

**Latest Innovations in Advanced Spine Surgery for Fellows: Front, Back or Side...
...You Decide!**

Mr M J H McCarthy
Consultant Spinal Surgeon
University Hospital Wales



Indications for Surgery

- **Decompression**
 - Spinal cord / nerve roots
- **Realignment**
 - Correct deformity
- **Stabilisation**
 - Prevent / Treat
 - Neurological deficit / deformity / pain
 - (Non fusion technology form of "stabilisation")

All may require fusion
Require Instrumentation
Instrumentation increases fusion

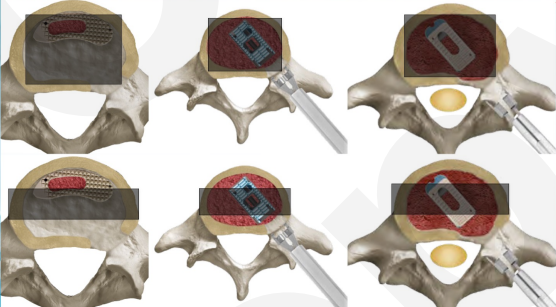
Indications for Surgery

- **What are you trying to achieve?**
- **Non-maleficence - "first, do no harm" (primum non nocere).**
- **DO THE APPROPRIATE OPERATION FOR THE PATIENT AND THEIR PATHOLOGY AND YOUR SKILL / ABILITY**

Fusion

- Fusion – think:
 - α contact surface area (1/ α subsidence)
 - $\uparrow$ compression $\downarrow$ tension
 - autograft > allograft > synthetic
 - vascular > avascular
 - structural graft > non structural
 - Biologics...
 - And unfortunately fusion may not be α clinical outcome
- **BUT, joints are designed to move**
 - Fusion is abnormal
 - Beware – nature against you!

Fusion Footprints



Interbody Fusion?

- Is an interbody fusion required?
 - Restore foraminal height (up / down)
 - Improve fusion
 - Revision of failed posterolateral fusion
 - Restore lordosis / correct deformity
 - Biomechanics – shear / large disc height / entire facet removed / long construct involving L5/S1
- Types:
 - Auto / allograft
 - Threaded / Cylindrical cages
 - Banana cages
 - Oblique cages
 - Articulated cages
 - Expandable cages




Indications ALIF

- (L2/3) 3/4 4/5 5/1 levels
- Restore foraminal height (up / down) ☒
- Improve fusion ☒
- Revision of failed posterolateral fusion ☒
- Restore lordosis / correct deformity ☒
- Biomechanics – shear / large disc height / entire facet removed / long construct involving L5/S1 ☒




Indications (MIS) TLIF

- All lumbar levels
- Restore foraminal height (up / down) ☒
- Improve fusion ☒
- Revision of failed posterolateral fusion ☒
- Restore lordosis / correct deformity ☒
- Biomechanics – shear / large disc height / entire facet removed / long construct involving L5/S1 ☒




Indications LLIF

- All lumbar levels except L5/1
- Restore foraminal height (up / down) ☒
- Improve fusion ☒
- Revision of failed posterolateral fusion ☒
- Restore lordosis / correct deformity ☒
- Biomechanics – shear / large disc height / entire facet removed / long construct involving L5/S1 ☒




Front vs Back vs Side Summary!

	Advantages	Disadvantages
PLIF	Bilateral access to canal, restores lordosis	Painful, infection, neural / dural injury scarring, limited higher up
Mini Open and MIS PLIF	Less painful, low infection, less blood loss, faster recovery	Fusion?, neural / dural injury scarring, limited higher up
Open TLIF	Access, fusion	Painful, infection, neural / dural injury scarring, endplate damage / subsidence
Mini Open TLIF	Less painful, low infection, fusion, less blood loss	Neural / dural injury scarring, disc preparation, endplate damage / subsidence
MIS TLIF	Even less pain, low infection, avoids paraspinous muscle damage, less blood loss, faster recovery	Fusion?, neural / dural injury scarring, disc preparation, endplate damage / subsidence
LLIF + Perc Post	Good fusion, less painful, low infection, T5-L5, avoids canal, less visceral vessel injury then ALIF, avoids paraspinous muscle damage, less blood loss, faster recovery	L4/S??, L5/S1 – No, endplate damage / subsidence, plexus injury, diaphragm injury, pneumothorax
ALIF + Perc Post	Best fusion, best restoration lordosis, less painful, low infection, avoids canal, avoids paraspinous muscle damage, mostly less blood loss than a TLIF	Access Surgeon, ilio-lumbar vein, visceral vessel injury, ileus, not above L3




All comes down to...

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

- Personality - Patient
- Personality - Pathology
- Personality - Practitioner

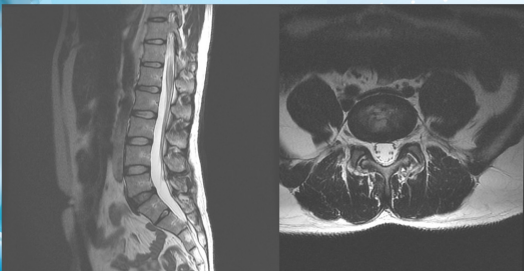


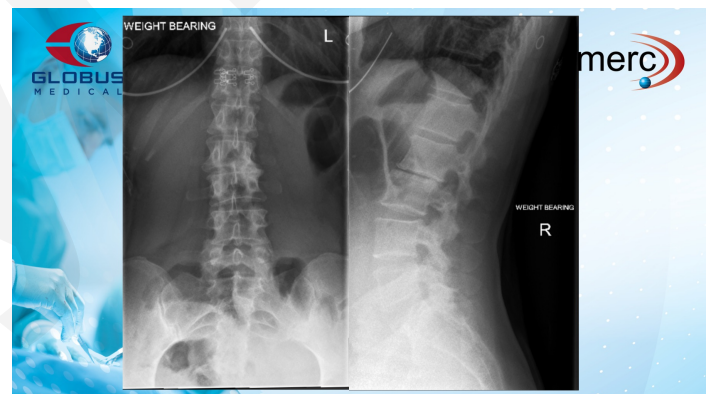
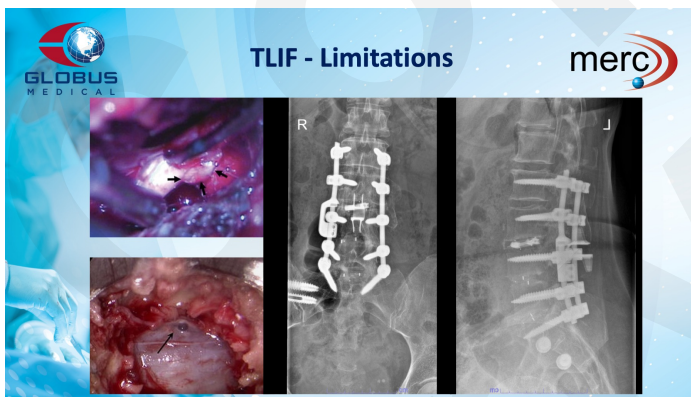
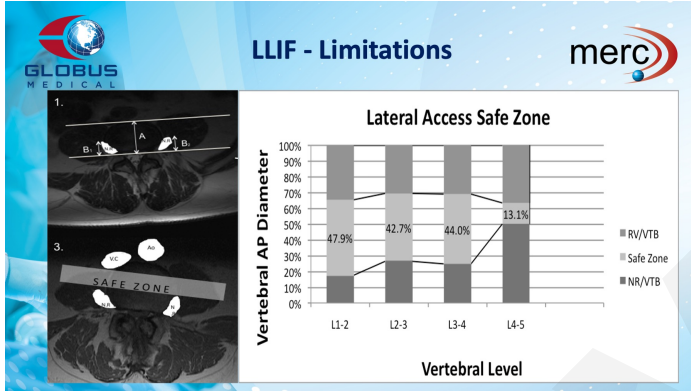
IS THERE APPROPRIATE OPERATION FOR THE PATIENT AND THEIR PATHOLOGY AND YOUR SKILL / ABILITY?

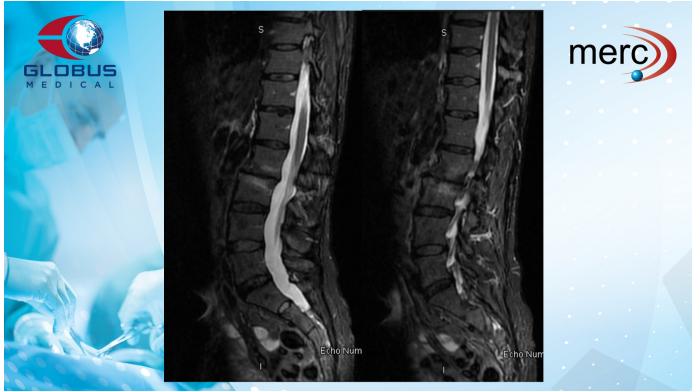



ALIF - Limitations

- VESSELS / OBESITY / ELDERLY







Front vs Back vs Side

- **INTERBODY DEVICE TO ADDRESS PAIN SOURCE**
 - Access into a shut down disc space...
- **ALIF**
 - Access surgeon (?) / specialist training
 - L2/3...
 - Good fusion footprint
- **LLIF**
 - Specialist training (?)
 - Low risk to neural structures
 - Ribs might get in the way
 - Good fusion footprint
 - Will require additional posterior surgery (?)
- **TLIF**
 - Neuronal elements exposed – not necessarily required
 - Smaller fusion footprint
 - All in one approach – front and back addressed

