Sports nutrition – can supplements really give an edge?

Dr. Sharon Madigan PhD, MSc, FFSEM

Head of Performance Nutrition

Sport Ireland Institute

@madigan_sharon

Impact of Nutrition for athletes

Focus

- **Athlete wellness** – strong immunity, reduced risk of injury and fatigue
- **Athlete performance** – fuel to train and perform, delay fatigue, enhance recovery
- **Athlete rehabilitation** – optimal healing and recovery from injury

Performance Impact

- Less training and competitive time lost to illness
- Supports optimal physical adaptations from training programmes
- Accelerated return to training

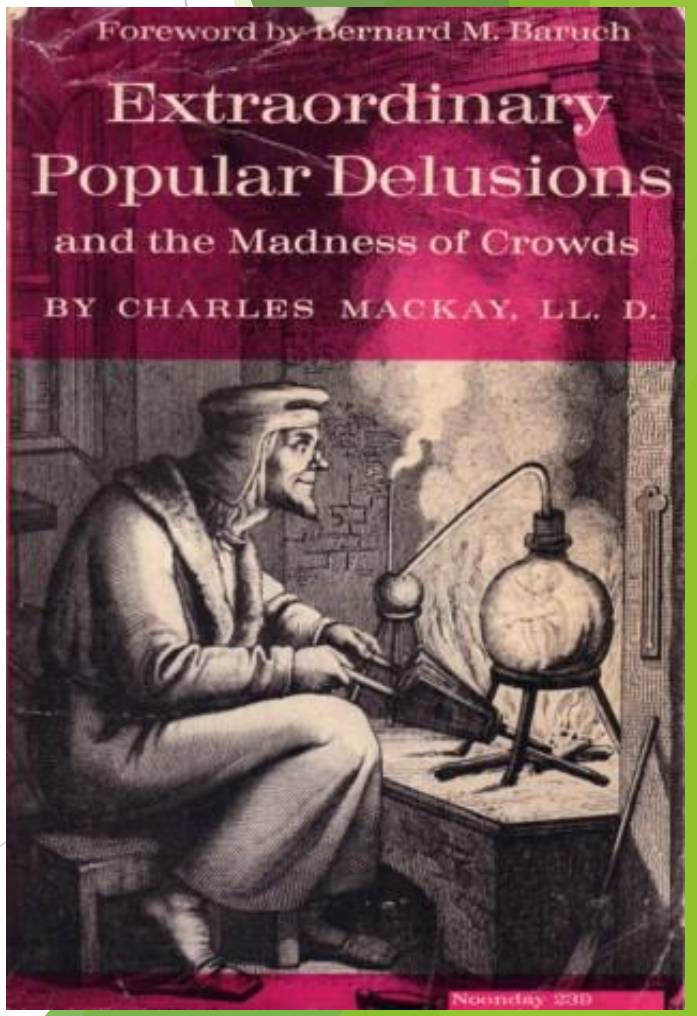
Sports Nutrition: Dr. Google……

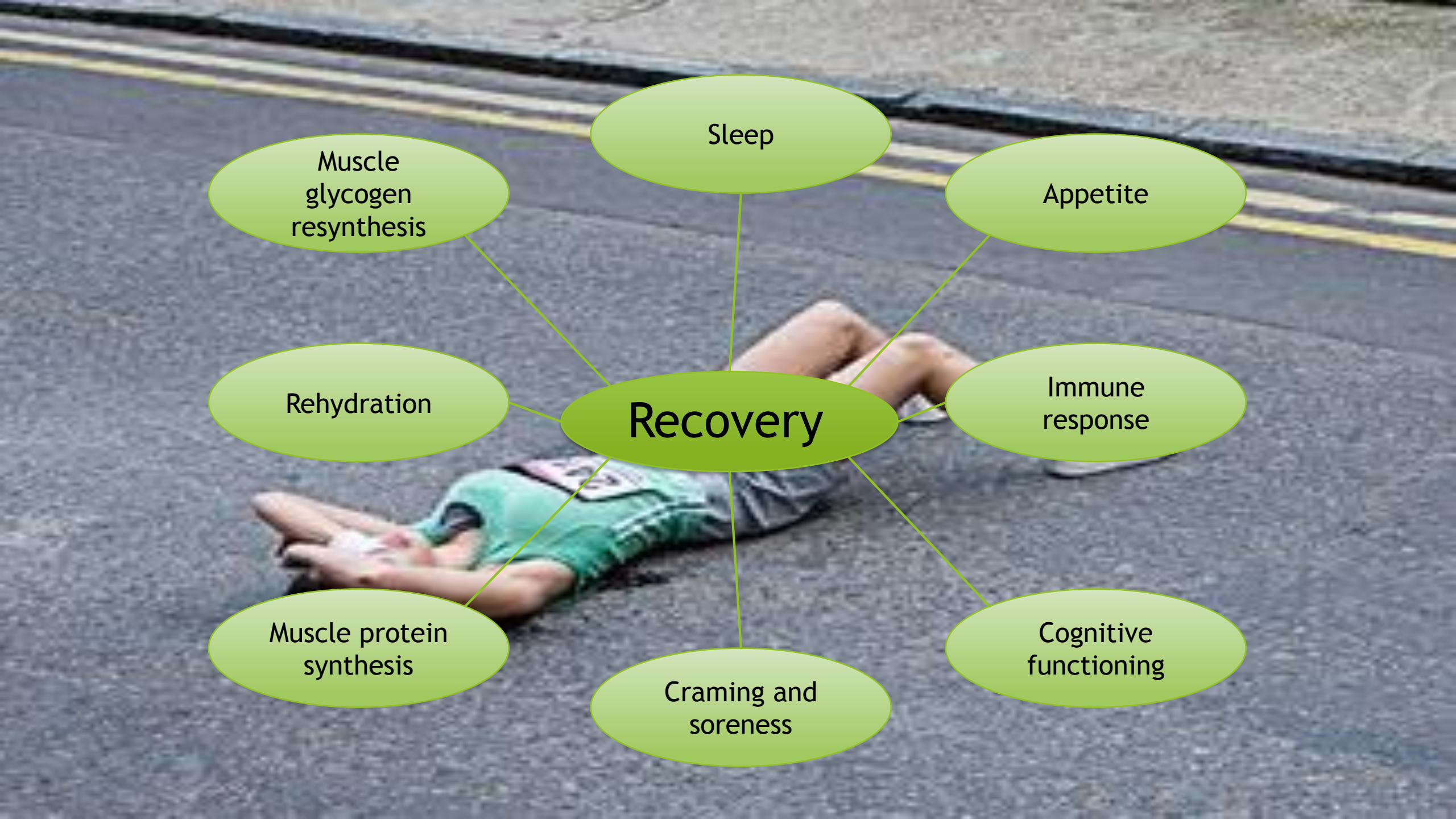
Navigation of the training and eating (fuelling) tightrope can be really difficult for athletes.

Gaps in education allow supplements to flourish

Athletes are consumers just like the general public….

- They get seduced by notions of what is healthy just like the general public
- They are financially linked to companies
- They are the n=1 which they want to share as it boosts profile in an environment that others find interesting.
- They have disordered eating behaviours : right / wrong / clean / dirty
- Fads and quick fixes
- Coaches and others who have a significant influence: telling them wrong things!
- Bandwagon is a great place to be
- Social v scientific proof
- Dr. Google




Sleep
Muscle glycogen resynthesis
Appetite
Rehydration
Recovery
Immune response
Muscle protein synthesis
Craming and soreness
Cognitive functioning

Lets take protein in the recovery piece……

498%

- Increase in products launched with High Protein Claims between 2010 and 2016 (GNPD, 2017) (Source, Board Bia)

Protein


SNICKERS
PROTEIN
18G


FULFIL
BARS, WITH BENEFITS
VITAMINS, WITH PROTEIN


Avonmore
Protein
Milk
50g


Avonmore
Protein
Milk
27g
VANILLA
EXTRA PROTEIN

Athletes are consumers just like the general public….

- “Sports Nutrition remains the fastest growing consumer health category for several years in a row”
- 47% of users consider Performance Nutrition products to be part of their “everyday” diet. (Mintel, 2017)
- “Now sports nutrition is muscling its way out of the weights room and into mass market retail”. (PwC, 2017)

Supplements

What is a supplement?

Any product that aims to ‘supplement’ your nutrition.

A lot of supplements are a waste of money and many lack the safety and efficacy to support their use

Consider supplements to be

Supplements should be considered the sprinkles to top your cake, if you don’t have the foundations of strong nutrition habits in place then the supplements will be of no benefit.

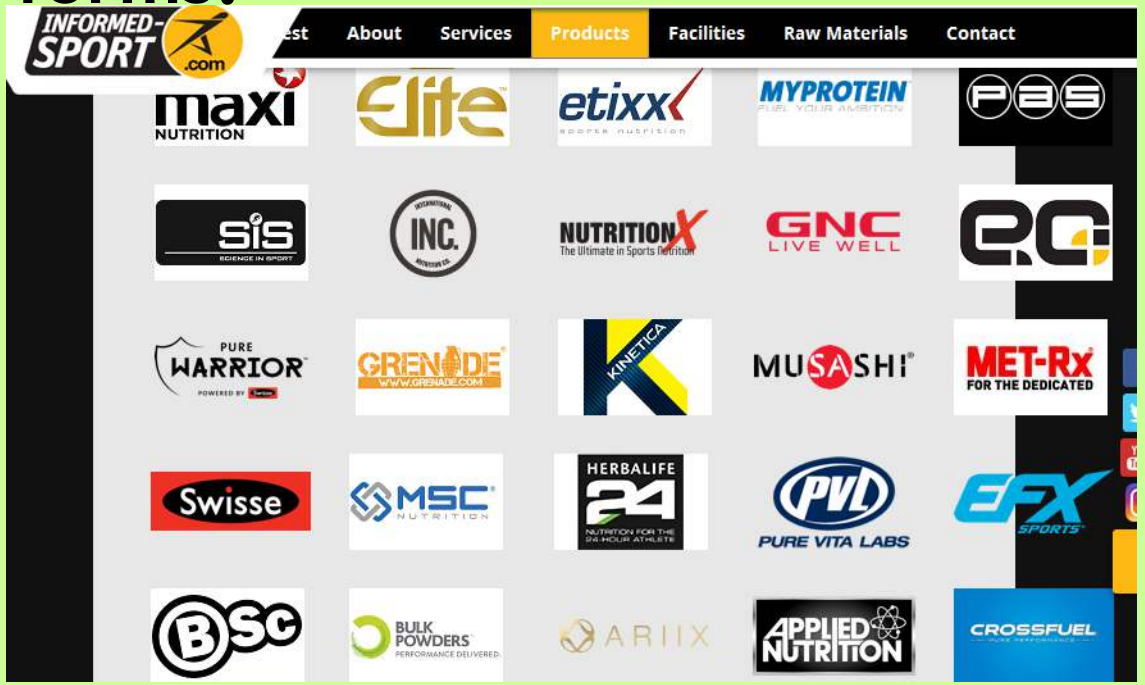
STRICT LIABILITY

The legal clause ‘strict liability’ means that an athlete is responsible for any and all substances that may appear in his or her urine or blood in a doping test.

What are sports supplements?

Sports supplements come in many forms:

- Normal foods
- Individual nutrients
- Sports drinks, bars etc
- Meal replacements
- Vitamins/Minerals
- Herbal products



Sports Supplement industry is not regulated

Why use supplements?

Reasons

- To benefit health
- To compensate for an inadequate diet
- To meet demands of hard training
- Because ‘team-mates’ take them
- Recommended by coach or other influential person
- To improve performance

Athletes want ‘the edge’

- Enhance energy supply
- Promote tissue growth and repair
- Promote immune function
- Maintain joint function
- Weight loss/fat loss
- Support quick recovery
- Central nervous system effects

Are supplements necessary?

Is ‘no’ the right answer?

- Not all athletes eat a varied diet
- Not all athletes have/need a high energy intake
- Diagnosed deficiency needs supplementation
- Some supplements may be useful in helping some athletes achieve their nutrition goals
- Some supplements do have properties when appropriately used will enhance performance in the right context.

What supplements are worth considering?

- The supplement must work in the context of the relevant sport – show some efficacy for use
- No adverse health effects
- Contain no banned substances

INFORMED-SPORT is a banned substance screening programme to test supplements and their ingredients for inadvertent contamination with substances prohibited by WADA

www.informed-sport.com

Creatine supplementation

- Variability in response – some non-responders
- Very popular with strength and speed sports

Creatine

Increases stores of creatine in the body for rapid energy reproduction (PCr).

Benefits

- ✓ Increased lean mass
- ✓ Greater muscle strength
- ✓ Improved high-intensity performance (30-150sec)
- ✓ Reduced oxidative damage
- ✓ Improved concentration in sleep deprived athletes
- ✓ Lower thermal strain (~1-2kg water retention)
- ✓ Enhanced glucose transport and storage

Timing

- ➢ None
- ➢ Combine with carbohydrates
- ➢ Can be good to link in with post-training recovery protocol
- ➢ If causing stomach upset then use warm water

Who?

- ➢ Track cycling and athletics
- ➢ Field based sports
- ➢ ?role in sports where risk of concussion (Dolan et al 2018).

Creatine

Increases stores of creatine in the body for rapid energy reproduction (PCr)

Dosage → **Loading** → **Maintenance Slow Loading**

Loading: 4x5g doses per day for 1 week

Maintenance Slow Loading: 3g per day (~1 tsp)

Concerns

- Contamination – banned substances or heavy metals
- Sickness – may cause GI distress (cramping, nausea, diarrhea, vomiting) – avoid trialing supplementation before competition

Sources

- Red meat
- Eggs
- Fish
- Creatine monohydrate

Buffering agents

- High rate of anaerobic metabolism results in increased lactic acid production and fall in pH
- Increasing buffering capacity should enhance performance where pH is limiting factor
- It is the H+ ion that is proposed to cause muscle fatigue, not lactate
- Muscle carnosine can act as an intracellular buffer (inside the muscle)
- Sodium bicarbonate ($NaHCO_3$) can act as an extracellular buffer (outside the muscle)

Beta-Alanine

Buffers the lactic acid by-products of exercise.

Benefits

- ✓ Prolonged performance through reduced fatigue
- ✓ Sustained high-intensity performance (1-7 mins)
- ✓ Greater repeated sprint performance
- ✓ Supports training load and high-intensity racing

Negatives

- ➢ Less effective in well-trained athletes
- ➢ Possible skin rashes & tingles

Timing

- ➢ Consume with meal (Carbs + Protein)
- ➢ If causing tingles then split dosage over day
- ➢ ALTERNATIVE: Sodium Bicarbonate (high risk)
- ➢ Trial in half dose, sipping

Who?

- ➢ Track cycling and athletics (sustained high intensity)
- ➢ Rowing
- ➢ Boxing and Judo

Beta-Alanine

Dosage → **Loading** → **Split Dose**

Loading

6-12 weeks

~3-6g per day

Split Dose

~3-6g per day

Split into 0.8-1.6g every 3-4 hours

Concerns

- Contamination – banned substances
- Sodium bicarbonate – can cause GI issues (half dose to trial)
- If kidney function is impaired, supplementation is not recommended

Sources

- Beta-alanine

Caffeine

Increases stimulation and focus.

Dosage → **Acute**

1-3mg/kg

~70-210mg for 70kg

Acute → **Trial in Training**

Withdraw and reintroduce before competition to maximise potential benefit

Concerns

- Contamination – banned substances
- Can disrupt sleep if taken late in the day
- Overstimulation can happen, always trial in training and only use for competition if it agrees with you
- GI issues (cramps, diarrhea) can be caused by supplementation

Sources

- Coffee – espresso
- Tea – trace amounts
- Energy drinks
- Gum
- Tablets
- Gels with Carbohydrates
- Pre-workout

Beetroot

Increases efficiency and reduces oxygen cost of exercise.

Benefits

- Greater blood flow which carries more oxygen to working muscle
- Reduced energy cost for power output
- Better energy production – in mitochondria
- Improvements in performance <40mins in duration
- Boost high-intensity, intermittent performance

Timing

- 2-3 hour pre-competition/training
- >3 days loading may be required in highly trained

Who?

- Endurance cyclists and athletics, rowers
- May benefit performance at high altitude

Probiotics

- No evidence that probiotic use directly enhances athletic performance
- May reduce sick days due to URTIs (Cox et al 2008, Gleeson et al 2011;2017)
- May reduce severity of symptoms of URTIs and GI upset (Cox et al 2008)
- May assist immune function in fatigued athletes (Clancy et al 2006, Nichols 2007)
- General health - useful in the treatment of gut disorders, effects of travel?

PRE-MENSTRUAL SYNDROME

DOES IT STOP YOU ACHIEVING YOUR SPORTING GOALS?

SPORT IRELAND INSTITUTE

Calling all female athletes across all sports, age 18+

Help our team of researchers based at the Sport Ireland Institute answer these important questions:

1. How common is PMS in athletes?
2. How does PMS effect training and performance?

Please go to the link to complete the survey (10-15mins to complete)

bit.ly/PMSstudy

Background

- Premenstrual syndrome (PMS) = mood, behavioural and physical changes which are limited to the two-week premenstrual phase[1,2]
- In athletes = believed to hamper performance
- Affects 30-40% of general population[3-6]
- Affects 8-42% of athletic population (greater prevalence in those competing at higher level)[2,7,8]

1. O'Brien, et al., 2011. Towards a consensus on diagnostic criteria, measurement and trial design of the premenstrual disorders: the ISPMD Montreal consensus. *Archives of women's mental health*, 14(1), pp.13–21.
2. Takeda, T., et al., 2015. Premenstrual Syndrome and Premenstrual Dysphoric Disorder in Japanese Collegiate Athletes. *Journal of paediatric and adolescent gynaecology*, 28(4), pp.215–218.
3. Andersch, B., wt al., 1986. Pre-menstrual complaints. I. Prevalence of pre-menstrual symptoms in a Swedish urban population. *Journal of psychosomatic obstetrics and gynaecology*, 5(1), pp.39–49.
4. Hallman, J., 1986. The pre-menstrual syndrome – an equivalent of depression? *Acta psychiatrica Scandinavica*, 73(4), pp.403–411.
5. Angst, J., et al., 2011. The epidemiology of perimenstrual psychological symptoms. *Acta psychiatrica scandinavica*, 104(2), pp.110–116.
6. Pearlstein, T., 2007. Prevalence, impact on morbidity, and disease burden. In P.M.S. O'Brien, A.J. Rapkin and P.T. Schmidt, eds. *The premenstrual syndromes: PMS and PMDD*. London, UK: Informa Healthcare, pp.37–47.
7. Czajkowska, M., et al., 2015. Menstrual Cycle and the Prevalence of Premenstrual Syndrome/Premenstrual Dysphoric Disorder in Adolescent Athletes. *Journal of paediatric and adolescent gynaecology*, 28(6), pp.492–498.
8. Heim, C., et al., 2000. Pituitary-adrenal and autonomic responses to stress in women after sexual and physical abuse in childhood. *Journal of the American medical association*, 284(5), pp.592–297.

Conventional treatments

- Pharmacologic[1-3]
  - Combined oral contraceptives
  - Gonadotropin releasing hormone analogues
  - Selective-serotonin reuptake inhibitors
  - Diuretics
  - Low dose-steroids
- Psychological interventions[6]
  - CBT
- Lifestyle[8]
  - Regular exercise
  - Adequate sleep hygiene
- Diet[4,5,7]
  - Calcium
  - Vitamins A and E
  - Pyridoxine
  - OMEGA-3 FA[9-11]

1. Lopez et al., 2008. Oral contraceptives containing drospirenone for premenstrual syndrome. *Cochrane database of systematic reviews* [Online], 1, (CD006586). Available from: http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD006586.pub4/epdf [Accessed 01/02/2017].

2. Marjoribanks et al., 2013. Selective serotonin reuptake inhibitors for premenstrual syndrome. *Cochrane database of systematic reviews* [Online], 6, (CD001396). Available from: http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD001396.pub3/epdf [Accessed 01/02/2017].

3. Green et al., 2017. Management of premenstrual syndrome: green-top guideline, No. 48. *BJOG: an international journal of obstetrics and gynaecology*, 124(3), pp.e73–105.

4. Thy-Jacobs et al., 1998. Calcium carbonate and the premenstrual syndrome: effects on premenstrual and menstrual symptoms. Premenstrual Syndrome Study Group. *American journal of obstetrics and gynaecology*, 179, (2), pp. 444–452.

5. Proctor and Murphy, 2001. Herbal and dietary therapies for primary and secondary dysmenorrhoea. *Cochrane database of systematic reviews* [Online], 2, (CD002124). Available from: http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD002124/epdf [Accessed 29/01/2017].

6. Stevinson and Ernst, 2001. Complementary/ alternative therapies for premenstrual syndrome: a systematic review of randomized controlled trials. *American journal of obstetrics and gynaecology*, 185(1), pp.227–235.

7. Kashanian et al., 2007. Pyridoxine (vitamin B6) therapy for premenstrual syndrome. *International journal of gynaecology and obstetrics*, 96(1), pp.43–44.

8. Ryu and Kim, 2015. Premenstrual syndrome: a mini review. *Maturitas*, 82(4), pp.436–440.

9. Sampalis et al., 2003. Evaluation of the effects of Neptune Krill Oil on the management of premenstrual syndrome and dysmenorrhea. *Alternative medicine review*, 8(2), pp.171–179.

10. Sohrabi et al., 2013. Evaluation of the effect of omega-3 fatty acids in the treatment of premenstrual syndrome: ‘‘a pilot trial’’. *Complementary therapies in medicine*, 21(3), pp.141–146.

11. Kheirkhah et al., 2016. Comparison of the effect of omega-3 fatty acids and perforan (Hypericum perforatum) on severity of premenstrual syndrome (PMS): a randomised trial. *International journal of medical research and health sciences*, 5(11), pp.333–340.

Potential role of Omega-3 FA?

- Omega-6 FA = release pro-inflammatory prostaglandins and leukotrienes[1-3]
- By reducing the inflammatory response can we achieve symptom management?

1. Alvin and Litt, 1982. Current status of etiology and management of dysmenorrhea in adolescence. *Pediatrics*, 70(4), pp.516–525.

2,. Koshikawa et al., 1992. Prostaglandins and premenstrual syndrome. *Prostaglandins, leukotrienes and essential fatty acids*, 45(1), pp.33–36.

3. Balbi et al., 2000. Influence of menstrual factors and dietary habits on menstrual pain in adolescence age. *European journal of obstetrics and gynaecology and reproductive biology*, 91(2), pp.143–148.

4. Chilton et al., 2017. Precision Nutrition and Omega-3 Polyunsaturated Fatty Acids: A Case for Personalized Supplementation Approaches for the Prevention and Management of Human Diseases. *Nutrients*, 9(11), E1165.

5. Hals et al., 2017. The time course of erythrocyte membrane fatty acid concentrations during and after treatment of non-human primates with increasing doses of an omega-3 rich phospholipid preparation derived from krill-oil. *Lipids in health and disease*, 16, article 16.

Athlete Case Study

- Very experienced athlete
- Unable to train consistently
- Keen to keep body fat low.
- Strength / endurance mix
- Frequently getting sick.
- ENT review with tonsillectomy due to ongoing recurring ear & throat symptoms
- Aim was to maximise training response for a peak in May of OG year and then again in games in Aug
- An integrated plan was put in place with service providers, the coach and athlete aimed at minimising the potential for injury, illness and under recovery in advance of a 2 month training camp (Aus /NZ)

DAY 2			
7.40 AM	GET UP		
8.00 AM	Water	250ml	
	USN Whey Protein	1 Scoop	
	Poliquin Complete Multi 2.0	2 Caps	
	Nordic Naturals Pro Omega D	2 Caps	
	Kiki Antioxidant Extreme	1 Cap	
	Muesli	1 Very small bowl	
	Milk	Enough for cereal	
	Orange Juice +	1 Small Glass	
	Jarrow Formulas Super Green Foods Green Defence Powder	1 Scoop/serve	
	Boiled Egg	1	
	Brown Wholegrain Roll	1 Small	
			9.00 AM Aerobic Loops
	Water sipped through session	400ml	80 mins inc warm up
10.30 AM	Water	250 ml	
	USN Whey Protein	1 Scoop	
	Lactobin N Colostrum	10g	
	White bread roll	1 small	
	Banana	1 small	
	Dried berries	small handful	
11.10 AM	Chocolate sweets - Kinder choc balls	4	
12.10 PM	Water	300ml	
	Brazil Nuts	5 or 6.	
12.45 PM	NAP for 50 mins.		
13.50 PM	Brown Wholegrain Seeded Roll	1	
	Boiled Egg	1	
	Sausage Pate	very small	
	Muller milk Cocunut Milk Drink	400 ml	
2.40 PM	Caffeine Gum	1 Piece	
	Water	200 ml	
			2.50 PM Technique Training
			100mins inc warm up
4.40 PM	Water	250 ml	
	USN Whey Protein	1 scoop	
	Banana	1	
	Dried berries	handful	
6.30 PM	Salted wholegrain Pretzel st (snacking for 1 hour)	90 grams	
			7.20 PM Physio Exercises
			40 mins
	Shower - Armband off.		
8.30 PM	Vietnamese Curry with Vegtables + Beef	normal dinner size	
	Boiled Rice	Cupful	
	Apfelschorle -(55% Apple Juice 45 % mineral water)	400 ml	
10.45 PM	Poliquin Uber Lysine	2 Caps	
11.00 PM	IN BED		

What changes occurred due to integrated involvement of MDT?

- No days lost to illness/injury, historically days lost at this camp were generally >10days
- Skinfold reduction even when CHO intakes increased
- Improvement in education around nutrition and the added benefits and also reduction in overall supplement usage

NUTRITION	1. Focus on recovery to minimise the effects of training and prevent fatigue. 2. Ensured that calorie intake matched output on heavy training days. Ensured that specific nutrient intake was sufficient (NB. CHO) 3. Stick with USN supplement products which are tested and reduces the risk of possible contamination.
PHYSIOLOGY	1. Testing on water and in lab pre and post camp 2. Coach trained to monitor lactate and feedback on sessions 3. Daily monitoring based on RPEs, sleep, mood etc. 4. Regular communication with coach and athlete during trip
PSYCHOLOGY	1. Athlete maintained close contact with psychologist and agreed goals were worked on 2. MDT fed in to psychologist as necessary

Athlete example:

- Average 3 training sessions in a 15hr period.
- Could do 5 in a 30hr period.
- Habitual low ferritin
- uRTI history
- Injury

- Sample of pre intakes and post food intakes

Breakfast	Calories	Carbs	Fat	Protein	Sodium	Sugar
Flahavan's Irish - Porridge Oats 30 g, 60 g	232	0	0	0	0	0
Bee Products Active - *Manuka Honey, 1 tbsp=30 g	102	25	0	0	5	25
Raspberries - Raw, 1 cup	64	15	1	1	1	5
Quick Tools	398	40	1	1	6	30
Lunch						
Homemade - Chicken Curry With White Rice, 1 plate	577	69	13	36	44	14
Bread - Spelt Bread, 2 slice	106	18	3	3	183	1
Quick Tools	683	87	16	39	227	15
Dinner						
Chicken - Breast, meat and skin, cooked, roasted, 1 cup, chopped or diced	276	0	11	42	99	0
Potatos - Roast -, 1 cup	189	25	9	3	128	1
Homemade - Roasted Winter Vegtables - Squash, Parsnip, Turnip, Carrots, Sweet Potatoe, Olive Oil and Parsley, 1 cup	189	30	7	3	490	0
Quick Tools	654	55	27	48	717	1
Snacks						
Lidl Fin Carre - Whole Nut and Fruit Chocolate, 25 g	142	12	9	2	30	11
Wholebake - 9 Bar Pumpkin (40g Bar), 40 g	204	11	14	9	0	9
Fruit - Banana, 126 g	110	30	0	1	1	19
Quick Tools	456	53	23	12	31	39
Totals	**2,191**	**235**	**67**	**100**	**981**	**85**
bingobingo80 Daily Goal	**3,795**	**521**	**126**	**142**	**2,500**	**77**

Breakfast

	Calories	Carbs	Fat	Protein	Sodium	Sugar
Kinetica - Oat Gain (Correct Info), 160 G	620	78	14	47	0	6
Flahavan's Irish - Porridge Oats 30 g, 60 g	232	0	0	0	0	0
Linwoods - Flaxseed, Milled, Cocoa & Berries, 100 g	455	4	39	22	30	4
Raspberries - Raw, 1 cup	64	15	1	1	1	5
Bee Products Active - *Manuka Honey, 1 tbsp=30 g	102	25	0	0	5	25
Tesco - Ground Cinnamon, 1 tsp	6	0	0	0	0	0
Cereal - Granola, 1/2 cup	280	36	14	6	0	12
Vitasoy - Rice Milk, 250 ml	125	24	3	1	162	15
Quick Tools	**1,884**	**182**	**71**	**77**	**198**	**67**

Lunch

Quick Tools

Dinner

Generic - Parmesan Chicken Filet, 1 Filet	270	8	13	31	340	0
Fresh Garlic - Garlic Clove, 2 Medium Clove (4g)	8	2	0	0	0	0
Maille - Whole Grain Mustard, 1 tsp, 5mL	10	0	0	0	100	0
Cream - Half and half, 100 g	130	4	12	3	41	0
Quick Tools	**418**	**14**	**25**	**34**	**481**	**0**

Snacks

Marks & Spencer - Mango Madness, 280 g	170	38	1	2	0	37	
Nature Valley - Sweet and Nutty Peanut, 1 Bar (30g)	148	15	8	4	100	9	
Belvita Breakfast - Wholegrain Breakfast Biscuit - Milk & Cereals, 4 biscuits	224	34	8	4	76	8	
Oc - Rice Cakes, 2 Cake	60	13	0	1	66	0	
M&S - Sour Cream & Black Pepper Wholegrain Snacks, 1 bag	290	34	15	5	0	4	
New York Bakery Co - Wholemeal Bagel, 100 g	248	41	3	12	400	5	
Sabroso - Serrano Ham Slices, 300 g	615	0	27	93	3,000	0	
Generic - Rocket Salad, 100 g	25	4	1	3	27	0	
Store Bought - Advocado, 150 g	240	13	22	3	11	1	
Hummus - Home prepared, 200 g	354	40	17	10	484	1	
Dubliner - Irish Cheese Slices, 40 g	158	0	12	10	320	0	
Tropicana.1 - Smooth Orange Juice - Pulp Free 250ml, 250 ml	120	25	0	2	0	25	
Quick Tools	2,652	257	114	149	4,484	90	

Totals	**4,954**	**453**	**210**	**260**	**5,163**	**157**
bingobingo80 Daily Goal	**2,430**	**334**	**81**	**91**	**2,500**	**49**
Remaining	**-2,524**	**-119**	**-129**	**-169**	**-2,663**	**-108**

Athlete Case

- **Background**
- Gets sick during winter months when training load increases
- When Skinfolds dropped she got sick
- Loss of days to sickness affecting consistency in training
- Significant physiological monitoring present but nutrition input started April 2017

Female Rower

Characteristics & anthropometrics

- Height: 1.80
- Weight: 76kg morning weight
- BF%: 20%

Biochemistry

Ferritin : 38

Cholesterol : 5.8

WCC: Low

Female Rower

Dietary recall (Training day)

Breakfast	**Muesli** **Weetabix during week**
10 am	Sandwich x2 ham and cheese Glenisk x1 Apple & banana Fruit bowl- berries, grapes, cucumber
After first session	Weetabix x8 & Milk
Lunch and dinner	Pasta and bolognaise
Before training	Belvita Apple & banana
After training	Porridge and fruit (very large bowl)
Before cycle	Apple & banana
After cycle	1000mls protein shake (50g scoop) with milk Muesli

Nutritional analysis
Energy: ~2800-3500 kcal

Weekly Training

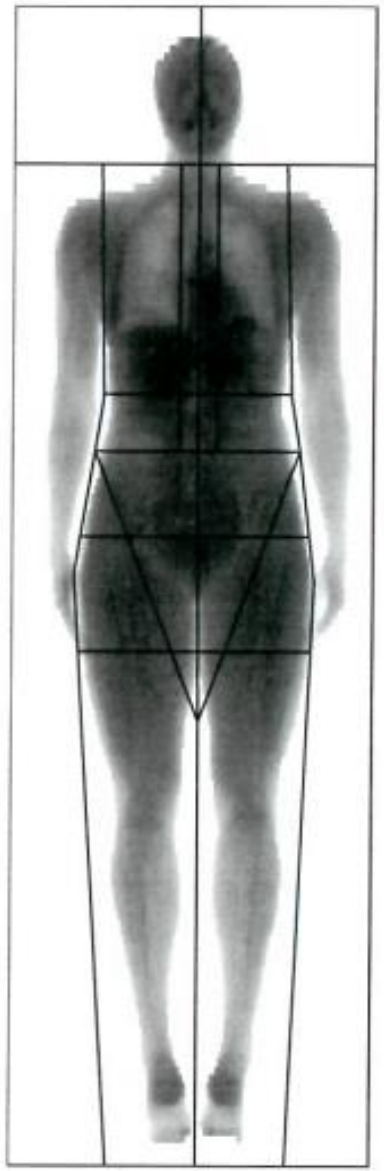
SPORT IRELAND INSTITUTE

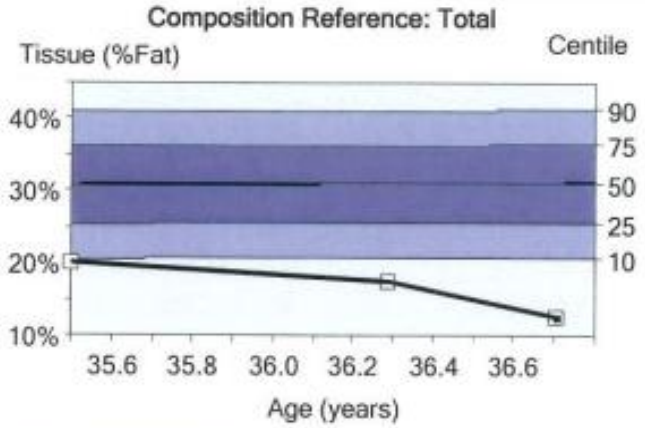
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
8 am		2hrs water (med intensity)	2hrs water (med intensity)	2hrs water (med intensity)	2hrs water (med intensity)	90mins water 90mins stat bike	2hrs water
10 am 12pm		Weights (60mins)	Weights (60mins)	90mins water session	Stat Bike (60mins)		12k Erg (60mins)
2 pm					12k on water (60mins)		
8.30-10.30 pm	Reformer class 45mins		Reformer class (60mins)				

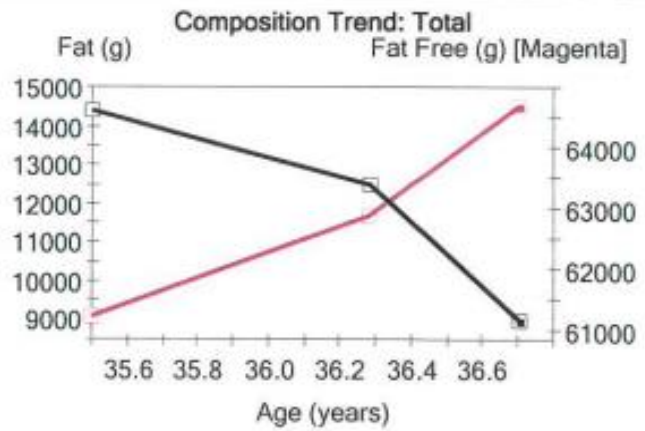
Outcomes

- Blood monitoring showed improvements in all areas
- No days lost to sickness so consistency in training
- Changes in body composition
- Improvements in performance
- Confidence in the process

Total Body Tissue Quantitation







Trend: Total (Basic Analysis)

Measured Date	Age (years)	Tissue[1] (%Fat)	Centile[2,3]	Total Mass (kg)	Region (%Fat)	Tissue[1] (g)	Fat[1] (g)	Lean[1] (g)	BMC (g)	Fat Free (g)
03/09/2018	36.7	12.7	1	73.6	12.2	70,322	8,962	61,359	3,328	64,687
04/04/2018	36.2	17.3	4	75.3	16.5	71,961	12,467	59,494	3,388	62,881
21/06/2017	35.5	20.0	9	75.6	19.1	72,247	14,419	57,827	3,397	61,224

Trend: Fat Distribution (Basic Analysis)

Measured Date	Age (years)	Android (%Fat)	Gynoid (%Fat)	A/G Ratio	Total Body[1] (%Fat)
03/09/2018	36.7	9.5	20.8	0.46	12.7
04/04/2018	36.2	17.8	25.1	0.71	17.3
21/06/2017	35.5	19.6	29.2	0.67	20.0

In what context were supplements key here?

- These are time poor athletes who are training for significant blocks of time every day.
- These athletes have huge energy requirements
- 50g protein switched to meal replacement product which means that shake goes from approx. 350-400 cals to 1300 cals.
- Aim to offset the energy losses in sessions as quickly as possible.
- This meal replacement actually then also acts as a recovery strategy (CHO and protein) and reduces the need for lots of products.
- Can be used in the boat in the morning as often feels sick first thing.

Context is key

- Athletes using supplements but not suitable for what they were trying to do.
- Often a “shot gun” approach applied by athletes and this can be tricky to navigate them around.
- Remember the external influencers.
- No is sometimes not the right answer at that time

Is there a wider application in other clinical practice outside sport?

International Journal of COPD

Dovepress

open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

Dietary beetroot juice – effects on physical performance in COPD patients: a randomized controlled crossover trial

This article was published in the following Dove Press journal:
International Journal of COPD
15 June 2017
Number of times this article has been viewed

Anne Louise Friis[1,*]
Carina Bjørnskov Steenholt[1,*]
Anders Løkke[2]
Mette Hansen[1]

Background and objective: Dietary beetroot juice (BR) supplementation has been shown to reduce the oxygen (O_2) consumption of standardized exercise and reduce resting blood pressure (BP) in healthy individuals. However, the physiological response of BR in chronic obstructive pulmonary disease (COPD) remains controversial. The objective was to test exercise performance in COPD, supplementing with higher doses of BR for a longer duration compared to previous trials in this patient group.

Nitric Oxide. 2015 August 1; 48: 22–30. doi:10.1016/j.niox.2014.10.007.

Dietary Nitrate Supplementation Improves Exercise Performance and Decreases Blood Pressure in COPD Patients

Michael J. Berry[a,c], Nicholas W. Justus[a], Jordan I. Hauser[a], Ashlee H. Case[a], Christine C. Helms[b,c], Swati Basu[b,c], Zachary Rogers[a], Marc T. Lewis[a], and Gary D. Miller[a,c]

[a]Health and Exercise Science Department, Wake Forest University, Winston-Salem, NC, 27109, USA

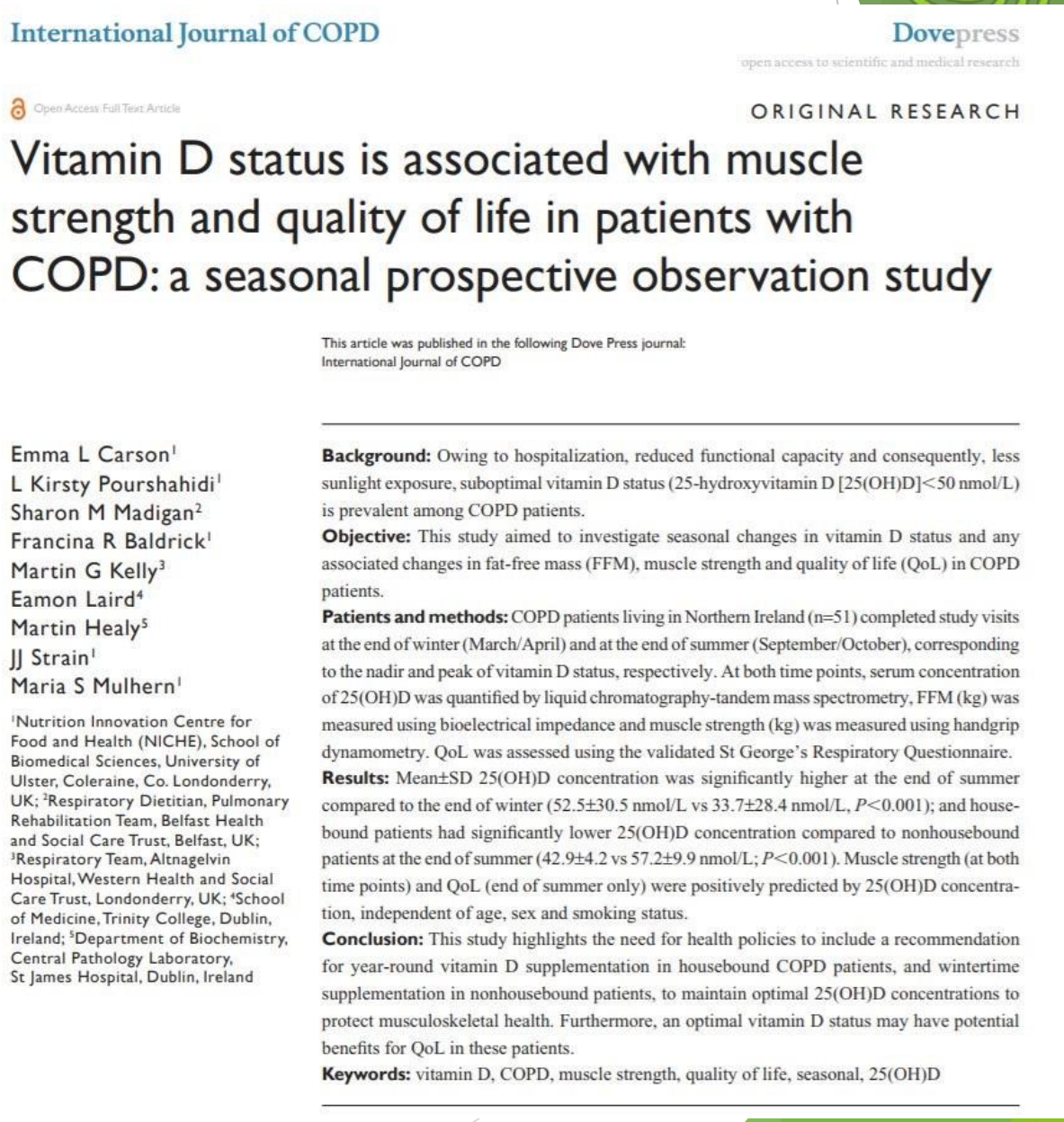
[b]Physics Department, Wake Forest University, Winston-Salem, NC, 27109, USA

[c]Translational Science Center, Wake Forest University, Winston-Salem, NC, 27109, USA

Clinical Application

Practice

- Past practice was winter time vitamin D supplementation.
- Patients with higher vitamin D levels had better muscle strength and better QoL compared to those with lower levels.
- Year Round vitamin D supplementation for all patients with COPD.
- Policies for MDT



International Journal of COPD

Dovepress

open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

Vitamin D status is associated with muscle strength and quality of life in patients with COPD: a seasonal prospective observation study

This article was published in the following Dove Press journal:
International Journal of COPD

Emma L Carson[1]
L Kirsty Pourshahidi[1]
Sharon M Madigan[2]
Francina R Baldrick[1]
Martin G Kelly[3]
Eamon Laird[4]
Martin Healy[5]
JJ Strain[1]
Maria S Mulhern[1]

[1]Nutrition Innovation Centre for Food and Health (NICHE), School of Biomedical Sciences, University of Ulster, Coleraine, Co. Londonderry, UK; [2]Respiratory Dietitian, Pulmonary Rehabilitation Team, Belfast Health and Social Care Trust, Belfast, UK; [3]Respiratory Team, Altnagelvin Hospital, Western Health and Social Care Trust, Londonderry, UK; [4]School of Medicine, Trinity College, Dublin, Ireland; [5]Department of Biochemistry, Central Pathology Laboratory, St James Hospital, Dublin, Ireland

Background: Owing to hospitalization, reduced functional capacity and consequently, less sunlight exposure, suboptimal vitamin D status (25-hydroxyvitamin D [25(OH)D]<50 nmol/L) is prevalent among COPD patients.

Objective: This study aimed to investigate seasonal changes in vitamin D status and any associated changes in fat-free mass (FFM), muscle strength and quality of life (QoL) in COPD patients.

Patients and methods: COPD patients living in Northern Ireland (n=51) completed study visits at the end of winter (March/April) and at the end of summer (September/October), corresponding to the nadir and peak of vitamin D status, respectively. At both time points, serum concentration of 25(OH)D was quantified by liquid chromatography-tandem mass spectrometry, FFM (kg) was measured using bioelectrical impedance and muscle strength (kg) was measured using handgrip dynamometry. QoL was assessed using the validated St George's Respiratory Questionnaire.

Results: Mean±SD 25(OH)D concentration was significantly higher at the end of summer compared to the end of winter (52.5±30.5 nmol/L vs 33.7±28.4 nmol/L, $P<0.001$); and housebound patients had significantly lower 25(OH)D concentration compared to nonhousebound patients at the end of summer (42.9±4.2 vs 57.2±9.9 nmol/L; $P<0.001$). Muscle strength (at both time points) and QoL (end of summer only) were positively predicted by 25(OH)D concentration, independent of age, sex and smoking status.

Conclusion: This study highlights the need for health policies to include a recommendation for year-round vitamin D supplementation in housebound COPD patients, and wintertime supplementation in nonhousebound patients, to maintain optimal 25(OH)D concentrations to protect musculoskeletal health. Furthermore, an optimal vitamin D status may have potential benefits for QoL in these patients.

Keywords: vitamin D, COPD, muscle strength, quality of life, seasonal, 25(OH)D

Is there a wider application in other clinical practice outside sport?

- Sacropenia
- PMS
- COPD
- Sleep

Sleep, Recovery and Supplements

nutrients

MDPI

Review

Sleep and Nutrition Interactions: Implications for Athletes

Rónán Doherty [1,2,3,*], Sharon Madigan [2], Giles Warrington [4,5] and Jason Ellis [3]

1 Letterkenny Institute of Technology, Port Road, Letterkenny, F92 FC93 County Donegal, Ireland
2 Sport Ireland Institute, National Sport Campus, Abbotstown, 15, D15 Y52H Dublin, Ireland; smadigan@instituteofsport.ie
3 Northumbria Centre for Sleep Research, Northumbria University, Newcastle NE1 8ST, UK; jason.ellis@northumbria.ac.uk
4 Health Research Institute, Schuman Building, University of Limerick, V94 T9PX County Donegal, Ireland; giles.warrington@ul.ie
5 Department of Physical Education and Sport Sciences, University of Limerick, V94 T9PX County Donegal, Ireland
* Correspondence: ronan.doherty@lyit.ie; Tel.: +353-749-186-299

Received: 4 February 2019; Accepted: 10 April 2019; Published: 11 April 2019

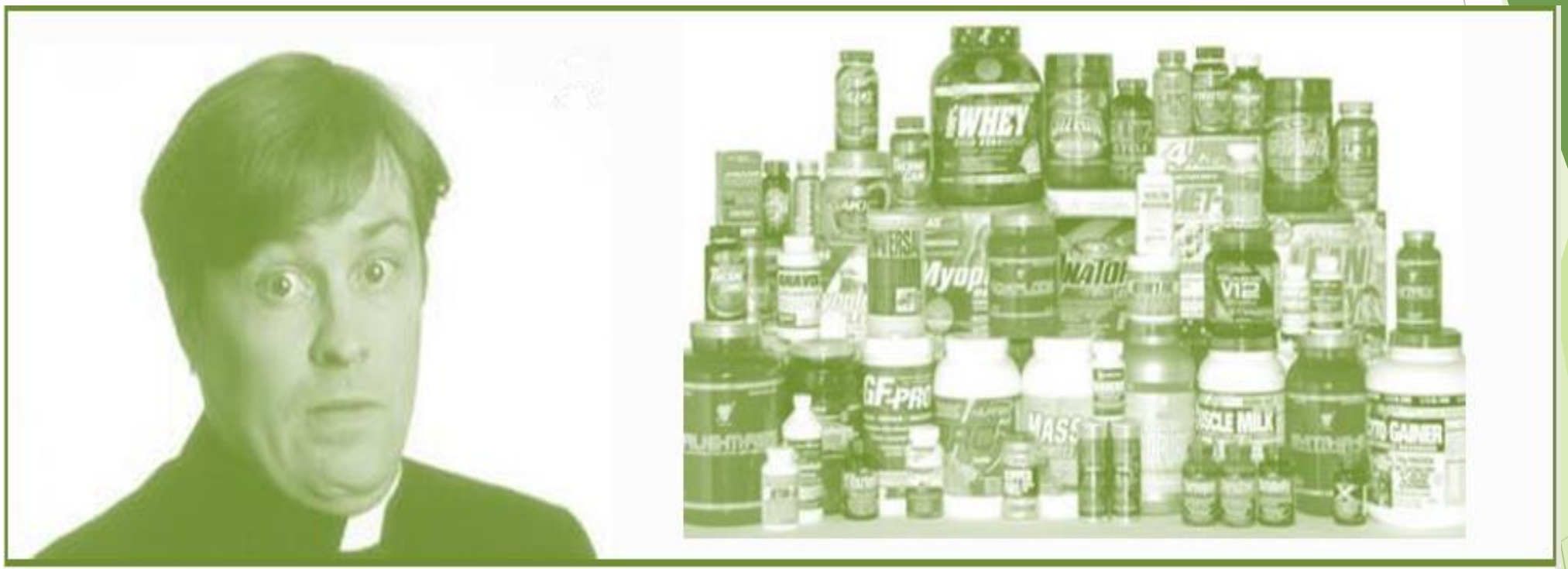
check for updates

2.6.1. Tart Cherries

Tart cherries contain high concentrations of melatonin and a range of phe
have both antioxidant and anti-inflammatory properties [66,67]. A recent stu
investigate the effect of tart cherry juice (2 × servings of 30 mL concentrate) o
sleep duration and sleep quality [50]. This was the first investigation to demor
juice supplementation increased circulating melatonin levels and improved sle
healthy adults. In the intervention group tart cherry juice supplementation re
elevated total melatonin content, increased time in bed (+24 min), increasec
(+34 min) improved sleep efficiency total (82.3%) and a significant reduction in da
($p < 0.05$) [50]. It must be noted that elevated melatonin concentrations may n
at work as sleep regulation is also influenced by proinflammatory cytokines
contain numerous compounds that have antioxidant and anti-inflammatory
study demonstrated that tart cherry juice consumption resulted in significan
severity index scores (13.2 ± 2.8 versus control 14.9 ± 3.6; $p < 0.05$) and wake
(62.1 ± 37.4 min versus control, 79.1 ± 38.6 mins; $p < 0.01$), in older females with insomnia ($n = 7$)
compared to a placebo [68].

Indeed, there is evidence that tart cherry juice supplementation post exercise may aid recovery from running a marathon [67]. The intervention group demonstrated a more rapid return of baseline isometric knee extension strength (pre-race 432 ± 114 vs. 48h 435 ± 109), 48 h post-marathon which was not demonstrated in the control group (pre-race 384 ± 112 vs. 48 h 349 ± 96) [67], indicating

Education is key



Glanbia, NBTY, Abbott Laboratories, GNC Holdings, MuscleTech, Cellucor, MusclePharm, Maxi Nutrition, PF, Champion Performance, Universal Nutrition, Nutrex, MHP, ProMeraSports, BPI Sports, Prolab Nutrition, Now Foods, Enervit, NutraClick, Dymatize Enterprises, CPT, UN, Gaspari Nutrition, ABC Nutritionals, Plethico Pharmaceuticals, Elivar, The Balance Bar, Carbery, Kerry Foods

Athlete education for me focuses on…..

SPORTS FOODS & SUPPLEMENTS GUIDELINES

Sports foods and supplements are categories of nutritional products that are marketed to athletes that claim to enhance athletic performance (ACSM 2016). They are generally categorised according to their main mode of action, which may be to increase strength and power, improve energy and endurance or enhance recovery after exercise. Sports foods and supplements may contain banned substances. This could result in a positive test for an athlete.

HOW MAY SUPPLEMENTS CAUSE PROBLEMS FOR ATHLETES?

- ✕ NOT REGULATED LIKE MEDICINES
- ✕ LABELS PROVIDE NO GUARANTEE OF THE PRODUCT CONTENTS
- ✕ CROSS CONTAMINATION IN THE PRODUCTION PROCESS

SPORT IRELAND ANTI-DOPING

WHAT IS CONSIDERED A HIGH RISK SUPPLEMENT?

Products that make unauthorised health claims such as weight loss, muscle building and sexual enhancement are considered to be higher risk of containing ingredients that could lead to a doping violation.

WHAT SHOULD I DO IF I WANT TO TAKE A SUPPLEMENT?

- ✓ Seek advice from a qualified sports nutrition professional
- ✓ Conduct a thorough internet search of the product you intend to take
- ✓ Research the name of the product and the ingredients listed
- ✓ Check the product website for any warnings
- ✓ Keep evidence of all reserach conducted
- ✓ Screenshots of research should be saved and backed up
- ✓ Only use batch tested products from a reliable source such as **www.informed-sport.com**

HERBAL PRODUCTS ARE NOT ALWAYS SAFE FOR ATHLETES. HERBAL SUPPLEMENTS MAY CONTAIN INGREDIENTS THAT COULD RESULT IN A DOPING VIOLATION

ALL ATHLETES ARE SOLELY RESPONSIBLE FOR WHAT THEY CONSUME

REMEMBER! Consideration of using a supplement should not be based on product marketing claims. Adopt a food first philosophy, not supplement first, to maximise health, safety and performance.

FALSE ADVERTISING

From time to time supplement products are promoted as 'drugs tested' or 'WADA endorsed'. These promotions are false and may lead to serious consequences for athletes.

Sport Ireland and the World Anti-Doping Agency do not endorse supplement products.

CONSEQUENCES

The current ban from sport for an anti-doping rule violation is 4 years.

If an athlete has evidence that they thoroughly researched the product as outlined in this leaflet they may receive a reduced sanction.

References:
American College of Sports Medicine Joint Position Statement. Nutrition and Athletic performance. Academy of Nutrition and Dietetics; Dietitians of Canada; American College of Sports Medicine. Med Sci Sports Exerc.2016; 48(3): 543-568.

Resources

SENr
The Sport and Exercise Nutrition Register
BDA

SPORT IRELAND INSTITUTE

Sports and Exercise Nutrition Register (SENr)
Supplement use in Sport
Position Statement

The aim of this position statement is to provide Athlete Support Personnel (ASP) with a robust framework to enable evidence-based decision making with regard to supplementation in sport. The guidance directs the ASP to enable them to:

- appropriately assess the need for supplementation
- assess the risk of supplementation
- understand the consequences of taking supplements from an anti-doping perspective
- and provide practical guidelines and tools for the safe usage in order to support athletes.

Thank you and Questions

SPORT IRELAND INSTITUTE