

Gastrointestinal Conditions in the Female Athlete



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KEYWORDS

- Athlete • Bariatric surgery • Celiac disease • Exercise • FODMAPs diet
- Inflammatory bowel disease • Intestinal microbiome • Irritable bowel syndrome

KEY POINTS

- Gastrointestinal (GI) symptoms are common in athletes. Moderate exercise can have benefits on these symptoms and diseases, whereas high-intensity training may negatively affect many of the GI problems commonly found in athletes.
- Irritable bowel syndrome (IBS) is the most common lower GI complaint in athletes with the diarrhea predominant variant the most common in women. A trial of a FODMAPs diet may be helpful for both the IBS and the gluten-sensitive athlete.
- Inflammatory bowel disease and celiac disease can affect the athlete's ability to absorb micronutrients and macronutrients. These diseases may impact performance related to their intestinal and extraintestinal symptoms.
- Bariatric surgery has become more common, with an increasing frequency of these individuals becoming highly active postsurgically. These patients face significant nutritional challenges to intense exercise and may benefit from the services of a sports-specific dietitian.

*More marathons are won or lost in the porta-toilets than at the dinner table.
—Bill Rodgers, multiple NY and Boston Marathon winner¹*

INTRODUCTION

The frequency of gastrointestinal (GI) complaints in athletes is surprisingly common. Of athletes, 30% to 50% report GI symptoms during training,^{1–3} yet the intensity of these symptoms and how much they affect exercise are not clear. Severe GI distress has been reported in 4% of marathoners and 32% of Ironman participants. Similarly, 7% of triathletes report having abandoned a race because of GI complaints.¹ Conditions that commonly plague the athlete can be classified as immune-mediated (celiac

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disease), inflammatory (inflammatory bowel disease [IBD], which refers to either ulcerative colitis [UC] or Crohn disease [CD]), or functional (irritable bowel syndrome [IBS]). Although many of the GI problems encountered by athletes are not gender specific, IBS and celiac disease are more prevalent in women.^{4,5} Women with either of the IBDs of UC or CD experience increased symptoms during their menstrual cycle, and the choice of contraception can further influence these hormonally related symptoms.^{6,7} Understanding the effects of exercise on the mechanical structure of the GI system and the physiologic function helps the clinician with both diagnosis and management, including recommendations on participation in exercise and competition.

Anatomy and Physiology

From a structural perspective, the GI tract can be divided into 4 major areas: the upper GI area, which extends from the esophagus to the stomach; the hepatobiliary system; the small intestines; and the colon. Various sports impact these locations differently, depending on the sport-specific posture as well as the physiologic response to exercise, which alters the functions within each region.¹ For example, upper GI symptoms, such as nausea, vomiting, gastroesophageal reflux, and belching, are more common in cycling sports compared with running. This upper GI symptom predominance is attributed to the delayed gastric-emptying time in response to exercise as well as the mechanical effect of the forward-flexed biking posture.^{1,3} Conversely, runners experience more lower GI symptoms of diarrhea, cramping, bleeding, and flatulence. These changes are related to a decreased vagal tone, increased adrenergic levels, prolonged perfusion times, and mechanical jostling of the intestinal contents.²

Effects of Exercise

The effects of regular exercise are widespread, yet variable throughout the body. Regular exercise influences the vagal tone and balance of the sympathetic/parasympathetic nervous system.⁸ Reliable exercise has been found to alter the vascular flow both during and after exercise.^{1,9} Consistent physical activity has been associated with a decrease in the rates of IBD flares, gallbladder disease, and colon cancer.⁹

Regulation of the intestinal tract is achieved through a combination of neuroendocrine factors and their effect on blood flow. During exercise, the parasympathetic system downregulates while sympathetic tone increases, causing alpha receptor-driven vasoconstriction.^{1,9} This vasoconstriction results in a reduction of splanchnic blood flow, in certain cases by up to 80% from baseline.¹ With the drop in parasympathetic activity, there is a reduction in esophageal peristalsis and lower esophageal sphincter tone, leading to an increase in reflux symptoms.⁹ Regular moderate exercise attenuates this downregulation of the parasympathetic system³ and can be detected indirectly by cardiac monitoring through observing variability in heart rate and within the electrocardiogram "R-R" interval. Moreover, this improved parasympathetic adaptation has been associated with enhanced gut-based neutrophil function and an anti-inflammatory effect.⁹

Not all the adaptations prove beneficial to the body though. The decreased vagal activity seen during exercise can continue into the postexercise recovery phase⁸ and can slow the nutrient absorption function of the intestines. It can also delay the healing that is needed to the epithelium after exercise. Vagal tone can only recover after sufficient rest, such as tapering training intensity and volume. This downregulation of neuroendocrine, blood flow, and effective nutrient absorption may be a factor in overtraining symptoms.⁸

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