



# Understanding Radiotherapy: What it is and How it Works

## Introduction

Radiotherapy, also known as radiation therapy, is a medical treatment that uses high energy radiation to destroy cancer cells. It is a type of cancer treatment that can be used alone or in combination with other treatments such as chemotherapy or surgery. Radiotherapy is an essential component of modern cancer care and is used to treat many different types of cancer.

Radiotherapy works by damaging the DNA of cancer cells, which prevents them from dividing and growing. The radiation used in radiotherapy is carefully targeted to the cancerous area, minimizing damage to healthy tissue. Radiotherapy can be delivered externally or internally, depending on the type and location of the cancer being treated.

External beam radiotherapy is the most common type of radiotherapy. It uses a machine called a linear accelerator to deliver high-energy radiation beams to the cancerous area from outside the body. The patient lies on a treatment table, and the machine moves around them, delivering radiation beams from different angles. The treatment is usually painless and lasts only a few minutes each day. The number of treatments and duration of treatment depend on the type and stage of cancer being treated.

Internal radiotherapy, also called brachytherapy, involves placing radioactive material directly into or near the cancerous area. This method allows for a higher dose of radiation to be delivered to the cancer cells while minimizing damage to healthy tissue. Internal radiotherapy can be delivered through an implant, injection, or ingestion of a radioactive substance.

Radiotherapy can be used as the primary treatment for some types of cancer, such as early stage prostate cancer or Hodgkin's lymphoma. It can also be used as a secondary treatment to reduce the size of a tumor before surgery or to

destroy any remaining cancer cells after surgery. In some cases, radiotherapy is used to relieve symptoms of advanced cancer, such as pain or difficulty swallowing. Like any cancer treatment, radiotherapy has potential side effects. The most common side effects: Radiotherapy, also known as radiation therapy, is a common form of cancer treatment that uses high energy radiation to target and destroy cancer cells in the body. It is often used in conjunction with other cancer treatments, such as chemotherapy and surgery, to maximize the chances of curing or controlling the disease.

## Description

### ■ How does radiotherapy work?

Radiotherapy works by damaging the DNA inside cancer cells, which prevents them from growing and dividing. The radiation used in radiotherapy is generated by machines called linear accelerators, which produce high energy beams of X-rays or other types of radiation. These beams are directed at the site of the cancer, where they penetrate the skin and other tissues to reach the cancer cells inside.

One of the challenges of radiotherapy is targeting the cancer cells while minimizing damage to healthy tissue. To accomplish this, radiation oncologists carefully plan the treatment using advanced imaging technology, such as CT scans or MRI scans, to create a detailed map of the patient's anatomy. This information is then used to calculate the optimal dose of radiation to deliver to the tumor while minimizing exposure to surrounding healthy tissue.

### ■ Types of radiotherapy

There are several different types of radiotherapy that can be used to treat cancer. The most common types include:

**External beam radiotherapy:** This type of radiotherapy uses a linear accelerator to deliver

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high energy beams of radiation from outside the body. The radiation is directed at the cancer site from different angles, allowing the maximum dose of radiation to be delivered to the tumor while minimizing exposure to healthy tissue.

**Brachytherapy:** In this type of radiotherapy, radioactive material is placed inside the body near the cancer site. This allows a high dose of radiation to be delivered directly to the tumor while minimizing exposure to surrounding healthy tissue.

**Proton therapy:** Proton therapy is a type of external beam radiotherapy that uses high energy protons instead of X-rays to deliver radiation to

Radiotherapy can be used to treat cancer in people of all ages, but the way it affects individuals may vary depending on their age. Here's a general overview of how radiotherapy may affect different age groups:

- **Infants and young children:** Radiotherapy can be a challenge in this age group due to the sensitivity of developing brain tissue and the risk of long term cognitive deficits. Special techniques, such as proton therapy or Intensity Modulated Radiation Therapy (IMRT), may be used to minimize radiation exposure to healthy tissues.
- **Children and adolescents:** Children and adolescents may experience some short-term side effects of radiotherapy, such as fatigue, skin irritation, and nausea. However, long term side effects may also occur, including growth and development problems, hormonal imbalances, and secondary cancers.
- **Adults:** Most adults tolerate radiotherapy well, but may experience short term side effects such as fatigue, skin irritation, and hair loss. Long term side effects may also occur, including radiation induced fibrosis, organ dysfunction and secondary cancers.
- **Older adults:** Older adults may be more vulnerable to the effects of radiotherapy due to pre-existing medical conditions and reduced organ function. They may also experience more short term side effects, such as fatigue and skin irritation and may take longer to recover.

Overall, the potential benefits of radiotherapy must be weighed against the risks for each individual, regardless of age. Treatment plans should be tailored to the patient's specific needs

and circumstances, and patients should be closely monitored for any side effects during and after treatment.

Radiotherapy is a medical treatment that uses high energy radiation to destroy cancer cells and shrink tumors. It is one of the most common and effective treatments for cancer. The discussion and conclusion for this topic can cover various aspects of radiotherapy, such as its benefits, side effects, types and advancements in technology.

One of the key benefits of radiotherapy is its ability to kill cancer cells. It can be used as a primary treatment or in combination with other treatments such as surgery or chemotherapy. Radiotherapy can also help relieve symptoms such as pain and bleeding.

However, radiotherapy can also cause side effects such as fatigue, skin irritation, and damage to healthy tissues. These side effects can be managed through medication and supportive care. It is essential to discuss the potential side effects of radiotherapy with a healthcare provider before undergoing treatment.

There are different types of radiotherapy, including external beam radiation therapy and internal radiation therapy. External beam radiation therapy uses a machine to deliver radiation to the cancer site from outside the body, while internal radiation therapy involves the placement of a radioactive source inside the body near the cancer cells. The type of radiotherapy used depends on the location and stage of the cancer.

Advancements in technology have improved the accuracy and effectiveness of radiotherapy. Techniques such as Intensity Modulated Radiation Therapy (IMRT), Image Guided Radiation Therapy (IGRT) and Stereotactic Body Radiation Therapy (SBRT) have increased the precision of radiation delivery and reduced damage to healthy tissues.

## Conclusion

In conclusion, radiotherapy is a vital treatment option for cancer patients. It has numerous benefits, but also comes with potential side effects that should be carefully managed. The different types of radiotherapy and advancements in technology have made it possible to deliver more precise and effective radiation treatment. Overall, radiotherapy has significantly improved the prognosis and quality of life for cancer patients.