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Construction of pediatric homogeneous phantoms for optimization of chest and skull radiographs

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We developed two pediatric patient-equivalent phantoms, the Pediatric Chest Equivalent Patient (PCEP) and the Pediatric Skull Equivalent Patient (PSEP) for children aged 1 to 5 years. We also used both phantoms for image quality evaluations in computed radiography systems to determine Gold Standard (GS) techniques for pediatric patients. We determined the simulator materials thickness (Lucite and aluminum) through biological tissues quantification (lung, soft, and bone) using an automatic computational algorithm. To objectively establish image quality levels, two physical quantities were used: effective detective quantum efficiency and contrast-to-noise ratio. These quantities were associated to values obtained for standard patients from previous studies. Results: For chest radiographies, the GS technique applied was 81 kVp, associated to 2.0 mAs and 83.6Gy of entrance skin dose (ESD), while for skull radiographies the GS technique was 70 kVp, associated to 5 mAs and 339Gy of ESD. Conclusion: This procedure allowed us to choose optimized techniques for pediatric protocols, thus improving quality of diagnosis for pediatric population and reducing diagnostic costs to our institution. These results could also be easily applied to other services with different equipment technologies.

Biography

Allan Felipe Fattori Alves has completed his Master Degree from University of São Paulo State, Brazil. He is currently a PhD Student at University of São Paulo State, Brazil. His main research lines are image quality evaluation in digital radiography systems and dosimetry applied to interventional radiology. He also has experience in quality control of X-ray equipments and quality assurance management in hospital routines.

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