

# Post-Surgical Management of the Person Living With and Beyond Cancer

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## ABSTRACT

This course section discusses the wide-ranging post-surgical implications in the oncology population. Various oncology diagnoses, surgical procedures, and the role of physical therapy management will be reviewed, and contemporary evidence will be presented. Given the complexity of this patient population, clinical reasoning will be prioritized and emphasized. This content will assist clinicians, educators, researchers, and students in evaluating and managing post-surgical patients in oncologic and orthopedic settings. **CASE ANALYSES:** Four case studies of varied oncologic diagnoses are presented to assist with the application of content and clinical reasoning. Common cancer diagnoses and surgical procedures will be explored to guide the providers through clinical scenarios similar to those encountered daily in this practice setting.

**Key Words:** post-surgical, oncology, physical therapy

## LEARNING OBJECTIVES

Upon completion of this course section, the course participant will be able to:

1. Identify indications for surgical management of various oncology diagnoses.
2. Explain the potential consequences of surgical intervention in the oncology domain, including multimodal approaches.
3. Compare and contrast common oncologic surgical interventions for prevalent diagnoses.
4. Apply appropriate examination and evaluation criteria for multiple post-surgical adverse effect sequelae.
5. Develop appropriate postoperative management plans of care for various oncology diagnoses.

## INTRODUCTION

Consequences of post-surgical intervention to the musculoskeletal system, such as pain, potential reduced strength and range of motion, and functional impairment, are similar in the oncology domain as they are in the orthopedic domain.

However, the complexity within the oncology population is compounded by other modalities employed, as surgery rarely occurs in isolation. Surgical management is indicated in approximately 60% of cancer cases.<sup>1</sup> Chemotherapy is also indicated in almost 60% of cancer cases, while radiation therapy is indicated in 50%.<sup>1</sup> Each of these three modalities for cancer management carries unique adverse effect sequelae. The severity of adverse effects is often increased with cumulative dosing of each individual therapy and compounded by therapy coupling. Chemotherapy or radiation therapy employed *prior* to surgical interventions, termed neoadjuvant treatment, is usually done with the intent to shrink a tumor or stop the spread of the cancer. It can improve the ability to resect a cancerous lesion completely and minimize the invasiveness of surgical interventions, thus optimizing surgical outcomes and potentially reducing post-surgical consequences. Adjuvant therapy refers to the administration of chemotherapy or radiation *following* the surgical removal of a cancerous lesion to eradicate any remaining cancerous cells or micro-metastases in the area or circulation, respectively.<sup>2</sup> The Independent Study Course section entitled “Adult Cancer Treatment in Orthopedic Physical Therapy: Considerations Beyond a Cancer Diagnosis” provides an in-depth discussion about the adverse effect profiles of radiation and chemotherapy.

This section will address post-surgical management considerations for the person living with and beyond cancer. As one would expect, the surgical intervention's location and the procedure's relative invasiveness will dictate local and regional musculoskeletal consequences. In this section, we will review the implications of surgical management of breast cancers, oropharyngeal and digestive cancers, including colorectal cancer, and genitourinary (GU) and gynecological (GYN) cancers. Due to increasing prevalence, these cancers are the most commonly encountered in oncology rehabilitation practice and are, therefore, important for orthopedic practitioners to appreciate and understand. Readers will gain insight into the best clinical practice skill development to manage this population's unique rehabilitative needs effectively.

## Surgical Indications

Common considerations for oncologic surgical intervention include the size and location of the lesion, pathological tissue type, patient age, medical comorbidities, and functional status. With respect to tumor size, large tumors are less likely to be resected, particularly without neoadjuvant therapy that can minimize the size and invasiveness of the surgical intervention. Tumors located close to critical structures (eg, arteries, nerves, or vital organs) are less likely to be excised to spare collateral and potential mortal damage to surrounding structures. Additionally, surgical intervention is often not the preferred intervention for aggressive tumor tissue types because the rapid progression and threat of spread before, during, and after the surgical process is high. Relative to comorbid and functional

status, indications for surgery are similar to those in the orthopedic or medical domains. Common considerations that may impact the medical and surgical teams' clearance for surgery include advanced age, underlying cardiovascular, pulmonary, or metabolic disease, sedentary lifestyle, and impaired ability to perform activities of daily living.

### Staging and Grading

Indications for oncologic surgery include:

1. For diagnosis and disease staging purposes
2. To resect parts or all of a cancerous lesion
3. For palliative purposes, to improve the quality of life (QoL) by improving pain, range of motion (ROM), and functional mobility

A widely accepted system for staging many cancers follows the TNM acronym, which indicates tumor size (T), absence or presence of lymph node involvement (N), and absence or presence of metastatic disease (M). See **Table 1** for stage qualifications for each indicator. Prostate cancer has a unique staging, and clinicians are encouraged to become aware of this scale, especially if their clinic population includes a high proportion of persons with prostate cancer. Tumor grading is an additional descriptor that defines how similar or different the tumor cells appear from the original tissue. Refer to **Table 2** for tumor grading criteria.

The goal of surgical resection is to remove the cancerous lesion altogether, and if complete resection is not possible, as much of the mass as possible. The concept of surgical margins assists in clarifying if all or only part of the cancerous tissues has been removed. A negative surgical margin indicates that no cancerous cells were detected during the surgical pathological study. In contrast, a positive surgical margin indicates that cancerous cells were detected in the surgical plane; this carries potential additional consequences in terms of the need for additional

**Table 2.** Tumor Grading

Grade	Category Description
GX	Grade cannot be assessed (Undetermined grade)
G1	Well-differentiated (Low grade) (Looks like parent cell)
G2	Moderately differentiated (Intermediate grade)
G3	Poorly differentiated (High grade)
G4	Undifferentiated (High grade) (Lost identity with parent cell)

surgery or adjuvant treatment with chemotherapy or radiation (**Figure 1**). Positive surgical margins can further negatively impact prognosis and contribute to financial toxicity due to the implied need for additional treatment to manage the disease.

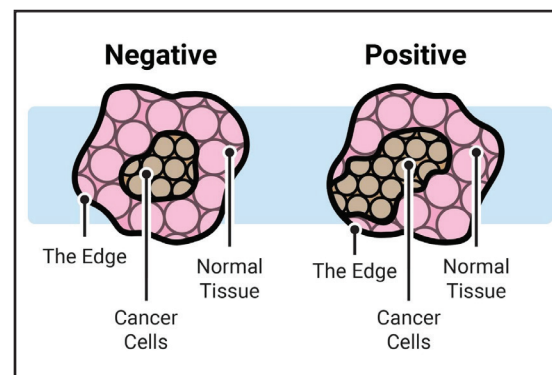
### Adverse Effects

As with surgical interventions in the orthopedic and medical domains, adverse consequences of oncology surgery are common. Postoperative pain is expected. Chronic and phantom pain are also relatively common but depend on a multitude of factors, including pre-morbid surgical status and whether or not a body part, or portion of it, is removed. Similarly, the adverse consequences of pain, which include deconditioning, decreased ROM and strength, and functional decline, are non-specific to the oncologic post-surgical domain. Due to these adverse con-

**Table 1.** Tumor Node Metastasis (TNM) Staging

Tumor Stage	Tumor Size	Lymph Nodes	Metastasis
Stage I	<2 cm	None	None
Stage II	2-5 cm	Present or absent, on same side	None
Stage III	>5cm	Present, on same side	None
Stage IV	Does not matter	Does not matter	Yes

**Figure 1.** Negative and Positive Surgical Margins



sequences, diminished activity and mobility levels following surgery can compound or progress relative to the time spent in this reduced capacity. Infection, delayed scar healing and dehiscence, and scarring and disfigurement are also potential consequences of surgery and are not uncommon because of combination therapy (ie, chemotherapy and radiation).

Postoperative edema is a normal consequence of any surgical procedure, oncologic or otherwise, and results from the inflammatory cascade. Management recommendations are therefore similar and include:

- Elevation where possible, compression when indicated
- Light movement, if appropriate
- Physical therapy interventions, including prescriptive exercise and manual techniques

Lymphedema, by contrast, results from direct or indirect trauma to the lymphatic system and includes tumor growth into lymphatic tissues, surgical removal of lymph nodes or lymphatic vasculature, or other sources of mechanical trauma to the lymphatic system culminating in the buildup of interstitial protein-rich fluid.<sup>1</sup> Management by a certified lymphedema therapist (CLT) is indicated to prescribe an individual decongestive plan. Screening through observation or by volumetric or circumferential measurements is essential to identify the condition early and optimize outcomes. Having a CLT within your referral network is important to manage this population efficiently and effectively.

Incontinence and sexual dysfunction are complications of many GU and GYN surgical interventions, and screening for both is within the purview of every physical therapist. Asking questions about incontinence and using appropriate measurement tools can efficiently guide referral to a pelvic floor or sex therapist as needed. It is also important to note that some pelvic floor dysfunctions may be remedied or improved through orthopedic interventions such as correcting a leg length discrepancy or pelvic/spinal mal-alignment. Therefore, orthopedic physical therapists should provide interventions within their licensure and certification scope before moving the patient forward in the referral process. It is important to have a pelvic floor therapist within your referral network to assist with the comprehensive management of this population. Resources and basic orthopedic strategies for managing post-surgical oncologic patients have been provided in this section of the Cancer Care Independent Study Course.

### Physical Therapists' Role in Prevention

Physical therapy is valuable at all phases of cancer survivorship. Vigilant attention, patient education, and prescriptive exercise are all needed to promote optimal post-surgical outcomes. In addition, physical therapists are well-positioned to promote prevention across the survivorship continuum. Prehabilitation

is defined as the process of improving the functional capability of a patient to undergo a surgical procedure. Prehabilitation, or secondary prevention, is paramount in the oncologic domain to optimize physiological status, reduce postoperative complication risk, and promote positive outcomes. Access to the patient at the time of diagnosis, prior to initiation of medical intervention, allows for:

1. The collection of baseline assessments for comparative analysis throughout the continuum of care
2. The establishment of a meaningful patient-provider relationship, providing a point of contact when (not if) adverse effects occur
3. Opportunities to educate on “what to expect” during the care trajectory as well as provide an individualized home exercise prescription<sup>1</sup>

Time varies from cancer diagnosis to surgery, and some timelines allow for multiple physical therapy treatment sessions. However, more commonly, the time to surgery is limited and should be used to educate and equip the patient.<sup>3</sup>

The primary emphasis of this section of the course will focus on tertiary prevention, that is, physical therapy management of the adverse effects of surgery and prevention of cancer recurrence. Tertiary intervention aims to address the symptoms, disabilities, or complications that have resulted from illnesses. It focuses on providing appropriate treatments, rehabilitation, and support to improve the client's quality of life and prevent further complications. A critical factor that physical therapists must consider in the context of oncology rehabilitation is financial toxicity. Many adverse effects of medical cancer management are referred to as toxicities, and the financial impact is no different. Cancer treatment and the subsequent need for rehabilitation are expensive, and many patients lack sufficient insurance coverage and resources to cover expenses adequately. The cumulative effects of the stressors from cancer diagnosis and management require the attention and action of each member of the care team. Referral to the appropriate team member to provide resources and management strategies is imperative to meet the holistic needs of each person living with and beyond a cancer diagnosis.

### Summary

This section of the course addresses the physical therapy post-surgical management of several of the most common cancer types encountered in the outpatient setting. Each section will provide a general overview of the diagnosis, including common treatment trajectories, followed by typical surgical interventions. Finally, the physical therapy management of adverse effects from surgical intervention, including prevalence and onset, assessments and outcome measures, and interventions, will be discussed.

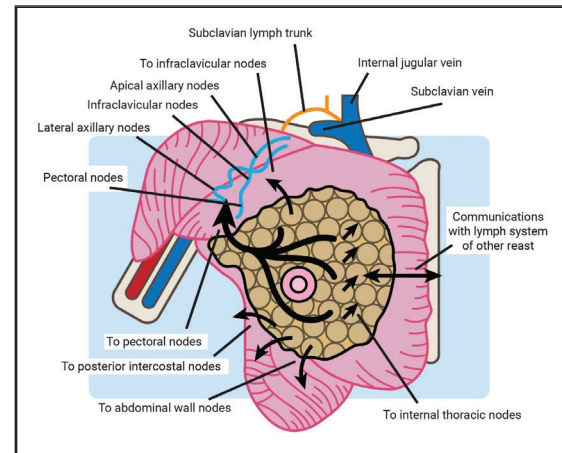
## POST-SURGICAL PHYSICAL THERAPY MANAGEMENT OF BREAST CANCERS

Approximately 1 in 8 women will be diagnosed with breast cancer in their lifetime.<sup>4</sup> Breast cancer is most commonly diagnosed in middle-aged females, at the median age of 62.<sup>4</sup> The most well-defined risk factors for breast cancer include age, prolonged estrogen exposure (nulliparity, early menarche, late menopause, hormone replacement), family history, obesity, smoking, alcohol, and dietary factors.<sup>5</sup> Although most breast cancer diagnoses occur in women, 1 in 833 men will be diagnosed with breast cancer in their lifetime.<sup>6</sup> Due to the rarity of male breast cancer diagnosis, little research is available for this patient population. Therefore, many treatment recommendations follow guidelines and treatment plans for breast cancer in women. Risk factors for the development of male breast cancer are similar to those for female breast cancer. However, there is an increased risk in men diagnosed with Klinefelter syndrome, who have an extra X chromosome. This syndrome increases the risk 14- to 50-fold and accounts for about 3% of all male breast cancer cases.<sup>7</sup>

There are many different types of breast cancer, but the most common are either ductal or lobular carcinoma, depending on the origin location of the disease. Breast cancer is further categorized as noninvasive (localized in the milk ducts or lobules) or invasive. The majority of breast cancer diagnoses are invasive and occur when the cancer extends out of the lobules or milk ducts, attacking nearby breast tissue or lymph nodes. Invasive ductal carcinoma is the most common type of breast cancer, followed by invasive lobular carcinoma. Invasive ductal carcinoma accounts for 70% to 75% of breast cancer diagnoses, and invasive lobular carcinoma accounts for 5% to 15%.<sup>8</sup> An individual can be diagnosed with mixed invasive ductal and lobular carcinoma, though this occurs in only approximately 5% of diagnoses. Please see **Figure 2** for breast cancer anatomy, including axillary lymph nodes.

Invasive breast cancer is further categorized into subtypes. The hormonal status of breast cancer impacts treatment decision-making and outcomes. Triple-positive breast cancer occurs when breast cancer cells grow by using estrogen and progesterone receptors and the human epidermal growth factor 2 (HER2) protein. Breast cancer can be estrogen-positive but progesterone-negative, or vice versa. Triple-negative breast cancer is an aggressive form of breast cancer that lacks estrogen and progesterone receptors and has normal levels of HER2. Triple-negative breast cancer often has a poorer prognosis because there are fewer treatment options given the hormonal status.<sup>1</sup> Inflammatory breast cancer is another aggressive form of invasive breast cancer when cancerous cells block lymph vessels in the breast and results in clinical findings including erythema, edema, and peau d'orange (orange peel texture appearance to the skin). It is essential to screen for any acute or sudden onset of erythema, edema, or peau d'orange and refer the patient back to a physician to rule out the development of inflammatory breast cancer.

**Figure 2.** Breast Cancer Anatomy Including Axillary Lymph Nodes



Fortunately, overall breast cancer survival rates have increased due to medical advances and early detection through screening tests. Treatment for breast cancer varies depending on many factors, including but not limited to clinical and pathologic staging at the time of diagnosis, hormonal status of the cancer, Ki-67 score (indicating the cancer proliferation rate, which is used as a prognostic indicator), pre or post-menopausal status of the patient, comorbidities, and past medical history. Some individuals with breast cancer will need to undergo neoadjuvant systemic therapy (chemotherapy or hormonal therapy before surgery), which can be used to decrease tumor size, improve local control, and reduce surgical morbidity, allowing a more successful surgical excision of the tumor (negative margins). Neoadjuvant chemotherapy can allow the surgical excision of tumors that may have been deemed inoperable before chemotherapy or may permit breast conservation with less extensive and invasive procedures. Radiation therapy is sometimes used in the adjuvant setting for local control of the cancer and to decrease the risk of local recurrence. Radiation can be directed to the whole breast following breast-conserving surgeries or to the chest wall post-mastectomy. In addition, the axillary region may be incorporated into the radiation treatment field if axillary lymph node involvement exists. The National Comprehensive Cancer Network (NCCN) provides detailed guidelines for best practices in cancer diagnosis. More specific medical breast cancer treatment algorithms can be found on their website.<sup>9</sup>

### Surgical Interventions

Many possible surgical interventions are used in the treatment of breast cancer. Before surgery, a patient will undergo clinical evaluation, imaging, and needle biopsy of suspicious lumps/bumps. The tumor needs to be deemed operable. Fol-