Fullscript

Sports nutrition in integrative medicine

Consumer demand for sports nutrition products is on the rise. In 2020, the global sport nutrition market was valued at nearly $17 billion USD and was projected to grow to $31 to 33 billion USD by 2027 to 2028. (Grand View Research 2021)(Polaris 2021) Sports nutrition products, initially used predominantly by bodybuilders and other athletes, are now popular among a broader audience, including amateur athletes and individuals who may use sports products to support active lifestyles.

Sport supplements, not to be confused with sports foods and drinks such as sports gels or electrolyte drinks, may be used to enhance recovery post exercise, build lean mass, aid weight loss, and improve athletic performance. (Kerksick 2018)

Macronutrient requirements for athletes

Macronutrient	Purpose	Recommended intake and timing	Formula
Carbohydrates	**Activity level intake**		
	<1 hour/day	252-420 g* per day	3-5 g/kg
	1 hour/day	420-588 g* per day	5-7 g/kg
	1-3 hours/day	504-840 g* per day	6-10 g/kg
	Peri-exercise (for optimal endurance exercise and performance)		
	Pre-exercise	84-336 g* 4 hours prior to exercise	1-4 g/kg
	Intra-exercise	30-60 g* every 10-15 minutes	-
	Post-exercise	101 g every 30 minutes for 3.5 hours	1.2 g/kg
Protein**	Weight maintenance	118-168 g** per day	1.4-2.0 g/kg
	Weight loss	168-202 g** per day	2.0-2.4 g/kg
Fat	Daily intake	56-97 g per day	20-35% total calories per day

Carbohydrate and protein calculations based on a 185 lb individual, and fat calculations based on an individual eating 2,500 calories per day.

*Carbohydrate intake should be at the higher end of this range if engaging in intense exercise compared to the lower or mid range for mild or moderate exercise, respectively.

**If eating only vegan protein sources, a person may need to consume 30 to 50% more grams of protein to get the same content of essential amino acids.

(Burke 2011)(Burke 2019)(Institute of Medicine 2002)(Jäger 2017)(Kerksick 2017)(Kerksick 2018)(Gorissen 2018)(Herreman 2020)

Calorie requirements for athletes

Calories	Exercise volume (PAF)	Calories per day	Formula for weight maintenance
Female	Low (1.5)	2214	= (9.99 x weight (kg) + 6.25 x height (cm) - 4.92 x age - 161) x PAF (1.4 to 2.4)
	Moderate (1.7)	2509	
	High (2)	2952	
Male	Low (1.5)	2791	= (9.99 x weight (kg) + 6.25 x height (cm) - 4.92 x age + 5) x PAF (1.4 to 2.4)
	Moderate (1.7)	3164	
	High (2)	3722	

*Assuming female age 30; U.S. average adult over 20: 171 lb, 5'3.5" (CDC, 2021)

**Assuming male age 30; U.S. average adult over 20: 200 lb, 5'9" (CDC, 2021)

(Bytomski 2018)(Frankenfield 2005)

PAF: Physical Activity Factor

Popular sport supplement ingredients

Many dietary supplements have been marketed to improve sports performance; however, only a few key ingredients have strong evidence to support these claims. The table below provides an overview of some of the ingredients that have supportive research.

Ingredient	Main effects	Dose
Performance		
Beta-alanine	↑ anaerobic performance particularly within 30-second to 4-minute ranges	2 g 2-3x per day
Caffeine	↑ athletic performance ↑ aerobic performance ↑ anaerobic performance ↓ ratings of perceived exertion	3-6 mg/kg, 1 hour before exercise
Carbohydrate beverage	↑ aerobic performance via glycogen sparing for sustained ATP	6-12 oz of 6-8% carbohydrate beverage, every 10-15 minutes during exercise
Citrulline malate & L-arginine	↑ anaerobic performance ↓ ratings of perceived exertion ↑ aerobic performance ↑ anaerobic performance	6-12 g, 1 hour before exercise 10-12 g, 1 hour before exercise
Creatine	↑ anaerobic performance and strength, especially for bouts of exertion 10 seconds-2 minutes	Initiation: 5 g, 4x per day for 5-7 days Maintenance: 3-5 g per day
Magnesium	↑ anaerobic performance	300-500 mg
Omega-3 fatty acids	↓ reaction time ↑ mood	3 g EPA+DHA in 2:1 ratio
Taurine	↑ aerobic performance	1-3 g, 1 hour before exercise
Body composition		
Whey protein	↑ muscle protein synthesis ↓ fat mass	20-40 g
HMB	↑ muscle mass in untrained athletes	1 g, 3x per day

Ingredient	Main effects	Dose
Recovery and pain		
Branched-chain amino acids (BCAAs)	↓ post-exercise muscle soreness and oxidative damage	200 mg/kg in a 2-3:1:1 leucine: isoleucine: valine ratio
Citrulline malate	↓ post-exercise muscle soreness	6-12 g, 1 hour before exercise
Curcumin	↓ exercise-related joint pain and improved recovery	180 mg Theracurmin®/500 mg Meriva®
Magnesium	↓ inflammation and migraine headaches	300-500 mg
Omega-3 fatty acids	↓ post-exercise muscle soreness	3 g EPA+DHA in a 2:1 ratio
Collagen	↓ exercise-related joint pain ↑ tendon and ligament repair	5-15 g per day
Immune support		
Vitamin C	↓ common cold risk, severity, and duration	1,000 mg per day
Vitamin D	↓ common cold risk	400-1,000 IU per day, though athletes may need 4,000-10,000 IU
Zinc	↓ common cold severity and duration	25 mg within 24 hours of onset, 2x per day for 6 days

(Braakhuis 2012)(Bemben 2005)(Butts 2018)(Doherty 2005)(Douglas 2007)(Fang 2020)(Fedewa 2019)(Fouré 2017)(Garrison 2012)(Grant 2020)(Gonzalez 2020)(Grgic 2018)(Grgic 2019)(Guest 2021)(Heffernan 2019)(Hobson 2012)(Jolliffe 2021)(Khemtong 2021)(Kerksick 2018)(Kreider 2017) (Kurtz 2021)(Ochi 2018)(Polito 2016)(Rhim 2020)(Salinas-Garcia 2014)(Saunders 2017)(Shen 2019)(Singh 1994)(Singh 2011)(Suhett 2021)(Thielecke 2020)(Trexler 2015)(Veronese 2020)(Viribay 2020)(Vukovich 2001)(Waldron 2018)(Zanella 2017)

Quality considerations for sports supplements

Third-party certifications provide dietary supplement companies with a means to improve industry transparency and ensure product quality. Though there are many third-party certifications available, a few key certifications of importance within the context of sport include:

- NSF Certified for Sport®
- Informed Sport®
- BSCG Certified Drug Free®

These organizations are particularly attuned to the regulations and doping standards set by various regulatory sporting bodies such as the World Anti-Doping Association (WADA). Supplements that do not possess these third-party seals can still be of high quality and may not contain any contaminants or banned substances prohibited for high-level sport. However, in cases in which sports supplements are used, it may be recommended to select products with these third-party certifications, particularly for athletes competing in sport, as these certifications offer various levels of testing for banned substances.

General guidelines for practitioners considering the use of dietary supplements for sport

Consider	Avoid
Starting with diet first 👍👍👍	Non-certified products 👎
3rd-party certified for sport products 👍👍	Proprietary blends 👎👎
3rd-party certified products 👍	FDA's tainted products list 👎👎👎

(BSCG 2021)(Informed Sport 2021)(NSF 2021)(WADA 2021)

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