

How Should the Referee Prep for and Recover from a Match?

Jay H. Williams, Ph.D.

Department of Human Nutrition, Foods and Exercise
Virginia Tech
Blacksburg, VA 24061



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What Makes a Referee Successful?

Decisions, decisions, decisions...

- Knowledge
- Experience
- Keeping up with the game
- Focus and concentration

Today...

- Match Demands
- Fitness
- Diet and Hydration



The Mental Game

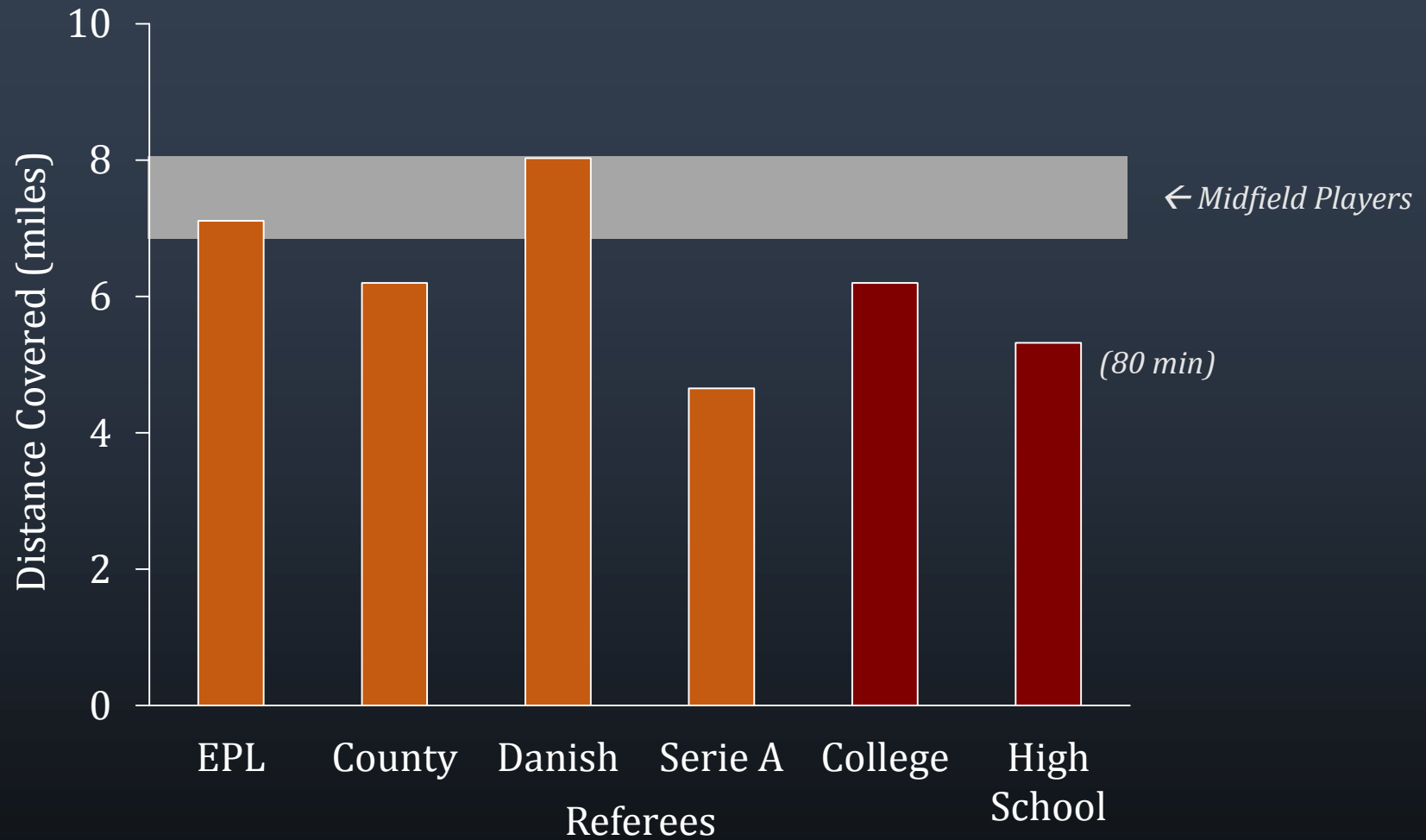
90 Minute Match

- 137 observable decisions (>60% with asst)
- 65 non-observable decisions
- 3-4 per minute

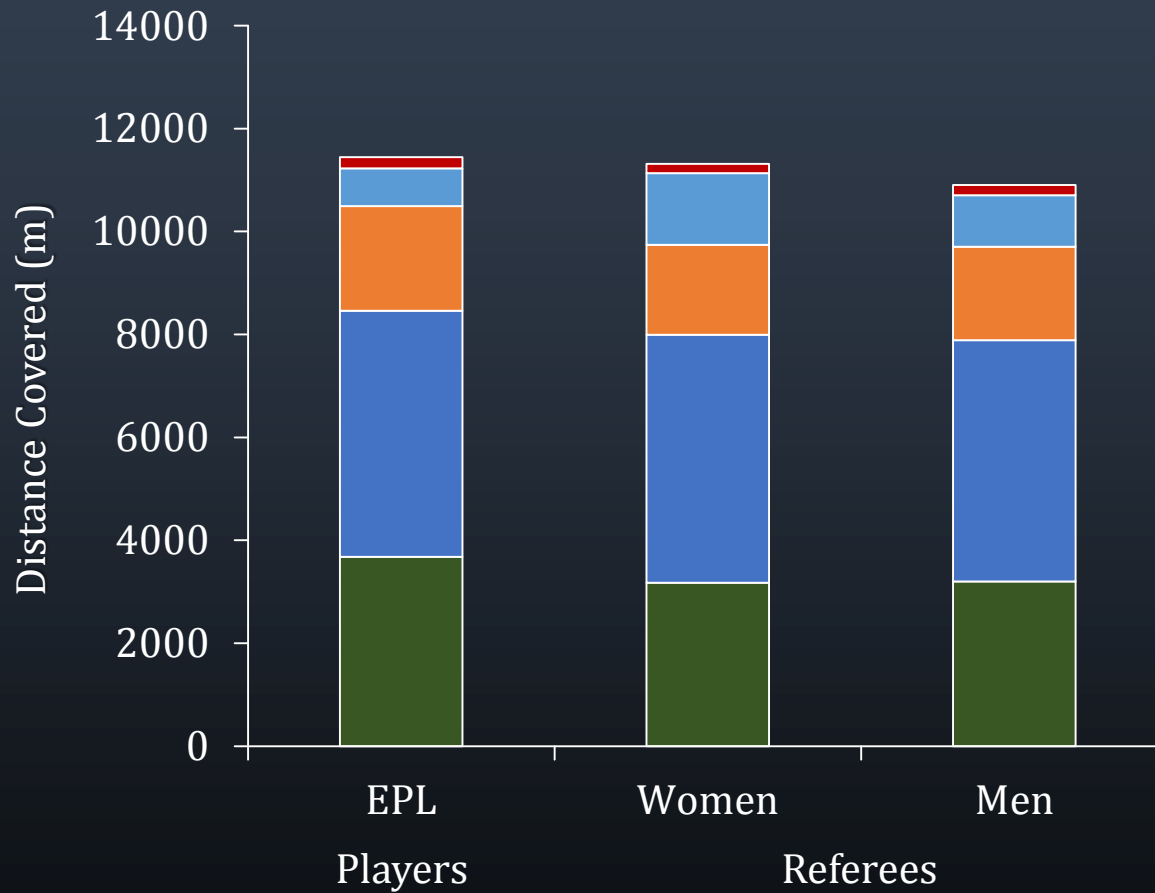
Greater decision rate at the end of each period and during added time



The Demands of a Match



Types of Movements



- Sprinting
- High Speed Running
- Running
- Jogging
- Walking



Additional Movements

Referees also...

- Cover up to...
 - 1000m running backwards
 - 200m running sideways
- Produce a high intensity bout...
 - Every 33.5 sec of play
 - That lasts ~2.5 sec

This increases energy cost by ~20%



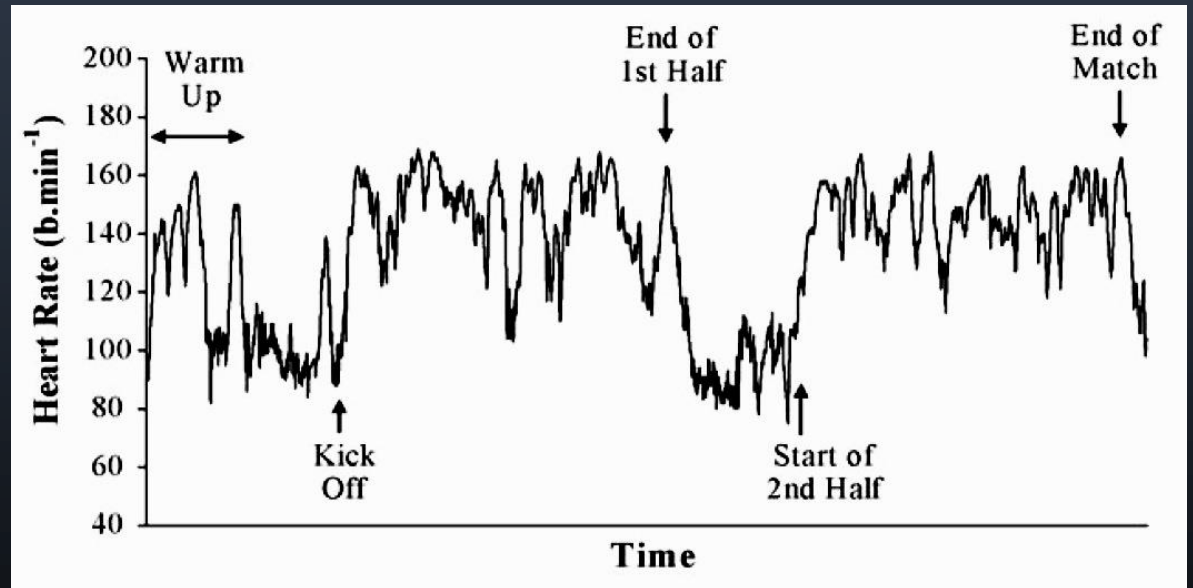
The Physiology of Refereeing

Cardiovascular

- 85-90% of maximal HR
- More than half of the match is spent with a HR between 90-100% of maximal

Fitness

- 75-85% of VO_2 max
- Typical VO_2 max is 40-50 ml O_2 /kg/min
 - Players ~ 60 ml O_2 /kg/min
 - 2 miles in 12 minutes (Cooper Test)



Assistant Referees

Total Distance:

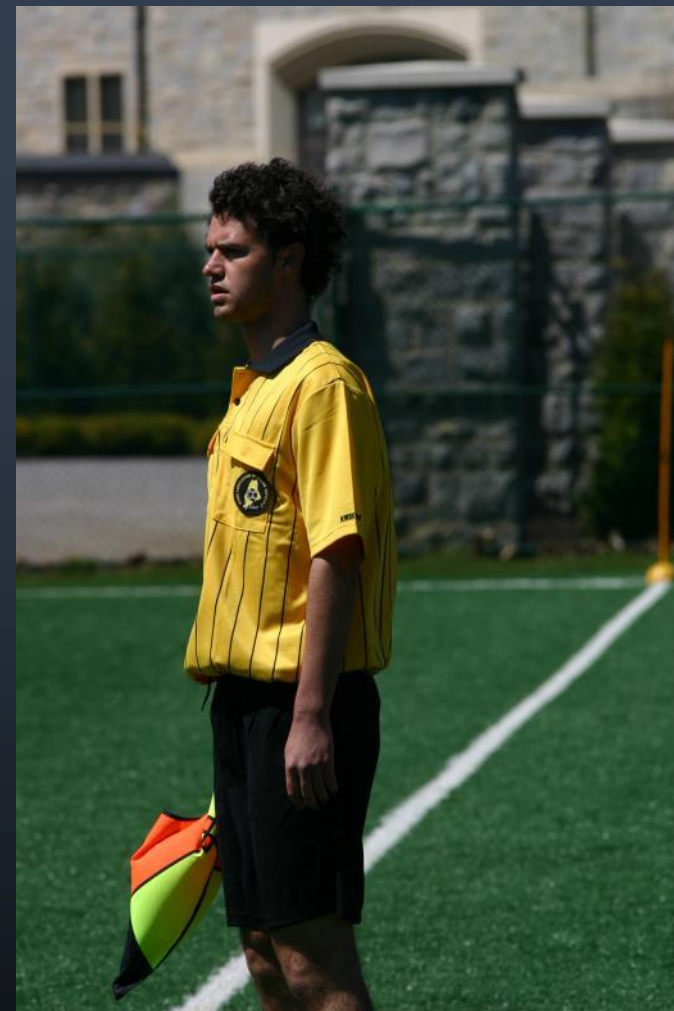
7,300 m (4.5 mi)

- Sprinting 310 m
- High Speed Running 300 m
- Moderate Speed Running 500 m
- Sideways & Backwards 1,220 m

Avg Heart Rate

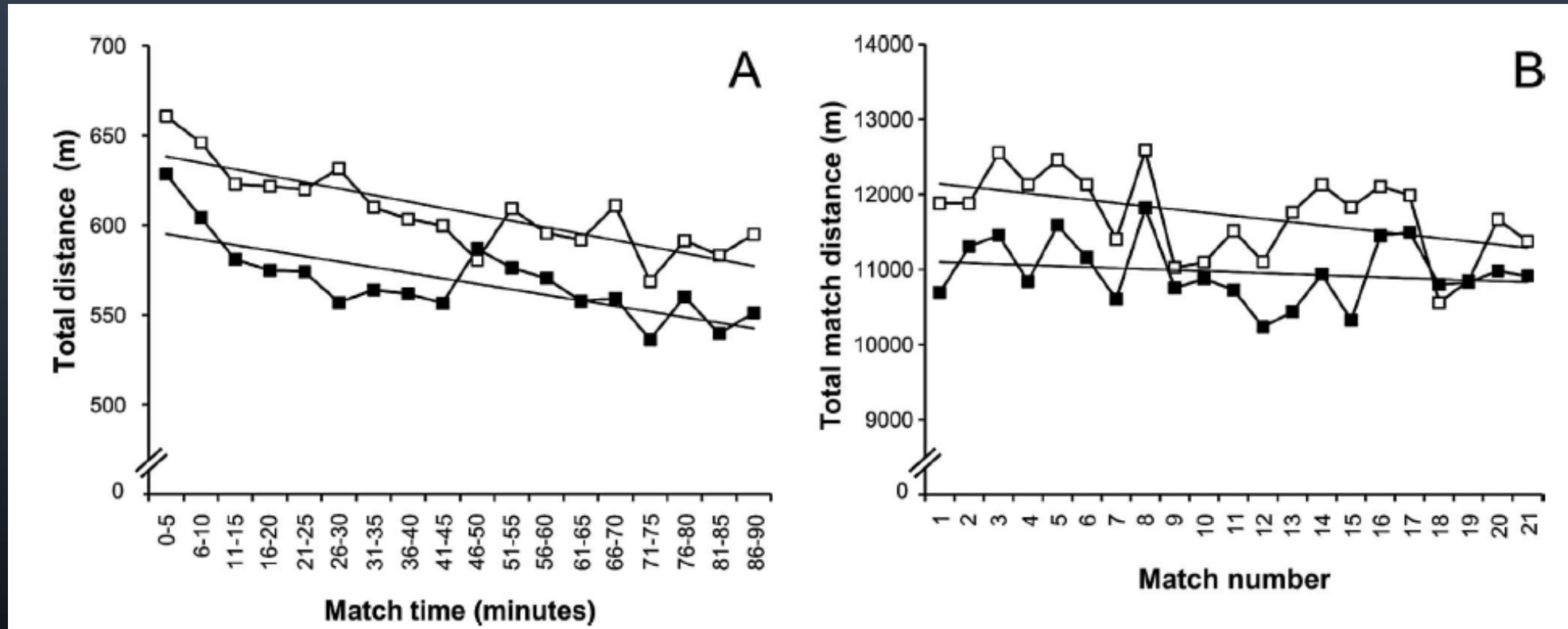
137 bpm

- 73% of maximal
- 65% of VO_2 max



Referee and Player Work Loads

Referees respond to the players



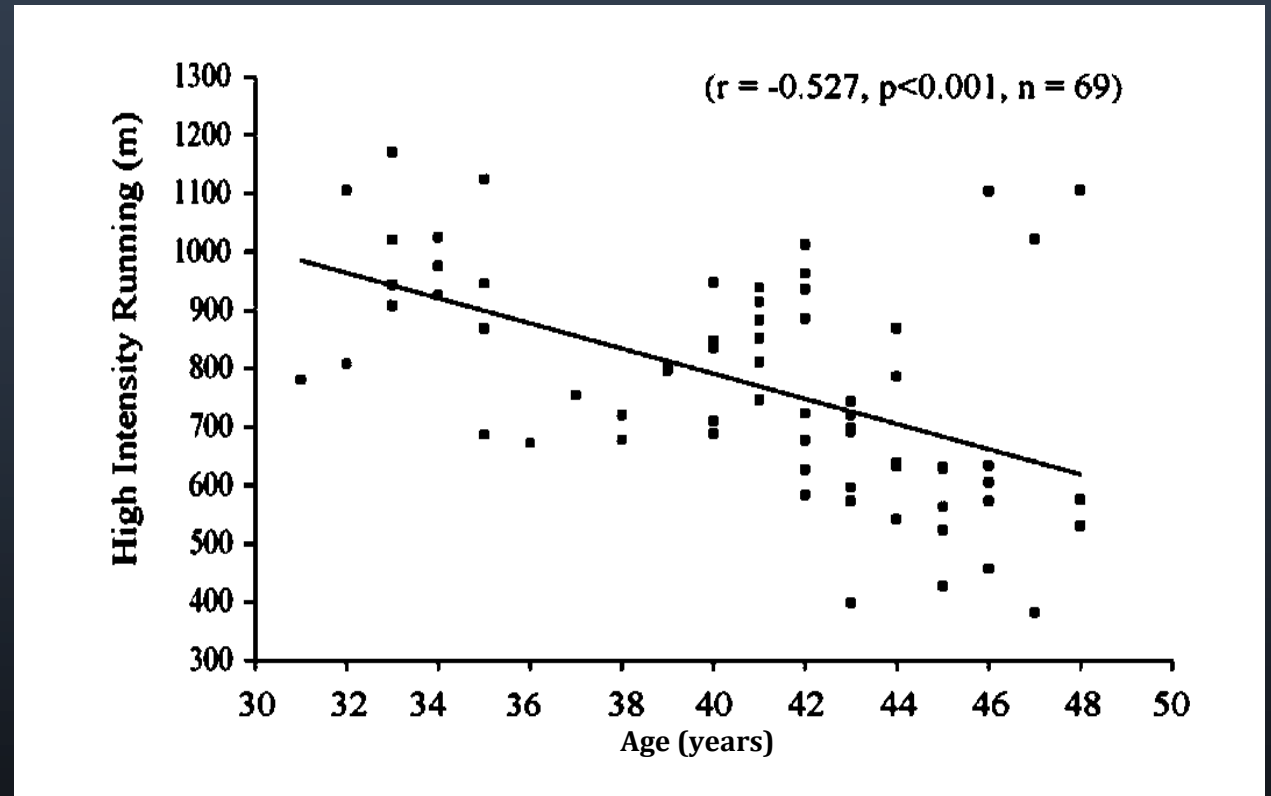
(Weston et al., 2011)



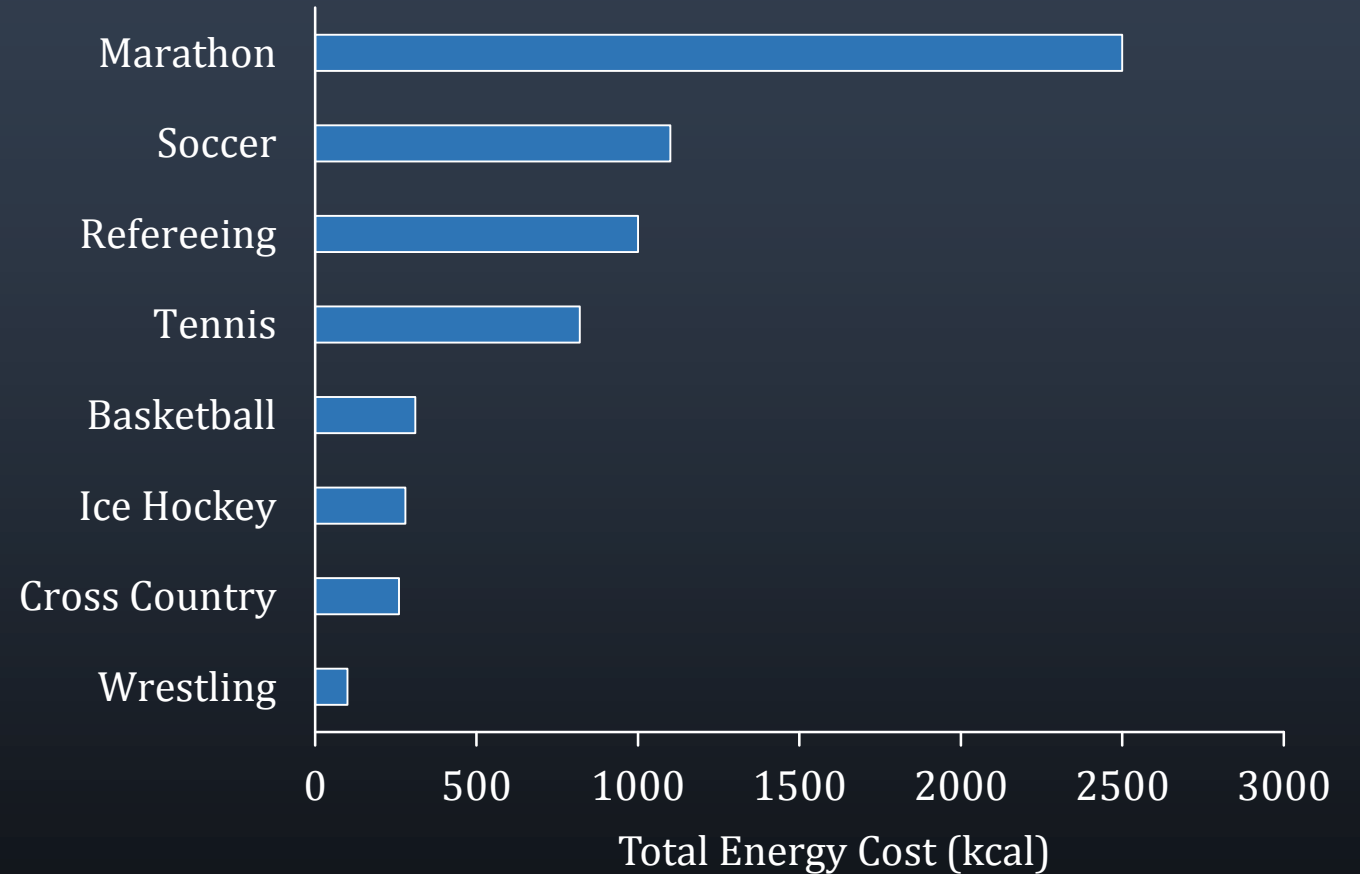
Other Factors

Age – As we get older, we slow down

- Aging ?
- Experience ?

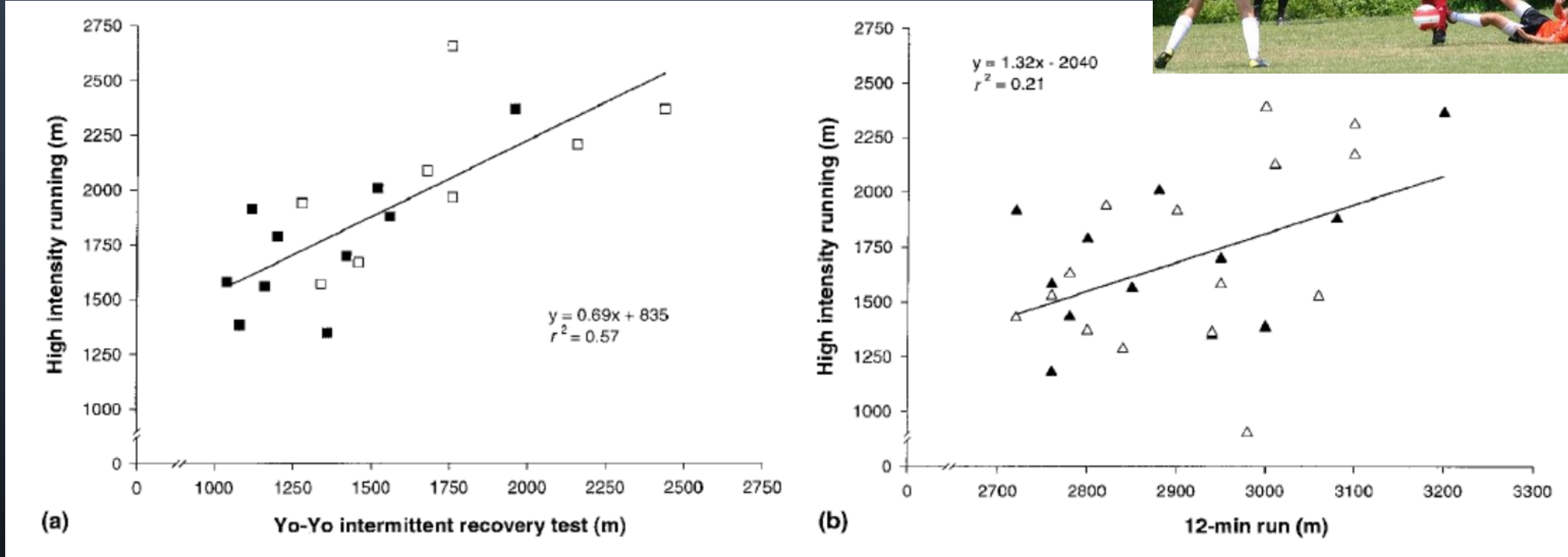


The Total Energy Cost of Refereeing



Importance of Fitness

Fitter referees cover more distance

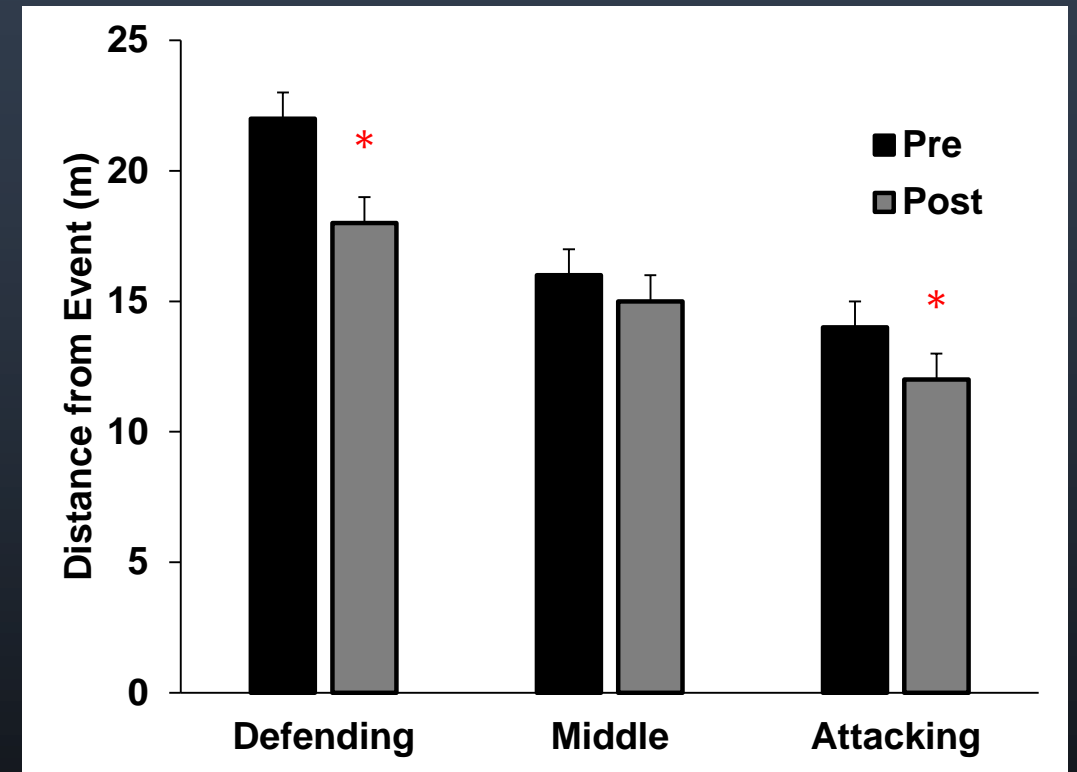
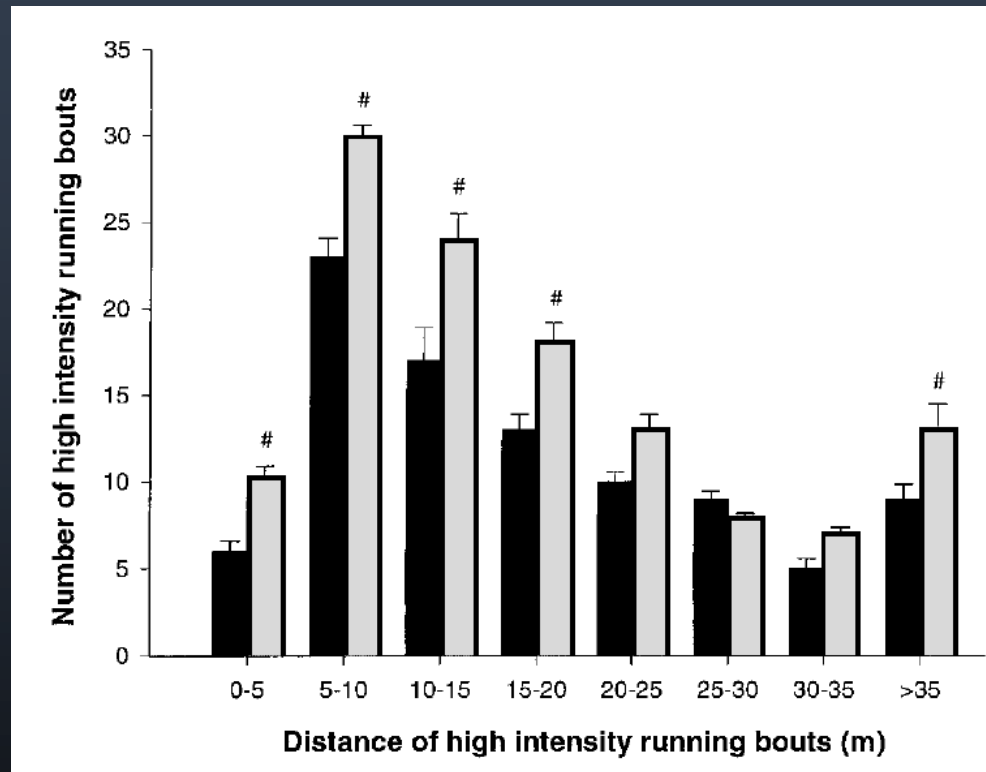


Krustrup and Bangsbo, 2001

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Effects of Training

Training = More work, better positioning



Krustrup and Bangsbo, 2001

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Fitness and Fatigue

Fit referees...

- Exercise at a lower percentage of their maximal
- Spend less time standing
- Execute more sprints (*especially at the end of each period*)
- Are in an optimal position (*right place at the right time*)
- Show less mental fatigue



How Can Referees Prep and Recover?

Referees

- Run a lot and expend a lot of energy
- The intensity of activity can be high
- They can become dehydrated
- Have a very high “mental load”

Factors contributing to referee performance

- Mental – focus, concentration
- Physiological – fitness and physical performance

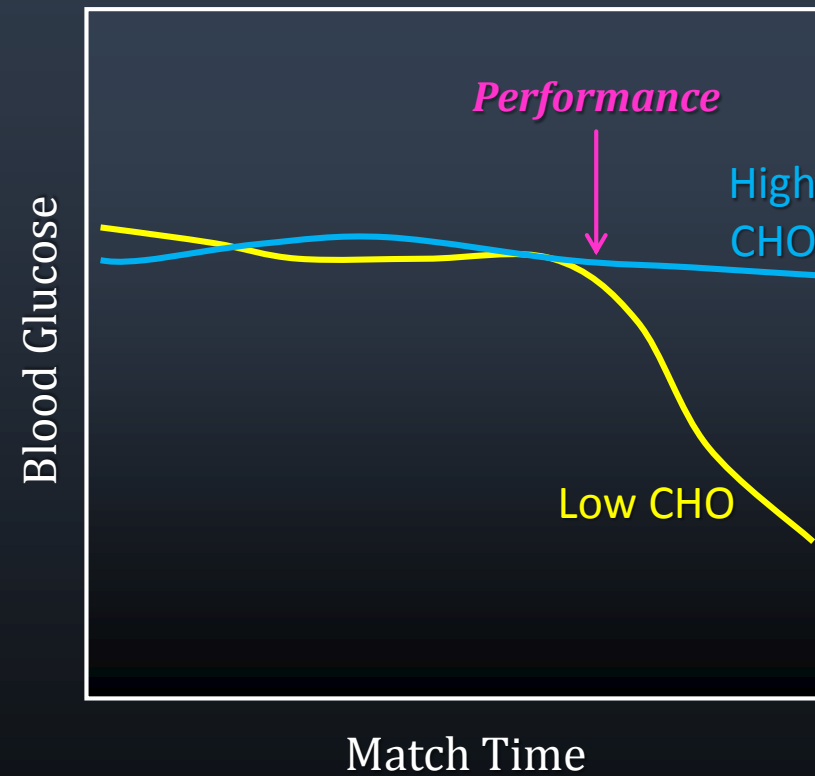
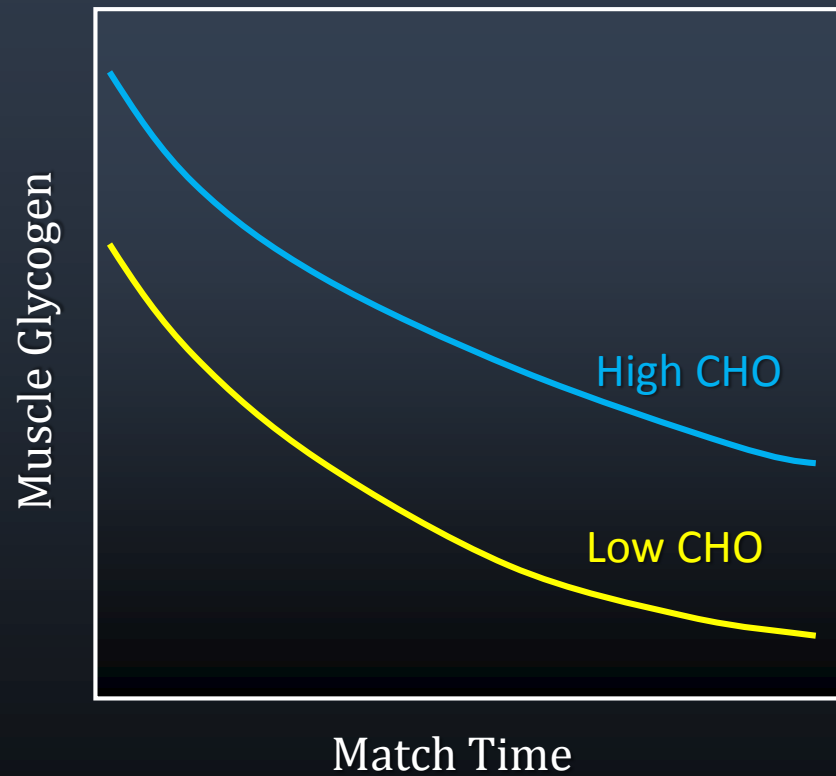
Improving performance...

- Training
- Diet **



What We Know About Diet and Performance

*Refereeing requires a lot of energy (~1000 kcal)
Poor diet leads to glycogen depletion and hypoglycemia*



Dehydration

Fluid replacement during the match is limited

Moderate Temperature (68-72° F, 75% RH)

- 1.5 to 2.0 L of fluid lost
- ~2% of body weight

Assistant referees

- Fluid loss about half of center referees

Performance is affected with 2% fluid loss



Hypoglycemia and Dehydration

Effects on Performance

- ✗ Decreased “energy” and lethargy
- ✗ Reduced motivation
- ✗ Irritability
- ✗ Poor decision making
- ✗ Loss of motor skills - technical

Dehydration - danger signs

- ✗ Weight loss of more than 3%
- ✗ Heat exhaustion
- ✗ Heat stroke
- ✗ Death



Preparation - Before the Match

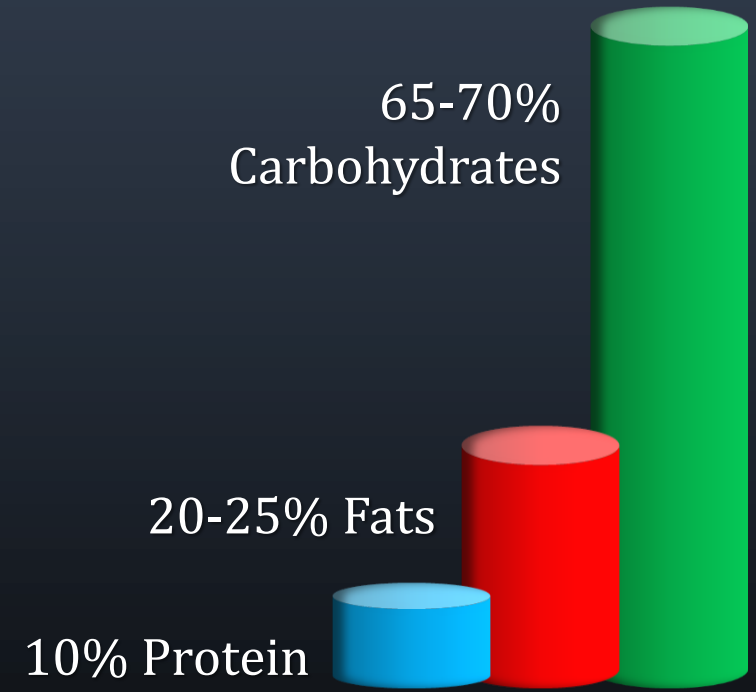
A Solid Diet

Carbohydrates, Proteins

- ✓ Pasta, rice, bread
- ✓ Fresh fruits and vegetables
- ✓ Lean meats
 - Chicken & turkey
- ✓ Low fat milk, fruit juices

Weak - Avoid

- ✗ Fried and fatty meats
- ✗ Pastries
- ✗ Canned fruits
- ✗ Soda
- ✗ Butter & Sauces



Preparation - Before the Match

Pre-Match Meal

- High in carbohydrates, low fat, some protein
- Fluids

Pre-Match Snack

- Carbohydrates – Chews
- Caffeine ??

Hydration

- Water
- Sports Drink

Feel full but not bloated or sluggish



During the Match

Drink when you can

At halftime

- Water or a sports drink
- Snack (easily digestible)

Fluids and carbohydrates

More important with...

- Heat and humidity
- Multiple matches



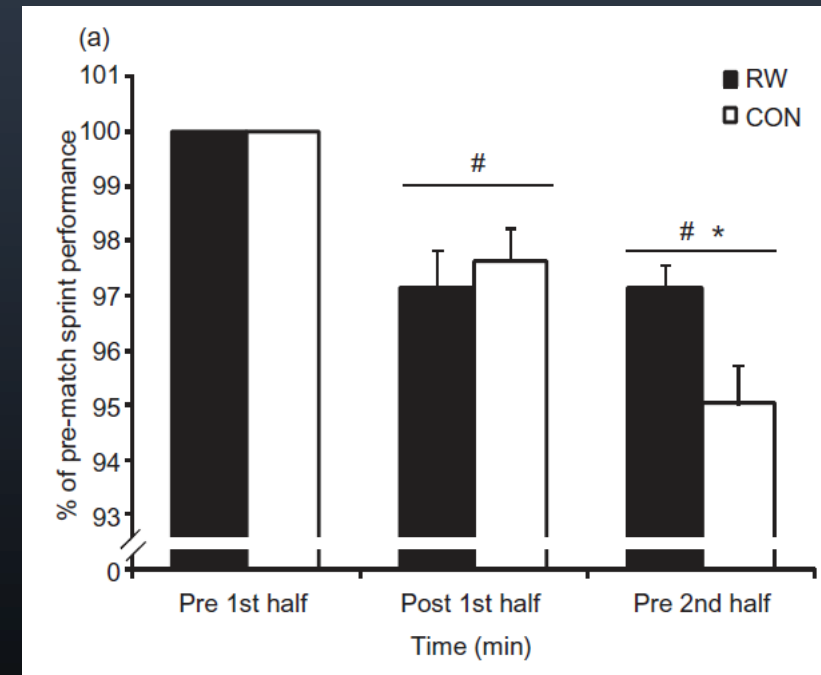
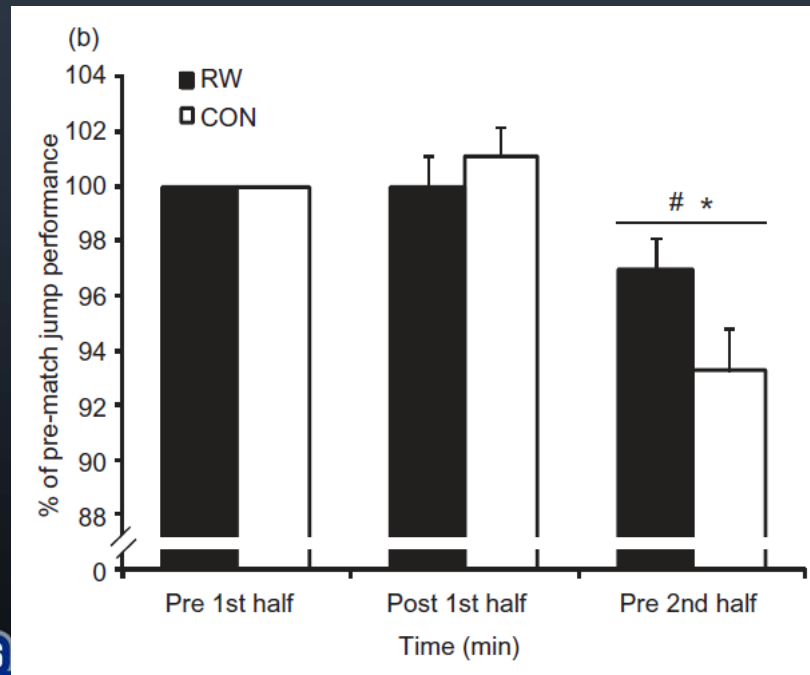
Half-Time Re-Warm Up?

Start of the Second Period

- More total and high speed running

Why?

- More rapid recovery
- Muscle temperature
- Blood glucose (energy)



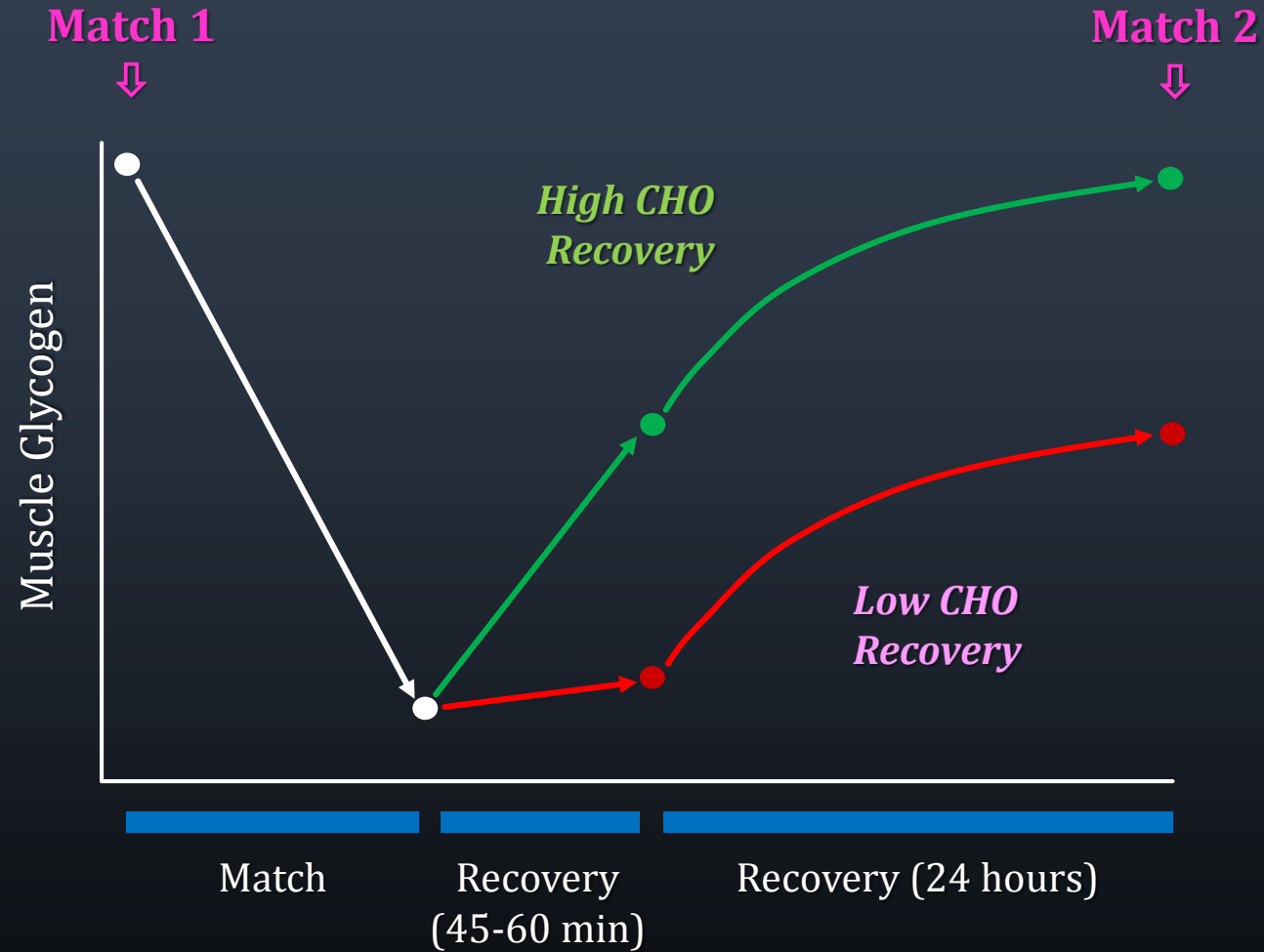
Recovery

The first 60 minutes

- **Carbohydrates** *(plus some protein)*
 - ✓ 1.0-1.5 g/kg
 - ✓ 85kg (185 lb) → 85-125 g CHO
 - ✓ 2-10 g Protein
- **Fluids**
 - ✓ 20-30 oz (600ml – 1L)
 - ✓ Water / Sports drinks
- **Low Fat**

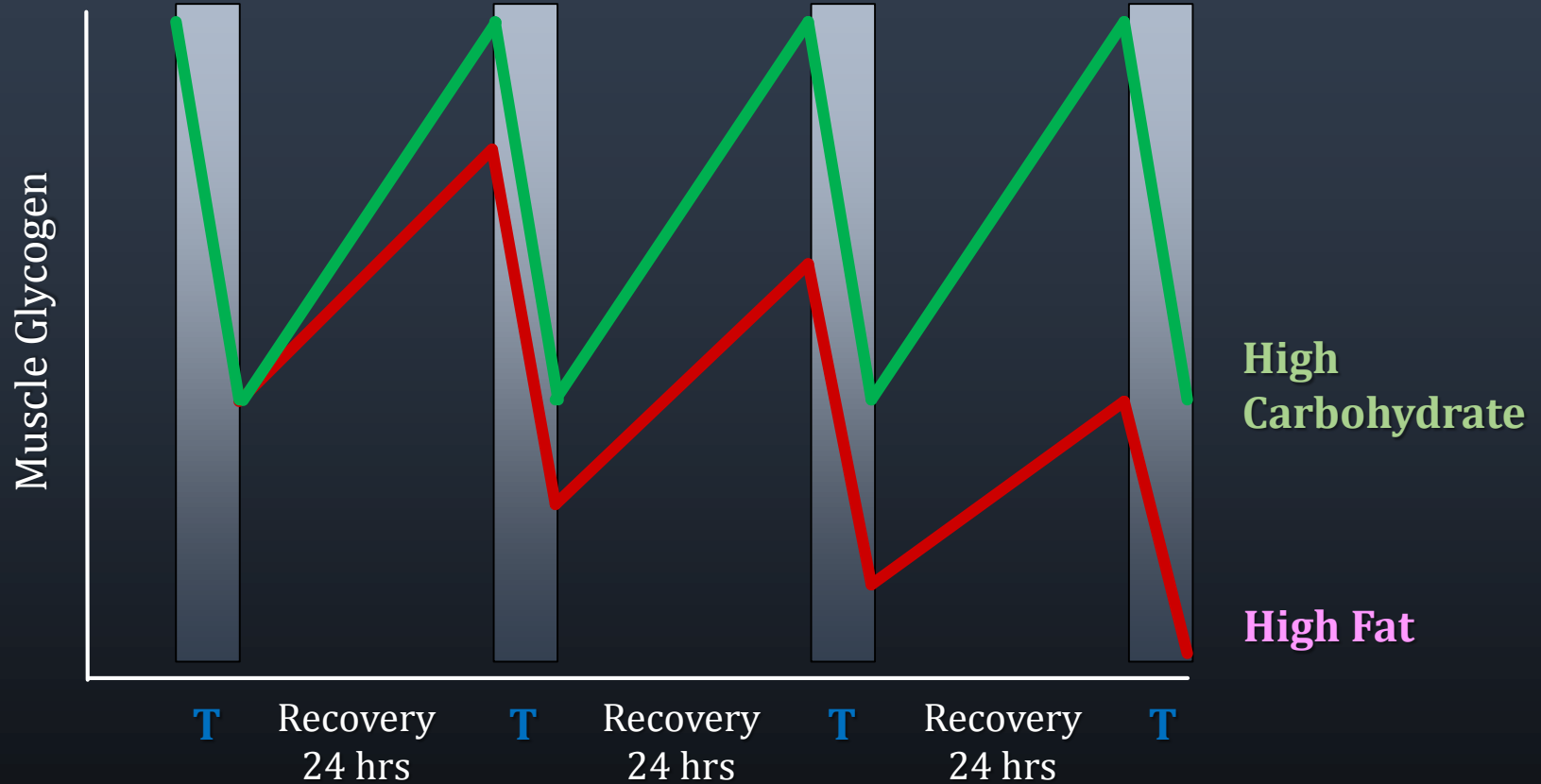


Jump Start the Recovery Process



Recovery

A long-term approach



Recovery

Hydration

Replace 1.5x fluid lost

- 1 kg lost = 1.5 liters
- 2 lb lost = 1.5 quarts

Soon after the match

- Sports Drinks - A good source of carbohydrates
- Avoid caffeine (*energy drinks*)
- Spread over the next 24 hrs

Alcohol

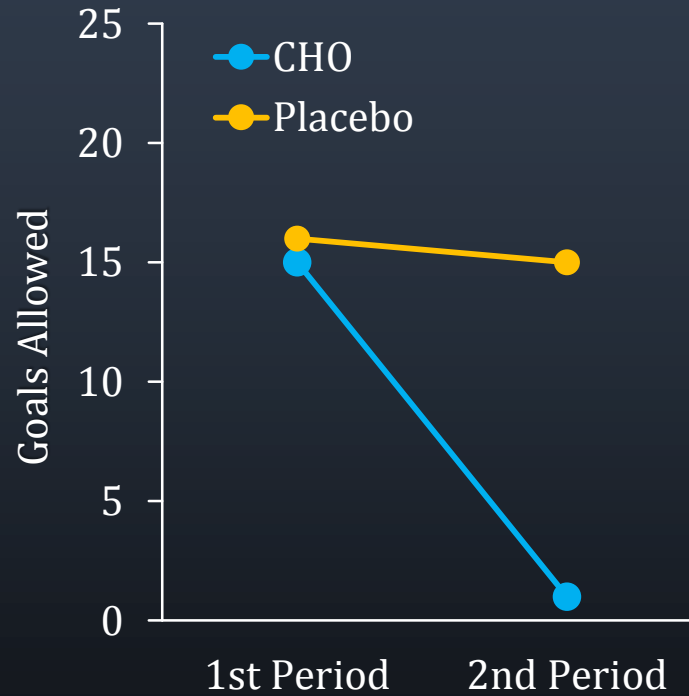
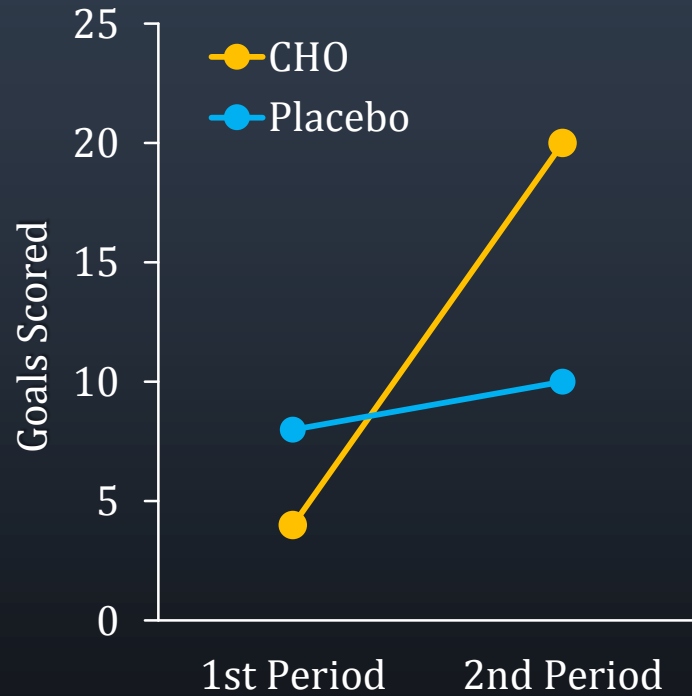
- Can delay recovery
- Can increase delayed-onset muscle soreness



Does this Work?

Does diet affect the match?

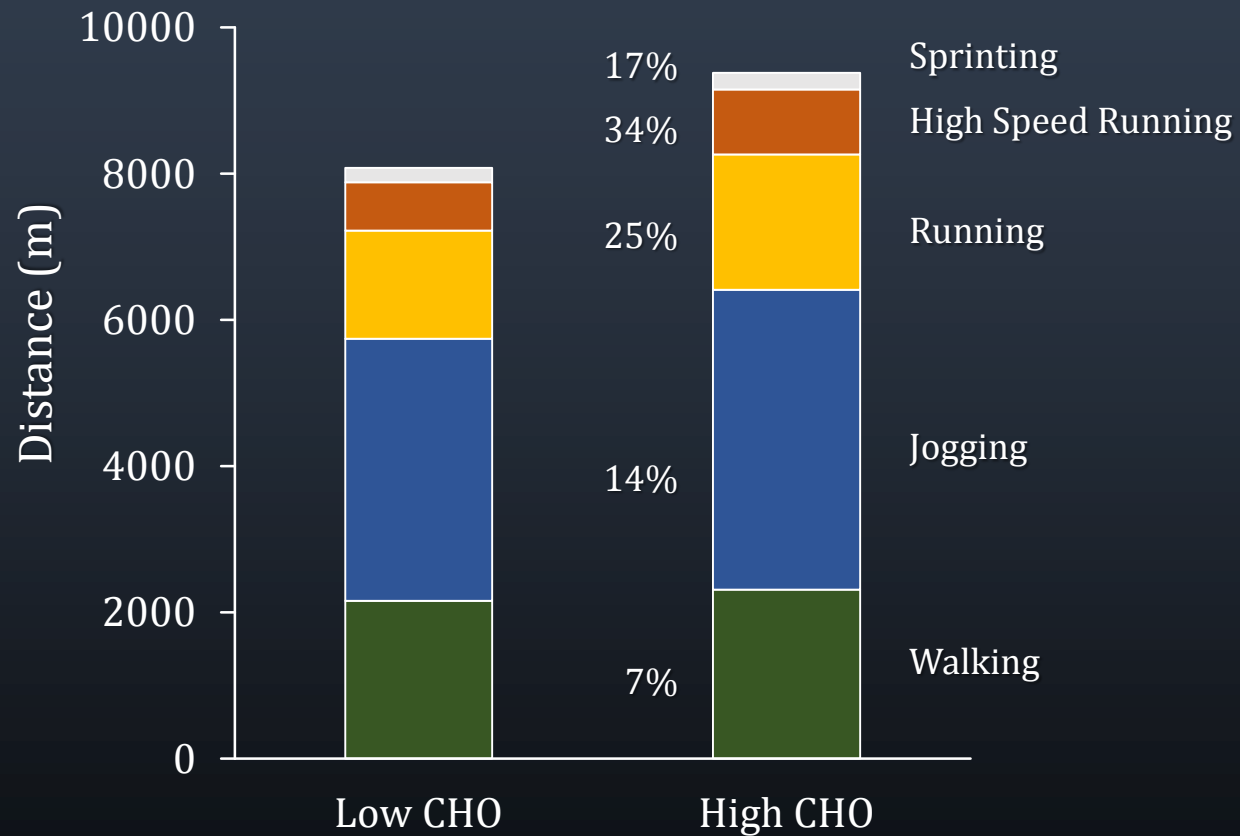
CHO or Placebo supplements given before each match



Diet and Performance

Does diet affect the match?

Teams placed on low and high CHO diets – cross over study



Aggregate Score:

Low CHO: 2

High CHO: 5



Special Case – The Diabetic Referee

Type 2 Diabetes

Refereeing can help with *glucose control* (training)

Before the match

- Monitor glucose
- Carbohydrates as needed
- Hydration

During the match

- Hypoglycemia
- Carbohydrates as needed

After the match

- Monitor glucose
- Carbohydrates as needed



Special Case – The Overweight Referee

Consult your physician

Extra Pounds / Overweight / Obese

Refereeing can help with *weight, blood pressure, cholesterol, etc* (fitness training)

Before the match

- Carbohydrates but limit
- Hydration

During the match

- Fluids
- Carbohydrates as needed

After the match

- Carbohydrates as needed
- Limit calories

Everyday Diet

- Reduce calories
- Limit fat intake



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To Recap...

Soccer refereeing

- Requires prolonged and high intensity efforts
- Uses about 1000 kcal per match
- Causes noticeable fluid loss

Both diet and fitness can affect physical and mental performance

Everyday and recovery diet should be...

- High in carbohydrates
- Low in fat
- Contain plenty of fluids



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US Youth Soccer & NSCAA Websites

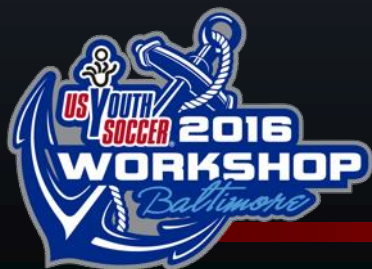
- Nutrition articles
- This presentation

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