

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

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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

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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

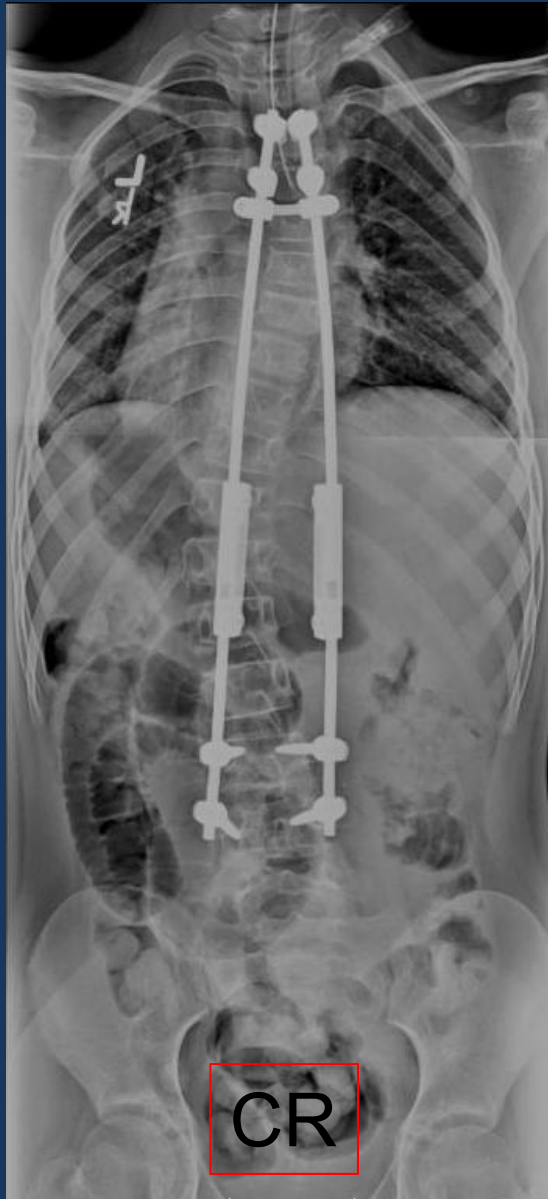
Sylvain Deschênes, PhD,* Guy Charron, MSc,† Gilles Beaudoin, PhD,† Hubert Labelle, MD,*
Josée Dubois, MD, MSc,* Marie-Claude Miron, MD,* and Stefan Parent, MD, PhD*

- 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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