The SMART System: Magnetic Deflection and Absorption Shielding of Treatment Contaminants to Enhance Radiotherapy Cancer Patient Outcomes by Reducing Normal Tissue Injuries

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The SMART System is designed to improve radiotherapy cancer treatment. This is performed through the use of two novel devices, forming an integrated system. The Specialised Magnetic Array for Radiation Therapy (SMART Magnet), and an improved Scale Maille Armor for Radiation Therapy (SMART Armor) work synergistically, globally reducing unwanted skin and subcutaneous tissue dose delivered during treatment. The SMART System minimizes skin damage caused by radiotherapy, as well as reducing primary cancer induction risks associated with additional radiation exposure. Exposure reductions are seen both within the treatment field and peripheral regions, whilst critically maintaining the prescribed cancer dose at depth. The SMART Magnet produces high strength magnetic fields which deflect unwanted tissue damaging electron contamination, (an x-ray produced by-product) from the treatment field to peripheral regions - where the SMART Armor then absorbs this unwanted radiation, substantially reducing patient exposure. SMART Armor is constructed from non-toxic, high density material and is designed to be flexible, conforming to all patient body shapes and positions. Results show that improvements to radiotherapy, through significant skin dose reductions up to 80% are achieved with the SMART System. Thus, up to 5000 milliSieverts (equivalent to the radiation exposure of 500CT examinations) can be removed during a typical radiotherapy course. Critically, results also show that the actual prescribed cancer treatment dose remains constant when using the SMART SYSTEM. Protocols for clinical use have been developed, and SMART Armor has been approved for clinical use in Australia.

Awards Won:

Second Award of $1,500

China Association for Science and Technology (CAST): Award of $1,200