



## Degenerative Cervical and Thoracic disorders

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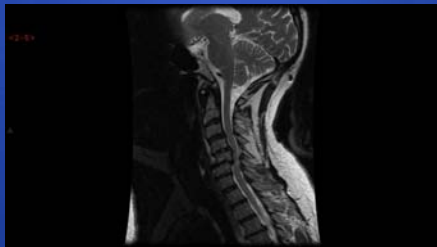
Spine Class 2010 -  
Formby

## Cervical disc disease

- Focal neck pain
- Radicular pain
- Upper limb weakness – loss of power
- Dysdiadochokinesia

? Otherwise **CONSERVATIVE**

## Cervical myelopathy



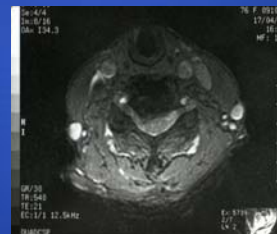
## Assessment of Cervical Myelopathy

- Does the patient present with unsteadiness of gait?
- Are there long tract signs:
  - Increased lower limb reflexes
  - Upgoing plantars
  - Ankle clonus
  - Inco-ordination
- Are there MRI changes within the cord?

## JOA Criterion points

Upper extremity function	
Paralysis	1
Fine motor function massively decreased	2
Fine motor function decelerated	3
Discrete weakness in hands or proximal arm	4
Normal function	5
Lower extremity function	
Unable to walk	1
Need walking aid on flat floor	2
Need handrail on stairs	3
Able to walk without walking aid, but inadequate	4
Normal function	5
Sensory	
Upper extremity/lower extremity/both	
Apparent sensory loss	1
Minimal sensory loss	2
Normal function	3
Bladder function	
Urinary retention	1
Severe dysfunction	2
Mild dysfunction	3
Normal function	4
<b>Total score 0-17</b>	

## Disc prolapse



## Options - depend on severity



Fusion ± cage



## Solis cage – Stryker, UK



- PEEK
- Serrated surfaces
- Good surface area for bone integration
- Titanium spikes to prevent migration

Titanium  
Polyether etherketone (PEEK)  
Carbon fibre

## Does the spine fuse?

- NOT in the Lumbar spine (Santos et al, Spine 2003;28:997)

So what about in the neck -

- a) autograft
- b) bone substitutes

Does it matter anyway?

## EDINBURGH CASE SERIES

- 15 Patients
- Age 29 - 79 (mean 52 years)
- mean 38 months post-op
- 10 patients had 1 level surgery, 5 had 2 level surgery
- Surgery performed for radiculopathy or myelopathy

Cowie & Gibson  
2009

## RESULTS

- FUSION DEFINED as trabecular continuity of bridging bone across the disc space and / or adjacent to the cage



ON PLAIN XRAY 19 / 20 CAGES SHOWED SOLID INCORPORATION OF BONE GRAFT

ON SPIRAL CT 5 ABOVE & 6 BELOW SHOWED NO INCORPORATION

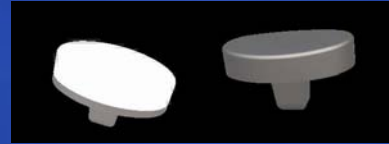
## Cervical Spine prostheses

1. Bryan Cervical prosthesis
2. Cummings prosthesis
3. BIONEC
4. RESCUE – Carbon Graphite

## Bryan disc



## BIONEC



**Potential to:**  
Retain mobility  
Maintain foraminal height  
Prevent adjacent disc wear

## C-disc



Cobalt chrome implant with titanium plasma spray porous coat

UHMW polyethylene (ArCom®) base  
Biplanar convexity

## Test equipment

- Custom made rig
- Constrained to axial displacement and anterior-posterior motions
- Dartec servo-hydraulic test machine



## Testing



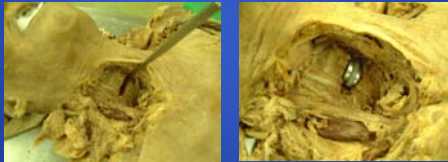
## Component after testing

1 million cycles at  $\pm 2$  mm at 0.5 Hz



## Trial implantation

### Cadaveric studies



## In-vivo testing - Edinburgh

- MHRA approved study
- Single centre
- 1 year minimum follow-up



- Completed December 2006



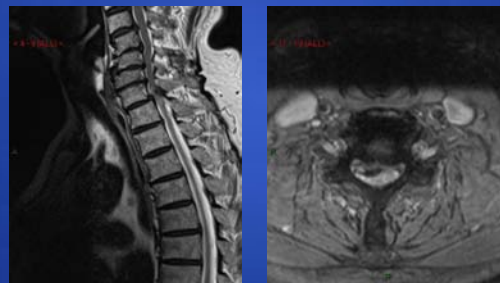
## 2<sup>nd</sup> Generation implants

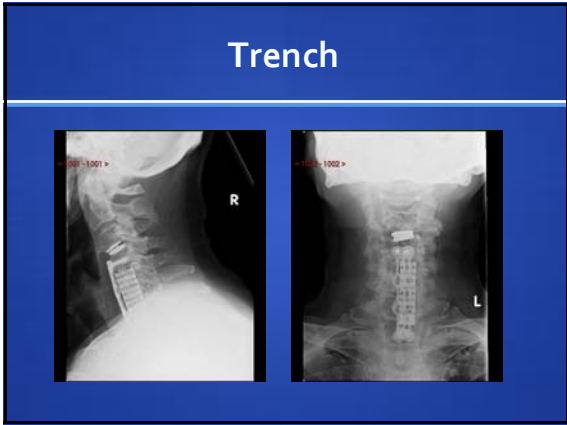
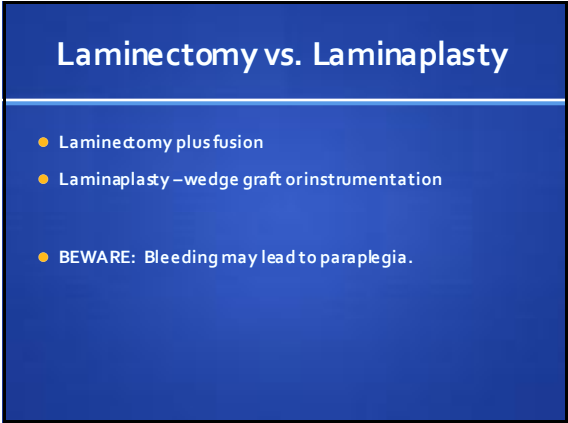


## MOBIDISC - C



## Severe multi-segment disease



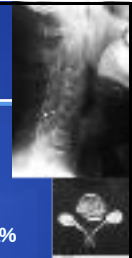


## DISH

- Forestier's disease (1971)
- Common in middle aged men
- Ossification of ant longit ligament at point of attachment of Sharpey's fibres to the waist of vertebra
- Right > left lum bar
- Diabetes mellitus 10%
- Hypertension 22%

## OPLL

- Segmental / Continuous / Mixed / Localized
- Aetiology unknown
- 2-3% Japs (up to 11% by 60); 0.2% UK
- up to 30% Diabetes
- Spinal ankylosis (DISH) in 30%
- Ankylosing spondylitis in 2%

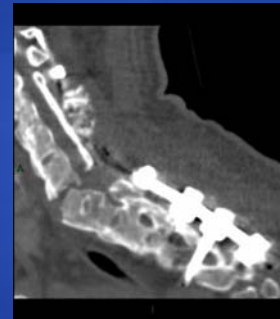


## Thoracic spine – Degenerative

- Ankylosing spondylitis
- Scheuermann's kyphosis
- Scoliosis –
  - Congenital
  - Idiopathic
- Post traumatic

## Ankylosing spondylitis

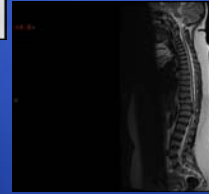
- Osteotomy – Cervical C7/T1, Lumbar L2/3
- Restore sagittal balance - ?THR
- Mehdian et al. Eur Sp. J 1999;8:505-9



## Diagnostic rarities



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## Questions?

