



ONCOLOGY
PROGRAMME
PATIENT & FAMILY
EDUCATION

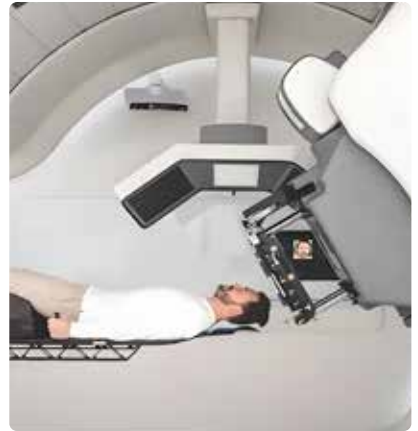
PATIENT'S GUIDE TO PROTON THERAPY

An Advanced Treatment for Cancer

WHAT IS PROTON THERAPY?

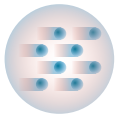
Your treatment journey with us is unique, and we're here to support you every step of the way. Radiation therapy targets cancer cells with intense energy to destroy their growth-controlling genetic material. For many, conventional high energy X-ray radiation therapy is an excellent option.

However, individuals with deep-seated tumours or tumours located near vital organs may benefit from a more precise form of radiation using proton beams. Proton Therapy precisely targets tumours while minimising damage to surrounding healthy tissues. This treatment is especially beneficial for children, as it reduces both short- and long-term side effects, as well as the risk of secondary cancers (or malignancies) in their developing bodies.



How Proton Therapy works

Proton therapy delivers highly precise doses of radiation to tumours while sparing nearby healthy cells and reducing the risk of side effects.



Proton Therapy uses protons which are tiny particles with a positive charge.

Tumour



Proton releases less energy when entering the body and deposit the maximum energy directly within the tumour, with no exit radiation dose beyond it. This contrasts with conventional radiation, which uses X-rays that pass through the body with undesired radiation dose before & after the tumour tissue.

Benefits of Proton Therapy?

Due to the precise targeting and energy release, proton therapy offers several important benefits for patients:



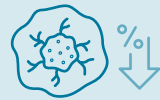
Less damage to the healthy cells and body parts around the tumour



Higher doses of radiation can be achieved to effectively treat the tumour



Less side effects, better quality of life



Reduced risk of second malignancy

CLINICAL INDICATIONS FOR PROTON THERAPY

In Singapore, proton therapy can treat a range of conditions stipulated by our Ministry of Health.

Each patient's diagnosis and condition are unique, making it essential for you to consult with our clinicians to determine your eligibility for proton therapy.

MOH Approved Proton Therapy Indications



Indications for patients of all ages

Brain Tumours

- ✔ Ependymoma
- ✔ Pituitary adenoma
- ✔ Acoustic neuroma
- ✔ Base of skull meningioma

Head & Neck Cancers

- ✔ Advanced and/or unresectable head and neck cancers
- ✔ Oropharyngeal cancer
- ✔ Cancers of the paranasal sinuses and other accessory sinuses

Bone and Soft Tissue Cancers

- ✔ Base of skull chordoma
- ✔ Base of skull chondrosarcoma
- ✔ Spinal and paraspinal bone and soft tissue sarcoma
- ✔ Non-metastatic retroperitoneal sarcomas

Digestive Tract Cancers

- ✔ Oesophageal cancer

Prostate Cancer

Liver Cancer

- ✔ Advanced high risk inoperable hepatocellular carcinoma

Lymphoma

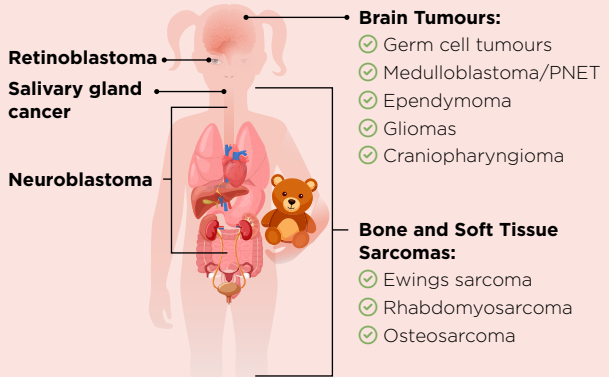
- ✔ Localised follicular lymphoma

*Locally advanced cancers undergoing concurrent chemoradiation therapy. For example, lung cancers under concurrent chemoradiation therapy.

Paediatric Tumour/Cancer

Proton therapy is also suitable for children and young adults under 25 with central and peripheral nervous system cancer, musculoskeletal cancer, and salivary gland cancer. They receive proton therapy in the same way as adults, although sedation may be needed if the patient is unable to remain still during sessions.

Radiation oncologists will work closely with the patient and guardian to assess treatment options and determine the most suitable approach. The clinical team will handle all preparations, including proton therapy approval.



Your Proton Therapy Journey

1 Pre-treatment Preparations

Before treatment begins, you will undergo a preparation process called **simulation**. Radiation therapists will determine the optimal treatment position using immobilisation accessories and perform CT scans to capture detailed anatomy images.

Marks will be drawn on your skin to help reproduce the treatment position during proton therapy course.

These images will be used to create customised treatment plans tailored to you, ensuring the most effective approach. Our nurses will also guide you on how to manage and cope with your treatment.



2

Personalised Proton Treatment Planning

After the simulation, the radiation oncologist will identify the target areas to be treated and mark the normal organs and healthy tissues that need to be protected. This process is known as **Treatment Planning**. The oncologist collaborates with physicists to create multiple plans using advance software and after the optimal plan is chosen, the physicist conducts patient-specific quality assurance (PSQA) to verify the plan's accuracy through conducting measurements using the same parameters from the plan.

There must be consistency in the treatment plan calculated results to ensure precise radiation delivery with an optimal dose for the tumour while preserving healthy tissues. You are not required to be present for these procedures.



3

Treatment Set-up

When you arrive for your treatment session:



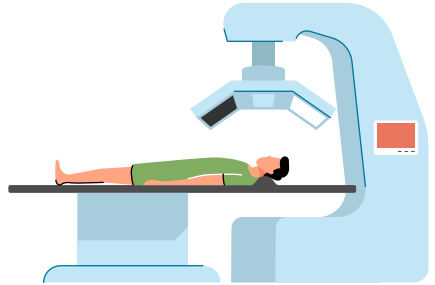
- a You will lie on the treatment couch in the same position used during your simulation. The room features personalised ambient lighting to help you feel more comfortable.
- b Our radiation therapists will align the markings on your skin with our laser systems. The immobilisation devices customised during your simulation will be used to ensure you are in the exact same position every time.
- c Before each session, we perform pre-treatment image verification to ensure set up and treatment accuracies.

4

Receiving Treatment

Once you are comfortably and accurately positioned with all necessary checks verified, our team will begin delivering the proton therapy from the treatment console.

Throughout the session, we will actively monitor you and communicate via CCTV from the control room to ensure you feel safe and supported.



5

Regular Consultation and Evaluation

During your proton therapy course, your radiation oncologist will meet with you weekly to review your progress and attend to your queries.

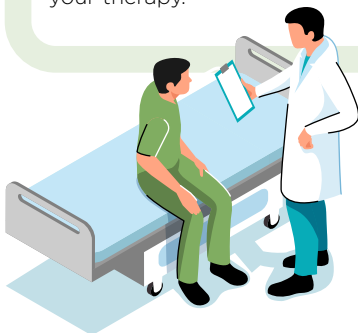
Dietetic consultations can also be arranged at Proton Therapy Centre to provide nutritional guidance and support. It is essential to manage and prevent unintentional weight loss due to swallowing difficulties or other nutritional deficiencies. Anatomy changes (including weight loss) might result in radiation dose distribution differences. The clinical team will conduct daily evaluations and may determine the need to repeat the simulation and treatment planning process to ensure the accuracy and precision of your therapy.

6

Follow-Up Care

After completing proton therapy, we will schedule follow-up appointments to monitor your recovery.

Our specialist will monitor your post-treatment progress and discuss any additional care you may require, ensuring you continue to receive the best support on your recovery journey.








Managing side effects of Proton Therapy

Since radiation therapy requires a lot of energy from your body to heal, it is important to adjust your activities to allow for adequate rest. Fatigue is a common side effect as your body adjusts to receiving radiation treatment. Be sure to get ample rest and consider incorporating light exercise into your daily routine.

As side effects are reduced with proton therapy, you'll likely find that your energy gradually returns after the initial adjustment and as you progress along towards the treatment completion.

Taking care of yourself during proton therapy is essential to manage side effects and maintain your overall well-being. Here are some important tips:

| Some common side effects | How to manage |
|---|---|
| Hair loss is common although usually temporary  | <ul style="list-style-type: none">✔ If you usually shave treatment area, use electric shaver to avoid skin injuries.✔ Use mild soap, cleansers and lukewarm water.✔ Reduce exposure to sunlight by using a hat or scarf. |
| Difficulty swallowing, soreness, dry mouth, and taste changes  | <ul style="list-style-type: none">✔ Brushing your teeth with a soft-bristled toothbrush and use non-alcohol mouthwash 3-4 times daily.✔ Eat a semi-solid or soft diet and avoid spicy, salty foods, and citrus fruits.✔ Avoid smoking and alcohol. |
| Skin irritation  | <ul style="list-style-type: none">✔ Wear loose cotton clothing.✔ Wash and dry your skin gently, patting dry instead of rubbing.✔ Avoid harsh products like perfumes and certain lotions that contains alcohol.✔ Avoid swimming and sunbathing during the treatment period. |
| Diarrhoea or bowel cramps  | <ul style="list-style-type: none">✔ Take a low fibre and non-dairy diet to minimise diarrhoea.✔ Eat smaller, more frequent meals to reduce digestive discomfort.✔ Avoid foods that can irritate your stomach, such as spicy foods, caffeine, and alcohol. |
| Painful or frequent urination from bladder irritation  | <ul style="list-style-type: none">✔ Drink plenty of fluids to stay hydrated.✔ Choose clear liquids like water, broth, and herbal teas to soothe your stomach.✔ Drink cranberry juice, which may help prevent bladder infections. If unwell, please inform your doctor. |

Emotional and Psychological Wellness

Living with cancer and undergoing treatment can be very stressful. It is common to feel anxious, depressed, worried, angry, confused, helpless, and lonely during this time. Overcoming these negative feelings is possible by exploring coping strategies with your family, friends, and professional counsellors. Support groups can also be helpful, as they allow you to share experiences with others in similar situations who can relate to what you're going through.

Try out some of these relaxation techniques to uplift your mood:



Meditation



Journaling



Light stretching exercises



A stroll in the park

Regular communication with your healthcare team ensures timely support and helps maintain your well-being throughout the treatment. **Inform your nurse or oncologist if you experience:**

- ✓ Fever or headaches
- ✓ Cough or breathlessness
- ✓ Nausea or vomiting
- ✓ More than 4-5 episodes of diarrhoea a day
- ✓ Unsteady gait

Frequently Asked Questions



How many treatment sessions and how frequent will the treatments be?

The number of treatment sessions varies depending on the type and location of the cancer, as well as individual treatment plans. Your doctor will provide a specific schedule tailored to your needs. Treatments are typically given 5 days a week, up to 8 weeks. Treatment schedule may be adjusted if there is a need, do speak with your radiation oncologist to finalise the details when starting the preparations for treatment.



How long will each treatment session last?

Each treatment session typically lasts about 30 to 40 minutes inclusive of patient preparation, patient positioning, image verification, and delivery of proton beam.



What happens if I miss a treatment session?

If you are unable to attend for your treatment appointment, it is important to inform your healthcare team as soon as possible. They will reschedule the missed session and adjust your treatment plan if necessary to ensure the best possible outcome.



Can I continue to work, attend school, or travel during proton therapy?

Everyone's experience with proton therapy is unique. While some continue with work or attend school as usual, others might prefer to take time off to rest. You are encouraged to continue doing activities you enjoy, as long as they do not drain your energy. Avoiding strenuous activities, and getting extra sleep can aid in the healing process.



Can I continue with my medication, supplements, or other alternative treatment such as Traditional Chinese Medicine?

It is crucial to inform your radiation oncologist about all the medications, supplements, and any alternative treatments you are receiving. Some adjustments may be necessary to ensure the safety and effectiveness of your treatment.



Can I have proton therapy if I am pregnant or planning to have children?

Proton therapy is generally not recommended during pregnancy due to potential risks to the developing baby. It can affect fertility depending on the treatment area and dose. If you are planning to have children, discuss your plans with your doctor to understand the potential impacts and explore options for fertility preservation.

Questions to Ask Your Doctor

It is important to have open and clear communication with your doctor to ensure you fully understand your treatment plan and what to expect. Here are some key questions to ask your doctor, as the answers will vary based on your individual condition and treatment plan:

- ⊕ How long do I have to wait after my surgery/chemotherapy to start proton therapy?
- ⊕ What preparations do I need to make before starting treatment?
- ⊕ Are there any long-term side effects I should be aware of?
- ⊕ What happens after treatment is completed and how would I know if the treatment worked?

Mount Elizabeth Cancer Care. Possible Starts Today.

Meet the Team

At Mount Elizabeth Proton Therapy Centre, we believe in providing holistic cancer care. Your primary doctor will collaborate with a multidisciplinary team of cancer specialists—including surgical, medical, and radiation oncologists, as well as haematologists—to determine the optimal course of treatment tailored to your needs. They are supported by skilled radiation therapists, medical physicist, nurses, and allied health professionals such as counsellors, dietitians and physiotherapists—all committed to helping you fight cancer.

Our goal is to ensure you receive the best possible care in a supportive and nurturing environment, helping you navigate your treatment journey with confidence and trust.



Speak to our team to understand your cancer management options better. We are here to help.



IHH Healthcare has a global network of 83 hospitals and ancillary services in 10 countries.

As a patient at Gleneagles Hospital Singapore, Mount Elizabeth Hospital, Mount Elizabeth Novena Hospital and Parkway East Hospital, you enjoy easy access to a full spectrum of integrated healthcare services under the IHH Healthcare ecosystem.

For more information, speak to us at:

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