adequate energy and water for the extra physical activity. Body fat proportion and weight should not be considered as a selection factor for participation in sports. Children do not endure severe temperatures as well as older sportsmen. Because of their larger relative body surface area, they respond to heat more gradually. They also sweat less, generate more heat, and are less capable of transferring heat from muscle to skin, all of which increase the chance of exhaustion. Priority should be given to maintaining enough hydration intake in young athletes before, throughout, and then after activity (Allen and Hopkins 2015) [41]. Adolescent athletes may have poor dietary intake due to increased mobility and social conditioning, which can impact food decisions (Krombholz, 2006) [42]. Iron deficiency is more common among young athletes. Adolescent calcium consumption is likewise significantly lower than suggested levels. It is critical to monitor children's height, weight, and BMI when they reach puberty to ensure that it provides the increased nutrition and energy required to fuel hormonal changes that happen during this period. This should be noted, although, that sportsmen may weigh more than what the chart advises since they are more strong (Sundgot-Borgen and Garthe 2013) [43]. As nutritional intake develops poor, the teenage athlete is more likely to suffer from unfavorable health implications such as an increase in fractures and anemia, as well as a lack of endurance to compete in athletic competitions. Adolescent food restriction Athletics have been linked to growth retardation and loss of increased metabolism and loss of lean body mass (Fogelholm, 1994) [44].

3.2 Gender

Performers may choose to compete in games that require them to be in weight categories or even where bodyweight is promoted as a requirement for peak efficiency. Gymnastics, boxing, jogging, and ice skating are instances of this sort of competition. Wrestling is a discipline that has gained popularity amongst men. A popular fallacy in wrestling is that competing in a lower-weight division gives the competitor an advantage; this almost always contributes to the technique of "cutting weight" for a chance to compete (Aiba, 2016) [45]. Whenever competitors in weight division activities are routinely tested for appearance, they are more likely to develop eating problems. Extreme weight loss, as seen in wrestling, is a big issue for school healthcare practitioners. Extreme weight reduction has been linked to lower strength and power, poor durability and efficiency, stunted growth, disordered eating, higher health hazards, and other negative effects in these sportsmen (Franchini *et al*., 2012) [46]. Football, weightlifting, track and field, weight training, weightlifting, and volleyball are all sports that need a high level of ability, speed, or velocity. In these activities, there is typically little emphasis on structured body composition or lifestyle factors. As a consequence,

participants in these activities experience disordered eating less commonly than those in leaner activities (Krentz and Warschburger 2011) [47]. Top high school sports linemen's height, strength, and body mass have all grown over the last three decades. Improved nourishment and endurance have been credited with this. Excessive weight reduction has been linked to lower strength and power, poor stamina and effectiveness, developmental delay, disordered eating, higher health risks, and other adverse consequences in these sportsmen (Farrow, 1992) [48].

Girls participation in sports has grown. Whenever training becomes so severe and calorie intake is excessively constrained at an early age, female athletes may experience issues with menstrual, posture, and poor nutrition (Hansen, 2000) [49]. Medical practitioners are concerned about athletes who must maintain thin or have a visually appealing look in strategies to succeed and operate with force. Athletes who compete in figure skating, diving, linked swimming, running, rhythmic dance, acrobatics, cheerleading, long-distance sports, weightlifting, and weight-class sporting events are more likely to develop weight issues as a result of the influence to be slim. Excessive dietary restriction as a result of mistaken notions of body composition may endanger both productivity and fitness (Redman *et al*., 2009) [50]. Dysfunctional eating is identified as any of numerous psychiatric conditions (including eating disorders or binge eating disorders) suffering from serious perturbation in eating patterns. It can lead to impairment achievement, increased risk of complications, depressed mood, hydration imbalance, and core body temperature changes, menopause, osteoporosis in female athletes (Loucks, 2004) [51]. Girls who participate in sports such as basketball, baseball, handball, and football seem to have fewer eating problems than those who participate in dance, jogging, acrobatics, and ice skating. Considering this, female athletes are more concerned about their being underweight or overweight than male athletes (Philips and Young 2009) [52].

4. Understanding the Dietary Concerns

4.1 Sports players Dietary Comprehension

Considering a stated serious interest in diet, sportsmen do not display adequate nutrition understanding for their performance demands. A shortage of nutritional awareness has been found at the high school, which might be linked to the outlets players turn to for nutrition advice. Athletes have been demonstrated to clearly have no knowledge of protein requirements, vitamin and mineral requirements, and hydration requirements (Clark 1994) [53]. Competitors also have nutrition misunderstandings about fluids and hydration, pre-competition meals, and energy requirements. For instance, always eat after 5-6 p.m.; 800-900 kcal/day is an appropriate energy intake; eat only when the meal is cold; neither meat, bread, or potatoes; and no drinks while exercising (Tam *et al*., 2020) [54]. Those who are misinformed may make poor eating choices, which may impair their productivity. The understanding and application of ergogenic aids by athletes are very important. Numerous sportsmen consume vitamins and ergogenic aids without knowing how effective they are (Martins, 2015) [55]. High school players who want to pursue athletics are more likely to utilize supplements to enhance their athletic performance (Alvarado, 2021) [56].

4.2 Nutritional Relevant Information

Competitors usually acquire nutrition advice from publications, wholefood shop employees, trainers, gym managers, and other sportsmen (Purcell *et al*., 2013) [57]. They are more likely to seek information from multiple sources other than health authorities, which might also result in a prolonged lack of proper nutrition instruction. Several sportsmen go to their families for dietary information and advice, but they also depend on athletic trainers (Heikkila *et al*., 2018) [58]. Competitors under certain disciplines may rely heavily on their instructors for dietary advice. Whenever trainers are uneducated about nourishment, it may cause problems for athletes (Bonci *et al*., 2008) [59].

4.3 Trainers' Improper Nutritional Suggestions

Instructors are frequently involved in changing competitors' food habits, particularly in disciplines such as boxing and acrobatics. Athletes and wrestlers have been seen to rely on instructors for nutritional assessment rather than parents or healthcare specialists (Mazzeo *et al*., 2013) [60]. Research of high school wrestling instructors found that while almost half assessed themselves as nutrition experts, the overwhelm either disagreed with or remained ambivalent regarding the assertion that "losing weight offers a strategic advantage. Instructors have been accused of advising sportsmen on incorrect carbohydrate consumption, hydration limitation, and excess weight (Carbone, 2021) [61]. Given the absence of established scientific proof, many people recommend using multivitamins and protein supplements. Generally, trainers have minimal nutrition expertise and education, yet they frequently give dietary guidance (Clark 1998) [62].

4.4 Weight Management

Some sportsmen might aim to increase weight (as in soccer) or drop weight (as in acrobatics, hockey, and wrestling) in order to enhance or preserve athletic performance. In any scenario losing weight ought to be progressive and begin early-well before the beginning of the league tournament or tournament (Manonre, 2015) [63]. Body growth may be achieved by increasing calorie consumption and strength exercises, whilst weight reduction can be achieved by decreasing calorie consumption and/or increasing calories burned (Artioli *et al*., 2010) [64]. Calorie counting, on the other hand, must never impede natural development. The propriety of weight limitation for particular sports such as boxing, hockey, and acrobatics has long been a source of debate. Many statewide high school athletic bodies have wrestling standards on safe weight-making techniques (Carl *et al*., 2017) [65]. Some of these are available over the Internet and are dependable tools for the school nurse. Regulations for hockey players and dancers have also been released.

4.5 The Requirement of Ergogenic Aids

Athletic competition in a fiercely competitive setting. In a society where achievement is so vital, it's simple to see why sportsmen turn to strategies like utilizing ergogenic drugs to get an advantage. Ergogenic aids are any drug or treatment that can improve athletic fitness or job. There are various ergogenic aids on the market that promise to boost athletic performance or aerobic capacity. Players may invest a great deal of money on medications that may not function as

advertised or, worse, endanger their wellbeing (Ellender and Linder 2005) [68].

According to a recent survey, 80-88 percent of student-athletes employed one or more nutritional supplements (Fakunaga, 2011) [67]. Despite supplement usage among high school athletes not being properly investigated, it is not impossible that several of these are using supplements well. Participants should be interviewed about the supplements they consume and their perceptions of their effectiveness. There is no evidence to back up the prevalent belief among high school athletes that vitamins boost energy or enhance muscular endurance (Ellender and Linder 2005) [68]. The National Collegiate Athletic Association (NCAA) does not prohibit dietary supplements since they're not deemed drugs; nevertheless, the NCAA does state that supplement usage is the responsibility of the student-athlete (Jenksin and Harbert 2008) [69]. Players should be informed about ergogenic aids only after a thorough study of the supplement's effectiveness and safety. Ergogenic aids are the focus of this section article in this edition (Calfee and Fadale 2006) [70].

5. Consequences for School Nursing Profession

Players' athletic dietary advice can take numerous forms. The step is to communicate, handouts or handbooks, present or arrange for workshops to be displayed to high school teams to put a value on peer connections, developing a structured review program with the assistance of a trainer so that sportsmen with disordered eating can acquire eligible counseling, or tapping into centralized statewide or country wide programs to demonstrate and improve health weight control between many sportsmen are all options for nursing staff (Junious *et al*., 2004) [71]. The American Diabetes Association, the American College of Sports Medicine, and the American Academy of Pediatrics are all reputable sports nutrition sites. Nutrition Science Guide for the Competent Working with Active Members, published by the American Dietetic Association, includes a wealth of material, which would include regulations for assessing sports nutrition information on the Web, how to analyze stimulant aids, and a checklist of reliable nutritional supplement Websites (Colberg *et al*., 2010) [72]. Nutritional instructions for athletes can be accessible on the web pages of certain sports-related professional associations. On its site, the NCAA provides a webpage dedicated to teaching collegiate players, managers, nutritionists, and other athletic department personnel about exercise physiology (Donnor, 2015) [73].

6. Conclusion

A well-balanced diet is crucial for developing athletes in order to ensure proper development and enhance athletic performance. An optimum diet consists of 45 to 65 percent carbs, 10 to 30 percent protein, and 25 to 35 percent fat. Fluids are essential for staying hydrated and should be drunk before, during, and after sports activity to avoid exhaustion. The frequency of meal consumption is critical for peak efficiency. Meals should be had at least 3 hours before a workout, and snacks should be consumed 1 to 2 hours before exercise. To allow muscles to repair and promote adequate restoration, recovery meals should be ingested within 30 minutes after exercise and again within 1 to 2 hours of activity. Good nutrition for youth sports is essential not just for sports achievement, and for development, maturation, and general health. On average, neither sportsmen nor instructors have adequate dietary expertise to properly establish an atmosphere conducive to better efficiency and improved health. For high school athletes, the health visitor should be a valuable resource. The 2005 Dietary Guidelines for Americans can be used as a starting point for nutritional guidelines for optimum health. Physicians who are informed about sports nutrition and have a nutrition facts support system can assist sportspeople in understanding their sports nutritional requirements.

7. References

1. Meyer F, O'Connor H, Shirreffs SM. Nutrition for the young athlete. Journal of sports sciences. 2007;25(S1):S73-S82.
2. Hannon MP, Close GL, Morton JP. Energy and macronutrient considerations for young athletes. Strength & Conditioning Journal. 2020;42(6):109-119.
3. Litt AS. Fuel for young athletes. Human Kinetics; c2004.
4. Lemon PW. Effects of exercise on dietary protein requirements. International Journal of Sport Nutrition. 1998;8:426-447.
5. Torun B. Energy requirements of children and adolescents. Public Health Nutrition. 2005;8(7a):968-993.
6. Walker RN, Heuberger RA. Predictive equations for energy needs for the critically ill. Respiratory Care. 2009;54(4):509-521.
7. Wierniuk A, Wlodarek D. Estimation of energy and nutritional intake of young men practicing aerobic sports. Roczniki Państwowego Zakładu Higieny. 2013;64:2.
8. Baker LB, Heaton LE, Nuccio RP, Stein KW. Dietitian-observed macronutrient intakes of young skill and team-sport athletes: adequacy of pre, during, and postexercise nutrition. International Journal of Sport Nutrition and Exercise Metabolism. 2014;24(2):166-176.
9. Nuttall FQ, Gannon MC. Plasma glucose and insulin response to macronutrients in no diabetic and NIDDM subjects. Diabetes Care. 1991;14(9):824-838.
10. Burke LM, Cox GR, Cummings NK, Desbrow B. Guidelines for daily carbohydrate intake. Sports Medicine. 2001;31(4):267-299.
11. Smith JW, Holmes ME, McAllister MJ. Nutritional considerations for performance in young athletes. Journal of Sports Medicine; c2015.
12. Thompson JL. Energy balance in young athletes. International Journal of Sport Nutrition and Exercise Metabolism. 1998;8(2):160-174.
13. Tipton KD, Wolfe RR. Protein and amino acids for athletes. Food, Nutrition and Sports Performance. 2004;2:104-129.
14. Moore DR. Protein requirements for master athletes: just older versions of their younger selves. Sports Medicine. 2021;51(1):13-30.
15. Duellman MC, Lukaszuk JM, Prawitz AD, Brandenburg JP. Protein supplement users among high school athletes have misconceptions about effectiveness. The Journal of Strength & Conditioning Research. 2008;22(4):1124-1129.

16. Tarnopolsky MA, Atkinson SA, MacDougall JD, Chesley A, Phillips S, Schwarcz HP. Evaluation of protein requirements for trained strength athletes. Journal of Applied Physiology. 1992;73(5):1986-1995.
17. Malina RM, Geithner CA. Body composition of young athletes. American Journal of Lifestyle Medicine. 2011;5(3):262-278.
18. Kruschitz R, Wallner-Liebmann SJ, Hamlin MJ, Moser M, Ludvik B, Schnedl WJ, *et al*. Detecting body fat–a weighty problem BMI versus subcutaneous fat patterns in athletes and non-athletes. PloS One. 2013;8(8):e72002.
19. Papadopoulou SK. Rehabilitation nutrition for injury recovery of athletes: The role of macronutrient intake. Nutrients. 2020;12(8):2449.
20. Aerenhouts D, Deriemaeker P, Hebbelinck M, Clarys P. Energy and macronutrient intake in adolescent sprint athletes: A follow-up study. Journal of Sports Sciences. 2011;29(1):73-82.
21. Baker LB, Heaton LE, Nuccio RP, Stein KW. Dietitian-observed macronutrient intakes of young skill and team-sport athletes: adequacy of pre, during, and postexercise nutrition. International Journal of Sport Nutrition and Exercise Metabolism. 2014;24(2):166-176.
22. Tenforde AS, Sayres LC, Sainani KL, Fredericson M. Evaluating the relationship of calcium and vitamin D in the prevention of stress fracture injuries in the young athlete: A review of the literature. PM & R. 2010;2(10):945-949.
23. Koundourakis NE, Avgoustinaki PD, Malliaraki N, Margioris AN. Muscular effects of vitamin D in young athletes and non-athletes and in the elderly. Hormones. 2016;15(4):471-488.
24. Constantini NW, Arieli R, Chodick G, Dubnov-Raz G. High prevalence of vitamin D insufficiency in athletes and dancers. Clinical Journal of Sport Medicine. 2010;20(5):368-371.
25. Ogan D, Pritchett K. Vitamin D and the athlete: risks, recommendations, and benefits. Nutrients. 2013;5(6):1856-1868.
26. Rowland TW. Iron deficiency in the young athlete. Pediatric Clinics of North America. 1990;37(5):1153-1163.
27. Koehler K, Braun H, Achtzehn S, Hildebrand U, Predel HG, Mester J, *et al*. Iron status in elite young athletes: gender-dependent influences of diet and exercise. European Journal of Applied Physiology. 2012;112(2), 513-523.
28. Clénin G, Cordes M, Huber A, Schumacher YO, Noack P, Scales J, *et al*. Iron deficiency in sports-definition, influence on performance and therapy. Swiss Medical Weekly. 2015;145:w14196.
29. Sim M, Garvican-Lewis LA, Cox GR, Govus A, McKay AK, Stellingwerff T, *et al*. Iron considerations for the athlete: A narrative review. European Journal of Applied Physiology. 2019;119(7):1463-1478.
30. Convertino VA, Armstrong LE, Coyle EF, Mack GW, Sawka MN, Senay Jr LC, *et al*. American College of Sports Medicine position stand. Exercise and fluid replacement. Medicine and Science in Sports and Exercise. 1996;28(1):1-7.
31. Kerksick CM, Arent S, Schoenfeld BJ, Stout JR, Campbell B, Wilborn CD, *et al*. International Society of Sports Nutrition position stand: Nutrient timing. Journal of the International Society of Sports Nutrition. 2017;14(1):33.
32. Paul GL. The rationale for consuming protein blends in sports nutrition. Journal of the American College of Nutrition. 2009;28(sup4):464S-472S.
33. Shirreffs SM. Hydration in sport and exercise: water, sports drinks and other drinks. Nutrition Bulletin. 2009;34(4):374-379.
34. Ratcliffe T. Responsibility for water sports management and development. Ocean & Coastal Management. 1992;18(2-4):259-268.
35. Hillyer M, Menon K, Singh R, Hillyer M, Menon K. The effects of dehydration on skill-based performance. Int J Sports Sci. 2015;5(3):99-107.
36. Maughan RJ, Shirreffs SM. Dehydration and rehydration in competitive sport. Scandinavian Journal of Medicine & Science in Sports. 2010;20:40-47.
37. Davis JK, Baker LB, Barnes K, Ungaro C, Stofan J. Thermoregulation, fluid balance, and sweat losses in American football players. Sports Medicine. 2016;46(10):1391-1405.
38. Stephens-Brown L, Davis M. Water requirements of canine athletes during multi-day exercise. Journal of Veterinary Internal Medicine. 2018;32(3):1149-1154.
39. Armstrong LE, Casa DJ. Methods to evaluate electrolyte and water turnover of athletes. Athletic Training & Sports Health Care. 2009;1(4):169-179.
40. Charlton G. Sports ground management. Australasian Parks and Leisure. 2015;18:3.
41. Allen SV, Hopkins WG. Age of peak competitive performance of elite athletes: A systematic review. Sports Medicine. 2015;45(10):1431-1441.
42. Krombholz H. Physical performance in relation to age, sex, birth order, social class, and sports activities of preschool children. Perceptual and motor skills. 2006;102(2):477-484.
43. Sundgot-Borgen J, Garthe I. Elite athletes in aesthetic and Olympic weight-class sports and the challenge of weight and body composition. Food, Nutrition and Sports Performance. 2013;3:109-122.
44. Fogelholm M. Effects of bodyweight reduction on sports performance. Sports Medicine. 1994;18(4):249-267.
45. Aiba K. The impact of women's pro wrestling performances on the transformation of gender. In Performance and Professional Wrestling. Routledge; c2016. p. 95-104.
46. Franchini E, Brito CJ, Artioli GG. Weight loss in combat sports: physiological, psychological and performance effects. Journal of the International Society of Sports Nutrition. 2012;9(1):52.
47. Krentz EM, Warschburger P. Sports-related correlates of disordered eating in aesthetic sports. Psychology of Sport and Exercise. 2011;12(4):375-382.
48. Farrow JA. The adolescent male with an eating disorder. Pediatric Annals. 1992;21(11):769-774.
49. Hansen MB. Fallen women, rising stars, new horizons. Film Quarterly. 2000;54(1):10.
50. Redman LM, Heilbronn LK, Martin CK, De Jonge L, Williamson DA, Delany JP, *et al*. Metabolic and behavioral compensations in response to caloric restriction: implications for the maintenance of weight loss. PloS One. 2009;4(2):e4377.

51. Loucks AB. Energy balance and body composition in sports and exercise. Journal of Sports Sciences. 2004;22(1):1-14.
52. Phillips JA, Young DR. Past-year sports participation, current physical activity, and fitness in urban adolescent girls. Journal of Physical Activity and Health. 2009;6(1):105-111.
53. Clark K. Nutritional guidance to soccer players for training and competition. Journal of Sports Sciences. 1994;12(sup1):S43-S50.
54. Tam R, Beck KL, Gifford JA, Flood VM, O'Connor HT. Development of an electronic questionnaire to assess sports nutrition knowledge in athletes. Journal of the American College of Nutrition. 2020;39(7):636-644.
55. Martins N. Nutrition knowledge and attitudes of college informal sports athletes: A comparison study of undergraduate collegiate athletes, informal athletes, and non-athletes. Southern Connecticut State University; c2015.
56. Alvarado GA. Info graphics and sports nutrition knowedge among student athletes (Doctoral dissertation, California State University, Los Angeles); c2021.
57. Purcell LK. Canadian Paediatric Society, & Paediatric Sports and Exercise Medicine Section. Sport nutrition for young athletes. Pediatrics & Child Health. 2013;18(4):200-202.
58. Heikkilä M, Valve R, Lehtovirta M, Fogelholm M. Nutrition knowledge among young Finnish endurance athletes and their coaches. International Journal of Sport Nutrition and Exercise Metabolism. 2018;28(5):522-527.
59. Bonci CM, Bonci LJ, Granger LR, Johnson CL, Malina RM, Milne LW, *et al*. National athletic trainers' association position statement: preventing, detecting, and managing disordered eating in athletes. Journal of Athletic Training. 2008;43(1):80-108.
60. Mazzeo F, Motti ML, Messina G, Monda V, Ascione A, Tafuri D, *et al*. Use of nutritional supplements among south Italian students of physical training and sport university. Toxicology. 2013;9:21-6.
61. Carbone A. How Nutrition Knowledge of Coaches, Athletic Trainers, and Strength and Conditioning Specialists Translates to Their Athletes (Doctoral dissertation, East Tennessee State University); c2021.
62. Clark N. Nutrition support programs for young adult athletes. International Journal of Sport Nutrition and Exercise Metabolism. 1998;8(4):416-425.
63. Manore MM. Weight management for athletes and active individuals: A brief review. Sports Medicine. 2015;45(1):83-92.
64. Artioli GG, Franchini E, Nicastro H, Sterkowicz S, Solis MY, Lancha AH. The need of a weight management control program in judo: a proposal based on the successful case of wrestling. Journal of the International Society of Sports Nutrition. 2010;7(1):15.
65. Carl RL, Johnson MD, Martin TJ, LaBella CR, Brooks MA, Diamond A, *et al*. Promotion of healthy weight-control practices in young athletes. Pediatrics. 2017;140:3.
66. Ellender L, Linder MM. Sports pharmacology and ergogenic aids. Primary Care: Clinics in Office Practice. 2005;32(1):277-292.
67. Fukunaga A. Nutrition and Fitness Guide for Graduating Student-Athletes; c2011.
68. Ellender L, Linder MM. Sports pharmacology and ergogenic aids. Primary Care: Clinics in Office Practice. 2005;32(1):277-292.
69. Jenkinson DM, Harbert AJ. Supplements and sports. American Family Physician. 2008;78(9):1039-1046.
70. Calfee R, Fadale P. Popular ergogenic drugs and supplements in young athletes. Pediatrics. 2006;117(3):e577-e589.
71. Junious DL, Johnson RJ, Peters Jr RJ, Markham CM, Kelder SH, Yacoubian Jr GS. A study of school nurse job satisfaction. The Journal of School Nursing. 2004;20(2):88-93.
72. Colberg SR, Sigal RJ, Fernhall B, Regensteiner JG, Blissmer BJ, Rubin RR, Braun B. Exercise and type 2 diabetes: the American College of Sports Medicine and the American Diabetes Association: joint position statement. Diabetes Care. 2010;33(12):e147-e167.
73. Donnor JK. Towards an interest-convergence in the education of African-American football student athletes in major college sports. Race Ethnicity and Education. 2015;8(1):45-67.
74. Phillips D, Young P. Online public relations: A practical guide to developing an online strategy in the world of social media. Kogan Page Publishers; c2009 May 3.