



# Evaluation of Manual Angulation Fixed Focal Approach Using Flat Panel Detector in Digital Radiography of Scoliosis

**Authors:** Tan, Sock-Keow; Sarji, Sazilah Ahmad; Ng, Kwan-Hoong; Yeong, Chai-Hong

**Source:** Journal of Medical Imaging and Health Informatics, Volume 5, Number 4, August 2015, pp. 697-703(7)

**Publisher:** American Scientific Publishers

Buy Article:  
**\$113.00 plus tax**  
(Refund Policy)

ADD TO CART

BUY NOW

[< previous article](#) | [view table of contents](#) | [next article >](#)

♥ [ADD TO FAVOURITES](#)

## Abstract:

Scoliosis patient underwent numerous spine radiographs during their monitor and treatment period, thus, may expose them to high accumulative radiation dose. In this study, the diagnostic performance of the flat panel detector (FPD) fixed focal approach with manual angulation was evaluated in term of accuracy and consistency of Cobb angle measurement, spatial accuracy as well as radiation dose to the patients compared to the conventional photostimulable phosphor (PSP) approach. Cobb angle measurements were evaluated with two special constructed human vertebrae phantoms. The intraclass correlation coefficients (ICC) for interobserver variation and percentage of accuracy in Cobb angle measurement were calculated. The significant differences in angle measurement between both approaches were assessed. The spatial accuracy was evaluated with TO. M1 phantom. Dose measurements were performed with radiochromic film and 20 cm polymethyl methacrylate (PMMA) slabs. The FPD fixed focal approach showed excellent interobserver reproducibility (ICC,  $r = 0.99$ ,  $p < 0.05$ ) for the Cobb angle measurement. There was no statistically significant difference ( $p > 0.05$ ) for the Cobb angle measured from both approaches. The FPD fixed focal approach resulted in higher accuracy (3%) of angle measurement compared to the conventional PSP approach. The spatial accuracy was within the recommended limit of AAPM report 93. An average entrance surface dose (ESD) reduction of 20% was achieved with FPD fixed focal approach. We developed and evaluated a manual tube angulation method which facilitates the use of existing FPD digital radiography system to produce full spine image. It has good consistency and high accuracy in the measurement of Cobb angle. The acquired images are suitable for angle measurement for scoliosis patients with substantial dose reduction.

---

**Keywords:** DIGITAL IMAGING; FIXED FOCAL APPROACH; FLAT PANEL DETECTOR; PHOTOSTIMULABLE PHOSPHOR; SCOLIOSIS RADIOGRAPHY

**Document Type:** Research Article

**DOI:** <http://dx.doi.org/10.1166/jmihi.2015.1450>

Publication date: 01 August 2015

[More about this publication?](#)

---

### Share Content



### Access Key

- F** *Free content*
- N** *New content*
- O** *Open access content*
- S** *Subscribed content*
- T** *Free trial content*

[Cookie Policy](#)