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ICOTEC SOLUTIONS FOR TUMOR DISEASES OF THE SPINE

# Light to the Spine – Focus on the Patient.



The Material for Radiation Therapy

## Optimized Imaging Leads to Effective Oncological Therapy

BLACK® ARMOR

From radiation planning and therapy through to follow-up examination: BlackArmor<sup>®</sup> Carbon/PEEK implants help you to achieve an optimal result for your patients in every stage of treatment.



## Planning Quality with BlackArmor<sup>®</sup> Implants



The artifact-reduced imaging of BlackArmor® Carbon/PEEK implants provides a more precise delineation of target volume and organs at risk.



#### OPTIMAL CONTOURING OF TARGET VOLUME AND ORGANS AT RISK

Exact delineation of gross tumor volume (GTV) and neighboring organs at risk, such as spinal cord<sup>1</sup> Optimized imaging for postoperative radiation treatment planning in CT and MRI<sup>1,5</sup>



### INCREASED ACCURACY IN DOSE CALCULATION

Up to 90% reduction of implant artifacts with BlackArmor® Carbon/PEEK vs. metallic implants<sup>1</sup>

Correct conversion of Hounsfield units from CT data<sup>2</sup>



#### THERAPY CAN BE STARTED EARLIER ON

Up to 75% reduction of planning time<sup>1</sup>

### Precise Radiation with BlackArmor®

"This gain in dosimetric quality will consequently reduce the risk of tumor underdosage and overdosage of critical OARs."

Müller et al. (2020)<sup>2</sup>



Optimized dose distribution enables dose escalation in the target volume with BlackArmor® Carbon/PEEK implants.



## LOCAL TUMOR CONTROL AND REDUCED TOXICITY

Reduction of hot and cold spots of up to  $50\%^{\rm 1}$ 

Minimal perturbation and attenuation effects of radiation<sup>4</sup>

Optimized application of SBRT with BlackArmor® Carbon/PEEK in the spinal column<sup>3</sup>

## **Optimized Follow-Up**



Even small recurrences near the implant can be diagnosed thanks to artifact-reduced imaging with BlackArmor®.



### EARLIER DETECTION OF EVEN SMALL RECURRENCES

Improvement of local therapy Optimization of systemic therapy

"Artifact-reduced imaging with Carbon/PEEK implants enables us to carry out follow-up examinations where even small recurrences can be detected and treated early on."

> Prof. Dr. med. Stephanie E. Combs Director of Clinic for Radiation Oncology and Radiation Therapy Technical University of Munich

#### References

<sup>1</sup>Poel R, et al. (2020): Assessing the Advantages of CFR-PEEK over Titanium Spinal Stabilization Implants in Proton Therapy – a Phantom Study. Institute of Physics and Engineering in Medicine.

<sup>2</sup> Müller B S. et al. (2020): The Dosimetric Impact of Stabilizing Spinal Implants in Radiotherapy Treatment Planning with Protons and Photons: Standard Titanium Alloy vs. Radiolucent Carbon-Fiber-Reinforced PEEK Systems. Journal of Applied Clinical Medical Physics.

<sup>3</sup> Schmidhalter D. et al. (2020): Dosimetric Analysis of Spine SBRT in Case of CFR-PEEK Implants. Annual SASRO Meeting.

<sup>4</sup> Klippel N. (2018): Dosimetric Impact of Titanium and Carbon Implants in Photon Therapy. Annual SSRMP Meeting.

<sup>5</sup> Ringel et al. (2017): Radiolucent Carbon Fiber-Reinforced Pedicle Screws for Treatment of Spinal Tumors: Advantages for Radiation Planning and Follow-Up Imaging. World Neurosurgery.





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