CANCER OF THE COLON/RECTUM

Colorectal cancer is the third most commonly occurring cancer worldwide. There were 1,926,425 new cases and 904,019 deaths worldwide in 2022 (Bray et al., CA: A Cancer Journal for Clinicians, 2024). Incidence rates have been decreasing overall for most of the past two decades due to colorectal cancer screening tests that allow for early detection and removal of polyps before they turn into cancer. However, incidence rates have increased by approximately 2.9% per year in people younger than 50 and 0.4% per year in adults aged 50-64, and colorectal cancer has now become the leading cause of cancer death in men under 50 and the second leading cause in women of the same age group (ACS, Colorectal Cancer Statistics, updated 2024).

Colorectal cancer refers to cancer of the large intestine. The first five feet of the intestine is called the colon and the last 6-8 inches is called the rectum. Because it is sometimes difficult to pinpoint a tumor in the large bowel, the colon and rectum are often grouped together as the colorectum. Colon cancer and rectal cancer share many features in common. Most colorectal cancers start as a growth on the inner lining of the colon or rectum called a polyp. Some types of polyps can change into cancer over the course of many years, but not all polyps will become cancerous. The chance of a polyp becoming cancerous depends on the type of polyp. The main types of polyps are (ACS, What Is Colorectal Cancer?, 2024):

- Adenomatous Polyps (adenomas)
- Hyperplastic Polyps and Inflammatory Polyps
- Sessile Serrated Lesions

Other factors that can increase someone's risk of developing colorectal cancer include having a polyp larger than 1 cm, having more than two polyps, or if dysplasia is seen in the polyp after it is removed (American Cancer Society, 2024). The colon is divided into four sections: the ascending colon, transverse colon, descending colon, and sigmoid colon. Most colorectal cancers arise in the sigmoid colon.Any change in bowel habits that persists for more than two weeks warrants prompt evaluation by a medical professional. Symptoms that should not be ignored include persistent narrowing of the size of the stools, gas pains, cramps, rectal bleeding or blood in the stool, and unexplained fatigue or weight loss. In 2024, the Center for Disease Control has indicated that the following lifestyle factors increase the risk of colorectal cancer (ACS, Colorectal Cancer Risk Factors, 2024; Wagle et al., CA: A Cancer Journal for Clinicians, 2025):

- Diet - high consumption of red meat and processed meat (bacon, sausage, hot dogs), low-fiber diet, high-fat diet, low intake of calcium and vitamin D, and high consumption of ultra-processed foods
- Sedentary lifestyle and lack of regular exercise
- Obesity, particularly having excess fat in the waist area, rather than the hips or thighs
- Gut microbiome dysbiosis - an imbalanced gut microbiome, influenced by diet and lifestyle, is increasingly recognized as a contributing factor
- Cigarette smoking - both the number of cigarettes per day and smoking initiation are associated with increased risk
- Moderate to heavy alcohol intake; studies consistently show that consumption above moderate levels significantly increases colorectal cancer risk, with heavy drinking associated with a 26% increased risk of distal colon cancer in men and a dose-response relationship confirmed across tumor sites and beverage types
- Inherited genetic conditions (lynch Syndrome & hereditary non-polyposis colorectal cancer or familial adenomatous polyposis (FAP)
- Type 2 diabetes - insulin resistance and elevated blood glucose create a pro-inflammatory environment that promotes tumor development
- Having a personal history of high-risk colorectal polyps
- Inherited genetic conditions, including Lynch Syndrome and familial adenomatous polyposis (FAP)

Types of Colorectal Cancer:

There are many types of colorectal cancer, the most common of which is adenocarcinoma, accounting for approximately 95% of all colorectal cancers. Rarer types include carcinoid tumors, gastrointestinal stromal tumors, and colorectal lymphoma (NCI, Rectal Cancer Treatment PDQ, 2024; ACS, What Is Colorectal Cancer?, 2024). Hereditary colorectal cancers - meaning that several generations of a family have had colorectal cancer - include hereditary nonpolyposis colorectal cancer (HNPCC/Lynch syndrome) and familial adenomatous polyposis (FAP) (ACS, Colorectal Cancer Risk Factors, 2024).

Although colon and rectal cancers are usually grouped together, there are differences in the way they are treated. Surgery for rectal cancer is often more complex than surgery for colon cancer, due to the narrow confines of the pelvis. This area contains the nerves responsible for sexual and bladder function, so particular care must be taken to avoid damaging them. Rectal cancer is also more likely to recur locally after surgery than colon cancer (Lotfollahzadeh, Kashyap, Tsoris, et al., StatPearls, 2023; ACS, What Is Colorectal Cancer?, 2024).

- **Adenocarcinomas –** are tumors that start in the lining of internal organs. "Adeno" means gland. These tumors start in cells with glandular properties, or cells that secrete. They can form in many different organs, such as the lung or the breast. In colorectal cancer, early tumors start as small adenomatous polyps that continue to grow and can then turn into malignant tumors.

There are two less common subtypes of adenocarcinomas:

- **Mucinous Adenocarcinoma –** is made up of about 60% mucus. The mucus may cause cancer cells to spread more quickly and become more aggressive than typical adenocarcinomas. Mucinous adenocarcinomas account for 10-15% percent of all rectal and colon adeno carcinomas (What Is Colorectal Cancer?, 2024).

- **Signet Ring Cell Adenocarcinoma –** account for fewer than 1% of all colon cancers. Named for its appearance under a microscope, signet ring cell adenocarcinoma is typically aggressive and may be more difficult to treat, with 5-year overall survival rates as low as 20% in patients with full signet ring cell tumors compared to approximately 55% in conventional adenocarcinoma (Gronnier et al., Cancers, 2023; Allart et al., Cancers, 2026

- **Gastrointestinal Stromal Tumors (GIST) –** are a rare type of colorectal cancer that forms in special cells found in the lining of the gastrointestinal (GI) tract called interstitial cells of Cajal (ICCs). Approximately 60% develop in the stomach, 30% in the small intestine, and 3-5% in the rectum. GISTs are classified as sarcomas, or cancers that begin in the connective and mesenchymal tissues (Serrano et al., Cancers, 2023; Italiano et al., PMC, 2023).

- **Primary Colorectal Lymphomas –** a type of non-Hodgkin lymphoma, this cancer type develops in the lymphatic system, specifically in cells called lymphocytes. Lymphocytes are a type of white blood cell that helps the body fight infections. Lymphoma may develop in many parts of the body, including the lymph nodes, bone marrow, spleen, thymus, and the digestive tract. Primary colorectal lymphomas account for 0.5% of all colorectal cancers and about 5% of lymphomas. This colorectal cancer type usually develops later in life and is more common in men (NCI, Rectal Cancer Treatment PDQ, 2024).

- **Carcinoid Tumors –** develop in nerve cells called neuroendocrine cells, which help regulate hormone production. These tumors are among a group of cancers called neuroendocrine tumors (NETs). Carcinoid tumor cells are slow-growing and may develop in the lungs and/or gastrointestinal tract. They account for about 1% of all colorectal cancers and half of all cancers found in the small intestine. Carcinoid tumors also sometimes produce hormones that may lead to various symptoms, depending on the type of hormone .Approximately 10% of individuals with these tumors experience carcinoid syndrome - characterized by flushing of the face, diarrhea, wheezing, and rapid heartbeat - caused by hormone-like substances released by the tumor (ACS, What Is Colorectal Cancer?, 2024).

- **Colon and Rectal Leiomyosarcomas –** are another form of sarcoma. Leiomyosarcoma essentially means “cancer of smooth muscle.” The colon and rectum have three layers of the type of muscle affected by leiomyosarcoma, and all three work together to guide waste through the digestive tract. This rare type of colorectal cancer accounts for about 0.1% of all colorectal cases (NCI, Rectal Cancer Treatment PDQ, 2024).

- **Colon and Rectal Melanomas –** most associated with skin cancer, these may start to develop anywhere, including in the colon or rectum, or may spread to the GI tract from the primary melanoma site. Melanomas account for 1-3% of all cancers that develop in the digestive system (ACS, What Is Colorectal Cancer?, 2024).

Procedures:

- **Polypectomy / Local Excision –** this minimally invasive procedure removes a small tumor or polyp from the inner lining of the colon using a colonoscope or flexible surgical tool. It is generally performed during a colonoscopy and is appropriate for very early-stage cancers that have not grown beyond the mucosal layer or spread to lymph nodes. Because it preserves the rest of the colon, it is considered curative in select cases where margins are clear and no invasion is present.

When it's used:

- Used for very early-stage colon cancers or precancerous polyps confined to the inner lining (mucosa)
- Appropriate when the tumor is small, superficial, and shows no invasion into deeper layers or lymph nodes
- Typically performed during screening colonoscopy for localized lesions with clear margins.

Following a polypectomy/local excision, recovery is typically rapid compared with major colorectal surgeries, since the procedure is minimally invasive and does not involve abdominal incisions or bowel reconnection. Most patients go home the same day or within 24 hours. Hospital time depends on the size, depth, and location of the lesion removed, but serious complications are uncommon. During the hospital stay, patients are monitored briefly for signs of bleeding, perforation, or pain before being discharged with dietary and activity guidelines.

During the first week, mild abdominal cramping, bloating, or small amounts of rectal bleeding are common. Patients are encouraged to rest but remain lightly active, as gentle walking promotes healthy bowel function and reduces the risk of gas retention. Straining, lifting heavy objects, or vigorous exercise should be avoided during this time to minimize pressure within the abdomen and allow the bowel wall to heal. A soft, low-fiber diet may be recommended for a few days before returning to normal eating habits.

From weeks 2-4, most individuals resume normal daily activities and work without restriction, provided there are no symptoms such as bleeding, pain, or fatigue. Moderate, low-impact activities such as walking, stretching, or gentle yoga are generally safe, but heavy lifting, high-intensity exercise, or abdominal workouts should still be avoided for at least 2-3 weeks after the procedure.

Between weeks 5-12, the colon lining continues to heal completely, and most patients are fully recovered. At this stage, there are no major restrictions on physical activity, and regular exercise can be gradually resumed as tolerated. Any strenuous activity involving core strain - such as heavy lifting, sprinting, or high-resistance training should only be reintroduced once the patient is symptom-free and cleared by their physician. Ongoing follow-up may include colonoscopy or imaging to ensure the polyp site has healed properly and that no residual or recurrent lesions are present.

- **Partial Colectomy (Segmental Reesection / Hemicolectomy) –** this is the most common surgery for colon cancer. The surgeon removes the portion of the colon containing the tumor, along with a margin of healthy tissue and nearby lymph nodes, and then reconnects the remaining ends of the bowel (anastomosis). This approach provides a balance between effective cancer removal and preservation of bowel function. The extent of resection depends on where the tumor is located.

  - **Right Hemicolectomy -** removal of the ascending colon (right side) and part of the transverse colon

  - **Left Hemicolectomy -** removal of the descending colon (left side)

  - **Sigmoid Colectomy (Sigmoidectomy) -** removal of the sigmoid colon, the S-shaped portion near the rectum

  - **Transverse Colectomy -** removal of the middle section of the colon

  - **Segmental Colectomy -** removal of a smaller segment within one of these sections when the tumor is localized

When it's used:

- Used for stage I-III colon cancers confined to one section of the colon

- Indicated when the tumor has invaded the bowel wall or lymph nodes but remains localized enough for curative removal

- Selected when there is adequate healthy colon remaining to reconnect the bowel after resection

- Suitable for patients with good general health and sufficient pulmonary and cardiac function to tolerate major surgery

Following a colectomy, recovery takes place gradually over several weeks as the body adapts to the loss of a portion or all of the colon and the bowel adjusts to its new function. Hospital stays typically range from 4-7 days for minimally invasive procedures such as laparoscopic or robotic colectomy and up to 10 days for open surgery or cases involving complications. During the hospital phase, the focus is on pain control, bowel function recovery, and prevention of complications such as infection, ileus (temporary paralysis of the bowel), or blood clots. Patients usually begin walking within 24 hours after surgery to promote circulation, reduce stiffness, and encourage intestinal movement. Once bowel sounds return and the patient can tolerate liquids and soft food, discharge is usually appropriate.

During the first four weeks at home, fatigue, abdominal soreness, and irregular bowel habits are common. It is normal for bowel movements to be loose or more frequent during this period as the remaining colon adapts. Activity should be limited to gentle walking and light daily movements, avoiding strain or twisting of the abdomen. Lifting, pushing, or pulling objects heavier than 5-10 pounds should be avoided to protect the abdominal incision and prevent hernias.

Patients are encouraged to maintain upright posture, take frequent short walks, and rest between activities to promote healing. Driving, sexual activity, and returning to work should wait until pain has subsided and mobility has improved - usually by the end of the first month.

Between weeks 5-8, energy levels gradually improve, and most patients begin to resume light household tasks or return to part-time work. Walking distances can be increased, and simple stretching may be introduced to maintain flexibility. However, activities that cause abdominal pressure, such as lifting more than 15 pounds, bending repeatedly, or high-impact exercise, should still be avoided.

Patients with a temporary stoma may need to adjust their routines around stoma care and pouch management, ensuring hydration and nutrition are maintained.

By weeks 9-12, most individuals experience a noticeable return of strength and endurance. Bowel patterns usually stabilize, and abdominal discomfort continues to diminish. At this stage, light to moderate exercise can be resumed, including stationary cycling, gentle resistance work, and longer walks, provided there is no pain or fatigue. Heavy lifting, core-intensive training, and strenuous aerobic exercise should wait until at least 12 weeks post-surgery and only after clearance from the surgeon. Full recovery, meaning unrestricted activity, stable digestion,and complete tissue healing, typically takes 3-6 months, depending on the extent of surgery and the patient's overall health

- **Total or Subtotal Colectomy –** involves removal of nearly all or the entire colon, typically used when there are multiple tumors, diffuse disease, or a hereditary condition such as familial adenomatous polyposis. After removal, the surgeon connects the small intestine to the rectum or creates a stoma to divert waste. This operation sacrifices more bowel length but provides the most comprehensive tumor clearance.

When it's used:

- Used when primary reconnection (anastomosis) is un safe due to infection, inflammation, or poor healing conditions
- Indicated when bowel obstruction, perforation, or emergency surgery prevents safe continuity restoration
- Sometimes performed temporarily to divert stool away from a healing connection after low or difficult resections
- May be permanent in advanced disease or when the rectum and sphincter must be removed

Following a total or subtotal colectomy, recovery is generally more complex and prolonged than after a partial colectomy because a larger section - or the entire colon - has been removed. Hospital stays typically range from 5-10 days, depending on whether the surgery was performed laparoscopically or through an open incision, and on how quickly bowel function returns. During the hospital phase, patients are closely monitored for pain control, hydration, and early complications such as infection, bleeding, or anastomotic leakage.

Walking is encouraged within 24 hours after surgery to prevent blood clots,stimulate bowel activity, and promote circulation. Because the small intestine must now adapt to handling most of the digestive process, bowel movements can be frequent and watery for several weeks. Once the patient can tolerate fluids and soft foods and the bowels are functioning, discharge is typically considered.

During the first month at home, fatigue and weakness are common, and it can take time for appetite and energy to return. Abdominal tenderness and changes in bowel habits - such as urgency, loose stools, or gas discomfort - are expected as the gastrointestinal tract adjusts. Activity should be limited to light walking and basic household tasks. Lifting, pushing, or pulling objects heavier than 5-10 pounds should be strictly avoided to protect the abdominal wall and internal sutures. Patients with a stoma require additional guidance on pouch care, hydration, and preventing skin irritation, as fluid loss and electrolyte imbalance can occur more easily after extensive colon removal.

Between weeks 5-8, strength gradually improves, and walking distances can increase at a comfortable pace. A regular eating pattern usually returns, though patients may need to eat smaller, more frequent meals and avoid high-fat or high-fiber foods until digestion stabilizes. Activities that create strain or abdominal pressure - such as lifting more than 15 pounds, bending repeatedly, or high-impact movement - should still be avoided. Rest remains an important part of recovery, as fatigue can fluctuate daily.

By weeks 9-12, most individuals are capable of resuming moderate daily activities, including light exercise such as walking, stationary cycling, and gentle stretching. Patients with a stoma typically become more confident managing their appliance and can resume many normal routines. Strenuous activity, heavy lifting, abdominal workouts, or high-intensity training should not begin until after 12 weeks and only with the surgeon's clearance. Full recovery, meaning stable bowel function, complete wound healing, and restored endurance - may take three to six months, depending on the patient's overall health, the extent of surgery, and any underlying conditions.

- **Colectomy with Stoma (Colostomy or Ileostomy) –** when reconnection of the colon is not possible or safe, a stoma is created. The bowel is brought to the surface of the abdomen, and stool is collected in a pouch outside the body. This may be temporary, allowing the bowel to heal before reattachment, or permanent if reconnection is not feasible. It is used when there is significant inflammation, poor healing potential, or bowel obstruction.

When it's used:

- Emergency surgery: when the bowel is obstructed, perforated, or severely inflamed, making reconnection too risky
- Poor healing conditions: in cases of infection, contamination of the abdominal cavity, or compromised blood supply to the remaining bowel
- Low rectal or complex resections: when the anastomosis (bowel connection) is very low in the pelvis and needs time to heal, a temporary stoma diverts stool away from the site
- Advanced or recurrent cancer: when curative surgery is not possible or the rectum and anal sphincter must be removed, resulting in a permanent colostomy
- Severe comorbidities or poor overall health: when the patient's condition would not tolerate the additional strain of bowel reconnection during the same operation

Following a total or subtotal colectomy with a stoma (colostomy or ileostomy), recovery takes longer and requires additional adaptation - both physically and emotionally - as the body adjusts to a new way of eliminating waste. Hospital stays typically range from 7-10 days, depending on whether the surgery was performed laparoscopically or as an open procedure, and on how quickly bowel function stabilizes. During this period, the focus is on pain management, hydration, and learning how to care for the stoma. Nurses provide education on pouch changes, skin protection, and recognizing signs of infection or leakage. Patients begin walking within 24 hours after surgery to improve circulation, promote bowel movement through the small intestine, and reduce the risk of blood clots. Once oral intake is tolerated, the stoma is functioning, and the patient feels comfortable with stoma care, discharge is considered appropriate.

During the first month at home, fatigue and abdominal tenderness are expected, and adjusting to stoma care can feel overwhelming. The abdomen and peristomal skin may be sensitive, and swelling around the stoma is common early on. Physical activity should be limited to short, slow walks and gentle daily movement. Lifting, pushing, or pulling anything heavier than 5-10 pound should be strictly avoided to prevent strain on the abdominal incision and reduce the risk of developing a parastomal hernia. Hydration is critical - especially after an ileostomy - since the large intestine, which normally absorbs much of the body's fluids, is no longer present. Small, frequent meals with moderate fiber are recommended while the digestive system adjusts. Rest periods throughout the day help manage fatigue and promote healing.

Between weeks 5-8, energy levels improve gradually, and walking distances can increase at a comfortable pace. By this stage, most patients can manage their stoma independently and resume basic household tasks, provided they avoid heavy lifting or twisting of the torso. Light stretching or range-of-motion exercises can be introduced, but abdominal and core work should still be avoided. Hydration and electrolyte balance continue to require attention, particularly for those with an ileostomy. Foods that cause gas, blockages, or odor should be introduced slowly, and medical follow-up is essential to assess stoma healing and pouch fit.

By weeks 9-12, strength and confidence typically improve, and most patients resume moderate daily activity, including light walking, stationary cycling, or gentle yoga. Stoma care becomes more routine, and bowel output patterns begin to stabilize. Heavy resistance training, running, or exercises that place pressure on the abdomen - such as planks, sit-ups, or weightlifting - should still be postponed until at least twelve weeks post-surgery, or longer if healing is incomplete. Core strengthening and higher-impact fitness can be gradually reintroduced under medical guidance, focusing on avoiding excessive strain near the stoma. Full recovery after a total or subtotal colectomy witha stoma may take 3-6 months, depending on surgical complexity, individual healing, and adaptation to stoma care.

- **Laparoscopic or Robotic Colectomy (minimally invasive approach) –** these methods use small incisions and specialized instruments guided by a camera or robotic system to perform the same procedures as traditional open colectomy. The benefits include less postoperative pain, smaller scars, faster recovery, and shorter hospital stays. This approach is suitable for most localized colon cancers when performed by experienced surgeons.

When it's used:

- Used for localized colon cancers in patients who are suitable for minimally invasive surgery
- Chosen when tumors are small, resectable, and there is no extensive local invasion or metastasis
- Preferred for patients seeking faster recovery, less postoperative pain, and minimal scarring
- Increasingly used for most elective resections in experienced surgical centers worldwide

Following a laparoscopic or robotic colectomy, recovery is generally faster and less painful than with open surgery because the procedure uses several small incisions rather than one large one. Hospital stays typically last between 3 and 5 days, though many patients undergoing robotic-assisted surgery may be discharged even sooner if bowel function returns quickly.

During hospitalization, the primary goals are pain management, gradual reintroduction of fluids and food, and early ambulation. Patients are encouraged to begin walking within 12-24 hours after surgery to reduce the risk of blood clots, stimulate bowel activity, and promote overall recovery. Once patients can tolerate a light diet and their bowel function begins to normalize, discharge is usually appropriate.

During the first month at home, most individuals experience mild fatigue, occasional abdominal discomfort, and changes in bowel habits, such as bloating or frequent stools. Physical activity should be limited to light, non-strenuous movements such as walking short distances several times per day. Lifting or carrying objects heavier than 10 pounds should be avoided to prevent stress on the healing incisions. Driving and returning to work should wait until pain is well controlled and reaction times have returned to normal-typically within 2-4 weeks, depending on the individual's recovery and job demands.

Between weeks 5-8, energy levels generally improve, and patients can increase walking distances or begin light stretching and gentle mobility exercises. Most can resume household chores and desk work without restriction but should still avoid any motion that strains the abdominal muscles, including bending, twisting, or lifting weights over 15 pounds). Bowel regularity usually stabilizes during this period, though diet adjustments may continue based on tolerance.

By weeks 9-12, most patients are capable of returning to normal routines, including moderate exercise such as brisk walking, low-resistance cycling, or gentle yoga. The small incisions are typically well healed, though deep internal tissues continue to strengthen. Heavy lifting, running, abdominal workouts, and high-impact exercise should be postponed until the three-month mark and only resumed once cleared by the surgeon. Complete recovery - defined by stable bowel function, restored strength, and full mobility - usually occurs within 8-12 weeks.

- **Emergency or Palliative Resections –** in some advanced or complicated cases such as bowel obstruction, perforation, or uncontrollable bleeding – surgery may be performed to relieve symptoms rather than to cure the cancer. The surgeon may remove or bypass the tumor, create a colostomy, or perform limited resection. The intent is to improve comfort, prevent infection, and restore bowel function rather than achieve long-term remission.

When it's used:

- Used in emergencies such as bowel obstruction, perforation, or severe bleeding caused by tumor growth
- Indicated for symptom relief rather than cure in advanced or metastatic disease
- May involve bypassing or removing the obstructed bowel segment, creating a stoma, or controlling bleeding
- Helps improve comfort, prevent infection, and restore intestinal function when curative treatment is not possible

Following an emergency or palliative colectomy, recovery varies widely depending on the reason for surgery, the patient's overall condition, and whether complications such as bowel perforation, obstruction, or bleeding were present before the operation. Hospital stays are typically longer than for planned procedures, often ranging from 7-14 days or more, since patients undergoing emergency surgery are frequently weaker or have other health issues that delay recovery. During hospitalization, the primary focus is stabilizing vital signs, controlling infection or inflammation, and ensuring the bowel and surrounding tissues heal properly. Pain management, hydration, and gradual reintroduction of oral intake are closely monitored. Walking is encouraged as soon as safely possible - usually within the first 48 hours – to promote circulation, reduce stiffness, and prevent pneumonia or blood clots.

The first month at home is focused on regaining basic strength and preventing complications such as wound infection, hernias, or dehydration. Activity should remain light, limited to slow walking and essential daily tasks. Lifting or carrying objects heavier than 5-10 pounds should be avoided to reduce abdominal strain. Depending on the extent of surgery, some patients may have a temporary or permanent stoma and will require time and education to adjust to stoma care.

Those recovering from emergency operations may also be coping with malnutrition or fatigue from prior illness, making rest and gradual progression especially important.

Between weeks 5-8, most patients begin regaining energy and can increase walking distance and frequency. Diet and bowel function gradually stabilize, though irregularities such as loose stools or mild cramping are common. Gentle stretching and breathing exercises may be helpful for mobility, but heavy exertion, twisting, or lifting more than 15 pounds should still be avoided. Emotional recovery is also an important part of this phase, especially for individuals living with advanced disease or a new stoma.

By weeks 9-12, strength and endurance typically improve, allowing patients to return to light daily activities. For those who underwent surgery with palliative intent, exercise is guided more by comfort and energy levels than by strict progression. Gentle, low-impact movement such as walking,easy cycling, or basic mobility exercises, can support circulation, mood, and independence. High-intensity activity, core strain, or weightlifting should be avoided indefinitely unless the patient has made exceptional progress and receives medical clearance.

Overall, recovery after an emergency or palliative resection focuses less on physical performance and more on restoring function, managing symptoms, and maintaining quality of life. Healing may take several months, and pacing activity to match individual tolerance - alongside emotional and nutritional support - is essential for optimal recovery and comfort.

- **Low Anterior Resection (LAR) –** a low anterior resection involves removing the rectosigmoid portion of the colon and upper part of the rectum, where the tumor is located, while preserving the anal sphincter and normal bowel continuity. The healthy ends of the colon and rectum are then reconnected (anastomosed). This approach allows the patient to maintain normal bowel control and avoid a permanent colostomy.

It is still very commonly performed worldwide, particularly for:

- Mid-to upper-rectal cancers that are located above 5-6 cm from the anal verge, where there is enough healthy tissue below the tumor to reconnect safely
- Early- to mid-stage rectal cancers (stage I-III) that have not invaded the anal sphincter or pelvic floor muscles
- Select sigmoid colon cancers that extend into the upper rectum

The operation may be done through open, laparoscopic, or robotic-assisted approaches, depending on surgeon expertise and tumor characteristics. Minimally invasive methods have become more prevalent due to their lower complication rates, faster recovery, and similar long-term oncologic outcomes.

When it's used:

- Used for rectosigmoid or upper rectal cancers located approximately 5-12 cm from the anal verge
- Indicated for stage I-III tumors that have not invaded the anal sphincter or pelvic floor muscles
- Selected when the goal is to preserve normal bowel continuity and avoid a permanent colostomy
- Suitable for patients with good sphincter control and adequate blood supply to permit safe reconnection
- Often combined with a temporary diverting ileostomy to protect the surgical connection while it heals

Following a low anterior resection (LAR), recovery tends to be gradual, as the body heals from both the bowel resection and the reattachment of the colon to the remaining rectum. Hospital stays typically last between 5-7 days for minimally invasive procedures, and up to ten days for open surgeries or more complex cases. The focus during hospitalization is on controlling pain, monitoring bowel function, and ensuring the anastomosis (bowel connection) heals properly. A temporary diverting ileostomy is often created to protect the reconnected section of the bowel. Early ambulation - beginning within 24 hours - is strongly encouraged to reduce the risk of blood clots, improve circulation, and promote return of bowel activity. Once the patient can tolerate fluids and a soft diet and bowel movement resumes, discharge is considered appropriate.

During the first month at home, fatigue and changes in bowel habits are common. It is important to avoid straining or sitting for prolonged periods. Activity should focus on gentle walking and light daily movement, avoiding lifting more than 5-10 pounds or engaging in any activity that increases abdominal pressure. Driving, sexual activity, and returning to work should wait until pain is well managed and energy levels improve - usually by 4-6 weeks.

Between weeks 5-8, most individuals begin to regain strength and confidence in movement. Walking distances can be increased gradually, and light stretching or gentle yoga may be introduced if cleared by the surgeon. If a temporary stoma is present, this period also allows for adaptation to stoma care and routine management. Bowel control continues to improve, but irregularity is still expected. Activities involving bending, twisting, or lifting more than 15 pounds should still be avoided.

By weeks 9-12, most patients experience better energy, reduced discomfort, and improved bowel regulation. Moderate activities such as longer walks, stationary cycling, and gentle resistance exercises may be resumed, provided there is no pain or fatigue. Core or abdominal strengthening and high-impact activity should be delayed until at least twelve weeks post-surgery and only after medical clearance, as the anastomosis and pelvic floor continue to heal.

Full recovery after a low anterior resection typically occurs over 3-6 months, depending on surgical complexity and whether an ileostomy was created. Bowel patterns may take several months to stabilize, and patients often benefit from dietary adjustments and pelvic floor retraining to improve function. The focus during the first three months is gradual reconditioning, avoiding abdominal strain, and allowing both physical and bowel function to recover safely.

- **Abdominoperineal Resection (APR) –** an abdominoperineal resection removes the rectum, anal canal, and surrounding tissue, including the sphincter muscles. The colon is then brought through the abdominal wall to form a permanent colostomy. This procedure is performed when there is no safe way to reconnect the bowel while preserving continence, typically because the tumor is too close to or involves the anal sphincter.

When it's used:

- Low rectal cancers (within 4-5 cm of the anal verge) n that cannot be adequately excised with clear margins through a low anterior resection
- Tumors invading the anal sphincter or levator ani muscles, where sphincter preservation would leave cancer behind
- Recurrent rectal cancers or those not responsive to chemoradiation
- Locally advanced anal adenocarcinomas or some cases of anal squamous carcinoma not suitable for non-surgical management.
- Locally advanced rectal cancer invading adjacent pelvic organs such as the bladder, uterus, vagina, prostate, or sacrum
- Recurrent colorectal cancer after prior resection or radiation, when confined to the pelvis and resectable en bloc
- Locally invasive gynecologic malignancies (such as cervical or vaginal cancer) involving the rectum or bladder
- Select cases of palliative intent, to relieve severe pain, obstruction, infection, or fistulas caused by invasive pelvic disease
- Persistent disease following chemoradiation, where complete resection offers a chance for long-term survival

Following an abdominoperineal resection (APR), recovery typically requires more time and care than other colorectal surgeries because it involves both an abdominal incision and a perineal wound. Hospital stays generally range from 7-10 days, although this can vary depending on the patient's health, the surgical approach (open vs. laparoscopic), and whether complications such as infection or delayed healing occur. During hospitalization, the focus is on pain control, wound management, and learning how to care for the permanent colostomy. The perineal incision can cause discomfort when sitting, so patients are encouraged to use cushions and change positions frequently. Walking usually begins within 24 hours after surgery to promote circulation, prevent clots, and aid bowel function through the remaining intestine. Discharge occurs once the stoma is functioning, pain is manageable, and patients are confident with basic stoma care.

The first four weeks at home are focused on rest, gradual mobility, and wound care. Fatigue, soreness, and drainage from the perineal wound are common. Walking is the safest form of exercise during this period, starting with short, slow sessions several times per day. Lifting, pushing, or pulling anything heavier than 5-10 pounds should be avoided to protect both incisions and prevent hernias near the stoma. Sitting for long periods should be minimized until the perineal area heals, and a soft cushion should be used for comfort. Maintaining hydration and a low-fiber diet early on helps prevent straining and allows the digestive system to adjust to colostomy function.

Between weeks 5-8, energy levels improve, and walking distances can increase at a steady pace. Most patients can perform light household tasks, provided they avoid bending, twisting, or heavy lifting. Gentle stretching may be introduced to restore mobility, but anything that places pressure on the perineum or abdomen should be postponed. Stoma management typically becomes easier during this time, and the perineal incision continues to close and strengthen.

By weeks 9-12, most individuals experience noticeable gains in strength and independence. Moderate activity such as walking longer distances, gentle yoga, or stationary cycling may be resumed as long as it does not High-impact movements, abdominal exercises, and lifting more than 15-20

pounds should still be avoided to prevent strain or hernia formation. Sitting comfort gradually improves, but full perineal healing can take several months.

Complete recovery from an abdominoperineal resection typically occurs within 3-6 months, though adaptation to a permanent colostomy may take longer.

- **Pelvic Exenteration –** pelvic exenteration is a far more extensive operation involving the removal of multiple pelvic organs - such as the rectum, bladder, reproductive organs, and sometimes part of the bony pelvis - to achieve complete removal of locally advanced or recurrent cancer. The procedure may be total, anterior, or posterior, depending on which structures are removed. Although pelvic exenteration carries high morbidity and a long recovery, it remains a potentially curative option for select patients with no distant metastases. Improvements in imaging, patient selection, reconstructive surgery, and peri-operative care have led to better survival and quality-of-life outcomes in recent years.

When it's used:

- Locally advanced rectal cancers that invade adjacent pelvic organs but have not spread distantly
- Recurrent colorectal or gynecologic cancers confined to the pelvis after prior surgery or radiation
- Palliative indications, in highly selected cases, to relieve pain,infection, or obstruction when other treatments fail

Following a pelvic exenteration, recovery is extensive and requires a multidisciplinary approach to address both the physical and emotional challenges of such a major operation. Hospital stays typically range from 10-21 days, depending on the extent of the surgery and whether it involved removal of adjacent organs such as the bladder, reproductive organs, or part of the bony pelvis. The immediate postoperative focus is on pain management, infection prevention, and monitoring for complications such as bleeding, wound breakdown, or abscess formation.

Patients are closely observed in a high-dependency or intensive care unit during the first few days, as multiple surgical sites and drains require careful management. Nutrition is reintroduced slowly - usually starting with clear fluids and progressing to soft foods once bowel activity resumes.

Patients often have one or more stomas (colostomy, ileostomy, or urostomy), and stoma education begins as soon as they are stable enough to participate. Gentle assisted walking usually starts within 48-72 hours to improve circulation, reduce stiffness, and prevent clots.

During the first month at home, recovery remains slow and focused on wound care, energy conservation, and learning to manage new bodily functions. Patients often experience fatigue, abdominal and pelvic tenderness, and significant adjustments to body image and daily routines, especially if permanent stomas are present. Physical activity should be minimal and limited to short, gentle walks several times a day, gradually increasing in duration as tolerated. Lifting, bending, twisting, or carrying objects heavier than 5-10 pounds should be strictly avoided to prevent wound separation or hernia formation. Hydration and nutrition are essential for healing, and small, frequent meals are often better tolerated. Emotional and psychological support are equally important during this phase, as patients adapt to major lifestyle changes.

Between weeks 5-8, energy levels begin to improve, and walking distances can be increased at a slow, steady pace. Light household activities may be resumed if they do not involve strain or fatigue. Some patients begin gentle stretching or physical therapy to restore mobility and prevent stiffness in the hips and lower back. Any exercise involving the abdominal or pelvic region should be avoided, as deep tissue healing continues. Wound sites, particularly perineal or pelvic incisions, often take several months to fully close and must be kept clean and dry to prevent infection.

By weeks 9-12, most individuals experience gradual increases in stamina and a greater ability to perform daily activities. Low-impact exercises such as walking, light stationary cycling, or gentle range-of-motion exercises can usually be performed without discomfort. However, heavy resistance training, running, or any movement that increases intra-abdominal pressure should be postponed until at least 12-16 weeks post-surgery and only after medical clearance. Adaptation to stoma care and urinary diversion continues during this period, with support from wound and ostomy care nurses.

Full recovery following a pelvic exenteration can take six months to a year, depending on surgical complexity, reconstruction, and the patient's baseline health. Many patients benefit from ongoing physical therapy, nutritional counseling, and psychological support.

Potential Side-effects from most Colorectal Surgeries:

- Pain and tenderness at the incision site(s), especially with movement or coughing
- Fatigue and weakness due to anesthesia, blood loss, or reduced nutrition intake
- Abdominal bloating or cramping as bowel function gradually returns
- Changes in bowel habits, such as loose stools, constipation, urgency, or frequent bowel movements
- Anastomotic leak (in surgeries involving bowel reconnection) leakage of intestinal contents at the surgical join, potentially causing infection or abscess
- Wound infection or abscess formation near the incision or in the pelvic cavity
- Postoperative ileus - temporary slowing or paralysis of bowel activity leading to nausea, bloating, or vomiting
- Adhesions or intestinal obstruction due to scar tissue formation
- Urinary retention or bladder dysfunction (especially in low rectal or pelvic surgeries where nerves are affected)
- Sexual dysfunction resulting from nerve damage in the pelvic area

Digestive and nutritional effects:

- Reduced nutrient absorption (more likely after large resections)
- Dehydration due to increased stool frequency or reduced colon length
- Food intolerance or difficulty digesting high-fiber or fatty foods early in recovery
- Weight loss or malnutrition if dietary intake is inadequate

Stoma-related side effects (for colostomy or ileostomy procedures):

- Deep vein thrombosis (DVT) or pulmonary embolism (PE) due to prolonged immobility after surgery
- Skin irritation (peristomal dermatitis) from leakage, adhesives, or frequent pouch changes
- Parastomal hernia - bulging near the stoma from weakened abdominal muscles
- Stoma prolapse (bowel protruding too far outward) or stoma retraction (sinking below skin level)
- Stomal bleeding or minor trauma during cleaning
- Stomal blockage or obstruction from undigested food or scar tissue
- Infection or abscess around the stoma site
- Dehydration or electrolyte imbalance, particularly with high-output ileostomies
- Excess gas, odor, or leakage affecting comfort and confidence

Body image changes and adjustment challenges, especially after permanent stoma creation:

- Anxiety or depression related to lifestyle adaptation or cancer recovery
- Social discomfort or fear of odor and leakage during daily activities
- Sleep disturbance from pain, stoma output, or anxiety

Types of Treatment Used:

- Ablative therapies (e.g., radio frequency ablation, microwave ablation)
- Anti-angiogenic therapy
- Chemotherapy (systemic cytotoxic agents)
- Immunotherapy (such as immune checkpoint inhibitors, BiTEs)
- Maintenance therapy (post-induction treatment to prolong remission)
- Precision or targeted therapy (drugs aimed at molecular drivers like EGFR, ALK, or ROS1)
- Proton therapy and advanced radiation modalities (e.g., stereotactic body radiation therapy, SBRT)
- Radiotherapy (external beam, 3D-conformal, intensity-modulated)