

The posterior surgical treatment for focal kyphosis in upper-middle thoracic spine

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The **characteristics** of focal kyphosis in upper-middle thoracic spine

- An apex above T6
- Mainly **post-TB or congenital**
- The thoracic cord is compressed by kyphosis apex, and **100% of the patients have neurological symptoms**
- Paralysis and bladder dysfunction are the final sequel
- Treatment often delayed by unobvious aspect
- **Surgery is the only treatment**



The characteristics of focal kyphosis in upper thoracic spine: **etiology**

- Upper thoracic spine: mainly post TB or congenital

22 cases from 2006 to 2012. **Post TB: 73% (16 cases), congenital: 23% (5 cases), and the rest one was post tumor resection**

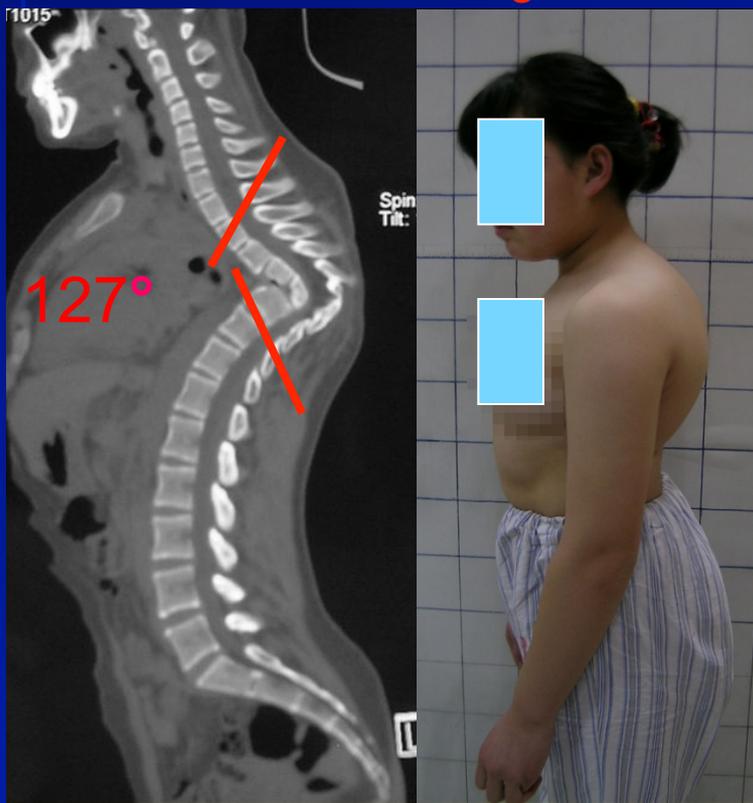
- lower thoracic spine and thoracolumbar junction: more traumatic

56 cases in the same period. Post traumatic: 46% (26 cases), **Post TB: 32% (18 cases), congenital: 20% (11 cases), and 1 iatrogenic**

The characteristics of focal kyphosis in upper thoracic spine: **aspect**

■ Upper thoracic

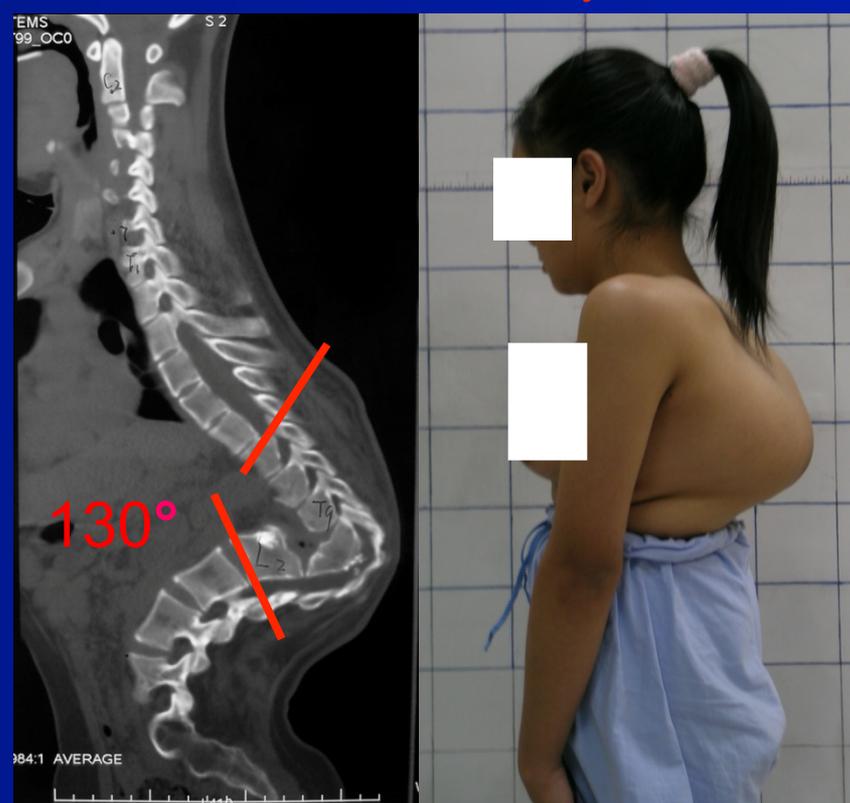
- inapparent aspect deformity
- See doctor for neurological deficit



T5-8

■ Thoracolumbar junction

- Apparent aspect deformity
- See doctor for deformity correction



T10-L1 **Orthopaedics**

The characteristics of focal kyphosis in upper thoracic spine: **lumbar lordosis**

- Upper thoracic kyphosis: **no significant increase of the lumbar lordosis**
- Thoracolumbar junction kyphosis: **significant increase of the lumbar lordosis**



T3-5 kyphosis 90°
lumbar lordosis 64°



T11-12
kyphosis 90°

lumbar lordosis
104°

The characteristics of focal kyphosis in upper thoracic spine: **neurological function**

- Upper thoracic kyphosis: **the main complain is neurological deficit, and minority back pain**

- ✓ Poor endurance to compression and distraction of the spinal cord in upper thoracic spine
- ✓ Thorax stability and rough normal of lumbar lordosis
- ✓ inapparent aspect deformity

- lower thoracic spine and thoracolumbar junction kyphosis: **the main complain includes neurological deficit, back pain, and aspect**

- ✓ a certain extent endurance to compression and distraction of the spinal cord in lower thoracic spine and thoracolumbar junction
- ✓ back pain: the stress increase of facet joint due to enlarged lumbar lordosis
- ✓ Apparent aspect deformity

Cases data

- 13 cases (June 2006 - April 2010)
- Kyphosis apex above T6
- Male: 7, Female: 6
- Mean age was 30.0 years (range, 11 to 61 years)
- Etiology:
 - vertebral tuberculosis: 8 cases
 - congenital vertebral dysplasia: 4 cases
 - kyphosis after spinal tumor surgery: 1 case

Surgical procedures

- Posterior pedicle subtraction osteotomy (PSO): 6 cases
- Posterior vertebral column resection (VCR): 7 cases



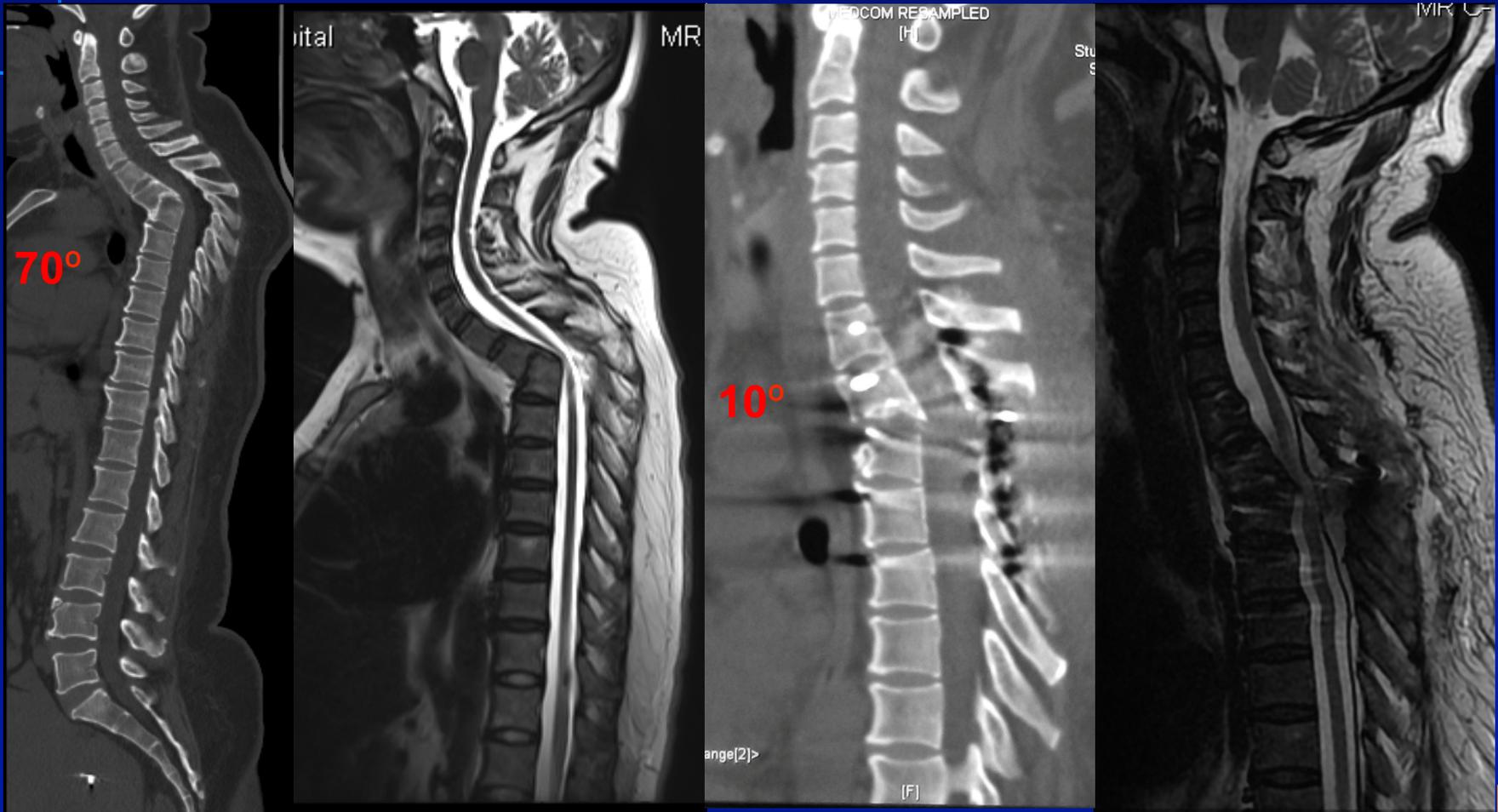
Results

Kyphosis correction of the two different surgical procedures

	Average kyphotic angle					
	Before surgery(°)	After surgery			At f/u	
		Angle(°)	Correction rate	Angle(°)	Correction rate	
PSO(n=6)	70.2	37.2	47.1%	37.2	47.1%	
VCR(n=7)	76.0	28.9	62.1%	30.1	60.5%	

	Frankel grading						Average ODI		
	Before surgery			At f/u			Before surgery	At f/u	Improving rate
	E	D	C	E	D	C			
PSO(n=6)	0	4	2	3	3	0	26.0	14.8	42.9%
VCR(n=7)	0	4	3	2	3	2	19.6	16.0	18.2%

Female, 44, post TB of T2-5



Pre-op

Post-op

Complications

- Transient paralysis of the lower extremities in 2 cases (both in VCR)
- Recurrent kyphosis due to implant failure in 1 case (in VCR)
- No severe complication in the PSO procedure

Conclusions

- Although high risk need to be warned, the corrective surgery for focal kyphosis in upper-middle thoracic spine still can achieve satisfactory results
- Given the comparative surgical results yet less complications, PSO seems a preferable procedure over VCR for kyphosis at this region.

None of the authors has any potential conflict of interest