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Acquired causes of intestinal malabsorption



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A B S T R A C T

This review focuses on the acquired causes, diagnosis, and treatment of intestinal malabsorption. Intestinal absorption is a complex process that depends on many variables, including the digestion of nutrients within the intestinal lumen, the absorptive surface of the small intestine, the membrane transport systems, and the epithelial absorptive enzymes.

Acquired causes of malabsorption are classified by focussing on the three phases of digestion and absorption: 1) luminal/digestive phase, 2) mucosal/absorptive phase, and 3) transport phase. Most acquired diseases affect the luminal/digestive phase. These include short bowel syndrome, extensive small bowel inflammation, motility disorders, and deficiencies of digestive enzymes or bile salts. Diagnosis depends on symptoms, physical examination, and blood and stool tests.

There is no gold standard for the diagnosis of malabsorption. Further testing should be based on the specific clinical context and the suspected underlying disease. Therapy is directed at nutritional support by enteral or parenteral feeding and screening for and supplementation of deficiencies in vitamins and minerals. Early enteral feeding is important for intestinal adaptation in short bowel syndrome. Medicinal treatment options for diarrhoea in malabsorption include loperamide, codeine, cholestyramine, or antibiotics.

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Introduction

The intestinal absorption of fluids, electrolytes, macronutrients (proteins, carbohydrates, and fats), and micronutrients (vitamins, minerals, and trace elements) is a delicate and complex process. Multiple factors are involved in this process, including the digestion of nutrients within the intestinal lumen, intestinal length and absorptive surface, the presence or absence of particular intestinal components such as the colon and Bauhin's valve, and the functioning of the membrane transport systems of the small intestinal epithelium involved in the absorption of specific micronutrients. A disruption in the process of intestinal absorption may lead to malabsorption. In clinical practice, malabsorption refers to impairments in both the absorption and digestion processes, for these are interdependent. Intestinal malabsorption can result from congenital and acquired causes. Acquired causes include maldigestion, loss of intestinal length due to resections, loss of absorptive surface due to inflammatory diseases, motility disorders, defects in the membrane transport systems of the small intestinal epithelium, and acquired defects in the epithelial absorptive surface [1]. The malabsorption can be global or partial (isolated). Global malabsorption results from diseases associated with either diffuse mucosal involvement or a reduced absorptive surface. Partial malabsorption results from diseases that interfere with the absorption of specific nutrients.

Malabsorption can lead to a number of clinical conditions, which have several definitions, depending on the severity and/or consequences of the malabsorption for the patient. Intestinal insufficiency or deficiency is the definition used when discussing impaired intestinal absorption and functioning. The European Society for Clinical Nutrition and Metabolism (ESPEN) defines intestinal insufficiency or deficiency as “the reduction of gut absorptive function that does not require intravenous supplementation to maintain health and/or growth”. When the reduction of absorptive function does require intravenous supplementation, it is defined as intestinal failure [2].

This review specifically focuses on the acquired causes of intestinal malabsorption and discusses the various diagnostic tools and treatment options.

Causes of acquired intestinal malabsorption

Acquired intestinal malabsorption can affect all age categories. Causes include gastrointestinal and systemic diseases, benign and malignant diseases, acute and chronic enteropathies, infectious and parasitic diseases, pancreatic and biliary diseases, and post-radiation/chemotherapy-induced enteritis [3,4]. When discussing the numerous causes of acquired intestinal malabsorption, it is important to focus on the following three phases of the process of digestion and nutrient absorption: 1) luminal and brush border processing, 2) absorption into the intestinal mucosa, and 3) transport into the circulation [5]. Malabsorption can result from defects occurring at each of these three phases, and one or more defects may exist concurrently. In the following sections of this article, the acquired causes of malabsorption are discussed in the context of the above-mentioned phases of the process of nutrient absorption. Table 2 provides an overview of the causes of malabsorption.

Luminal and brush border processing phase

Diseases affecting the luminal phase of the intestinal absorption process are responsible for the majority of acquired causes of malabsorption. These can be divided into diseases affecting the

Table 1
Risk factors for developing short bowel disease.

Children	Adults
Resection of $\geq 70\%$ of total length of small bowel or remaining length starting at the ligament of Treitz: <50 cm with preterm birth (36 weeks) <75 cm with term birth (37–41 weeks)	Duodenostomy
<100 cm with child >1 year old	Jejunoleal anastomosis and <35 cm residual small intestine Jejunocolic or ileocolic anastomosis and <60 cm residual small intestine End jejunostomy and <115 cm residual small intestine

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