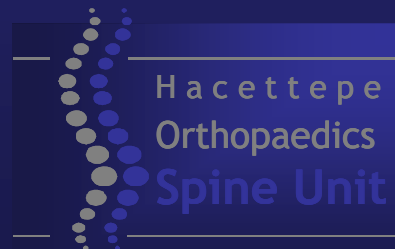


Growing Rod Instrumentation and Vertebral Body Growth: A Radiological Investigation in Immature Pigs

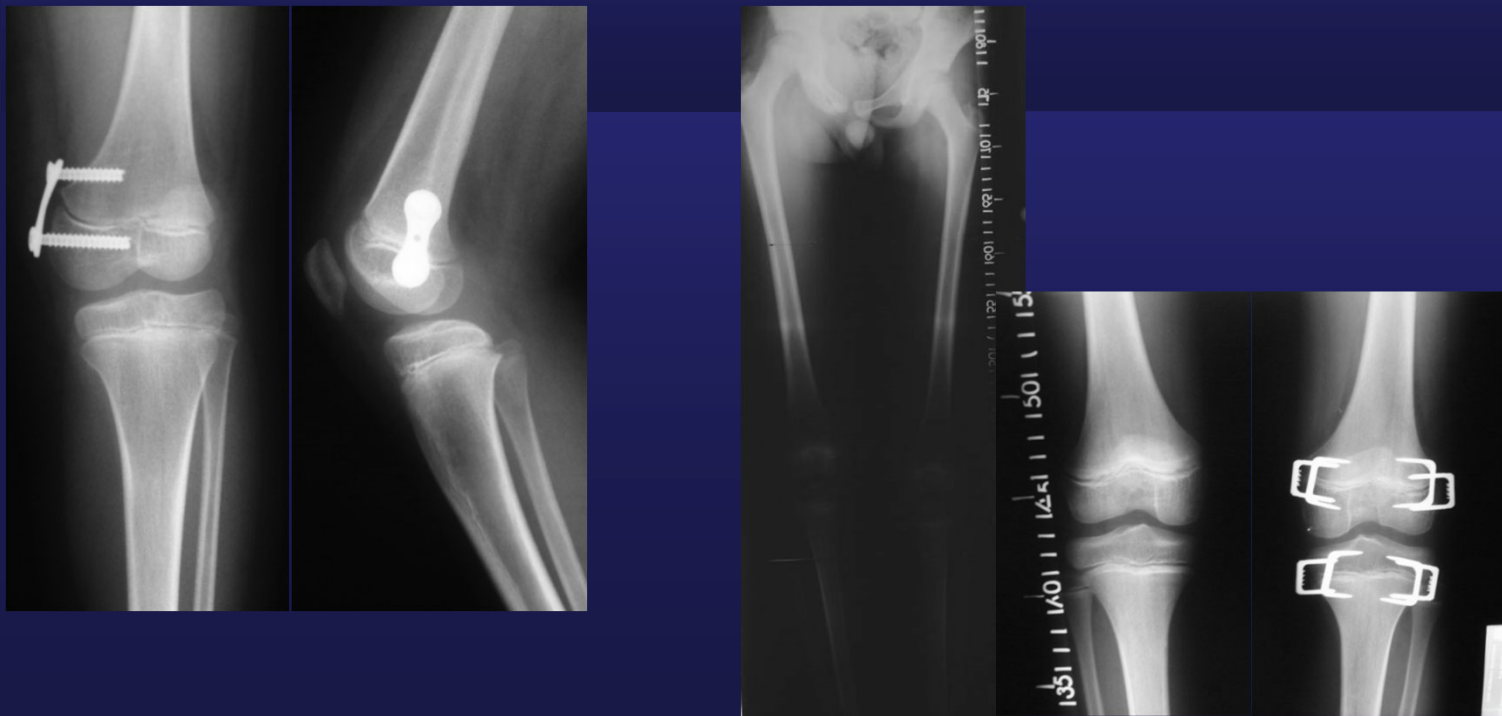
Guney Yilmaz,, Gokhan Demirkiran, Kenan Daglioglu, Cenk Ozkan,
Gazi Huri, Muharrem Yazici





Heuter-Volkman principle

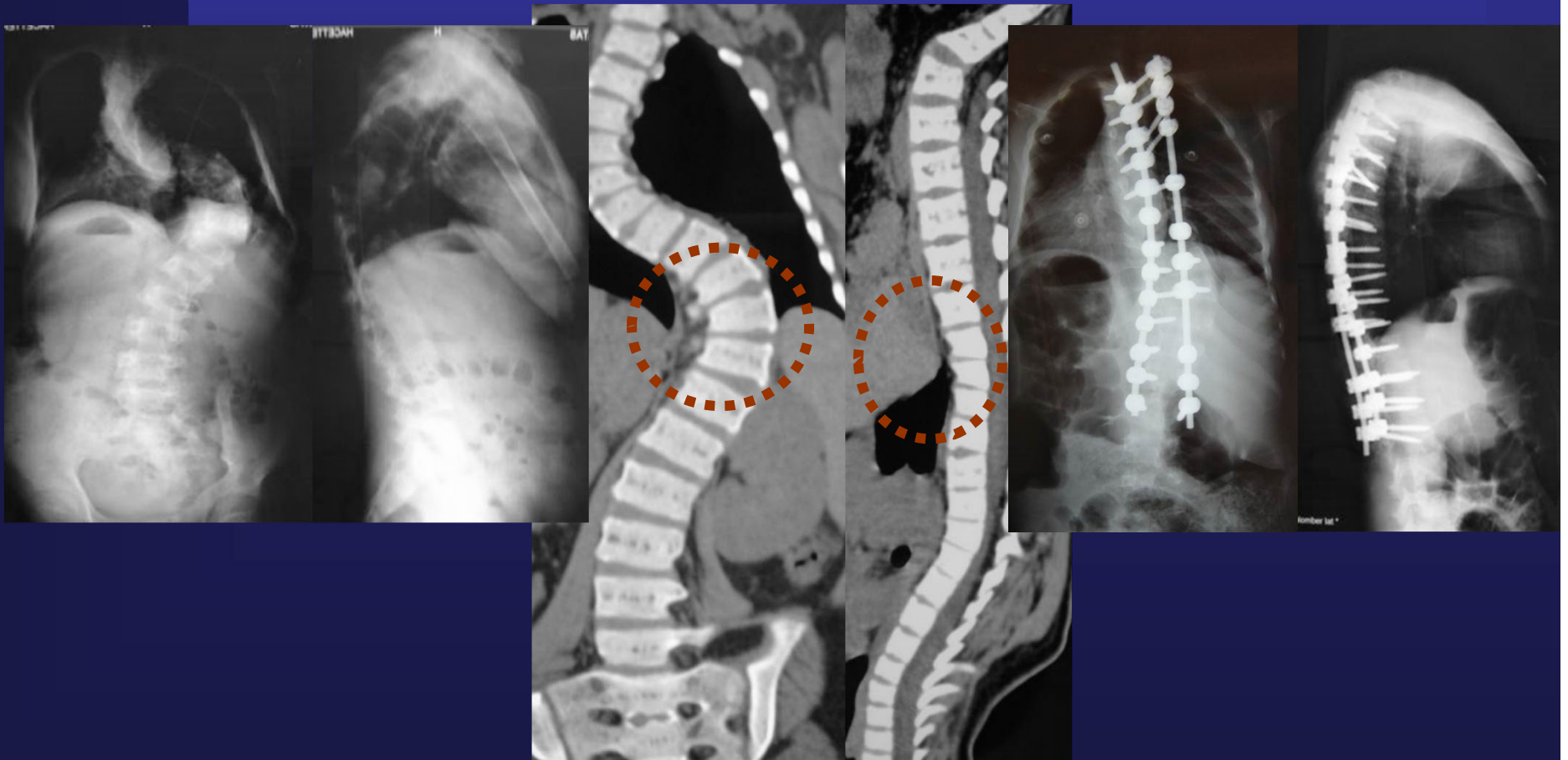
- Appendicular skeleton
 - Growth stimulation with distraction
 - Growth inhibition with compression





Heuter-Volkman principle and Spine

- Compression





Heuter-Volkman principle and Spine

- Distraction
 - Stokes IA
 - Animal tails
 - Ilizarov frame with spings(continues distraction)
 - Distraction stimulates vertebral growth
 - Growth of unsegmented bar after VEPTR ??
 - Stimulation or preservation of growth?



Growing rod instrumentation

- Control of deformity
- Preservation of growth potential
- Stimulation of growth????





Purpose

- To evaluate the vertebral body growth under the distraction forces in immature pigs treated with growing rod technique



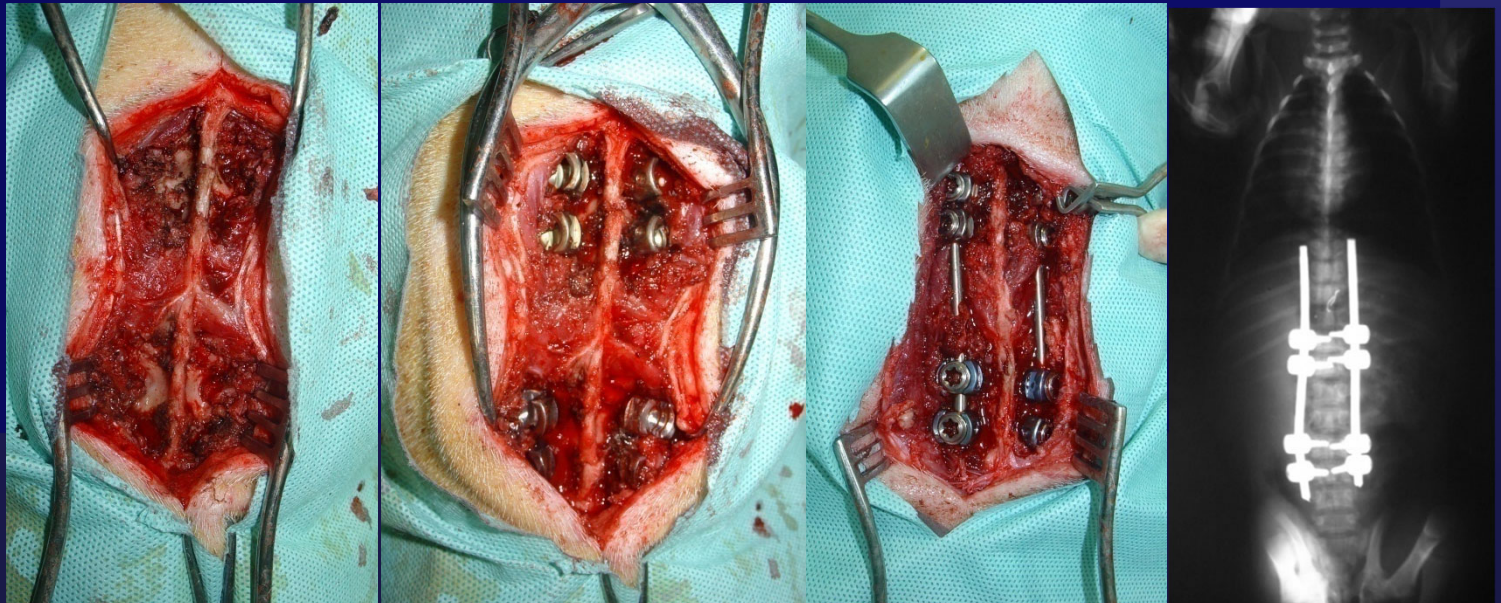
Materials and Methods

- 8 eight-week old domestic pigs
 - 1 excluded (early DWI and pull-out of implants)



Materials and Methods

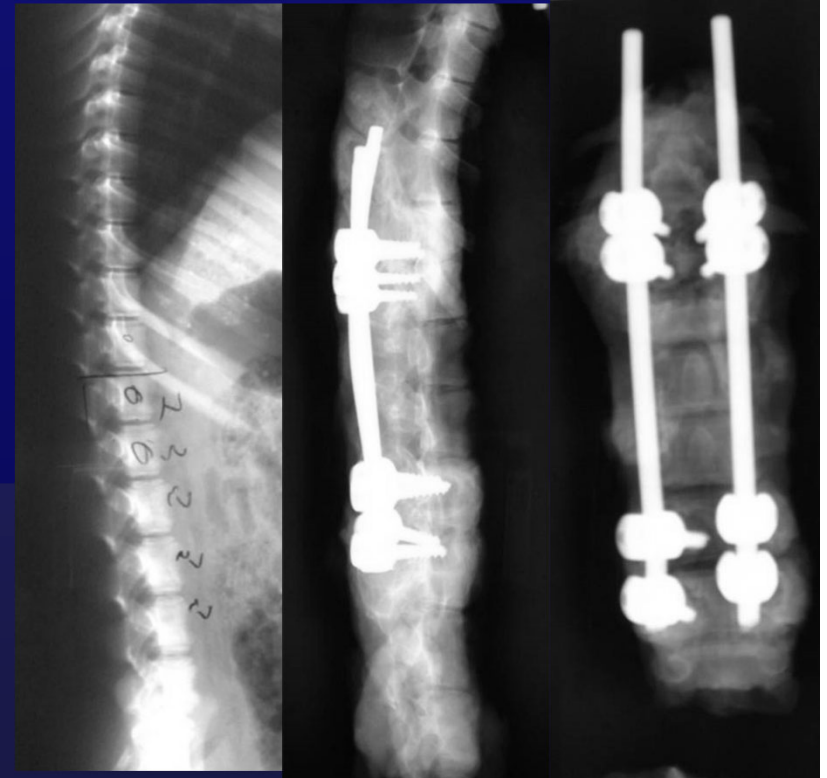
- Skin incision
 - T11-L6
- Subperiosteal exposure
 - T12-L1 and L4-5
- Pedicle screw instrumentation
 - T12-L1 and L4-5





Materials and Methods

- Distraction
 - Index surgery
- Rod lengthening
 - 1st and 2nd month
- Sacrificiation
 - Postoperative
3rd month





Materials and Methods

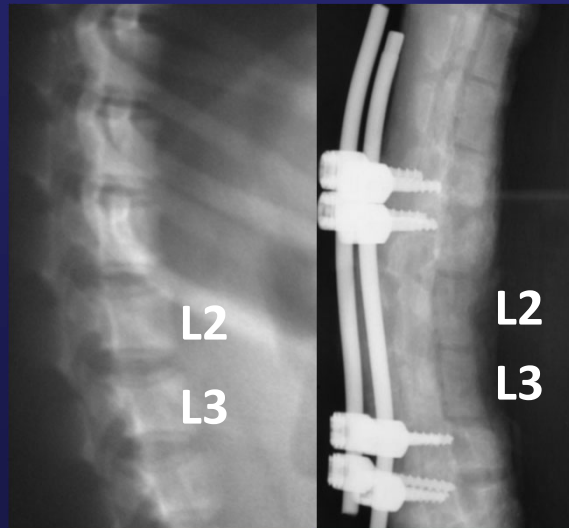
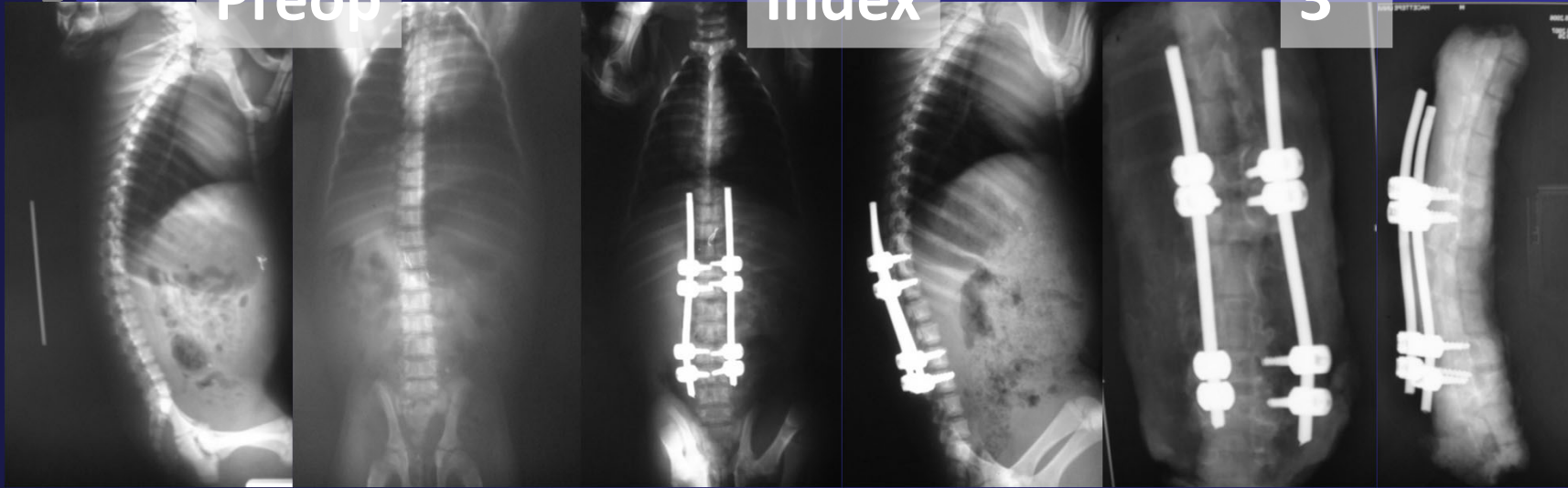
- Vertebral body heights
 - Before index and final FU
 - Distracted segments (n= 14)
 - L2 and L3
 - Control segments (n= 21)
 - T9, T10, T11
 - Average VBH and % increase in VBH

Pig # 4

Preop

Index

3rd





Results

	HD	HC	<i>p</i>
Preop	11.29	11.14	0.231
FU	18.66	16.89	0.001
% increase	65	51.89	0.005





Conclusion

- Vertebral growth continues during growing rod instrumentation
- Distraction forces (growing rod instrumentation) also stimulates apophyseal growth of axial skeleton