

## HKU Successfully Implants the World's First Remotely Controlled Expandable Device to Treat Scoliotic Children

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January 13, 2010



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### What is Scoliosis



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## Causes of scoliosis

- Congenital
  - Rare
  - True incidence unknown
- Of unknown cause (idiopathic)
  - Late onset (adolescents)
    - 3-5 per 1000 children
  - Early onset ( $\leq 5$  yrs of age)
    - 1-2 per 10,000 children



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## Consequence of scoliosis

- Poor cosmesis
- Impaired pulmonary function
  - Early onset
    - Impaired lung growth
  - Severe curvature
    - Restrictive lung disease
  - Increased mortality



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## Management options in adolescents

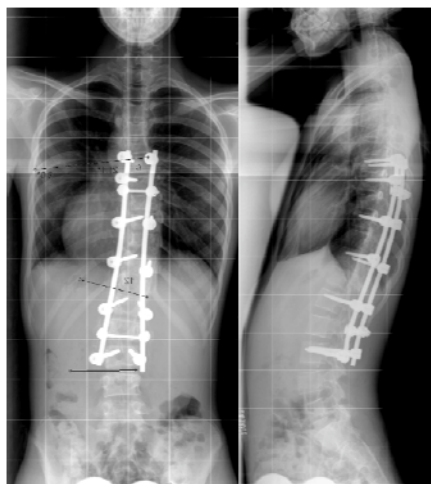
- Bracing
  - Prevent curve progression
  - Tie over growth spurt
  - Until skeletal maturity



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## For severe scoliosis – spinal fusion



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## Management options in very young children

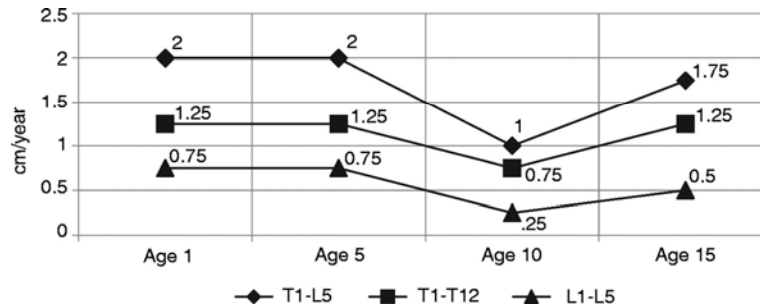
- Bracing
  - Immature rib cage can deform with brace
  - Many years of bracing (up to 10 years)
- Early fusion
  - Fusion of 5year-old child – 12.5cm loss of vertical height
    - *Curr Opin Paeds 2005*
  - Therefore not recommended



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## Spinal growth in children



- Spine growth T1-L5:
  - 0 to 5yr = 10cm
  - 5-10yr = 5cm
  - 10yr to maturity = 10cm

Dimeglio A: Growth of the spine before age 5 years.  
*J Pediatr Orthop B* 1993;1:102-107



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## Special Considerations for Spinal deformities in young children

- Rapidly growing spine
  - Early fusion undesirable
- Maintenance of pulmonary development

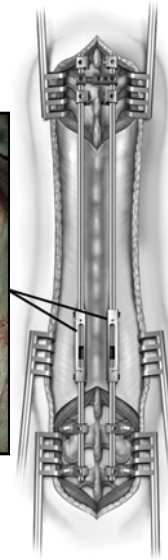
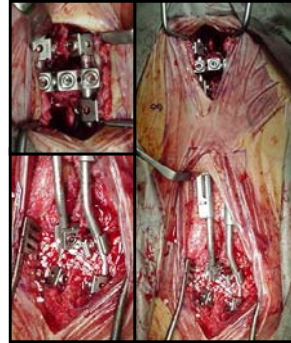


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## Recent advances in management of scoliosis Growing instrumentations

- Internal brace
  - to achieve and maintain deformity correction during spinal growth
- Serial lengthening every 6 – 12 months



J Am Acad Orthop Surg 2006



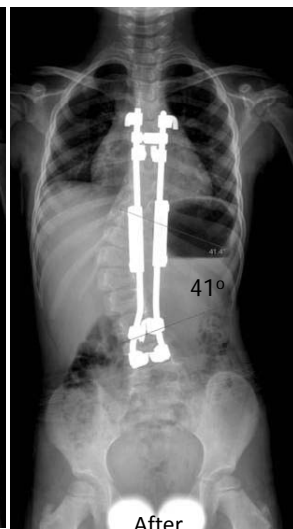
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## Clinical problem – spinal deformity in young child *A growing internal brace*



Before



After



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## Disadvantages of existing growing implants

- Repeated surgeries for distraction every 6 months
- Still require additional surgery for spinal fusion during adolescence
- Complications
  - Implant breakage and dislodgement
  - Wound infection



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## A new Spinal Bracing and Distraction System

- System allows the patient to undergo distraction with an external magnet **without** the need for repeated surgeries
- A breakthrough in technology - **small internal magnetic motor**
- **Minimally invasive** implantation possible



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## Case presentation

5 years of age  
with scoliosis of  
32 degrees

Treated by  
bracing



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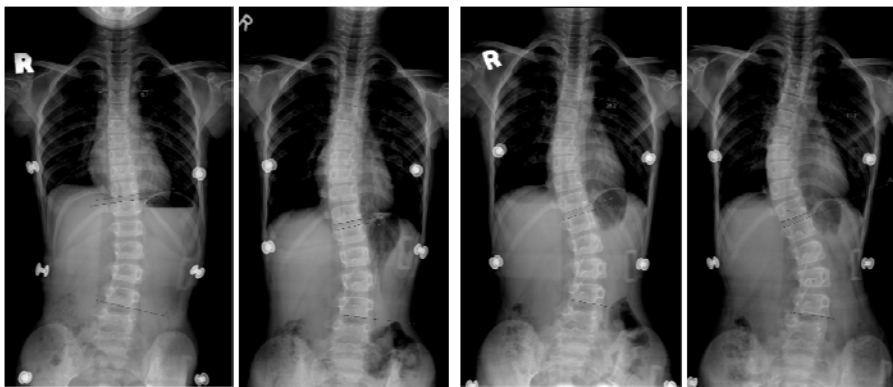
## Progressive deterioration despite treatment with brace

2002

2003

2007

2009

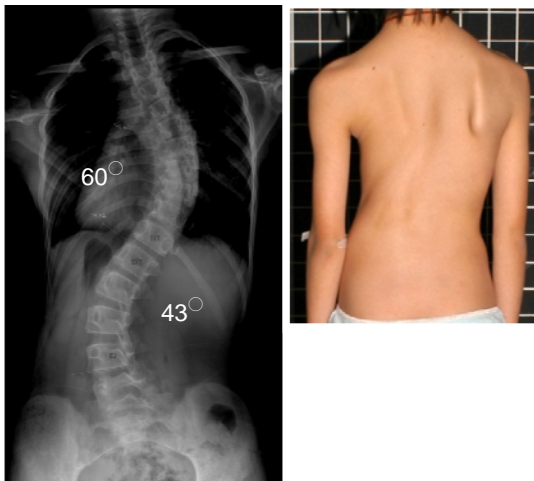


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## 2009 before surgery

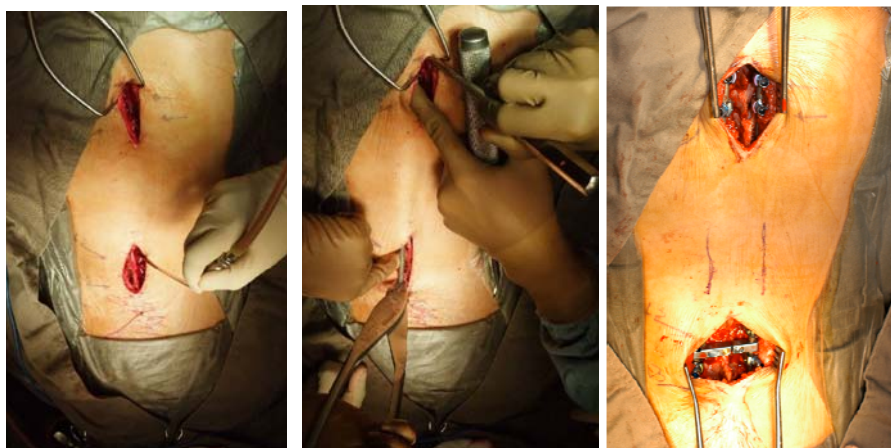


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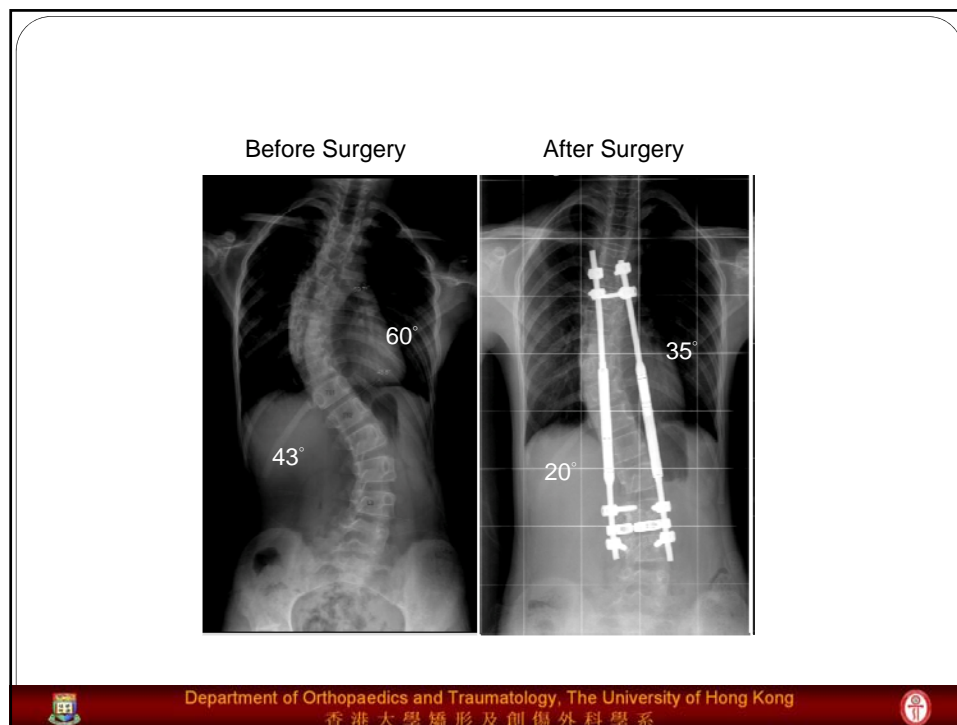
## Surgery

- Minimally invasive implantation



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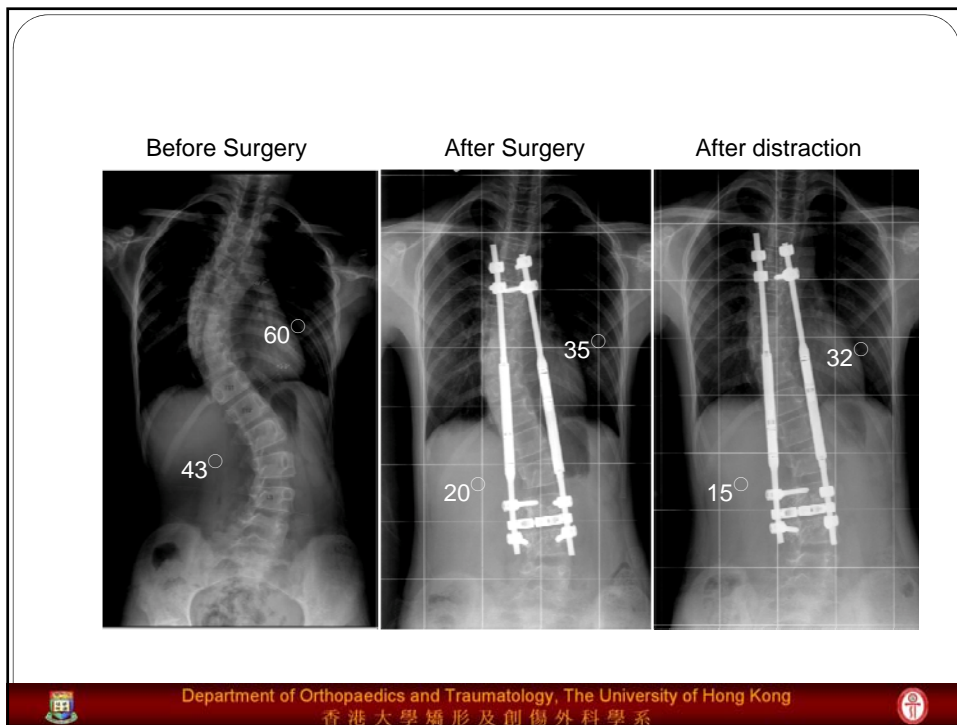
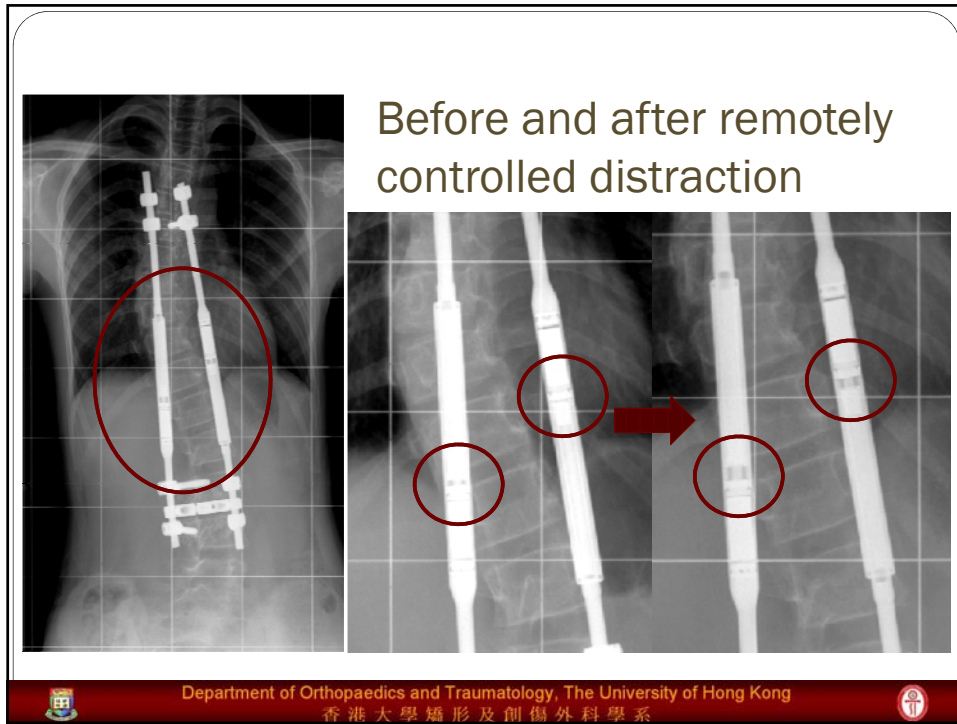




## Distraction with patient awake



- A 30-seconds procedure
- No anaesthesia required
- Can go home on the same day



## Progress

- 2 patients with early onset scoliosis
  - 5 years old girl
    - Surgery - November 2009
    - First distraction – December 2009
    - Second distraction – January 2010
  - 12 years old girl
    - Surgery – December 2009
    - First distraction – January 2010



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## HKU – a centre of excellence in treating scoliosis

HKU conducted the world's first remotely controlled expandable device because:

- HKU's Clinical Trials Centre, a well-developed centre for clinical trials, has an important role to play in this study
- The Department of Orthopaedics and Traumatology, HKU, is world-renowned for its treatment of scoliosis



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## Breakthrough in management of scoliosis in young children

- Future aims
  - Recruit more subjects in the study (Hotline: 2974 0239)
  - Avoid the need for repeated surgeries in young children with severe scoliosis
  - Improved outcomes



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## Demonstration of distraction



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## The University of Hong Kong



Queen Mary Hospital



The Duchess of Kent Children's Hospital

LKS Faculty of Medicine



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