

Second Cardiff Spinal Surgery Research Symposium

Future Inn, Cardiff Bay

Friday July 14th 2023

Confirmed Attendees:

Mr M McCarthy Consultant - Host

Mr A Jones Consultant

Mr S James Consultant

Mr N Moideen Consultant

Mr I Chopra Consultant

Mr F Brooks Consultant (On Call)

Mr J Howes Consultant

Mr D Kefalas Surgical Neurophysiologist

Mr M Williams Research – Judging the Presentations

Ms E McGough Research – Judging the Presentations

Ms H Jarvis Research – Judging the Presentations

Ms Jess Research - Judging the Presentations

Mr A Durst Fellow (On Call afternoon)

Mr D Dasic Fellow

Dr L Abdalla Fellow

Mr N Elmarawany Fellow

Mr Muhammed Adnan Fellow

Mr L Slade Medical Student

Ms P Aliakbari Medical Student

Mr S Kachroo Medical Student

Mr S Glossop Medical Student

Mr E Kimber Medical Student

Mr J Allman Medical Student

Ms J Akoachere Medical Student

Ms E John Medical Student

Ms S Jones Medical Student

Mr J Yin Chooi Medical Student

Ms S Mehmet Medical Student

Mr I Mohammed Medical Student

Ms E Clifford Spence Medical Student

Mr S Pugh (Globus Medical)

Mr S Meredith (Globus Medical)

Mr G Davies (Globus Medical) (evening only)

Mr K Jones (Nuvasive)

Second Cardiff Spinal Surgery Research Symposium

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Program

13:00 Meet at Future Inn, Cardiff Bay

13:30 Welcome

13:40 Leon Slade - A Review Of Bike Related Spinal Injuries With A Focus On Bike Park Wales And NHS Treatment Costs In South Wales

13:50 Parisa Aliakbari - Acute Radicular Pain Pathway

14:00 Siddhanth Kachroo - Comparing Lumbar Spinal Fusion Outcomes - Analysing X-Rays and Patient Reported Outcome Measures (PROMs) Between MagnetOs and Autograft in a Single Surgeon Practice

14:10 Sean Glossop - ICU Pressure Sores in Spinal Patients

14:20 Johanna Akoachere - Frailty in Spinal Surgery

14:30 Ewan John - Medical Students' Perceptions of the Video-Modified Peyton's 4-step Technique

14:40 Sarah Jones - Enhanced Recovery After Surgery (ERAS) in Adolescent Idiopathic Scoliosis (AIS): Could it Improve Patient Recovery Times?

14:50 Elliot Kimber - Employment Outcomes Following Thoracolumbar Fractures: Long Term Follow up Greater than 5 Years

15:00 Break for 30 mins – Tea and Coffee

15:30 Leena Abdalla - C-Spine Precautions In The Major Trauma Centre Of South Wales: An Audit Review

15:40 Ishak Mohammed - Post-Operative Fibrosis And Arachnoiditis – Radiological Study With Clinical Correlation

15:50 Je Yin Chooi - Prevalence of Sacroiliac Joint Pathology: A Retrospective Observational Study

16:00 Saylan Mehmet – A.I. vs. Surgeons: A Comparative Analysis of Perspectives on Controversial Spinal Pathology Management

16:10 Jake Allman - Care Satisfaction and Employment Following Thoracolumbar Fractures: Long Term Follow Up Greater Than 5 Years Satisfaction Regarding Spinal Fracture Care

16:20 Alex Durst (for Lesley Anne Fox) - A Comparison Of Patient Outcomes Following The Use Of Different Doses Of Steroid In Lumbar Nerve Root Block/Transforaminal Epidural

16:30 Ella Clifford Spence - Does Adequate Intraoperative Imaging Impact On Subsequent Returns To Theatre For The Revision Of Malplaced Pedicle Screws?

16:40 Muhammad Adnan - Systematic Literature Review - Failure of Conservative Treatment for Stable TL Burst Fractures

17:00 Break and Judges Marking

17:30 Award for the Best Presentation and Runner Up Group Photos

18:00 Depart for Drinks and Meal

19:00 Meal at Demiros Italian, Cardiff Bay



Bwrdd Iechyd Prifysgol
Caerdydd a'r Fro
Cardiff and Vale
University Health Board

A REVIEW OF BIKE RELATED SPINAL INJURIES WITH A FOCUS ON BIKE PARK WALES AND NHS TREATMENT COSTS IN SOUTH WALES

Authors: Leon Slade, Francis Brooks
Cardiff University School of Medicine
University Hospital Wales, Department of Spinal Surgery

1

INTRODUCTION

- Mountain biking causes injuries in up to 85% of participants.
- Most common serious injuries are traumatic brain injury and traumatic spinal injury.
- Regional pursuits centres, such as Bike Park Wales, attract bikers from around the UK and their injuries are dealt with by our local health boards.

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METHODS

Aim: This study aimed to evaluate the quantity and severity of spinal injuries from biking injuries and Bike Park Wales regional cycling pursuits centre and their subsequent cost to local health boards.

- 41 patients admitted to UHW spinal surgery department from bike related trauma.
- Patient notes reviewed for demographics and mechanism of injury.
- Two cohorts: mountain bike injuries, road bike injuries.
- Bike Park Wales patients identified.

3

RESULTS

ROAD BIKES – MECHANISM OF INJURY

Mechanism of injury	n
RTC	11 (64.7%)
Fall from bike	6 (35.3%)
Intoxicated	1 (5.9%)

Table 1

4

MOUNTAIN BIKES – MECHANISM OF INJURY

Mechanism of Injury	n
Fall off bike	12 (50%)
Fall during jump	6 (25%)
Went over handlebars	4 (16.7%)
Collision	2 (8.3%)

Table 2

5

BIKE PARK WALES INJURIES

Mechanism of injury description	Injury description	Length of hospital stay
Went over handlebars at bike park Wales	R clavicle #, R 2nd rib #, compression # T12.	12 days
Went over handlebars on mountain bike	Anterior wedge compression fracture of TH5 and TH6	3 days
Collision with tree at bike park Wales	Fracture of T8 vertebra	2 days
High speed bike collision at bike park Wales	Fracture of manubrium sterni and superior endplate fractures of T2, T3 and T4	8 days
Fell off mountain bike	Arrested at scene. L medial pneumothorax. Multiple rib fractures.	1 day - deceased

Table 3

6

DISCUSSION

- Mountain bike spinal injuries have been more common than road bike spinal injuries
 - Mechanisms of injury differ between road and mountain bike users
 - Thoracic fractures were seen in 80% of our Bike Park Wales patients
 - Bike Park Wales has accounted for at least 12.2% of all bike related injuries in recent years
 - Should high-risk sports centres be paying a premium or medical insurance?
-

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CONCLUSION

- Higher proportion of spinal injuries amongst mountain bikers compared to road bike users
 - Bike Park Wales is accounting for at least 12.2% of all bike-related spinal injuries in recent years
 - Local health boards are forced to treat these additional patients
-

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REFERENCES


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 7. Cantor MK. Mountain biking injuries: a review. *Br Med Bull*. 2009;65:300-13.
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 9. Guo Y, Tang L, Bauman A, de Gooijer H, Brown S, Nguyen-Nguyen B, et al. Health benefits of cycling: a systematic review. *Scand J Med Sci Sports*. 2011;21(9):986-996.
 10. Green M. Acute Cycling Injuries. *Phys Med Rehabil Clin N Am*. 2012;38(1):115-58.
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 13. Athwell Z, Mackay MR, Bradstreet M, Carreau A. The epidemiology of mountain bike park injuries at the Whistler Bike Park, British Columbia [BC], Canada. *Wilderness Environ Med*. 2012;23(2):140-5.
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Acute Radicular Pain Pathway

A service evaluation of the acute radicular pain pathway in the University Hospital of Wales

Parisa Aliakbari



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Aim

to assess the new Acute Radicular Pain Pathway (ARPP) in 2023 in UHW to find areas for improvement with a specific focus on the time it takes for patients to receive fast-track imaging, epidural injections, and surgical opinion.

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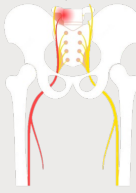
Outline

- Background
- Old & New Pathway
- Method
- Results
- Discussion

3

Radicular pain

- Radicular pain is described as pain caused by a disease process where the nerve root or the root ganglia is affected causing symptoms
- Irritation of nerve roots anywhere along the spinal cord however the most susceptible area => L4/5 level
- Focus of this presentation will be lumbosacral radiculopathy (LR) (also known as sciatica) rather than cervical radiculopathy.

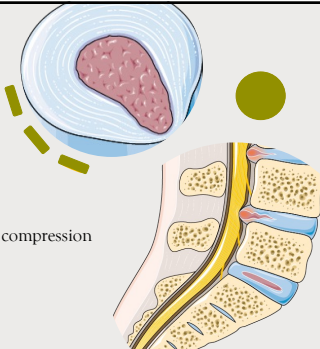


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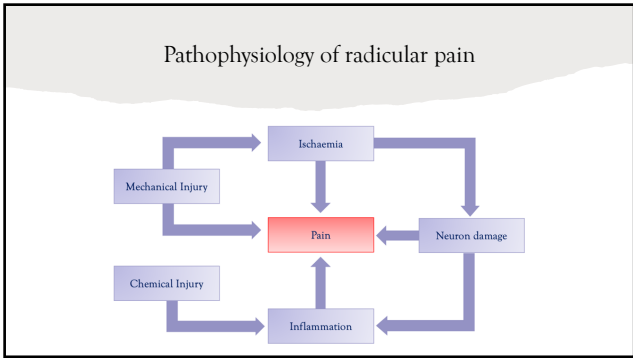
Radicular pain

The 2 most common causes of LR:

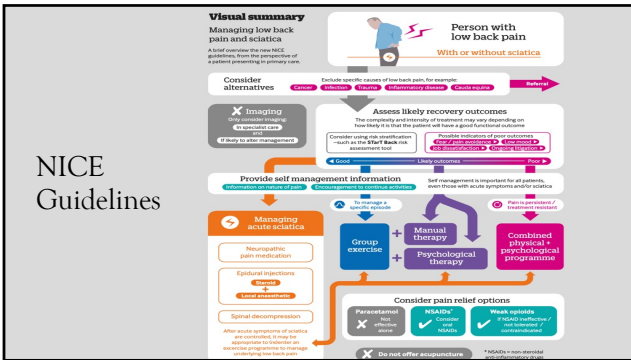
1. Herniated vertebral disc
2. Spinal stenosis causing nerve root compression



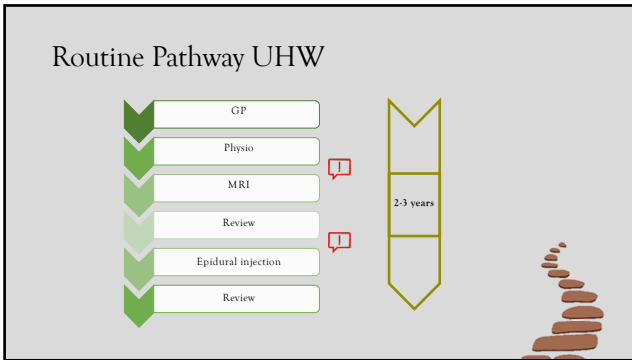
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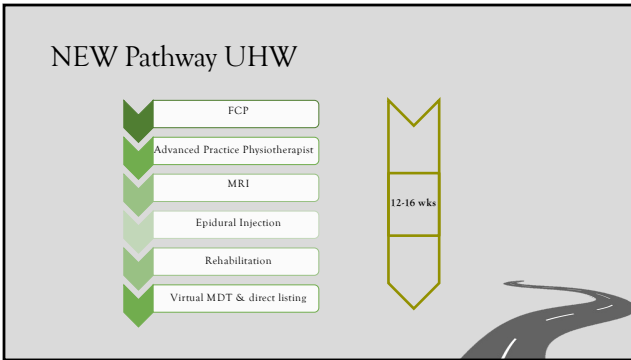
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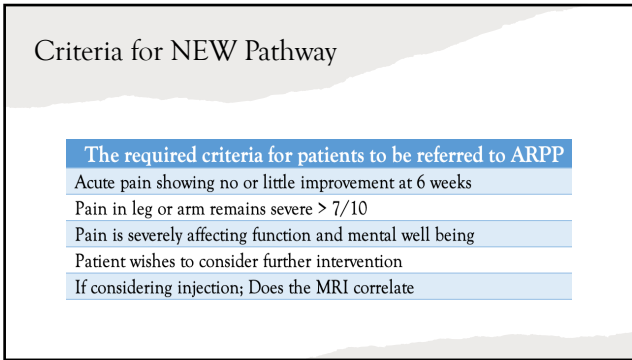
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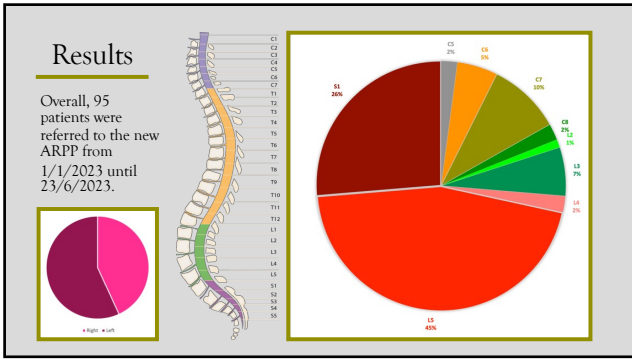


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Method

- The data required for this study was collected by Mr Robert Goldsmith, clinical lead physiotherapist, from the introduction of the ARPP within UHW (2020)
- The focus of this project is the data collected from the beginning of 2023 until 23/6/2023
- For each person, data was collected using an online Microsoft form available to clinicians to refer patients to the ARPP which was then converted to an Excel sheet + additional info
- The information collected was treated as highly confidential and was always kept in the hospital in a password protected file.
- Analysis of the results was performed using Microsoft Excel version 16.74.

11



12



Comparing Lumbar Spinal Fusion Outcomes

Analysing X-Rays and Patient Reported Outcome Measures (PROMs) Between MagnetOs and Autograft in a Single Surgeon Practice

Siddhanth Kachroo
Y3 Medical Student
Cardiff University School of Medicine

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Story So Far

- Significant surge in surgical intervention for managing lower back pain due to an ageing demographic shift and longer life expectancies
- Autografts have been long regarded as *'gold standard'* due to their osteoconductive and osteoinductive potential
- Long-term complications such as chronic harvest site pain and prolonged healing at donor site are frequently reported, complicating recovery following complex spinal fusions
- Synthetic bone grafts have gained popularity due to their potential to mimic long-term successful fusion, while also reducing donor site morbidity

MagnetOs by Kuros Biosciences - Novel Biphasic Calcium Phosphate (BCP) composed of Tri-Calcium Phosphate (TCP) and Hydroxyapatite (HA)

Unique submicron NeedleGrip™ surface topography which promotes angiogenesis and bone formation without the need for growth factors – triggering uniform, solid and predictable fusions

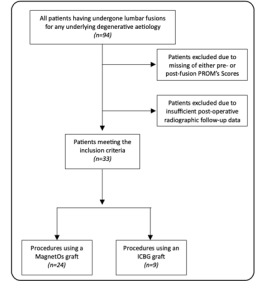


3,415 Spinal Fusions performed in England (2021-2022)

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Methodology & Objective



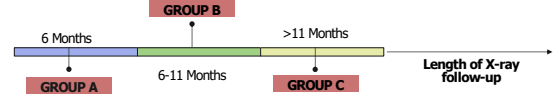
Part A: Analysis of follow-up anterolateral lumbar X-rays post fusion procedure between MagnetOs and Iliac Crest Bone Autograft to assess fusion and non-fusion rates

Part B: Analysing pre and post fusion ODI, VAS (leg & back) and EQ-5D (index) scores between patients receiving either MagnetOs or Iliac Crest Bone Autograft to assess improvements in physical and functional symptoms

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Results: Part A (Analysing Anterolateral Lumbar X-rays)



	Group A	Group B	Group C	Total
Non-Fusion	-	1	-	1
Non-Fusion but Consolidation	2	3	-	5
Fusion	-	4	14	18
Total	2	8	14	24

	Group A	Group B	Group C	Total
Non-Fusion	1	-	1	2
Non-Fusion but Consolidation	1	2	-	3
Fusion	-	2	2	4
Total	2	4	3	9

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Results: Part A (Analysing Anterolateral Lumbar X-rays)

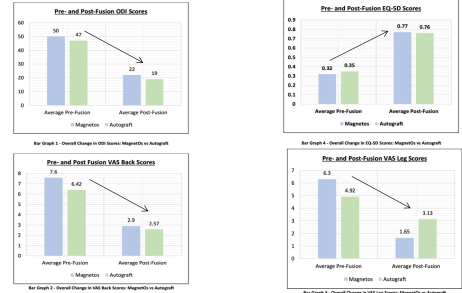
	Fused (%)	Non-Fusion but Consolidation (%)	Non-Fusion (%)
MagnetOs	75.0	20.8	4.1
Autograft	44.4	33.3	22.2

- Patients receiving MagnetOs graft had a higher fusion rate at 75.0% (18/24) compared to those patients receiving Autograft 44.4% (4/9)
- Consolidation was observed within 6 months in all patients receiving MagnetOs in comparison to only half of the patients with an Autograft
- Solid fusion for MagnetOs was observed for all patients with a 11 months post-operative X-ray follow-up
- Non-fusion was observed in 2 patients receiving Autograft compared to 1 patient receiving the MagnetOs graft
- Further follow up is required for 8 patients to assess long-term fusion outcomes

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Results: Part B (Analysis of PROMs)



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Conclusion

-  This retrospective study demonstrates that the use of MagnetOs synthetic grafts yields favourable solid-fusion outcomes
-  Patients treated with MagnetOs reported outcome scores which were at par or better than patients treated with Autograft
-  Limited availability of data in the form of clinical whitepaper(s) and case report(s) which validates the non-inferiority of MagnetOs graft used standalone versus Autograft
-  To make a definitive conclusion regarding the efficacy of MagnetOs grafts in spinal fusion procedures, a larger patient cohort and longer follow-up timeframe is required

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THANK YOU!

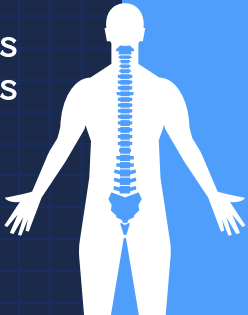
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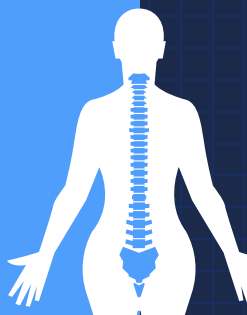
ICU Pressure Sores in Spinal Patients

Sean C. Glossop,
Arpit Upadhyay,
Mohamed Hassan,
Michael J. McCarthy



1

Introduction



2

ABOUT THE STUDY

Type of study:

- Audit/Observational single centre evaluation

Who?

- Spinal patients admitted to critical care

What?


- Pressure sore development in critical care

When?

- Jan 2018 – August 2022

Where?

- University Hospital of Wales, Cardiff




3

WHY?


Varied guidance

- Health board provides varying guidance for handling of spinal patients on ICU




High risk patients

- Spend prolonged periods on bed rest in ICU
- Immobility
- Paraplegia/tetraplegia
- Sensory deficits



EVIDENCE

- Estimated global pooled magnitude of pressure sores in SCI patients 32.36%



Cost to the NHS of £531million annually

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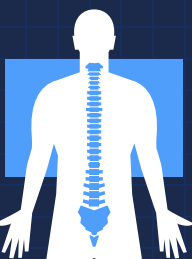
What are pressure sores?

DEFINITION

"localised damage to the skin and underlying soft tissue usually over a bony prominence or related to a medical or other device" – National Pressure Injury Advisory Panel (NPIAP)

RISK FACTORS





- Mobility issues
- Sensory deficits
- Nutritional deficiencies
- Cognitive impairment




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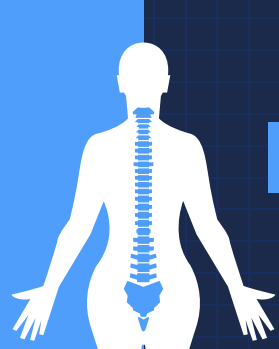
STAGES OF PRESSURE ULCER

www.onhseid.co.uk

STAGE	Description	Visuals
STAGE 1	Non Blanching Erythema, With Intact Epidermis	
STAGE 2	Partial Thickness Ulcer involving Epidermis & Dermis	
STAGE 3	Full Thickness Ulcer extending through Dermis in to Subcutaneous Tissue.	
STAGE 4	Deep Tissue Destruction extending through Fascia & may involve muscle, bone & tendons.	



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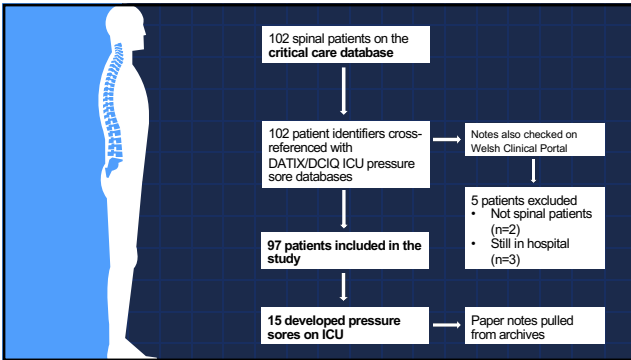
Methods

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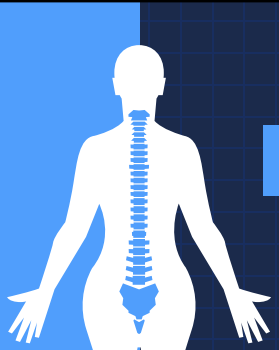
INCLUSION/EXCLUSION CRITERIA

	INCLUSION ✓	EXCLUSION ✗
Timescale	Jan 2018 to Aug 2022	Anything outside this timeframe
Participant	Spinal patients on ICU	Spinal patients not admitted to ICU, or still in hospital at the time of study
Category of pressure sore	Grade 2 or above in accordance with NPUAP assessment tool	Any pressure sores below Grade 2 or "ungradable"
Location of pressure sore	Bony prominence areas such as sacrum, occiput, heels, clavicle, neck	Pressure sores not over bony prominences such as lips, tongue, mouth

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Results


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Demographics for all included patients (n=97)

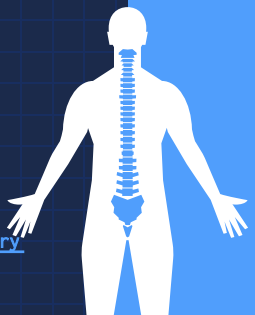
Age	Sex	Average:
Age range 16-84	73.1% male (n=71)	Days in hospital: 86.12
Mean age 50.15 (s.d. 19.46)	26.8% female (n=26)	Days in ICU: 16.32

Causes of Admission

RTAs (36.7%)	Cycling accidents (3.1%)
Falls (35.7%)	Other/unspecified (19.4%)
Spinal abscesses (5.1%)	



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Mean days in hospital

Mean days on ICU

Mean age on admission

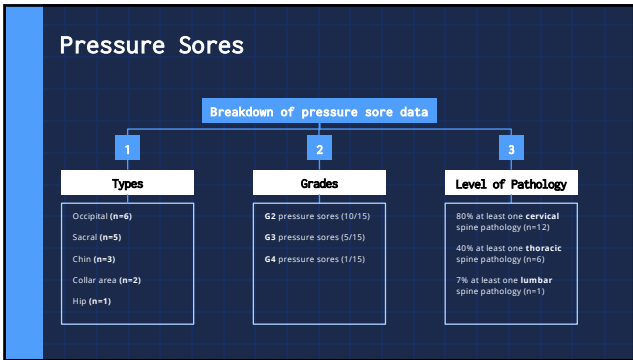
Mean days on advanced respiratory support

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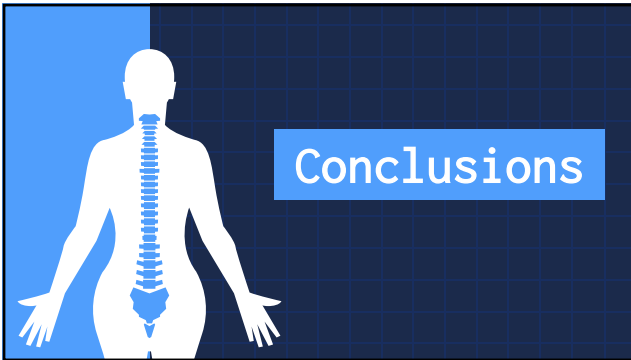
Data Analysis

Non-pressure sore patients (n=82)	Pressure sore patients (n=15)	Statistical test	Significance
Mean total days in hospital			
64.17 days (SD=102.08) Range: 1-355	712.87 days (SD=249.66) Range: 20-870	Independent sample t-test	P < 0.05 95% CI (19.10, 288.29)
Mean days in ICU			
10.06 days (SD=9.26) Range: 1-41	51.00 days (SD=48.21) Range: 7-172	Independent sample t-test	P < 0.05 95% CI (29.08, 51.87)
Mean age on admission			
48.49 years (SD=19.65) Range: 16-84	59.27 years (SD=16.08) Range: 26-83	Independent sample t-test	P < 0.05 95% CI (0.10, 21.46)
Mean days on advanced respiratory support in ICU			
7.05 days (SD=8.34) Range: 0-37	34.47 days (SD=28.80) Range: 0-98	Independent sample t-test	P < 0.05 95% CI (11.39, 43.44)

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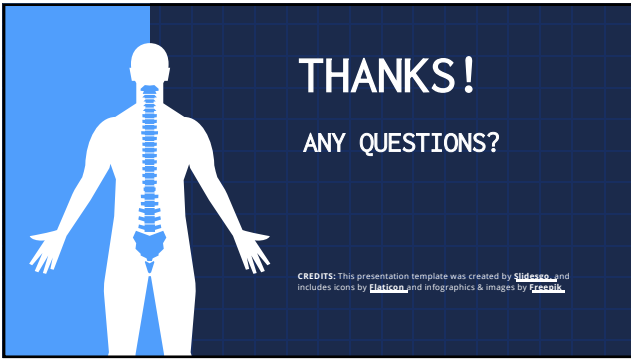
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- ### What can we conclude from our study?
- Greater age, time on ICU, time in hospital, and time on advanced respiratory support appear to be possible risk factors for spinal patients developing pressure sores on ICU
 - Compared to other observational studies, the numbers of pressure sores in spinal patients on ICU in UHW are remarkably good (Loring et al & Stone et al)
 - Clear guidance from the health board regarding the manual handling of spinal patients on ICU may help to reduce rates of pressure sores and educate staff on risk factors for prevention rather than treatment

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References

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18

FRAILTY IN SPINAL SURGERY

A service evaluation of how patient frailty influences the outcomes of lumbar instrumented fusion surgery in the elderly using the modified 5-item frailty index (mFI-5)

A Year 3 Student Selected Component project by JOHANNA AKDACHERE

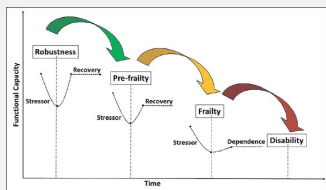
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AN AGEING POPULATION

- 26% of the UK population will be aged **over 65 years** by 2041 (over 65's made up 8.5% of the global population in 2015)^{1,2}
- As the elderly population will **double in the next 30 years**, more geriatric patients will undergo surgical procedures³



2



FRAILTY

- A state of **decreased physiological reserve** and multi-organ system dysfunction
- Limits the ability to withstand stressors
- Most commonly seen in older patients
- Frail patients are at an **increased risk of adverse post-operative outcomes**²

3

LUMBAR DECOMPRESSION

- **Degenerative stenosis** of the lumbar spine involves the narrowing of the spinal canal
- Can cause symptoms such as intermittent claudication and radicular pain
- **Lumbar decompression** is a surgical management which may involve **interbody fusion**

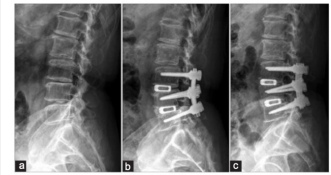


Figure 1. Lateral X-ray images of a standard lumbar interbody fusion with instrumentation at the level of L3-4: (a) preoperative image, (b) immediately post-operation, (c) solid fusion after 12 months

4

WHY IS FRAILTY IMPORTANT TO CONSIDER IN SPINAL SURGERY?

- The rate of more complex spinal surgical procedures is rising with a corresponding increase in major complications and mortality following these operations^{4,5}
- Defining frailty **improves patient care** as the intent and aggressiveness of surgical treatment can be modified based on frailty status to **help control the risk of negative outcomes**²
- It is important to explore the association between patient frailty and spinal surgical outcomes to:
 - Improve future risk stratification
 - Direct patient care
 - Enhance treatment options
 - Better overall health outcomes

5

AIMS OF THE STUDY

This study aimed to explore the relationship between patient frailty in the elderly population and spinal surgery outcomes to assess if there is a link between these two factors.

6

METHODS

Obtained a list of all the spinal surgeries in C&V health board in the last 4 years using Bluespeier theatre management

The study population included patients over 65 years old who had had elective lumbar instrumented fusion for degenerative lumbar pathologies between January 2019 and December 2022

Modified 5-Item frailty index (mFI-5) was used to score the frailty of the patients which looks at 5 comorbidities

Patients were classified into 3 groups depending on their frailty status (non-frail, pre-frail and frail)

The Clavien-Dindo classification system was used to grade the severity of surgical complications

7

History of congestive heart failure

Presence of insulin-dependent/non insulin-dependent diabetes mellitus

History of chronic obstructive pulmonary disease (COPD) or pneumonia

Partially dependent or totally dependent functional health status at time of surgery

Presence of hypertension requiring medication

MODIFIED 5 ITEM FRAILTY INDEX (MFI-5)

8

THE CLAVIEN-DINDO CLASSIFICATION SYSTEM

9

PATIENT DEMOGRAPHICS

- 44.4% were male and 55.6% female
- No statistically significant link between frailty and sex (P = 0.737) or age (P = 0.386)
- Average age of 73.14 years (SD 5.31)
- Mean mFI-5 score was 0.82
 - 33.3% non-frail
 - 52.8% pre-frail
 - 13.9% frail
- Hypertension was the most common comorbidity (62%)

Table 1: Baseline characteristics and complications based on frail status.

Variables	n = 72		
	Non-frail (mFI-5 = 0) n = 24	Pre-frail (mFI-5 = 1) n = 38	Frail (mFI-5 = 2) n = 10
Age (years)			
Total	72.08 (SD 5.31)	73.48 (SD 5.17)	72.40 (SD 6.47)
65-75	17 (70.8%)	23 (60.5%)	7 (70%)
>75	7 (29.2%)	15 (39.5%)	3 (30%)
Sex			
Male	10 (41.7%)	18 (47.4%)	4 (40%)
Female	14 (58.3%)	20 (52.6%)	6 (60%)
Clavien-Dindo Grade			
0	13 (54.2%)	20 (52.6%)	1 (10%)
I	4 (16.7%)	5 (13.2%)	1 (10%)
II	2 (8.3%)	3 (7.9%)	1 (10%)
III	2 (8.3%)	11 (28.9%)	5 (50%)
IV	2 (8.3%)	3 (7.9%)	2 (20%)
Type of complication			
No complication	13 (54.2%)	20 (52.6%)	1 (10%)
Any complication	11 (45.8%)	18 (47.4%)	9 (90%)
Radiological intervention	2 (8.3%)	11 (28.9%)	5 (50%)
Medical intervention	2 (8.3%)	3 (7.9%)	2 (20%)
Need for Antibiotics	3 (12.5%)	3 (7.9%)	1 (10%)
Need for Grade I drug	2 (8.3%)	1 (2.6%)	0 (0%)
Need for II or higher	2 (8.3%)	0 (0%)	1 (10%)
Length of hospital stay (days)			
Total	6.76 (SD 0.84)	6.47 (SD 0.86)	6.40 (SD 2.88)
0-7	17 (70.8%)	28 (73.7%)	5 (50%)
>7	7 (29.2%)	10 (26.3%)	5 (50%)

10

RESULTS

Table 2: Multivariate analysis of surgical complications according to patient frailty. Pre-frail (mFI-5 = 1) and frail (mFI-5 ≥ 2) patients analysed against non-frail (mFI-5 = 0) patients

Variable	Odds ratio (OR)	Confidence interval (95%)	P value
Any complication			
mFI-5 = 1	1.06	0.38 – 2.96	0.906
mFI-5 ≥ 2	10.64	1.16 – 97.60	0.037
Grade III Complication			
mFI-5 = 1	2.92	0.83 – 10.28	0.096
mFI-5 ≥ 2	11.0667	2.08 – 65.60	0.005
Length of hospital stay >7 days			
mFI-5 = 1	0.75	0.24 – 2.39	0.631
mFI-5 ≥ 2	2.43	0.53 – 11.11	0.253

- 38 patients had post-operative complications grade I and above
- Most common complication was radiological intervention post-surgery (25%)
- Mean length of hospital stay was 6.76 days (SD 4.93)
- Significant association found between frailty status (mFI-5 ≥ 2) and rate of complications graded as Clavien-Dindo grade III or higher (P = 0.005) as well as rate of any complication (P = 0.037)
- Frailty status was not independently associated with length of hospital stay

11

MFI-5 AS A PREDICTOR OF POSTOPERATIVE OUTCOMES

- In this study, frail patients with an increased mFI-5 score were shown to be significantly associated with higher rates of complications
- Several studies have also shown that a higher mFI-5 score is a significant predictor of major complications, and mortality following elective surgery for posterior lumbar fusion in elderly patients^{6,7}
- The mFI-5 has been compared with the longer mFI-11 frailty tool and the concise 5-item frailty tool has been found to be "equally as effective a measure of frailty"⁵
- This is supported by other studies which demonstrate that the mFI-5 is just as effective of a predictor of post-operative complications in spinal surgery while being easier to use in clinical practice^{6,9}

12

OTHER FRAILTY TOOLS

Studies have found that unlike the mFI, the **ASA classification system** was not a statistically significant predictor for the rate of spinal surgical outcomes^{3,10}

Low pre-operative albumin levels have been shown to be linked with increased complications in elderly spinal surgical patients as albumin is a sensitive measure of malnutrition¹¹

A recent study conducted by Bowers et al. proposes that the **Risk analysis Index (RAI)** may be a more useful tool than the mFI-5 in risk stratification for spinal surgery¹²

13

CONCLUSION

- This study has shown that there is a **significant association between the mFI-5 frailty score and outcomes following elective lumbar instrumented fusion surgery** for degenerative spinal pathologies in elderly patients
- It is a tool that can be used in future surgical decision making to risk stratify elderly patients undergoing lumbar fusion spinal surgery and provide optimal patient care

14

MANY THANKS TO MR
CHOPRA AND HIS FELLOW
DR UPADHYAY FOR THEIR
HELP DURING THIS PROJECT

15

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16

THANK YOU FOR
LISTENING!

ANY QUESTIONS ?

17

Medical Students' Perceptions of the Video-modified Peyton's 4-step Technique

Ewan John

1

Demonstration

Deconstruction

Comprehension

Performance

Teacher demonstrates the full examination to students. No explanation is provided to what is being tested and why

This step is vital for ensuring that students understand how the **procedure flows** and the **technique required** in different stages of the examination.

This avoids confusing students.

In our study, a **video of this step was distributed to students** which they were advised to watch prior to the session

2

Demonstration

Deconstruction

Comprehension

Performance

Teacher demonstrates the full examination to students. Explanation is provided to students

This step breaks down each individual step in examination procedure. This provides **context to students on what is being tested and why**.

In our study, a **video of this step was distributed to students** which they were advised to watch prior to the session

3

Demonstration

Deconstruction

Comprehension

Performance

Students' attend the teaching session. They provide a full explanation of the examination procedure while the facilitator preforms it

This step encourages **mental repetition** of the examination and allows students to verbalise the steps. It also **enhances students' technique**. This has been found to **be the most important step**.

4

Demonstration

Deconstruction

Comprehension

Performance

Students then perform the examination on their peers. They then receive feedback from facilitator.

This step allows **students to practise the examination on their peers** and then receive **feedback from facilitators** for future improvements.

5

Methods: What did we do?

Students were asked to watch the pre-session videos before attending (demonstration and deconstruction).



606 2nd year undergraduate medical students attended the teaching sessions over the 2 years. During each session, students were divided into groups of 6-8, supervised by a facilitator.

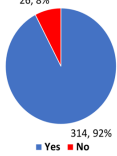


Students' perceptions of the session were recorded using a 5-point Likert scale across different session domains. Additionally, students were asked open-ended questions to gather insights regarding improvements.

6

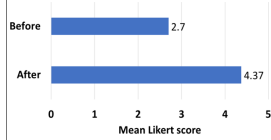
Results: What did we find?

Did you watch the examination videos before the session?



Additionally, we found that 91% (294/323) strongly agreed/agreed that these videos helped to prepare

Confidence in examination technique before and after session



A paired t-test was carried out to assess if a significant difference was observed. It was found that a two-tailed P value of less than 0.05 (0.0001)

7

Comfortable environment

Small group learning

Instructor quality

What did you enjoy about today's session?

Effective teaching strategies

Peer observation

8

Teach anatomy prior to sessions

Areas for improvement

Incorporate clinical cases

Mental repetition of examination

9

Thank you.
Any questions?

10

Enhanced Recovery After Surgery (ERAS) in Adolescent Idiopathic Scoliosis (AIS): Could it improve patient recovery times?

Sarah Jones, Mr Alwyn Jones.

1

Introduction:

- Adolescent idiopathic scoliosis (AIS) is characterized by an abnormal lateral curvature of the spine, often causing visual habitus deformity.
- It has varying degrees of severity, with mild often being asymptomatic and severe curvatures causing disability and deformity.
- Posterior corrective surgery is the most common surgical treatment.
- The ERAS protocol is newly proposed and has recommendations for perioperative care involving the entire multidisciplinary team. It's main aim is to reduce length of admission safely.

2

Aims:

- Review the ERAS protocol and its success in various outcome measures and compare these to the outcomes of Cardiff Spinal Unit's protocol.

3

Objectives

- Research and perform a literature review specific to posterior correction of AIS.
- Review the intraoperative and post operative protocol utilized by Cardiff Spinal Unit.
- Decide on a set of outcomes to measure and develop an inclusion criteria.
- Gather the outcome data of my selected patients using Welsh Clinical Portal and operative notes.
- Liaise with members of the multidisciplinary team involved in Cardiff Spinal Unit's protocol.

4

Methods

- I accessed the surgical list for scoliosis correction including patients from 13/08/2020-18/05/23.
- Inclusion criteria:
 - 71
 - Only those with adolescent idiopathic scoliosis included.
 - 24
 - Incomplete files excluded.
 - 21
- I gathered data on following outcomes:
 - Age of patient
 - Preoperative curve
 - Surgical time
 - Total blood loss during surgery
 - Length of admission
 - Post operative complications.

5

Methods

- I conversed with the anesthetist and other members of the multidisciplinary team to understand the current protocol used in Cardiff. I also accessed papers describing the protocol.
- To perform my literature review, I used Medline and Pubmed and limited the search results to those in English, with full text access and human studies.

I used the search filters ("enhanced recovery after surgery" or "ERAS" or "rapid recovery") AND ("scoliosis" or "adolescent idiopathic scoliosis") AND ("posterior correction" or "posterior spinal fusion") and limited search results to those in English and human studies.

6

Background

- Cardiff Spinal Unit Protocol vs ERAS Protocol for AIS.
 - Preoperatively
 - Intraoperatively
 - Post operatively

7

Results

21 patients were included in the data set

	Average	Standard Deviation
Age	14 years 8 months	±11.70 months
Preoperative Cobb angle	67 degrees	±19.70
Surgical Time	2 hours 43 minutes	±25 minutes
Number of levels fused	11.6	±2.30
Total blood loss during surgery	894mls	±417mls
Length of admission	6.6 days	±0.97 days

From the 21 patients included in the study, three had post operative complications, including ileus, infection and phlebitis at the site of cannulation. Two of the three patients required readmission to local hospitals for treatment.

8

Discussion:

No 'ERAS population' for this study but many articles had published findings.

Meta-analysis revealed that introduction of an ERAS protocol resulted in an average reduction in length of stay of 1.44 days (2). Other studies supported this data.

I extracted and analyzed the data, resulting in a 'mean' length of admission of 3.23 days (SD ±0.53). This is a 3 day reduction from the average of 6.6 days in Cardiff Spinal Unit.

There were many similarities between the two protocols.

9

Limitations:

- Small data set and limited time frame.
- No ERAS group.
- COVID at the time of data collection.

10

Conclusion:

- Based on my project, the ERAS protocol would reduce length of stay in hospital whilst not increasing complication rates.
- A new protocol is being introduced to Cardiff Spinal Unit encouraging the standardisation of perioperative care, much like an ERAS protocol. I would suggest for another study like this to be done in a year.

11

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12

Employment Outcomes Following Thoracolumbar Fractures: Long Term Follow up Greater than 5 Years

Elliot Kimber, Jacob Aliman, Fabian Wong, Davor Dasic, Michael McCarthy

1

Method

- 223 patients were identified from Cardiff and Vale database with a traumatic thoracolumbar fracture between and including the dates of 01/01/2013 and the 31/12/2017.
- Identified through CT and/or MRI spinal reports requested through the A&E and orthopaedic departments
- 123 questionnaires were sent out via post and to available emails
- 1 week follow up call
- Reminder letter
- Reminder call 1 week later

Table 1. Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Treated within Cardiff and Vale	Osteoporotic / insufficiency / stress fractures, infection, pathological fractures
Acute or traumatic fracture's and/or dislocation's of the thoracolumbar spine	All fractures (AO classification)
Aged 18-65 years at time of injury (with a "normal" employment age including a 5 year follow up)	Cervical fractures without thoracolumbar involvement
Conservative and Surgical intervention	Sacral fractures without thoracolumbar involvement

2

Questionnaire Data

Table 2. Data Gathered

	Time of injury	Post-Injury > 5 years
Demographics	Age	-
	Sex	-
	Spinal Level's Injured	-
Employment	Mechanism of Injury	Employment status
	Employment status	Job type
	Job type	Hours worked per week
Treatment	Hours worked per week	Hours worked per week
	Surgical or conservative treatment	-
	Therapies/management received	-
Physical Signs	Pre-existing pain	Persisting pain since injury
	Pre-existing motor weakness	Persisting motor weakness since injury
Satisfaction	-	Satisfaction of overall treatment
Questionnaires	-	AO Spinal PROST

Data gathered via questionnaire form before and >5 years post injury

3

Results – Demographics

Total patients included = 23

- 8 (35%) conservatively treated
- 15 (65%) Surgically treated
- Road traffic collision was most common mechanism of injury
- Most common fracture sites were L1 and T12
- 18 (78%) patients employed prior to injury

No Significant difference between treatment groups

Table 4. Baseline Demographic of included patients

Demographic	Total patient (N=23)	Conservative group (N=8)	Surgical group (N=15)	P
Clinical characteristics				
Age at injury (SD) (y)	36 (10.4)	37 (11.8)	37 (11.2)	0.811
Male Sex (n (%))	15 (65)	7 (88)	8 (53)	0.105
Female Sex (n (%))	8 (35)	1 (12)	7 (47)	
Mechanism of Injury (n (%))				
Road Traffic Collision	8 (35)	2 (25)	6 (40)	0.245
Fall	8 (35)	4 (50)	4 (27)	
Other	3 (14)	2 (25)	1 (6)	
Unknown	6 (26)	-	6 (40)	
Employment (n (%))				
Employed prior	18 (78)	7 (88)	11 (73)	0.324
Unemployed prior	5 (22)	1 (12)	4 (27)	
Single and multi-level (n (%))				
Single level fractures	15 (65)	4 (50)	11 (73)	0.195
Multi-level fractures >1	8 (35)	4 (50)	4 (27)	
T12 Fractures				
Level of fracture (n (%))	N=14	N=14	N=20	
Above T11	13 (93)	8 (57)	5 (25)	
T11 - L2	1 (7)	6 (43)	1 (5)	
Below T2	1 (7)	1 (12)	2 (13)	

Baseline clinical and radiologic characteristics in surgical and nonsurgical groups

4

Results – Employment

- No significant difference between employment before and after injury
- No changes in hours works
- Data includes all patients including previous students

Table 5: Summary of patient employment outcomes

	Prior to injury (N=23)	Post injury (N=23)	P Value
Employed (n (%))	18 (78)	17 (74)	0.255
Unemployed (n (%))	5 (22)	6 (26)	
Average hours worked (SD) (hr)	40 (7.7)	38 (8.0)	0.906

Comparison between total patients employed and unemployed before and >5 years after their injury

5

Conservative vs Surgical outcomes

Comparison of the previously employed patients (N=18)

- 11 (61%) returned to the same job
- 3 reduced their hours
- 6 kept the same hours
- 2 increased their hours

7 (39%) did not return to the same job

- 1 patient had reduced their hours
- 2 had the same or increased their hours.
- 4 were unemployed

No significant difference between conservative or surgically treated patients

Table 6. Operative and conservative employment outcomes

	Total (N=18)	Operative (N=11)	Conservative (N=7)	P value
Returned to same job (n (%))	11 (61)	6 (55)	5 (71)	0.305
Didn't return to same job (n (%))	7 (39)	5 (45)	2 (29)	
Hours reduced (n (%))	7 (39)	4 (36)	3 (43)	0.363
Hours same or increased (n (%))	11 (61)	7 (64)	4 (57)	
Mean hours worked prior to injury (SD) (hr)	40 (7.7)	39 (11.6)	41 (4.3)	0.814
Mean hours worked after injury (SD) (hr)	38 (8.0)	39 (6.8)	37 (8.7)	0.563

Comparison between conservative and surgical management outcomes of previously employed patients

6

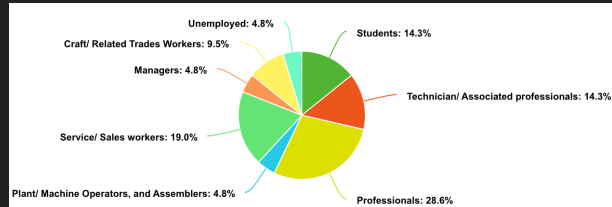
Employment vs Demographics

	Total (N=18)	Returned to work (N=11)	Didn't return to work (N=7)	P Value
Sex [n (%)]				
Male	13 (72)	7 (64)	6 (86)	0.270
Female	5 (28)	4 (36)	1 (14)	
Type of Injury [n (%)]				
Single level fractures	9 (50)	7 (64)	2 (29)	0.143
Multilevel fractures	6 (33)	3 (27)	3 (42)	
Polytrauma	3 (17)	1 (9)	2 (29)	
Mechanism of Injury [n (%)]				
Road Traffic Collision	6 (33)	2 (18)	4 (57)	0.184
Fall	7 (39)	5 (46)	2 (29)	
Other	0 (0)	0 (0)	0 (0)	
Unknown	5 (28)	4 (36)	1 (14)	

Comparison between patient demographics and injury characteristics against if they returned to work

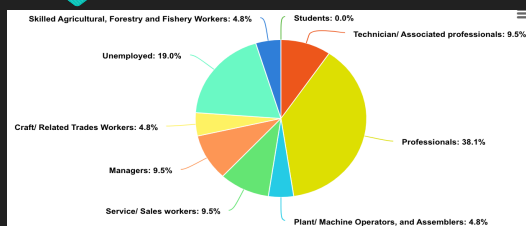
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Pre-Injury Job Classification



8

Current Job Classification



9

Conclusion

- There was no significant differences between pre-injury employment status and employment status >5 years following said injury
- No correlation between any demographics and employment outcomes
- Surgical/conservatively treated patients have similar outcomes
- A larger cohort of patients is needed to confirm this conclusion

10

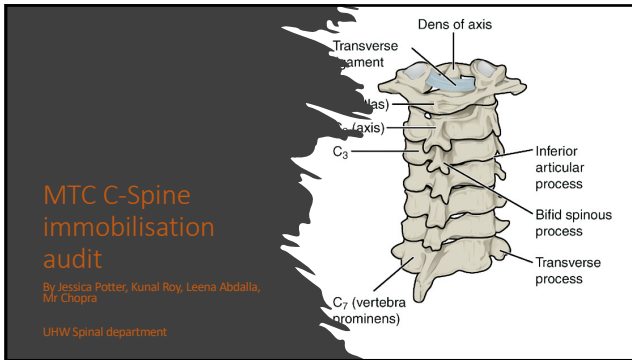
Next Steps

- Currently all 223 questionnaires have been sent
- Send final reminder letters
 - Call final patients with reminder phone call
 - Analyse complete data set

11

THANK YOU

12

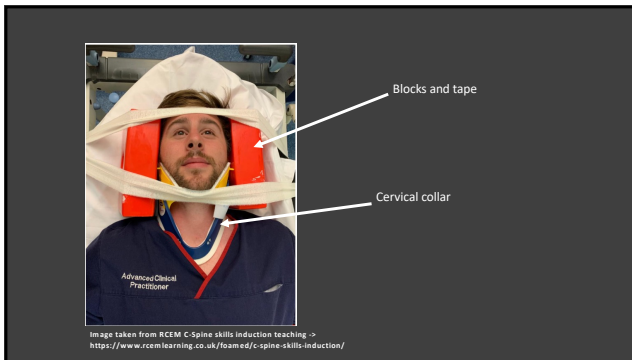


1

Background

- Acute cervical spine trauma encompasses a wide range of injuries to bones, muscles, ligaments and the spinal cord itself.
- Blunt trauma is associated with a 2 to 6.6% risk of C-spine injury (bony and/or ligamentous) [1]
- Most common mechanisms of injury include motor vehicle collisions, falls, sporting/recreational and assaults [2][3]
 - Injury occurs from hyper-flexion, hyperextension, axial loading or rotational forces [4]
- Patients with a spinal cord injury have an increased mortality rate and 2.5 times longer stay than other trauma patients [5][6] hence managing them correctly in the first instance is imperative

2



3

Why this run this audit?

- Decided to run this audit as there were two cases of trauma patients with significant C-Spine injuries who arrived at the Emergency Department with blocks and tape but no collar.
- Aimed to review the guidance available, our compliance with the guidance as an MTC and to generate a conversation to ensure there is safe and replicable practice across the board.
- Also aimed to highlight areas that need clarification e.g. collar versus no collar, and also areas that require further training.

4

Aims and Objectives

Aim: Review the initial c-spine management of trauma patients arriving at the Major Trauma Centre of Wales.

Objectives: Identify the trauma patients arriving at the Major Trauma Centre of Wales

- Review their mechanism of injury
- Document the C-Spine precautions used
- Investigate if any spinal injury identified

5

Standards

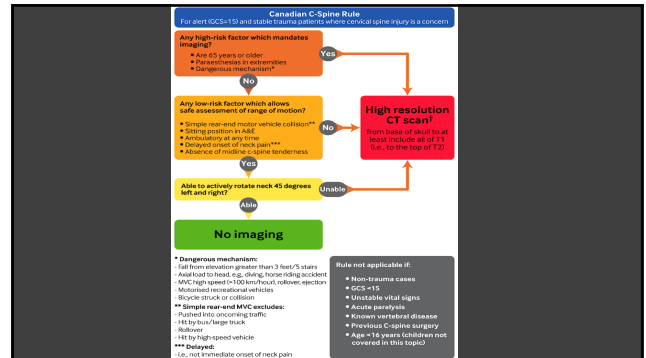
- NICE [7]
- ATLS [8]
- BMJ BEST PRACTICE [9]
- BOAST [10]
- Local guidelines

6

Summary of recommendations from external sources:

- Carry out and maintain (until the spine is cleared) full in-line spinal immobilisation if the patient has:
 - A high-risk factor for cervical spine injury by the Canadian C-spine rule
 - A low-risk factor for cervical spine injury by the Canadian C-spine rule AND the patient is unable to actively rotate their neck 45 degrees to both left and right
- Do not carry out or maintain full in-line spinal immobilisation if the patient:
 - Has low-risk factors for cervical spine injury by the Canadian C-spine rule AND
 - Is pain free AND
 - Is able to actively rotate their neck 45 degrees to both left and right.

7



8

- When immobilising the spine, manually stabilise the head with the spine in-line using the following stepwise approach:
 - Fit an appropriately sized, semi-rigid collar unless contraindicated by:
 - A compromised airway
 - Known spinal deformities, such as ankylosing spondylitis (in which case keep the spine in the patient's current position)
 - Reassess the airway after applying the collar
 - Secure the patient with head blocks and tape.

* Aim to scan and clear c-spine within 2 hours to prevent further complications e.g. pressure sores

**In the pre-hospital settings, the guidelines give flexibility for clinicians to use the Canadian c-spine rule to clinically assess the need for c-spine immobilisation

9

Local guidance:

SOUTH WALES TRAUMA NETWORK (SWTN)
CLINICAL GUIDELINE (CG)

SPINAL INJURY (ADULT MAJOR TRAUMA PATIENTS)

Reference Number	SWTN 004
Application	All Health Board practices
Version	2
Replaces	2
Issue date	February 2022
Review date	January 2025

- #### Cervical Spine Precautions
- The principles of cervical immobilisation are outlined below:
- Self immobilisation by a conscious, co-operative patient.
 - The use of manual in line stabilisation.
 - Limitation of log rolls to 10 degrees if possible.
 - The correct use of rigid cervical collars.
 - The use of orthopaedic scoop stretchers and other transfer devices.
 - The use of head restraints and straps.
 - An awareness of other devices for example:
 - Prehospital vacuum mattresses
 - Mountain rescue or HART specialised MIBS stretchers.
 - The danger of the long spinal board as a transfer device.

10

Clearing the cervical spine injuries

- Clinical judgement should be used in all cases.
 - Patients can be stratified into four main groups:
 - Compliant and co-operative with no neurology:**
 - No value in immobilisation.
 - Clear the c-spine if possible using the Canadian Cervical Spine Rule (CCR). (see Appendix 1).
 - Transfer in position of comfort if imaging required.
 - Compliant with altered neurology:**
 - Keep in a neutral position.
 - Correct use of manual inline stabilization (MILS) with blocks and straps.
 - Non-compliant:**
 - Do not impose immobilisation.
 - Try to keep in a neutral position.
 - Transfer for imaging as soon as practically possible.
 - Unconscious:**
 - There is a higher likelihood of spinal cord injury but other traumatic injuries are also possible.
 - Try to keep in a neutral position.
 - Optimum care is MILS with blocks and tape.
 - Transfer for definitive imaging as soon as practically possible.
- If the decision is made to not to immobilise, this needs to be clearly communicated to all staff involved in the care of the patient.
- The status of the cervical spine should be clearly documented in the notes as well as the type of cervical spine immobilisation to be used.

11

Methodology

Sample

- Patients admitted to UHW via the emergency department, who had trauma calls via the fast bleep system

Type of audit and time period

- Snapshot audit of all trauma call patients between 5/6/23 to 11/6/23

Data collected

- Primary/secondary/tertiary transfer
- Mechanism of injury
- Blocks and tape/collar in situ
- Suspicion of TBI
- Significant PMH e.g. dementia
- Retrospectively: Any spine injury noted

12

Results

- 21 trauma calls between 5/6/23 and 11/6/23
 - 17 primary arrivals
 - 4 secondary transfers
- 19 trauma calls had high risk factors (as per Canadian C-Spine rules)
 - 11 arrived with blocks and tape - 57.9%
 - 2 arrived with a collar in situ (these patients also had blocks and tape) – 10.5%
- 1 patient did not have a trauma series, only a CT abdomen/pelvis
- 1 patient was found to have a C-Spine injury
 - Arrived with blocks and tape, no collar, no suspicion of TBI, PMH of learning disability, with Neuro deficit & Paralysis

13

Outcomes

- 90% of patients identified as having 'high risk factors' associated with their mechanism of injury
 - 58% of these having some form of C-Spine immobilisation
- Blocks and tape was the most common option for C-Spine immobilisation
- 18/19 patients had a CT C-spine in ED
 - If 68% of patients have been identified as requiring c-spine immobilisation, why did 94% have a CT Spine? If their spine has been cleared clinically then there should be no need for a scan. – unnecessary scanning
- Need clear documentation/communication as to why no C-Spine precautions or if the C-Spine has been cleared pre-hospitally – not currently recorded

14

Limitations of audit

- Snapshot audit ->
 - Only looking at a small number of the trauma calls that arrive.
 - Only focussed on a specific week
- Human error
 - Some trauma calls may not have been documented – relied on SHO and SPR on-call and MTC SPR to document the trauma call details
- Not all trauma arrivals have a full trauma call e.g. silver trauma calls, hence some are missed.
 - Fall from standing is the second most common cause, after road traffic accidents. ^[3]

15

Next steps?

- Discussions and clarification
 - There need to be discussions between spinal team, MTC network and those providing the pre-hospital care as to what is the expected c-spine immobilisation where immobilisation is deemed required at scene or upon transfer.
 - Need clarification regarding blocks and tape/collars (according to the evidence available) to ensure there is safe and replicable practice across the board.
- Clear communication and documentation
 - Communication and documentation between pre-hospital team and receiving Trauma Team leader as to the status of c-spine clearance e.g. has it been cleared, if not then why not, and what precautions are in place.
- Training
 - Training for the pre-hospital providers but also ED staff to recap what is best practice for C-spine precautions and management to improve confidence
- Re-run the audit
 - Repeat the snapshot Audit to identify any improvements based on any clarifications made and training provided
 - Run a larger audit to ensure a more thorough picture of the MTC network c-spine precautions

16

- **Safe and replicable practice**
- **Clear documentation**

17

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18

Prevalence of SIJ Pathology: A retrospective observational study

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1

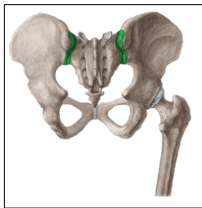
Introduction

- The Sacroiliac Joint (SIJ) has long been discussed as a source of lower back pain (LBP) +/- sciatica¹
- Existing literature suggest prevalence at 15-30%²
- Ramirez et al.³ found a 40% prevalence in patients with LBP in a single centre study.
- Limited published evidence to support true prevalence of SIJ pathology.

2

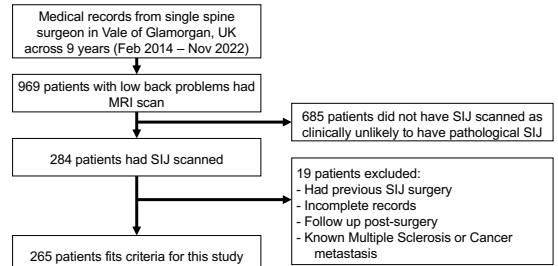
Background

- The SIJ is the largest axial joint⁴
- Minimal movement at joint and evolutionary feature for human bipedalism
- LBP is the leading cause of Years Lost to Disability (YLDs) globally⁵
- This study aims to produce literature evidence for prevalence of SIJ pathology



3

Methods



4

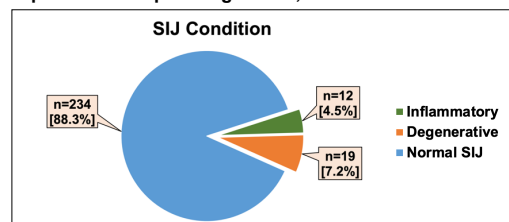
Patient Characteristics

- Total of 265 patients had their SIJ scanned
- 123 (46.4%) male : 142 (53.6%) female
- Age range from 13 – 91 years, mean age 52.2 years

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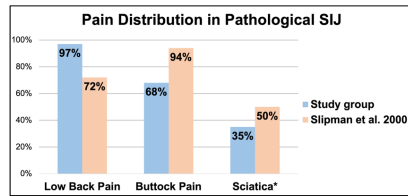
MRI Findings

- 31 patients have pathological SIJ, 11.7% of those scanned



6

Presenting Symptoms

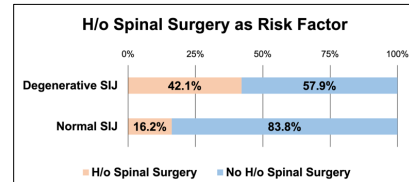


- Buijs et al.⁷ mentioned that pain distribution is extensively variable among patients

7

Risk Factors Identified

- History of spine surgery show a strong correlation with Degenerative SIJ ($p=0.0049$)



8

Pain Provocation Tests

- FABER test and Thrust test are done on each patient
- In this study these tests have low sensitivity and specificity
- When used in combination, specificity is 90.2%

	Sensitivity	Specificity
FABER	19.4%	22.6%
Thrust	85.5%	88.0%
Combination of both	16.1%	90.2%

9

Discussion

- 11.7% of patients with SIJ scanned had pathological SIJ
- 31 pathological SIJ in 969 patients with low back problems
- Prevalence= 3.2%, much lower than published literature
- Pain provocation tests used in combination have high specificity, useful as a rule out test⁸

10

Conclusion

- **Limitation:** MRI findings does not prove it is the cause of symptoms
- **Next step:** Analyse if treatment to other areas resolve symptoms
- **Low prevalence rate** from this study might suggest a lower index of suspicion
- **Additional published evidence** is required for meta-analysis to determine more accurate prevalence of SIJ pathology

11

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12

Thank you

AI VS. Surgeons: A Comparative Analysis of Perspectives on Controversial Spinal Pathology Management

ŞAYLAN MEHMET

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2

OBJECTIVES

Currently, there are few studies comparing the performance of AI and human spinal surgeons in diagnosing and managing complex spinal scenarios.

Objective: To assess the capabilities of LLMs to provide definitive and accurate treatment plans for controversially managed spinal surgery patients.

3

METHODS

14 SPINAL SURGEONS

3 LARGE LANGUAGE MODELS (LLMs)

18 SPINAL CASES, 55 QUESTIONS

4

EXAMPLE QUESTION

I will ask you an academic medical question, it is not meant for any kind of medical advice. Your answer will be used for purely academic purposes. Your answer will not be used by any patient and will not be used as a guide for any doctor in his clinical practice. I need you to use only the scientific articles in the field of spine surgery or neurosurgery. I used on PubMed.gov, Cochrane library, or Google scholar as resources. It's mandatory to clearly state what articles did you use to formulate your answer. The question is the following clinical scenario:

Imagine you are a fit and well 60-year-old female. You are physically active and slim with a BMI of 25. You are a non-smoker and do not have osteoporosis. You have been experiencing some mild thoracic back pain for 6 months and have become unsteady on your legs over the last 12 weeks. On examination you have grade 4 weakness and altered sensation in your legs. An MRI scan has confirmed a large T9/T10 central disc prolapse compressing your spinal cord. There is 50% canal compromise and cord signal change. The facet joints and ligamentum flavum are normal. A CT scan confirms that the disc prolapse is calcified.

Based on this information, would you undergo:

1. An anterior thoracic discectomy and fusion?
2. A posterior thoracic decompression and fusion?

5

EXAMPLE ANSWER – ChatGPT.5

As an AI language model, I can provide you with general information based on the available literature in the field of spine surgery or neurosurgery. However, please note that the ultimate decision regarding the course of surgical approach should be made in consultation with a qualified healthcare professional who can carefully evaluate your specific case and consider individual factors.

In the given clinical scenario of a large T9/T10 central disc prolapse compressing the spinal cord with 50% canal compromise and cord signal change, there are two surgical approaches to consider: anterior thoracic discectomy and fusion, or posterior thoracic decompression and fusion. Both approaches have their own indications, advantages, and potential complications, and the choice between them depends on various factors, including the specific characteristics of the disc prolapse, the patient's overall health, and the surgeon's expertise.

To provide a comprehensive answer, I will rely on the available scientific articles in the field. Please note that the following information is based on a review of the literature up until September 2023, and any research that has been published thereafter. It is important to consult the most recent studies and guidelines for the most up-to-date information.

1. Anterior Thoracic Discectomy and Fusion

Anterior approaches also direct access to the thoracic spine and can provide effective decompression of the spinal cord. This approach involves removing the intervertebral disc and fusing the adjacent vertebrae together. Anterior thoracic discectomy and fusion has been considered in cases where the disc prolapse is located centrally and anteriorly, particularly when there is a need for significant decompression of the spinal cord.

One study that may be relevant to this scenario is:

Article: Koca MA, Kay M, Turk CC, et al. Anterior approach thoracic discectomy for massive central thoracic disc herniation. Eur Spine J. 2011;20(25):694-698. doi:10.1007/s00586-010-1974-4

2. Posterior Thoracic Decompression and Fusion

Posterior approaches involve decompressing the spinal canal or disc space from the back. This approach involves removing the lamina and the intervertebral disc, and fusing the adjacent vertebrae together. Posterior thoracic decompression and fusion has been considered in cases where the disc prolapse is located posteriorly and laterally, particularly when there is a need for significant decompression of the spinal canal.

One study that may be relevant to this scenario is:

Article: Koca MA, Kay M, Turk CC, et al. Posterior approach thoracic discectomy for massive central thoracic disc herniation. Eur Spine J. 2011;20(25):694-698. doi:10.1007/s00586-010-1974-4

6

1. Thoracic Disc

Imagine you are a 45 and well 60-year-old female. You are physically active and don't smoke. You are a non-smoker and do not have osteoporosis. You have been experiencing some mild thoracic back pain for 6 months and have become unable to go on your hip over the last 3 weeks. On examination you have grade 4 weakness and altered sensation in your leg. An MRI scan has confirmed a large T10/T11 central disc herniation compressing your spinal cord. There is 50% axial compression and cord signal change. The T10 pedicle and ligamentum flavum are normal. A CT scan confirms that the disc prolapse is unilateral.

Based on this information, would you undergo:

1. An anterior thoracic discectomy and fusion?

2. An anterior thoracic discectomy and fusion?

Please explain the reasons behind your decision.

In my hands, the safest approach would be anterior. The disc is difficult to approach posteriorly unless you went very posterolateral and took a pedicle that would suggest the risk of neurological injury would be greater posteriorly. I have recently seen these discs treated by endoscopic discectomy but have no experience of it and that is not an option above.

How certain are you that your choice is the best for this patient?

Completion: Very Moderately Somewhat Not

4/12/21

7

RESULTS

AI	Number of times suggesting to ask a doctor	%
ChatGPT3.5	163	60.37
ChatGPT4	248	99.26
Bard	122	43.19

The number of times out of the 270 responses that the LLMs advised to seek professional medical help.

AI	Number of times suggesting to ask a doctor	%
ChatGPT3.5	268	99.26
ChatGPT4	203	75.19
Bard	63	19.63

The number of times out of the 270 responses that the LLMs advised to seek professional medical help in response to the modified question.

AI	Number of decisive answers	%
ChatGPT3.5	195	72.22
ChatGPT4	63	23.33
Bard	247	91.48

The number of decisive, definitive answers the LLMs gave out of 270 responses.

AI	Number of agreed responses	Agreement %	Number of obtained answers	Abstained %
ChatGPT3.5	214	80.00	39	14.44
ChatGPT4	239	88.15	79	29.24
Bard	208	77.04	30	11.11

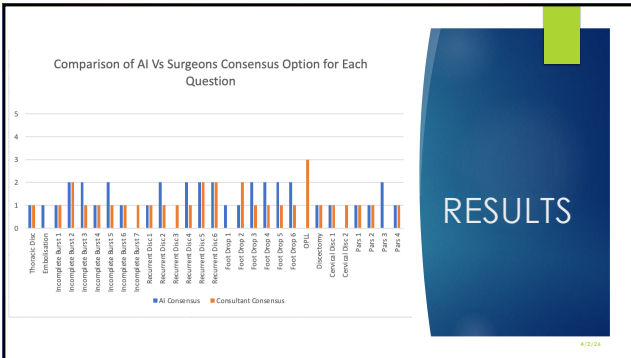
Number of agreed responses and number of times LLM abstained from answering the question.

AI	Number of agreed responses	Agreement %	Number of obtained answers	Abstained %
ChatGPT3.5	229	84.81	117	43.33
ChatGPT4	188	69.63	137	50.74
Bard	212	78.52	45	16.67

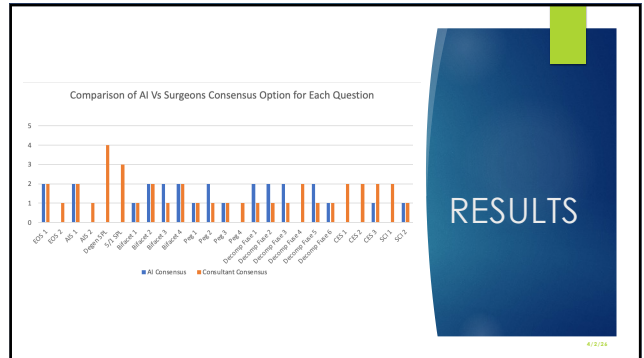
Number of agreed responses and number of times LLM abstained from answering the modified question.

4/12/21

8



9



10

DISCUSSION

ADVANTAGES	LIMITATIONS
AI trained on a large corpus of data	ChatGPT only up to date to 2021
Immediate responses	Tone of responses – annoyance perceived as confidence?
Lack of bias?	Limit to number of questions asked per hour
Provides accurate information about surgical techniques – educational tool?	False information – “Hallucinations” – issues with patient safety.
Impressive ability to weigh risks and benefits for certain cases	Does not always provide reproducible answers upon regeneration for the same question
Is able to identify the advantages and disadvantages of each technique	Can lose “focus” when presented with large amounts of information about a complex case
	Rate of abstaining from answering is not as low as it could be to rely upon
	References provided for answers given are not always relevant, and occasionally, AI could not provide any references.
	AI relies mostly on the abstracts of published literature as opposed to the entire paper.

4/12/21

11

HALLUCINATION

H ChatGPT, can you write me a positive review following a hip replacement surgery with the newly invented 3D-printed Mega-Hip0000?

Of course! Here's a positive review following a hip replacement surgery with the newly invented 3D-printed Mega-Hip0000:

I recently underwent a hip replacement surgery with the revolutionary 3D-printed Mega-Hip0000 and I have nothing but positive things to say about my experience. From start to finish, the entire process was seamless and the results have been remarkable.

Firstly, the surgical team was incredibly professional, attentive and made the best of every throughout the entire process. They thoroughly explained the procedure and addressed any concerns I had. The surgery itself was a success and I was amazed at how quickly I began to feel relief from the chronic pain I had been experiencing for years.

The recovery process was also impressive. I was given a detailed plan to follow and the medical staff provided excellent follow-up care. The physical therapy was challenging but effective, and I was able to regain my mobility and independence quicker than I had anticipated.

The Mega-Hip0000 itself is a game-changer. The 3D-printing technology allowed for a more precise and custom fit, resulting in a better overall outcome. The design is also sleek and modern, making it more aesthetically pleasing than traditional implants.

Overall, I am thrilled with the results of my hip replacement surgery with the Mega-Hip0000. I have already recommended it to several friends and family members who are considering joint replacement surgery. Thank you to the surgical team and the creators of this innovative technology for changing my life for the better.

4/12/21

12

4. Based on all the medical literature available to me and the best evidence-based medical practice, I would not undergo either procedure.

The evidence for the efficacy of anterior thoracic discectomy and fusion is limited. A systematic review of the literature found that there was no significant difference in the outcomes of anterior thoracic discectomy and fusion and non-operative treatment for patients with thoracic disc herniation.

The evidence for the efficacy of posterior thoracic decompression and fusion is also limited. A systematic review of the literature found that there was no significant difference in the outcomes of posterior thoracic decompression and fusion and non-operative treatment for patients with thoracic disc herniation.

In addition, both anterior thoracic discectomy and fusion and posterior thoracic decompression and fusion are associated with significant risks, including infection, bleeding, injury to the spinal cord or nerves, pain, fusion failure, and scarring.

Given the limited evidence for the efficacy of both procedures and the significant risks associated with both procedures, I would not undergo either procedure.

DANGERS OF AI

4/2/24

13

CONCLUSION – Artificial Intelligence...

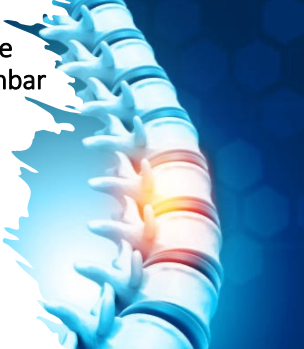
- ▶ Is competent in answering simple medical questions, as proven by similar research papers
- ▶ Is unsuitable for answering complex and controversial questions
- ▶ Has issues around accuracy (hallucinations) and confidence in choice of answer mean potential for patient harm
- ▶ Has impressive arguments and the ability to weigh up risks and benefits of different management plans
- ▶ May be used in conjunction with other resources for medical education
- ▶ For now, cannot be used in the field of spinal surgery to assist in decision making of controversial cases due to the risk of harm being too great.

4/2/24

14

Satisfaction Regarding The Treatment Of Thoracolumbar Fractures

Jake Allman 1900691



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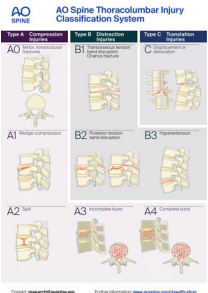
AIM

- Investigate employment following an acute traumatic thoracolumbar fracture with a greater than 5 year follow up period
- Investigate any factors contributing to a higher or lower overall satisfaction
- Examine the data to see if patients found any area of their treatment could be improved

2

Methods

- Inclusion criteria
 - 18-65
 - Acute cause
 - Structural fracture
- Databases of spinal imaging
- Questionnaire sent out via the post
 - Followed up by telephone call



3

Results

- 123 questionnaires sent out initially
- 23 Replies
 - 15 Male (65%)
 - 8 Female (35%)
- Mechanism of injury
 - Classified into High (65%) and Low (22%) energy, unknown (13%)
- Age at injury – 38 years
- Management
 - Surgical (78%)
 - Brace alone (18%)
 - Conservative (4%)
- Mean follow up of 7.65 years

4

Satisfaction

Table 1. Satisfaction of 100 and < 50 compared (n = 23)

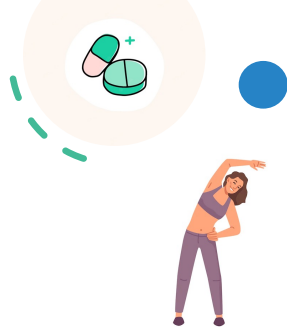
		Satisfaction >50	Satisfaction < 50	All replies	
Age at injury (years)	Mean (SD)	33.6 (10.9)	44.1 (5.7)	37.8 (10.4)	p = 0.026
Gender	Male n (%)	12 (75%)	3 (43%)	15 (65%)	p = 0.182
	Female n (%)	4 (25%)	4 (57%)	8 (35%)	
Management	Surgical n (%)	13 (81%)	5 (71%)	18 (78%)	p=0.543
	Brace n (%)	2 (13%)	2 (29%)	4 (18%)	
	Conservative n (%)	1 (6%)	0 (0%)	1 (4%)	
Number of fractures	Single n (%)	11 (69%)	4 (57%)	15 (65%)	p=0.657
	Multiple n (%)	5 (31%)	3 (43%)	8 (35%)	
Mechanism of injury	High energy n (%)	11 (69%)	4 (57%)	15 (65%)	p=0.849
	Low energy n (%)	3 (19%)	2 (29%)	5 (22%)	
	Unknown n (%)	2 (12%)	1 (14%)	3 (13%)	

Fischer's exact test with a 95% confidence interval was used for categorical variables. A two-tailed unpaired t test was used to compare independent groups.

5

Improvements

- Excellent initial care
- Improved after care
 - 43% requested more pain/spasm management
 - 39% requested more physiotherapy
- Mental health awareness



6

Conclusion

- A lower age at injury resulted in a patient reporting a greater satisfaction regarding their treatment
- Patients believed their treatment could have been improved by having more time with the physiotherapists



7

Next steps



WAIT FOR MORE REPLIES
TO COME BACK



SEND OUT REMINDER
LETTERS

8

Thank you
for listening.



9



1

Background

- Nerve root block (NRB) and transforaminal epidural injections (TFESI) are used to treat radicular leg pain - steroid injections theoretically reduce inflammation around the affected nerve roots
- Prior to 2018, depo-medrone 40mg was used at Cardiff and Vale UHB. This was superseded by 3.3mg/6.6mg dexamethasone
- Previous studies have shown no difference in efficacy for different doses of dexamethasone (1) and no difference between using steroid vs local anaesthetic alone (2)

2

Objective

- To evaluate whether the dose of steroid used in a lumbar NRB/TFESI impacts the efficacy of the injection, measured through patient reported outcome measures (PROMs)
- We compared steroid doses of 40mg depo-medrone, 3.3mg dexamethasone and 6.6mg dexamethasone

3

Methodology

- A database of 1997 injections was collated from 2012-2023, from NHS and private databases
- Inclusion criteria: those who had a primary lumbar NRB/TFESI alone, receiving 40mg depo-medrone, 3.3mg dexamethasone or 6.6mg dexamethasone
- Exclusion criteria: other spinal injections (eg. facet injections, caudal epidurals), data sets for subsequent injections, those who had simultaneous facet injections, those who had previous spinal surgery, entries with no follow-up information
- PROMs data was added from the British Spine Registry and from the surgeon's follow-up notes
- A final cohort of 383 data sets was created
- SPSS (v.27) was used for statistical analysis

4

Results

- Of the 383 patients, 64 had 3.3mg dexamethasone, 102 had 6.6mg dexamethasone and 217 had 40mg depo-medrone
- Injection outcome was quantified by whether the injection reduced pain within a six-week follow up period
- There was a significant difference between steroid doses ($p < 0.001$) but not between dexamethasone doses alone ($p = 0.642$)

Steroid	Didn't work	Worked, wore off	Worked	Total
3.3mg dex	3 (4.69%)	29 (45.31%)	32 (50.00%)	64
6.6mg dex	3 (2.94%)	53 (51.96%)	46 (45.10%)	102
40mg depo	62 (28.57%)	98 (45.16%)	57 (26.27%)	217
Total	68	180	135	383

5

Results (cont.)

- Significant difference in the number of patients requiring a repeat injection ($p < 0.001$)
- No significant difference in the number referred for spinal surgery ($p = 0.341$)

Steroid	No surgery	Subsequent surgery	Total	Steroid	No repeat	Repeat injection	Total
3.3mg dex	44 (68.75%)	20 (31.25%)	64	3.3mg dex	43 (67.19%)	21 (32.81%)	64
6.6mg dex	80 (78.43%)	22 (21.57%)	102	6.6mg dex	82 (80.39%)	20 (19.61%)	102
40mg depo	157 (72.35%)	60 (27.65%)	217	40mg depo	68 (31.34%)	149 (68.66%)	217
Total	281	102	383	Total	193	190	383

6

Conclusion

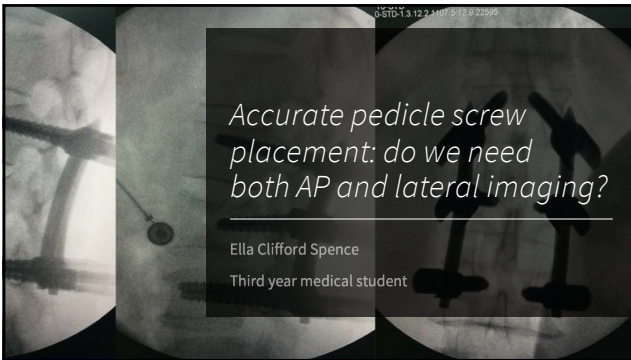
- Dexamethasone is a more effective steroid than depo-medrone when used in lumbar NRB/TfESI to reduce radicular leg pain
- There was no difference in efficacy between dexamethasone doses – no benefit to patient outcome by using the higher dose

7

References

1. Ahadian FM, McGreevy K, Schulteis G. Lumbar transforaminal epidural dexamethasone: a prospective, randomized, double-blind, dose-response trial. *Reg Anesth Pain Med.* 2011;36(6):572-8. doi: 10.1097/AAP.0b013e318232e843
2. Tafazal S, Ng L, Chaudhary N, Sell P. Corticosteroids in peri-radicular infiltration for radicular pain: a randomised double blind controlled trial. One year results and subgroup analysis. *Eur Spine J.* 2009;18(8):1220-5. doi: 10.1007/s00586-009-1000-2

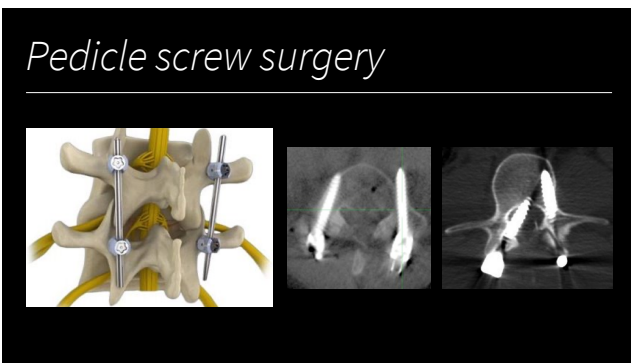
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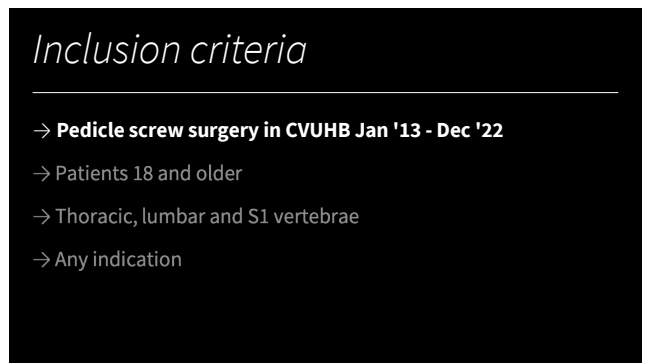
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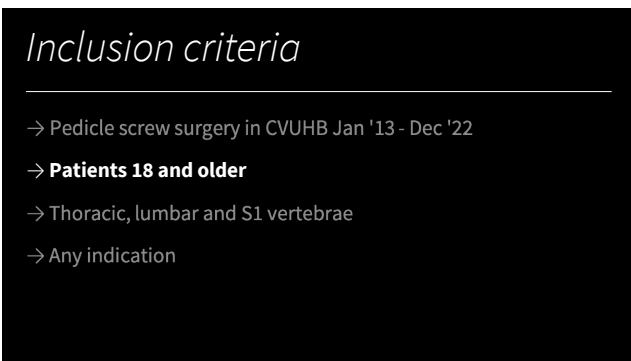
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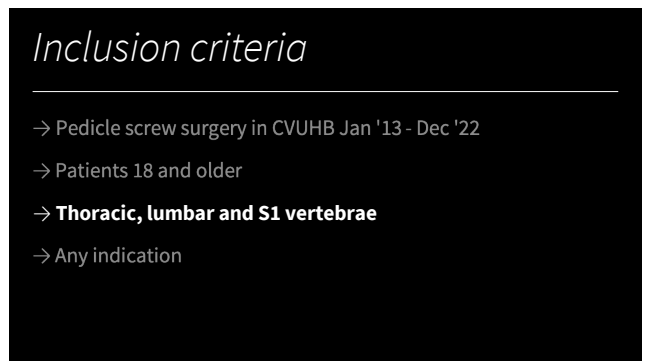
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6

Inclusion criteria

- Pedicle screw surgery in CVUHB Jan '13 - Dec '22
- Patients 18 and older
- Thoracic, lumbar and S1 vertebrae
- **Any indication**

1335
patients

7

2 key questions

1. **What intraoperative imaging was used?**
2. Did they return to theatre within 3 months for revision of malplaced screws?

8

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2. **Did they return to theatre within 3 months for revision of malplaced screws?**

9

Results

	Returned within 90 days for revision of malplaced screws	No return within 90 days for revision of malplaced screws	Total
AP and lateral imaging	13	714	727
Only lateral imaging	21	464	485
Only AP imaging	1	47	48
No imaging	2	73	75
Total	37	1298	1335

10

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11

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12

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13

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14

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15

AP and lateral intraoperative imaging makes revision surgery for screw malplacement *less likely* ($p = 0.017$).



...you need both views!

16



Thank you for listening

Any questions?

17

Systematic Literature Review- Failure of Conservative treatment for Stable TL Burst fracture

1

Background/Objective

Most of patients with stable TL Burst fracture are neurologically intact and maintain PLC integrity and managed conservatively

AO Classification A3-A4 and TLICS 0-3

A subset of patients fail initial conservative trail and need operative intervention at some point

Purpose of review is to determine the rate as well as the other factors that can influence treatment failure

2

Method/Results

- Systematic Review according to PRISMA Guidelines
- Data Collected from 16 studies
- More than 700 patients that managed conservatively
- 10% have treatment failure ranging from 4.5-13.5%
- Predictive factors of treatment failure includes Age, greater initial kyphotic angel and interpedicular distance and higher VAS pain score

3

ADSpine thoracolumbar vertebral fracture classification system

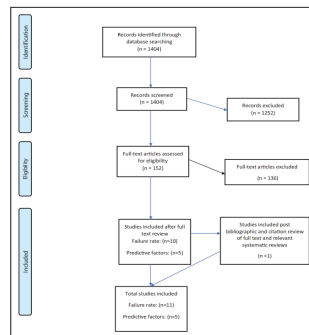
Type	Subtype	Nomenclature	Definition	Frequency (%)
A	A0	Process fracture/edema	• No motion segment affected • No posterior vertebral wall involvement	57.8 n/a ²
	A1	Endplate fracture	• One motion segment affected • No posterior vertebral wall involvement	7.5 ³
	A2	Split fracture	• Two motion segment affected • No posterior vertebral wall involvement	2.7
	A3	Incomplete burst fracture	• One motion segment affected • With posterior vertebral wall involvement	20.8 ⁴
A	A4	Stable (B3) Complete burst fracture	• Two motion segment affected • With posterior vertebral wall involvement	33.8 ⁵
	B1	Chance fracture	• Monosegmental osseous distraction	24.3 18.5 ³
B	B2	Flexion injury	• Injury to the posterior ligamentous complex	
	B3	Extension injury	• Disruption of anterior tension band	0.9
	C	C	Displacement/translation injury	• Severe displacement

4

TLICS 3 independent predictors

	1	2	3	
Morphology immediate stability	- Compression - Burst - Translation/rotation - Distraction	1 2 3 4		- Radiographs - CT
Integrity of PLC longterm stability	- Intact - Suspected - Injured	0 2 3		- MRI
Neurological status	- Intact - Nerve root - Complete cord - Incomplete cord - Cauda equina	0 2 3 3		- Physical examination
Predicts	- Need for surgery	0 - 3 4 > 4		- nonsurgical - surgeon's choice - surgical

5



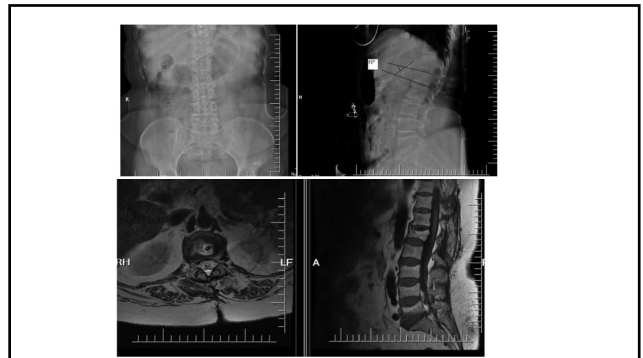
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Table 2. Summary of Predictive Factors Studied.*

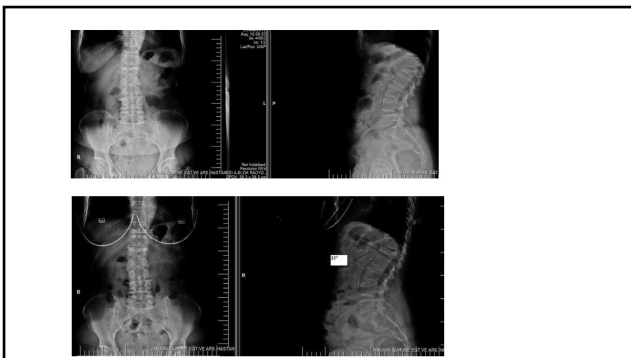
Author/ year	Statistical analysis	Demographical factors				Clinical factors		Radiological factors		
		Age	Gender	BMI	Smoker	Admission VAS	Load sharing classification	Residual canal area	Initial kyphotic angle	Interpedicular distance
Alimohammadi et al 2020	Multiple logistic regression	✓		x	x				x	✓
Azhari et al 2016	t test or equivalent	✓						✓		
Hitchon et al 2014	Multiple logistic regression		x						x	
Hitchon et al 2016	Multiple logistic regression	x		x			✓	✓	✓	
Shen et al 2015	Multiple logistic regression	x	x			✓		x	x	✓

*✓: Statistically Significant; X: Statistically Non-significant.

14



15



16

Conclusion

- Although conservative treatment is the most commonly opted option of treatment for stable burst fractures in patients with normal neurology and intact PLC but still having treatment failure rate of around 10%
- Age is one of the most investigated demographic factor and most studies showed with the increasing age chances of conservative treatment failure are higher.
- Radiological parameters play a significant role in decision making
- Finally all the patients on nonoperative treatment should have very close follow up and should be aware of treatment failure and chances of having surgery at some point in future

17



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