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Zero-Gravity™ Radiation Protection System

In line with BIOTRONIK's commitment to uncompromised safety, the [Zero-Gravity Radiation Protection System](#) is designed to increase the level of radiation protection while also eliminating weight burden for the operator. It consists of a body and head shield suspended from a balancer that moves along a ceiling rail, or a movable base.

Radiation hazards for physicians in the workplace

Many physicians worldwide are exposed to radiation every day. In recent years, the frequency and duration of interventional radiology and cardiology procedures have increased markedly.¹ Against this increase, health care workers are being exposed to higher radiation doses and orthopedic strain from wearing heavy protective apparel. Health problems are thus more frequently observed in staff working in cath labs.²

How does Zero-Gravity work?

Zero-Gravity acts as a continuously suspended lead barrier with a clear acrylic head shield and a calf-length body shield. The shield material has a significantly higher lead equivalency than traditional radiation protection apparel.³ This allows Zero-Gravity to provide an 87-100 percent reduction in radiation exposure when compared to conventional lead aprons that use table shields and movable shields.⁴ The Zero-Gravity shield connects magnetically to a lightweight vest. This way, the physician can move in the room freely and unencumbered, even during difficult interventions or diagnostic procedures.

By contrast, a standard lead apron can weigh up to ten kilograms and, in some cases, may be worn for more than six hours a day. The resulting orthopedic strain can limit physicians' careers or cut them short.⁴ This can also lead to missed work days, increasing costs for hospitals and healthcare systems.⁵ Against these standard lead aprons, Zero-Gravity showed an approximately 80% reduction in shoulder strain.⁶

References:

¹ Mettler FA Jr et al. *Radiology*. 2009, 253.

² Data derived from A.M. Koenig, D.Sasse, R.Etzel, A.H. Mahnken: Comparison of Shoulder Strain Relief between Radiation Protection Aprons, presented at European Congress of Radiology (ECR) 2017

³ A measurement of the reduction of intensity (attenuation) of X-rays by an absorbent material. The attenuating effect is comparable to that of a pure lead layer of corresponding thickness. The Zero-Gravity body shield has a lead equivalency of up to 1 mm, and the head shield of 0.5 mm.

⁴ Savage C et al. *OJ Rad*. 2013, 3.

⁵ Tomassoni G. *J Afib*. 2013, 5(7).

⁶ Andreassi et. Al, 2016. *Circ Cardiovasc Interv*. 2016;9