

Spine Deformities in Children 兒童脊柱側彎

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鍾培言

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Spine deformities in children 兒童脊柱側彎

- Adolescent idiopathic scoliosis ~70-80%
- 青少年特發性脊柱側彎——70-80%
- Congenital scoliosis ~5-10%
- 先天性脊柱側彎——5-10%
- Neuromuscular scoliosis ~5-10%
- 神經肌肉性脊柱側彎——5-10%

Adolescent idiopathic scoliosis

Jack C. Cheng^{1,2}, René M. Castelein³, Winnie C. Chui⁴, Aina J. Danielsson^{5,6}, Matthew B. Dobbs⁷,
Theodoros B. Grivas⁸, Christina A. Gurnett⁹, Keith D. Luk¹⁰, Alain Moreau¹¹⁻¹³,
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NATURE REVIEWS | DISEASE PRIMERS

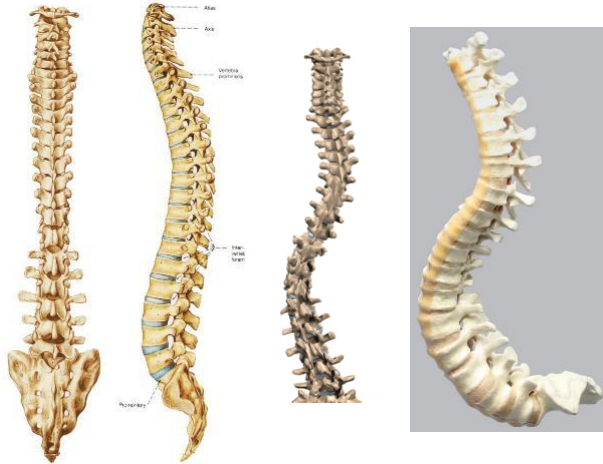


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What is scoliosis? 甚麼是脊柱側彎

- Lateral deviation of the spine
- 脊柱的側向偏移
- 3D deformity
- 三維畸形
- Rotational deformity
- 旋轉畸形
- $>10^\circ$



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AIS 青少年特發性脊柱側彎

- Commonest deformity 最常見的畸形
- ~4% adolescence 影響大約4%青少年
- 11% of 1st degree relatives have AIS
- 11%患者其一等直系親屬也患有脊柱側彎
- Cause unknown 病因未知
- Genetics 基因
 - ?Muscular, neural 肌肉，神經



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AIS青少年特發性脊柱側彎

	Total總計	Boys男生	Girls女生	Girls:Boys Ratio 男女比例
>10°	2.49%	1.34%	3.59%	2.7
>20°	1.39%	0.50%	2.24%	4.5
>40°	0.23%	0.05%	0.40%	8.1

SPINE Volume 35, Number 17, pp 1607-1614
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Clinical Effectiveness of School Screening for Adolescent Idiopathic Scoliosis

A Large Population-Based Retrospective Cohort Study

Keith D. K. Luk, MCh (Orth),* C. F. Lee, PhD,† Kenneth M. C. Cheung, MD,*

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Screening 篩查



- 1995: screening for scoliosis in Hong Kong
- 1995年香港開始脊柱側彎篩查
- Detect at early stage for early treatment
- 盡早發現盡早治療
- Forward bending test with scoliometer
- 身軀前屈測試
- 脊柱側彎度數測量儀



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Moire莫爾



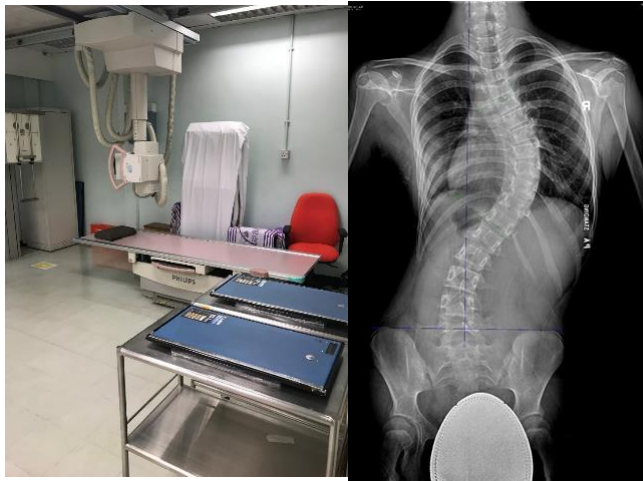
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X-ray X光



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Appearance 外表

- Mostly healthy patients 大多數為健康兒童
- Tend to be taller 身高較高
- Longer arms and legs 較長的手臂與腿
- Thinner 身形較瘦
- Shoulder and trunk asymmetry 肩、軀幹不對稱
- Back hump 後背駝峰
- Flat back 平背



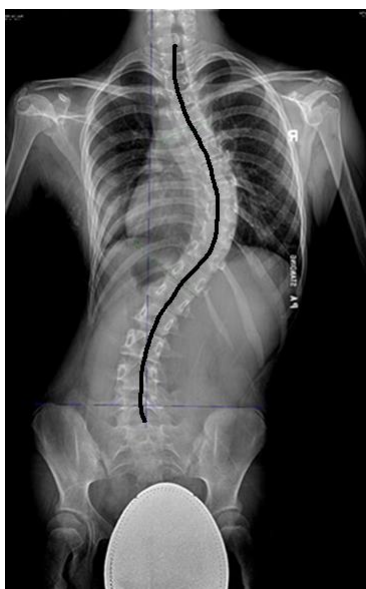
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Deformities 畸形



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Consequences 後果

- Deterioration during growth spurt 生長突增期間的惡化
- Treatment based on curve size 根據側彎程度制定治療方案
- Problems問題
- Pain 疼痛
- Cardiopulmonary compromise 心肺功能
- Cosmetic problem 美觀問題
- Poor mental health 心理健康



Misconceptions 錯誤觀念

- Poor posture 姿勢不正確
- Injury 受傷
- One-handed sports 單手運動
- Heavy schoolbag 書包過重
- Pregnancy problems 孕期影響



Management strategies 治療方案

- Observation 觀察
- Bracing 佩戴腰架
- Surgery 手術
- How to decide? 如何決定?
 - Cobb angle Cobb角
 - Skeletal growth potential 骨骼生長潛力

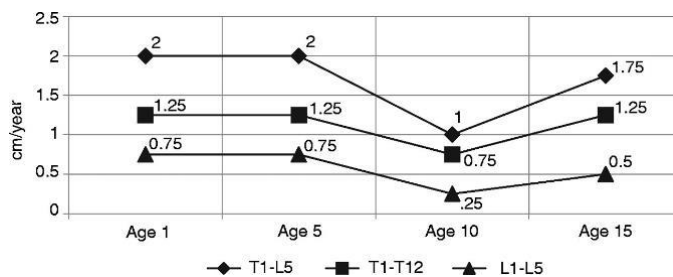


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Skeletal growth 骨骼生長

- Birth to age 5 (rapid) 出生至5歲（迅速）
- 5-10yr (less rapid) 5-10歲（較緩慢）
- >10yr (rapid) 10歲以後（迅速）



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



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Skeletal growth 骨骼生長

- Height 身高
- Arm length 臂長
- X-rays X光



Clin Orthop Relat Res (2018) 476:429–436
DOI 10.1007/s11999-0000000000000027

Clinical Research

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Curve Progression in Adolescent Idiopathic Scoliosis Does Not Match Skeletal Growth

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Bracing 腰架

- Curve size 20-40° 側彎度數20-40°
- Prevent progression to surgery 防止惡化
- Stop at maturity 成熟後停止治療
- Many designs 多種設計
- Made by thermoplastic material 熱塑性材料製成
- Wearing time and tightness 佩戴時間與鬆緊度
- Must maintain exercises 必須保持運動習慣



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Boston Bracing 波士頓 腰架



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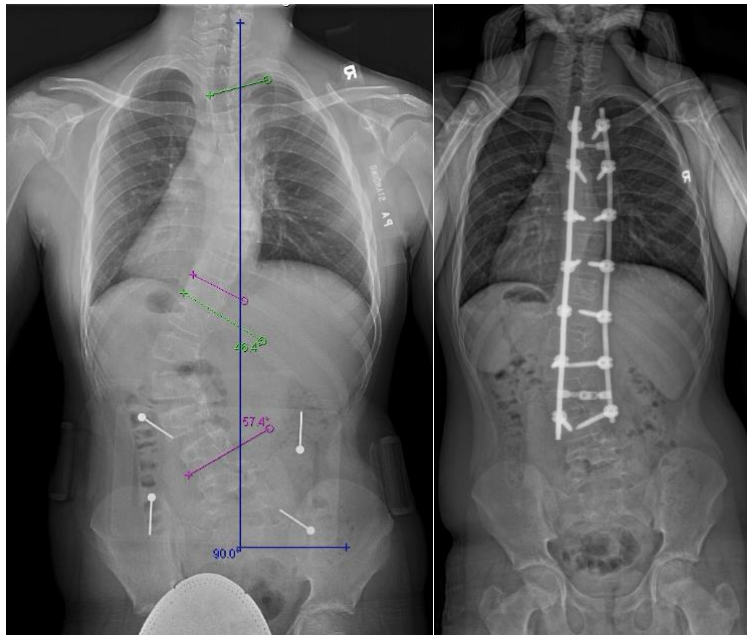
Surgery手術

- $>40-45^\circ$
- Spinal correction and fusion 脊柱矯正與融合
- Main risks 主要風險
- Neurological deficit 神經功能缺損
- Infection 感染
- Recurrence 復發



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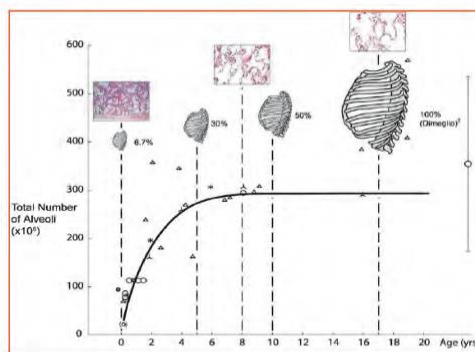


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Early onset scoliosis 早發性脊柱側彎

- Correct spine and chest volume
- 脊柱矯正和胸腔容量
- After 8 years old, the lung is matured
- 8歲以後，肺發育成熟
- Growth friendly surgery
- 利於生長的手術
- Allow spine growth
- 允許脊柱生長



Graph summarizing multiple small series of morphometric studies of autopsied lungs (Thurlbeck 1982, Dunnill 1962, Thurlbeck 1975, Zeltner and Burri, 1987, Zeltner et al, 1987, Davies and Reid, 1970) with relative percent adult thoracic size as a age (Dimeglio, 1990)



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Growing rods 生長棒

- Nonfusion 無需融合
- Regular distractions 定期拉伸
- Traditionally, every 6 months 傳統生長棒每半年更換一次
 - A 5yr old girl may need 16 surgeries! 一個五歲女孩需要約16次手術！

Magnetically controlled growing rods for severe spinal curvature in young children: a prospective case series

Kenneth Man-Chee Cheung, Jason Pui-Yin Cheung, Dino Samartzis, Kin-Cheung Mak, Yat-Wa Wong, Wai-Yuen Cheung, Behrooz A Akbarnia, Keith Dip-Kei Luk



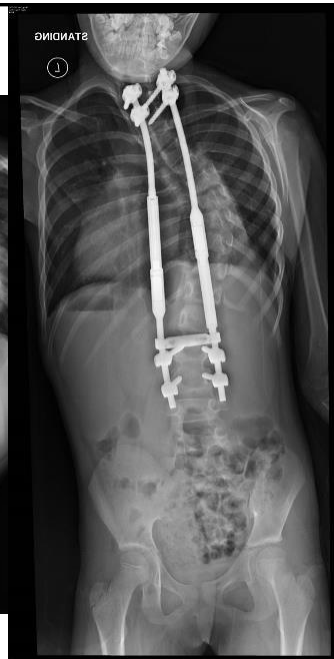
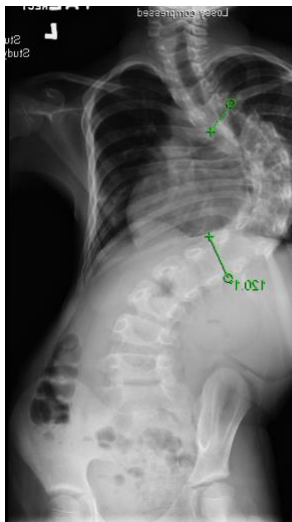
Lancet 2012; 379: 1967-74



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Growing rods

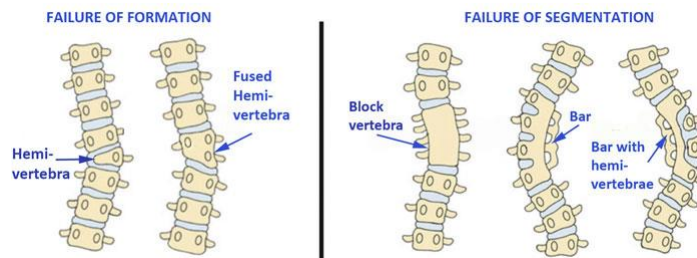


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Congenital scoliosis 先天性脊柱側彎

- Failure of formation 椎體成型困難
- Failure of segmentation 椎體分節困難



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Neuromuscular scoliosis 神經肌肉性脊柱側彎

- Cerebral palsy
- 腦癱
- Muscular dystrophy
- 肌肉萎縮症
- Spinal muscular atrophy
- 脊柱肌肉萎縮
- Spinal tumor
- 脊柱腫瘤
- Spina bifida
- 脊柱裂
- After spinal cord injury
- 脊髓損傷後



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What's the difference? 不同之處？

- More medical comorbidities 更多併發症
- Progression despite skeletal maturity 成年後仍會繼續惡化
- High risk for surgery 手術的高風險性
- Use of ventilator 需要呼吸裝置
- PICU support 兒童重症監護室支持



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Treatment aims 治療目的

- Less cosmetic problem 較少美觀問題
- Fitting wheelchair 適應輪椅
- Avoid rib-pelvis impingement 避免肋骨-盆骨撞擊
- Improve feeding 改善餵養
- Balance 平衡
- Prevent progression 防止惡化



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Summary 總結

- Scoliosis not uncommon in children 脊柱側彎在兒童中並不少見
- Screening in Hong Kong can identify most patients 香港的脊柱側彎篩查計劃能夠發現大多數脊柱側彎患者
- Mild cases are observed 輕微脊柱側彎患者需要定期覆診跟進
- Moderate cases may need bracing 中度脊柱側彎患者可能需要佩戴腰架
- Severe cases need surgery 嚴重脊柱側彎患者需要手術治療



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Thank you 謝謝！



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成人脊椎退化性側彎

關日康醫生

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英國愛丁堡皇家外科醫學院骨科院士

香港骨科醫學院院士

香港醫學專科學院院士(骨科)

香港大學李嘉誠醫學院矯型及創傷外科學系臨床助理教授



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成因

■ 青少年特發性脊柱側彎

- $>50^\circ$
- 每年平均增長率： 1°

■ 成人脊椎退化性側彎

- 骨質疏鬆
- 退化性



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被忽略的青少年特發性脊柱側彎



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青少年特發性脊柱側彎

- 青春期的脊柱彎度 $<30^{\circ}$ 的患者，一般在成年期不會出現明顯的加重
- $>50^{\circ}$ 健康患者的脊柱緩慢出現彎曲
- 脊柱彎曲的度數每年增加約 $0.5-2^{\circ}$



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病徵

- 病人：
 - 外觀
 - 腰部疼痛
- 醫生：
 - 側彎惡化
 - 影響平衡、心肺功能
- 手術治療



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病例

- 24 歲
- 11 歲發現青少年特發性脊柱側彎、但當時不肯接受治療
- 腰部疼痛
- 影響情緒、抑鬱症



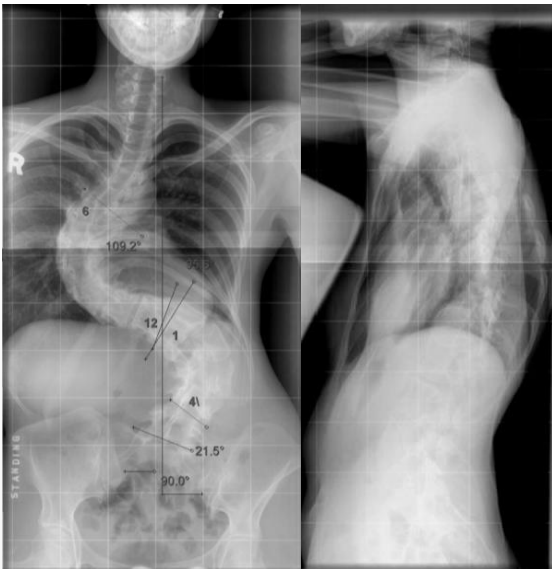
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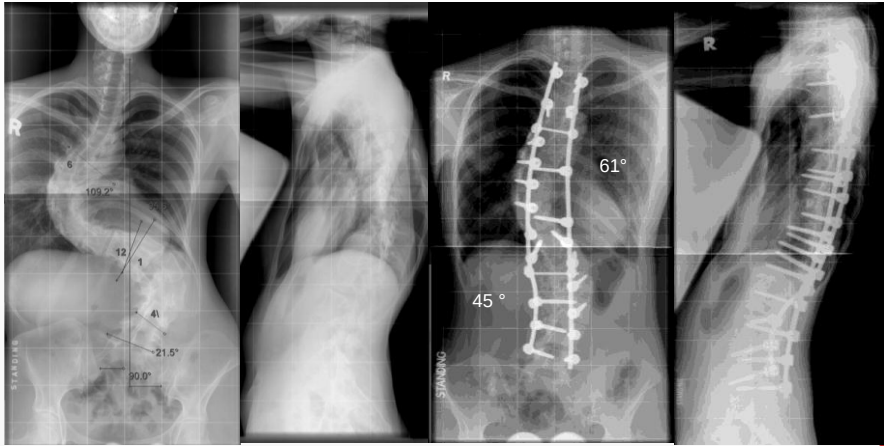
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Apr 08: T6-T12 = 110° / L1-L4 = 96°



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開放性融合手術



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術前

術後



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被忽略的青少年特發性脊柱側彎

- 脊柱柔軟程度減少、所以增長融合節段
- 增加手術時間
- 增加失血比率
- 增加併發症比率

建議及早治療



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退化性側彎



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成因

■ 顧名思義，這種脊柱側彎在成年期出現

■ 歸因於：

- 椎間盤退變
- 關節炎
- 椎間隙的楔形變



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兩足動物

Sagittal view of primate skeleton :
C shaped spine



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盆骨形狀

Pelvis primate

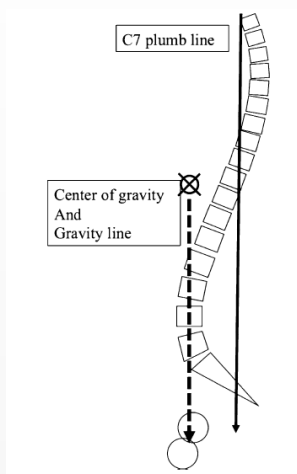
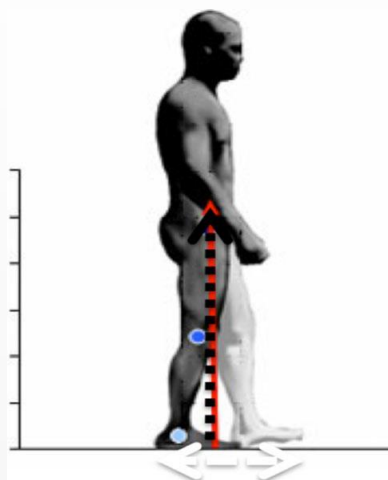


pelvis human



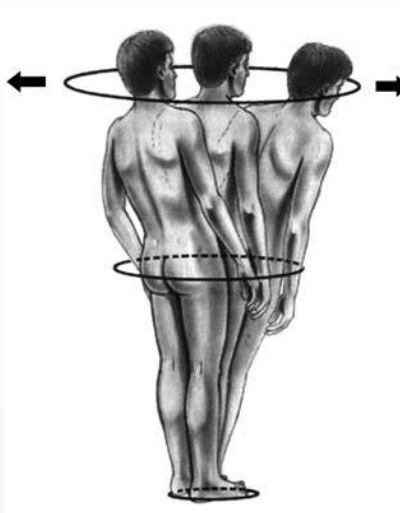
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物體的重心



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“Cone of Economy” 經濟錐體

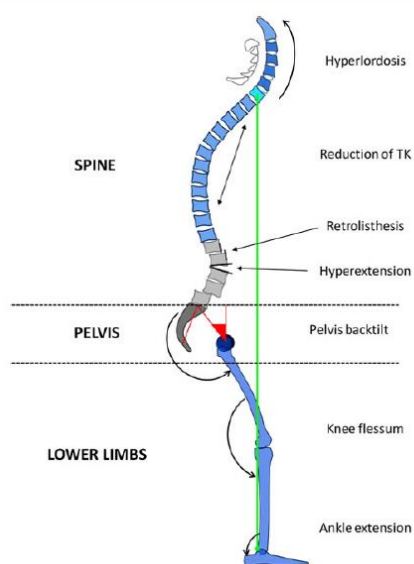
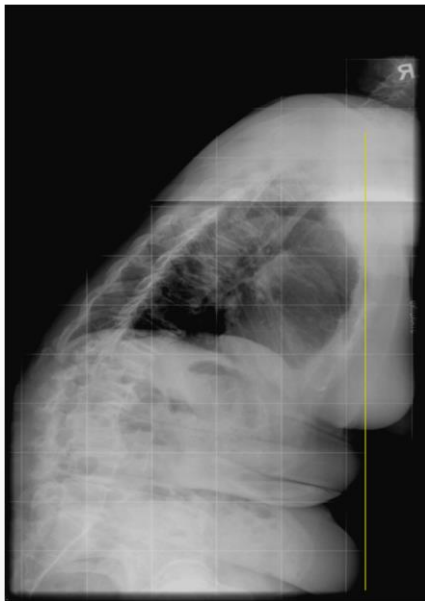


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一般不是外觀的問題

■ 疼痛

- 背部後凸
- 骨頭
- 僵硬
- 小關節退化
- 神經線放射痛

■ 神經根出口狹窄

- 下肢無力
- 麻木



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診斷

- 一些病人可能會通過軀幹向前傾斜以試圖擴大神經根的出口
- 一些患者由於腰段（下腰部）正常前凸的丟失（脊柱前凸），也會出現軀幹前傾
 - 屈髖和屈膝保持直立的姿勢
 - 小腿肌肉產生更大的壓力，導致患者早期出現疲勞
- 逐漸減少和喪失日常生活和活動的功能



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病情

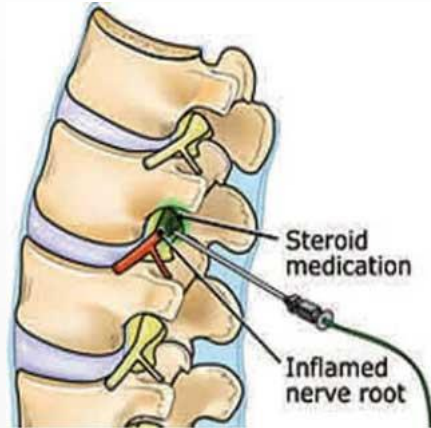
- 初期病徵較輕微
- 病徵惡化速度緩慢



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治療

- 主要針對病徵
- 通常要其他影像
 - 磁力共振 MRI
 - 電腦掃描 CT/myelogram
 - 神經根Nerve root blocks
 - Discograms
 - Facet blocks



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非手術治療

- 定期觀察，止痛藥
- 物理治療運動
 - 加強腹部和背部核心肌肉的力量
 - 提高柔韌性
- 不建議使用支具
 - 降低肌肉強度



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手術治療的目標

- 恢復脊柱平衡
- 減輕疼痛
- 神經線減壓
- 改善生活質量



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不同手術方案的選擇

- 微創神經減壓手術



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■ 微創間接減壓及融合手術



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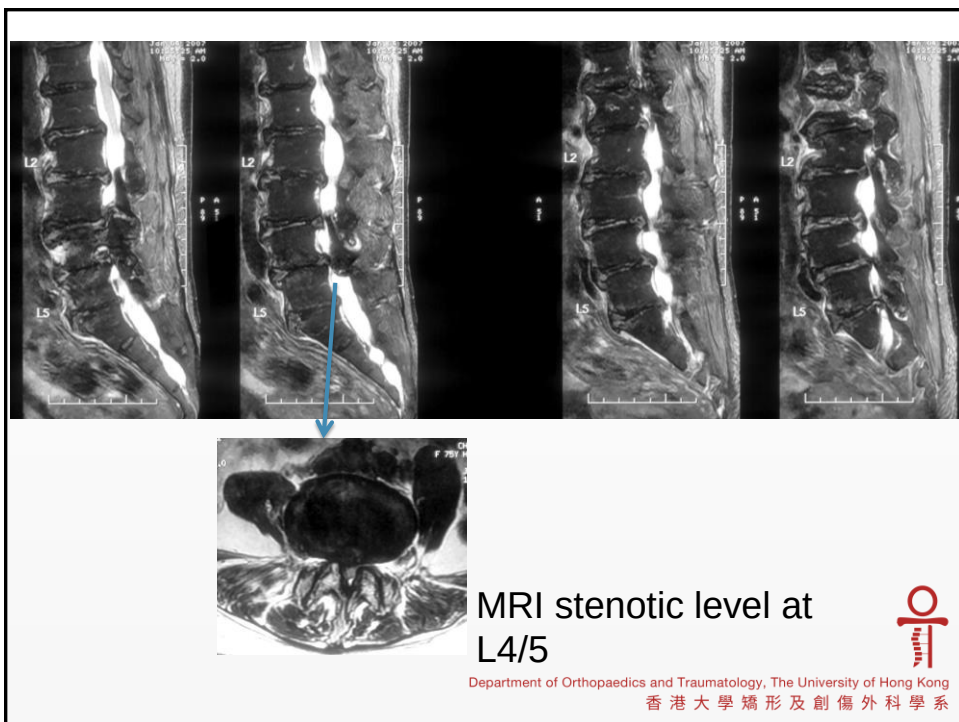
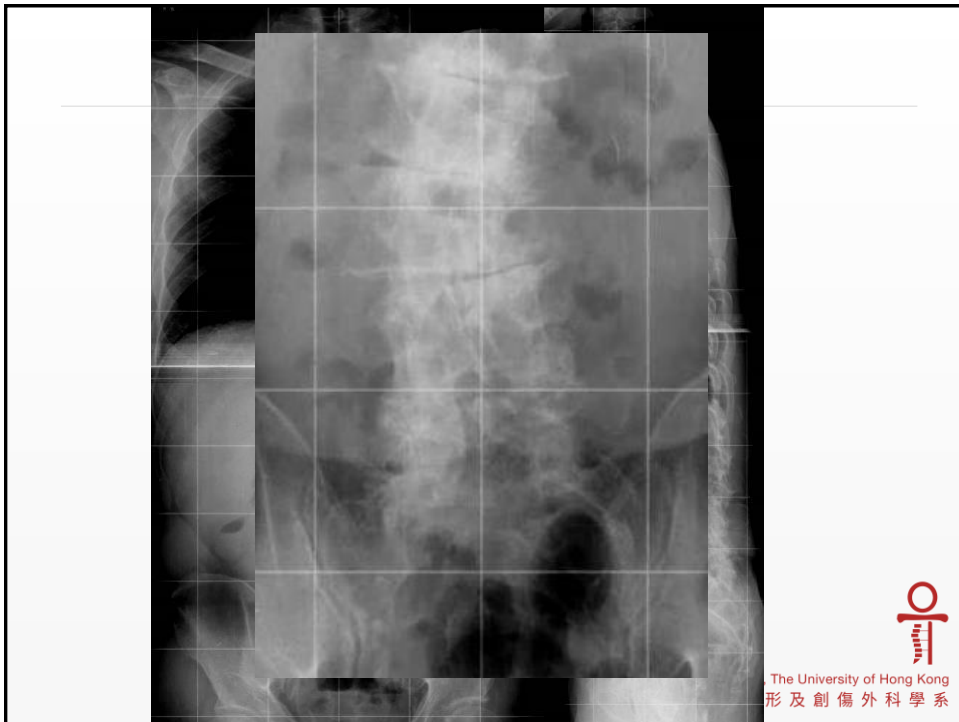
病例

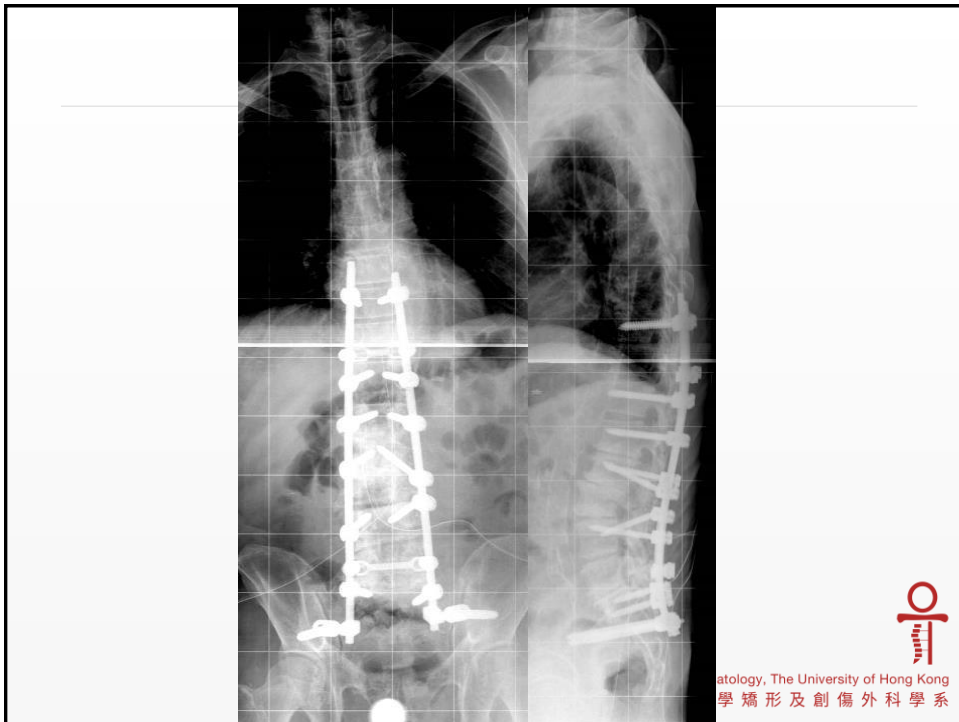
- 75 歲
- 腰部疼痛
- 左邊腳底麻木
- 軀幹向前傾
- 用拐杖走路限制一個街口

- 嚴重影響生活和情緒



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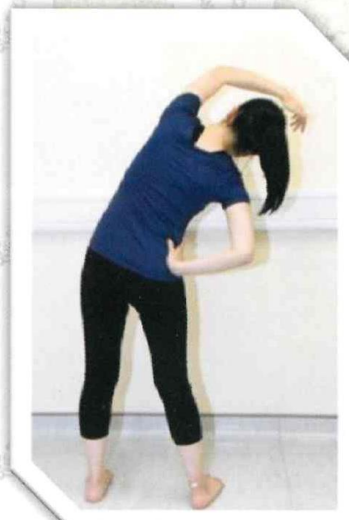
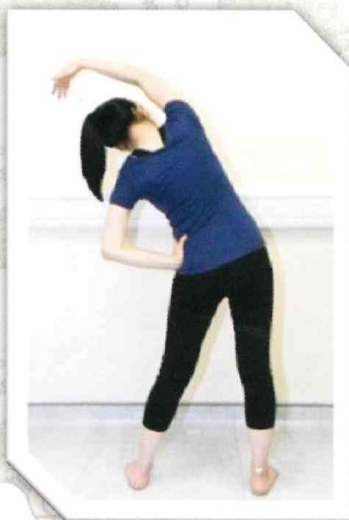
日常生活小貼士

1. 走路時挺胸縮小腹，不要拖著腳底板
2. 坐著辦公或打電腦時盡量把椅子拉近桌面，讓電腦螢幕靠近自己一些，避免讓身體太往前傾，增加脊椎負擔
3. 不要彎腰提重物
4. 揸包包要左右手平衡負重
5. 打噴嚏或咳嗽時要稍微往前彎



腰部運動

1. 腰部側彎運動

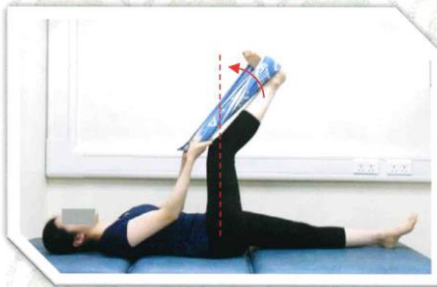


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2. 腰部旋轉運動



5. 腘繩肌及坐骨神經舒展運動



3. 腰部屈曲運動



6. 髖屈肌及股神經舒展運動

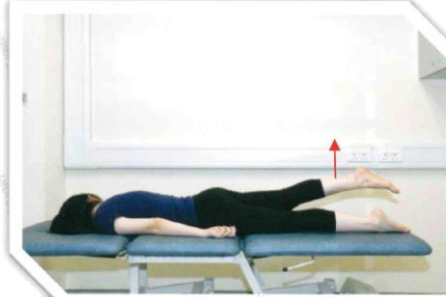


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7. 腹肌強化運動



8. 背部強化運動 (一)



9. 背部強化運動 (二)



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