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1

FODMAPs & Athletes: Current Research & Strategies

Event Materials

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Connecting military family service providers and Cooperative Extension professionals to research and to each other through engaging online learning opportunities

https://militaryfamilieslearningnetwork.org

MILITARY FAMILIES LEARNING NETWORK

This material is based upon work supported by the National Institute of Food and Agriculture, U.S. Department of Agriculture, and the Office of Military Family Readiness Policy, U.S. Department of Defense under Award Numbers 2015-48770-24368 and 2019-48770-30366.

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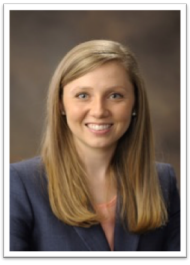
Today's Presenter



Lauren Killian, PhD

Instructor, Georgia State University
Consultant, Deep See Strategies, LLC

- Dissertation research on nutritional habits and gastrointestinal symptoms of endurance athletes
- Teaching and research activities combine specializations in food science & sports nutrition

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Objectives

- Identify high FODMAP foods commonly consumed by athletes
- Describe potential concerns regarding FODMAP restriction by athletes
- Explain the main strategies for FODMAP reduction and which may be best suited for athletes

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Gastrointestinal (GI) symptoms in athletes…

Are commonly reported
- Affects training and competition

Mirror symptoms and symptom patterns of patients with irritable bowel syndrome (IBS)

May be mitigated by a current promising IBS management strategy
- Restriction of Fermentable Oligosaccharides, Disaccharides, Monosaccharides, And Polyols (FODMAP)

https://commons.wikimedia.org/wiki/File:Belfast_City_Marathon,_May_2010_(01).JPG#filelinks;
https://pixabay.com/illustrations/intestine-human-body-2970172/;
https://www.publicdomainpictures.net/en/view-image.php?image=127815&picture=mixed-veg

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Please respond to the pop-up poll.

What is your previous experience with the low FODMAP diet?

A. Never heard of it (until now)
B. Heard of it, but do not know too much
C. Reasonable amount of knowledge
D. Very knowledgeable and/or use with clients or self

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Introduction to FODMAPs

Fermentable	Undigested carbohydrates that are able to be degraded by gut bacteria to produce gases (hydrogen, methane, and carbon dioxide)
Oligosaccharides	• Fructans/Fructo-oligosaccharides (FOS) (wheat, rye, onions, and garlic) • Galacto-oligosaccharides (GOS) (legumes, pulses)
Disaccharides	Lactose (milk, soft cheese, yogurts)
Monosaccharide	Fructose in excess of glucose (honey, apples, high fructose corn syrups)
Polyols	Sugar polyols (e.g. sorbitol, mannitol) found in some fruits and vegetables and used as artificial sweeteners

Adapted from Monash University low FODMAP resources:
https://www.monashfodmap.com/about-fodmap-and-ibs/frequently-asked-questions/

See MFLN webinar
"THE LOW FODMAP DIET FOR IRRITABLE BOWEL SYNDROME: FROM EVIDENCE TO PRACTICE"
for more details on the low FODMAP diet.
https://militaryfamilieslearningnetwork.org/event/20300/

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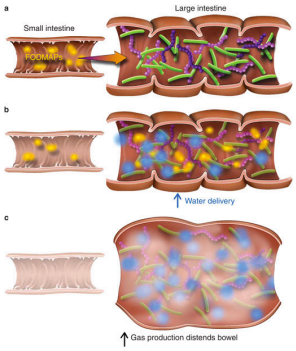
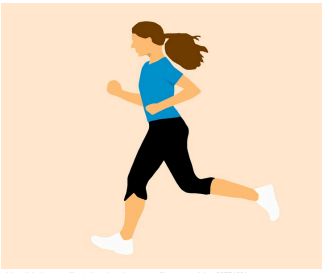
Mechanisms of Action





https://pixabay.com/illustrations/running-woman-fitness-practicing-2875180/

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Figure from Shepherd et al. 2013

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Research in Athletes & FODMAPs

- Earliest references dealt with gluten-free diets among athletes (Despain 2014; Lis et al. 2015)
- Restriction of high FODMAP foods/food categories for GI symptom reduction (Lis et al. 2016a)
  - Not intentionally restricting FODMAP
  - Lactose most common

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Athletes & FODMAP: Case Studies

- Male multisport athlete (Lis et al. 2016b)
  - Single-blind intervention with 6-day low FODMAP diet
  - Daily training repeated
  - Reduced symptom severity scores during low FODMAP intervention
- Female ultra-endurance runner (Gaskell and Costa 2019)
  - Previous IBS diagnosis and low FODMAP diet
  - More strict low FODMAP prior to/during 6-day multi-stage ultramarathon
  - Symptoms well controlled during race

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Athletes & FODMAP: Interventions

- 11 runners with exercise-induced GI symptoms (Lis et al. 2018)
  - 6-day low or high FODMAP diets
  - Repeated exercise with running sessions days 4 & 5
  - Low FODMAP diet significantly reduced daily GI symptom area under the curve but not affect symptoms during exercise
- 16 recreationally active runners (Wiffin et al. 2019)
  - 7-day low FODMAP diet under free-living conditions
  - Low FODMAP decreased IBS symptom severity scores
  - Perceived improvement in habitual exercise frequency & intensity
  - Significantly less carbohydrate consumed during low FODMAP condition
- Some other interventions included a low FODMAP diet lead in (Costa et al. 2017a; Snipe et al. 2017, 2018a, 2018b; Hoffman et al. 2018)

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Athletes & FODMAP:
Reviews & Recommendations

- Systematic review on exercise-induced GI symptoms (Costa et al. 2017b)
- Review of runner's diarrhea (de Oliveira 2017)
- Reviews & recommendations related to GI symptoms in athletes (Costa n.d.; Christoph and Miele 2017; Diduch 2017; Koon et al. 2017; Burke et al. 2019; Lis et al. 2019; Lis 2019)
- Blogs & Websites
  - Athletes with GI symptoms who may want to consider
  - Athletes already following low FODMAP

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High FODMAP Foods Commonly Consumed in an Athlete's Diet

Adapted from: Lis at al. 2019

FODMAP category	High FODMAP foods
High lactose	Yogurt, cow's milk
Excess fructose	Apples, figs, watermelon, cherries, agave, honey, many fruit juices (e.g., apple, orange), and beetroot
High fructans/GOS	Dates, dried apricots, cashews/pistachio nuts, breads/bagels, pasta, onions, wheat-based energy bars, and ripe banana
High polyols	Dried apricots, protein bars and powders, some electrolyte tablets, and sugar-free gum/candies

Note. Check cereals, bars, sports foods, mixed beverages, and mixed meals for high FODMAP ingredients. Depending on the types and blend, fruit juices can be high in excess fructose and therefore problematic for some athletes (especially when ingested in high amounts)

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Question Break

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My Research

- **Questionnaire**
  - IBS, nutritional habits, GI symptoms, & symptom management strategies
- **IBS**
  - IBS prevalence, IBS-related symptoms, & treatment strategies
- **FODMAP Content**
  - Foods surrounding exercise
  - Sports nutrition products
  - Habitual diets
- **Product Use Factors**
  - Sensory acceptance
  - On-course availability
  - Marketing/distribution & price

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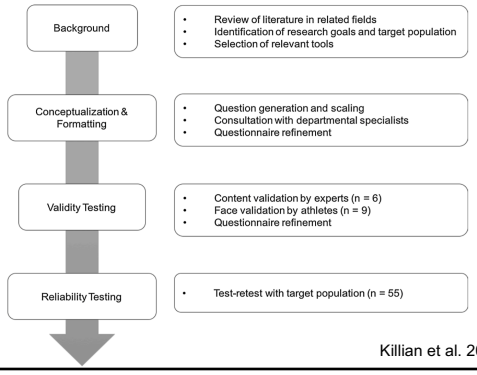
Endurance Athlete Questionnaire (EAQ) Development & Validation



Killian et al. 2018 17

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Digestive Diseases and Sciences
https://doi.org/10.1007/s10620-018-5289-8

ORIGINAL ARTICLE

Questionnaire on Irritable Bowel Syndrome and Symptom Management Among Endurance Athletes Is Valid and Reliable

Lauren A. Killian[1] · Karen M. Chapman-Novakofski[2] · Soo-Yeun Lee[3]

Received: 1 April 2018 / Accepted: 14 September 2018

drink/energy drink	❍	❍	❍	❍	❍
Solid food	❍	❍	❍	❍	❍
Gel/gummy	❍	❍	❍	❍	❍
Homemade product/something else	❍	❍	❍	❍	❍

31) How often do you have the following gastrointestinal complaints **during TRAINING**?

	Never	Rarely	Sometimes	Often	Always
Gastrointestinal cramps/pains	❍	❍	❍	❍	❍
Bloating	❍	❍	❍	❍	❍
Flatulence	❍	❍	❍	❍	❍
Urge to defecate	❍	❍	❍	❍	❍
Defecation	❍	❍	❍	❍	❍
Diarrhea	❍	❍	❍	❍	❍
Constipation	❍	❍	❍	❍	❍

- Sources of information
- IBS diagnostic criteria
- Demographics

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IBS-Related Symptoms & Treatment of Endurance Athletes

EAQ Portions Used

- IBS diagnosis and diagnostic criteria
- Lower GI symptom frequencies
- Symptom management strategies

Participants

- 430 endurance athletes between December 2015 and January 2017

Endurance Athlete Questionnaire participant demographics (n = 430).

Characteristic	n	%
Gender		
Male	186	43.3
Female	244	56.7
Age		
18-29	77	17.9
30-39	141	33.1
40-49	122	28.6
50-59	65	15.3
60+	19	4.4
Competition Level		
Beginner/amateur/casual	202	47.0
Competitive age-grouper	219	50.9
Elite/professional	9	2.1
Lifetime Competition Participation		
Marathon	354	82.3
Ultra-marathon	131	30.5
Half-distance triathlon	241	70.9
Full-distance triathlon	133	30.9

Adapted from Killian and Lee 2019

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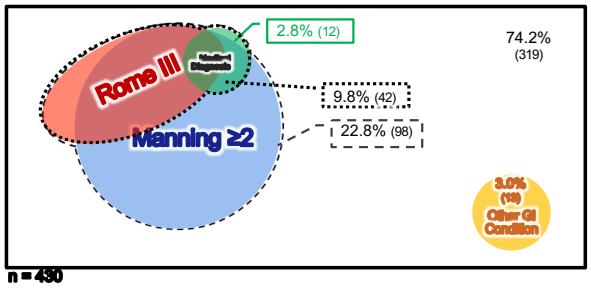
IBS is underdiagnosed among endurance athletes



Adapted visual presentation of data from Killian and Lee 2019

NOTE: NOT TO SCALE

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IBS-like symptoms are experienced by more than those with IBS

Table 4. Prevalence (in %) of at least 1 lower gastrointestinal (GI) symptom at rest, during training, 2 h after training, during competition, and 2 h after competition.

	Overall, *n* = 417	Males, *n* = 184	Females, *n* = 233
At rest	66.0bc	58.7	71.7b*
During training	67.9c	63.6	71.2b
2 h after training	62.6abc	59.2	65.2ab
During competition	56.1a	52.7	58.8a
2 h after competition	60.2ab	58.2	61.8a

Note: Different lowercase letters indicate statistically significant differences between time points within each column (overall: $\chi^2(4) = 31.238$, $p < 0.001$; females: $\chi^2(4) = 26.244$, $p < 0.001$)
*Significantly different between males and females

Killian and Lee 2019

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IBS and IBS-like symptoms are ineffectively managed

- Athletes reported symptoms interrupting or preventing exercise at least sometimes
  - 18.6% during training
  - 11.6% during competition
- Athletes with IBS had more frequent symptoms at almost all timepoints
  - Symptoms more frequently interrupted or prevented training and competition
- Symptom frequency generally decreased from rest to exercise conditions
  - GI cramps/pain, bloating, and flatulence did not decrease during exercise for athletes with IBS

Killian and Lee 2019

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Athlete Symptom Management Strategies

- Most commonly reported consulting friends, family, and coaches
- 9.6% reported consulting a nutritionist/dietitian
- Most commonly reported referencing internet/websites
- Nutritional modifications
  - 45.8% of all athletes
  - 76.2% of athletes with IBS

Killian and Lee 2019

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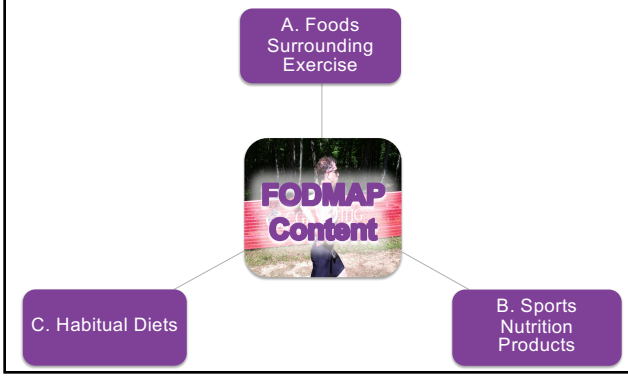
FODMAP Intake of Endurance Athletes (Manuscripts In Review)



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FODMAP Surrounding Exercise & in Sports Nutrition Products

- Athletes commonly consume high FODMAP foods & beverages at pre-race dinners & breakfasts
- Many of the most popular sports nutrition beverages, solids, & gels/gummies are high in FODMAP
  - Particularly in multiple servings
  - Mostly oligosaccharides & excess fructose
  - Not always clear from ingredient statement

IN REVIEW

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Habitual FODMAP Intake

- Overall high habitual FODMAP intake
  - Over the 12g proposed cutoff (Tuck and Vanner 2018)
  - Similar to high intake used in IBS research
- Some statistically significant differences seen in median intakes between those with & without certain lower GI symptoms

IN REVIEW

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Factors Influencing Low/High FODMAP Product Use

- Sensory study of gels & solids
  - Results: Lower FODMAP products had higher overall liking scores
- Online availability & pricing
  - Low FODMAP products available online at likely non-prohibitive prices
- Race availability
  - Low FODMAP products available at some races, but athletes desiring to use low FODMAP strategies should consider using/carrying their own

READY FOR REVIEW

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Question Break

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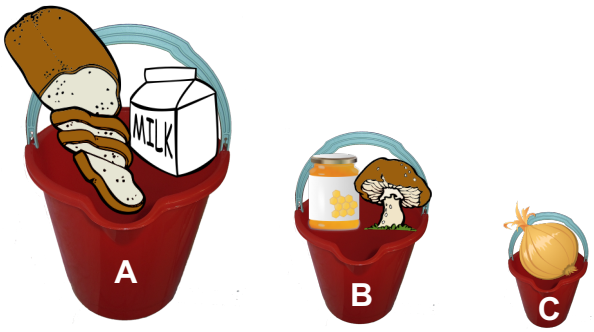
Low FODMAP Implementation



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Low FODMAP Implementation

STEP 1: Strict low FODMAP diet	
2 - 6 weeks	Swapping low FODMAP foods in place of typical high FODMAP foods
STEP 2: FODMAP Reintroduction	
Over 8 – 12 weeks	Reintroduce 1 FODMAP at a time/1 food at a time every ~3 days in increasing amounts
STEP 3: FODMAP Personalization	
Long term	Consuming tolerated high FODMAP foods in proper amounts for individual

Based on information from: https://www.monashfodmap.com/ibs-central/i-have-ibs/starting-the-low-fodmap-diet

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Concerns with a Low FODMAP Diet in Athletes

- Adequate calories
- Adequate carbohydrate
- Adequate micronutrients
- Compounding effects of exercise
- Sports nutrition products
- Disordered eating behaviors
- Nutrition while traveling
- Microbiome changes/reduced short chain fatty acid production

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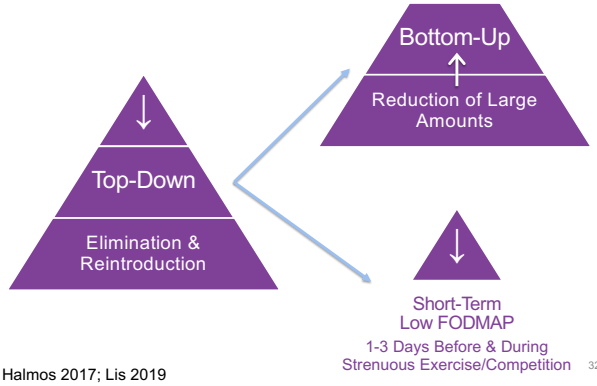
Low FODMAP Diet Strategies



Halmos 2017; Lis 2019

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Practical Suggestions for Symptomatic Athletes

- Evaluate for clinical conditions
- Consult a dietitian trained in sports nutrition & FODMAPs
- Determine macronutrient needs for current training level
- Keep a food diary to examine for high FODMAP targets for bottom-up approach
- Try bottom-up or short-term approach first, if possible
- Examine ingredients and/or FODMAP analysis results for sports nutrition products
  - Change these products first, if necessary
- Check products supplied at races & consider using your own
- Remember the importance of reintroduction

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Summary

- Low FODMAP dietary strategies have shown promise for GI symptom reduction in athletes
- IBS is underdiagnosed in endurance athletes
- Athletes commonly consume high FODMAP foods
  - Prior to races, in sports nutrition products, & within everyday diets
- Acceptable low FODMAP sports nutrition products exist, but athletes may need to provide their own
- Bottom-down or short-term low FODMAP dietary strategies may be best suited to help athletes avoid nutrient deficiencies & other concerns related to a restricted diet

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Thank you!

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Upcoming Event

Cancer Preventive Lifestyle Behaviors: Why You Should Talk to Your Clients Now

Wednesday, May 27, 2020
11:00 a.m. – 12:00 p.m. EST

Event Page:
MilitaryFamiliesLearningNetwork.org/event/34444

This webinar will present the most recent guidelines on nutrition, physical activity, and weight management for cancer prevention.

Continuing education credit will be available for this webinar!

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This webinar has been approved for the following continuing education (CE) credits:

- 1.0 CPEU from the Commission on Dietetic Registration (CDR)

Evaluation Link
Go to the event page for evaluation and post-test link.

Continuing Education

Questions?
Email Kristen DiFilippo at kdfilip@Illinois.edu

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