DEPARTMENT OF THE ARMY
HEADQUARTERS, 10TH MOUNTAIN DIVISION (LIGHT INFANTRY) AND FORT DRUM
FORT DRUM, NEW YORK 13602-5000

INSTRUCTION FOR LEADER

Complete outlined tasks in preparation for training. During training, you will read the script directly, guide Soldiers through the associated group discussion and activities, and provide Soldiers with handouts. Finally, complete an AAR.

PREPARATION

1. Print and review this leader guide to ensure subject familiarity.
2. Print enough handouts for number of Soldiers in training.

SCRIPT TO BE READ DIRECTLY

1. **Introduction to Nutrition for Injury-Prevention and Recovery:** Injuries are one of the most challenging parts of being an athlete and are, unfortunately, a commonly shared experience for all types of athletes. Military personnel, also referred to as the Tactical Athlete, have one of the most physically demanding jobs in our society. The tactical athlete stressors that are unique to the Warfighter and required as essential job tasks to be completed routinely as part of occupational demand and performance-based training inevitably correlate with higher rates of musculoskeletal injuries and conditions. Greater attention is being paid to the role evidence-based nutrition plays in improving occupational and physical performance as well as reducing risk of injury and illness for military populations.
2. **Nutrition to Strengthen Bones and Muscles:** The foods you eat daily matter when it comes to reducing risk of *and* healing from injury and musculoskeletal conditions. Having a nutrient bank account, being a well-fueled athlete that consumes adequate daily energy (calories) with a body that has adequate reserves of vitamins and minerals from a nutrient-rich diet, is not only a huge part of preventing injury but a best practice for quick recovery if injury were to occur. Specific key nutrients found in a variety of foods play a role in maintaining and strengthening bones and muscles and are crucial while recovering from injury and/or orthopedic surgery, healing wounds, and reducing chronic pain so that you can get back to duty and an active lifestyle.
3. Key nutrients include:
    a. **Protein.** Primary macronutrient in bone and muscle building and repair, wound healing, immune system strength. High quality protein foods containing all amino acids (aka building blocks) either alone or in combination (plant-sources) should be emphasized. Recommend small to moderate amounts at each snack

(15-20g) and meal (20-40g) at regular intervals throughout the day. Example sources: eggs, lean meats and poultry, fish and seafood, beans and legumes, nuts and seeds, milk and yogurt.

b. **Calcium and Vitamin D.** A mineral and a vitamin that are critical for building and maintaining strong bones throughout life. Referred to as battle-buddies, they work in tandem to support the musculoskeletal system. Vitamin D is a current "nutrient of concern" in general American populations due to difficulty obtaining from the diet, and the military is no exception, with high rates of low serum vitamin d status. Example sources: (Calcium) dairy, green leafy vegetables (spinach, collards, kale), broccoli, sesame seeds, brazil nuts and almonds, and tofu. (Vitamin D) fatty fish (salmon, tuna, mackerel, herring), milk, egg yolk, mushrooms exposed to sunlight, some yogurts and cheeses, and fortified orange juice or cereals – also the "sunshine vitamin". We can synthesize vitamin d when skin is exposed to UVB rays from sunlight; recommendations are between 5 to 30 minutes daily or minimum twice weekly to the face, arms, hands, and/or legs without sunscreen.
c. **Vitamin C.** A powerful antioxidant and immune system modulator. Enhances the body's response during the early phase of acute injury or post-surgery. Plays an important role in collagen synthesis (forms bonds between strands of collagen fiber) which improves tissue healing. Example sources (wide-spread in fruits and vegetables): citrus (oranges, grapefruit, lemon), kiwis, bell pepper, broccoli, brussels sprouts, cauliflower, kale, cherries, apples, apricots.
d. **Zinc.** A mineral required for over 300 enzymes in the body and plays key role in functions that are necessary for tissue regeneration and repair (DNA synthesis, cell division, protein synthesis). Example sources: oysters, meat (especially beef and pork), shellfish (crab, lobster), legumes and beans (chickpea, lentils, adzuki bean), oats, wheat germ or bran, eggs, milk.
e. **Omega-3 Fatty Acid.** An unsaturated dietary fat that has become known as a poster child for healthy "good fats". Serves as a key nutrient in reducing inflammation and decreasing oxidative stress to help heal while also reducing swelling and pain, supporting oxygen delivery, and protecting heart, brain, and nerve health. Example sources: marine sources are best (fatty fish such as salmon, tuna, sardines or algae for non-fish eaters or vegans) plant-sources that can be included (chia seeds and flax seeds whole, ground, or in oil form, walnuts).
f. **Other Note-Worthy Nutrients.** The following vitamins/minerals also play a role in bone health and recovery from injury: Phosphorus (bone mineralization – dairy, meat and poultry, eggs, fish, nuts, legumes, grains, vegetables), Magnesium (bone integrity – nuts and seeds, green leafy vegetable, whole grains), Vitamin A (immune system & bone integrity – orange-colored vegetable and fruit: carrot, sweet potato, pumpkin, mango – spinach, beef liver, spinach,

fish, dairy, eggs). Clearly an abundance of nutrients have a stake in the musculoskeletal system. **Pro-Tip**: most of these nutrients will be prevalent in a diet following foundational healthy eating pattern: fruits, vegetables, whole grains, lean meats, seafood, beans and legumes, nuts and seeds, dairy, and healthy fat sources.

4. **Adequate Fueling ("Fuel for the Work Required"):** Consuming enough energy (calories) to meet baseline needs (resting or basal metabolic rate) and carry out daily physical demands is often underestimated by the athlete, particularly the Warfighter, who is no stranger to daily interferences with regular, consistent food intake. Being in a state of what professionals refer to as **"low energy availability"** means you are chronically under-fueled, or simply, not consuming enough calories from food to support basic physiological functioning, support activities of daily living (yes, walking in the PX, washing your vehicle, and even eating uses energy!), and physical activity, exercise, and performance and operational training. While the body will adapt to **low energy availability** in the name of survival, it is at the expense of optimal performance and readiness with an increased risk of injury and illness. If you are unsure about daily calorie needs, visit your nearby dietitian. Alternatively, predictive equations online or through food diary and nutrition tracking apps can provide an estimate for reference but are not always accurate.
5. **Change in Calorie (Energy) Needs & Body Composition:** When injured or on a physical profile, activity levels can drastically decrease from what is usual for the tactical athlete and Warfighter. While the process of healing and recovery requires additional energy intake, it is important to adjust daily calorie intake to accommodate for reduced energy expenditure from structured activity and exercise to maintain appropriate a healthy weight at goal. If you are seeing undesired weight gain, know that daily intake should be adjusted either by portions at meals and snacks, number of snacks consumed daily, or by total calories if known.

   For reference:

   a. ½lb weight gain per week is generated by 250 calorie surplus per day
   b. 1lb weight gain per week is generated by 500 calorie surplus per day
   c. 1.5lb weight gain per week is generated by 750 calorie surplus per day
   d. 2lb weight gain per week is generated by 1,000 calorie surplus per day

   Finding ways to move and exercise are still important for overall health, energy balance and maintaining healthy weight, maintenance of muscle and lean body mass, strengthening bones and improving endurance, and managing stress and supporting mental health and resilience. Staying within the limits of profile and allowing body to fully heal and recover are top priority. Finding alternative exercises to raise heart rate (cardio) and engage muscle (strength) can be extremely beneficial during this time.

Consulting with physical therapist, athletic trainer, and strength and conditioning coaches will ensure you are doing the right things to support these intricacies.

A change in appetite is common when regular daily physical activity levels are decreased and pain is increased, as it can suppress hunger and desire to eat. Keep this in mind when adjusting calories to accommodate for reduced energy expenditure. Less food intake due to reduced appetite is not supportive for optimal healing and recovery since you are less likely to consume daily intake requirements for essential vitamins and minerals (calcium, vitamin d, zinc, vitamin c, etc.!) as well as protein and total calories. If this occurs, increase frequency of meals and snacks (every 2-3 hours), with more easily digestible add-ins to meals such as protein shakes, fruit/veggie smoothies, 100% fruit or vegetable juice, and yogurt drinks. Try higher-calorie foods for snacks, such as nut butter with fruit (ex: apple slices with a glob of peanut butter), fruit-yogurt-granola parfait, dried fruit, overnight oats, trail mix, guacamole and plain tortilla chips, avocado toast.

OPTIONAL CHECK ON LEARNING

1. **Group Discussions:** Share ideas for adding foods that contain key nutrients to support bone and musculoskeletal system health: calcium, vitamin d, phosphorus, magnesium, vitamin C, zinc, omega-3 and protein. Discuss how to prevent low-energy-availability and consume sufficient daily calories to meet needs of the individual tactical athlete in the group. Allow time for sharing personal experiences with injury and subsequent healing and recovery process, unexpected weight or body composition changes, and if therapeutic nutrition was utilized during this time.
2. **Practical Exercise:** Write sample 1-day menu plan with provided template (breakfast, lunch, dinner, and 1-2 snacks if desired) for an athlete that is injured and recovering and wishing to incorporate ideal nutrition to support the process and return to duty or sport ASAP.

AAR

1. What were the pros and cons of this training?
2. Do they feel they have a better understanding of key nutrients to support the musculoskeletal system and reduce risk of injury and/or support rapid recovery if injury were to occur?
3. What, if any, barriers were there to conducting the group discussion and activity?

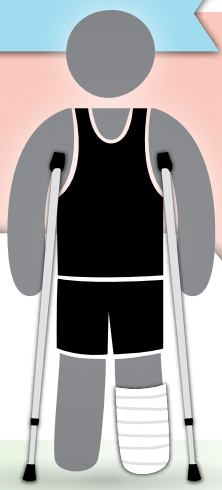
SUPPORTING RESOURCES

1. Sports, Cardiovascular, and Wellness Nutrition (SCAN). *Nutrition for the Injured Athlete.* (See Handout)
2. Collegiate and Professional Sports Dietitians Association (CPSDA). *Nutritional Support for Injury Recovery and Return-to-Play*. (See Handout)
3. Warfighter Nutrition Guide | HPRC (hprc-online.org) Chapter 3, 4, 11
4. FM 7-22 Chapter 8, 8-1, 8-17
5. H2F Nutrition Team and Dietitians at Guthrie

NUTRITIONAL SUPPORT FOR INJURY RECOVERY AND RETURN-TO-PLAY

by Ryan Harmon, MS, RD, CSSD and Andres Ayesta, MS, RD, LD, CSCS

Injuries are an inevitable part of sports participation. Nutrition may not be able to keep an athlete completely injury-free, but it can support and often speed up injury recovery. Poor nutrition will impair recovery and lengthen the time it takes an athlete to return to play.

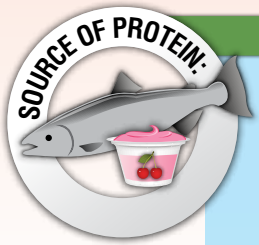


Nutrition intervention by the sports dietitian should occur immediately following an injury. The athlete should be screened for nutrient deficiencies, energy balance, lipid balance, optimal hydration and sleep habits. The nutrition plan should be tailored to an individual's phase of injury, resting metabolic rate (RMR), physical activity level and desire to minimize any gains in fat mass.

GOALS OF NUTRITION INTERVENTION:

• Support muscle protein synthesis. • Preserve muscle mass. • Maintain energy balance. • Prevent body fat accrual.

NUTRITIONAL CONSIDERATIONS:



PROTEIN

- Helps athletes heal and repair muscle tissue.
- Should emphasize proteins with a high leucine content (aim for ~3g leucine per serving).
- Daily protein intake should be between 1.6-2.5g/kg BW/day (depending on phase of injury).
- **Protein specifics:**
  - **Meal dose** = 20-40g (depending upon leucine content).
  - **Frequency** = every ~3-4h (4-6 meals daily).
  - **Type** = quickly digested, high leucine content during the day (whey protein, part-skim cheddar cheese and lean meats are great sources); slowly digested proteins prior to sleep (i.e. low-fat cottage cheese, low-fat Greek yogurt).

CARBOHYDRATE (NEEDS UNIQUE TO EACH SCENARIO)

- Used for fuel so the protein eaten can be used to heal and repair muscle tissue.
- Needs are typically lower to prevent excess weight gain*.
- Should include whole grains, fresh fruits and vegetables.
- **Carbohydrate recommendations** should be 3-5g/kg BW/day.
  - For a 170lb male = 232-386g/day (typical 4oz whole-wheat bagel = 60 grams).
  - Choose low glycemic index foods (i.e. whole grains).

*The athlete should understand that some weight gain may be preferable to support a full recovery.

FAT (NEEDS UNIQUE TO EACH SCENARIO)

- Essential for healing, recovery and decreasing inflammation.
- Should come from anti-inflammatory nuts and nut butters, seeds, avocado, oily fish, flaxseed oil, extra virgin olive oil and omega-3 fish oil.
- Pro-inflammatory omega-6 vegetable oils, saturated and trans fats should be limited.
- Omega-6/omega-3 ratio should be low to enhance anti-inflammation.

NUTRITIONAL SUPPORT FOR INJURY RECOVERY AND RETURN-TO-PLAY

MICRONUTRIENTS	SOURCES	FUNCTION
Vitamin C	Citrus fruit, red and green peppers, cantaloupe	Antioxidant, wound healing, tissue repair, immune function
Vitamin A	Sweet potato, spinach, carrots, tomatoes	Cell growth and development, immune function
Vitamin D	Sun exposure, oily fish, dairy products, fortified foods	Promotes calcium absorption and bone health
Calcium	Low-fat milk, fortified non-dairy milk, low-fat Greek yogurt, cheese, broccoli, kale, fortified orange juice	Supports skeletal structure and function
Magnesium	Almonds, sesame and sunflower seeds, cashews, peanuts, bananas	Nucleic acid and protein synthesis, improves absorption and metabolism of calcium and vitamin D, improves circulation
Zinc	Lean beef, crabmeat, chicken, cashews, fortified cereals	Wound healing, protein synthesis, immune function
Copper	Sesame, pumpkin and sunflower seeds, cashews, shiitake mushrooms	Assists with red blood cell (RBC) formation, immune function and bone health, regenerates elastin

RESEARCH-BASED SUPPLEMENTS & NUTRITIONAL CONSIDERATIONS (0-8 WEEKS):

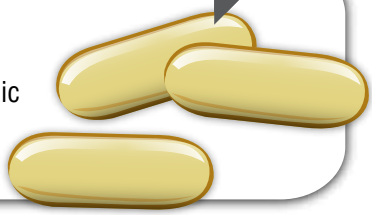
Ultimately, a nutrition plan that includes a well-balanced diet from a variety of whole foods is best for a healing athlete. Supplements may be beneficial to an athlete's nutrition plan in addition to meals and snacks. Athletes should meet with a sports dietitian to see how supplements can safely fit into their nutrition plan.

FOODS THAT MAY SPEED RECOVERY FROM INJURY:

- **High quality omega-3 fatty acids:** found in cold-water fish such as salmon and tuna.
- **Branched chain amino acids (BCAAs):** 3g of leucine every 3-4 hours (found in 25-30g whey protein powder, 140g chicken or 170g fish).
- **Casein:** 20-25g prior to bed (casein protein powder, 1 cup of low-fat cottage cheese or 1½ cups Greek Yogurt).
- **Tart cherry juice:** 12oz - 24oz per day for anti-inflammatory and antioxidant support.
- **Gelatin or gelatin-based foods:** may support collagen synthesis.

RESEARCH-BASED SUPPLEMENTS THAT MAY SPEED RECOVERY FROM INJURY:

- **Creatine monohydrate:** 10 g/day for 2 weeks, then 5 g/day (conditionally appropriate – unique to each scenario).
- **β-hydroxy-β-methylbutyrate (HMB):** leucine metabolite shown to provide anabolic and anti-catabolic properties on lean body mass – 3g/day (HMB calcium or free acid form).
- **Fish oil supplements:** 3-4g/day DHA + EPA recomended.



Athletes should maintain a nutritious diet on a daily basis to maximize nutrient stores rather than ramping up their nutrition once an injury occurs.

 (CONTINUED FROM PAGE 5)

Nutrition for the Injured Athlete

Athlete Scenario

After years of working towards the starting quarterback position, I recently tore my ACL. As my thoughts shift to surgery and rehabilitation, I am concerned about weight gain. I want to heal from my injury as effectively as possible. Are there any changes I can make to my diet to optimize injury recovery and ensure my weight stays in check?

Nutrition Goals for an Injured Athlete:

- Limit high-sugar and/or high-fat foods (calorie-dense foods) as a method to balance calories to match your reduced physical activity.
- Promote healing by maintaining calorie intake and consuming foods with a concentrated amount of nutrients (nutrient-dense foods), including lean protein, fruits, vegetables, whole grains and low-fat or fat-free dairy.
- Increase intake of nutrients that are important for tissue repair, bone health, and immune function.

Calorie Balance:

- Reduce your portions of carbohydrates such as bread, pasta, and potatoes when you are less active and substitute with fruits and vegetables.
- Drink more water and limit sugar-sweetened beverages such as soda, sports drinks, and juices.

Nutrients that Heal:

- Protein promotes healing (Greek or regular low-fat yogurt, beans, fish, poultry, lean meats)
- Omega-3 fatty acids may help reduce inflammation and speed recovery (walnuts, soy foods, ground flax seeds and fish such as salmon, mackerel and sardines)
- Vitamin C aids tissue repair, wound healing, and promotes positive immune function (citrus fruits, strawberries, tomatoes, peppers, kiwi, melons)
- Vitamin A helps promote cell growth and development (sweet potatoes, carrots, papaya, bell peppers)
- Zinc, a trace mineral, is involved with wound healing and immune function (almonds, seeds, beef, seafood)
- Calcium and vitamin D are essential for bone development and repair. Both vitamins can be found in low-fat dairy products and fortified foods such as: cereal, tofu, leafy greens, cold-water fish and eggs. Skin exposure to sunlight (in moderation) is also an excellent source of vitamin D.

Tips to Take With You

1. Replace calorie-dense foods with nutrient-dense foods. Plan ahead to make sure these substitutions are always available.
2. Include protein-rich foods at meals and snacks to aid in healing. Incorporate cottage cheese to breakfast, beans for lunch, grilled fish for dinner, and nuts and Greek yogurt for snacks.
3. Consult a sports RDN for addressing your nutritional concerns when recovering from an injury.

Contact SCAN
www.scandpg.org
800.249.2875

Written by SCAN registered dietitian nutritionists (RDNs) to provide nutrition guidance. The key to optimal meal planning is individualization. Contact a SCAN RDN or a Board Certified Specialist in Sports Dietetics (CSSD) for personalized nutrition plans. Access "Find a SCAN RDN" at www.scandpg.org or by phone at 800.249.2875.

 Photo Credit: © vanillaechoes—yayimages.com

Sample Meal Plan

Use this form to create an individualized meal plan.

Meal	Menu
Breakfast	
Lunch	
Dinner	
Snack	

Notes: