

WOMEN'S DISABILITY SPORT WEBINAR SERIES

Nutrition Considerations for Female Para Athletes

Presenter: Holly Pitters RD, Sport Nutritionist

March 11th, 2026



Territorial Acknowledgement

ON Para Network acknowledges that the land and waterways that we live, work, and play on have been, and continue to be, the traditional territory of the Haudenosaunee, Wendat, Anishinaabeg, and Mississaugas of the Credit First Nation. We also honor the stewardship of the many First Nations, Metis, and Inuit that call this land home today.

Purpose of the Series



- Cover a wide range of topics that impact female athletes, with information tailored through the lens of disability
- Topics discussed in the series includes:
 - Coaching Female Wheelchair Sport Athletes – Physiological Considerations for Sport Performance
 - Bladder, Bowel, & Beyond: Women's Health in Para Sport
 - Athlete Panel: Balancing Disability, Sport & Motherhood - Tips, Tricks, & Lessons Learned
 - Mental Performance & Mental Health in Women's Disability Sport
 - Nutrition Needs for Female Para Athletes
 - Funding Opportunities for Para Sport – Grant & Sponsorship Tips

Agenda

- Nutrition considerations for energy, protein, fibre, and fluid requirements
- Nutrients of Concern
- Relative Energy Deficiency in Sport (RED-S)
- Managing Energy Availability
- Summary & Questions

“What”

“So What”

“Now What”



Disclaimer




- Most nutrition research on able-bodied individuals and athletes; only some on sedentary individuals with SCI, and minimal on para-athletes as a whole
- **Important to tailor general sport nutrition recommendations to own needs**
 - Ex. kidney disease may require renal diet (restricted fluids, protein, Na, K, Phos)
 - May need to work individually with a specialized renal (or other) dietitian, to ensure both health and performance goals are being met



Nutrition Considerations

Energy, Protein, Fibre, Fluids

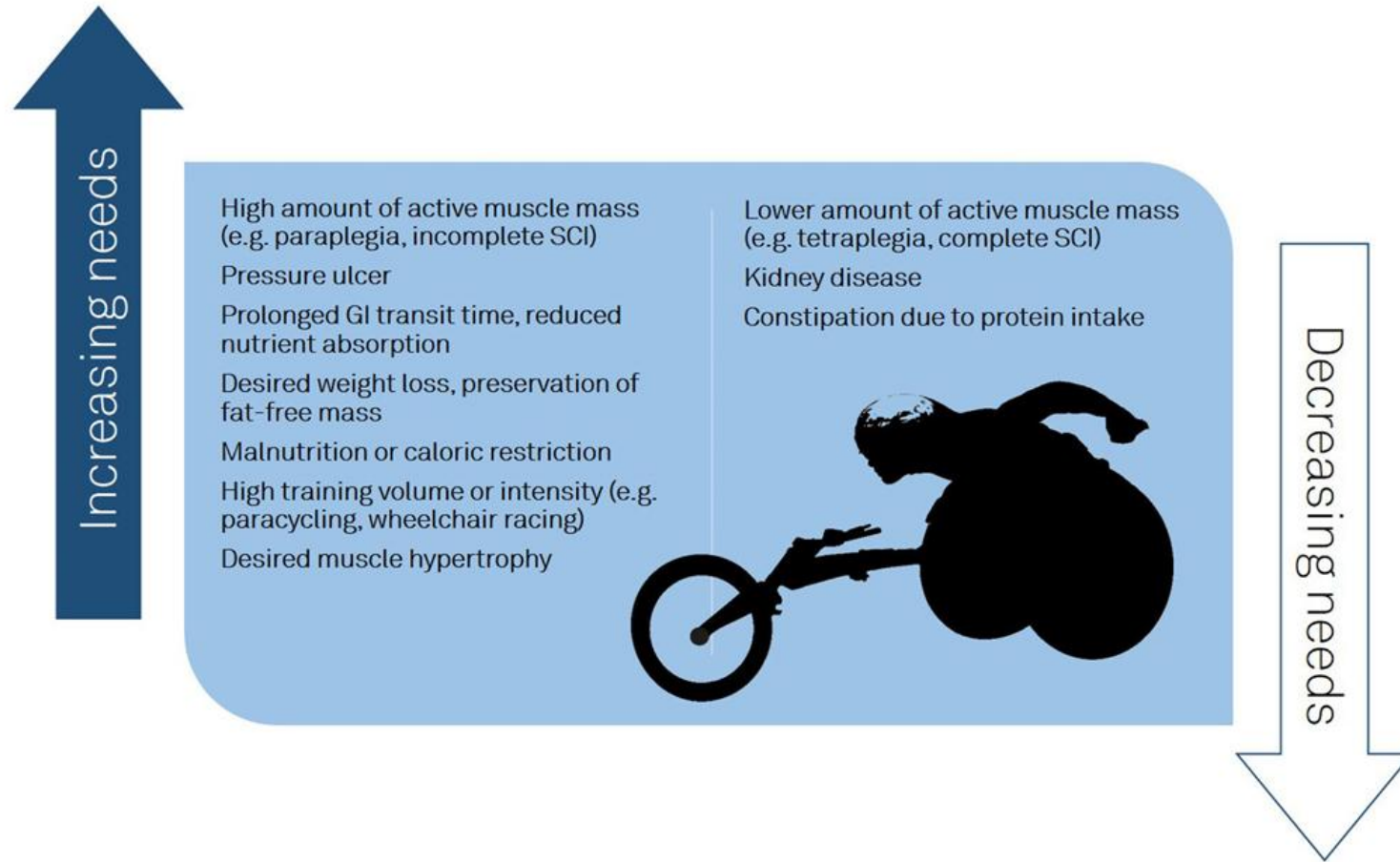
Energy

- **SCI-athletes** have  energy needs than able-bodied athletes, but  energy needs than sedentary able-bodied individuals
 - Variance related to level of injury and complete vs. incomplete (e.g., higher level, complete injury = less energy needed at rest)
- SCI-athletes also have  energy expenditure than able-bodied athletes
 - Greatest energy expenditure reduction in athletes with tetraplegia or those participating in more static wheelchair sports (e.g., rugby 75% less, tennis 50% less, basketball 25% less)
- RMR and energy cost during structured exercise may be lower in SCI-athletes, but energy cost of activities of daily living is often higher
- **For amputation / CP**, energy needs may be similar to or exceed able-bodied estimates
 - Greater tissue loss = lower RMR but +++ energy expenditure when ambulating with prosthetics
 - Movement inefficiencies d/t muscle stiffness/spasticity/involuntary movements, all increase needs

Protein

Variable Protein Needs

- **Minimum recommendation:** 1.2 g/kg/d (similar to able-bodied athletes)



Fibre



Neurogenic bowel → goal to improve stool frequency / consistency, without causing constipation / incontinence

- Gradually increase fibre to **minimum 15-20 g/d** (AB female recommendation: 25 g/d)
- Balance both soluble & insoluble fibre (most fibre foods have both)
 - *Soluble*: dissolve in water, helps thicken stool (↓ diarrhea / incontinence)
 - *Insoluble*: do not dissolve in water, helps move stool through (↓ constipation)

Swallowing dysfunction can be an additional GI-related concern for **CP** - impacts feeding tolerance and ability to meet energy needs

- Focus: texture modification, energy-dense foods

GI function and nutrient absorption for **amputees** is similar to able-bodied athletes

- Focus: accurate energy estimation, body composition

Fluids

↑ Heat exhaustion / heat stroke due to ↓ sweat rate / impaired thermoregulation

- Nervous system disruption and / or less skin surface area to dissipate heat
- Underhydration and UTI's common due to reduced urination frequency, pain / discomfort, catheter use

Minimum Target: 1.5-2.0 L/d

- Will need more as you increase fibre intake or constipation can worsen



Nutrients of Concern




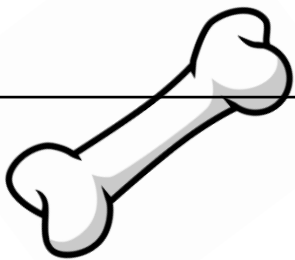
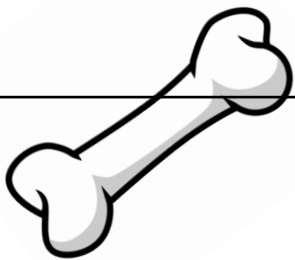
risk of deficiencies due to lowered overall intake, altered GI function / absorption



risk for vitamin D deficiency due to skin protection / staying indoors (impaired thermoregulation)



risk of low BMD due to vitamin D deficiency and less weight-bearing activities / impact forces

Nutrient	Sources	Tips
<p>Iron</p> 	<p><i>Best:</i> iron from animal sources is more bioavailable (e.g., meat, poultry, fish, shellfish, eggs)</p> <p><i>Good:</i> iron from plant-based foods are harder to absorb (e.g., legumes, dark greens, nuts/seeds, enriched grains)</p>	<ul style="list-style-type: none"> - Regular bloodwork (at least 1-2x/yr) - Pair with vit C (fruit/veg) to increase absorption - Cook leafy greens (reduces oxalates) - Wait 1-2 hrs after a meal to drink tea/coffee or take calcium supplements (tannins, polyphenols, and calcium all reduce iron absorption)
<p>Vitamin D</p> 	<p><i>Best:</i> sun exposure to bare skin if possible</p> <p><i>Good:</i> fish, fortified milks/yogurts, fortified juices, skim milk powder, eggs</p>	<ul style="list-style-type: none"> - Supplement with at least 1000 IU/d Sept-May - May need higher doses but consult doctor / RD
<p>Calcium</p> 	<p><i>Best:</i> animal and plant-based milks, hard cheeses (cheddar, gouda, mozzarella, swiss), plain yogurt, ricotta cheese, calcium-set tofu (firm vs. silken)</p> <p><i>Good:</i> flavoured yogurt, camembert / feta / parmesan cheese, salmon / sardines with bones</p>	<ul style="list-style-type: none"> - Calcium is most easily absorbed through milk products. Aim for 2-4 servings of dairy daily. - Vegetables contain compounds that lower how much calcium your body can absorb

Relative Energy Deficiency in Sport (RED-S)

Causes & Consequences of Low Energy Availability

Energy Availability

Energy Availability (EA): The amount of dietary energy leftover for essential functions after accounting for the energy expended during training.

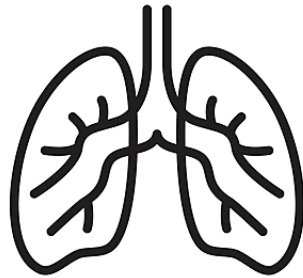
Low Energy Availability (LEA): When the amount of dietary energy leftover is too low.



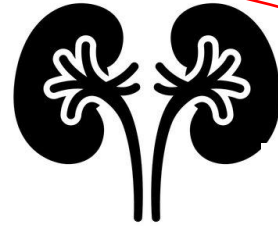
Brain



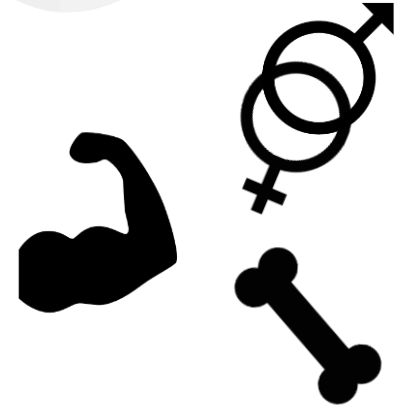
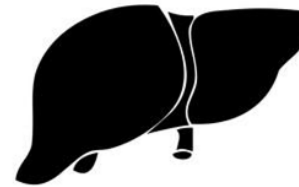
Heart



Lungs



Kidneys & Liver



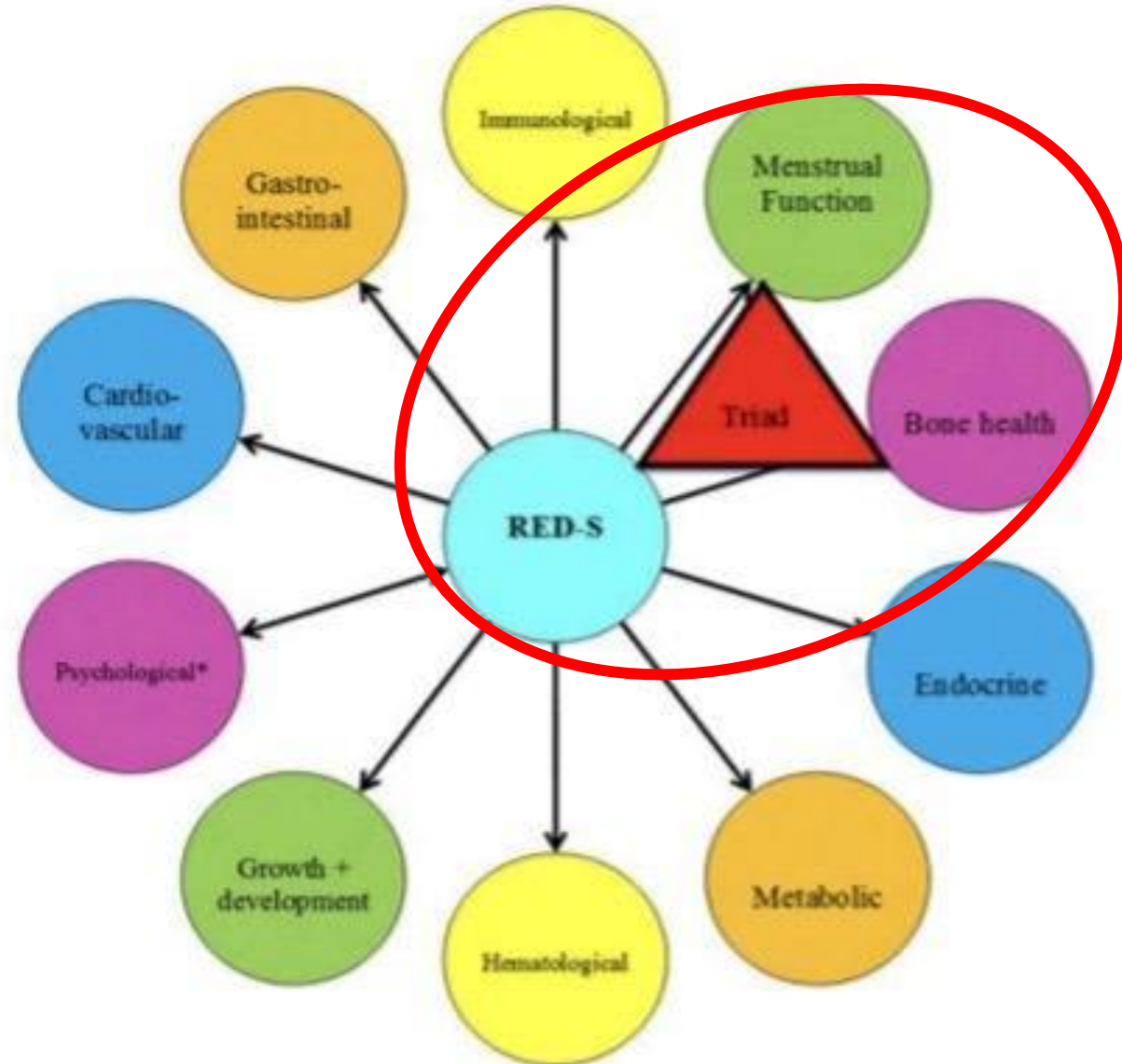
Other

Causes of LEA

Intentional Restriction	Unintentional Restriction
<ul style="list-style-type: none">• To make weight for competition	<ul style="list-style-type: none">• Inadequate nutrition knowledge
<ul style="list-style-type: none">• To modify body composition	<ul style="list-style-type: none">• New / heavy training blocks
	<ul style="list-style-type: none">• Junior athletes moving to senior programs
	<ul style="list-style-type: none">• Travel
	<ul style="list-style-type: none">• Illness

Consequences of LEA

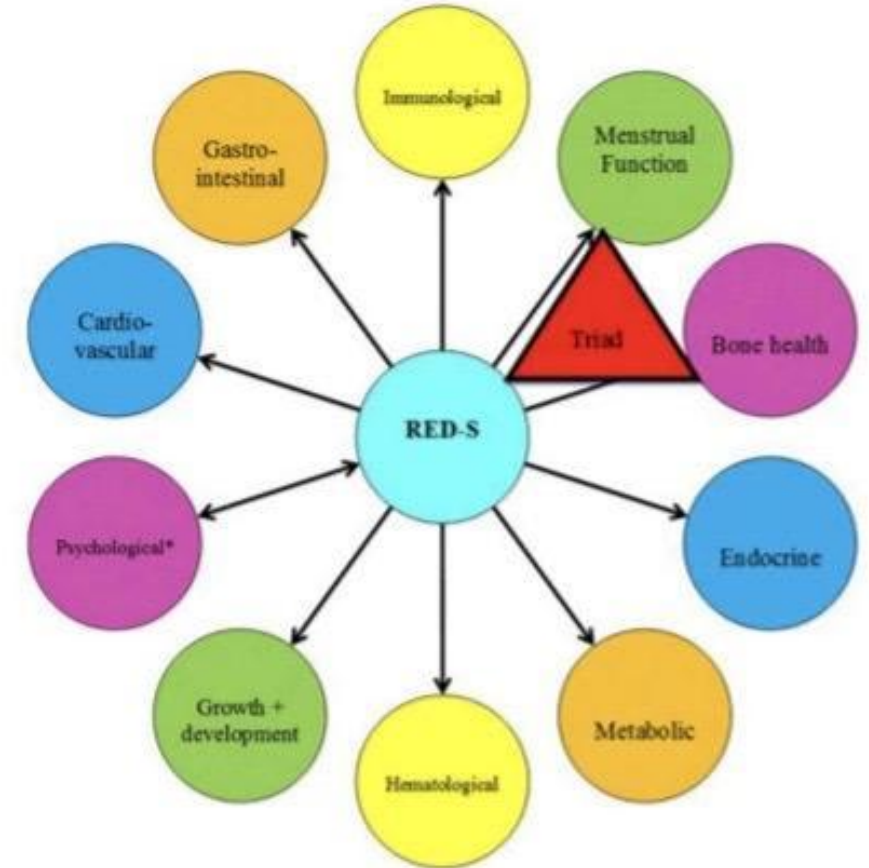
- Chronic / Severe LEA → RED-S
- **RED-S = Relative Energy Deficiency in Sport** (formerly *The Female Athlete Triad*)
 - Both males and females at risk
 - Consequences to all body systems



Consequences – Health

RED-S can cause **poor health** due to higher risk of:

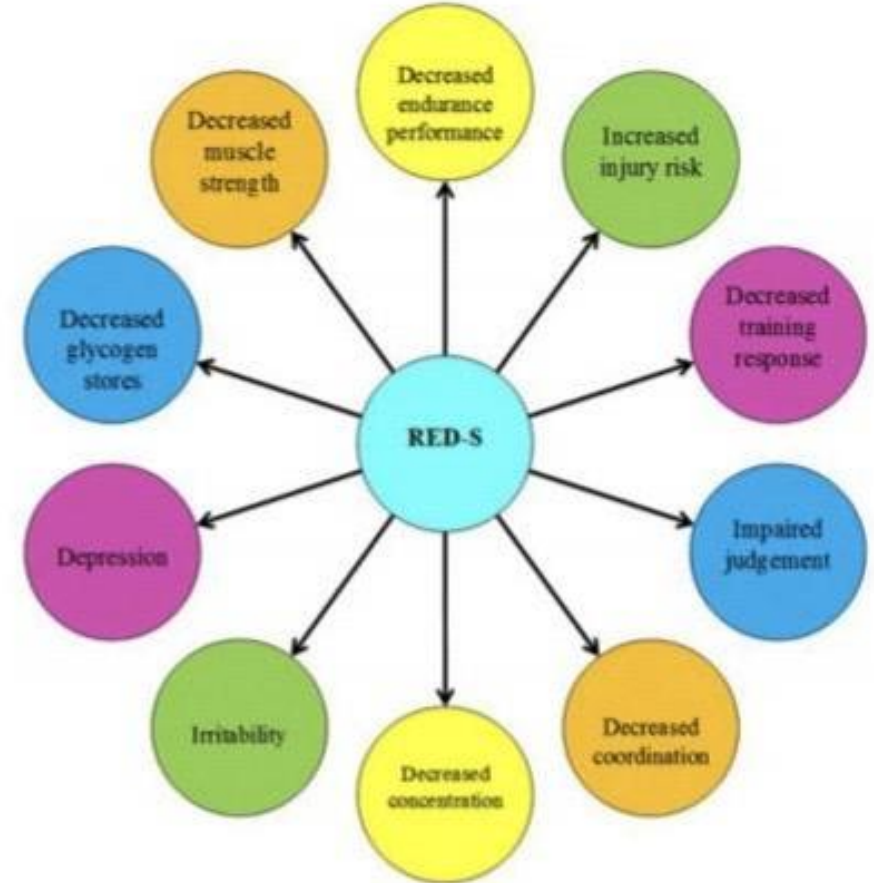
- Injury
- Illness
- Low mood or depression
- Poor reproductive health
- Reduced bone quality
- Low iron status
- GI upset



Consequences – Performance

RED-S can cause **poor performance** due to lower:

- Energy levels
- Focus and concentration
- Muscle strength
- Glycogen storage
- Endurance capacity
- Adaptation to training

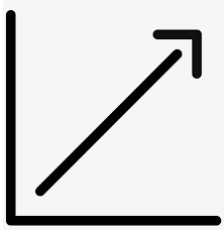


Signs & Symptoms of LEA

1. Do I feel tired all of the time, even when obtaining adequate sleep?
2. Am I excessively sore and feeling like I can't quite recover between training sessions?
3. Is my performance failing to improve at the rate my coaches and myself are expecting?
4. Is my mood often low and / or fluctuating?
5. Have I had reoccurring injuries in the past year?
6. Am I frequently ill or sick?
7. Are my iron stores low?
8. Have I experienced stress fractures?
9. **Females:** Is my menstrual cycle irregular, lighter / heavier than normal, or absent?



5 Tips for Managing Energy



1. Eat to match training volume



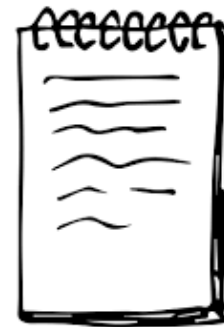
2. Eat every 2-4 hours



3. Eat around training / competition



4. Adopt an 'all
foods fit' approach



5. Plan ahead

Managing Energy Availability – Part 1

Fueling Day-to-Day

The Macronutrients

Carbohydrates



Protein



Fat



Water



All Macronutrients are Important!

There is no hierarchy of importance in the macronutrients; all are critically important and fulfill necessary biological functions.

- ✓ Carbohydrates are our body's main source of fuel
- ✓ Protein is needed to help with growth/repair of cells/tissues
- ✓ Fat is needed for energy reserves, insulation/protection of organs, & absorption of fat-soluble vitamins (A, D, E, K)
- ✓ Water helps with lubrication, digestion, flushing of waste, and body temperature

Balanced Meals

Canada's food guide

Food guide snapshot



Easy/No Training Day

Whole Grains

Vegetables

Lean Protein

FATS - 2 tsp.

- Oils
- Avocado
- Mayonnaise
- Nuts, seeds
- Butter
- Margarine

FLAVOURS

- Salt, pepper
- Herbs, spices
- Vinegar
- Salsa
- Mustard

Balanced Meals

Training Day



The Athlete Plate for a Training Day is a circular diagram divided into four quadrants: Whole Grains (top), Vegetables (right), Lean Protein (bottom), and Fats (left). It is surrounded by icons for water, coffee, fruit, and dairy. To the right, a list of fats and flavours is provided.

FATS - 1 tbsp.
 Oils
 Avocado
 Mayonnaise
 Nuts, seeds
 Butter
 Margarine

FLAVOURS
 Salt, pepper
 Herbs, spices
 Vinegar
 Salsa
 Mustard

Hard Training Day



The Athlete Plate for a Hard Training Day is a circular diagram divided into four quadrants: Whole Grains (top), Vegetables (right), Lean Protein (bottom), and Fats (left). It is surrounded by icons for water, coffee, fruit, and dairy. To the right, a list of fats and flavours is provided.

FATS - 2 tbsp.
 Oils
 Avocado
 Mayonnaise
 Nuts, seeds
 Butter
 Margarine

FLAVOURS
 Salt, pepper
 Herbs, spices
 Vinegar
 Salsa
 Mustard

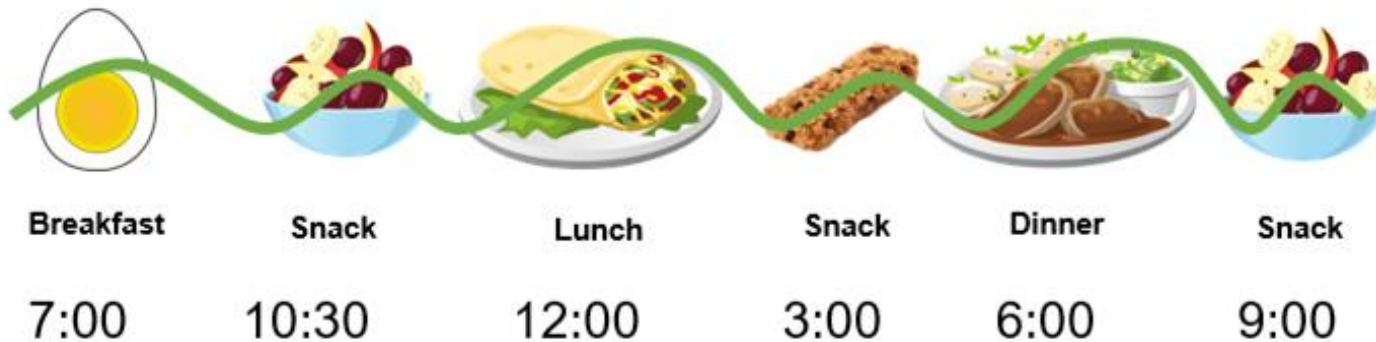
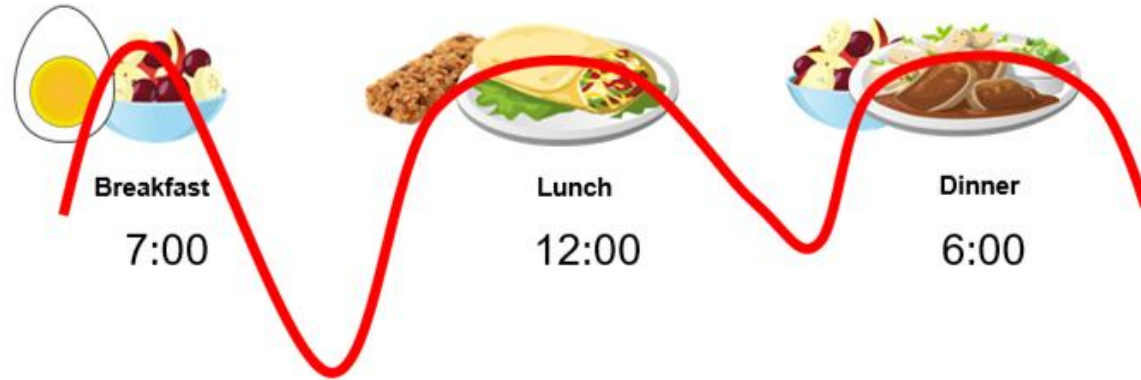
Utilize the 'Athlete Plates' to eat to match our training volume!

Recognize that more training, requires more energy (carbs + fat)!

Meal Timing

Avoid going longer than 4 hours without eating. Eating consistently throughout the day (e.g., every 2-4 hours) helps stabilize energy levels which is **optimal for health and performance.**

Smaller more frequent meals can also help with symptoms caused by **delayed gastric emptying!**



Balanced Snacks

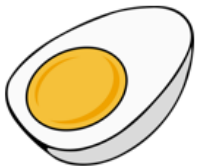
Aim to eat ~4-6 times a day (e.g., 3 meals and 1-3 snacks). **Balanced snacks combine carbohydrate** (for quick energy) **and protein** (for lasting energy).



Carbs



Protein



➔ **Quick Energy**

➔ **Slow Energy**

Examples:

- Fruit + Cheese
- Veggies + Hummus
- Crackers + Tuna
- Dried Fruit + Nuts
- Berries + Greek Yogurt
- Banana + Nut Butter
- Cereal / Oatmeal + Milk

Hydration

3%

The level of dehydration that causes you to sense *thirst*

2%

The level of dehydration which can decrease performance by 10%



All Foods Fit!

Eat to nourish the **BODY**

- Prioritize whole foods
- Limit saturated / trans fats and refined sugars

Eat to nourish the **SOUL**

- Food is meant to be enjoyed and celebrated
- Enjoy processed foods in moderation
 - *Nutrition by Addition*

Practice eating in a **balanced but flexible** way to boost both **physical and mental health**.

Weight is **NOT** an indicator of health OR performance!



“
The only foods that you should avoid are the ones that you're allergic to, intolerant to, or are under seasoned.”

Weight Management

Key Takeaways for Weight Management in Para Sport

1 Smaller margin = smaller cuts

- ✓ Use 5–10% reductions
- ✓ 100–250 kcal/day for most
- ✓ Avoid aggressive deficits



2 Protect performance

- ✓ Fuel moderate & hard training days
- ✓ Keep carbs around workouts
- ✓ Keep protein consistent



3 Monitor the right metrics

- ✓ Energy
- ✓ Mood
- ✓ Training output
- ✓ Recovery
- ✓ Not just the scale



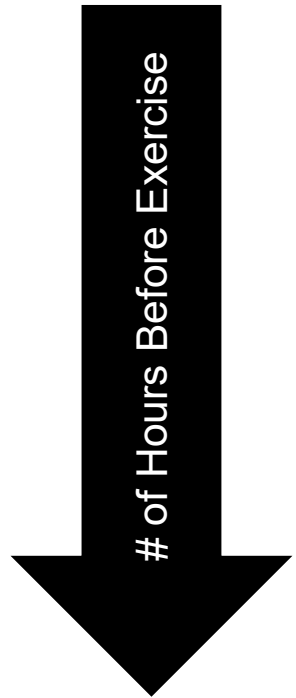
Smaller. | Slower. | Safer.

Managing Energy Availability – Part 2

Fueling Around Training / Competition

Pre-Workout Nutrition

The 321 Rule:



3

Carbs + Protein + Fat + Fiber

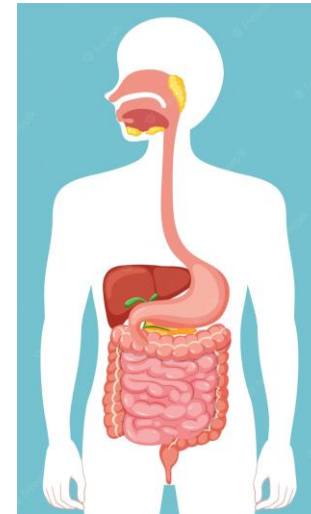
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Carbs + Protein

1

Carbs

What and how much you should eat before training / competition **depends on how long you have to digest!**



FAT: 4-9h

PRO: 2-5h

CHO: <2h

Pre-Workout Nutrition

3 Hours Before

A Full Meal:

- Chicken fajitas
- Beef/Tofu noodle bowl with vegetables
- Protein Pancakes with Greek yogurt and fruit
- Baked salmon with coconut rice and roasted broccoli

2 Hours Before

A Balanced Snack:

- Toast with peanut butter
- Cheese and crackers
- Breakfast sandwich
- Oatmeal made with milk and fruit
- Pita and hummus
- Trail mix

1 Hour Before

A Carb-Rich Snack:

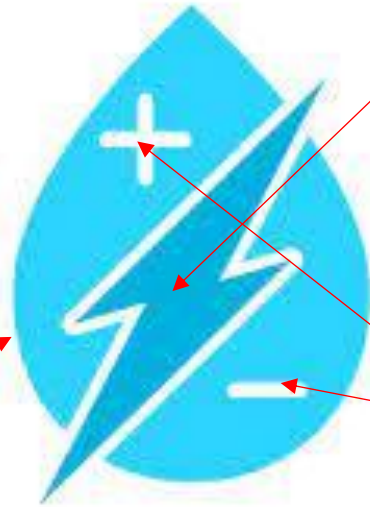
- Banana
- Apple sauce
- Pretzels
- Plain granola bar
- Plain crackers / cookies
- Sport drink
- Fruit leather
- Dried fruit

During Workout Nutrition

During exercise, we lose / use up:

2. Water

Athletes lose water through sweat more quickly than consumed fluids can be absorbed. The goal is to drink enough to avoid reaching a critical state of underhydration. **Consume fluids at least every 10-15 min to avoid thirst.**



1. Carbs

The body only stores **~90 min** worth of carbohydrate energy (glycogen), so you'll need to top up during training / competitions lasting longer than **60 min!**

3. Electrolytes (mainly sodium)

Athletes also lose electrolytes through sweat. The natural electrolytes in meals/snacks can help you retain fluid. This means better hydration and less bathroom breaks!

During Workout Nutrition

Session Duration / Intensity	Carbohydrate Needs	Example
45-60 min / Low Intensity	None, or small amounts	Water only, or bites of banana or bar
1-2.5 hours / High Intensity / Hot & Humid	30-60 g/h	Original Sport drink + bar
>2.5 hours	60-90 g/h	Original Sport drink + bar + 2-3 apple squeezes

1 choice = ~30g CHO



Post-Workout Nutrition

The 3 R's of Recovery:

Refuel

Rebuild

Rehydrate

Refuel

Include **carbohydrates** within **15-30 min** of exercise to help optimize refueling of muscle glycogen (sugar) stores.

Examples:



Minimum: 30 grams

Rebuild



Include **protein** within **1-hour** of exercise to help optimize rebuilding of cells and muscle repair.

*Similarly, mind your meds!

Examples:



Minimum: 20 grams



Rehydrate

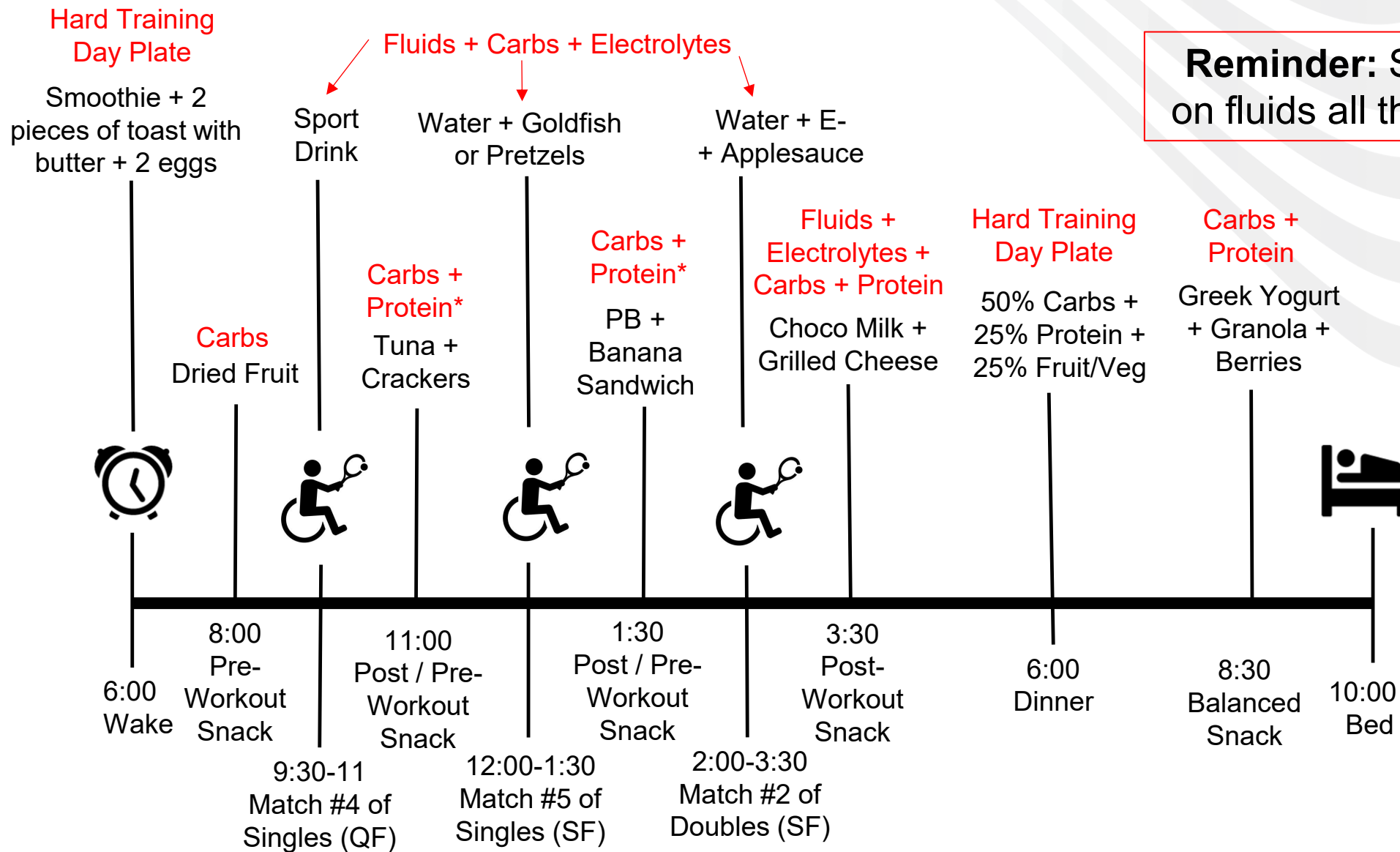
Replace **water and electrolytes** lost during activity.
Pair fluids with sodium-rich foods to help increase absorption.



Putting It All Together

Plan Ahead

Example (Multi-Match Day)



Reminder: Should be sipping on fluids all throughout the day!

Summary

- Eat to match your training volume (e.g., athlete plates)
- Eat every 2-4 hours (e.g., enjoy balanced snacks between meals)
- Minimize stomach upset with the 321 Rule
- Replace water, electrolytes, & carbs lost during exercise
- Recover optimally with the 3 R's of Recovery
- If using supplements, ensure they are 3rd party tested
- Plan ahead for practices, matches, tournaments, and travel!



Thank You!

Questions?



Next Session

Athlete Funding Opportunities in Para Sport: Grant & Sponsorship Tips

Presenters:

Lisa Myers, BCWSA Grant Manager & Program Consultant

Marissa Papaconstantinou, 3x Paralympian

April 8th, 2026