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Podium Presentation Session 4: Spine and Trauma

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Impact of the 20mph Speed Limit on Spinal Trauma Admissions to the Major Trauma Centre for Wales

Sanjana Purbhoo[1], Michael McCarthy[2]

[1]Cardiff University School of Medicine

[2]University Hospital of Wales

Background

- Motor vehicle collisions (MVCs) are a common cause of spinal trauma
- Introduction of new speed limit in Wales on 17th September 2023
- Aim to reduce incidence, related injury and burden on NHS

Current Literature

- Injury probability increases with crash speed
- Limited studies on effectiveness of speed limits
- Insufficient literature on 20mph speed limits and spinal trauma

Aims

1. To assess the number of MVC-related spinal trauma admissions to the MTC for Wales 1-year before and 1-year after implementation of the new 20mph speed limit.

2. To analyse the data including demographics, mechanism of injury, management and location.

Methods

Study Design

SWTN database produced for all patients admitted to the MTC from 17/09/22-04/01/25 with mechanism of injury recorded as ‘vehicle incident’.

1. Patients admitted between 17/09/22-16/09/23 = ‘pre-20mph’
2. Patients admitted between 17/09/23-01/01/25 = ‘post-20mph’

Inclusion Criteria

Patients admitted to the MTC with ‘vehicle incident’ and who sustained spinal trauma.

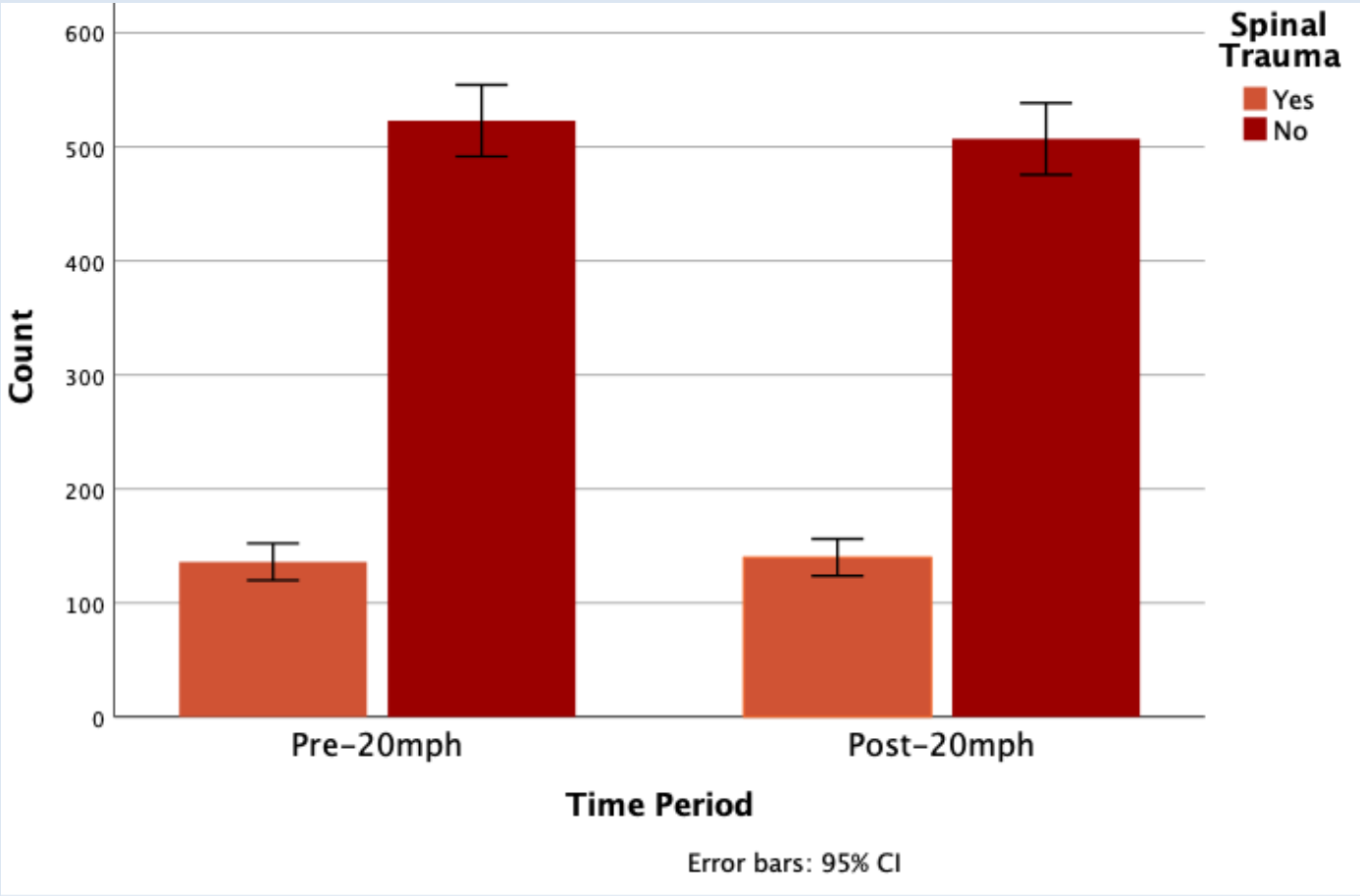
Results

- 1,306 patients admitted with ‘vehicle incident’
- 306 patients sustained spinal trauma
- 276 patients included in study
- 136 patients admitted pre-20mph
- 140 patients admitted post-20mph

Results

Variable		Pre-20mph (n=136)	Post-20mph (n=140)
Age	Paediatric (<18)	3%	7%
	Adult (18≤ x≤ 64)	78%	76%
	Geriatric (≥65)	19%	23%
Gender	Male	74%	66%
	Female	26%	34%
Anatomical region	Cervical	18%	20%
	Thoracic	28%	26%
	Lumbar	27%	29%
	=2 regions	24%	21%
	=3 regions	3%	4%
Road user	Car	45%	48%
	Motorbike	24%	17%
	Bicycle	7%	4%
	Pedestrian	15%	16%
	Other	9%	15%
Management	Conservative	84%	84%
	Surgical	12%	14%
	Conservative and surgical	4%	2%

Number of Patients admitted to the MTC as ‘Vehicle Incident’ before and after the 20mph Speed Limit



Conclusions

- 20mph speed limit has had **no significant impact** on spinal trauma admissions to the MTC for Wales
- Road safety campaigns and stricter police enforcement are required to improve driver compliance with speed limits
- Further studies over a longer period would be beneficial

References

Kent R, Cormier J, McMurry TL, Johan Ivarsson B, Funk J, Hartka T, et al. Spinal injury rates and specific causation in motor vehicle collisions. Accident analysis and prevention. 2023;186:107047-. doi: 10.1016/j.aap.2023.107047

Nils L, Yi W, Hanna J. Safe speeds: fatality and injury risks of pedestrians, cyclists, motorcyclists, and car drivers impacting the front of another passenger car as a function of closing speed and age. Traffic Safety Research. 2022;2. doi: 10.55329/vfma7555

Kokka K, Nightingale G, Williams AJ, Abbas A, Popov V, Sharp S, et al. Effect of 20 mph speed limits on traffic injuries in Edinburgh, UK: a natural experiment and modelling study. Journal of epidemiology and community health (1979). 2024;78(7):437-43. doi: 10.1136/jech-2023-221612

Welsh Government. Introducing default 20mph speed limits. Welsh Government; 2021 [accessed 19/04/2025]. Available from https://www.gov.wales/introducing-default-20mph-speed-limits

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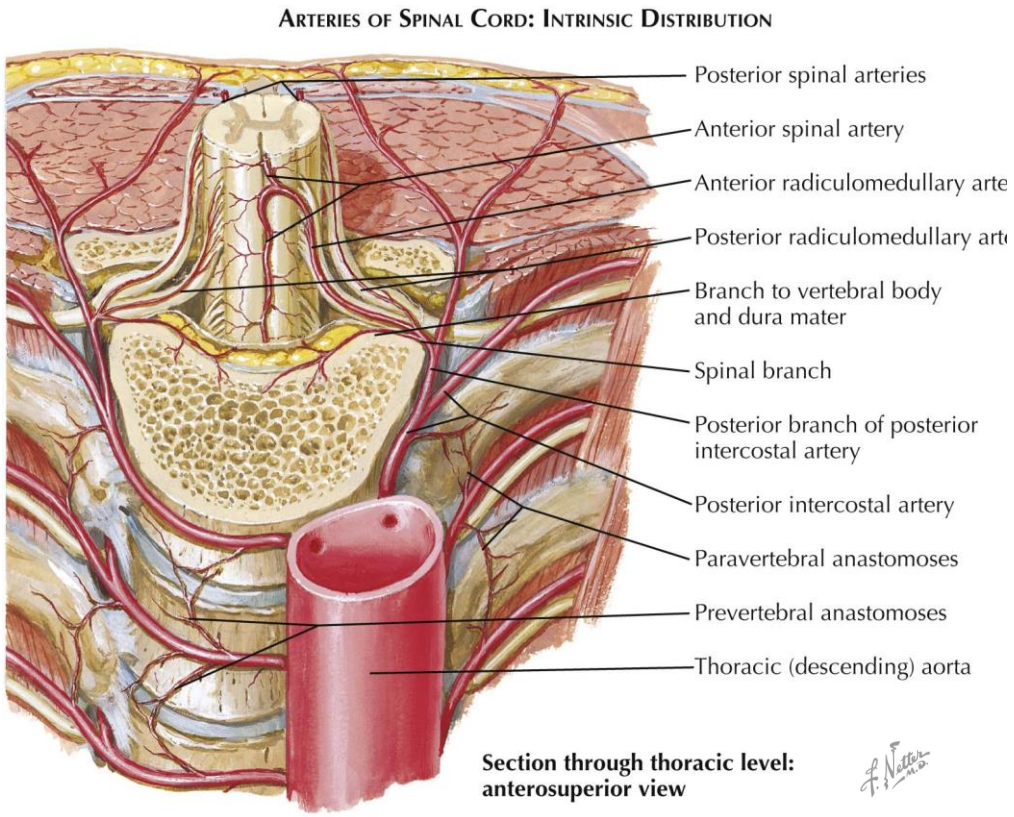


A 10-Year Analysis of Pedicle Screw Placement in the Surgical Treatment of Adolescent Idiopathic Scoliosis

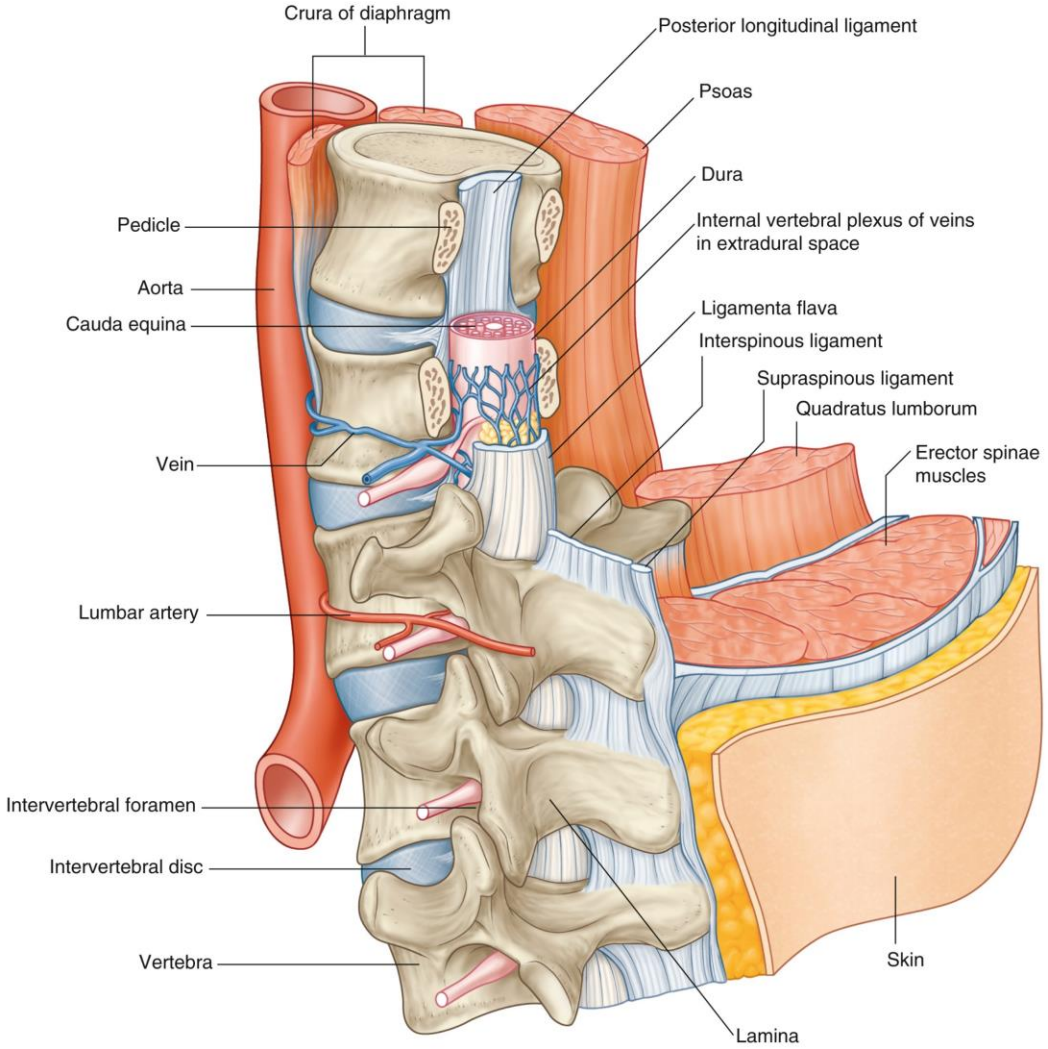
Ms Sophie J Griffiths, Prof Michael J McCarthy, Mr Stuart James, Mr Alwyn Jones, Prof Sashin Ahuja, Mr John Howes, Mr Paul Davies, Mr Naz Moideen

GIG CYMRU NHS WALES

INTRODUCTION



Adapted from: Arteries of Spinal Cord: Intrinsic Distribution (1)



Arrangement of Structures in the Vertebral Canal and the Back (Lumbar Region) (2)

(1) Netter FH, Jones HR, Machado CAG, Pekins JA. Netter Collection of Medical Illustrations: Nervous System, Part II – Spinal Cord and Peripheral Motor and Sensory Systems

(2) Drake RL, Vogl AW, Mitchell AWM. Gray's Anatomy for Students. 5th ed. Philadelphia: Elsevier Saunders; 2024.

AIMS

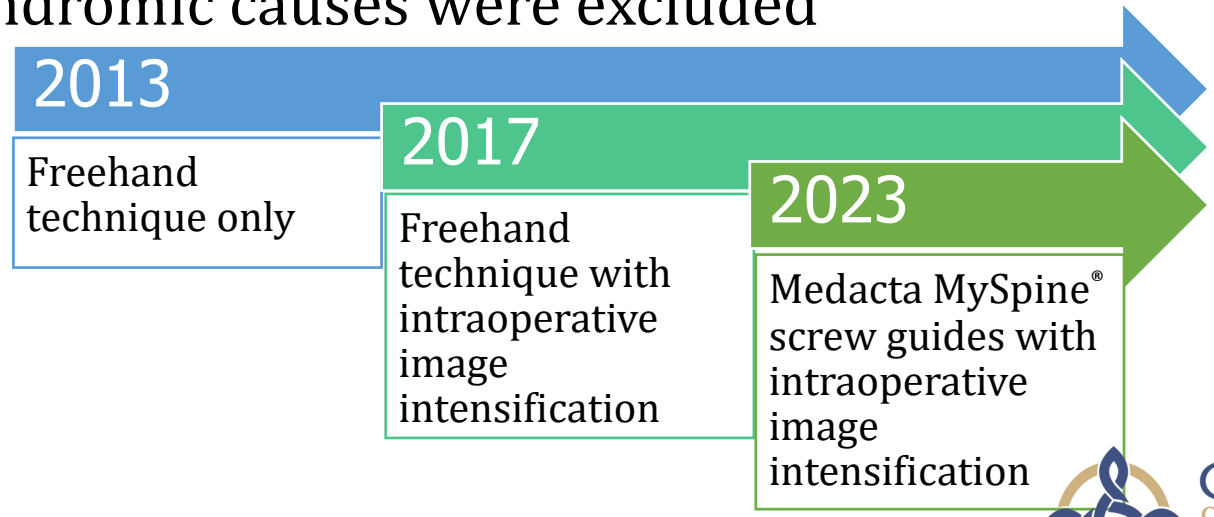
1. To determine rates of screw malplacement in adolescent idiopathic scoliosis patients

2. To determine the difference in the number of malplaced screws identifiable on postoperative XR compared to CT

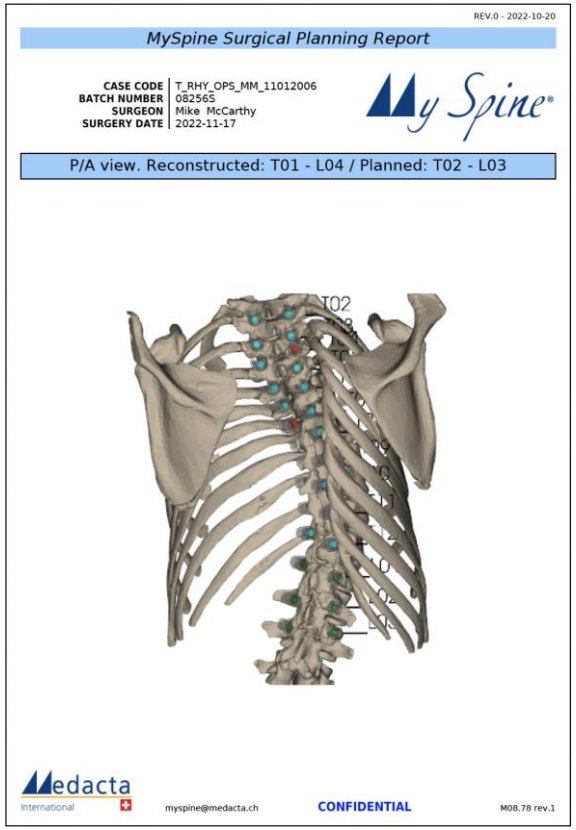
3. To identify the number of patients that underwent revision surgery

METHOD

- Complete list of operations carried out between January 2013 and December 2023 obtained from the Bluespier database
- Inclusion criteria: Children between the ages of 10 and 18 that underwent primary instrumented fusion to treat idiopathic scoliosis
  - Neuromuscular, congenital and syndromic causes were excluded
- Radiological imaging stored on the Synapse database interpreted



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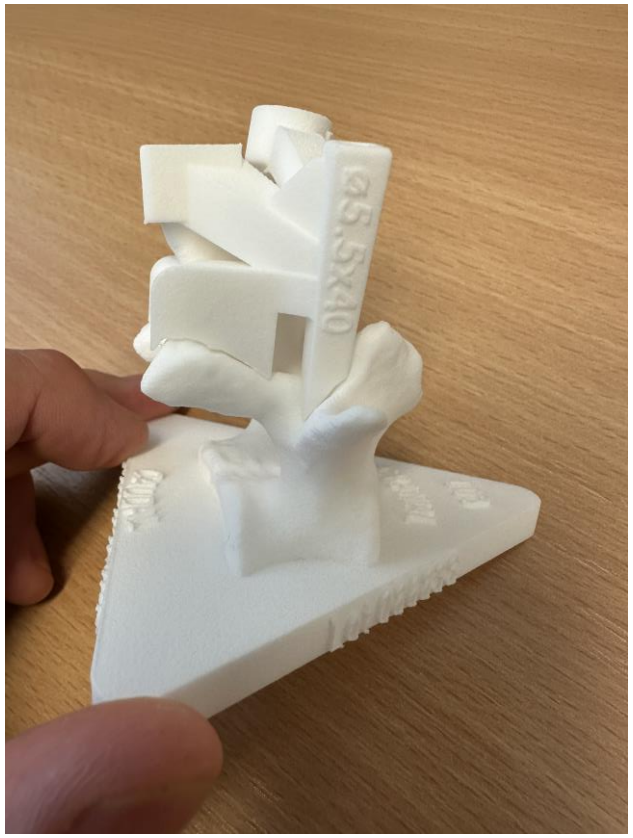

REV.0 - 2022-10-20

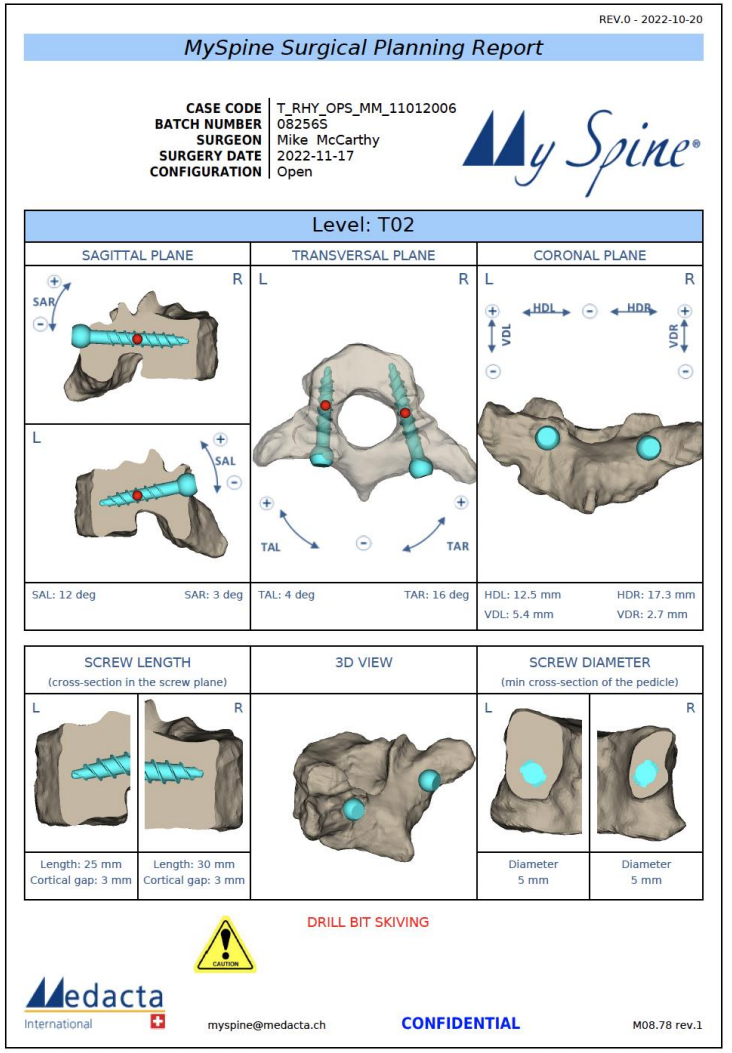
MySpine Surgical Planning Report

CASE CODE	T_RHY_OPS_MM_11012006
BATCH NUMBER	08256S
SURGEON	Mike McCarthy
SURGERY DATE	2022-11-17

P/A view. Reconstructed: T01 - L04 / Planned: T02 - L03

Medacta International myspine@medacta.ch **CONFIDENTIAL** M08.78 rev.1




REV.0 - 2022-10-20

MySpine Surgical Planning Report

CASE CODE	T_RHY_OPS_MM_11012006
BATCH NUMBER	08256S
SURGEON	Mike McCarthy
SURGERY DATE	2022-11-17
CONFIGURATION	Open

Level: T02

SAGITTAL PLANE	TRANSVERSAL PLANE	CORONAL PLANE
SAL: 12 deg SAR: 3 deg	TAL: 4 deg TAR: 16 deg	HDL: 12.5 mm HDR: 17.3 mm VDL: 5.4 mm VDR: 2.7 mm

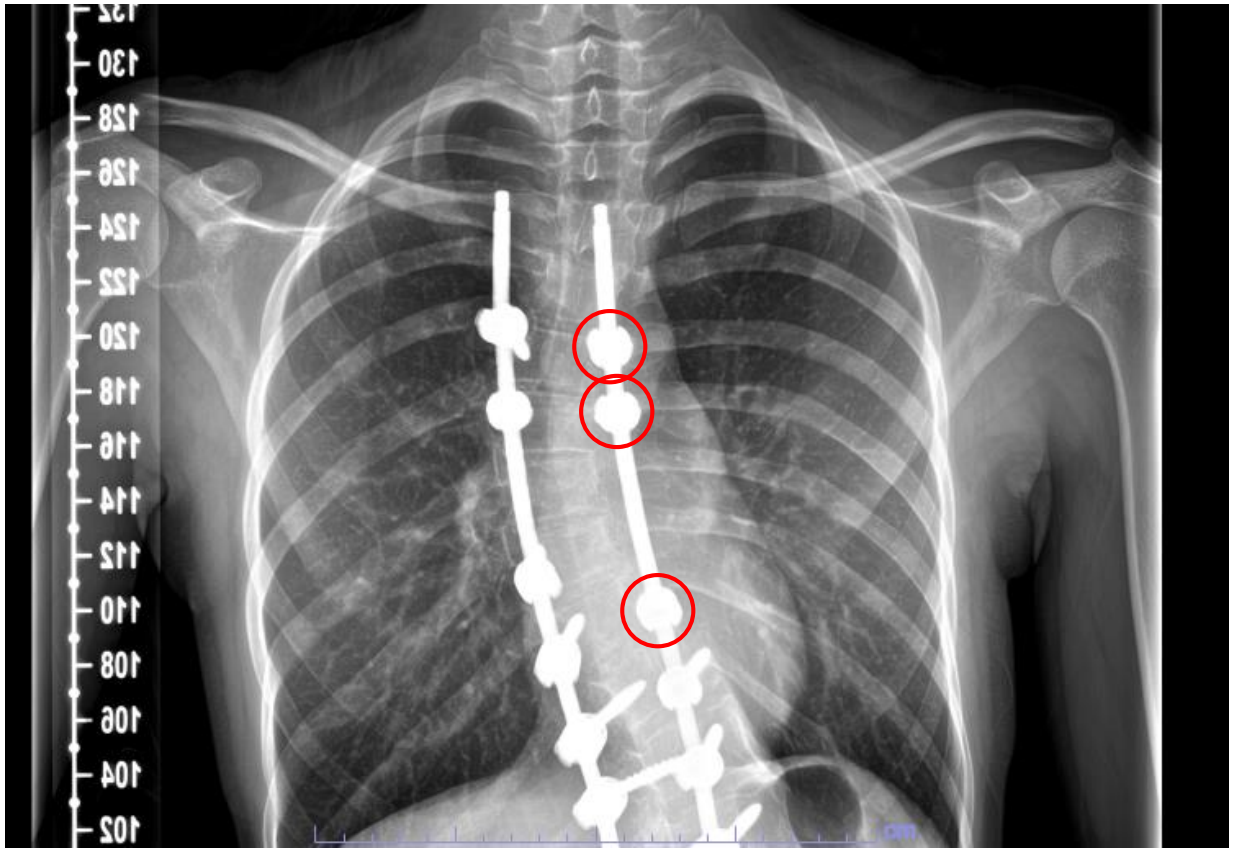
SCREW LENGTH (cross-section in the screw plane)		3D VIEW	SCREW DIAMETER (min cross-section of the pedicle)	
Length: 25 mm Cortical gap: 3 mm	Length: 30 mm Cortical gap: 3 mm		Diameter 5 mm	Diameter 5 mm

DRILL BIT SKIVING

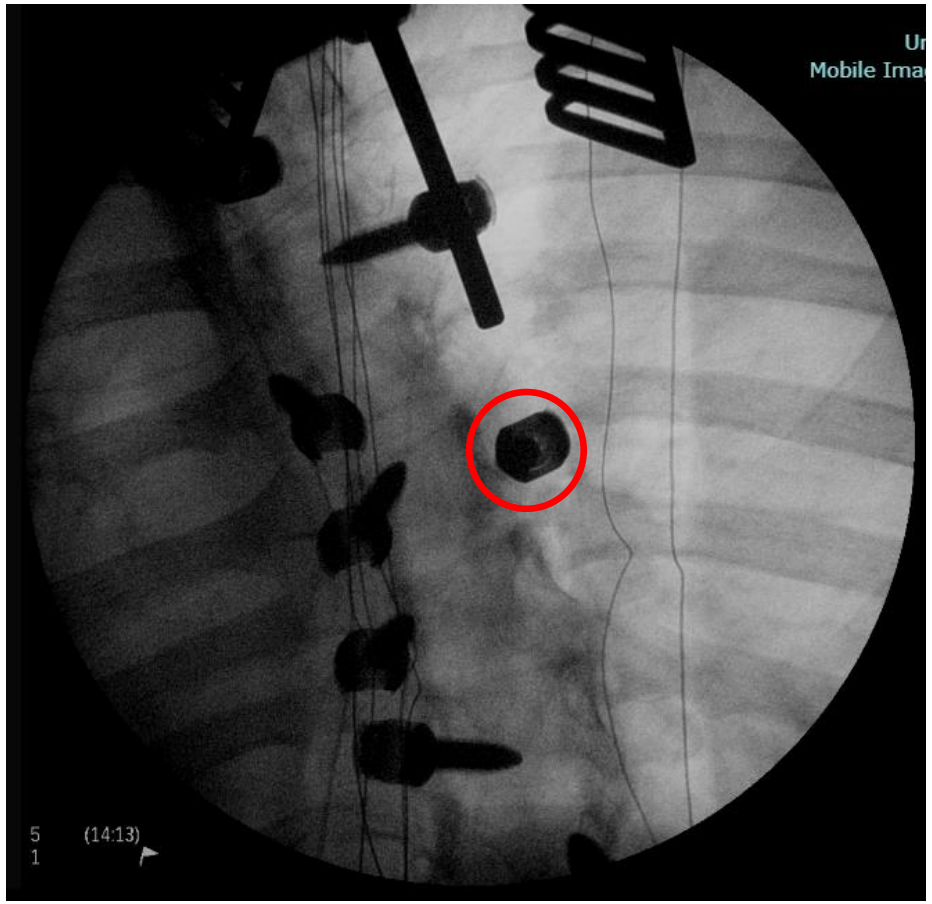
Medacta International myspine@medacta.ch **CONFIDENTIAL** M08.78 rev.1

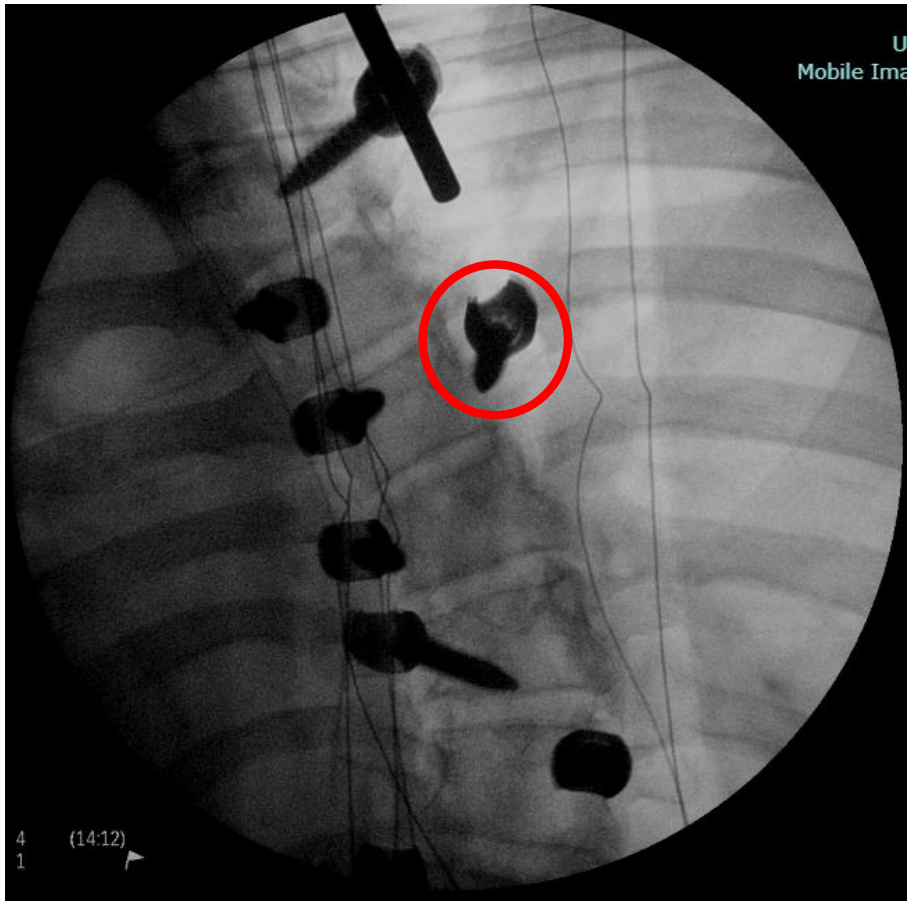
MALPLACED SCREWS IN DIFFERENT IMAGING MODALITIES





MALPLACED SCREWS IN DIFFERENT IMAGING MODALITIES





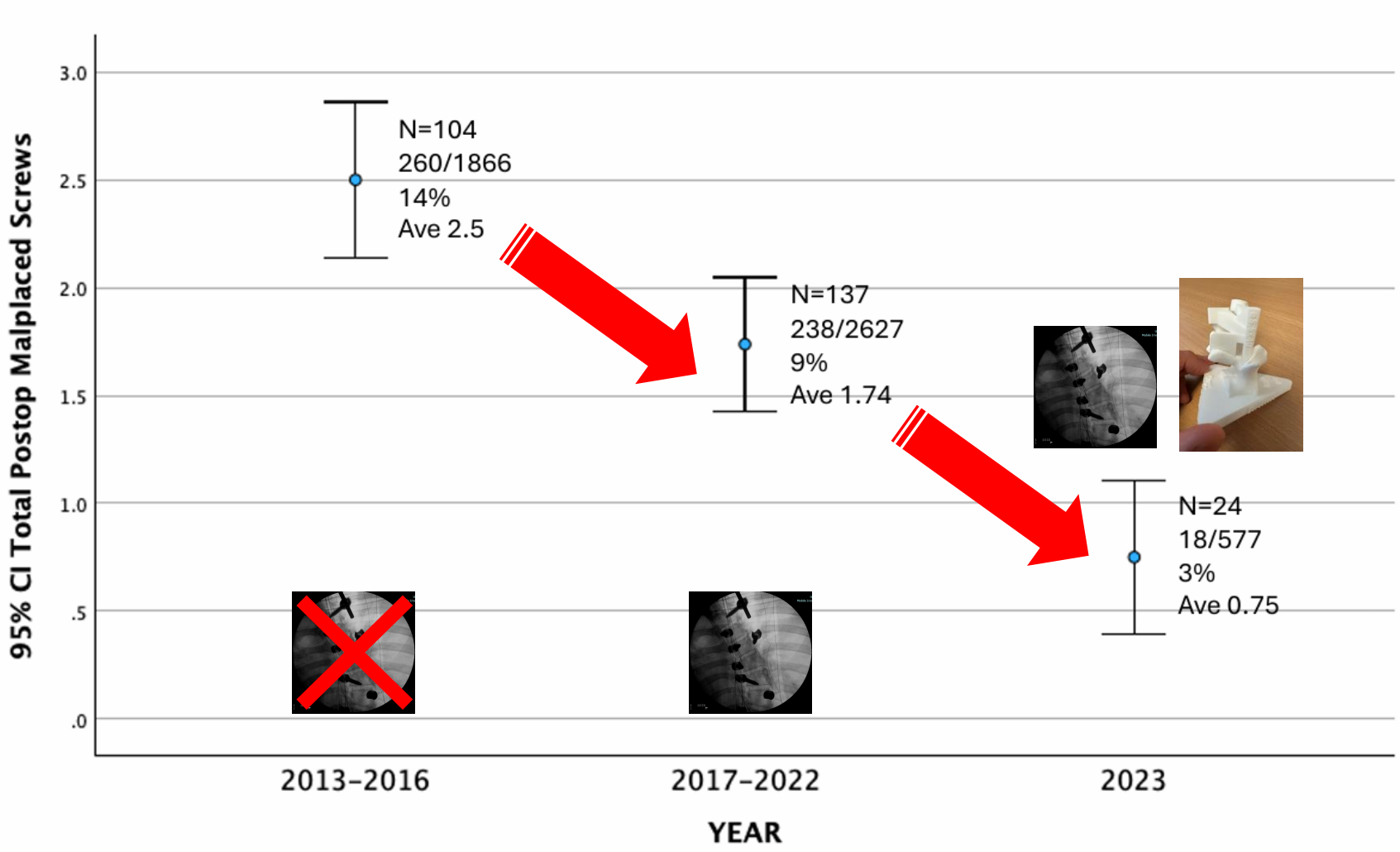
RESULTS

- 226 females and 39 males (N=265) included in the study

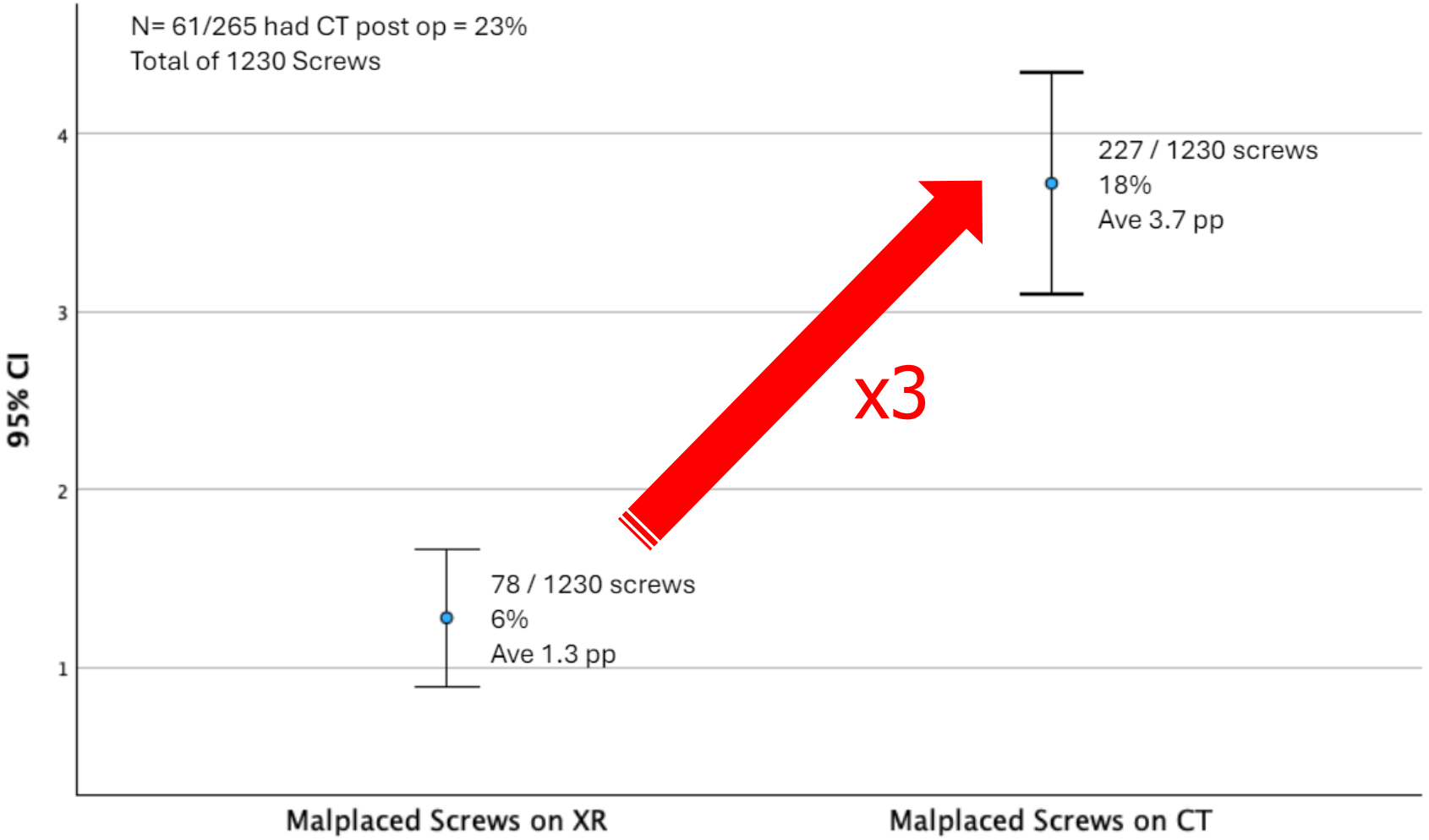
- 5070 screws placed
- Average of 19.13 (SD±3.98) screws placed per patient
- Between 11 and 29 screws placed per patient

- 516 (10%) screws malplaced
- Average 1.95 (SD±1.85) screws malplaced per patient
- Between 0 and 8 screws malplaced per patient
- 71% of patients had at least one malplaced screw

RATES OF SCREW MALPLACEMENT

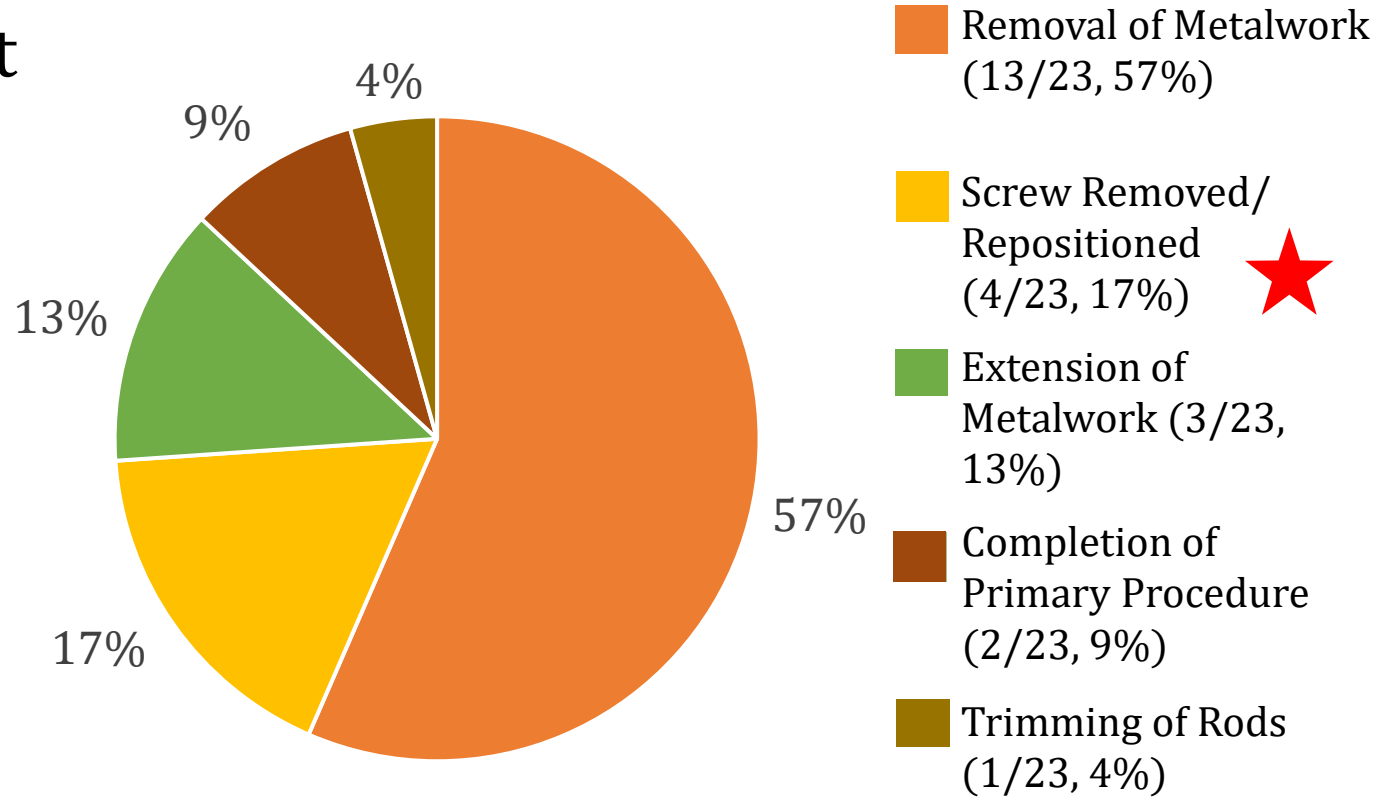


CT VS X-RAY


N= 61/265 had CT post op = 23%
Total of 1230 Screws
95% CI
4
3
2
1
227 / 1230 screws
18%
Ave 3.7 pp
x3
78 / 1230 screws
6%
Ave 1.3 pp
Malplaced Screws on XR
Malplaced Screws on CT

REVISION SURGERY

- 23 (9%) patients underwent revision surgery
- Average number of months from the date of primary surgery to revision was 27.2 months (SD±26.29)



CONCLUSIONS



- MySpine® guides combined with intraoperative image intensification provides the greatest reduction in screw malplacement

- Intraoperative image intensification alone provides a significant reduction in malplacement rate

- CT is a more accurate method of identifying malplaced screws postoperatively



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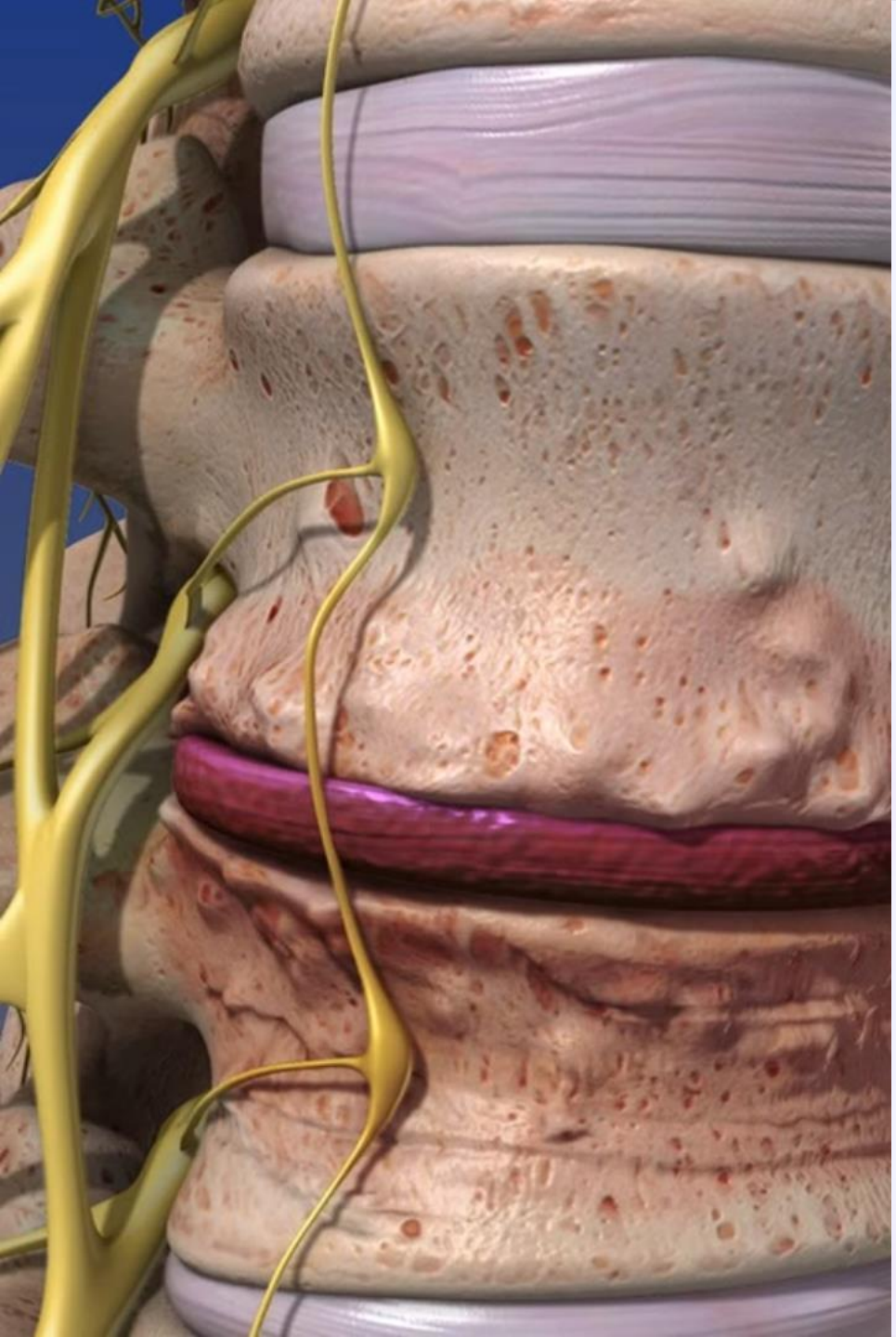
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An Investigative Analysis on the Impact of Antibiotic Duration on Outcomes in Primary Spinal Infections with Retained Metalwork: A 10-Year review

Agbo Pethiyagoda[1], Michael McCarthy[2], Taofeek Adeyemy[2]

[1]Cardiff University
[2]University Hospital of Wales

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"No conflict of interest to disclose"

Current Treatment

Presentation

•Relentless pain and present at rest.

•Muscle spasm may occur causing scoliosis or torticollis.

•Acute fever and pain

•Vague symptoms – chronic illness

•Neurological deficit

Diagnosis

History + Examination

MRI – to confirm location

Cultures – definitive diagnosis

Treatment

Treatment options include non-operative and operative approaches.

Non-operative-

Organism identified by cultures, aspirate or tissue biopsy

6-12 weeks of IV Abx

Bracing to support the spine to prevent deformity

Success rates – 75%

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Current Treatment

Operative – Indications for Surgery

Progressive Neurological impairment

Presence of a spinal abscess

Severe pain in presence of external immobilisation

Progressive spinal deformity

Gross instability

Failure of non-operative treatment

Surgery

Drain infection and debride all non-viable tissue

Stabilise spine with metalwork

What happens afterwards?

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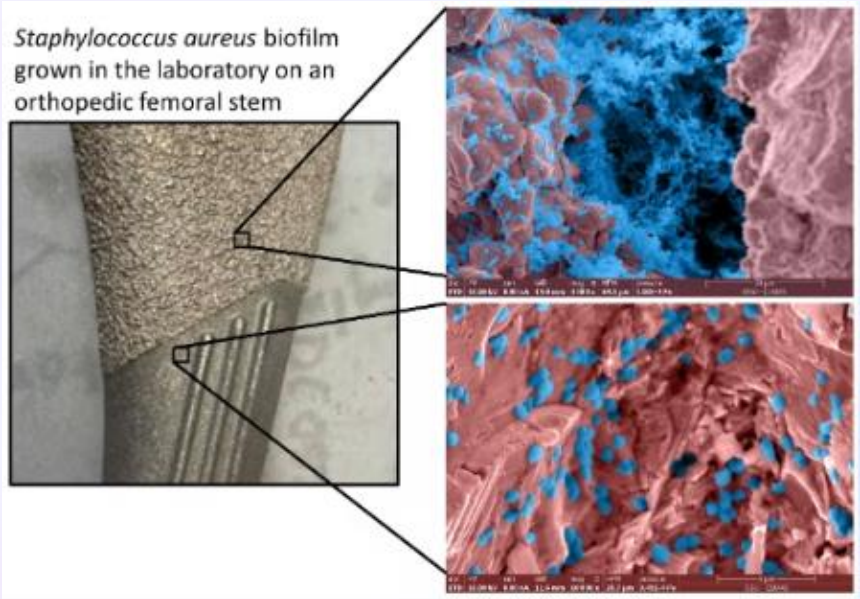
Current Literature on Metalwork

- Mostly on metalwork that has already been installed for other reasons (eg- scoliosis), rather than primary infec
- Mixture of studies that support both for and against the use of chronic Abx therapy

Biofilm – a microbial-derived immobile community characterised by cells embedded in a matrix of extracellular polymeric substances, which they produce.

“ Ch ronic Abx therapy cannot eradicate biofilms, but may suppress symptoms”

“ Bu t, where do we draw the line?”



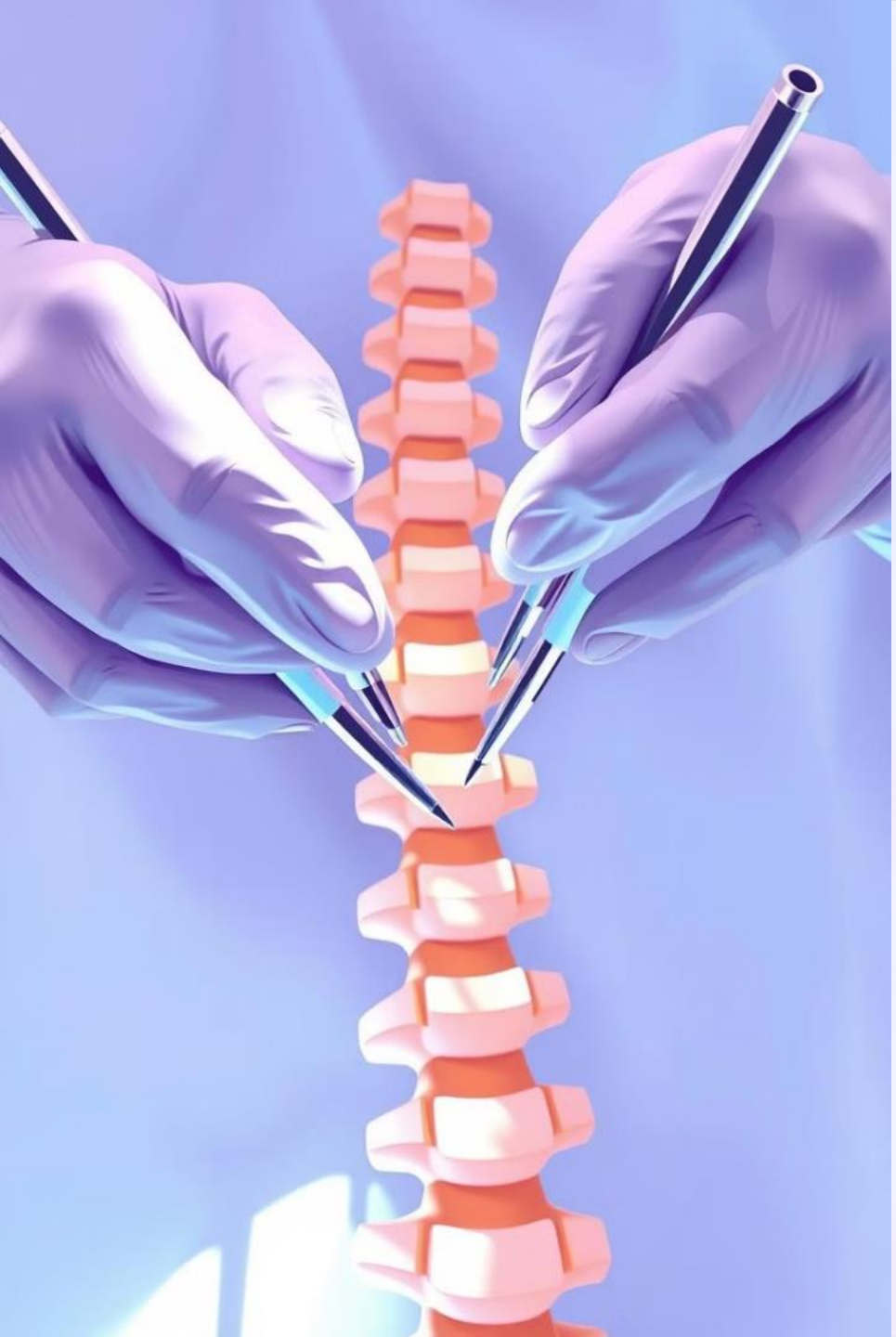
Within a biofilm, pathogens become irreversibly attached to the substratum and/or each other.

Age of biofilm influences susceptibility to Abx

Pathogens protected against Abx and Immune response

Identification of causative infectious organism difficult

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Methods

1 Study Design

A retrospective cohort study analyzing 52 patients over ten years.

2 Patient Selection

Inclusion criteria: Patients who underwent primary spinal infection surgeries.

3 Data Collection

Patient demographics: Age, sex.

Clinical data: Type and location of infection, comorbidities, duration of infection, surgical details, blood loss, and hospital stay.

Treatment details: Types of hardware inserted, duration of antibiotics, organisms identified, and their antibiotic sensitivities.

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Results

Variable		(n=52)
Mean Age		61 years
Sex	Male Female	31 (60%) 21 (40%)
Location	Cervical Thoracic Lumbar Sacral	19 (37%) 19 (37%) 11 (21%) 4 (7.7%)
Infection type	Discitis Vertebral Osteomyelitis Epidural Abscess Paraspinal Abscess	22 (42%) 7 (13%) 26 (50%) 7 (13%)
Infection time	Acute Chronic	45 (87%) 7 (13%)
Indication for Surgery	Deformity Neural Compression*	6 (12%) 46 (88%)
Microbiology	Most Common Identified Organism - Staph. Aureus	15 (29%)
Antibiotic Duration	Acute (<12 weeks) Chronic (>12 weeks)	30 (58%) 1 (0.02%)

Patients with metalwork removal = 0

Mean Post Op. Abx therapy = 8.4 weeks

Revision surgery = 7 patients (13%)

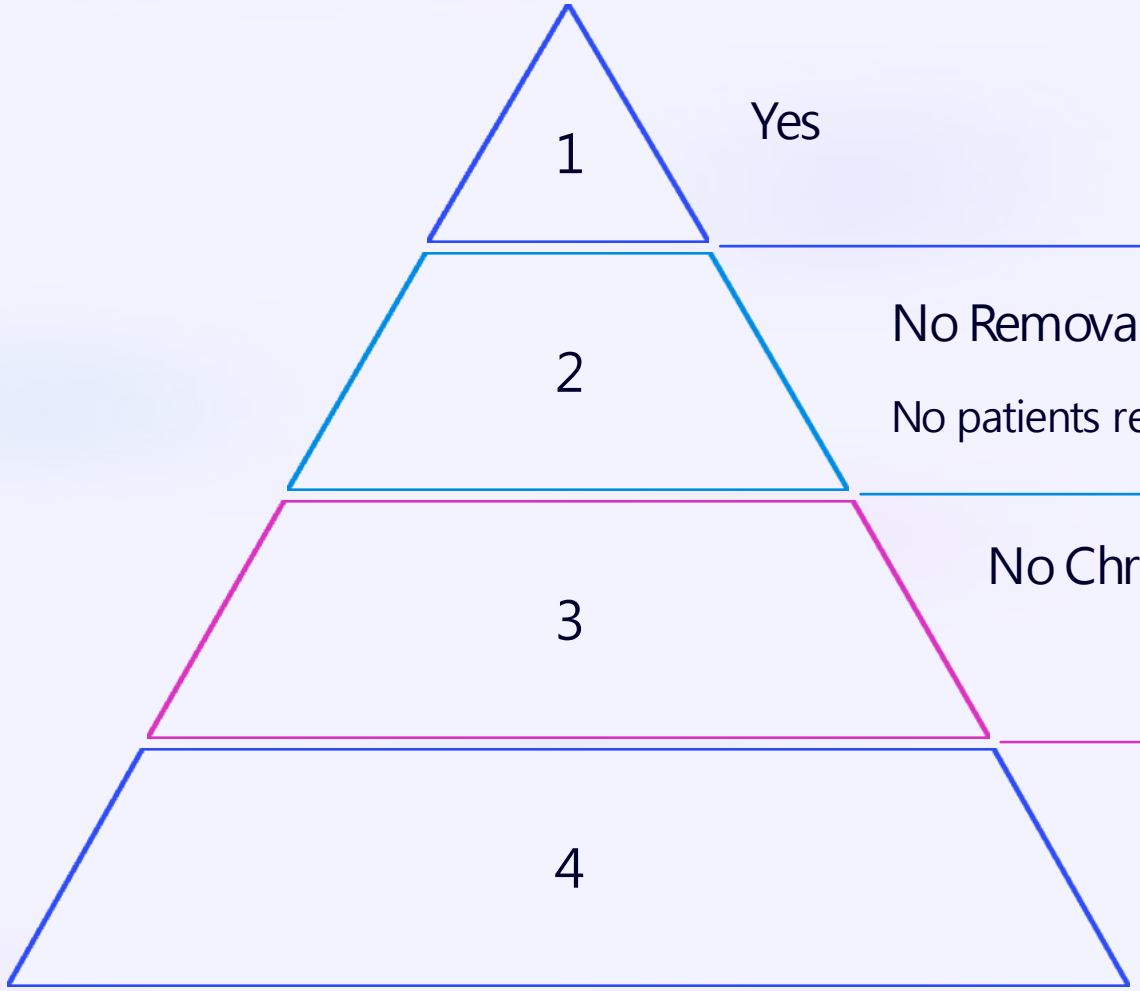
- For minor re-infections

No adverse long-term outcomes were reported (minimum follow-up was 2 years)

*Most commonly pain, along with changes to sensation/function

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Can Metalwork be Retained in Primary Infections without Chronic Antibiotic Therapy?



Yes

No Removal

No patients required metalwork removal.

No Chronic Abx

But based off literature review, 6 months would be ideal.

This may help reduce the minor re-infections we saw in our cohort.

Structural Support

Metalwork provides necessary structural support.

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2.Berbari EF, Kanj SS, Kowalski TJ, et al. 2015 Infectious Diseases Society of America (IDSA) clinical practice guidelines for the diagnosis and treatment of native vertebral osteomyelitis in adults. *Clin Infect Dis*. 2015;61(6):e26-e46. doi:10.1093/cid/civ482

3.Park KH, Cho OH, Lee YM, et al. Optimal duration of antibiotic therapy in patients with hematogenous vertebral osteomyelitis at low risk and high risk of recurrence. *Spine J*. 2016;16(7):859-865. doi:10.1016/j.spinee.2016.03.010

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Dr Andre Chou[1] Dr Sarah Patrick[1], Miss Kanwal Cheema[1], Mr Morgan Bayley[2]

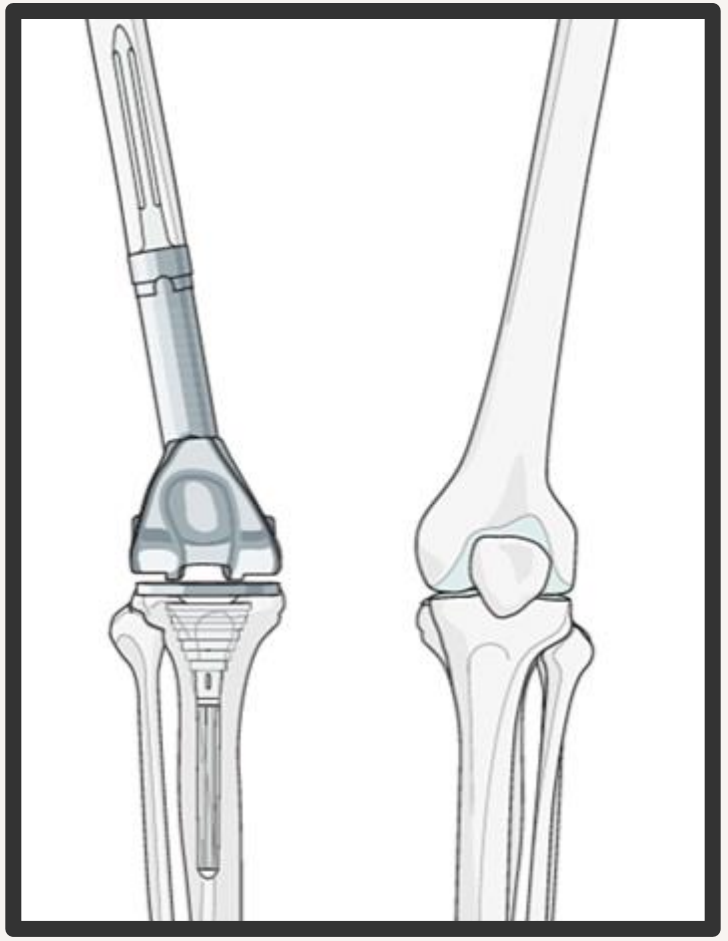
[1]*Grange University Hospital, Cwmbran*
[2]*Morriston Hospital, Swansea*

Distal Femoral Fractures in the elderly: Fix or replace?

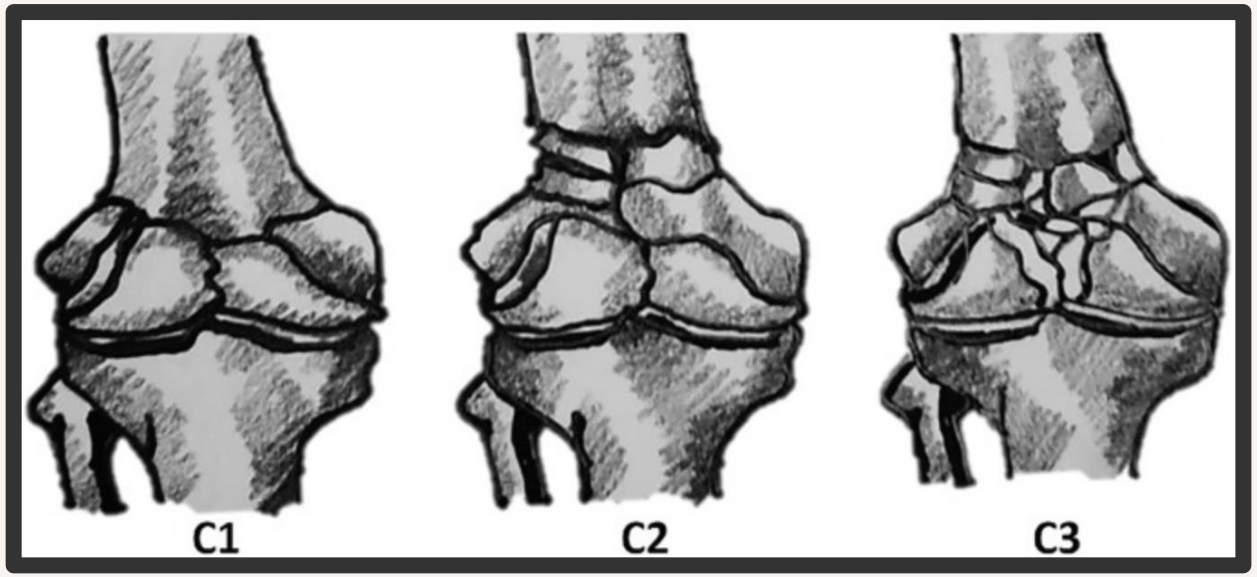
PREMISE

- Increasing incidence
- High mortality
- ORIF vs DFR
- NWB vs FWB

- Swansea Bay and Aneurin Bevan



METHODS



Retrospective

Electronic health records

December 1st 2020
November 30th 2022

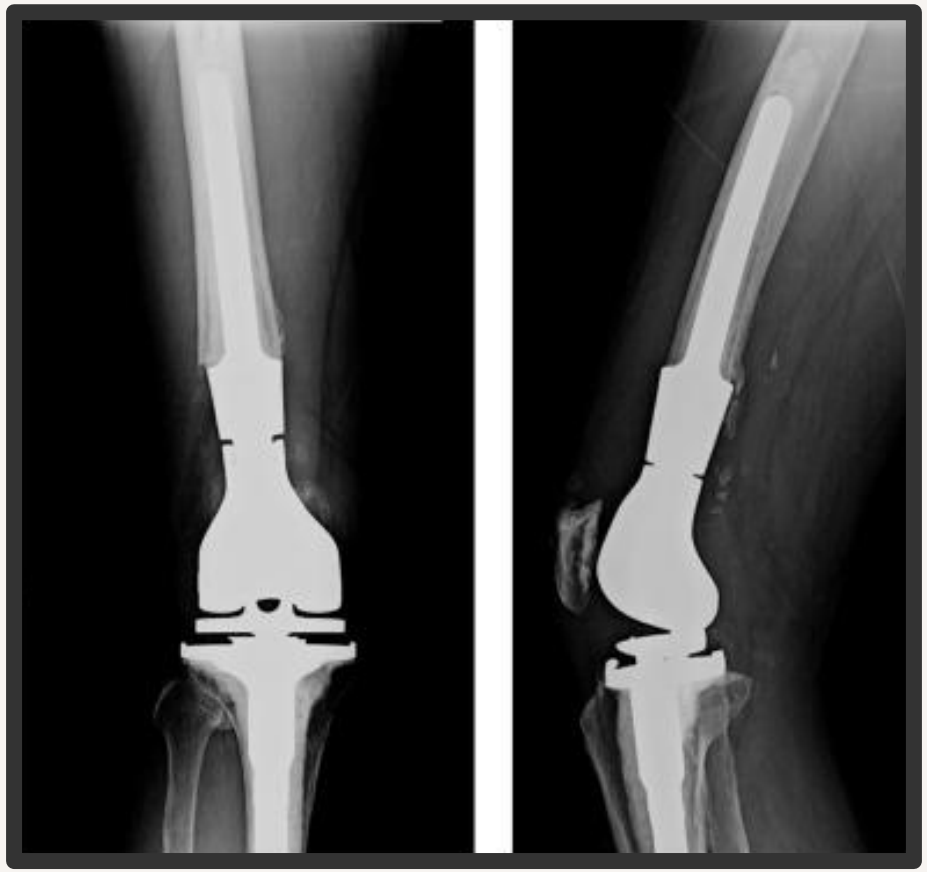
Inclusion	Exclusion
AO 33-C1	Open
A0 33-C2	Bilateral
A0 33-C3	Periprosthetic

RESULTS

		DFR	ORIF
	n	17	50
**	mean age	85 (63-98)	76 (52-94)
	sex (M:F)	4:13	6:44
	side (L:R)	7:10	21:29
	Nottingham	7.9%	7.2%

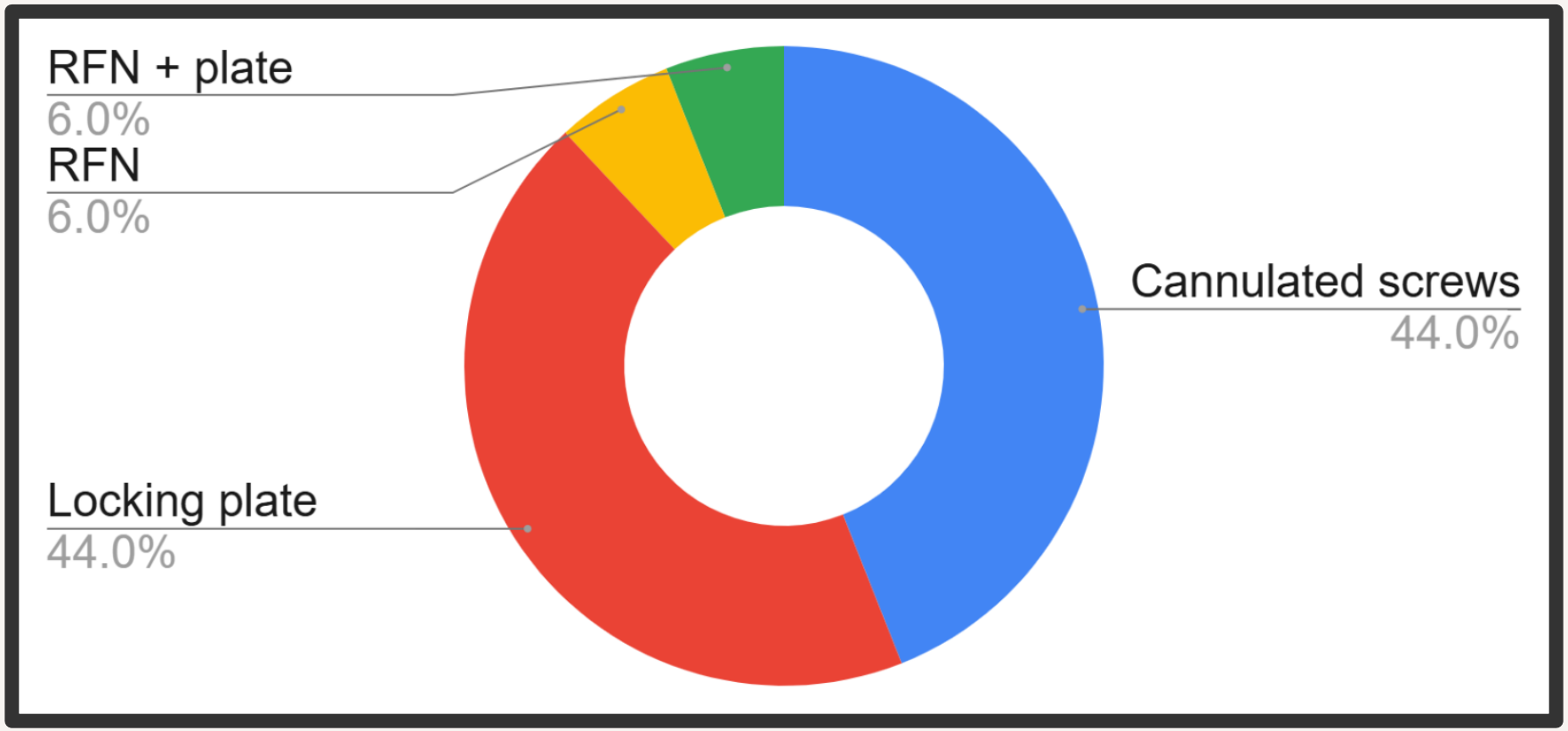
RESULTS

DFR

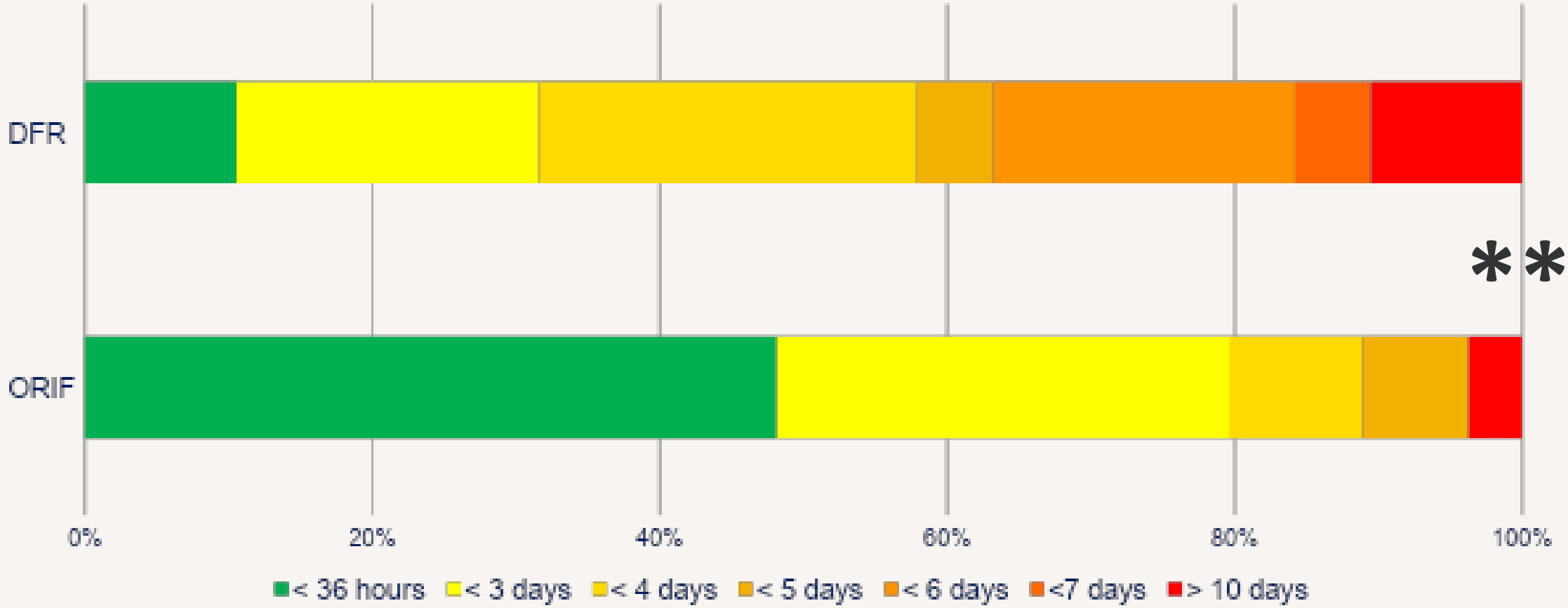


RESULTS

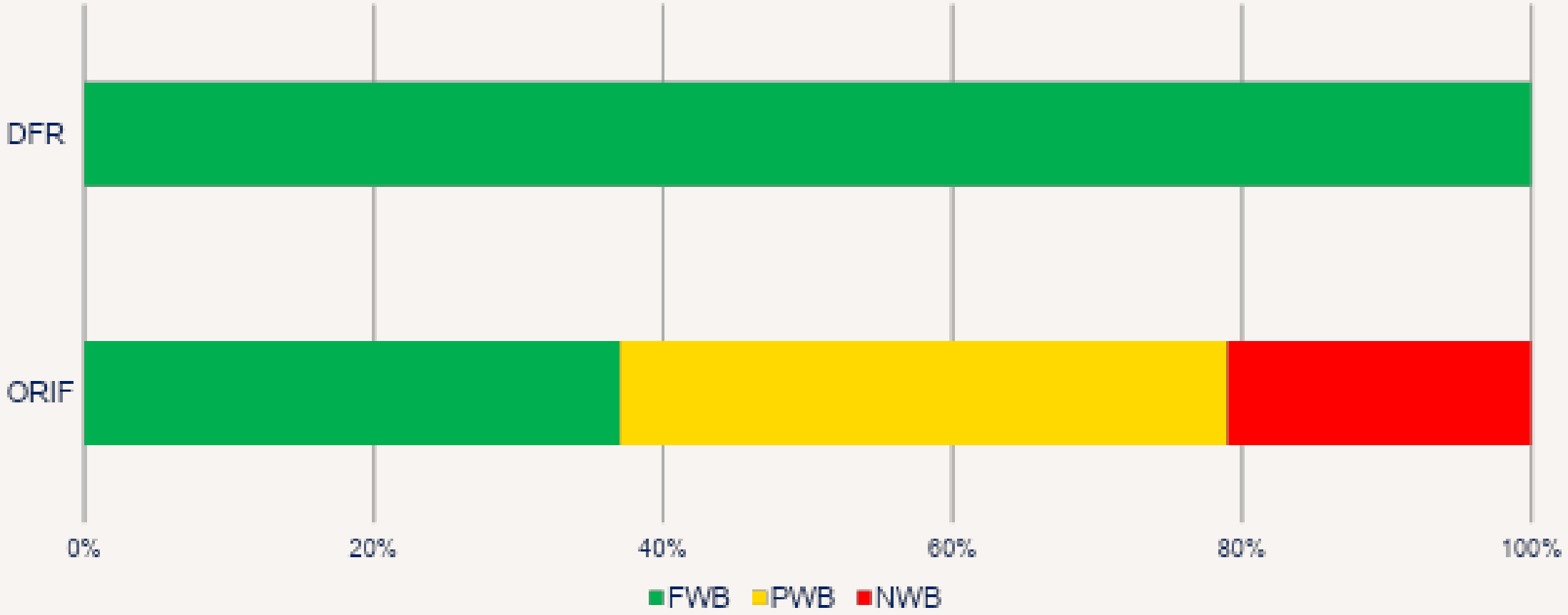
ORIF



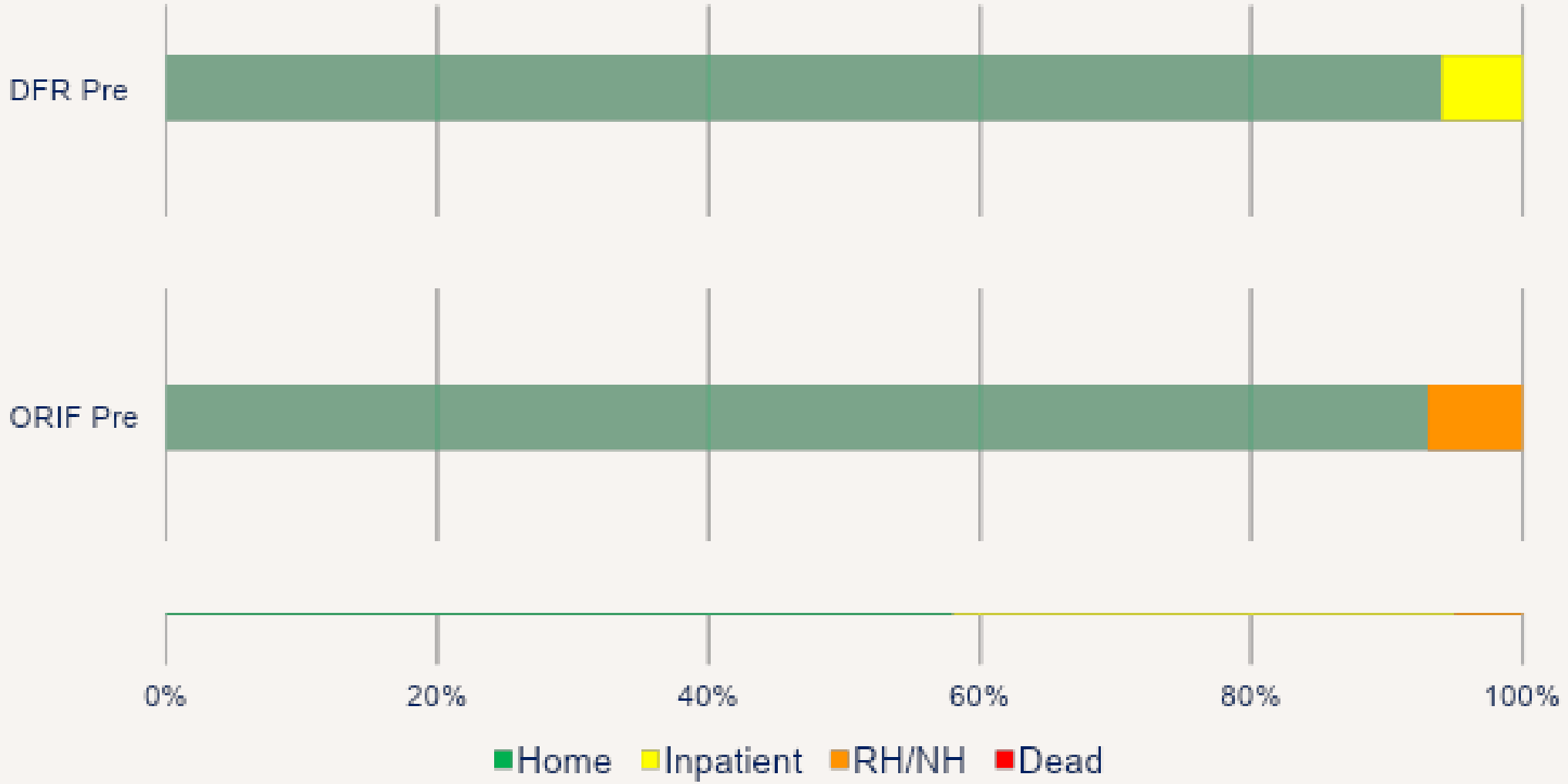
RESULTS - TIME TO SURGERY



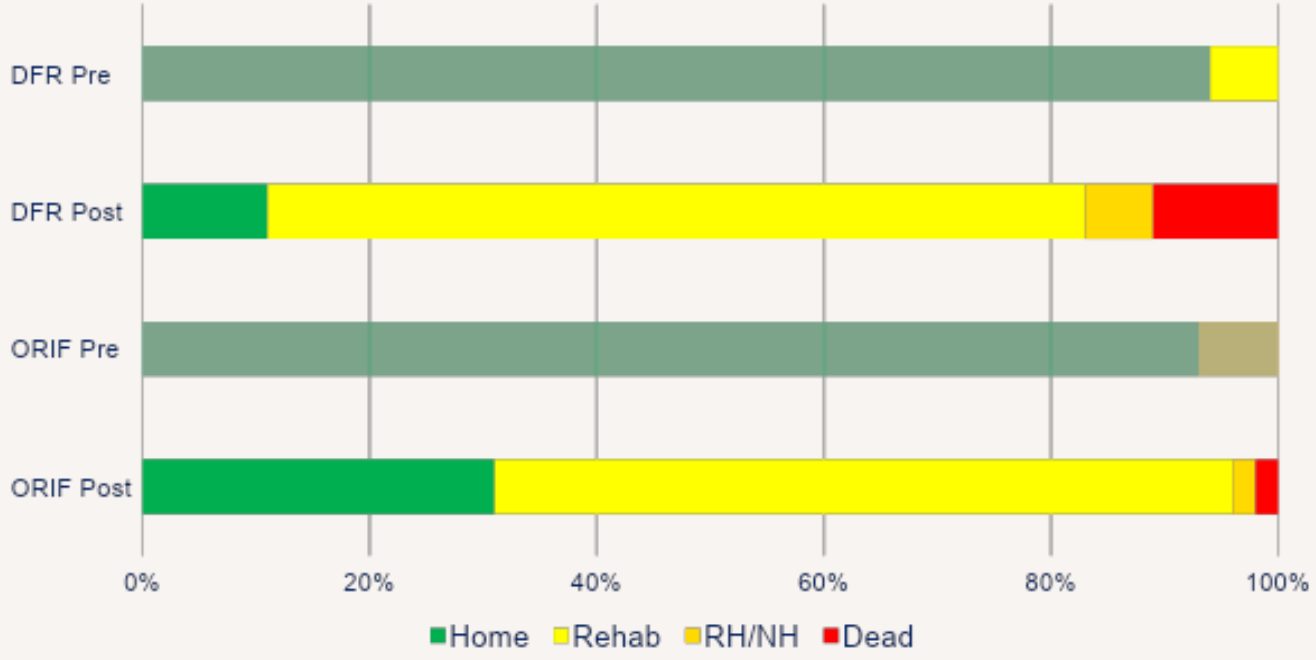
RESULTS - WEIGHT BEARING STATUS



RESULTS - ADMISSION SOURCE

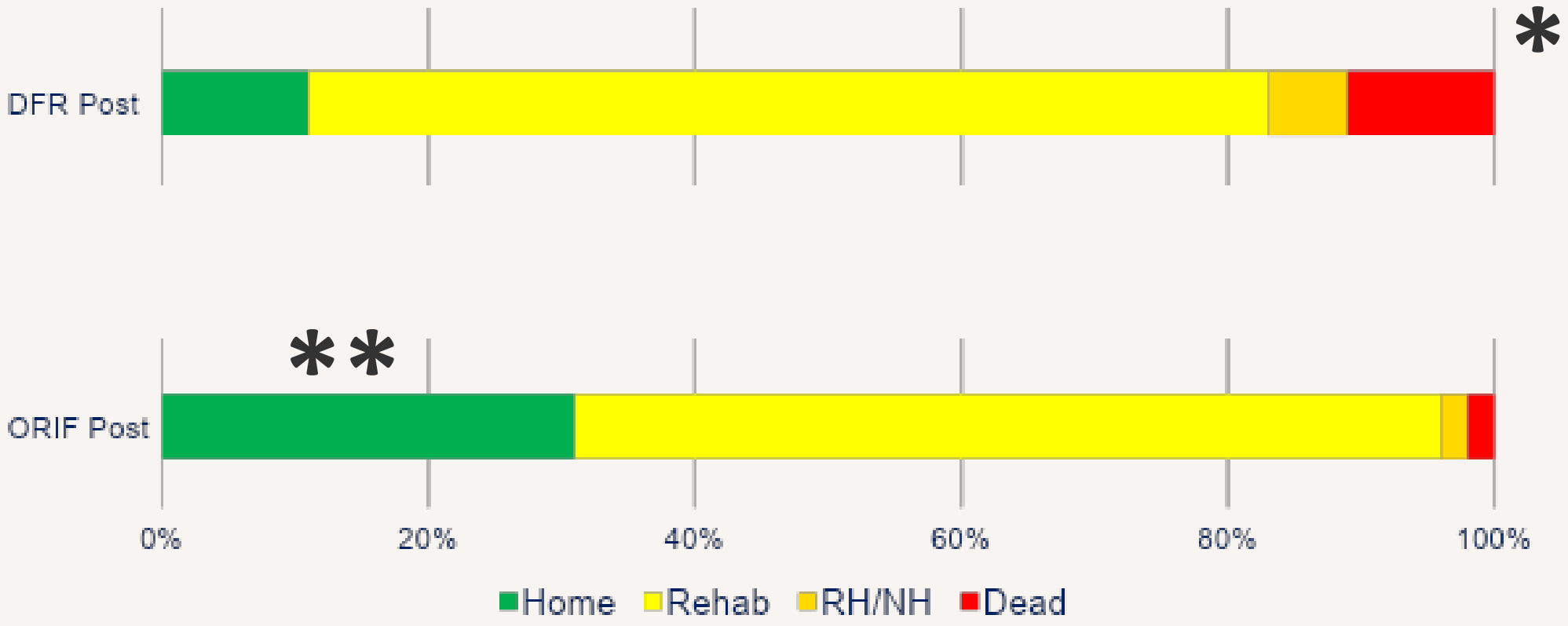


RESULTS - LENGTH OF STAY

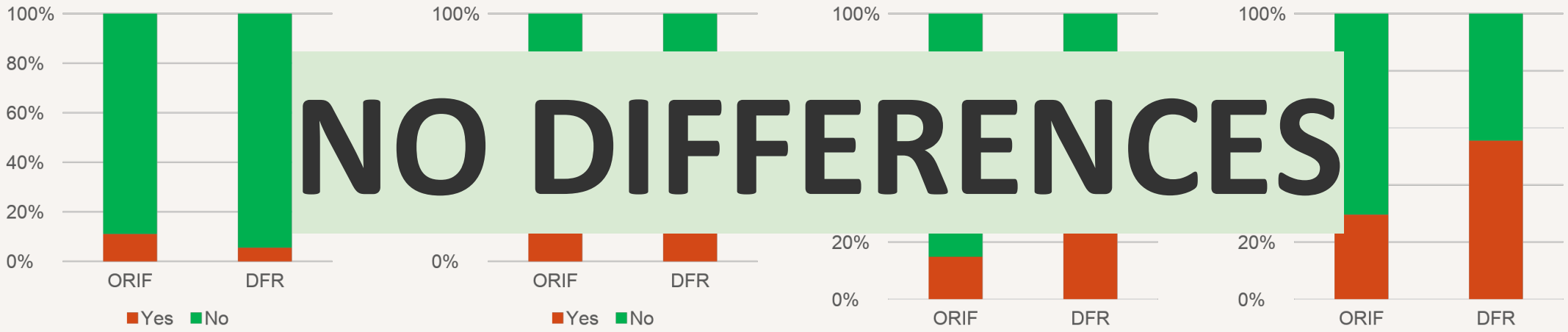


		DFR	ORIF
**	LOS	29.1	13.2

RESULTS - DISCHARGE DESTINATION



RESULTS - OTHERS



NO DIFFERENCES

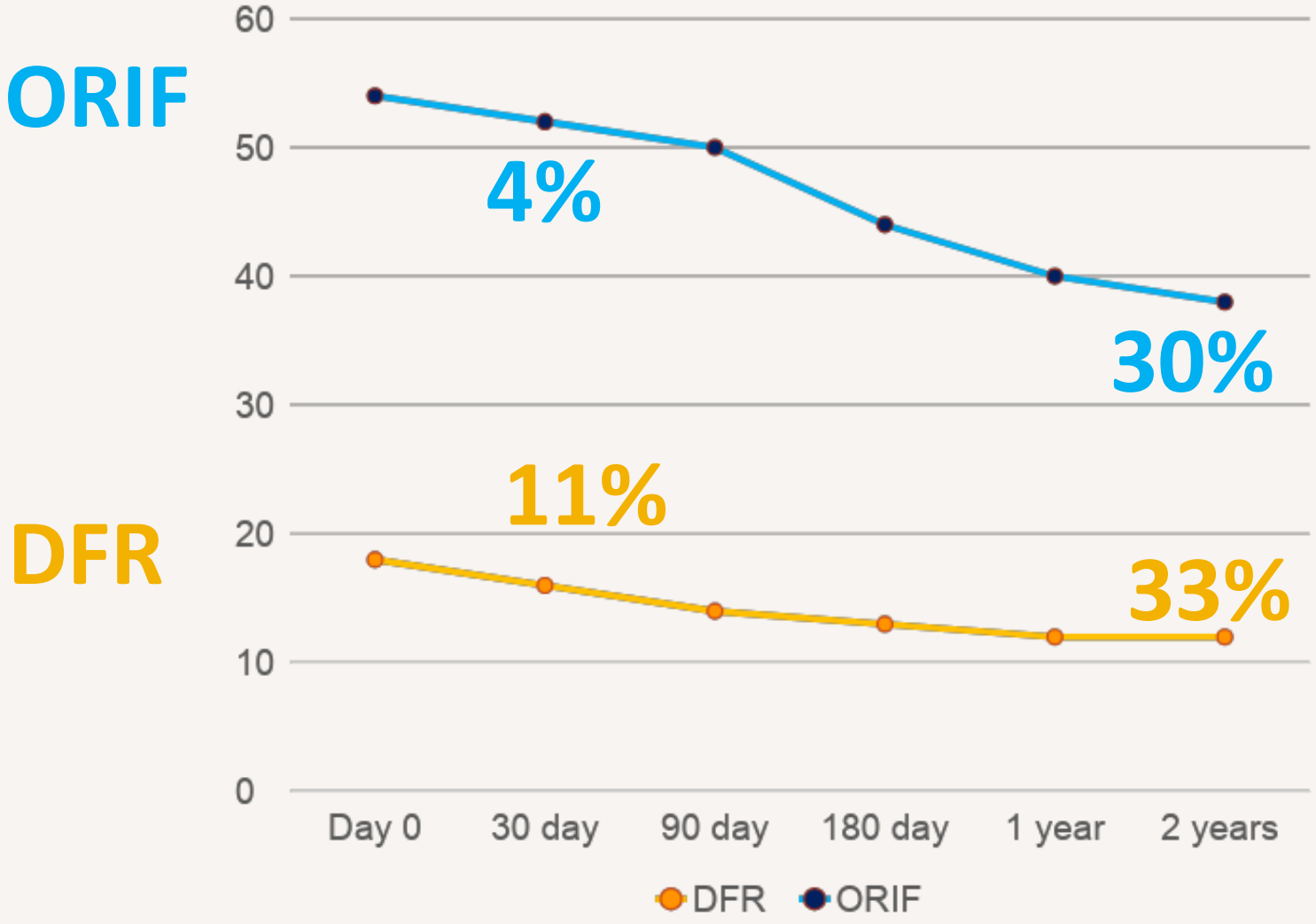
Further surgery

Post op transfusion

Post op delirium

Physio <24h

RESULTS - MORTALITY



NHFD 7% 30-day mortality in hips[1]

18-30% mortality at 1 year - distal femur studies[2]

CONCLUSIONS

- Distal Femoral Replacements:
  - Longer wait for surgery (NHFD data[3])
  - Longer length of stay
  - BUT more likely for FWB post surgery
- Small sample size

REFERENCES

1. Royal College of Physicians. Improving understanding: the National Hip Fracture Database report on 2021. London: RCP, 2022.
2. Mubark I, Abouelela A, Genena A, Al Ghunimat A, Sarhan I, Ashwood N. Mortality Following Distal Femur Fractures Versus Proximal Femur Fractures in Elderly Population: The Impact of Best Practice Tariff. Cureus. 2020 Sep 30;12(9):e10744. doi: 10.7759/cureus.10744. PMID: 33150119; PMCID: PMC7603877.
3. National Hip Fracture Database Charts. https://www.nhfd.co.uk/20/NHFDCharts.nsf/vwcharts/Mortality?open Accessed on 21/11/2023.

Diolch yn fawr

Welsh Orthopaedic Society Annual Meeting 2025

Podium Presentation Session 4: Spine and Trauma

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HOSPITAL INNOVATIONS
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Prospective study of surgical site infections in neck of femur fractures in Morriston Hospital; a 6 year analysis from 2019-2024

Francesca Solari
ST5
University Hospital Wales

Introduction



Methods

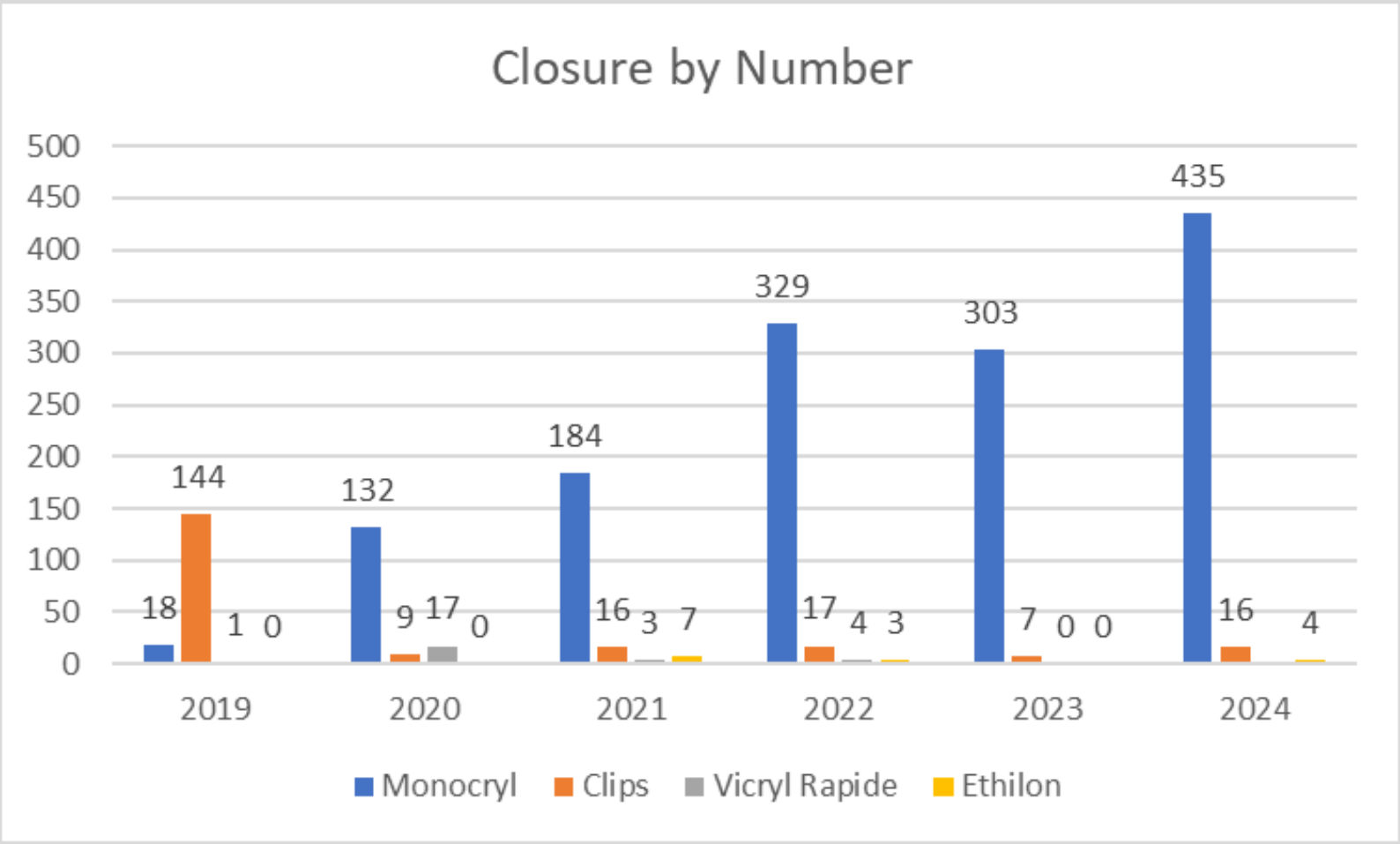
- Prospective cohort study 2019-2024
- All surgically treated neck of femur fractures in Morriston Hospital
- Data collected on
  - Operation type
  - Wound closure
  - AMT
  - Grade of surgeon
  - ASA
  - Time to theatre
  - Operative time
- Statistical analysis
  - Univariate Chi Square and Mann Witney U
  - Multivariate logistic regression analysis

Results

- 1737 patients included over a 6yr period
- 74 developed an SSI (4.3%)

	2019	2020	2021	2022	2023	2024
Number of Neck of Femur Fractures	159	159	288	354	311	466
Infections	15	7	12	15	17	9
(%)	(9.43)	(4.40)	(4.16)	(4.24)	(5.47)	(1.93)
Clips	141	9	29	22	8	27
(%)	(88.3)	(5.6)	(10.0)	(6.3)	(2.6)	(5.8)
Monocryl	18	133	249	329	303	435
(%)	(11.3)	(83.7)	(86.5)	(92.9)	(97.4)	(93.3)
Other	1	17	10	3	0	4
(%)	(0.6)	(10.7)	(3.5)	(0.8)	(0)	(0.9)

Results


Closure by Number
500
450
400
350
300
250
200
150
100
50
0
18
144
1
0
132
9
17
0
184
16
3
7
329
17
4
3
303
7
0
0
435
16
4
2019
2020
2021
2022
2023
2024
Monocryl
Clips
Vicryl Rapide
Ethilon

Results

Univariate analysis

- Closure significant at p 0.022
- Time to theatre p <0.001
- Operative time p <0.001

Results

Univariate analysis

- Closure significant at p 0.022
- Time to theatre p <0.001
- Operative time p <0.001

Multivariate analysis: Log regression

- Operation duration p 0.029 (OR 1.004)
- Operation type
  - Hemi p <0.0001 (OR 0.354)
  - Nail p <0.0001 (OR 0.276)
- AMT
  - AMT-0 p 0.011 (OR: 0.656), AMT-3 p 0.012 (OR: 0.466)
  - AMT-8 p < 0.0001 (OR: 0.381), AMT-9 p 0.023 (OR: 0.659)
- Non significant
  - Closure method
  - Time to theatre
  - Surgeon grade

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Conclusion

- SSI rate 4.3% across the 6 year period
- Univariate analysis:
  - closure, operative time and time to theatre were significant
- Multivariate analysis:
  - Operation type, operation duration and AMT were independent predictors of infection
- Observational
  - Use of clips fell from 88.3% to 5.8%
  - With a fall in infection from 9.43 to 1.93%
- Limitations
- Take home
  - SSI in NOF# is multifactorial - frailty, operation type and duration
  - Closure may be a factor
- Next steps
  - Continue this prospective audit in Morriston

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WORTH

Thankyou - Questions

A Prospective Analysis of Surgical Site Infections in the Neck of Femur Fractures in a Trauma Unit: A Six-Year Analysis From 2019 to 2024

Francesca Solari • Claire Joyner • Kumar Dash • Shady Hanna • Kelly Porter • Victoria Williams • Aso Mohammed

Published: May 05, 2025 **DOI:** 10.7759/cureus.83545

https://www.cureus.com/articles/364954-a-prospective-analysis-of-surgical-site-infections-in-the-neck-of-femur-fractures-in-a-trauma-unit-a-six-year-analysis-from-2019-to-2024#!/

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HOSPITAL INNOVATIONS
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Evaluation of the Repatriation Process Involving Major Trauma Patients

Ahmad Walid, Masroor Ahmed, Mayank Kumar, Matija Krkovic

Cambridge University Hospitals NHS Trust

Introduction

- Major Trauma Network came into existence in 2012 as a hub and spoke model with at least one MTC in every region for management of polytrauma patients requiring specialist care.
- Major Trauma Clinical Network specifies that “a patient should be repatriated to their respective trauma unit within 48 hours of acceptance by a consultant”.
- Repatriation is a daunting challenge for most MTCs.

Aim

- **This study aims to evaluate the compliance of getting patients repatriated from an MTC to their corresponding trauma unit within the specified timeframe.**

Reasons for this study

- Delay in repatriation is a double-edged sword affecting both trauma units and MTCs alike.
- It causes delay in stable complex trauma transfers to MTC awaiting beds. This delay increases surgical complexity and occasionally affects patient outcomes.
- Increased cost ~ £220/patient/day.
- Psychological burden on patients and their relatives.

Methodology

- Retrospective review between January 2022 and June 2024.

- **Inclusion Criteria** –

1. Addenbrookes is not their trauma unit.
2. Admitted under T&O as the primary team.
3. Deemed surgically fit for discharge with ongoing rehab needs.
4. Have a named accepting consultant in their respective trauma units.

Results

- Total patients reviewed (N) = 224.
- Only 68.7% (n=154) repatriated to their local trauma units.
- About 31% (n=70) were discharged directly to their usual place of residence as were deemed therapy fit for discharge awaiting rehab bed.
- Only 14% (n= 31) were repatriated in line with the MTCN specified time frame.
- Average delay of 6 days (144 hours) between acceptance and actual repatriation.

Recurring theme

- Lack of beds at the local trauma unit.
- Accepting wards closed due to isolation.
- Patient isolation due to MRSA/COVID.
- Delay in acceptance by local T&O team.

Way forward - Not so simple

- Referring consultant from the trauma unit is to be the default accepting consultant.
- Early escalation to bed managers across both sites.
- Need for dedicated rehabilitation centres.

Questions?

Thank you

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