Management of degenerative low back pain

John O’Dowd
Frimley Park Hospital
Back pain

- **Prevalence**
  - 14-30% Day of asking
  - 30-40% Within one month
  - 60% Lifetime
Back pain

- Acute episodes
  - 50% settle completely in 4 weeks
  - 15-20% persist > 1 year
  - 70% will have 3 or more recurrences

- 20% of all patients (50% population)
  - Back symptoms for long periods
Probability of return to work

100%

Time off work

2 years
Estimated annual back pain care

- Surgery: 24,000
- In-patients: 100,000
- Out-patients: 1,600,000
- GP consultations: 3-7 million
- Population prevalence: 16,500,000

1993
Annual costs
GP practice list 10000

- 2180 consultations £23,700
- Prescribed drugs £8,000
- 440 outpatient clinics £13,000
- 150 inpatient days £20,000
- 1,270 p.t. sessions £11,000
- 90 A&E attendance's £3,000
- 270 X-rays £8,000

Total £88,000
NHS cost

- £480 million
- Additional costs
  - 0.5 million private consultations, £35 million
  - 7.2 million private pt sessions, £144 million
  - Non prescribed medicine, £18 million
  - 52 million days off work, £3.8 billion
  - 106 million DSS benefits, £1.4 billion
Surgery rates

SCO | ENG | SWE | NZ | AUS | NOR | DEN | NL | USA
---|-----|-----|----|-----|-----|-----|----|----
0.13 | 0.19 | 0.33 | 0.4 | 0.44 | 0.49 | 0.64 | 0.73 | 1
Increase in disorders causing disability - USA: 1960-80 (%)
Disc disease - post mortem incidence

- 20 years: 0%
- 70 years: 90-100%
Discogenic low back pain

- Natural history
  - 65% improve spontaneously over time
- Surgery
  - Success rates 30-90%
Low back pain v disc disease

- Ageing v degeneration
- No clear diagnostic labels
- No established treatments
Exclude red flags with clinical assessment

Treat
- Reassurance
- Brief period of rest
- NSAID’s
- Manipulative therapy
Physical therapy

- Physiotherapy
- Osteopathy
- Chiropractice
Evidence based medicine

- Anecdote
- Case reports
- Inventor series
- Clinical study
- Randomised controlled trials
- Systematic reviews
- Meta-analysis
Sources

Clinical Practice Guidelines
US Department of Health and Human Services
Method

- Systematic review
- Quality of evidence assessment
- Net benefit v net harm
- Net benefit v cost
Conservative treatment of acute and chronic non-specific low back pain

A systematic review of randomised controlled trials of the most common interventions

Van Tulder et al

Amsterdam
Spine 1997
Educational and Behavioural Interventions for Back Pain in Primary Care
Judith Turner
Seattle
Spine 1997
Conclusion

- NSAID
- Muscle relaxant
- ? Manipulation
- No exercise therapy
Conclusion

- Manipulation
- Back school (in occupational setting)
- Exercise therapy
Conclusion

- RCT's poor quality
- Surgery ??
- Further study
- Personal preference
O’Dowd’s Herbal Rub

- **Success rates**
  - Low back pain: 50% in 4 weeks
  - Sciatica: 90% in 6 weeks
  - Cervical disc: 90% in 3 months
Warning

- Caution
- Experimental
- Not for widespread use
- Randomised trials
- Evidence based medicine
Incredible surgery on my back saved my career as a goalie

Daily Mail
July 1997
300 cases
‘New disc’
Return to sport
Problems

- Surgery for back pain
- Fusion for back pain
- Approach for fusion
- Interbody fusion
  - Technique
  - Implant
Treatment

- Surgery at all
- Fusion v stabilisation
- Posterior v anterior v 360
- ALIF v PLIF
- Instrumented v non instrumented
- Autograft v Allograft v Cage
- Minimally invasive
Issues

- Approach
  - Thoracoscopy
  - Posterolateral endoscopy
  - Anterior lumbar

- Spinal surgery
  - Release
  - Vertebrectomy
  - Decompression
  - Fusion
Big issues

- Implants

Cages
Indications

Clinical or Pathological
Clinical Indications

- Pain
  - Back
  - Leg
- Function / Disability
- Quality of Life
Indications

- Degenerative
  - Spondylolisthesis
  - Segmental instability
  - Spinal Stenosis
  - Scoliosis
Indications

- Iatrogenic
  - Previous decompression
  - Previous fusion / pseudarthrosis
  - ‘Failed low back’ syndrome
Indications

- Congenital
  - Spondylolysis
  - Kyphoscoliosis
- Traumatic
  - Spondylolisthesis
- Inflammatory
- Tumour
Decompression

- Disc herniation
  - 134 Rx = laminectomy, discectomy and fusion
  - 200 Rx = laminectomy and discectomy
- 3.5-16 year follow up
- Non fusion group had significantly higher reoperation rate (19% v 6%)

*Tria et al CORR 224:134 1987*
Low back pain analysis

Pedicle screw fixation in spinal disorders

European View

Boos and Webb  *ESJ* 1997  6:2-18

Success Clinical Fusion
68 papers 5601 cases
Fusion

- **Posterior**
  - Percutaneous Interbody Fusion
    - +/- stabilisation
    - Biological/structural
    - Ex fix/Subcutaneous Implant

- **Anterior**
  - Minimally invasive interbody fusion
  - Autograft iliac crest
  - Interbody cage
Clinical use

Requiring fusion → + decompression

OR

ALIF or 360°

MISS ALIF

Patient factors
Surgeon factors

PLIF
MISS ALIF approach evolution

Laparoscopy

Mini open

Retroperitoneal endoscopic

MISS / LISS
POSTERIOR FUSION
‘MAGERL’ POSTERIOR FUSION
ANTERIOR FUSION

Femoral ring allograft
Anterior/ posterior fusion
BAK cage results

- RCT’s: 0
- Inventor series: 80%+
- FDA study
- Likely clinical results: ~50%
ALIF

- Open
- MISS
  - Mini open
    - Microscope
    - Endoscope
  - Endoscopic
    - Transperitoneal
    - Retroperitoneal
Interbody fusion

- Clinical rationale
- Biomechanical rationale
- Approach
- Technique
  - Open
  - MISS
  - Graft method
Interbody fusion: options

- Iliac crest autograft
- Corticocancellous autograft
- Femoral ring allograft
- Corticocancellous autograft / Harms cage
- Inert metal cages / autograft
- Inert metal cages / substitute
  - Coral
  - HA
  - TCP
- Biologically active device
  - Solid TCP / HA
  - Coated metal spacer
Hybrid Interbody Graft

- 40 patients
- Femoral cortical allograft/ autograft
- 25% no posterior stabilisation
- Overall fusion rate 96%
  - 98% with posterior fixation
  - 75 % with no posterior fixation
- Disc height increased initially
- Returned to preop value with long term follow up

Holte, O’Brien & Renton  ESJ 1994 3:32
Femoral diaphyseal allograft for anterior lumbar interbody fusion

Long term follow up

Pettine and Salib 1993 Orthop Trans 17:12

- 101 patients
- 16-32 month follow up
  - 36 anterior alone
  - 65 combined A+P (most instrumented)
- Fusion rates
  - Anterior alone 86%
  - Non instrumented A+P 92%
  - Instrumented A+P 98%
  - Previous pseudarthrosis 92%
“History”

- 1991: Obenchain - Lap discectomy
- 1993: Sachs - Lap interbody fusion
- 1993: Zdeblick - Lap interbody cage
- 1995: Mayer - Mini ALIF
- 1996: Thalgott - BERGS
Nottingham series

- Open from November 1994
- Laparoscopic from January 1995
- 51 cases
- 64 levels
  - 22 laparoscopic
  - 3 conversions
  - 23 open (13 two level)
  - 3 PLIF
Diagnosis

- 39 ddd
- 5 listheses
- 7 previous surgery
- 20/51 smokers
Demographics

- Mean age 41
- 22 males
- 29 females
Operating time minutes

- Laparoscopic: 135 minutes
- Conversion: 160 minutes
- Open 1: 193 minutes
- Open 2: 211 minutes

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<tr>
<td>Conversion</td>
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<tr>
<td>PLIF</td>
<td>3450</td>
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<tr>
<td>Open 1</td>
<td>888</td>
</tr>
<tr>
<td>Open 2</td>
<td>432</td>
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P = 0.03
Complications intraoperative

- **Laparoscopic**
  - CIA tear
  - 2 CIV tears
  - 3 conversions
    - 2 adhesions
    - 1 midline colon

- **Open**
  - CIV tear

- **PLIF**
  - Haemorrhage 5580
Complications postoperative

- **Laparoscopic**
  - 1 wound infection
  - 5 L5 nerve root pains, Rx root block (23%)
  - 3 L5 nerve root pain no relief (14%)

- **Open**
  - 3 nerve root pains, various levels (14%)
Post op mobilisation

\[ p < 0.05 \text{ lap v ALIF 1 all parameters} \]
Subjective self assessment

- Excellent: 16%
- Good: 27%
- Fair: 10%
- Same: 36%
- Worse: 11%
Pain- anterior BAK

Pre op 3 months 6 months 12 months 24 months

48 32 35 33 30

100 79 58 70
ODI - laparoscopic

Pre op: 100
3 months: 79
6 months: 78
12 months: 74
24 months: 67
ODI - anterior BAK

Pre op: 100
3 months: 84
6 months: 85
12 months: 75
24 months: 77

48 33 35 32 30
Revision

- **Laparoscopic**
  - 6/22 (27%) mean 14.6 months (4-24)
  - 5 posterior decompression / fusion
  - 1 anterior revision

- **Conversions**
  - 2/3 (66%) mean 10.5 months (3-18)

- **Open**
  - 7/23 (30%) mean 17.8 months (2-25)
Failure rate

- 31% anterior cages
- Mean 15 months
- Range 2-25
Conclusion

- Laparoscopic approach established
- Approach outcomes better than open
- L5/S1 easier
  - Retrograde ejaculation
- L4/5 + higher possible
  - Access
  - Vascular problems
Conclusion

- Implants
  - High failure rate
  - Poor clinical results in remaining cages

- ? Implant
- ? Principle
- ? Outcome measures
Future

- Bio integrating implant
- Bio degrading implant
- Biological disc replacement
  - Annulus
  - Nucleus