

Nutrition for Recovery in Baseball

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Let's just come out and say what we already know: The baseball season is LONG. It seems inevitable that come mid-season, many players will start to feel "off" in one form or another. Fatigue may creep in and these players want to know how they can continue to feel good, throw hard and remain injury-free for the rest of the season. Because of the long duration of a typical MLB season, it is important to complement medical care and recovery modalities by focusing on proper recovery nutrition in order to keep players on their "A-game." Meals and snacks prior to games help to fuel performance, whereas a proper post-game fueling routine will support recovery prior to the next game. Performance staff are often tasked with post-activity nutrition on top of providing athletes with medical and recovery care; therefore, setting basic and practical nutrition goals is key. Focusing on the 3 Rs of recovery (refuel with carbohydrates, repair with protein and rehydrate with fluid) will help to support your players' recovery and keep them performing longer.

REFUEL: CARBOHYDRATES

The stored form of carbohydrate in muscle, known as glycogen, is the first to be used for energy during a baseball game. When those fuel stores become depleted without being restored through foods and fluids, this may lead to decreases in performance.¹ The brain and central nervous system also depend on carbohydrates as a fuel source. When deficient in carbohydrate, the athlete may begin to feel fatigued and can lack concentration; therefore, reaction time and performance will suffer.² Given that these are all attributes to making plays on-field or reviewing film before the next game, it is imperative that athletes select quality carbohydrates for their recovery plate. "Quality" carbohydrates refer to sources that provide superior nutrients and fiber versus the more refined sources that lack substance. See *Table 1* for dosage, sources and benefits.

The amount of carbohydrate each player needs post-game will also depend on their field position. For instance, pitchers and catchers who are involved in every play for multiple innings will likely have a greater need to refuel than their fellow teammates who may not have seen as much action. A carbohydrate-rich diet should be adequate to replenish muscle glycogen in most post-game scenarios.¹ Rather than focusing on the exact gram amount that each player needs, help them

to visualize their plate. For example, the starting and closing pitchers and catchers who performed more should aim to fill about $\frac{2}{3}$ of their plates with carbohydrate choices, while the lower-action teammates can aim for $\frac{1}{4}$ of their plate being carbohydrate. Additionally, a practical way for players to get some quick-acting carbohydrates is to consume a "team shot" of tart cherry juice at the end of the game. Tart cherry not only provides energy, but it also has been shown to deliver antioxidants and anti-inflammatory properties via anthocyanins and flavanols.³ It may also help to promote a calming effect to enhance sleep quality, which could offer additional benefits after night games.

Table 1

NUTRIENT	DOSAGE	QUALITY SOURCES	BENEFITS
Carbohydrates	<p>$\frac{2}{3}$ of recovery plate for multi-inning pitchers/catchers</p> <p>$\frac{1}{4}$ of recovery plate for all other players</p>	Brown rice, whole wheat pasta, corn tortillas, fruit, vegetables, beans	<p>Replenish glycogen</p> <p>Support demands of training and recovery</p>

REPAIR: PROTEIN

Muscle protein is constantly being broken down and utilized by the body during exercise and throughout everyday life. Unlike muscle glycogen, amino acids, which are the building blocks of protein, are unable to be stored in the body for later use. Due to this, protein sources must be consumed by the athlete to replenish their muscle and lean body mass.¹ Upon learning this, there seems to always be that one player on the team who then overeats protein at his meals. The exact amount of protein an athlete needs will vary based upon body mass, but research suggests that 0.25-0.3 g/kg of a complete protein is appropriate to provide the necessary amino acids to support recovery and muscle protein synthesis. Intake above this amount will not result in greater gains in strength or mass. It is imperative to encourage the players to break up their protein intake to smaller meals or snacks every 3-5 hours throughout the day, rather than one large portion post-game. This not only will allow for a constant stream of amino acids to be absorbed into the blood and delivered to the body throughout the day, but it also allows adequate plate space for the other nutrients needed in a post-game recovery meal. The actual amount of protein needed by each athlete will vary based on their body weight and composition, but in

general, each player should be encouraged to fill about ¼ of his recovery plate with protein. Complete protein sources, which contain all of the essential amino acids that the body does not make itself, will be ideal to support muscle growth and maintenance. Be sure to provide lean proteins that are grilled, baked or boiled rather than breaded, deep-fried and/or smothered in heavy sauces. See *Table 2 for dosage, sources and benefits.*

Table 2

NUTRIENT	DOSAGE	QUALITY SOURCES	BENEFITS
Protein	0.25-0.30g/kg BW ¼ of recovery plate	Poultry, beef, fish, eggs, tofu, whey protein powder	Supports muscle protein synthesis

REHYDRATE: FLUID

Dehydration during practice and games may not only negatively affect performance, it may also delay recovery from a previous game. As little as 2% dehydration is associated with impaired performance in stop-and-go sports⁶ such as baseball. Performance measures such as skill, agility and running have been found to be negatively affected and players also have increased feelings of fatigue as they accumulate a body water deficit. This is especially important when competing in hot and humid conditions, and for the players who are more active and/or wear more gear in-game, such as pitchers and catchers.

Rapid post-game rehydration is especially important when there is a short timeframe between the end of the game and the start of the next (e.g., double-headers or going from a night game to day game the following day). During this limited recovery time, defined as less than 12 hours, 150% fluid replacement is recommended.⁵ A drink volume greater than sweat loss must be ingested to restore electrolytes and fluid balance. However, when recovery time is extended, body-water balance is typically achieved with ad libitum food and fluid consumption during post-game recovery meals.⁵

Because sweating rates and sweat electrolyte concentrations vary from player-to-player, customized fluid replacement strategies are recommended. It is also important to note that rehydrating with fluids that contain electrolytes can provide benefits over water alone and are important for retention, thirst stimulation and electrolyte replacement.⁷ Another option for improved electrolyte consumption while rehydrating is to consume salty foods with water.

Refer to Table 3 for hydration assessments and rehydration techniques and recommendations.

Table 3

OCCASION	ASSESSMENT TECHNIQUE	DEFINITION	RECOMMENDATION
During Game	Change in body mass	Pre and post body mass in minimal clothing Retest in various intensities, durations and environmental conditions	Avoid >2% dehydration Consume beverages with sodium for replacement and thirst stimulation
Post-Game (recovery)	Change in body mass	Difference between pre and post body mass	150% fluid replacement (24 oz for each 1 lb lost) Consume beverages with sodium and/or snacks/meals with sodium to replace losses, stimulate thirst, retention

Source: Sawka, M.N., L.M. Burke, E.R. Eichner, R.J. Maughan, S.J. Montain, and N.S. Stachenfeld (2007). American College of Sports Medicine position stand. Exercise and fluid replacement. *Med. Sci. Sports Exerc.* 39:377-390.

KEY TAKE-AWAYS

- Refuel your players post-game through quality carbohydrate sources to replenish glycogen and support the demands of training and recovery.
- Repair your players' muscles via quality protein sources to support muscle protein synthesis.
- Rehydrate with 150% fluid losses based on the individual player's body weight change from pre- to post-game.

CONCLUSION

Encourage players to focus on the 3 Rs of recovery: Replenish with carbohydrates, rebuild with protein and rehydrate with fluids. By providing the guidance and nutrient-dense options after each game, the players may learn to enjoy new foods while also improving their recovery throughout the season.

The views expressed are those of the authors and do not necessarily reflect the position or policy of PepsiCo, Inc.

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