

A Technology in Radiation Oncology  
that Tracks Tumor Step by Step:

# MR LINAC



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# PRECISE RADIATION TECHNOLOGY

Today, crucial developments are taking place in cancer treatments. One of the disciplines in which the most crucial developments are taking place is the Radiation Oncology. One of the smart technologies that directly targets the tumor, almost do no harm to surrounding tissues, thus greatly protecting the quality of life of patients is MR Linac device.

## What are the characteristics of MR Linac?

MR Linac provides high-quality, real-time images at the time when it sends the radiation beams from linear accelerator to tumor targets. It precisely locates tumors and healthy organs, using the high-definition images from MRG scanner.

This way, the volume of the treated tumors can be reduced, which, in turn, minimizes the radiation-associated negative effects. MR Linac is a special device that allows to monitor the response to radiation during the course of treatment, with an unprecedented precision thanks to the real-time MR images of the tumors progressing within the body and the healthy organs around them, and to readjust the treatment in every session depending on the current size and form of the tumor, if required.

# What kind of technology is MR Linac?

MR Linac is a technology that combines high magnetic resonance imaging (MRI) device and a linear accelerator (radiation beams) in a single device for the first time. The combination of these two powerful technologies in a single device allows for radiation oncologists to track the location of tumor and monitor any movement of it throughout the course of the treatment.



# For the treatment of which diseases is it used particularly?

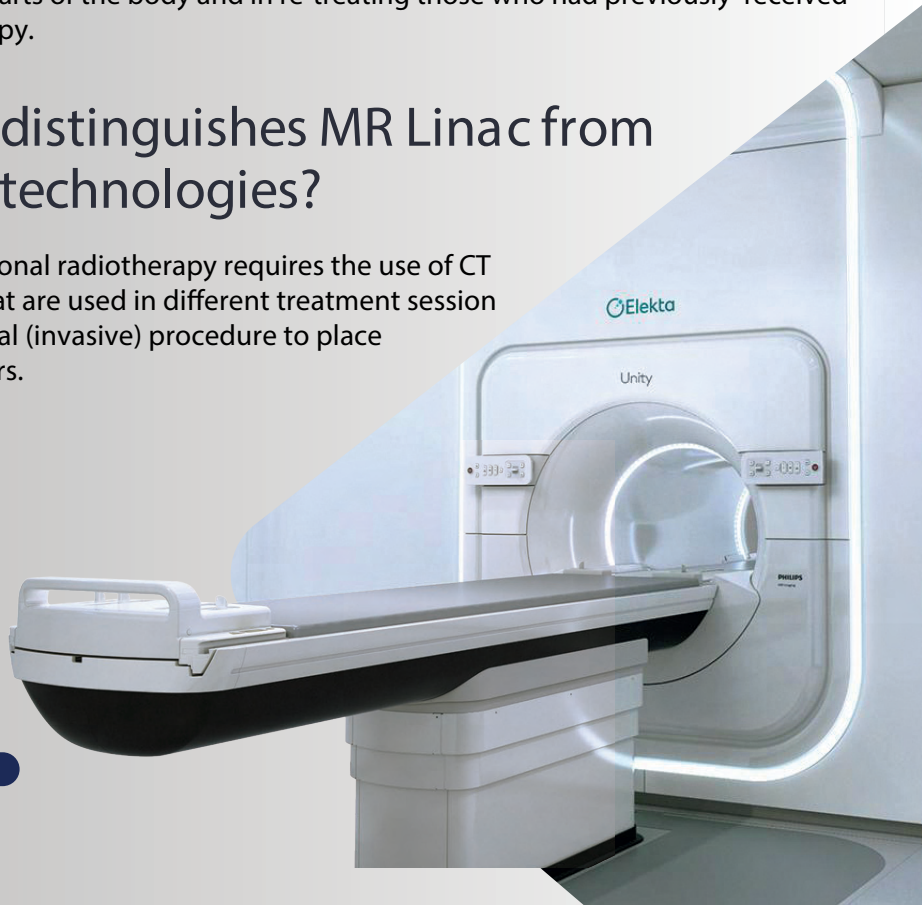
MR Linac device is radiotherapy equipment that is used to treat tumors in various parts of the body. Some of these types of cancers include:

- Pancreas cancer
- Lung cancer
- Liver cancer
- Prostate cancer
- Rectal cancers
- Kidney tumors
- Head-Neck cancers
- Breast cancers
- Brain tumors

MR Linac provides an extraordinarily precise radiation particularly in treating tumors of small size. It has a vital role in cases where the disease has spread to different parts of the body and in re-treating those who had previously received radiotherapy.

## What distinguishes MR Linac from other technologies?

The traditional radiotherapy requires the use of CT images that are used in different treatment session or a surgical (invasive) procedure to place radiotracers.





MR Linac, however, provides us real-time MR images during the treatment without any extra exposure to radiation (beams), compared to the traditional CT-guided treatments, which reduces the radiation-induced risks of the patient. MR Linac guarantees a clearer image of tumors, providing an outstanding imaging quality. Thanks to MR images taken on a daily basis, it enables us to see the tumor and the healthy organs around it. The real-time images taken during the treatment allows for the identification of the daily anatomical changes of the patient and the administration of the treatment method which is called adaptive radiotherapy, if necessary. With adaptive therapy, the anatomical changes that occur throughout the course of the treatment can be taken into account right away to easily optimize the treatment.

Thus, the tumor of the patient is targeted better, the radiation dose given to the healthy tissues are minimized, and healthy organs are allowed to be protected from unnecessary doses of radiation. MR Linac improves the quality of life of patients throughout the cancer treatment by decreasing the toxicity (harm caused by radiation) in healthy organs.



Can it be administered alone in cancer treatment in certain cases, or is it administered in addition to other treatments such as chemotherapy, surgery etc.?

The decision on whether MR Linac is to be administered alone or in combination with other treatments is made by the physicians on a patient basis.

Is it a technology that may replace surgery in cancer treatment?

MR Linac and surgical procedures are different treatment approaches, none of which can replace the other. While, in some cases, surgical procedures may be required, the devices such as MR Linac can increase the possibility of the use of radiotherapy option in cancer treatment. The treatment option to be used is determined by the physician depending on the medical condition of the patient and the type of the cancer.



# How long does the treatment take?

Patients can go back to their routine as there is nothing to interrupt the daily life after treatment. The length of treatment varies depending on the area to be treated. Treatments take 30-to-40 minutes. If, however, any preparation is required for the treatment area, or the tumor localization is in an area with significant movement, the length of treatment may be longer.



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