Particle Therapy
An advanced form of radiation treatment for cancer

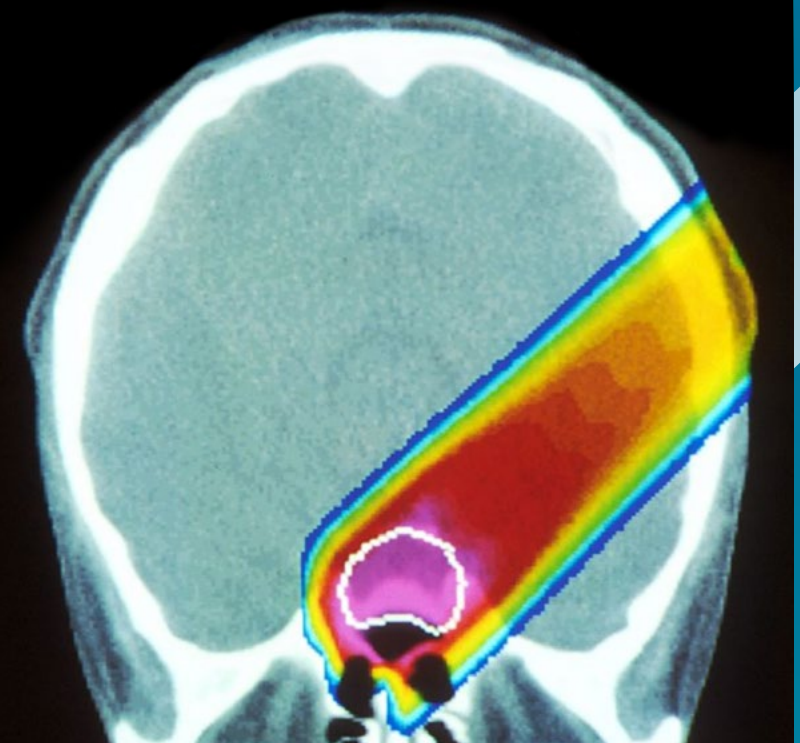
Particle therapy is similar to traditional forms of radiation therapy, but it offers an even more targeted approach. This means that the risk of damage to tissues around a tumour is lower than with standard radiation.

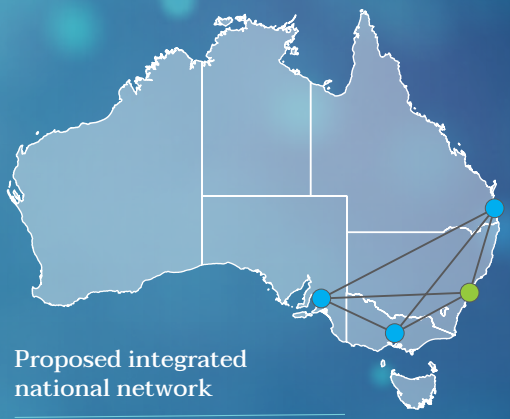
Instead of x-rays, particle therapy uses protons or heavy ions such as carbon, which have an improved ability over x-rays to kill cancer cells.

Particle therapy painlessly delivers radiation through the skin and is non-invasive. And the particles release their energy at the site of the cancer.

This makes the treatment suitable for cancers that involve tumours near sensitive parts of the body, such as the eyes, brain, and spinal cord.

While traditional radiation therapy can target such tumours, there is a higher risk of side effects because of damage to the surrounding tissue and organs.





Proposed integrated national network

Proton facility

Carbon/Proton facility

In other countries, particle therapy is recommended for some patients with difficult-to-treat cancers.

Proton therapy has been approved overseas for use in children, adolescents and young adults, who are more at risk of long term damaging side effects from conventional treatment approaches.

It minimises the radiation to critical structures in the body and limits the risks of long-term side effects.

More than 4500 Australian patients each year could benefit from particle therapy.

How particle therapy works

Technology is used to speed up particles to increase their energy. This energy delivers the particles to the desired location in the body. The particles deliver the required radiation dose precisely in the tumour.

> *This is a global phenomenon in terms of improving the delivery of radiation therapy to optimise cancer care for our patients.*

Stephen Frank MD
Proton Center Medical Director
University of Texas MD Anderson Cancer Center, USA

With particle therapy, there is far less radiation deposited outside of the tumour. With conventional radiation therapy, x-rays continue to give radiation doses as they leave the person's body. This means that radiation is deposited in nearby healthy tissues, possibly causing side effects.

Proton and carbon ions are more effective in targeting and killing cancer cells deep in the body.

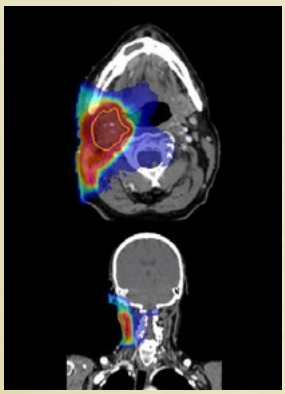
Using particle therapy, a radiation oncologist can customise the beam of radiation to strike within the borders of the tumour, whatever shape it is.

The number of treatment sessions depends on the type and stage of the cancer but can be fewer than a course of traditional radiation therapy. This, combined with the lower chance of side effects with particle therapy, means patients benefit from a faster return to their normal life.

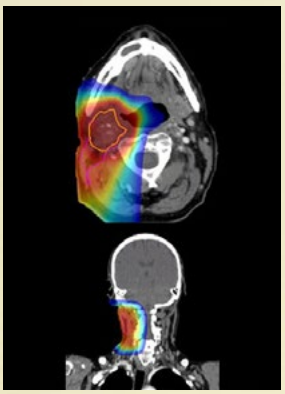
Although the Royal Australasian College of Radiologists has stated that particle therapy should be available to Australian cancer patients, currently there are no facilities here*.

* The first proton therapy facility is under construction in Adelaide.

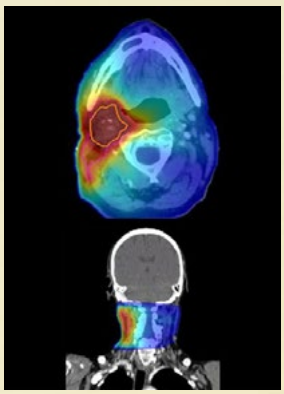
Carbon ions



Protons



X-rays



A comparison of where radiation is deposited using carbon ions, protons and x-rays.

Published October 2019.