



During Exercise

Multi-protein
Provides energy to maintain long, strenuous physical activity

When should you consume it? (30-60 minutes before and after)

Benefits: Improves endurance, reduces fatigue, increases energy

Post-Exercise

"Refeed"

<30 minutes after practice - refuel and replenish

Optimal drink:
- Flavors are in a standard state
- Incorporated into the diet quickly
- Tastes is more appealing to teens
- Maximal ability to liquid drinks

Allows muscles to **rebuild**
- enhanced muscle recovery

Combination of carbohydrates and protein seems better than carbohydrates alone

50 grams of carbohydrates with 10-25 grams of protein =

- 1/2 cup chocolate milk
- 1 whole banana and 1/2 cup sandwich
- 1 slice cornbread & 1 cup milk
- 1 small yogurt

Pre-exercise

Energy (glucose) - supplies the body for working hard

An isotonic drink: Fully rehydrates
- 100% carbohydrate solution, neutral pH, 20-30% sodium
- 10-15% sodium
- 10-15% sodium

10-15% sodium: Not too salty, not too sweet

Hydration needs to be met at all times! Proper fuel intake is essential for supporting the body's energy needs

Recommendations for teens

Whole grains
Low-fat dairy (bones)
Protein (fish)
Fruits/Vegetables
Eat breakfast
Avoid fast food/fried foods for school lunch
Avoid empty carbohydrates/sugary drinks
Avoid energy drinks

- Have to be in a state of energy balance for next few days to work

Post-Exercise Hydration

Measure weight before and after exercise

- For every pound lost, drink 16 oz fluid

- If exercise > 1 hour, sports drink to replace electrolytes
- To replace the sports drink, drink fruit juice, chocolate milk, and consume fruits and vegetables

Light yellow urine is good indicator of adequate hydration

Sports Drinks

Why do you think that gatorade should only be used after 1 hour of intense exercise?

- Kids will drink one with lunch, one after school, and one with dinner
- Not being used for their original purpose
- replacing lost carbohydrate and electrolytes

I ran for USU - 1:1 gatorade with water (meet in Arizona)

Supplements

Do teens need them?

30-40% young athletes take at least 1 dietary supplement

Touted to build strength and increase speed - **Bigger, Faster, Stronger**

For teens - **useless at best, harmful at worst**

- Products are not tested on teens, or regulated
- Adverse side effects - dehydration, kidney problems, cramps
- Affect hormone balance - stunted growth
- Can achieve all that they need through diet

Food is Fuel

- Most sedentary adults 2,000-3,000 calories
- Active teen girls need 2,200-3,500 calories
- Active teen boys 3,000 - 5,000 calories

- Not just being more active, they are growing!

Need snacks throughout the day to boost calories
Backpack friendly snacks

- Trail mix
- PB and crackers
- Granola bars

Protein supplements

Not necessary if consuming healthy diet

Advised that teens should:
Shun supplements and consume real foods

Muscles can get all the protein they need from foods

Quality Protein: Lean meat, chicken, turkey, fish, eggs, low-fat milk, cheese and yogurt

Include some protein in every meal to help muscles recover.

Caffeine

"#1 abused drug in the world"

Energy to get through the day, Or the next workout

I will have an edge

Some think it is needed, can't perform without

It's cool

Creatine

"One of most popular supplements"

Helps to create ATP in the body for muscle contractions

- Improve strength and performance - intermittent, high intensity activities
- Weight lifting, wrestling baseball
- Positive short term when using a carefully designed training program
- No studies for long term effects
- Not tested in teens

Side Effects

- weight gain
- muscle cramps
- kidney problems
- increased risk of heat illness / dehydration
- high blood pressure / heart problems
- dangerous interactions with other drugs
- Huntington's disease

Teens are highly discouraged from using creatine supplements
Creatine is found in protein-rich foods - Meat/fish

Example of diet meeting protein needs:

1.7 grams protein/kg body weight for strength training
- High end of protein needs

54 kg x 1.7 grams protein = 91.8 grams

USDA source list

- 1 1/2 cups wheat chex = 9 grams
- 2 glasses 2% milk = 28 grams
- 1 cup spaghetti = 21 grams
- 2 hard boiled eggs = 16 g
- 4 oz tenderloin steak = 36 g

93 grams

Caffeine

Absorbed in stomach, peaks 1-2 hours after ingestion

Caffeine (3-8 mg/kg body weight) one hour before exercise improves endurance running and cycling performance

- Trained, elite athletes

54 kg x 4 mg = 216 mg

Side Effects

Caffeine is a diuretic
- High-dose acute toxicity

Caffeine is a stimulant

Stimulates the central nervous system and increases heart rate

Should be avoided in children who are under 18 years old - especially in competitive sports

Female Athlete Triad

Getting too few calories to support exercise

Low energy availability
- Energy intake less than energy expended
- Leads to bone loss
- Affects menstrual cycle

Disordered eating
- Eating too many calories with low fat or fat-free foods
- Leads to bone loss
- Affects menstrual cycle

Low bone mineral density
- Increased risk of fractures (stress fractures, osteoporosis)



Nutrition For Teens

"The better the diet, the better the athlete"



Jennifer Day, R.D.



Food is Fuel

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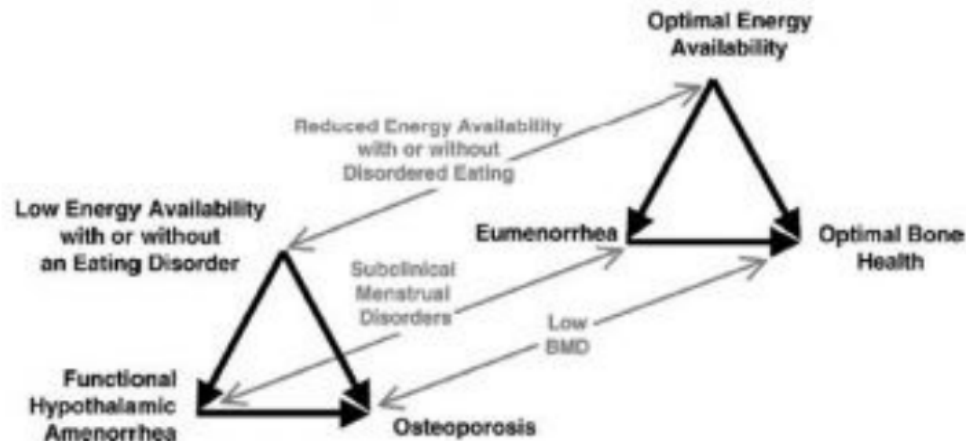
Backpack friendly snacks

- Trail mix
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- Granola bars

Female Athlete Triad

Consuming too few calories to support exercise

- Body goes into survival mode to preserve energy



- *Hormone imbalance*

- Irregular menstruation
- Increased bone turnover (stress fractures)
- Musculoskeletal injuries

Signs and Symptoms

- **Menstrual dysfunction**
>3 months without menstruating
- **Stress fracture**
- **Low index of energy availability**
 - energy left for the body after exercise
Need to know BF%
kcal eaten per day
- **Poor body image**

<45 kcal/kg free fat mass body weight per day is at risk

82% female runners at USU were <45 kcal per kg

Need prevention early



Prevention

High school is the time to educate female athletes

- If females are participating in sports, their energy needs will be higher
- first indicator is loss of menstruation



Loss of period is not normal

Need to go to parents/coaches/doctor

Increase intake until menstruation returns

Menstruation can return in as little as five days when intake is increased

Recommendations for teens

Whole grains

Low-fat dairy (bones)

Protein (diet)

Fruits/Vegetables

Eat breakfast

Avoid fast food/fried foods for school lunch

Avoid empty carbohydrates/sugary drinks

Avoid energy drinks



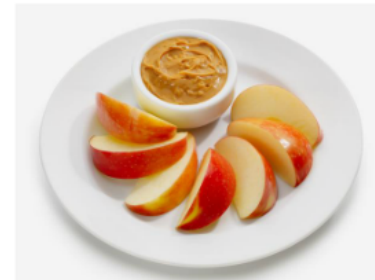
- **Have to be in a state of energy balance for next few steps to work**

Pre-exercise

"Energy phase" - prepping the body, like fueling a car

2-3 hrs before practice - light snack is helpful

- 1/2 turkey sandwich, apple with pb, handful almonds, high protein energy bar
- 1-2 glasses of water



<1 hr before practice - few bites provide added energy

- 2-3 crackers, string cheese
- 5-10 ounces of water
 - 1 oz = mouthful



Wouldn't want to set out on a trip with the gas tank empty on your car - same for prepping the body for exercise



During Exercise

"Maintenance"

Provide energy to sustain long, strenuous physical activity

- Energy beans, gu - marathons, cycling
- **Not recommended for teens**



Fluids

- **Water** should be consumed in small amounts every 15-20 minutes
- If **exercise exceeds 1 hour**, sports drink



Post-Exercise

"Refuel"

<30 minutes after practice - refuel and replenish

Optimal time -

- muscles are in a starved state
- increased blood flow to muscles
- muscle is more sensitive to insulin
 - improved ability to digest glucose

***Allows muscles to rebuild
- enhanced muscle recovery***



Combination of carbohydrate and protein works better than carbohydrate alone

50 grams of carbohydrate with 10-15 grams of protein =



- small chocolate milk
- apple juice and PB&J sandwich
- 2 cups cornflakes 1 cup milk
- Small yogurt



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Optimal drink:
- Flavors are in a natural state
- Incorporated fiber for gut health
- Protein is more sensitive to heat
- Natural acids to boost protein

Allows muscles to **rebuild**
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Combination of carbohydrates and protein seems better than carbohydrates alone

50 grams of carbohydrates with 10-25 grams of protein =

- 1.5 cups chocolate milk
- 1 whole banana and 1 slice sandwich
- 1 slice cornbread & 1 cup milk
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Pre-exercise

Energy (protein) - supports the body's pre-exercise work

An effective strategy: multi-meal to fuel
- 1-2 hours before exercise, include:
- Carbs for quick energy, healthy fats for sustained energy
- 1-2 cups of water

1-2 hours before: 1-2 cups of water, 1 slice sandwich

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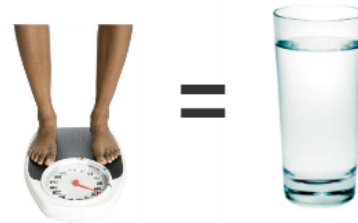
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Gatorade

9 tsp sugar!



Same amount as a can of coke

**Better off drinking
water**



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Caffeine (3-9 mg/kg body weight) one hour before exercise improves endurance running and cycling performance

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- 85-95 mg in one cup coffee



Mechanism behind endurance improvements is unclear

Caffeine improves performance in short term exercise up to 5 minutes at 90% - 100% effort

- enhances muscles ability to work without oxygen
- Does not aide sprint performance

Side Effects

Caffeine is a diuretic

- High dose = poor hydration status



Caffeine is a stimulant

- harmful effects on the developing nervous system and cardiovascular system
- Stimulates release of adrenaline, when this wears off - fatigue, irritability, headache
- Disrupts sleep pattern



Energy Drinks

Popular among high school teens

Very high levels of caffeine, as well as other stimulants

- **Guarana** - South American plant that contains a caffeine compound called guaranine. One gram of guarana is equal to 40 mg of caffeine.
- **Ginseng** - root has also been linked to increased risk of insomnia, headache and hypertension.
- **B-vitamins** - some energy drinks have high levels, can be toxic
Example: B6 toxicity - nerve damage
- **Sugars** - Users who consume two or three energy drinks could be taking in 90 to 120 grams of sugar, which is 4 to 6 times the maximum recommended daily intake
- **Caffeine**
Mayo Clinic advises: Adolescents should limit themselves to no more than 100 mg of caffeine a day.

Soda is regulated at < 65 grams of caffeine

Energy Drinks aren't regulated, "supplement"

20 oz red bull - 189 mg 24 oz wired X505 - 505 mg

24 oz Rockstar "punched" contains 360 mg

What is really in
Energy Drinks?



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When would protein supplements be warranted?

Gaining Weight

6'3 Teenage boy weighing 140 lbs, trying to gain weight

- Eats all day long trying to get 6,000 calories
- Can't physically eat enough food
 - Can pack in protein and calories without eating a meal

Time Restraint

Rushing from activity to activity

- Convenient
- Better than not eating



Wrap it Up

Athletes have increased energy needs

- Growing, and being active

Females need to make sure they are eating enough to maintain menstruation

- If missed period for >3 months seek help

If maintaining a healthy diet, pre- and post-exercise nutrition is beneficial for performance and recovery

Teen athletes get everything they need from a healthy diet

- Don't need supplements
- Avoid energy drinks
- Don't need sports drinks unless exercise > 1 hour

