



OPTIMIZING **RECOVERY**

Maximizing Post-
Exercise Nutrition

BUILT WITH
CHOCOLATE MILK

post-exercise nutrition

Can **affect performance** at the next event

Helps **reduce the chances of injury**

Boosts the **health, well-being** of athletes

**IT'S JUST AS IMPORTANT AS
PRE-EVENT NUTRITION!**

what is recovery?

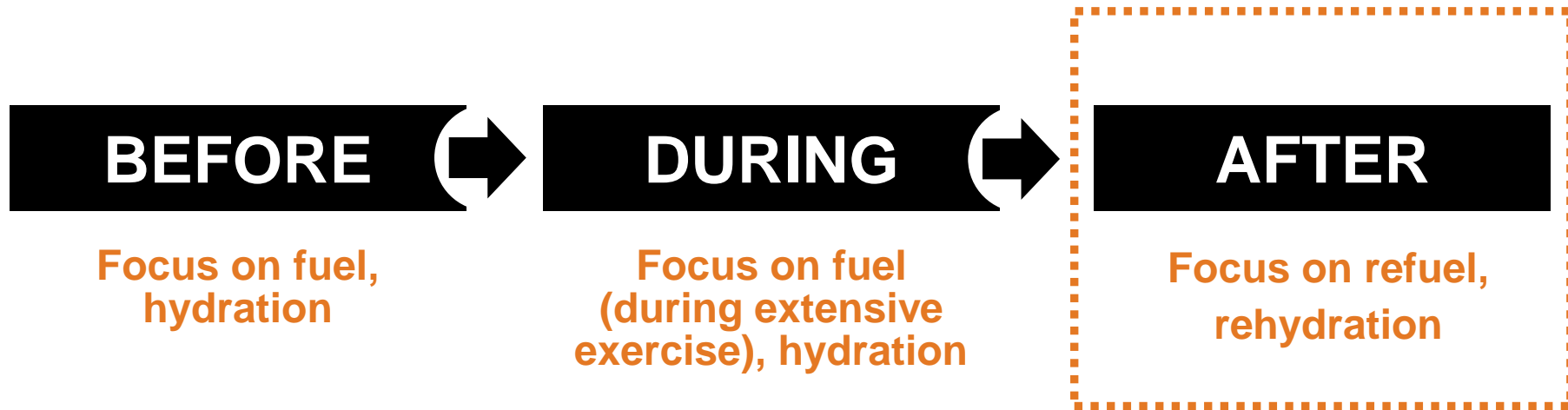
Muscle/
glycogen
replenishment and
rebuilding

Electrolyte
replenishment and
rehydration

Mental rest and
recovery

Recovery can help athletes **avoid injuries**,
and **feel their best** so they can
stick to their training routines

the recovery context



WHAT TO EAT



Carbs

Protein

Fluids and electrolytes

WHEN TO EAT



**30 minutes to 2
hours after
strenuous exercise**

HOW MUCH TO EAT



0.75 g carbs/lb body weight

**16-24 fl. oz./lb body weight
lost during exercise**

WHAT TO EAT



Carbs

Protein

Fluids and electrolytes

CARBOHYDRATES

to refuel depleted muscle glycogen



PROTEIN

to reduce muscle breakdown and stimulate growth

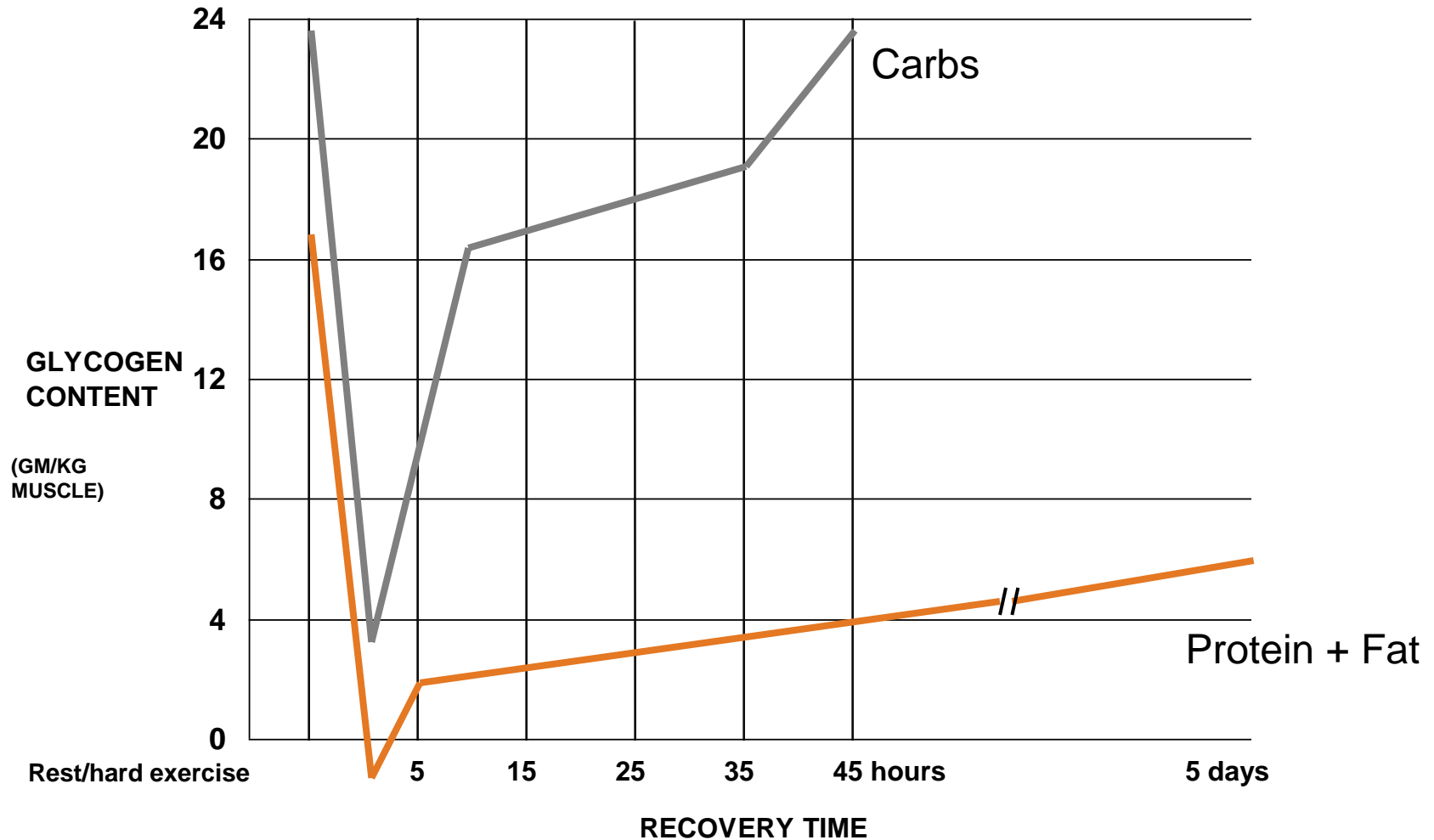


FLUID and ELECTROLYTES

to rehydrate the body by replenishing sweat losses



carbs refuel while protein builds and repairs



the power of protein

About one gram
protein for every
three or four
grams carbs

Consider:

- Type of protein, quality
- Leucine content
- The combination with carbs

for example, after exercise 120 pound athlete may need...

Carbohydrate

82 grams

(amount in about 24 ounces of chocolate milk)

Protein

20 to 27 grams

(approximately equal to the amount in 24 ounces of chocolate milk)

Fluids

24 ounces

(depending on exercise intensity, weight loss)

Electrolytes

**Sodium, calcium, potassium
and magnesium**

(depending on sweat losses)

and, a 190 pound athlete may need...

Carbohydrate

130 grams
(amount in about 40 ounces of chocolate milk)

Protein

32 to 43 grams
(amount in a quart of milk)

Fluids

24 ounces
(depending on exercise intensity, weight loss)

Electrolytes

**Sodium, calcium, potassium and
magnesium**
(depending on sweat losses)

considerations for recovery

**Food vs.
beverage**

**Carb and
protein
combo**

**Convenience
and
affordability**

**Taste and
tolerance**

**Intensity of
workout,
recovery
timing**

Find the right options and combinations for each athlete

post-workout snack ideas

- Turkey and Cheese with Apple Slices and Pretzels
- Tuna on Whole Wheat
- Banana and Peanut Butter
- Chocolate Milk





**a closer look at
chocolate milk**

BUILT WITH
CHOCOLATE MILK

why chocolate milk?

Backed by
Science

Trusted by
Athletes



a growing body of evidence

More than 20 studies on the specific benefits of milk and chocolate milk for post-exercise recovery

International Journal of Sport Nutrition and Exercise Metabolism, 2006, 16, 70-81
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Chocolate Milk as a Post-Exercise Recovery Aid

Jason R. Karp, Jeanne D. Johnston, Sandra Tecklenburg, Timothy D. Mickleborough, Alyce D. Fly, and Joel M. Stager

Nine male, endurance-trained cyclists performed an interval workout followed by 4 h of recovery, and a subsequent endurance trial to exhaustion at 70% $\dot{V}O_{2max}$ on three separate days. Immediately following the first exercise bout and 2 h of recovery, subjects drank isovolumetric amounts of chocolate milk, fluid replacement drink (FR), or carbohydrate replacement drink (CR), in a single-blind, randomized design. Carbohydrate content was equivalent for chocolate milk and CR. Time to exhaustion (TTE), average heart rate (HR), rating of perceived exertion (RPE), and total work (W) for the endurance exercise were compared between trials. TTE and W were significantly greater for chocolate milk and FR trials compared to CR trial. The results of this study suggest that chocolate milk is an effective recovery aid between two exhausting exercise bouts.

Key Words: glycogen resynthesis, endurance performance, nutrition, sports drink

It is well known that endurance exercise performance is influenced by the amount of stored glycogen in skeletal muscles, and that intense endurance exercise decreases muscle glycogen stores (9, 10, 13, 18), leading to a diminution in performance. The resynthesis of glycogen between training sessions occurs most rapidly if carbohydrates (CHO) are consumed within 30 min to 1 h after exercise (9, 13, 17). Indeed, delaying carbohydrate ingestion for 2 h after a workout can reduce the rate of glycogen resynthesis by half (20, 23). To maximize the rate of glycogen resynthesis, it is suggested that 50 to 75 g of CHO be ingested within 30 to 45 min after exercise (1), with ingestion of 1.2 to 1.5 g CHO/kg of body weight/hour for the next few hours (12, 16, 20, 24, 29). Ingesting protein along with carbohydrate (at a CHO-to-protein ratio of 3 to 2.9:1) has been shown to hasten the rate of glycogen synthesis and improve endurance performance, especially when the amount of carbohydrate ingested is less than current recommendations (20, 21, 35, 39). Of particular importance is the study of Ivy et al. (23), who found that the ingestion of a solution containing a 4:1 CHO-to-protein ratio improved endurance performance

The authors are with the Dept of Kinesiology and Applied Health Sciences, Human Performance Laboratory, Indiana University, Bloomington, IN 47402.

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2006

Med Sport Sci. 2013;59:127-34. doi: 10.1159/000341954. Epub 2012 Oct 15.
Chocolate milk: a post-exercise recovery beverage for endurance sports.

Pritchett K, Pritchett R.

Department of Nutrition Exercise and Health Sciences, Central Washington University, Ellensburg, Wash., USA.

Abstract

An optimal post-exercise nutrition regimen is fundamental for ensuring recovery. Therefore, the purpose of this study was to evaluate the effectiveness of chocolate milk as a post-exercise recovery beverage for many athletes taking the place of a sports drink. The study was a randomized, controlled trial. The study was conducted in a laboratory setting. The study was conducted in a laboratory setting. The study was conducted in a laboratory setting.

THE UNIVERSITY OF TEXAS
AT AUSTIN

Chocolate Milk Gives Athletes Leg-up After Exercise, Says University of Texas at Austin Study

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**Journal of the International Society
of Sports Nutrition**

Review
Milk: the new sports drink? A Review
Brian D Roy

lowfat chocolate milk: what's in it?

Nutrition Facts

Serving Size 8 fl oz

Servings Per Container 1

Amount Per Serving

Calories 160

Calories from Fat 25

% Daily Value*

Total Fat 2.5g

4%

Saturated Fat 1.5g

8%

Cholesterol 10mg

3%

Sodium 150mg

6%

Total Carbohydrate 26g

8%

Dietary Fiber 1g

4%

Sugars 25g

Protein 8g

Vitamin A 10%

Vitamin C 4%

Calcium 30%

Iron 4%

Potassium 12%

Vitamin D 25%

Riboflavin 25%

Niacin 12%

Vitamin B12 15%

Phosphorus 25%

Magnesium 8%

*Percent Daily Values are based on a 2,000 calorie diet. Your daily values may be higher or lower depending on your calorie needs:

	Calories	2,000	2,500
Total Fat	Less Than	65g	80g
Saturated Fat	Less Than	20g	25g
Cholesterol	Less Than	300mg	300 mg
Sodium	Less Than	2,400mg	2,400mg
Total Carbohydrate		300g	375g
Dietary Fiber		25g	30g

Calories per gram:

Fat 9

Carbohydrate 4

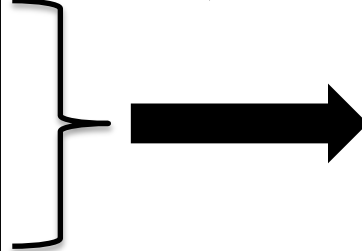
Protein 4



CARBS



PROTEIN



9 ESSENTIAL NUTRIENTS
including many not found in sports drinks

CALCIUM and VITAMIN D
B VITAMINS
ELECTROLYTES
sodium, potassium, calcium, magnesium

the research

1

Refuel and Rehydrate

2

Perform

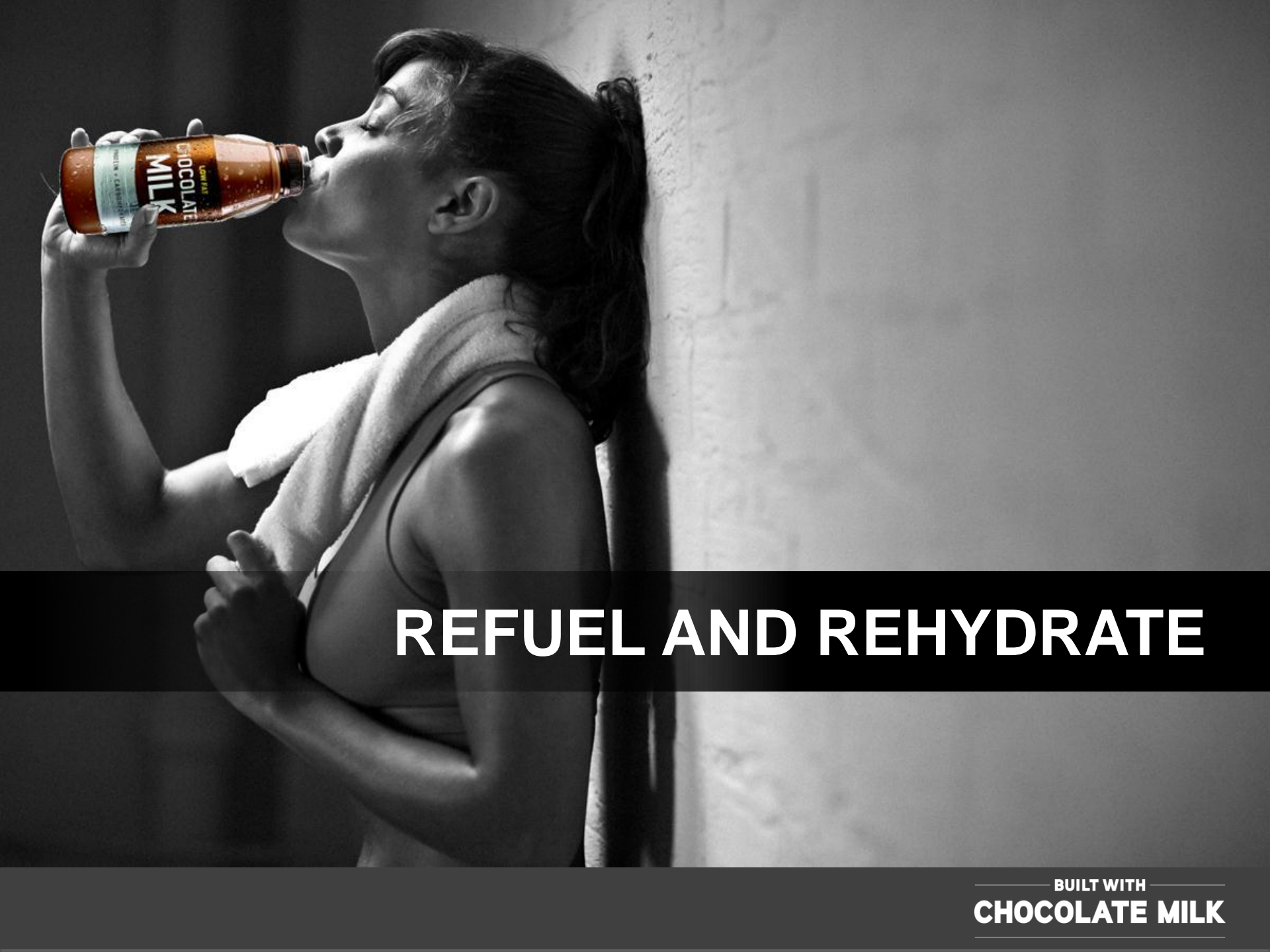
3

Rebuild

4

Reshape





REFUEL AND REHYDRATE

BUILT WITH
CHOCOLATE MILK

replacing muscle glycogen

Lowfat chocolate milk contains the right three to one mix of carbs and protein scientifically shown to help refuel muscles. It helps restore muscles quickly to their peak potential and helps replenish what your body has lost – including fluids and critical nutrients lost in sweat.

- Male runners who drank 16 ounces of chocolate milk after exercise led to **greater concentration of glycogen in muscles** at 30 and 60 minutes post-exercise, compared to a carb only sports drink
- Athletes who drank milk after exercise stayed **hydrated longer** than when they drank a sports drink



The Right Mix of
Carbohydrates and
Protein

3:1

Karfonta KE, et al. *Medicine & Science in Sports & Exercise*. 2010;42:S64
Watson P, et al. *European Journal of Applied Physiology*. 2008;104:633-642.
Shirreffs SM, et al. *British Journal of Nutrition*. 2007;98:173-180.



PERFORM

BUILT WITH
CHOCOLATE MILK

power and speed during the next workout

Drinking chocolate milk after a hard workout could give athletes a performance edge, according to a growing body of research.

In separate studies, after an exhaustive first bout of exercise, followed by recovering with chocolate milk versus a traditional sports drink or calorie-free beverage:

- Cyclists cycled **51% longer** in a time-to-exhaustion trial later that same day
- Swimmers shaved off 2.1 seconds per 200 yard swim and **.5 seconds** per 75 yard sprint in time trials later that same day
- Runners ran **23% longer** in a follow-up run



Karp JR, et al. *Journal of Sport Nutrition and Exercise Metabolism*. 2006;16:78-91.
Thomas K, et al. *Applied Physiology, Nutrition and Metabolism*. 2009;34:78-82.
Ferguson-Stegall L, et al. *Journal of Strength and Conditioning Research*. 2011;25:1210-1224.
Lunn WR, et al. *Medicine & Science in Sports & Exercise*. 2012;44:682-691
Ferguson-Stegall L, et al. *Journal of nutrition and Metabolism*. 2011.



REBUILD

BUILT WITH
CHOCOLATE MILK

a muscle building advantage

Lowfat chocolate milk contains high-quality protein to help repair and rebuild muscles after strenuous exercise.

- Male runners those who drank fat free chocolate milk after exercise **had enhanced skeletal muscle protein synthesis** – a sign that muscles were able to repair and rebuild – compared to a fluid replacement drink with *just* carbohydrates
- Athletic men and women who drank milk one hour after a “leg resistance exercise routine” **experienced a significant increase in two measured amino acids**
- Athletes who recovered immediately with plain or chocolate milk **had less exercise-induced muscle damage** than those who drank water or sports drinks



Lunn W, et al. *Medicine and Science in Sports and Exercise*. 2010;42:S48.
Elliot TA, et al. *Medical Science in Sports and Exercise*. 2006;38:667-674.
Cockburn E, et al. *Applied Physiology, Nutrition and Metabolism*. 2008;33:775-783.
Cockburn E et al. *Applied Physiology, Nutrition and Metabolism*. 2010;35:270-277



RESHAPE

BUILT WITH
CHOCOLATE MILK

improved body composition

Drinking chocolate milk post-workout could help athletes tone up and reshape their bodies, according to research.

- 32 healthy but untrained cyclists who recovered with chocolate milk **gained more muscle** and **lost more fat** during training, with a 3 pound lean muscle advantage, compared to athletes who recovered with a carbohydrate drink
- A 12-week training program found that milk drinkers **gained more muscle** and **lost more fat** than those who refueled with a soy or carb-only beverage

McCleave EL et al. *ACSM*, 2011.
Hartman JW, et al. *American Journal of Clinical Nutrition*, 2007;86:373-381.
Josse et al. *Medicine & Science in Sports & Exercise*. 2010;42:1122-1130.

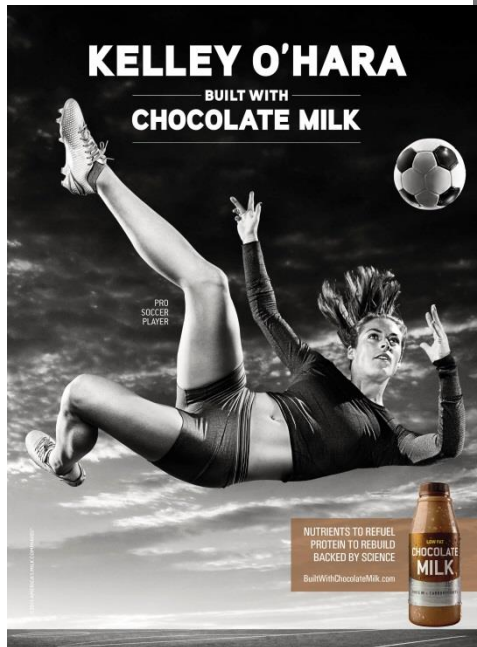


BUILT WITH CHOCOLATE MILK athletes

Kevin Love



Kelley O'Hara



Mirinda Carfrae



Luke McKenzie



Craig Alexander

how you can get in the game

1. To learn more about the science behind the recovery benefits of lowfat chocolate milk and access exclusive training tips and videos, log on to BuiltWithChocolateMilk.com.
2. Follow BUILT WITH CHOCOLATE MILK and join the conversation by using #BuildIt
 - Facebook.com/BuiltWithChocolateMilk
 - Twitter.com/Chocolate_Milk
 - Instagram.com/BuiltWithChocolateMilk
 - YouTube.com/BuiltWithChocolateMilk
3. Talk to your local dairy about where your favorite chocolate milk is sold.
 - Come talk to us afterwards if you would like to be introduced to your local dairy.
4. Send a letter to parents to ask them to buy chocolate milk for their children's recovery efforts



THANK YOU.