

# **Abstract: Optimization on scoliosis examination on Canons DR system, comparison between CsI and GOS scintillators**

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**Purpose:** To develop my knowledge concerning the sensitivity of different scintillators when these are inter-joined with Canon's DR receptor, specifically for exams of scoliosis.

**Problem:** Scoliosis patients are typically girls from 11 years of age and upwards that are checked repeatedly through x-ray examinations to ensure Cobb's angle is not worsened. Since new tissue weighting factors show that tissue such as mammae is more sensitive to x-rays than previously assumed, and the fact that we are working with pediatrics it is very important that we keep the doses as low as possible at the exams. Most recordings of scoliosis today are carried out on CR systems even though most radiological departments have DR systems available. Theoretically speaking the two modalities are similar regarding dose and image quality. In this project consequently, the focus will be to obtain images of equal dose and quality at a DR system when using different receptors during the exam. This is a completely new opportunity, as it has earlier been difficult to compare distinct scintillators connected to the receptors due to unlike processing of the image. Given that Canon have released a receptor with CsI scintillator we are provided with the prospect for examining the following hypothesis:

*A Canon receptor with CsI scintillator is able to give an acceptable image quality with a lower dosage at a scoliosis recording than Canon's receptor with a GOS scintillator.*

**Materials and method:** The project relies on an empirical study in which theory is used as a background for the test setup and later audit appraisal. Two tests are carried out on two different hospitals with each their receptor, and afterwards the results are compared. To guarantee comparable tests the results are verified through status checks and statistical t-tests. In the experiment we use a thoracal torso, a 17 cm airgab, a total filtration of 4 mmAl and FFA at 2 meters, where we make two recordings at a fixed kV of 80 and mAs

changing from 0,5 to 25. At each recording we write down the values for DAP and REX respectively to secure the experiment from any bias during the audit appraisal. The test is validated against a scientific article and the results are treated following.

**Conclusion:** I found a bias in the size of the specter, since the torso is larger than an average scoliosis patient. For that reason the test values of the recordings can not be transferred directly into practice at the radiological departments. Even though we ensured the generators were alike the test showed fluctuations in the images at both 6,3 mAs and 10 mAs for the generator connected to the CsI receptor. The audit group should also have been larger to secure greater reliability, but regardless of this the test showed a significant tendency as the CsI receptor at 2 mAs and 2,5 mAs produce an image that is just acceptable for scoliosis exams contrary to the GOS, which required 4 or even 6,3 mAs respectively for a picture of analogous quality.