Radiotherapy Patient System
`RPS head` by gKteso
Adjustable head support
for Radiotherapy Cancer Treatments

RPS head

3 DoF angle correction improves brain therapy

Description and essential performance features of the adjustable head support

Stereotactic radiation therapy becomes more and more frequent. Recently, the simultaneous treatment of multiple brain metastases using a single isocenter is to become a standard. Accurate delivery of stereotactic treatment techniques requires – besides the translational positioning – exact rotational alignment with the planning CT. This positioning is normally done by a 6D robotic couch. As some Linacs are equipped with couches that are restricted to translational movements, these would profit from a head immobilization system with adjustable Roll, Pitch and Yaw.

The RPS head allows sub-millimeter patient positioning accuracy in three degrees of freedom, improving clinical workflow and patient confidence. 3 DoF means that the system can correct rotational errors (roll, pitch, and yaw).

A rotatable plate is fixed by a ball joint, placed near the neck, to a base plate beneath the patient. The base plate holds the head of a patient with the aid of a thermoplastic mask. The adjustment mechanism is placed around the body axis at the cranial end of the base plate. Care was taken to minimize the diameter of the mechanism in order not to spoil non-coplanar beams. The angles are manually adjustable via three individual hand wheels related to the desired rotations.

Intended use and intended user

The RPS Head device is intended to support rotational positioning error corrections of a patient head prior to a radiotherapy cancer treatment. Rotational error correction is possible in all three axes individually within the range of +/- 4.0 degrees by adjusting related knobs manually on the device.
The device is to be used by radiation physicists, respectively their MTAs (medical technical assistants). Before rotational error correction and subsequent treatment, the patient's head is immobilized by a thermoplastic mask (which is not part of the RPS Head device).

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Document no. 30700098 Rev02

Technical data

Pitch (X*) rotation	+/- 3°
Roll (Y*) rotation	+/- 4°
Yaw (Z*) rotation	+/- 4°
Accuracy	+/- 0,2°
Maximum weight of patient**	200kg / 440lbs
Product weight	4kg / 8.8 lbs
Standards	IEC 60601-1:2005 + Cor.:2006 + Cor.:2007 + A1:2012
Supported mask systems	IT-V, Macromedics, Q-Fix, others
Supported couchtops	Elekta iBEAM® evo Couchtop, Elekta Connexion™, Varian Halcyon Couchtop, Macromedics Omnicouch, others

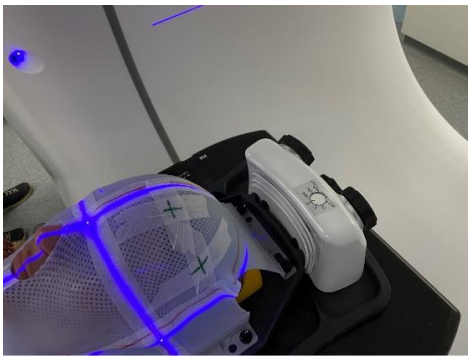
* IEC 61217 Radiotherapy equipment – Coordinates, movements and scales
** max. 15 kg head weight ≈ 7,4% x max. patient weight according to subclause 9.8.3.2 IEC 60601-1

Key features

Angle correction for everybody

A lightweight add on opens new features

Easy to use



Angle correction support for ring-mounted delivery systems (Varian Halcyon™) and tomotherapy systems

Scientific Reference: Otto A. Sauer, Sonja Wegener, Robert Schindhelm (University of Würzburg, Germany, Department of Radiation Oncology) *Design of a rotatable head fixation for cranial stereotactic treatments,* ESTRO 2021

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