Symposium: Nutrition and Physical Performance: A Century of Progress and Tribute to the Modern Olympic Movement

Introduction

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The title and subject of the 1996 American Institute of Nutrition Symposium was conceived in 1993. The year 1996 would be the centennial of the modern Olympic movement and would commemorate world athletic achievement from the first revival of the games in 1896 in Athens, Greece, to the celebration of the XXVIth Olympiad in Atlanta, Georgia. Symposium objectives were to 1) present a historical review of nutrition and physical performance, with special emphasis on research associated with Olympic athletes, 2) review data on athletic training and physical performance from cultural, medical, nutrition and physiological perspectives, and 3) present a diversified program of scientist-athletes and Olympic gold medal athletes to address both science and personal experience with athletic training, diet and nutrition, and human performance.

Symposium participants represented a team that included academicians, athletes and industry scientists and administrators. Together, we shared the vision that both biomedical sciences and social sciences are important when examining athletic performance from nutritional and physiological perspectives and that accurate, clear communication of sound, science-based nutrition information should be our role.

History of nutrition symposia in past years honored significant nutritionists, physicians and physiologists, usually on the centennial, bicentennial or tercentennial of their death. The 1996 symposium, in contrast, looked to the past, present and future. The concept was to pay respects to Olympic athletes who participated in Athens, Greece, at the 1st Olympiad of the modern era in 1896, honor champions of recent Olympiads, and identify to the extent possible science-based future projects to better determine the role of nutrition in athletic performance.

Four scientific papers were presented during the first two hours; four distinguished gold medal Olympic champions presented their views on their diet, food patterns and athletic performance during the third hour.

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The first article, “From Olympia to Atlanta: A Cultural-Historical Perspective on Diet and Athletic Training” (Grivetti and Applegate 1997), provided background information to the symposium theme by integrating social science and bioscience perspectives on the diet and training of athletes. The mythological origins for gymnastics, running, weight lifting and wrestling were identified; then three specific Greek and Latin texts were reviewed that documented athletic training techniques that included speed work and running in sand, a 4-day cycle of alternating hard and easy efforts, and cross training that combined endurance running, weight training and wrestling with animals. Diet of Greek and Roman athletes was highly variable, depending upon historical period, and ranged from patterns based upon cereals, cheese and fruits to a nearly all-meat diet, to combinations that focused on white bread, fish and pork. Ancient Greek and Roman athletic diets were contrasted with historical accounts of Olympic athletes from the modern era, specifically, food consumption patterns of different national teams at the XIXth Olympiad of the modern era held in Berlin, Germany (1936). Nutritional studies of Olympic athletes by German scientists presented only aggregate data, and athletic performance was not correlated with food intake or specific dietary practices. Food-related preparations at Atlanta were described, where 5 million meals would be served during the 33-day Olympic festival to nearly 12,000 athletes from 197 countries. Food purchase requirements included 270,000 pounds of apples, 240,000 pounds of beef, 150,000 pounds of poultry, 86,000 pounds of pasta and rice, and 550,000 gallons of bottled water.

The second article, “Search for the Competitive Edge: A History of Dietary Fads and Supplements” (Applegate and Grivetti 1997), reviewed the use of dietary aids and supplements from ancient times to modern day. Ergogenic aid use has its roots in superstition and ritualistic behavior of athletes who perceive their past performances as predicated upon a unique dietary constituent or dietary manipulation. Although little information exists regarding dietary fads or supplement use by athletes before the 19th century, the advent of ergogenic aid use with “scientific” justification. During recent decades, ergogenic aids such as supplemental alkaline salts, caffeine, carbohydrate and protein have been used with some
success. As exercise physiologists perfected the understanding of metabolic reactions involving various substances, athletes in turn perfected the amounts, forms and timing of administration for optimal performance. Researchers and athletes alike have been attracted to the potential benefits of vitamins as ergogenic aids since the early part of the 20th century. Other ergogenic aids such as anabolic steroids and blood doping enhance performance but present serious health risks and ethical issues that contravene the ideals of good sportsmanship. During the past 10 years, ergogenic aid use and their popularity have often preceded scientific substantiation of claims, and monetary gain frequently underlies the use of these substances. Today, protein isolates and antioxidant nutrients are used by athletes competing in a wide variety of sports, and curiously, many ergogenic aids of present day differ little from the ergogenic aids of old.

The third article, “Diets of Elite Athletes: Has the Discipline of Sports Nutrition Made an Impact?” (Grandjean 1997), explored historical and contemporary issues associated with scientific nutrition and what Olympic and elite athletes actually eat. Although qualitative descriptions exist of special diets and particular foods used by athletes in antiquity, dietary survey data on Olympians are sketchy and virtually nonexistent. Olympians competing at Helsinki in 1952 reported diets high in energy, fat and protein, with average daily energy intakes of 18,841 kJ, with 40% of energy coming from carbohydrate, 20% from protein and 40% from fat. Recent food intake data on elite American athletes competing in the same sports show that energy intakes have ranged from 49,155 kJ for female figure skaters to 24,700 kJ for male cyclists. The percentages of energy from carbohydrate in other elite athletes have ranged from 40% in female runners to 68% for male triathletes, with group macronutrient intakes that have ranged from 20 to 43% for fat and from 10 to 22% for protein. Other studies of American elite athletes, based upon 3-day intake records, have documented the extreme heterogeneity of athletic populations, where daily energy intakes have ranged between 5171 and 29,643 kJ, with 22–71% of energy from carbohydrate, 6–31% from protein and 13–56% from fat.

The fourth article, “Sports Medicine: A Century of Progress” (Tipton 1997), examined the complementary relationships among the care of the athlete, training and diet. According to the International Olympic Committee (IOC), the medical care and treatment of the athlete, medical examinations, clinical diagnosis, evaluation of performance capacity, nutritional consultation and training prescriptions are the responsibilities of sports medicine. Since 1896, performance times for most athletic events (100-meter dash, 800-meter run, marathon race, discus throw, etc.) have improved dramatically, and one reason has been the advances made in sport medicine. However, sport medicine officials have been slow to assume or to fulfill these functions. For example, medical examinations were not required until 1920, an official team physician and athletic trainer were not appointed until 1924, formal research on Olympic athletes did not begin until 1928, and whether women were eligible to compete in “strenuous” athletic events was not resolved until after 1960. In fact, the participation of women in Olympic competition (they were not allowed to compete in 1896) became more of a social-cultural than a biological issue during the past century, although the collapse of several women runners in the 800-meter race in the 1928 Olympic Games hindered their acceptance for many Olympiads. Despite the fact that individuals have trained for Olympic competition since ancient times, the scientific principles for training athletes did not become established until several decades ago. Although an international sports medicine organization (Federation International Medico-Sportive, FIMS) was established in 1928, it had minimal influence on sports medicine practices or procedures until well after the Second World War. In the United States, the American College of Sports Medicine was chartered in 1954, but it was much later before the organization was able to exert influence on the Olympic movement. In essence, the progress in sports medicine during this past century has occurred predominately during recent decades.

At the conclusion of the scientific papers, four distinguished Olympic champions made presentations during the third hour. This roundtable (Applegate et al. 1997) with questions from the audience was comoderated by Priscilla M. Clarkson, Department of Exercise Science, University of Massachusetts, Amherst, and Roger B. McDonald, Department of Nutrition, University of California, Davis.

Billy Mills, Olympic champion in the 10,000-meter race, related the importance of understanding desire, self-motivation and hard work, that passion allows the pursuit of excellence in the face of adversity. He trained year around using an unchanging 10-day cycle of activities that included combinations of endurance, speed work, strength training, recovery, focus and visualization. He also blended scientific and traditional Native American approaches to food and dietary patterns in achieving Olympic victory.

Bruce Baumgartner, twice Olympic champion in heavyweight wrestling and winner of the 1995 Sullivan Award, identified dietary and hydration constraints wrestlers face during training and competition and described the differences in training and approaches to diet that he observed since 1974, when he began competitive wrestling. He made the point that because wrestling at one time was not a high publicity or high visual impact sport, competitors did not receive nutrition and physiological information or have access to research studies as did athletes in other “high profile” sports. He noted that this deficit changed once the American international wrestling program achieved international success. His training cycle consisted of three hard days, with two practice sessions daily, a pattern that included weight training and aerobic cardiovascular activities, coupled with combative wrestling efforts that lasted 30–40 min. He described his classic, food group dietary system, and he reported eating a wide variety from the four food groups, coupled with dietary supplements. He argued that there was no specific dietary, nutritional or training key to fit each athlete, and that no specific dietary regimen would work for all. Lastly, he encouraged further nutritional-physiological research to help the Olympic movement, so young athletes would be better trained and healthier.

Nicolle Haislett, three-time Olympic champion, described how swimmers’ needs were different from those of athletes in track and field and wrestling. She identified differences between male and female swimmers and noted as girls passed to adolescence and maturity, or as women aged and entered college, that women swimmers regularly struggled with weight-related issues more than did men. She described differences in approaches to diet, training and body perception between male and female swimmers and noted that most athletes did not consider diet and nutrition important during childhood and the early years of swimming competition. Nutrition and weight-related issues, however, became more and more important to adolescent swimmers, especially when preparing for major competitions. She described training techniques and approaches to tapering, and she related how reduced energy expenditures during the weeks prior to intense competition required careful decisions regarding food intake. She related that whereas young swimmers, male and female, can obtain

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considerable information regarding nutrition and physiology from coaches, this information is not readily absorbed. At the
elite level swimming is highly mental, and participants often
do not want to bother with food, diet and nutrition and con-
sider these to be just additional issues to cause worry during
practice and competition.
Alfred Oerter, four-time Olympic champion in the discus,
challenged the scientific community to better disseminate nu-
trition and physiology research to athletes. He noted that few
high school track and field coaches he has worked with receive
information that would improve or accelerate student athlete
programs. He described growing up without a sense of manag-
ing dietary protein, carbohydrate or fat. He noted his familiar-
ity with hundreds of approaches to diet and fads promoted to
improve athletic performance, and that they come and go. He
related that he was raised on traditional Hungarian and Polish
foods and has continued his basic dietary pattern throughout
his competitive career, coupled with dietary supplements. He
argued against changing one’s diet prior to the Olympic trials
and for eating the same foods before the Games: why change
something that already worked? He related that competition
in the Olympic Games, and in all athletics, is an intensely
personal activity and that trainers and physicians, as well as
nutritionists and physiologists, should teach their athletes to
become self-sufficient and think for themselves.
The symposium documented that athletics, games, leisure
pursuits, physical education, play activities and sports lie at
the juncture of the humanities, social sciences, and biological-
medical sciences. Research on human athletics, games, leisure,
play, recreation and sport has been conducted by a broad range
of scientists, whether dietitians, nutritionists, physicians or
researchers. Research on these themes also has been conducted
by scholars representing the humanities and social sciences,
whether anthropologists, artists, classicists, economists, geogra-
phers, historians, musicians, psychologists or sociologists.
We hope that this symposium will lead to further collabora-
tion between athletes and scientists by focusing research inter-
est on the nutritional and physiological needs of athletes and
on the interrelationships between sound nutrition and im-
proved athletic performance.

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