

EOS-Imaging System Is Available for Early-Onset Scoliosis (EOS) Patients and Can Reduce Their Ionizing Radiation Exposure

Burt Yaszay, MD; Nima Kabirian, MD; Gregory M. Mundis, MD;
Jeff B. Pawelek, BS; Carrie E. Bartley, MA; Behrooz A. Akbarnia, MD

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Introduction

Ionizing radiation (IR) and the related health hazards are concerning!



116. Longitudinal Analysis of Radiation Exposure During the Course of Growing Rod Treatment for Early Onset Scoliosis

Gregory M. Mundis, MD; Edward K. Nomoto, MD; Michael W. Hennessy, MD; Jeff Pawelek; Burt Yaszay, MD; Behrooz A. Akbarnia, MD
USA

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- 24 EOS pts treated with GR over a course of 8.5 years
 - Mean IR prior to index surgery= 22.4 mSv
 - Mean IR during 1st postop year= 10.8 mSv
 - Annual IR after the 1st postop year= 7 mSv
 - Annual IR after final fusion= 7.2 mSv
- Total IR from initial spine x-ray to 1 year after index surgery:
- Congenital (63 mSv) > syndromic (35 mSv) > idiopathic (29 mSv) > NM (28 mSv).



- Patients undergoing GR treatment had **3.4x more IR than estimated background radiation**. Among this group **younger** patients and those undergoing **revision surgery** were exposed to significantly higher IR doses. **Etiology** also seemed to play a role in IR exposure.



Recent studies

- A new slot-scanning imaging system, “EOS-imaging”, was shown to have significantly lower emitted ionizing radiation in older patients with Adolescent Idiopathic Scoliosis.



■ Diagnostic Imaging of Spinal Deformities

Reducing Patients Radiation Dose With a New Slot-Scanning X-ray Imager

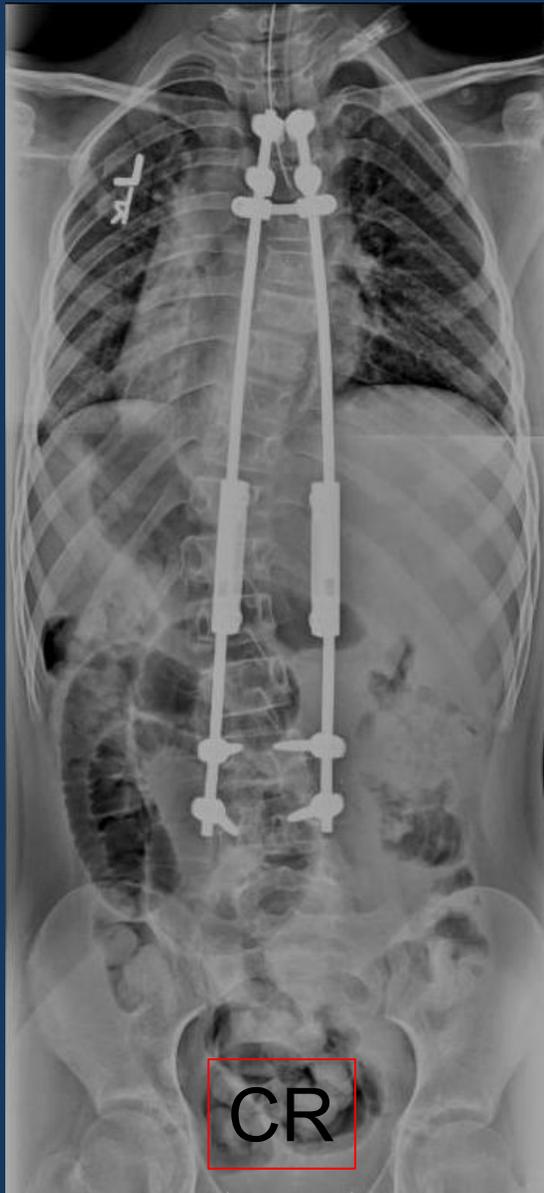
Sylvain Deschênes, PhD,* Guy Charron, MSc,† Gilles Beaudoin, PhD,† Hubert Labelle, MD,*
Josée Dubois, MD, MSc,* Marie-Claude Miron, MD,* and Stefan Parent, MD, PhD*

- The authors established that the EOS system offers overall **enhanced image quality** while **reducing drastically the entrance dose** for the patient.



Image Quality

- Image quality is comparable or often better



Objective

- Evaluate the role of EOS imaging in patients with Early Onset Scoliosis (EOS) → Radiation exposure and age



Materials and Methods

- 38 GSSG patients with either **conventional** (CR) or **EOS-imaging** captured spine films (PA, Lat, Bending) included from the date of installment of EOS-imaging over the course of **26 months**. No CT scan IR included.
- Unlike CR, both **AP & Lat images** are taken at the same time. **Bending films** were obtainable by EOS machine.
- Mean **total annual IR dose per patient** compared to annual background radiation estimated by RSNA (2.4 mSv).
- The mean **IR dose per single PA** and **Lat** spine films with EOS-imaging system was reported as **0.81** and **1.67** mSv per the manufacturer.



Results

	Conventional Radiography	EOS-Imaging
Number of patients	23	18
Mean total IR dose per patient	10.2 mSv (3.3-20.3)	1.3 mSv (0.6-2.2)
Total annual IR/background IR	X 4.25	X 0.54

- The mean age at the first spine x-ray was **4.1** years (0.11-9.2) in CR and **7.6** year (3.3-10.5) in EOS-imaging group.



Results

- Mean age and range at the 1st spine x-ray
 - CR - 4.1 years (0.11-9.2)
 - EOS - 7.6 year (3.3-10.5) in EOS-imaging group.



Conclusion

- The total annual radiation dose per patient from EOS-imaging system is lower than conventional systems
- EOS imaging can be utilized for patients as young **as 3 years old**.
- This study suggests that the use of the new slot-scanning system can **reduce the annual radiation dose in early-onset scoliosis**; however, a larger cohort with a longer follow-up is needed to critically examine this statement.



Thank you

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