

Energy Drinks and Athlete Performance

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Objectives:

-  Recognize the effects of energy drinks on athletic performance
-  Provide athletes and parents information to make wise decisions regarding energy drinks
-  Identify healthier and sustainable alternatives to energy drinks

History of Energy Drinks

- 1962 Started in Japan when a pharmaceutical company made the drink Lipovitan-D. It contained vitamins B1, B2 and B6 along with niacin and taurine.
- 1980's energy drinks grew in popularity throughout Asia.
- 1987 an Australian named Dietrich Mateschitz added caffeine and sugars and formulated Red Bull which quickly spread throughout Europe.
- Late 1980s Americans were drinking Jolt Cola made by Coke. They advertised "all the sugar and twice the caffeine" of regular Coke.

Popular Energy Drinks

- ▶ Monster
- ▶ Red Bull
- ▶ AMP
- ▶ Full Throttle
- ▶ Rockstar



Differences between Sports Drinks and Energy Drinks

	Sports Drinks	Energy Drinks
Common brands	Gatorade, Powerade	Red Bull, Monster Energy
Advertised purpose	Rehydrate the body after intense exercise	To rapidly increase energy, endurance, and performance
Ingredients	Glucose, Electrolytes	Caffeine, sugar, herbal supplements, and other vitamins or substances
Effects	Replaces lost electrolytes and carbohydrates during sustained strenuous exercise, prevents dehydration	Temporarily increases heart and respiratory rates and blood pressure, not designed to hydrate the body

Energy Drinks vs Sports Drinks

Energy Drinks

- ▶ Very high in sugar
- ▶ Contains added ingredients that may not be tested
- ▶ May cause upset stomach during activity
- ▶ Less hydrating
- ▶ Contains caffeine
- ▶ Contain other vitamins
- ▶ Contain other herbal ingredients

Sports Drinks

- ▶ High in sugar
- ▶ Contain added sodium and potassium
- ▶ May help for extended period of exercise
- ▶ Hydrating
- ▶ Do not contain caffeine

Marketing for Energy Drinks

- Beverage companies claim for market 21 + years or older.
- Half of all energy drink sales are sold to individuals 25 yrs. and younger.
- They agree that children should not drink energy drinks.
- Experts say advertisements target teenage population.
- According to self report studies, energy drinks are consumed by 30 to 50% adolescents and young adults.
- Common reason for consumption is for an increase in energy.

Basic Content of Energy Drinks

- ▶ Caffeine
- ▶ Sugar
- ▶ Taurine
- ▶ Guarana
- ▶ B vitamins



Supplement Facts	
Serving Size 3.11 fl. oz. (94.0 mL)	
Serving Per Container 2	
Amount Per Serving	% Daily Value
Calories	100
Total Carb	27g 95%
Sugars	27g 1
Riboflavin	1.7mg 100%
Niacin	24mg 100%
Vitamin B6	2mg 100%
Vitamin B12	6mcg 100%
Sodium	180mg 6%
Thaurine	1000mg 1
Power Blending	200mg 1
Energy Blend	500mg 1
L-Carnitine	Glucose
Caffeine	Guarana, Inositol
Glucuronolactone	Methionine



Caffeine

- A psychoactive stimulant drug - most commonly used psychoactive drug used worldwide.
- Acts on the central nervous system to speed up the messages to and from the brain so that a person feels more aware and active.
- Normal amount per day for adults is 200-300mg, in healthy adults less than 400 mg per day is considered safe according to the FDA.
- Teenage limit no more than 100 mg per day.
- FDA imposes a limit of 71 mg caffeine per 12 fl. oz of soda.
- Energy drinks are classified as a dietary supplement so contents are not strictly controlled.



Caffeine Amounts in Drinks

- ▶ 12oz serving of Amp contains 107mg of caffeine
- ▶ 12 oz serving of Red Bull contains 116mg
- ▶ 12 oz serving of Monster contains 120mg
- ▶ 12 oz serving of cola contains 34-38mg
- ▶ 12 oz cappuccino contains 75mg
- ▶ 12 oz brewed coffee contains 150mg
- ▶ 12 oz (Starbucks) contains 261mg

Caffeine Doses and Implications

1-3 mg/kg (12.5-100 mg)	4-12 mg/kg (300-900 mg)	> 300 mg daily
Increased Exercise Endurance	Upset stomach	Miscarriage
Improved Cognition	Anxiety and Jitteriness	Low Birth Weight
Improved Mood	Tachycardia, ↑ heart rate	
Increased Reaction time	Headache, fatigue	

Caffeine and Performance

- ▶ Caffeine contained in energy drinks has ergogenic potential for affecting both physical and mental performance
- ▶ Exercise data evaluating caffeine has been shown to increase performance by 2-4% among spring, endurance, and muscular type exercise.
- ▶ The dose required is from 3-6 mg/kg body weight; in some cases lower doses show endurance benefits
- ▶ Endurance exercise benefits come from the increase in FFA oxidation
- ▶ Caffeine plays a role in increasing performance by stimulating the central nervous system and neuromuscular system in power and strength performance
- ▶ The research is inconsistent when comparing other ingredients found in energy drinks.

Caffeine and Performance

- ▶ Increases are found in peak and power during resistance exercise
- ▶ Pre-caffeine ingestions results in an increase in number of repetitions performed
 - ▶ Caffeine ingestion of 5 to 6 mg/kg body weight, significant increases in acute strength and power performance as well as increases in training volume have been reported.
 - ▶ Significant increase in maximal bench press strength among resistance trained women.
 - ▶ Ingestion 10 min prior to workout significantly increased number of repetitions performed during 4-6 sets.

Concerns with Caffeine

- ▶ Raises blood pressure
- ▶ Increased anxiety
- ▶ Cardiovascular effect
- ▶ Diuretic in high amounts
- ▶ Seizure risk
- ▶ Stomach upset
- ▶ Diarrhea



Sugar

Question: How many teaspoons of sugar are in an energy drink?



Sugar

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14 teaspoons



Sugar Comparisons

- ▶ Red Bull has 52 grams of sugar compared with ¾ cup generic frosted flakes has 11 g of sugar.
- ▶ 16 oz Monster drink has 54 grams of sugar, it contains the same amount as 3.5 cups of frosted flakes cereal.

Amount Per Serving	% Daily Value	
Calories	100	
Total Carb	27g	9%*
Sugars	27g	†
Riboflavin Vit B2	1.7mg	100%
Niacin Vit B3	20mg	100%
Vitamin B6	2mg	100%
Vitamin B12	6mcg	100%
Sodium	180mg	8%
Taurine	1000mg	†
Panax Ginseng	200mg	†
Energy Blend	2500mg	†
L-Carnitine, Glucose, Caffeine, Guarana, Inositol, Glucuronolactone, Maltodextrin		



Taurine

-  An amino acid produced naturally by the body
-  Get from foods that contain vitamin B6
-  Small amounts can help detoxify and cleanse the body of harmful substances
-  Concentrated in the heart tissue and brain

Taurine Dangers

- When mixed with caffeine and taken in large doses it will stress the heart
- Increase heart stroke volume
- Large amounts can become toxic

Guarana

-  Plant native to Brazil
-  Produces a berry about the size of a coffee bean
-  Used to make sodas in Brazil
-  Stimulant that contains about twice the concentration of caffeine found in coffee beans

Guarana Dangers

- Each small fruit contains 2 x times as much caffeine as a coffee bean
- Used as a stimulant
- When mixed with caffeine and other stimulants it can cause an irregular heart beat
- Can be fatal when mixed with medication

Other Ingredients...

- ▶ B vitamins - energy vitamins not proven to boost energy
- ▶ Yohimbe - affects cardiac function, should not be combined with blood pressure medications, decongestants, tricyclic antidepressants
- ▶ Ginseng - prolongs bleeding time and should not be combined warfarin, or corticosteroids. May interfere with estrogens and reduce blood glucose levels.

Each of these ingredients, when mixed together produce more caffeine

Large amounts of caffeine can lead to dehydration, headaches, dizziness and even death

When these drinks are taken with drugs and alcohol results can be fatal

So What Does this All Mean?

Energy Drinks During Physical Activity

Use of energy drinks can lead to:

- ▶ Vomiting
- ▶ Increased heart rate
- ▶ Dehydration
- ▶ Muscle cramps
- ▶ Upset stomach

Labeling of Energy Drinks

- Do not list mg of caffeine
- 1000mg of taurine
- 18g of sugar
- 200mg of guarana (equivalent to 400 mg of caffeine)
- Missing ingredients - not regulated

Danger of Consumption

- This drink could contain as much as 500 mg of caffeine
- Cold beverages easier to consume quickly over a hot cup of coffee
- Caffeine naïve
- Amount consumed too much per body size
- Heavy, frequent consumption patterns

Why Energy Drinks are Worse than Coffee



- Coffee is served hot
- Coffee is usually sipped slowly
- Energy drinks are served cold, like a soft drink
- Energy drinks are consumed in large amounts in a short amount of time

Teens and Energy Drinks

- ▶ About a third of 12 to 24 yr. old's say they regularly drink energy drinks
- ▶ Warnings on labels say "not for children"
- ▶ Students are drinking them to be more alert
- ▶ Students are drinking them for a quick high
- ▶ Students are mixing them with medication for a high
- ▶ Students are drinking 2 to 4 drinks at a time
- ▶ Students are taking them before and after athletic competition and practice

Energy Drink Regulation



- Poison control and emergency rooms are seeing a rise in the number of caffeine overdose related cases
 - Many school systems have banned energy drinks on campus
 - The NCAA considers energy drinks a performance enhancing drug and will suspend an athlete for a year for testing positive.
- Some countries have outlawed the sale of energy drinks

Safe Ways to Stay Energized

DRINK 8-12 CUPS OF WATER DAILY

GET 8-10 HOURS OF SLEEP EVERY NIGHT

EAT A VARIETY OF FRUITS AND VEGETABLES

CHOOSE LEAN MEATS AND DAIRY FOODS FOR PROTEIN

EAT WHOLE GRAINS FOR BALANCED ENERGY



Hydration Guidelines

- ▶ 2004 AI from the Institute of Medicine - Men 3.7 L (130 oz and women 2.7 L (95 oz per day
- ▶ Beverages that are caffeinated should be limited
- ▶ Remember to choose calorie free beverages
- ▶ Add 16 oz more for every hour of exercise

In Conclusion

-  Energy drinks are harmful and can be deadly
-  Know what it is you are putting into your body
-  Don't be fooled by all the advertising
-  Educate families and children about the adverse effects of energy drinks
-  Community groups, athletic groups, and schools need to promote risk awareness

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