



Optimizing Outcomes in Complex Adult Deformity Surgery

"The operation is only one part of the outcome."



Professor M J H McCarthy
Consultant Spinal Surgeon

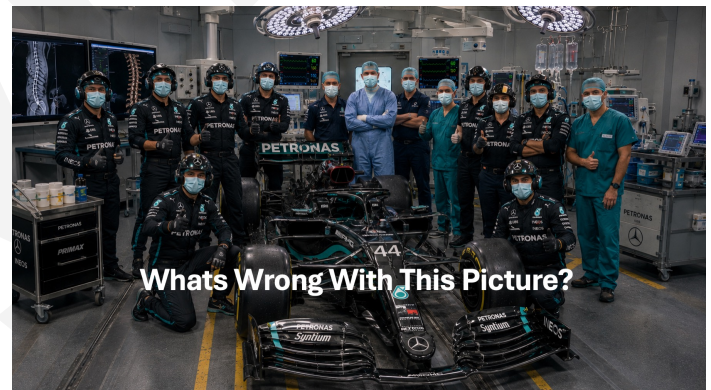
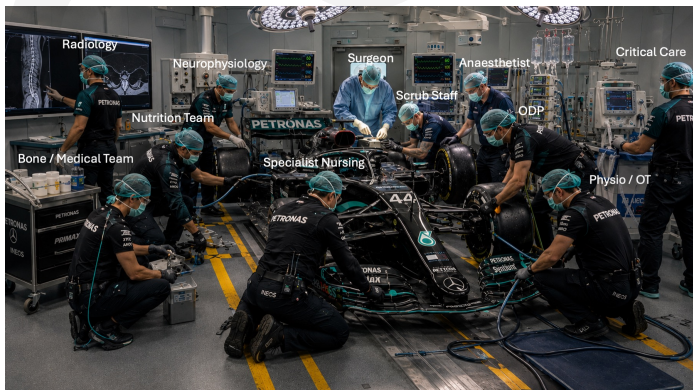
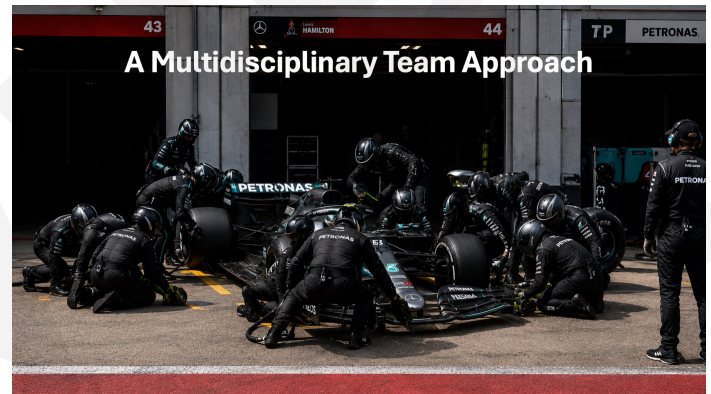


What Constitutes A Good Outcome?

- "What correction gives this particular patient the greatest durable benefit for the lowest biological and mechanical price?"
- Good Outcome =
 - Patient Benefit – pain, function, disability, independence, HRQoL
 - MINUS
 - Cost of Treatment – neurological deficit, infection, blood loss, medical morbidity, pseudarthrosis, implant failure, PJK/F, revision surgery



Adult Spinal Deformity Be Like...





ASD - Have an Algorithm...

- What does the patient want?
- What is most appropriate for your patient?
- Surgical factors to consider - ABC Approach:
 - **A**ge **A**lignment **A**natomy **A**ccess
 - **B**one Quality / **B**alance
 - **C**ompression – central / lateral / foraminal
 - **D**isc Height / **D**egeneration / **D**eformity / **D**ura
 - **E**valuate Stability – supine / erect / dynamic
 - **F**acet Orientation / **G**ap
 - **H**ow many operations?...



The 7 Ps

- Proper
- Planning and
- Preparation
- Prevents
- P
- Poor
- Performance

Attention to detail
Never let your guard down

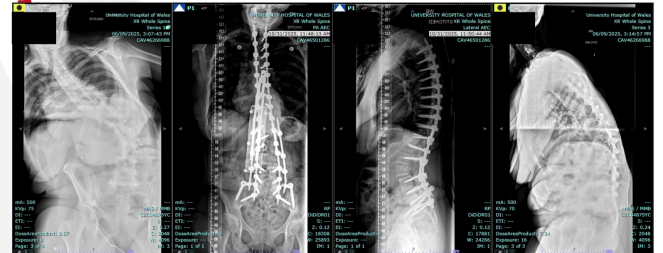


Operate On The Patient NOT The X-Ray

- Important Modifiable Patient Risk Factors
 - Frailty / Sarcopenia
 - Nutrition
 - Diabetes / metabolic health
 - Bone Health
 - Anaemia / cardiovascular / respiratory
 - Smoking
- Prehabilitation is part of deformity surgery



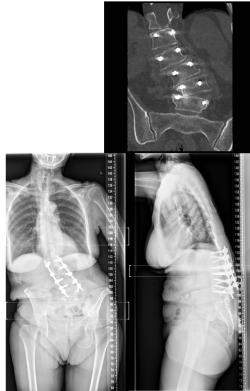
This Patient Was Only In Hospital 3 Months





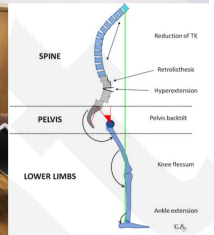
Bone Health

- CT sagittal reconstruction → HU measurement → DEXA → optimisation → construct
- Poor bone → change the patient AND change the operation
 - Anabolic treatment
 - Ca/Vit D optimisation
 - Fixation strategy
 - Pelvic fixation
 - Screw strategy
 - UIV strategy
 - Selective cement augmentation



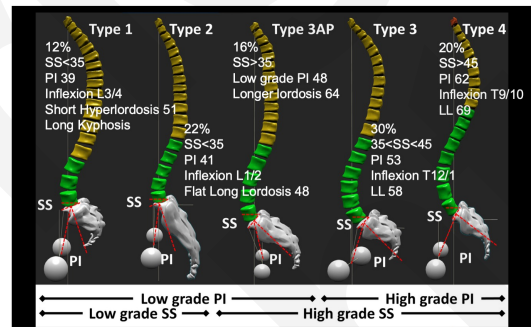
Stop Chasing PI-LL = 0

- SOS = Shape of Spine
- Age / Race / Gender specific norms
 - Age
 - Pelvic morphology
 - Baseline shape
 - Compensation
 - Lumbar lordosis distribution
 - Thoracic shape
 - Proportionality
 - Patient frailty / function

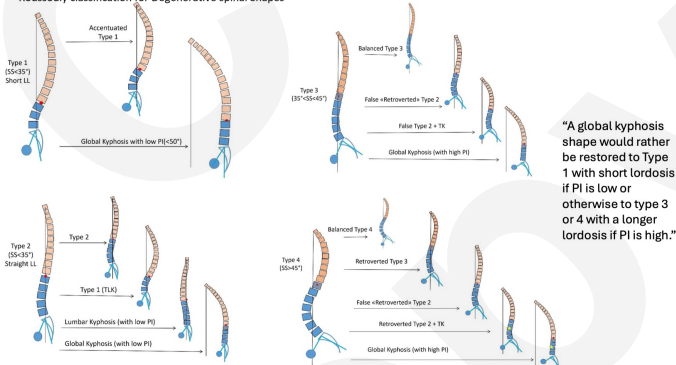


Mantras

- Overcorrection can be just as harmful as undercorrection.
- Alignment is not a number. It is a shape.
- Moved from absolute thresholds to proportional alignment → moving toward individualised shape
 - Where should the lordosis be?
 - Not just — how much lordosis is there?

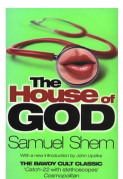


Roussouly classification for Degenerative spinal Shapes



Do Smallest Op That Achieves Objective

- House of God Law 13 – “The delivery of good medical care is to do as much nothing as possible”
- Decompression → MIS/hybrid → interbody reconstruction → posterior osteotomies → PSO → VCR
- Complex deformity doesn't automatically mean maximum surgical complexity

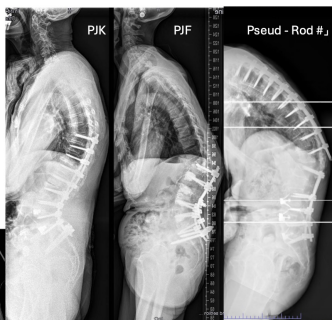




Prevent Mech Failure Before It Happens



- **Patient** – Frailty / Osteoporosis / Sarcopenia
- **Alignment** – Overcorrection / Poor lordosis distribution / Residual compensation
- **Construct** – UIV choice / Rod contour / Transition stiffness / Fixation strategy
- **Adjuncts** – Tethers / Hooks / Cement / Bone optimisation
- **There is no magic tether. Preventing PJF begins before the incision.**



The Cord Doesn't Care About Cobb Angle



- **Use Neuromonitoring** and the Danny Chans if there's a problem:

- Check monitoring
- Corrective manoeuvre
- Haemoglobin
- Anaesthesia
- New drugs
- Screws



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The Cord Doesn't Operate In Isolation



- PERFUSION
- OXYGEN DELIVERY
- BLOOD
- TEMPERATURE



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Specialist Centres



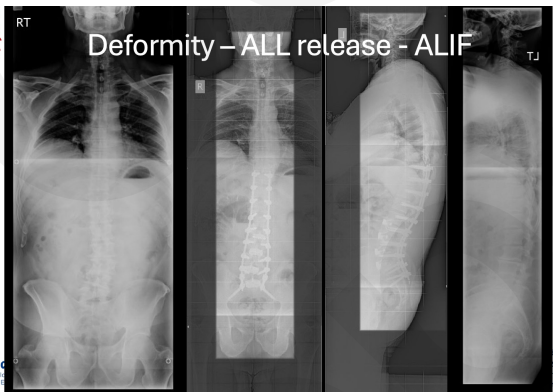
- **Specialist Training in Deformity Surgery**
 - Anterior / Lateral approaches and Osteotomies
- 2 Surgeons IS safer
- Teams doing the operations regularly IS safer
- Stage for a reason not simply because the operation is big
- Even a simple low back operation can lead to a deformity operation
 - Any lumbar fusion 3 levels or more is a deformity operation



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Deformity – ALL release - ALIF



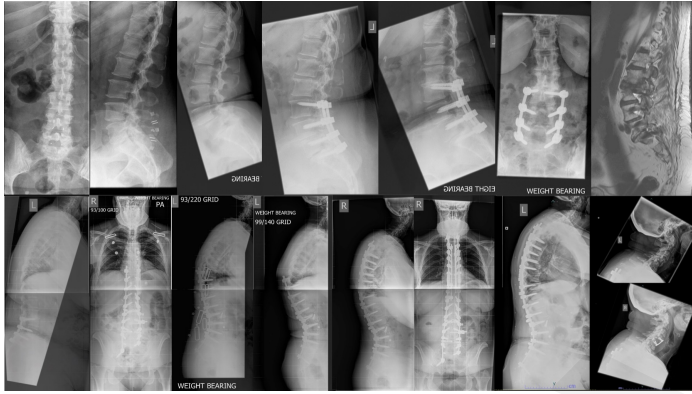
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Deformity – Osteotomy - PSO



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Know When To Quit

A man's got to know his limitations



Adult Spinal Deformity:

Pay attention to the detail
NEVER let your guard down
Otherwise it'll be a...

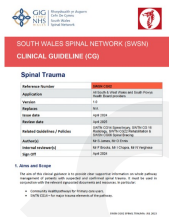
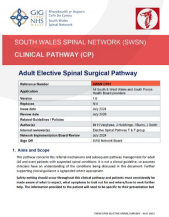


The 4 Last Rights of Adult Spinal Deformity Surgery

- RIGHT PATIENT** frailty, biology, bone, expectations
- RIGHT PLAN** personalised alignment & morphology
- RIGHT OPERATION** sufficient correction, minimum necessary morbidity
- RIGHT PHYSIOLOGY** blood, perfusion, neurology, recovery



Next Steps



Adult Spinal Deformity CG



Thank you
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