Metal ion release during growth-friendly instrumentation for EOS

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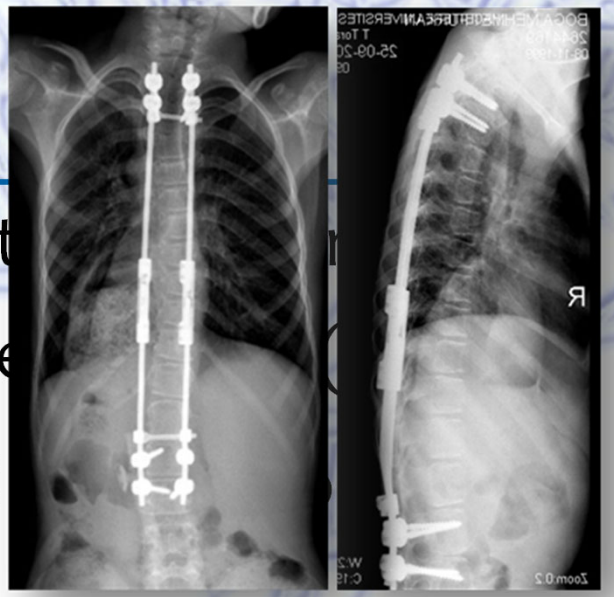
Hacettepe Orthopaedics

Disclosures

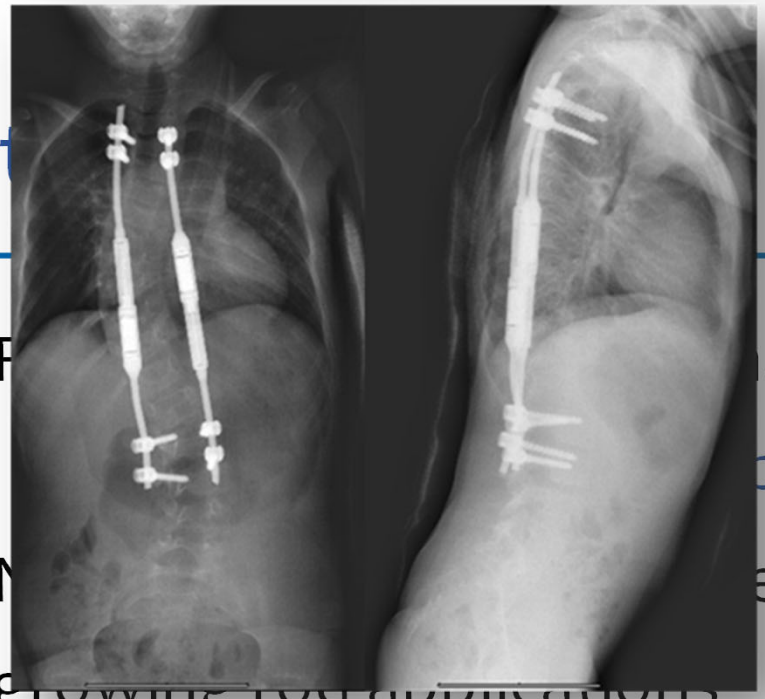
- Ayaz Efendiyev, no disclosure
- Caglar Yilgor, no disclosure
- Filiz Akbiyik, no disclosure
- Gokhan Demirkiran, no disclosure
- Alpaslan Senkoylu, Europiean Spine Society, SRS
- Ahmet Alanay, Stryker, Depuy, JBJS-Am, ESJ, SRS
- Muharrem Yazici, Depuy, J Chil Orthop

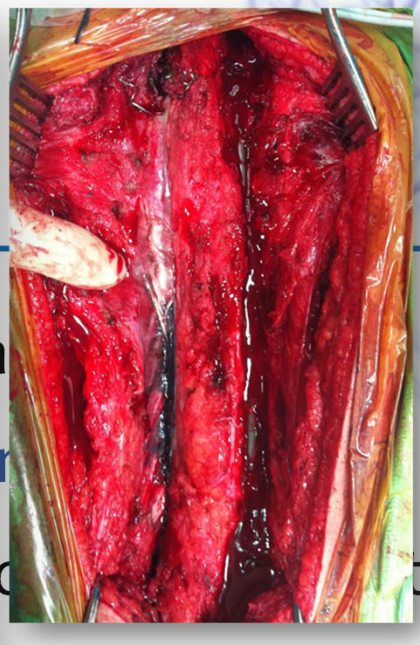
Introduction

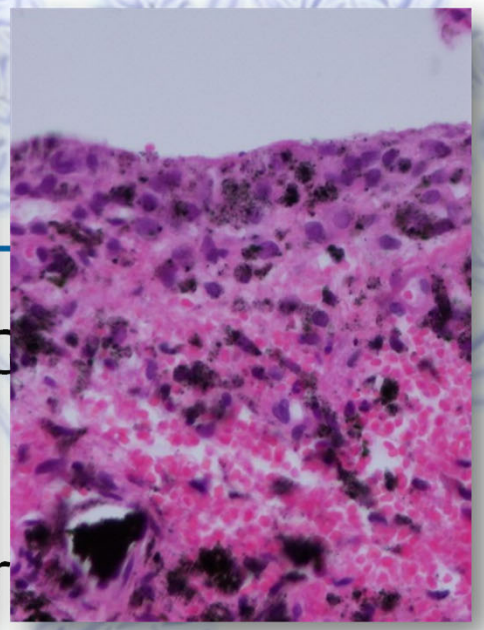


- Growth friendly modalities are stat
  procedure for Early Onset Spine De
- Spinal instruments cause localized
  distribute systemically
- Children with EOSD are instrumented at earlier ages
- Live with metallic implants for a long time

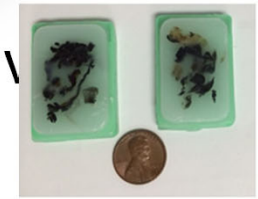
Int

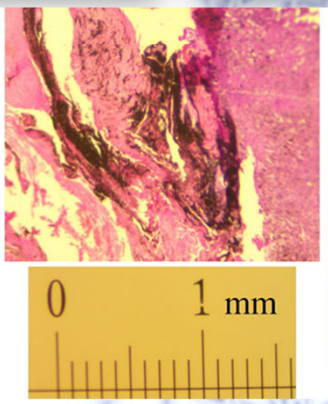


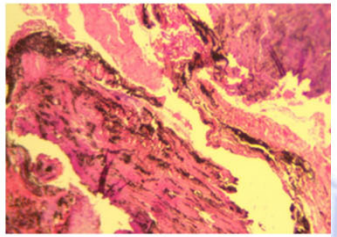




- P a C
- M ed tr
  growing rod applications
- Magnetically controlled grov







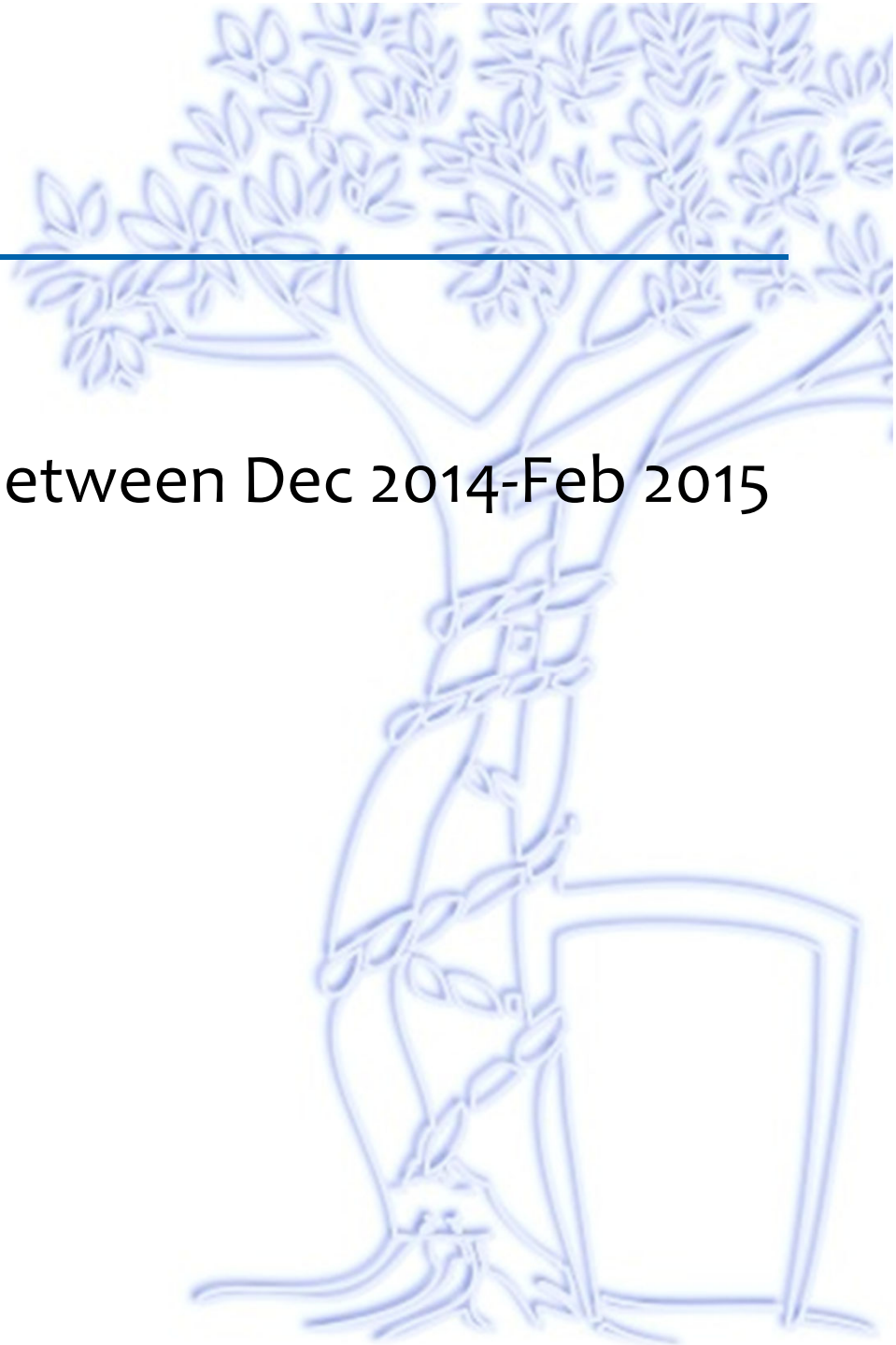
  - Minimally invasive
  - Instances of sterile draina
  - Excessive local staining observed in some revision procedures

Aim

- To compare the metal ion levels of age-matched
  - Growing rod (GR)
  - Magnetically controlled growing rods (MCGR)
  - Non-instrumented controls.

Material & Methods

- Three clinics included
- Blood samples obtained between Dec 2014-Feb 2015
  - GR group 15 pt
  - MCGR group 22 pt
  - Control group 15 pt



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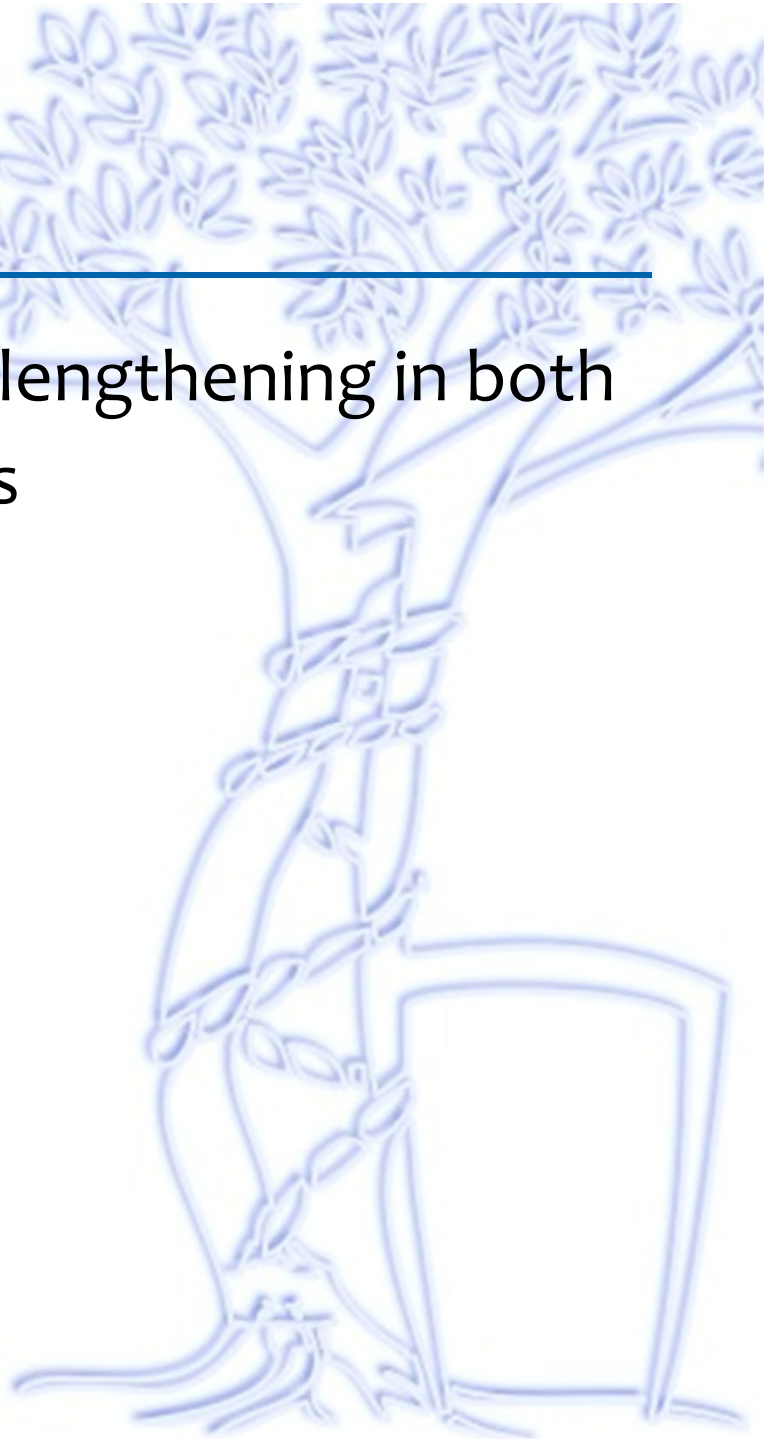
Material & Methods

- Blood samples obtained before lengthening in both GR (surgical) and MCGR patients

- Serums analyzed
  - Titanium
  - Vanadium
  - Aluminium
  - Boron
  - Iron



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Results

	GR	MGCR	Control	P
No of patients	15	22	15	
Age (year)(range)	10.7(6-15)	8.5(2-13)	10.4(5-15)	0.864
Follow-up (w)(range)	214(62-514)	91(3-232)	-	**0.003**
No of Implant	8.73	8.72	-	0,658
No of rod (single /double)	2/13	5/17	-	0.636
Transvers connector	1	3	-	0.461
No of lengthening(range)	7.2(2-16)	8,8(0-24)	-	0.988

Titanium (<7.7 µg/L)

	Control	GR	MCGR	p
Titanium	2.8±1.4	7.3±4.3	10.2±6.8	0.0001

comparison	P
Control vs GR	**0.008**
Control vs MCGR	**0.0001**
GR vs MCGR	0.901

Vanadium(<0.05 µg/L)

	Control	GR	MCGR	p
Vanadium	0.2±0.0	0.2±0.0	0.5±0.5	0.0001

Comparison	P
Control vs GR	1
Control vs MCGR	**0.0001**
GR vs MCGR	**0.004**

Aluminium (1-14 µg/L), Boron < 100 µg/L

	Control	GR	MCGR	P
Aluminium (µg/L)	5.4±4.1	8.1±7.4	7.8±5.1	0.675
Boron (µg/L)	86.7±2.7	86.9±2.5	85.0±6.6	0.396

Iron (37-145 µg/dL)

	Control	GR	MCGR	P
Iron (µg/dL)	124.2±41.2	76.3±39.8	102.4±31.4	**0.01**

comparison	P
Control vs GR	**0.003**
Control vs MCGR	0.431
GR vs MCGR	**0.005**

Conclusions

- Both GR and MCGR applications significantly release titanium and vanadium
- MCGR releases more titanium and significantly more vanadium than the traditional GR.
- This excessive release might be related to the magnetic distractions and the structural properties of the MCGR device.
- Further longer follow-up studies are needed