

Kyphosis and Implantation: Modeling a Clinical Phenomenon

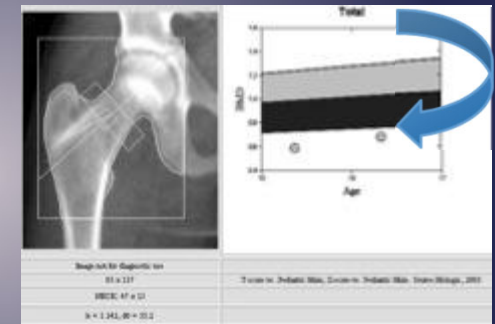
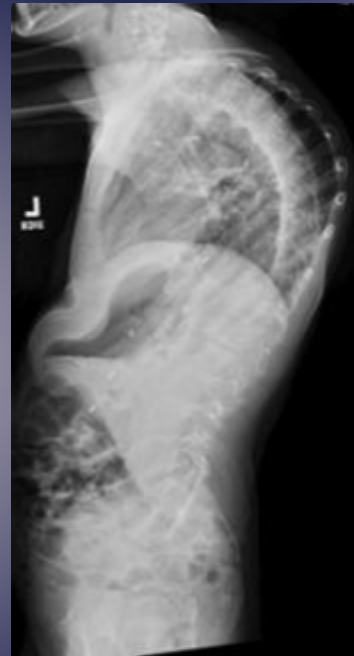
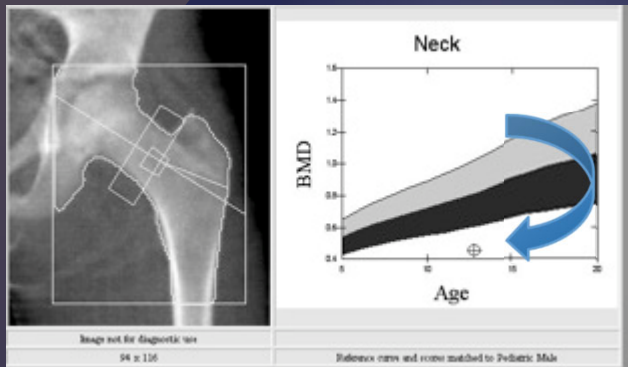
{



Richard H Gross, MD (grossr@musc.edu)
Hai Yao, PhD (yaoh@musc.edu)
Greg Wright, MS (mrgregjwright@gmail.com)

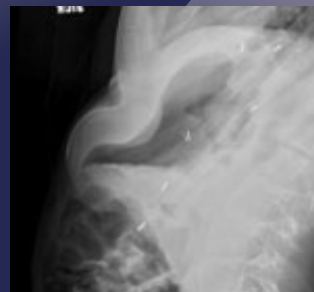
From the Medical University of South Carolina
Charleston, SC

Rib construct a product of desperation for managing kyphotic deformity in boy with VATER syndrome and osteoporosis



Current studies 66
month followup

Preop sternal
compression on
stomach, relieved by
kyphos correction

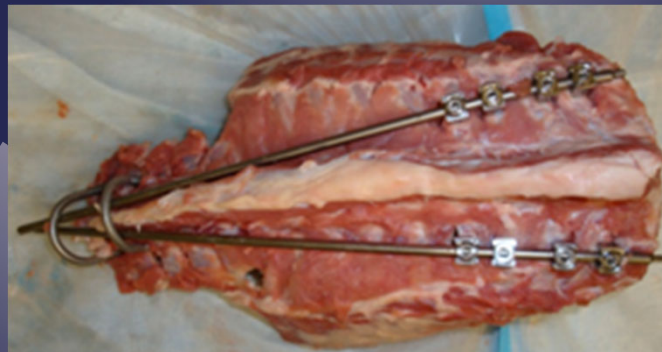


2011 SRS new investigator grant

- ⌘ Purpose: Test strength of current fixation methods (growing rods, VEPTR, rib construct) to kyphotic pullout forces in a porcine model
- ⌘ Synthes spine refused to make VEPTR's available for study
- ⌘ 2 groups tested – 6 spines each from 21.6 plus or minus 1.5 Kg pigs. The pig has 15 ribs.



Pedicle screws in T3-4.
Flourosopic confirmation
of screw location



2 downgoing hooks on 3-4,
upgoing hooks on 5-6

Pedicle screws

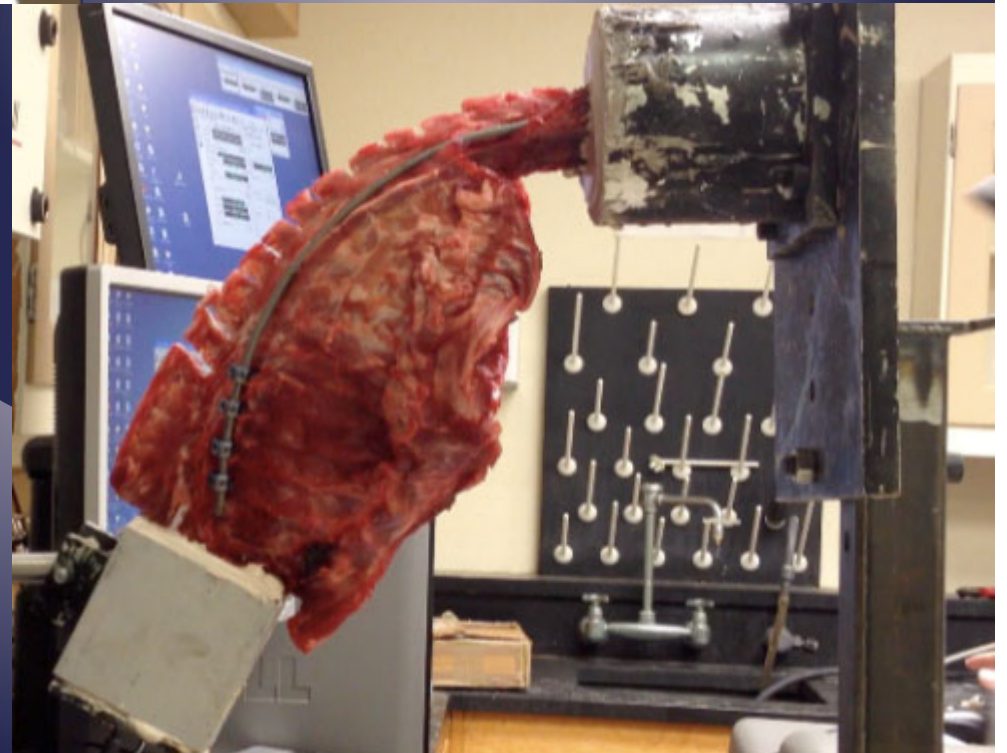


As kyphotic deflection and force increased, there was a partial failure(arrow), then complete failure in all specimens

Rib construct

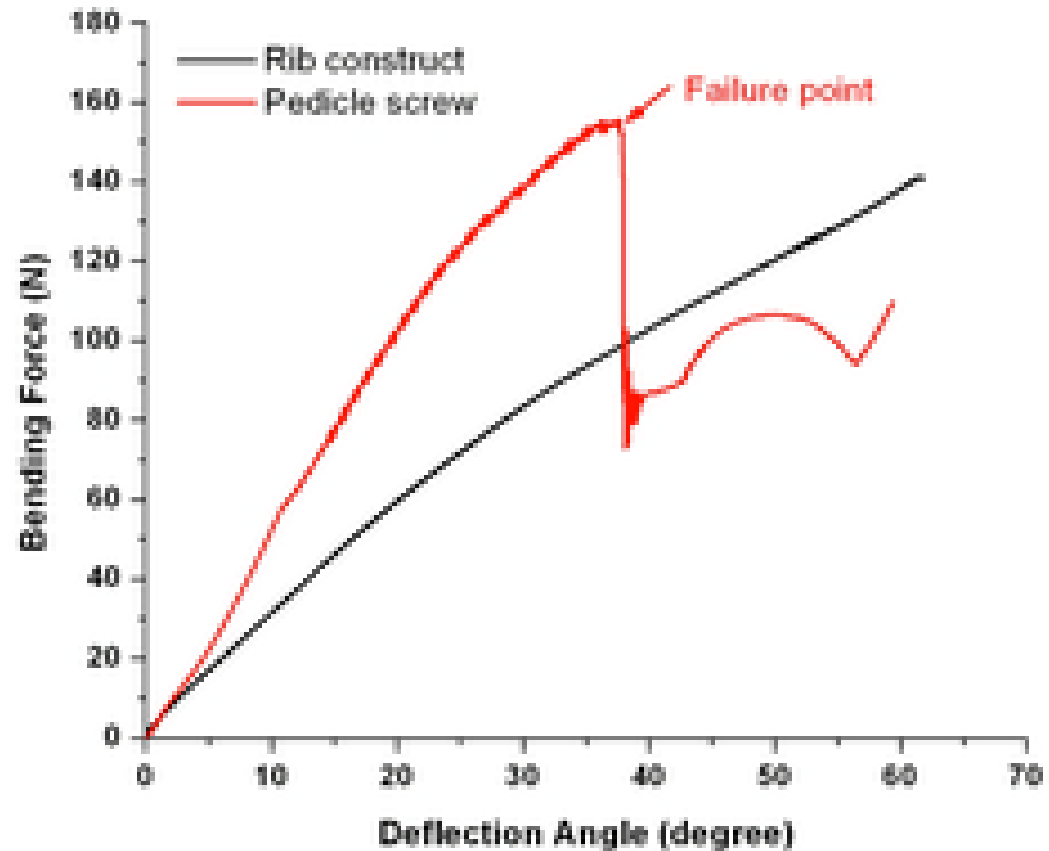


No failure in any of the 6 constructs tested



Results

- ⌘ No failure observed with rib construct. Average deflection 50.3 degrees, maximum bending force 119.7 N
- ⌘ For pedicle screws, failure recorded on all 6 spines. Average deflection angle at failure 35.8 degrees. Average bending force at failure 118.6



Conclusions

- ✓ The rib construct offers superior resistance to kyphotic pullout forces when compared to pedicle screws. Unfortunately, we were unable to test the VEPTR.
- ✓ One clinical paper reported poor results with the VEPTR for patients with kyphosis

Reinker K, Simmons JW, Patil V, Stinson Z. Can VEPTR([REGISTERED]) control progression of early-onset kyphoscoliosis? A cohort study of VEPTR([REGISTERED]) patients with severe kyphoscoliosis. Clinical Orthopaedics & Related Research. 469(5):1342-8. 2011 May

- ✓ Thus, at this time, we feel the rib construct is the only reliable method for control of kyphosis in the management of early onset spinal deformity