PROTON THERAPY Clinical Benefits

**Brain**
- 31% increase in disease control for aggressive tumors at base of skull (chordomas) at 5 years.
- 50% less likely to have secondary brain tumor from treatment.
- 55% reduction in average dose to the hippocampi (memory function) in treatment of meningioma.

**Lung**
- 35% relative increase in overall survival for Stage II & III lung cancer.
- 56% relative reduction in incidences of serious (grade 3) pain with swallowing (esophagitis).
- Up to 4-week reduction in treatment time for select cases.

**Esophageal**
- 10% increase in overall survival at 5 years in stage I-III disease.
- 10% increase in local cancer control at 5 years in stage II-III.
- 15% decrease in distant metastasis at 5 years in stage II-III.
- 26% reduction in pulmonary toxicity compared with X-ray therapy (IMRT).
- 21% reduction in the risk of severe, treatment related lymphopenia, particularly in lower esophagus.
- 3-4-day reduction in average hospital stay after surgery.

**Prostate**
- 5% higher 5-year overall survival in intermediate risk.
- Patients who received proton therapy report highest quality of life compared to surgery, x-ray, or brachytherapy patients.
- 35% less radiation to the bladder and 59% less radiation to the rectum.
- 42% reduction in relative risk of developing a secondary malignancy.
- 50% reduction in treatment related bowel frequency and urgency at 2 years.
- 21% lower risk of urinary toxicity at 2 years.
- 25% lower risk of erectile dysfunction at 2 years.

**Breast**
- 88% less radiation dose to the heart for left sided breast cancer.
- 44% reduction in clinically significant radiation doses to the lung.
- 90% of partial breast irradiation cases result in good to excellent cosmetic outcomes at 5 years.
- Well tolerated - Less than 4% serious side effects (grade 3) in locally advanced breast cancer.

**Rectal/Anal**
- More than 50% reduction in radiation dose to critical structures including bone marrow.

**Liver**
- Associated with excellent local control and favorable survival rates.
- Able to treat larger tumors (>6cm) ineligible for stereotactic radiation (SBRT) or ablation.

**Overall**

---

Results from separate studies compared in some instances. The benefits of proton therapy for each individual patient will vary based on their individual diagnosis. A personal consultation with a proton-experienced radiation oncologist is recommended in all cases. See Proton Therapy Clinical Benefits Sources and Citations or visit ProtonBenefits.com for more information.
PROTON THERAPY

Clinical Benefits

Sources & Citations

BRAIN

HEAD & NECK

LIVER

LUNG

ESOPHAGEAL

PROSTATE

RECTAL/ANAL

OVERALL