



# Gamma knife

Information for the patients

**Gamma knife** – is a type of radiosurgery treatment method, used to treat the selected zones in the brain.

This is a non-invasive therapy method, which is based on very precisely focused beams of ionising radiation that are directed into the treatment zone located in the brain.

The therapy procedure is painless. Usually the patient can return back to normal everyday life on the next day after the surgery.



**The therapy procedure is performed in four steps:**

1. securing a head frame,
2. imaging procedure: CT, MRI or angiography,
3. treatment planning,
4. therapy.

# How does the Gamma Knife work?

## *Gamma knife*

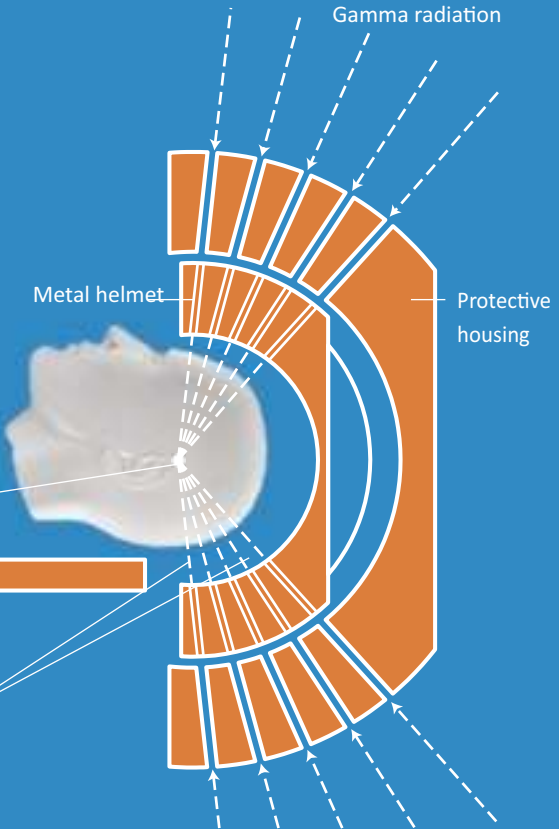
Therapy method – is a bloodless surgery, designed to treat oncological and neurological diseases.

The open cranial incisions are not required during the surgery. A patient's treatment lasts a single session.

The patient usually can go home soon after treatment.

The method facilitates treatment of very fine foci that are located deep in the brain.

The Gamma Knife uses up to 192 sources of ionising radiation precisely focused beams of radiation that are directed very precisely into the required brain area using the automatised system.



## What diseases are treated with the Gamma Knife?



### The Gama Knife is used to treat the following diseases

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#### **Tumours:**

1. Primary high and low grade tumours of the brain.
2. Metastatic brain tumours (the malignant cells that arrived from the other tumour located in other body area).
3. Other benign tumours: meningiomas, neurinomas (schwannomas), adenomas of hypophysis (pituitary gland), craniopharyngiomas, chordomas, chondrosarcomas, etc.

#### **Vascular pathology:**

1. Brain vascular malformations, such as arteriovenous malformations and cavernomas (cavernous angiomas).
2. Arteriovenous fistulas.

#### **Functional diseases:**

1. Tremor (essential tremor or Parkinson's disease-related tremor).
2. Pain in different body areas that is not control by medical treatment, when any other treatment is not effective – this may happen as a result of the neurological diseases or cancer-induced pain caused by osseous metastases.
3. Trigeminal neuralgia.
4. Epilepsy with hippocampal sclerosis.
5. Psychiatric diseases – treatment resistant obsessive compulsive syndrome or severe depression.

# FAQ

## 1. Which healthcare professional can issue a referral for the Gamma Knife procedure?

Any physician can issue a referral for the consultation with physician neurosurgeon.

## 2. Who can decide that this surgery is the most suitable treatment option for a given patient?

A physician neurosurgeon will decide that the gamma knife treatment can be applied for a patient suffering from head tumours; the patient is discussed in the multidisciplinary joint consultation with physicians involving oncologists, radiotherapists, radiologists, pathologists and neurologists.

In case of functional diseases the treatment for the patient is prescribed by a mutual decision of physicians specialists.

## 3. How the patient should prepare himself (herself) for the Gamma Knife treatment?

- This procedure can be used both for adults and children.
- Sedation is not required for adolescents and adults and the patient can go home on the next day after the treatment, unless the treating physician decides otherwise.
- For children sedation is applied during the procedure (the patient is put to sleep) and they are usually discharged home after several days.
- The patient receives explanations during the consultation with neurosurgeon about the course of planned procedure, its duration and planned duration of in-hospital stay, as well as date and time of the procedure is specified.
- The physician also assigns the examinations that should be carried out before the day of surgery.

#### 4. What happens during the preparation for the procedure on the day of surgery?

- On the day of planned procedure, before the treatment a stereotaxic frame is secured to the patient's head, to fix the patient's head in a certain position. This procedure takes 5-10 minutes. A little pressure can be felt during frame application. A stereotaxic frame allows to locate the exact position of the pathology in the system of coordinates and to ensure desired precision.
- In certain circumstances the patient can be offered to split the treatment into several stages lasting several days or weeks. In this case a special mask is recommended instead of stereotaxic frame.
- Head magnetic resonance, computed tomography or angiography imaging is performed after securing the frame.
- Then treatment planning takes place for 1- 4 hours. Physicians make decisions which areas should be treated and what doses should be used. The patient stays at the ward during that time.

#### 5. How the procedure is performed?

- The procedure may last 15 minutes or an hour or longer.
- When the treatment planning is completed the patient lies comfortably on the Gamma Knife couch to which a stereotaxic frame is secured.
- The treatment team leaves the room which is equipped with microphones and cameras;
- which allow the patient to communicate and to express his/her wishes during the entire treatment session.
- The Gamma Knife treatment is not associated with any additional sounds and is absolutely painless.
- The patient can sleep during the procedure or to enjoy listening to favourite music.
- When the treatment is completed, a stereotaxic frame is removed and the patient is accompanied to a ward for rest.



## 6. What is the biggest advantage of the Gamma Knife as compared with other procedures?

A risk of complications characteristic for the open surgery is significantly lower during the Gamma Knife treatment.

The patient can return back to his/her normal routines soon after the Gamma Knife treatment.

This treatment can help people who before could not get any support because of concomitant diseases or their age.

## 7. Is this procedure in all cases reimbursed by the means of the Compulsory Health Insurance Fund?

Yes, of the citizens of the Republic of Lithuania who are covered by the Compulsory Health Insurance, the Gamma Knife treatment is reimbursed by the means of the Compulsory Health Insurance Fund.

## 8. How to know if the surgery was successful for the patient?

- The patients suffering from head tumours will not experience any immediate effect. The follow-up head MRI imaging will show that the tumour, shrinks, disappears or stops growing depending on the tumour type.
- Patients with metastatic disease are followed- up every 3 months, those with benign tumours every half a year.
- Sometimes few weeks or several months are required for the patients treated for trigeminal neuralgia to see the treatment effect. The same is applicable for the patients treated for tremor.





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