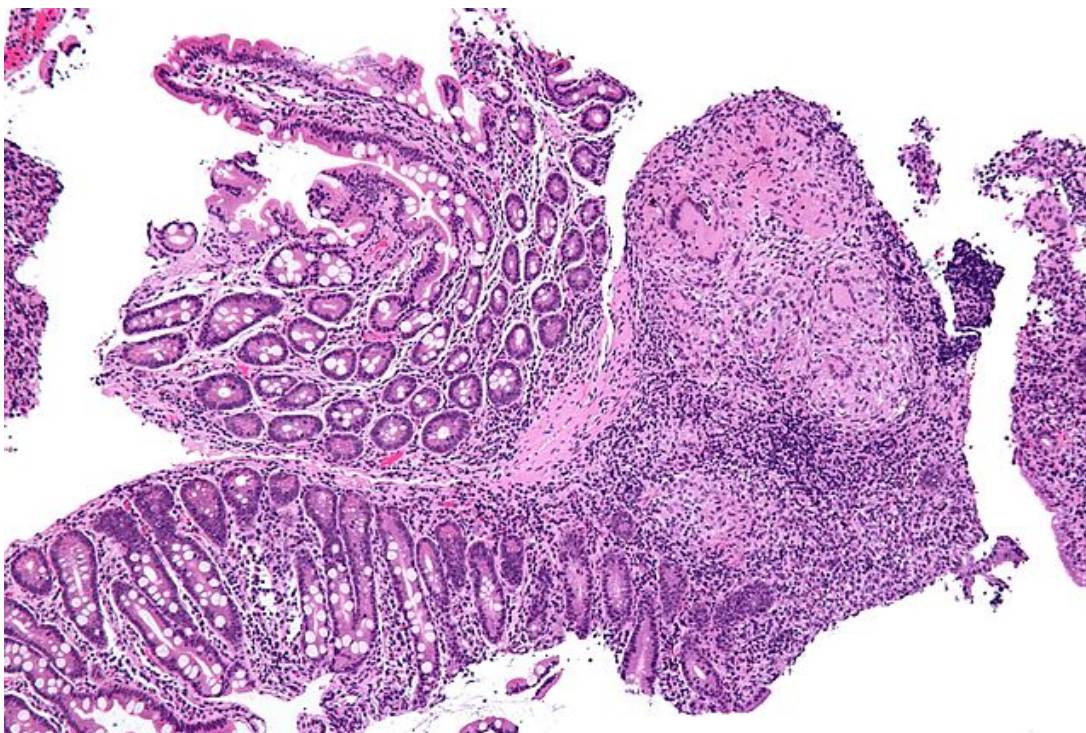


# Crohn's Disease (Ileitis) and Ulcerative Colitis (UC) — Causes and Treatment

[See online here](#)

**Inflammatory bowel disease (IBD) is a chronic inflammatory disease of the gastrointestinal tracts and is comprised of two major disorders: ulcerative colitis (UC) and Crohn's disease (CD). Both diseases have characteristics that may be overlapping while other characteristics may be different. Characteristics which will be discussed in detail throughout this article.**



## Introduction

Although the two [inflammatory bowel diseases](#) almost have the same general symptoms, they are two separate disorders because each affects different areas of the gastrointestinal tract. However, in 10–15 % of the patients it is difficult to classify them into any of the two diseases and thus they are labelled cases of indeterminate colitis.

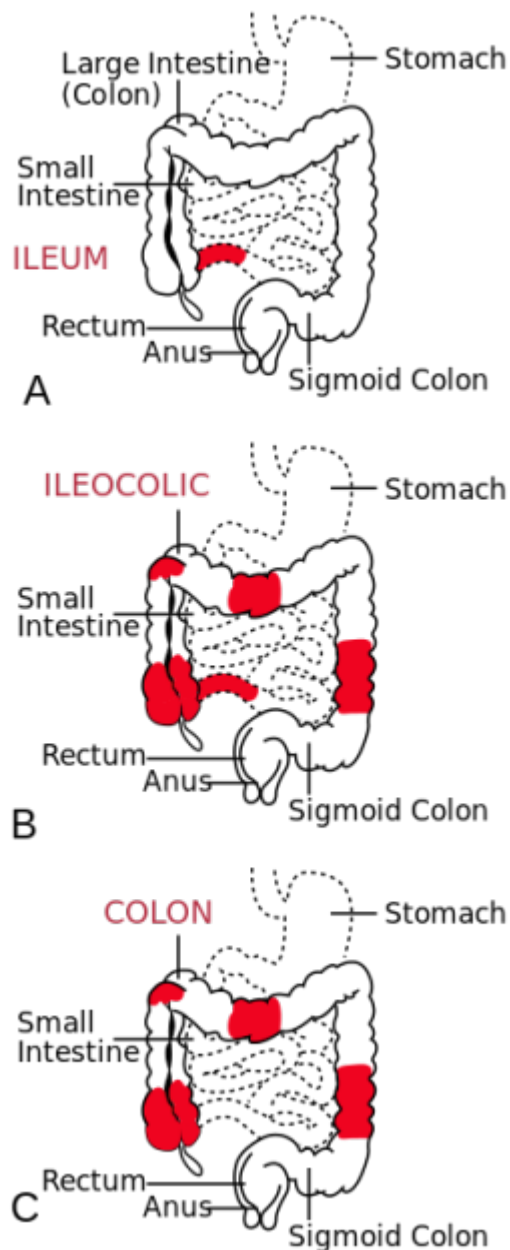
Crohn's disease commonly affects the terminal [ileum](#) and the start of the [colon](#), but it can also attack any point in the GI tract, i.e. from the mouth to the anus. Ulcerative colitis specifically affects the colon. It is important to know the characteristic signs and symptoms of the two diseases for proper treatment.



**Image:** "Endoscopic image of ulcerative colitis affecting the left side of the colon. Note that the classic features of ulcerative colitis are not seen here, and that the image resembles Crohn's colitis as it shows serpiginous ulcers. The purpose of this image is to show the difficulty in differentiating between the two disorders on endoscopy." by Samir.  
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## Definitions of Crohn's Disease (Ileitis) and Ulcerative Colitis (UC)

### Crohn's disease



[Image](#): "Schematic of patterns of disease in Crohn's disease (CD), based on a diagram of the human intestine in GFDL." by Samir, vectorized by Fvasconcellos. License: [CC BY-SA 3.0](#)

Is characterized by **transmural inflammation** (entire wall thickness) **with skip lesions**, affecting any point along the GI tract. The particular affected area can vary among every affected individual.

The inflammation can occur as patches in the intestine, leaving uninfammatory section (**skip lesions**), while, in ulcerative colitis, this is not observed.

It is also associated with the development of **fistulas** which are channels or open connections between two areas, such as one twist of the colon to another or colon to skin, bladder, or vagina.

## Ulcerative colitis

Ulcerative colitis is characterized by frequent episodes of inflammation that affect the innermost layer of the rectum and colon (mucosal layer) causing ulcers and soreness in

the GI tract (no fistula formation). The combination of inflammation and ulceration can cause abdominal discomfort and frequent emptying of the colon.

Both are long-lasting and persistent when not carefully managed in their early stages. Long-term remission can be observed with treatment for these inflammatory diseases.

## Risk Factors of Crohn's Disease (Ileitis) and Ulcerative Colitis (UC)

The exact pathophysiology of inflammatory bowel disease (IBD) is unclear, but a number of risk factors are associated with their development.

Risk factors	Description
<b>Age and gender</b>	<ul style="list-style-type: none"> <li>• Most cases of IBD start at an age between 15 and 40 years.</li> <li>• In Crohn's disease, there is a slight female predominance which suggests hormonal factors in the disease progression.</li> </ul>
<b>Racial and ethnicity</b>	<ul style="list-style-type: none"> <li>• The racial and ethnic differences are significantly dependent on environmental and lifestyle factors in addition to the underlying genetic differences.</li> <li>• IBD occurs more in the developed, urban, and northern areas rather than undeveloped, rural and southern climates. <ul style="list-style-type: none"> <li>• It occurs more commonly in Jewish patients.</li> <li>• It is more common in Caucasians.</li> </ul> </li> </ul>
<b>Genetic susceptibility</b>	<ul style="list-style-type: none"> <li>• IBD usually runs in the family; 25% of patients with IBD have a first-degree relative (parent-children, siblings, and parent-siblings) with the disorder.</li> <li>• Genetics have a major threat of having Crohn's disease rather than ulcerative colitis with more risks when both parents are affected.</li> </ul>
<b>Smoking</b>	<ul style="list-style-type: none"> <li>• <b>Ulcerative colitis:</b> Current studies suggest that smoking is not a risk factor for the development of UC and, in fact, may even be protective of or reduce disease symptoms.</li> <li>• <b>Crohn's disease:</b> Smoking increases the risk of Crohn's disease twofold. It also increases the risk of the recurrence of CD.</li> </ul>
<b>Diet</b>	<ul style="list-style-type: none"> <li>• Suggested that certain food antigens may precipitate the development of IBD and it is suggested that the Western diet (e.g. processed, fried, and sugary foods) is associated with an increased risk of Crohn's disease, and also ulcerative colitis.</li> </ul>
<b>Obesity</b>	<ul style="list-style-type: none"> <li>• Excessive obesity may contribute in the development of IBD due to an intra-abdominal accumulation of fat, leading to mucosal inflammation and disease development.</li> </ul>
<b>Infections</b>	<ul style="list-style-type: none"> <li>• The GI tract naturally contains beneficial bacteria that are harmless and help in digestion. <ul style="list-style-type: none"> <li>• Imbalance and/or alterations in the gut commensal microorganisms may contribute to the development of IBD.</li> </ul> </li> <li>• It has been suggested that multiple pathogens (e.g., <i>Shigella</i>, <i>Salmonella</i>, <i>Campylobacter</i>, <i>Clostridium difficile</i> spp.) can trigger an inflammatory response that can't be controlled by the mucosal immune system.</li> </ul>
<b>Antibiotics</b>	<ul style="list-style-type: none"> <li>• Antibiotics may alter gut flora and increase the risk of IBD.</li> </ul>
<b>Oral contraceptives and Hormone Replacement Therapy</b>	<ul style="list-style-type: none"> <li>• Hormone therapy can have thrombotic effects on the microvasculature which predisposes for IBD. Women using OCP or HRT have an increased risk of developing IBD.</li> </ul>
<b>Appendectomy</b>	<ul style="list-style-type: none"> <li>• Several studies have shown that an appendectomy may protect patients from the occurrence of UC. The mechanism is yet unknown.</li> </ul>

## Psychosocial factors

• **Psychosocial factors** (e.g. stress) may have a role in exacerbations of symptoms in patients with IBD, possibly through stimulating the enteric nervous system and the release of proinflammatory cytokines.

# Classification of Crohn's Disease (Ileitis) and Ulcerative Colitis (UC)

## Crohn's disease classification

The classification of Crohn's disease is based on the inflammation (clinical behavior), anatomical distribution (location) and operative history (age). There are generally two types which hold different values for the mentioned features:

- Vienna class
- Montreal class

### Vienna class

This was an older staging system which was arrived at as a report of the working party of the world congress of gastroenterology in 1998. It classifies patients based on three major parameters as:

#### Age at diagnosis

- A1- less than 40 years
- A2- more than or equal to 40 years
- Location of the disease
- L1- terminal ileum
- L2-colon
- L3-ileocolon
- L4-upper gastro-intestinal

#### Behavior of the disease

- B1-non-stricturing non-penetrating
- B2- stricturing
- B3 -penetrating

### Montreal class

The classification of the disease has undergone tremendous changes to try and establish a classification that is easy and thus widely used by clinicians. An updated classification of the Vienna classification was released which did not make changes to the three main characteristics of the classification but on the subclassification of the disease category.

#### Age at presentation:

Recognition of the diseases early in life lead to the subclassification into:

- A1- less than 16 years
- A2- 17- 40 years
- A3- greater than or equal to 40 years

#### Location of the disease:

With the advent of upper gastrointestinal endoscopy, more cases of upper

gastrointestinal tract disease were identified leading to the classification as:

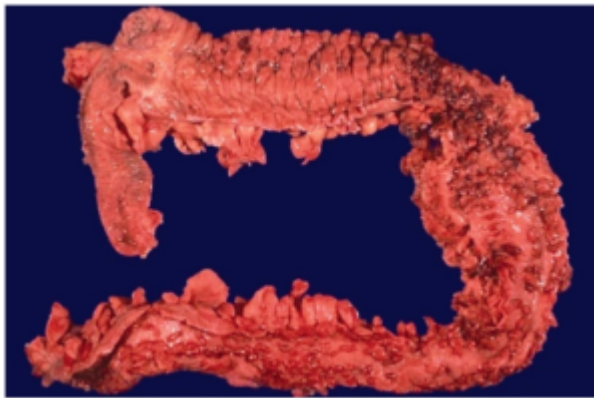
- L1- terminal ileum
- L2-colon
- L3-ileocolon
- L4-upper gastro-intestinal

**Behavior of the disease:**

Rectal disease was considered a different entity and an extra group added:

- B1-non-stricturing non-penetrating
- B2- stricturing
- B3 -penetrating
- P-type perianal disease

## Ulcerative colitis classification



**Image:** "Gross photograph of ulcerative colitis. Diffuse erythema, edema, and many inflammatory polyps are noted in the rectum, left colon, transverse colon, and hepatic flexure. The right colon and terminal ileum are normal." by openi. License: [CC BY 3.0](https://creativecommons.org/licenses/by/3.0/)

This specific type of IBD is classified by considering the area of colon affected, along with its severity:

- Class I/S1- Mild UC
- Class II/S2 - Moderate UC
- Class III/S3 - Severe UC

**Class I/S1 - Mild UC**

Passing up to four stools per day, together with blood and normal inflammatory markers (ESR) with absence of any systemic illness. The affected area is restricted to the rectum (ulcerative proctitis).

**Class II/S2 - Moderate UC**

Passing four or more stools per day and has negligible signs of systemic noxiousness.

**Class III/S3 - Severe UC**

Passing six or more blood-containing stools regularly, a pulse rate of >90 bpm, a temperature of >37.5°C, blood hemoglobin <10.5 g/100 ml, and elevated ESR >30 mm/h. Youngsters below 16 years of age having prolonged ulcerative colitis are inclined to have severe symptoms. ESR is a terminology used for the erythrocyte sedimentation

rate.

## Clinical Features of Crohn's Disease (Ileitis) and Ulcerative Colitis (UC)

IBDs, when symptomatic, have nearly the same presentation. The affected area is the main key way of distinguishing Crohn's disease from ulcerative colitis. The signs and symptoms of inflammatory bowel disease usually range from mild to severe conditions. Symptoms may develop suddenly.

### Signs and symptoms include:

- Abdominal pain due to inflammation and ulceration
- Bloody stool
- Ongoing diarrhea that causes intensified intestine cramping
- [Diarrhea](#) that sustains sleeplessness
- Low-grade fever lasting more than a day
- Mouth sores
- Fatigue and stress
- Nausea and vomiting
- Severe abdominal/pelvic pain
- Abnormal eating habits and difficulty in absorption and digestion

### Characteristic Crohn's disease symptoms:

- Perianal disease with fistula formation
- Delayed growth
- Skin and joint inflammation
- Liver inflammation

### Particular ulcerative colitis symptoms

- Rectal pain
- Rectal bleeding with mucous and pus
- Perseverance to defecate
- Incapability to have a bowel movement despite the urgency

## Diagnosis of Crohn's Disease (Ileitis) and Ulcerative Colitis (UC)

When Crohn's disease or ulcerative colitis is suspected, diagnosis is confirmed with a biopsy and radiological exams. There is no specific test for IBDs, besides biopsy, and one has to go through multiple options for the investigations.

### Blood tests

#### Hemoglobin

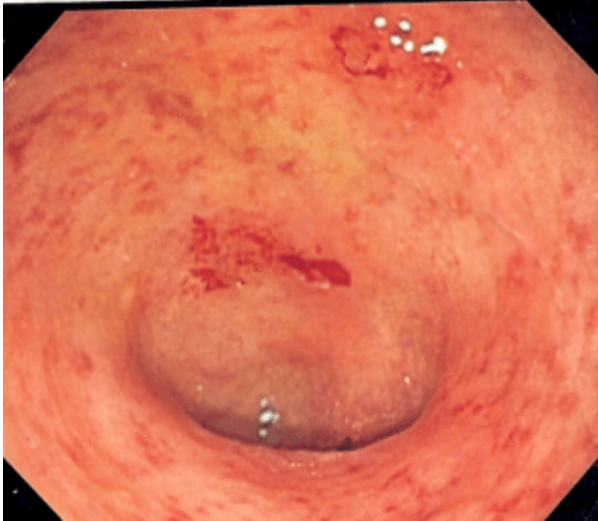
Patients are usually anemic and the efficiency of red blood cells is inadequate for transmission of oxygen to the tissues. Also, the early signs of infections can be interpreted.

## Stool tests

Identifying fecal occult will help in investigating the root cause behind these deadly diseases.

## Other Diagnostic Tests

### Colonoscopy



**Image:** "Endoscopic image of ulcerative colitis showing a loss of vascular pattern of the sigmoid colon, granularity and some friability of the mucosa." by Samir. License: [CC BY-SA 3.0](https://creativecommons.org/licenses/by-sa/3.0/)

This specific procedure is performed with the help of an endoscope. A few tissue samples can be taken out during the procedure for histological analysis. Groups of inflammatory cells known as granulomas are associated with Crohn's.

### Flexible sigmoidoscopy

The sigmoid is the last segment of the colon and is examined with an endoscope known as a slender.

### X-ray

An erect abdominal e-ray is recommended for the diagnosis of a perforated colon. It is a severe complication.

### Computerized tomography (CT)

It is a focused X-ray to show **more detailed X-ray analysis**. This scan can be performed for abdomen and pelvis inflammation. This is equally helpful in ulcerative colitis, as well as Crohn's disease.

### Magnetic resonance imaging (MRI)

A magnetic field, together with radio waves, is created in this procedure for a detailed analysis of tissues and organs. MRI is predominantly valuable for assessing a fistula near the anal area and it is termed as pelvic MRI; a CT scan does this too.



# Investigations of Crohn's disease

## Capsule endoscopy

In this particular procedure, you swallow a capsule consisting of a small camera to take pictures that are transmitted to a computer belt. After the procedure, the camera expels out of the body with the stool.

## Investigations for ulcerative colitis

### CT enterography combined with magnetic resonance (MR) enterography.

Unlike conventional imaging procedures, ulcerative colitis is diagnosed with more precision by using a combination of CT and MR enterography revealing soreness in the bowel. MR enterography is a substitute source. Soreness is the patch making a pattern caused by ulcerative colitis.

### Chromoendoscopy

Ulcerative colitis with colorectal cancer can be examined by chromoendoscopy in which a technician uses a spray dye to spot abnormal tissue variations.

## Differential Diagnosis of Crohn's Disease (Ileitis) and Ulcerative Colitis (UC)

The following comparison may help in distinguishing between both diseases:

<b>Clinical</b>	<b>Ulcerative Colitis</b>	<b>Crohn's Disease</b>
Gross blood in stool	Yes	Occasionally
Mucus	Yes	Occasionally
Systemic symptoms	Occasionally	Frequently
Pain	Occasionally	Frequently
Abdominal mass	Rarely	Yes
Significant perineal disease	No	Frequently
Fistulas	No	Yes
Small intestinal obstruction	No	Frequently
Colonic obstruction	Rarely	Frequently
Response to antibiotics	No	Yes
Recurrence after surgery	No	Yes
ANCA-positive	Frequently	Rarely
ASCA-positive	Rarely	Frequently
<b>Endoscopic</b>		
Rectal sparing	Rarely	Frequently
Continuous disease	Yes	Occasionally
"Cobblestoning"	No	Yes
Granuloma on biopsy	No	Occasionally
<b>Radiographic</b>		
Small bowel significantly abnormal	No	Yes
Abnormal terminal ileum	No	Yes
Segmental colitis	No	Yes

Asymmetric colitis	No	Yes
Stricture	Occasionally	Frequently

## Treatment of Crohn's Disease (Ileitis) and Ulcerative Colitis (UC)

Treatment of IBD can be divided into:

- **Pharmacological treatment**
- **Surgical treatment**

The goals of treatment of the disease include:

1. **Achieve remission**
2. **Avoid flares of inflammation**

### Pharmacological treatment

It involves a stepwise approach that progresses as follows:

1. Antibiotics and anti-inflammatory medications such as aminosalicylates
2. Steroids
3. Immunomodulators

### Anti-inflammatory medications

#### 5-aminosalicylates

5-ASA agents, such as **sulfasalazine**, are effective in inducing and maintaining remission in UC, with a limited role in inducing and maintaining remission in CD. This is most useful for the treatment of active Crohn's disease involving the colon.

#### Corticosteroids

Corticosteroids are effective in the treatment of moderately severe UC or CD. Corticosteroids don't play any role in maintaining remission of either UC or CD. They can be given orally as prednisone (40-60 mg/d) or parenterally as hydrocortisone (300 mg/d) or methylprednisolone (40-60 mg/d). Because of the systemic side effects of standard corticosteroids, another medication called **budesonide** (9 mg/day), which is used for 2-3 months, has the same potent effect of prednisone, but with fewer side effects.

### Immunosuppressors

#### Azathioprine and 6- Mercaptopurine

They are purine analogs that are used mainly in the treatment of corticosteroid-dependent IBD and used as glucocorticoid-sparing agents in UC & CD.

#### Methotrexate

It is effective in inducing and maintaining remission in active CD and allows the reducing of the dosage of glucocorticoids.

#### Biological therapies

The first approved biological therapy in the treatment of Crohn's disease refractory to previous regimens or moderate to severely active ulcerative colitis.

## Antibiotics

Antibiotics can lessen the quantity of drainage and occasionally dissolve fistulas in patients with Crohn's disease. Regularly recommended antibiotics include Metronidazole and Ciprofloxacin depending on the severity.

## Anti-diarrheals

A fibrous supplement including psyllium powder or methylcellulose help relieves moderate diarrhea by adding fiber bulk to the stool. Loperamide is effective for severe diarrhea.

## Supplements

Iron and vitamin supplements taken on a daily basis will overcome iron deficiency and vitamin B-12 will fulfill the body's needs and will encourage regular growth and development. Calcium supplements can reduce the risk of osteoporosis that occurs in Crohn's disease.

## Surgery

Indications and the preferred type of surgery vary with the specific disease.

### **Ulcerative colitis**

Here surgery is curative, and it is only indicated when:

- There is persistent inflammation.
- Medical therapy has failed.
- There is a concurrent malignancy or anaplastic process.

### **Procedures of choice include:**

- a. Proctocolectomy with stoma fashioning
- b. Proctocolectomy with ileoanal anastomosis which is the most common procedure although it has associated complications of pouch formation.

### **Crohn's disease**

The disease may involve any part of the gastrointestinal tract and thus surgery is not curative. It is only indicated when there are complications such as strictures or fistula formation.

Due to the imminent risk of recurrence, the smallest possible resection is done to allow for future resections and minimize the onset of surgery-related complications.

Procedures of choice include strictureplasty in which the impaired section is separated from the small intestine.

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