AI Fracture Detection in Paediatrics

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A Systematic Review and Meta-Analysis

BACKGROUND

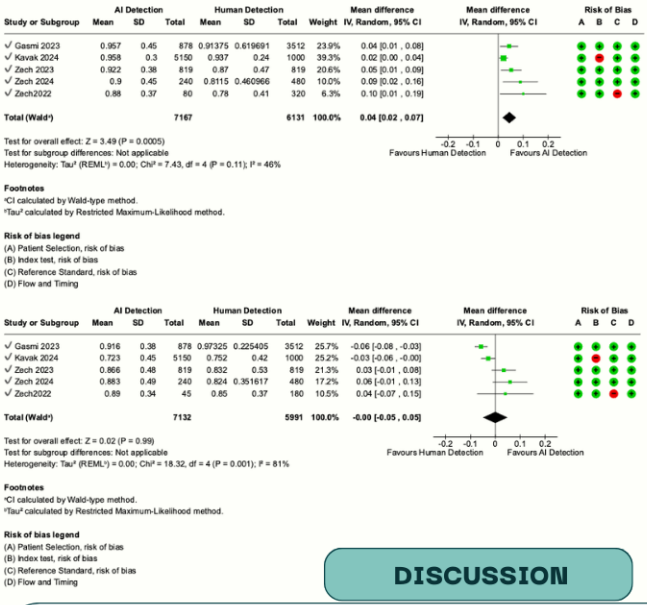
Paediatric fractures are a common cause of emergency department visits, yet their detection remains challenging due to subtle radiographic findings and variations in skeletal anatomy. Missed fractures can lead to delayed treatment and medicolegal consequences.
Artificial intelligence (AI) has emerged as a potential tool to enhance diagnostic accuracy and efficiency in paediatric fracture detection. This systematic review and meta-analysis evaluates the performance of AI algorithms in detecting paediatric fractures compared to human radiologists.

METHOD

This study was registered in PROSPERO (CRD42024619744) and conducted according to PRISMA guidelines. A comprehensive search of PubMed, EMBASE, and Web of Science was performed, focusing on studies published from January 2019 to December 2024.

Population: Paediatric patients (aged 0-21 years) undergoing radiographic imaging for suspected fractures.
Intervention: AI algorithms designed for the detection of fractures in paediatric radiographs.
Comparator: Human radiologist interpretations or standard diagnostic methods.
Outcomes:
Primary Outcome: Diagnostic accuracy (sensitivity, specificity, accuracy and AUC for AI vs Human interpretation)
Secondary Outcomes: Diagnostic accuracy (sensitivity, specificity, accuracy, area under the curve [AUC] for AI assisted interpretation,Time to diagnosis, False positive and false negative rates
Study Design: Randomized controlled trials (RCTs), prospective and retrospective cohort studies, Retrospective validation test or diagnostic accuracy studies

Literature review
A comprehensive search strategy was performed using the databases: PubMed, EMBASE and Web of Science. Inclusion criteria encompassed studies evaluating AI in detecting appendicular skeletal fractures in patients aged 0-21 years, comparing AI with human interpretations. Meta-analysis was performed using RevMan software, employing a random-effects model due to study heterogeneity. The primary outcomes included diagnostic accuracy (sensitivity, specificity, and area under the curve [AUC]) for AI and AI-assisted detection. Secondary ouâtcomes included time



RESULTS

- From 473 identified studies, 11 met the inclusion criteria. AI demonstrated high diagnostic performance, with sensitivity ranging from 88% to 96% and specificity varying from 63.7% to 97.1%.
- Meta-analysis showed a statistically significant increase in sensitivity for AI detection (mean difference: 0.04, p=0.0005), while specificity did not differ significantly from human interpretation.
- The specificity analysis from the meta-analysis indicated no mean difference between the two groups 0.00 [-0.05 , 0.05], (Test for overall effect: Z = 0.02 (P = 0.99)
- AI-assisted interpretation improved diagnostic accuracy for radiology residents, particularly in non-obvious fractures, and reduced interpretation time. However, false positive rates remained notable, highlighting the need for AI as an adjunct rather than a standalone diagnostic tool.

DISCUSSION

Meta-analysis shows a statistically significant higher sensitivity, with no significant difference in specificity for AI compared to human readers and both higher sensitivity and specificity for AI assisted interpretation.
Overall, these findings underscore the critical role of human expertise in radiograph interpretation
By integrating AI assistance, clinicians can benefit from increased sensitivity while maintaining high specificity.
AI performance varied by anatomical location and fracture type.
AI has demonstrated comparable diagnostic accuracy to human readers, with some studies showing that it can augment radiologists' performance.
However, the limited external validation of many AI models raises concerns about their generalizability to broader paediatric populations.`

CONCLUSION

Future research in the field of AI for paediatric fracture detection should prioritize the development of multicenter randomized controlled trials (RCTs) to evaluate AI performance across diverse clinical settings, enhancing the generalizability of findings.
Comparative studies involving multiple AI systems are essential to determine relative effectiveness and identify the most suitable tools for clinical use.
Additionally, the use of prospective data, coupled with the inclusion of clinical details such as patient history and physical examination findings, should be emphasized in training and validation processes to better replicate real-world scenarios.
Finally, exploring how AI can be seamlessly integrated into clinical workflows within paediatric emergency departments will be crucial for maximizing its utility and impact on patient care.

THE EFFECTS OF ANAESTHESIA ON CHILDREN UNDER 1 YEARS OF AGE UNDERGOING SURGERY FOR DEVELOPMENTAL DYSPLASIA OF THE HIP

Purpose:

Developmental dysplasia of the hip (DDH) affects 0.1% of newborns, with 30 children in Wales requiring corrective surgery each year. General anaesthetic has been linked to the induction of apoptosis, impaired neurogenesis and reactive oxygen species formation, which may cause complications in the developing brains of infants. Our aim was to determine whether there is a relationship between receiving general anaesthetic for DDH before 12 months of age and an increased risk of prolonged hospital stay.

Methods:

Retrospective data was collected between 2013-2024 from 77 patients under 12 months, who had surgery for DDH. Additional days in the hospital were used as a proxy for postoperative complications and analysed against anaesthetic duration, age at the time of surgery, sex and the operative approach. A multivariate regression was performed and a p-value of <0.05, was deemed statistically significant.

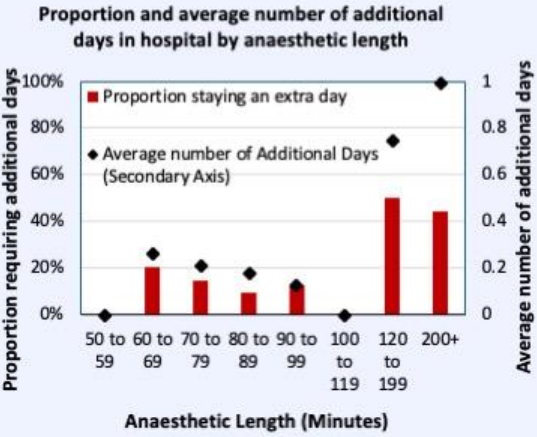
Results:

The anaesthetic duration had a positive relationship with the number of additional days spent in the hospital (p-value 0.0316). Age at the time of surgery also had a significantly positive relationship with the duration of hospital stay (p<0.05), however, no statistically significant relationship was proven when comparing sex, the operative approach of closed or open reduction and the patient requirement of unilateral/bilateral reductions.

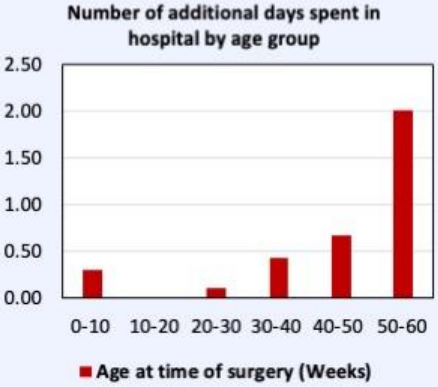
Age group	Average number of additional days in hospital
0-3 months	0.20
3-6 months	0.00
6-9 months	0.31
9-12 months	0.93

Age bracket (months)	Intervention	Median anaesthetic length	Average length of additional days in hospital
0-3	CR = 8	83.25	0.25
3-6	CR = 17	75.00	0.00
6-9	CR = 16	89.44	0.31
	OR = 10	175.40	0.30
	OR + A = 1	65.00	0.00
9-12	CR =7	82.00	0.14
	OR = 7	191.29	1.57

Those in the 0-3- and 3-6-month age categories had the lowest average additional length of hospital stay, with those in the 3–6-month age bracket also having the lowest median anaesthetic duration at 75 minutes. When looking at those in the 9–12-month age bracket, the average anaesthetic length was 2.33 times greater, whilst their length of hospital stays increased by a multiple of 11.2 for those undergoing an open reduction compared with a closed reduction.



This graph shows both the proportion of patients requiring additional days and the average number of additional days being considerably higher for those receiving more than 120 minutes of anaesthetic. The longer the anaesthetic duration and the older they are at the time of surgery considerably increases the likelihood of increased hospital stay in a way that is statistically significant.



Age in weeks at the time of surgery had a statistically positive relationship with the number of additional days spent in the hospital. Suggesting it is more likely that complications arise when performing the surgery on older children.

Conclusions:

This study has shown a positive relationship between the duration of anaesthetic and the likelihood of a prolonged hospital stay for those under 12 months requiring surgical intervention for DDH. There is also an increased risk of a prolonged unplanned hospital stay for those aged >9 months.

Acknowledgements: I would like to thank Miss Clare Carpenter for her ongoing support with this project.

Sarah Dalby, Year 5 Medicine, Cardiff University, 2025

CUMULATIVE EFFECTS OF A 9 MONTH JUMPING INTERVENTION ON BONE HEALTH OUTCOMES IN ADOLESCENT MALE ATHLETES

BY MR ROBERT CLOWES

INTRODUCTION AND BACKGROUND

BONE ACCRUAL IN ADOLESCENCE:
UP TO 90% OF ADULT BONE MASS IS ACQUIRED BY LATE ADOLESCENCE. EARLY INTERVENTION IS KEY TO REDUCE FUTURE FRACTURE AND OSTEOPOROSIS RISK.

PLYOMETRIC JUMP TRAINING (PJT):
PJT EXERTS HIGH GROUND REACTION FORCES, STIMULATING BONE LOADING. PROGRAMS OVER 6 MONTHS HAVE SHOWN POSITIVE BMC ADAPTATIONS, PARTICULARLY IN NON-OSTEOGENIC SPORTS LIKE SWIMMING AND CYCLING.

GAP IN THE LITERATURE:
THERE IS LIMITED UNDERSTANDING OF HOW NUMBER OF JUMPS AND TOTAL APPLIED FORCE RELATES TO BONE OUTCOMES IN ELITE ADOLESCENT ATHLETES ACROSS DIFFERENT SPORTS.

STUDY AIM:
TO EXAMINE THE RELATIONSHIP BETWEEN CUMULATIVE NUMBER OF JUMPS AND TOTAL FORCE APPLIED DURING A 9-MONTH PJT PROGRAM AND CHANGES IN BONE MINERAL CONTENT (BMC) IN SWIMMERS, FOOTBALLERS, AND CYCLISTS.

METHODS

DESIGN & PARTICIPANTS:
- RETROSPECTIVE ANALYSIS FROM THE PRO-BONE STUDY.
- 48 MALE ADOLESCENTS (12–14 YEARS): 19 SWIMMERS, 15 FOOTBALLERS, 14 CYCLISTS.
- INTERVENTION: 9-MONTH PROGRESSIVE PJT (COUNTER-MOVEMENT JUMPS WITH INCREASING VEST WEIGHTS).

BONE HEALTH ASSESSMENT:
- DXA SCANS PRE- AND POST-INTERVENTION MEASURED BMC AT FEMORAL NECK, LEGS, AND TBLH (TOTAL BODY LESS HEAD).

INTERVENTION SUMMARY:
- 3 PROGRESSIVE LEVELS OVER 9 MONTHS: INCREASING JUMPS/WEEK AND VEST LOAD (0–2.5 KG).
- TOTAL FORCE CALCULATED USING:
  FORCE = (NO. OF JUMPS × 5.3) × (BODY MASS ± WEIGHT)

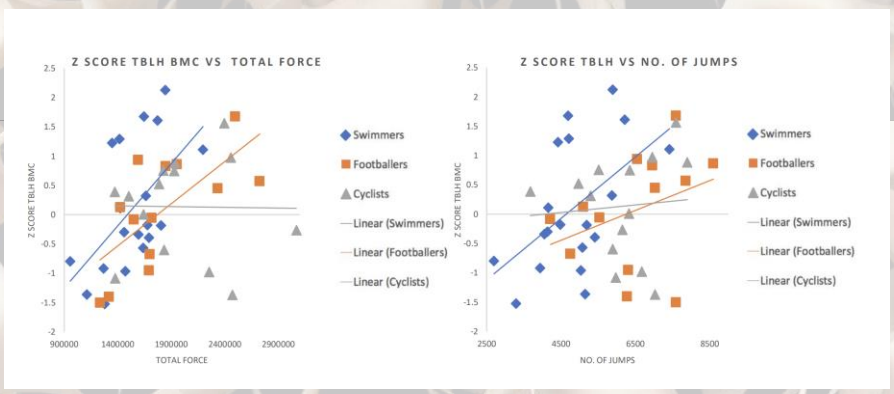
STATISTICAL ANALYSIS:
- LINEAR REGRESSION MODELS ASSESSED THE RELATIONSHIP BETWEEN TOTAL JUMPS/FORCE AND CHANGES IN BMC, ADJUSTED FOR PHV AND LEAN MASS.

RESULTS

SWIMMERS:
- STRONG POSITIVE ASSOCIATIONS BETWEEN BOTH NUMBER OF JUMPS AND TOTAL FORCE WITH BMC AT ALL SITES.
- TBLH R^2 = 0.674 (JUMPS); 0.625 (FORCE)
- FEMUR NECK R^2 = 0.613 (JUMPS); LEGS R^2 = 0.648 (FORCE)

FOOTBALLERS:
- MODERATE POSITIVE RELATIONSHIP WITH TOTAL FORCE.
- TBLH R^2 = 0.798; LEGS R^2 = 0.63
- WEAKER ASSOCIATIONS WITH NUMBER OF JUMPS.

CYCLISTS:
- NO SIGNIFICANT ASSOCIATIONS OBSERVED.
- SMALLEST SAMPLE GROUP (N=14), LIMITING CONCLUSIONS.



DISCUSSION POINTS

- PJT EFFECTIVE IN NON-OSTEOGENIC SPORTS: SWIMMERS RESPONDED BEST, SHOWING RELIABLE IMPROVEMENT IN BMC WITH BOTH JUMP NUMBER AND FORCE.
- FOOTBALLERS BENEFIT TOO: DESPITE OSTEOGENIC BASELINE ACTIVITY, ADDITIONAL PJT STILL PROVIDED BMC BENEFITS.
- CYCLISTS UNRESPONSIVE: MAY BE DUE TO LOW WEIGHT-BEARING STIMULUS OR SMALL SAMPLE SIZE.
- NO CLEAR THRESHOLD IDENTIFIED: LINEAR IMPROVEMENTS OBSERVED—NO BMC PLATEAU OR UPPER BENEFIT LIMIT FOUND.

CONCLUSION:

9-MONTH PJT IMPROVES BONE HEALTH IN ADOLESCENT SWIMMERS AND FOOTBALLERS; CUMULATIVE LOAD (JUMPS × FORCE) OFFERS A SIMPLE TRAINING METRIC TO MONITOR SKELETAL BENEFITS. MORE RESEARCH IS NEEDED IN CYCLISTS AND ACROSS BOTH GENDERS.

How have generic LLMs progressed in their ability to write clinic letters and manage patients in the context of VFC?

Amy Smith, James Brock, Rana Anss, Charles Kimberley, Claire Joyner, Francesa Solari, Tariq Yasin, Hasan Aldallal, Arwel Poacher

Introduction:

- The British Orthopaedic Association recommends including diagnosis, investigations, and management plans, but this is often not adhered to.
- Large Language Models (LLMs) provide an opportunity to streamline conversion of clinical notes into readable letters. The aim of this study is to explore whether LLMs; GPT-3, Chat-GPT and GPT4 can write clinic letters and predict management plans for common orthopaedic scenarios

Method:

- Fifteen scenarios were generated and the LLMs prompted to write clinic letters and generate management plans for identical scenarios with plans removed.
- Letters were assessed for readability using the Readable Tool.
- Accuracy of letters and management plans were assessed by six independent consultant orthopaedic clinicians using a Likert Scale rating from 0-10

Results:

- There was no significant difference in the readability or the accuracy of clinical letters and management plans (Figure 1, 2A, 2B).
- The mean accuracy score for management plans generated by GPT-4 was 9.1/10 which was significantly greater compared to Chat-GPT (7.9/10, p <0.001) and GPT-3 (6.8/10, p <0.001).
- Limitations: advice was generalised, not orthopaedic specific and reflected a general practice approach, and there were some inaccuracies present in management plans; however this improved with each LLM generation.

Metric	Mean GPT-4 Response (SD)	Mean Chat-GPT Response (SD)	Mean GPT-3 Response (SD)	P-Value (Significance)
Flesch-Kincaid Grade Level	9.11 (0.48)	8.77 (0.918)	8.47 (0.982)	0.4023 (NS)
Flesch Readability Ease	56.3 (3.48)	58.2 (4.00)	59.3 (6.98)	0.4861 (NS)
SMOG Index	12.1 (0.64)	11.6 (0.755)	11.4 (1.01)	0.5870 (NS)
General Public Reach (%)	80.6 (4.0)	80.3 (4.20)	81.2 (5.78)	0.6218 (NS)

Figure 1: Mean readability scores for Chat-GPT, GPT-3 and GPT-4 derived responses (SD = Standard Deviation) and p-value for paired t-test comparing mean difference. Statistical Significance equates to p-value < 0.05. NS = Not significant.

Conclusion:

- Converting clinical notes or dictations straight to highly readable letters by automation is possible with LLM's and they can produce generally accurate management plans. However, the letters contain inaccuracies, inconsistencies and inappropriate terminology
- Subsequent generations of LLM demonstrate an improvement in their ability to assess medical issues and produce accurate management plans of increasing complexity, suggesting appropriate training on a HIPPA compliant AI LLM could reduce administrative burden and increase clinical efficiency

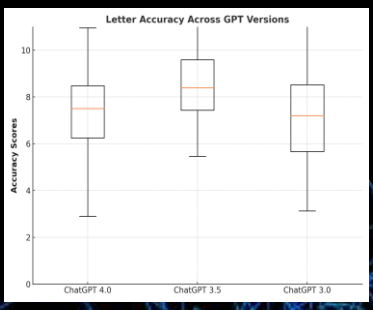
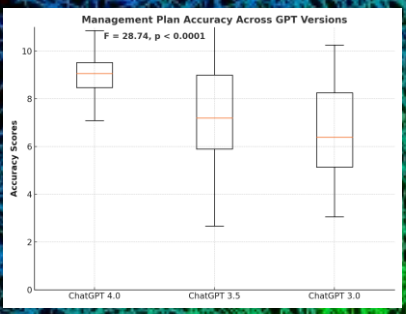


Figure 2a: Accuracy scores for clinical letters generated by Chat-GPT, GPT-3 and GPT, independently scored by six senior orthopaedic clinicians. Grey lines show paired prompts. Compared using paired t-test;
Figure 2b: Accuracy scores for management plans generated by Chat-GPT, GPT-3 and GPT, independently scored by six senior Orthopaedic clinicians. Grey lines show paired prompts. Compared using paired t-test;



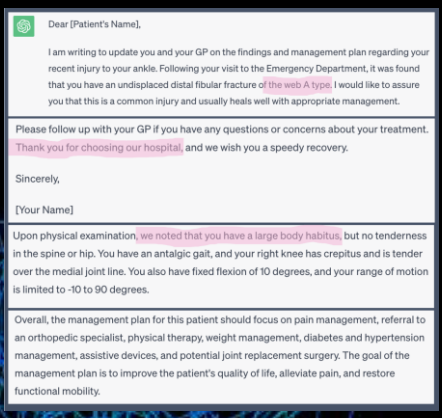


Figure 3: Prompt examples show that advice was sometimes too general and contained inaccuracies and inappropriate use of medical jargon in earlier generations.

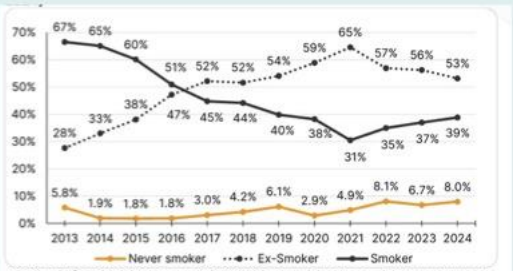
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Exploring the Relationship Between Vaping and Bone Health: A Systematic Review

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Background

E-cigarette use has risen significantly, with 9.1% of the UK population using them in 2023, up from 6.3% in 2022 (1). E-cigarettes are promoted for smoking cessation, yet their long-term effects, particularly on bone health, remain relatively unexplored. Fig. 1 shows higher vaping rates among ex-smokers than current smokers, along with a rise in use among never-smokers. This, coupled with the recent surge in youth vaping, highlights the urgent need to investigate the implications of vaping on bone health, as its increasing use presents a growing public health concern.



ASH Smokefree GB Adult Surveys 2013-2024. *Unweighted base: Adult current vapers (2013=325, 2014=498, 2015=614, 2016=667, 2017=669, 2018=738, 2019=854, 2020=787, 2021=826, 2022=1,089, 2023=1,079, 2024=1,408)*

Fig 1. representing smoking status among current adult e-cigarette users in Great Britain (2013-2024)

Aim

This systematic review evaluates the impact of e-cigarettes on bone health at the molecular, tissue and orthopaedic levels. It aims to determine whether e-cigarettes pose a risk to bone health and surgical outcomes, providing evidence-based recommendations for patients and clinicians , particularly in perioperative and post-operative care.

Method

A systematic search was conducted on January 6, 2025, across PubMed, Medline, Embase, Google Scholar, ScienceDirect, and Web of Science to identify studies on bone health in human and animal models, excluding those focused solely on tobacco smoking. A total of 21 studies were included: eight in vivo and four in vitro animal studies, two in vivo and five in vitro human studies, one systematic review and meta-analysis, one cross-sectional study, and one retrospective analysis. The review followed PRISMA guidelines and adhered to a pre-specified protocol to minimise bias, with the criteria summarised in Table 1.

Inclusion Criteria	Exclusion Criteria
Comparison of e-cigarette users vs non-users/smokers.	No relevant comparison group.
Animal and lab-based studies (in vivo, in vitro, ex vivo).	Wound healing, vascular, or dental studies.
E-cigarette vapour	Tobacco smoking or other nicotine methods (e.g. patch, gum)
Human participants of any age or health status, including those undergoing orthopaedic surgery.	Non-English studies
Bone healing, strength, or orthopaedic recovery.	Non-Full Text

Table 1.Summary of inclusion and exclusion criteria

Results

Inflammatory Markers and Pathways

E-cigarette vapour inhibits osteogenic differentiation, reducing markers like Runx2 and Ocn (2) and triggers inflammatory pathways (3). Long-term exposure increases peripheral blood monocytes, indicating a myeloid bias (4). Both cigarette smoke and E-cigarette vapour elevate reactive oxygen species (ROS) and downregulate Connexin 43, disrupting mesenchymal stem cell function (5). Nicotine and flavours like cinnamon exacerbate these effects, promoting osteoclastogenesis over osteoblastogenesis (6).

Stem Cell Differentiation and Osteoblast Function

Perinatal nicotine exposure impairs bone marrow-derived mesenchymal stem cells (MSC) function and delays bone healing (7). E-cigarette vapour reduces MSC proliferation and osteoblast function, with nicotine-free vapour showing moderate effects and nicotine-containing vapour causing more severe damage (8). Flavoured e-liquids, especially cinnamon, increase toxicity and reduce cell viability (9). E-cigarette exposure also impairs osteoblast growth on dental implants (10).

Bone Healing and Orthopaedic Outcomes

E-cigarette exposure shows no significant changes in bone structure but reduced bone strength and microcracks were observed with cigarette smoke (11). Zebrafish exposed to e-cigarette vapour showed skeletal defects (12). Human studies link e-cigarette use to higher fragility fractures and bone loss (13), with longer surgeries and slower recovery in orthopaedic patients (14).

Conclusion

E-cigarette use presents a clear and growing risk to bone health at the molecular, stem cell, and orthopaedic levels. Vapour exposure disrupts mesenchymal stem cell (MSC) and osteoblast function, impairs osteogenic differentiation, and activates inflammatory pathways — with nicotine and flavourings, especially cinnamon, worsening these effects. Human studies associate vaping with bone loss, increased fragility fractures, and slower recovery after orthopaedic surgery.

However, the current evidence is limited, of mixed quality, and affected by confounding factors such as dual use with tobacco. Variation in study design and the poor standardisation of e-cigarette components, including chemicals and flavourings, further complicate interpretation. There is a pressing need for well-designed, long-term clinical studies in chronic vapers. Clinicians should consider vaping history in pre-operative assessments and musculoskeletal management to better inform care and guide public health policy.

Acknowledgements

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Too Many Cooks? The Impact of Multiple Reviews on Cauda Equina Pathway Delays

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Bwrdd Iechyd Prifysgol Aneurin Bevan University Health Board



INTRODUCTION

Cauda Equina Syndrome (CES), though rare—affecting approximately 1 to 3 people per 100,000 [4] - is a spinal emergency requiring urgent intervention. Delays in diagnosis can lead to permanent deficits and can be catastrophic for the patient. This study audits the CES pathway in South Wales hospitals, assessing healthcare professional involvement before MRI and adherence to spinal network guidelines.

Objectives

Primary aim:
To determine the number of competent healthcare provider reviews of patients prior to MRI

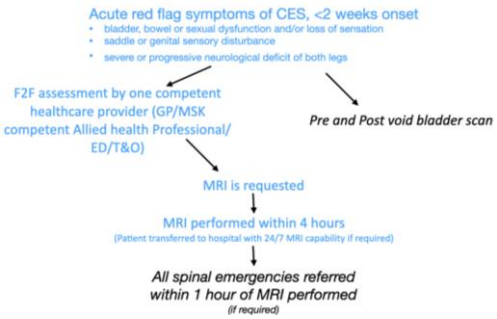
Secondary aim:
To study the patient journey to assess whether it deviates from the South Wales Network pathway/GIRFT pathway.

Methods

- A retrospective review of suspected CES cases was conducted using data from the South Wales Spinal Network.
- Patients aged >16 years presenting with suspected CES from various referral sources were included.
- Exclusion criteria were radicular complaints without bladder/bowel disturbance and metastatic spinal cord compression (MSCC).
- Data points included symptom onset to presentation time, number of professionals seen pre-MRI, inter-hospital transfers, and MRI timing, benchmarked against network guidelines.

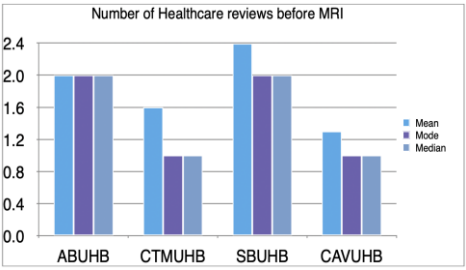
Background

- Flowchart demonstrates the intended pathway that a patient with Suspected CES should follow
- The sections in blue were the focus of this project
- The flow chart is taken from the South Wales Spinal Network Guidance on Cauda Equina [1], which is based on the GIRFT guidance for Cauda Equina [2][3]

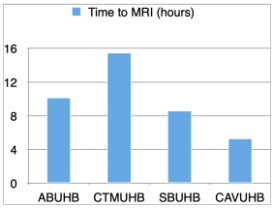


Results

- 157 patients were included.
- Time from symptom onset to presentation ranged from 3 hours to > 2months
- Most patients initially consulted GPs or Emergency Departments.



- Multiple professionals reviewed 60.89% of cases before MRI, potentially delaying diagnosis
- 3.2 % required inter-hospital transfer.
- CES was radiologically confirmed in 9.6% of cases.
- Compliance of each trust to the South Wales Network pathway/GIRFT pathway, two were 0% fully compliant, one was 3.57% fully compliant, and one was 52% compliant; there was various compliance with each step of the pathway across all trusts (Range 0% to 89.29%)



Median time from first contact to MRI in each trust had notable variation

CONCLUSION

CES diagnosis delays persist, especially in MRI access. Variability in pre-imaging professional reviews indicates inefficiencies. Enhancing MRI availability and refining referral pathways may improve patient outcomes. Standardised regional collaboration is needed to reduce delays.

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ACKNOWLEDGEMENTS

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Team-Based Clinician Deployment Enhances Outcomes in Orthopaedic Trauma Care: A Retrospective Cohort Analysis

Rich Roberts[1], Jakub Majchrzak[1], Raminder Singh[1]

1. Department of Trauma and Orthopaedic Surgery, Wrexham Maelor Hospital, Wrexham, UK

Introduction

- NHS Resource Constraints: The NHS faces significant challenges in resource allocation, particularly within trauma and orthopaedic services, due to increasing demand and limited capacity[1].
- Impact of the COVID-19 Pandemic: The pandemic has exacerbated existing pressures, leading to the suspension of non-urgent elective surgeries and necessitating the reallocation of staff to manage acute care demands[2].
- SHO Deployment Models: Two primary models for deploying Senior House Officers (SHOs) exist:
    - Location-Based: SHOs are assigned to specific wards or outlier areas.
    - Team-Based: SHOs are integrated directly into consultant-led teams.
- Potential Benefits of Team-Based Deployment: Integrating SHOs into consultant-led teams may enhance continuity of care, improve communication, and lead to better patient outcomes in trauma settings[3].

Aim

To evaluate whether transitioning from a location-based to a team-based Senior House Officer (SHO) deployment model improves clinical outcomes and resource efficiency for trauma patients at Wrexham Maelor Hospital.

Specific objectives include assessing changes in:

- Hospital length of stay
- Day 1 postoperative X-ray compliance
- Day 1 postoperative blood test compliance

Methods

Study Design: Retrospective cohort analysis comparing outcomes before and after implementing a team-based SHO deployment model.

Setting: Department of Trauma and Orthopaedics, Wrexham Maelor Hospital.

Population: Trauma patients admitted during two defined periods:

- Pre-intervention: June–July 2024 (location-based deployment)
- Post-intervention: September–October 2024 (team-based deployment initiated August 2024)

Data Collection: Two collectors utilised physical notes, Welsh Clinical portal and Outpatient letters. Data collection period – January 2025





Results

Retrospective analysis identified 169 trauma patients, 71 were managed in a location-based system and 98 in a teams-based system

Characteristic	Pre-Intervention (n=71)	Post-Intervention (n=98)
Age (years)	73.59 ± 17.58	66.23 ± 20.43
Gender (% Female)	73.30%	51.65%
Gender (% Male)	26.70%	48.35%
Deprivation Score	6.17 ± 2.67	6.33 ± 2.44
Charlson Index	1.31 ± 1.60	1.07 ± 1.53

mean ± standard deviation (SD) or percentage (%). Charlson index represents patient comorbidity; deprivation scores reflect socioeconomic status (higher scores indicating lower deprivation).

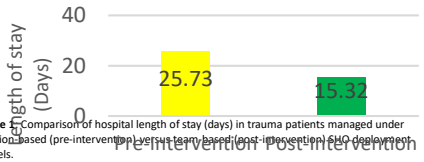


Figure 1. Comparison of hospital length of stay (days) in trauma patients managed under location-based (pre-intervention) versus team-based (post-intervention) SHO deployment models.

Outcome Measure	Pre-Intervention	Post-Intervention	P-value
Length of Stay (days) (Primary)	25.73 ± 32.86	15.32 ± 19.70	**<0.05**
Day 1 Blood Compliance (NOFs) (%)	94.40%	95.50%	0.84
Number of Blood Test Days	1.50 ± 0.55	1.30 ± 0.65	0.34
Day 1 X-ray Compliance (NOFs) (%)	53.90%	85.70%	**<0.05**
Number of X-ray Days	1.47 ± 0.52	1.30 ± 0.68	0.52

The post-intervention group (n=98) was slightly younger (mean age 66 vs. 74), had a lower Charlson comorbidity index, and a more balanced gender distribution compared to the pre-intervention group (n=71). Deprivation scores were similar between groups. The team-based model significantly reduced mean hospital length of stay (25.73 to 15.32 days, p=0.03) and improved Day 1 postoperative X-ray compliance (53.9% to 85.7%, p=0.04). No significant differences were observed in Day 1 blood test compliance or the average number of investigation days.

Conclusion

Transitioning from a location-based to a team-based SHO deployment model was associated with significant improvements in trauma care efficiency and quality at a district general hospital. Specifically, the team-based model resulted in a reduced hospital length of stay and improved Day 1 postoperative X-ray compliance in patients with neck of femur fractures. These findings suggest that aligning junior doctors with consultant-led teams enhances continuity, coordination, and accountability in patient care. Wider adoption of this model may support more effective use of NHS resources and improve trauma outcomes. Further prospective studies are recommended to validate these results and explore long-term impacts.

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Evaluation of the Early Clinical Outcome of Anterior Cruciate Ligament Reconstruction: Soft Tissue Pure Semitendinosus Vs. Augmented Soft Tissue Graft by Full Thickness Peroneus Longus Tendon

Fahad.Al-hasani ,Mohammed A. Yousif, Midhat M. Mahdi

Background

ACL injuries are common, debilitating, and often require reconstruction due to poor natural healing. Surgical techniques and graft choices have evolved significantly. Hamstring tendons (HT) are common autografts but have drawbacks (nerve injury risk, size uncertainty, muscle weakness). Peroneus longus tendon (PLT) is emerging as an alternative with potential benefits.

Aim

To evaluate the early clinical outcome of ACL reconstruction comparing soft tissue pure semitendinosus graft (Group 1) versus augmented soft tissue graft using semitendinosus plus full thickness peroneus longus tendon (Group 2).

Methods

Design: Cohort prospective study.
Participants: 50 male patients (25 per group) undergoing primary ACL reconstruction.
Group 1: Pure Semitendinosus (ST) graft.
Group 2: Augmented ST + Peroneus Longus (PLT) graft. Follow-up: 6 months.
Outcome Measures: Knee stability (Lachman, Pivot Shift, Giving Way), Functional Scores (Lysholm), Complications, ROM.
Surgical Technique: Arthroscopic reconstruction, standardized graft preparation (6-strand), fixation with interference screws.
Rehabilitation: Standardized protocol.
Statistical Analysis: SPSS v26, Chi-square/Fisher's exact test, $p < 0.05$ considered significant.

Result

Demographics:
No significant difference in Age ($p=0.480$) or BMI ($p=0.059$) between groups.
All patients were male. Intra-operative Findings:
No significant difference in associated injuries (Medial/Lateral Meniscus, Cartilage Defect).
- Medial Meniscus: 36% (G1) vs 48% (G2), $p=0.255$ Post-operative Complications (Low rates overall):
Infection (Implantation site): 1 case (4%) in G1 vs 0% in G2.
Knee Stiffness: 2 cases (8%) in G1 vs 1 case (4%) in G2 ($p=0.64$).
No Hyposthesia reported.

Post-operative Stability (6 Months):
Instability: Significantly better in G2 - ($p=0.049$).
Frequent: 8% (G1) vs 0% (G2)-
Sometimes: 16% (G1) vs 0% (G2)-
- Never: 72% (G1) vs 96% (G2)

Lysholm Scores (6 Months):
- Trend towards better post-op scores in G2 ($p=0.385$).
- Excellent: 72% (G1) vs 88% (G2)
- Good: 16% (G1) vs 8% (G2)
- Fair: 12% (G1) vs 4% (G2)

Conclusions

Augmented grafts (ST + PLT) demonstrated significantly better postoperative stability compared to pure ST grafts at 6 months, with less reported giving way and instability. A trend towards better functional outcomes (Lysholm scores) was observed in the augmented group, although not statistically significant. Complication rates were low in both groups.

Age-related impact of a Fracture Liaison Service (FLS) on Mortality and Refracture Prevention

Pritika Anthonypillai, Amara Williams, Sophie Maggs, Linda Scanlon, Chris Edwards, Inder Singh

Introduction

Risk of re-fracture within 1 year of index fracture is between 10 to 31%[1, 2]

FLS aims to reduce re-fracture by:

1. Patients aged 50+ are identified by FLS
2. Assessed for osteoporosis
3. Investigated appropriately if required
4. Commenced on osteoporosis care plan

Objectives

Patients aged 50-80 and ≥80 seen by FLS were evaluated for:

1. **Re-fracture within 1 year**
2. **Mortality within 1 year**

Methods

All patients seen for 6 consecutive months (July – December 2023) were included.

10 excluded due to missing data

1099 patients → 1089 patients → Below 80 (534 patients- 49%) / Over 80 (555 patients – 51%)

Data collected for

- **Previous fractures**
- **Index fracture**
- **Re-fractures within 1 year**
- **Mortality within 1 year**

Baseline data

- 53% (n=577) had a previous fracture
- 12% (n=136) were already on bone treatment

Impact of FLS Intervention

- 57% (n=621) were started on treatment by FLS
- 84% (n=916) did not re-fracture within a year

Outcomes: Mean days to re-fracture
Above 80 = 200 days (range 2-513)
Below 80 = 207 days (range 7-528)

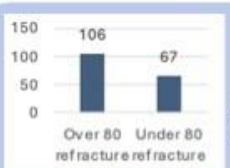


Figure 1: Re-fracture within 1 year

Above 80 years = 61%
Under 80 years = 39%
(p<0.0001)

Outcomes: 18% (n=199) patients died within 1 year of fracture

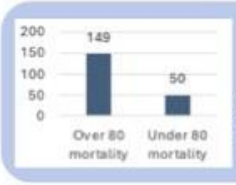


Figure 2: Mortality within 1 year

Above 80 years = 75%
Under 80 years = 25%
(p<0.0001)

Conclusion

- Patients (>80 or <80) re-fractured within a similar time frame
- Mortality and re-fractures were significantly higher in patients over 80 years

Therefore, older patients need more targeted interventions

Thank you to Dr Inder Singh and the AB-FLS team for their support and guidance throughout this study

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Is it time to update the Tokuhashi scoring system for Metastatic Spinal Cord Compression from a Lung primary- A Systematic Review

Dev Panchal, Dr N S Iqbal & Prof Sashin Ahuja

Cardiff University | Prifysgol Caerdydd

GIG CYMRU NHS WALES | Bwrdd Iechyd Prifysgol Caerdydd a'r Fro | Cardiff and Vale University Health Board

Introduction

- Tokuhashi score is a clinical scoring system used by surgeons in evaluating benefit of surgical intervention on patients with metastatic cord compression(1, 2).
- The scoring system considers various factors, one of them being the primary site of the tumor.
- Tumor site with poor prognosis are given a lower score
- Due to poor outcomes in patients Lung Primary gets a low score on scoring system.

Objective

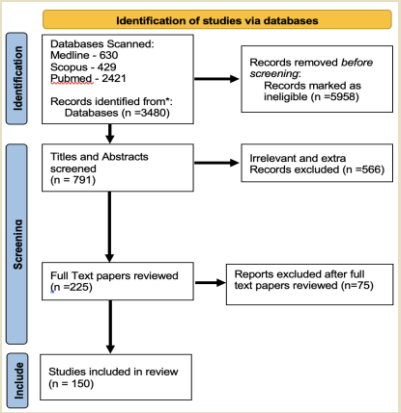
- The Objective of the study was to determine if the modified Tokuhashi Scoring system requires an update for Metastatic Cord Compression caused due to a Lung Primary
- We conducted a systematic review looking at changes in survivorship of patients with Lung Cancer in the last 25 years

Method

- We divided lung cancer into three types based on the 2017 NICE guidelines for treatment (3):
  1. Small Cell Lung Cancer (SCLC)
  2. Squamous Non-Small Cell Lung Cancer (Sq NSCLC)
  3. Non-Squamous Non-Small Cell Lung Cancer (NSq NSCLC)

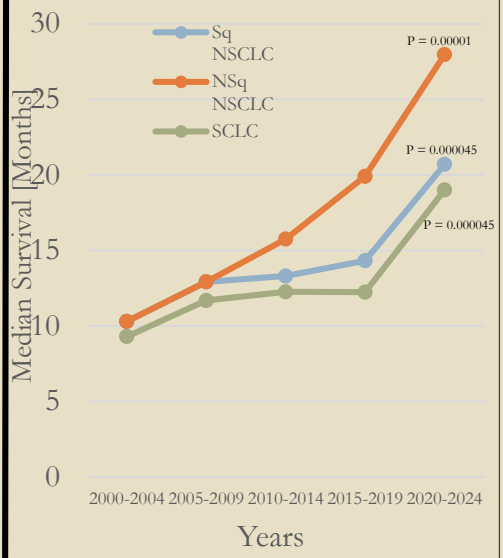
Search Terms Used:
- (Median Survival OR Overall Survival)
- (Metastatic OR Extensive Disease)
- (Type of Cancer)
- (Radiotherapy OR Chemotherapy OR Immunotherapy OR Lung Surgery)

AND



Results

	Time Period [Median Survival (mOS) [Months]		
Lung Cancer Type	2000-2004	2020-2024	P- Value
Sq NSCLC	10.3	20.7	0.000045
Non Sq NSCLC	10.3	27.97	0.00001
SCLC	9.3	19.01	0.000045



Conclusion

- The results show a significant increase in median survival times from 2000-2004 to 2020-2024.
- This can be attributed to the improvement in treatment options.
- Having shown a significant improvement in survival since the Tokuhashi score was last reviewed (in 2005), these results suggest that patients with spinal metastasis from a primary Lung cancer should be scored higher allowing them a chance at treatment.
- Hence, a review of the Tokuhashi scoring system for patients with primary Lung cancer and other primary tumors should be considered to better patient treatment options.

References :

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Special Thanks to Prof Sashin Ahuja and Dr Sahar Iqbal

Poster #34

Cannulated Screws With and Without Tension Band Wiring vs Tension Band Wiring Alone for Fixation of Patella Fractures

Chinmay Tijare[1,2], Raven Joseph[3,2], Khalis Boksh[2], Pip Divall[2], Tawfiq Korim[2], Randeep Aujla[2]

[1]Nottingham University Hospitals NHS Trust, Nottingham, United Kingdom [2]University Hospitals of Leicester NHS Trust, Leicester, United Kingdom [3]Swansea Bay University Health Board, Swansea, United Kingdom

Background

Patella fractures are rare (1–3% of all skeletal injuries) [1], but can severely impair knee extension [2]. The conventional fixation technique is Tension Band Wiring (TBW) however, complications such as hardware irritation and migration are common [3]. Cannulated Screws (CS) with or without a tension band construct (CSTBW) are alternatives with potentially superior outcomes.

Aims

to evaluate and compare: clinical outcomes, complication rates and time to union in patients with transverse patella fractures treated with TBW, CS, or CSTBW (Figure 1).

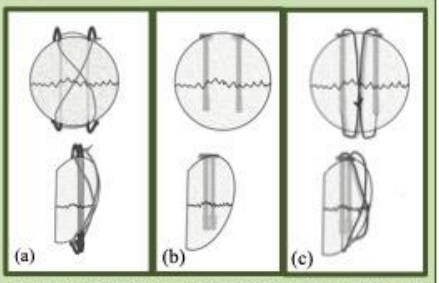


Figure 1: AP and lateral schematic drawings of (a) TBW (b) CS (c) CSTBW for transverse patella fractures

Methods

A systematic review and meta-analysis were conducted following PRISMA 2020 guidelines, searching Medline, Embase, CENTRAL, and the Cochrane Database up to March 12, 2024. There were no restrictions on language, publication date, or journal impact factor. Two independent reviewers screened studies, including only cohort or randomized controlled trials comparing different fixation techniques. The ROBINS-I tool was used to assess bias, leading to the exclusion of one study at critical risk. Data analysis was conducted in R (v4.4.0), using odds ratios for binary outcomes and standard mean differences for continuous ones. A random effects model was applied, with heterogeneity assessed using I^2 statistics.

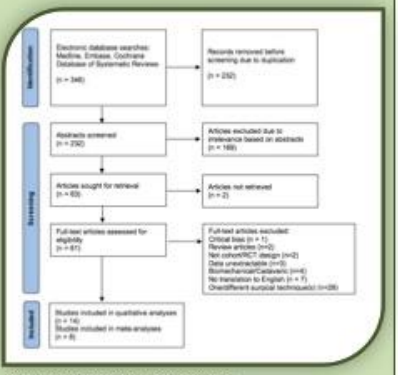


Figure 2: PRISMA Flow Chart

Key Results

1. Fewer complications and lower implant removal rates were seen in CS and CSTBW groups compared to TBW.

2. CSTBW showed superior flexion at 3 months compared to TBW (SMD 0.92, 95% CI 0.28–1.56, p=0.0048).

3. Pain (VAS) was significantly lower in CSTBW than in TBW at 3 months (SMD -1.27, 95% CI -1.73 to -0.82, p<0.001).

4. Lysholm functional scores favoured CSTBW over TBW at 12 months (SMD 0.80, 95% CI 0.21–1.39, p=0.0082).

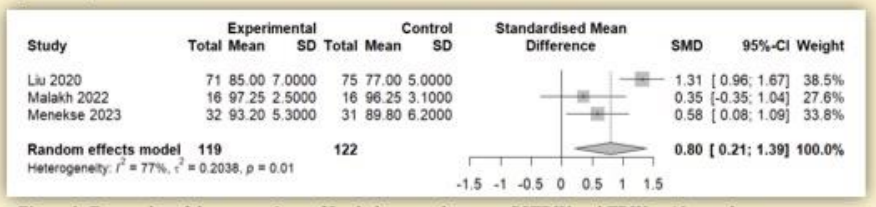


Figure 3: Forest plot of the comparison of Lysholm score between CSTBW and TBW at 12 months

Limitations

- Most included studies had moderate methodological quality (mean MINORS score 15.8/24).
- Considerable heterogeneity in surgical technique and implant choice.
- Short follow-up (≤12 months); long-term outcomes remain uncertain.
- Lack of standardized patient-reported outcome tools and missing MCID data for VAS and Lysholm.

Conclusions

CS fixation with or without TBW was associated with better clinical outcomes and fewer complications than TBW alone for transverse patella fractures. Further studies with larger sample sizes, longer-term follow-up, standardised rehab protocols and broadened inclusion criteria to include multiple fracture patterns with stratified analysis are needed to improve clinical relevance.

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PERMANENT HYDROGEL INJECTIONS FOR KNEE ARTHRITIS – PROMISING NEW TREATMENT OR SNAKE OIL?

Introduction

Osteoarthritis (OA) is a major contributor to morbidity worldwide. Injectables are one of a number of non-surgical treatments available to help control symptoms.

Arthrosamid® is a non-absorbable, biocompatible, injectable, transparent hydrogel comprising of 97.5% water and 2.5% of cross-linked polyacrylamide. It is indicated for the treatment of OA of the knee and has demonstrated clinical benefit compared to Hyaluronic Acid (HA). The precise mechanism of action is currently unknown.

The aim of this study was to confirm the clinical effectiveness of Arthrosamid® for knee OA at 3-month follow-up and to investigate its potential mechanism(s) of action.

Methods

Patients were recruited prospectively and underwent 6ml injection of Arthrosamid® into the knee joint.

Inclusion criteria

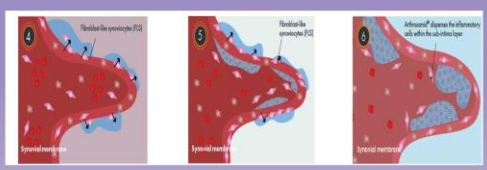
1. Radiological OA greater than Kellgren-Lawrence (KL) scale 2.
2. A knee pain score of greater than 40/100 on a visual analogue scale (VAS).
3. No surgery or injection within 12-months.

Exclusion criteria

1. Previous trauma with significant alteration in bone architecture.
2. Joint re-placement operation on the other knee.
3. Inflammatory arthritis (i.e., rheumatoid arthritis, spondylarthritis and gout).
4. Previous injection within 12 months.
5. BMI >35.

The primary outcome measure was the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) score at 3-months post injection.

Synovial Scaffolding:



Results and Discussion

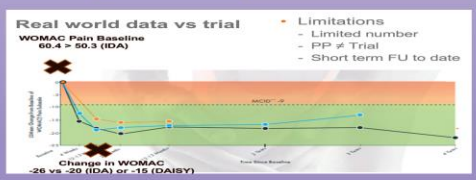
To date, 204 Patients have received hydrogel injections, with 58 available full data sets (age 41-89 years, KL 2-4 Knee OA). Baseline and 3-month data are presented. VAS Pain 68 vs 41 (p<0.0001), OKS 28 vs 17 (p<0.0001), WOMAC Pain 60 vs 34 (p<0.0001), WOMAC. Total 56 vs 35 (p<0.0001).

Mean Scores	Baseline	3 Months	t Test	MCID	SCB/PASS
VAS Pain (100)	68	41	<0.0001	8.4 to 19.9	27 to 31
OKS (48 worst)	28	17	<0.0001	4.8 to 5	<18
WOMAC Pain (100)	60	34	<0.0001	9 to 12	n/a
WOMAC Total (96 Worst)	56	35	<0.0001	16.1	n/a

UK Survey

95 Patients from 6 UK Surgeons responded to an anonymous survey. Sixty-eight percent "would recommend this treatment" and 62% were "satisfied". Of the 204 patients treated locally, 2 re-attended. One patient underwent joint aspiration at 3 weeks, and one developed a severe soft tissue reaction requiring washout, muscle debridement and soft tissue coverage. Both had negative aspirates for infection but elevated inflammatory markers.





Conclusions

Intra-articular injection of Arthrosamid® provides clinically meaningful improvements in patients with knee OA, with an overall response rate at 3 months of 82%.

Karthikeyan Dhandapani (Presenting), Srijan Curpad, Zakiyy Azeez, Nadia Mansour, Emma Blain, Andrew Miller

Aneurin Bevan UHB, University College London, Cardiff University

Senior House Officer lead neck of femur fracture operating in Morriston Hospital

Mr Rob Clowes, Dr Adedamola Olaniyi, Miss Robyn Caldwell, Dr Pamela Wong, Dr Lucy James and Mr Piers Page

Introduction & Background

- Neck of femur (NOF) fractures are high-volume, high-value cases for orthopaedic SHOs
- National training guidelines recommend 12 NOF cases as primary surgeon by ST3 application
- Locally, SHOs were missing operative opportunities due to rota shortages
- Gap in literature: While trainee surgical exposure is widely acknowledged as essential, few quality improvement projects have quantified the impact of rota management on operative training outcomes

Methods

Design: Retrospective audit with pre/post intervention comparison
Data Source: Theatre Operation Management System (TOMS)
Timeframes:

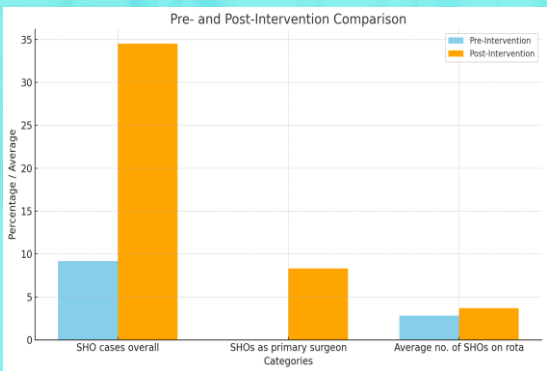
- **Pre-intervention**: Apr–May 2024
- **Post-intervention**: Aug–Sep 2024

Variables Recorded:

- Operation date & type
- Role of surgeons (1st, 2nd, 3rd)
- SHO presence and whether they were primary surgeon
- Number of SHOs on the rota

Results

	Pre-Intervention	Post-Intervention	Statistical Test	p-value
SHO cases overall	8 / 87 (9.2%)	29 / 84 (34.5%)	Chi-square test	0.000125
SHOs as primary surgeon	0 / 87 (0%)	7 / 84 (8.3%)	Fisher's exact test	0.006
Average no. of SHOs on rota	2.83	3.683	Two-sample t-test	< 0.001



Discussion Points

- Rota management directly impacts training access in surgical settings
- Collaborative planning enables targeted improvements in operative exposure
- Demonstrates a low-cost, high-impact strategy for meeting national training targets
- Results support broader application across surgical departments

Key Conclusions

1.SHOs as primary surgeons: Intervention enabled SHOs to take on leading roles.
2.SHO cases overall: Significant growth in SHO involvement.
3.Intervention had a **substantial positive impact** on SHO participation.

Recommendations

- Filling SHO rota gaps significantly improves surgical experience
- Leadership roles in theatre are achievable with structured support
- Model is reproducible and aligns with GMC & JCST training goals

Two stemmed implants in one femur, should they be bridged?

Adnan Hussain, Omar Basbous, Sam Stevens, Yousuf Mirza, Sanjeev Agarwal

Introduction: Increasing number of orthopaedic patients are having lower limb arthroplasty with a knee and a hip stemmed implants present in the same limb for various indications. The presence of two stemmed implants theoretically produces a stress riser between the implants and may cause a interprosthetic fracture there is no consensus regarding the need to mitigate this and there are no recommendations regarding bridging the implants to minimize this risk. We present our series of patients who had two implants in same femur without bridging plates and their observed fractures

Methods: From our hospital database of patients with stemmed knee implants operated from 2017 to 2021 we identified patients with ipsilateral stemmed hip implants using x-rays and patient notes. Demographic data, Patient co-morbidities, interprosthetic distance presence of cement mantle and cortical thickness of femur at level of isthmus was measured. Any complications were identified through patient notes and x-rays. Combined implant survival was noted in years.

Results: 29 patients selected, 20 females, 9 males. In 20 cases hips were implanted first. Mean age of our patients was 70. Median implant survivorship was 5 years. Median interprosthetic distance was 90 mm and cortical thickness 31.25. Complication rate was 34.6 percent which included infections, aseptic loosening and 1 hip dislocation and 1 interprosthetic fracture.



Fig 1: Measurement of cortical thickness and implant tip distances on xrays. Standard Xray measurement assumed to be 1.15.



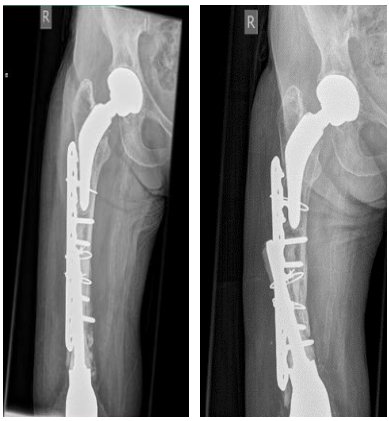


Fig 3: Xrays of example cases used in our study

Fig3: Fracture despite the bridging plate due to infection.

Conclusion: In our series significant numbers of interprosthetic fractures were not demonstrated and in our experience subjecting patients to additional operative time and associated morbidity of bridging fixation is not necessary and two stemmed implants in femur without bridging is a safe option.

Limitations and future research direction: This is an observational study with a small sample size. It would be more useful to combine this with a longer follow-up study with dedicated imaging to improve accuracy and a Finite element analysis to predict implant behavior and stress generation in vivo. Most of the studies in this area have included in vitro data and there is no consensus in literature regarding dealing with this increasingly common situation of having 2 stemmed implants in the femur.

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evron Vs Transverse Cut Comparison In Minimally Invasive Hallux Valgus Correction. Does The Osteotomy Affect Outcome?

N.Hill[1], T.L.Lewis[2], A.Reaney[1], R.Ray[2] , D.Gordon[3]

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Background:
There has recently been a move to utilising distal transverse osteotomies (META) rather than
chevron osteotomies (MICA) during minimally invasive hallux valgus surgery (MIS HV). The aim of this study is to investigate if there are any differences in union rates or clinical outcomes between these two techniques.

Methods:
A retrospective comparative analysis of a single surgeon research registry containing prospectively collected patient reported outcomes for patients undergoing MIS HV. Patients with minimum two year follow up were divided into two cohorts based on which osteotomy technique was used. Outcome measures were union rates and clinical outcomes (assessed using the Manchester-Oxford Foot Questionnaire, a validated outcome measure).

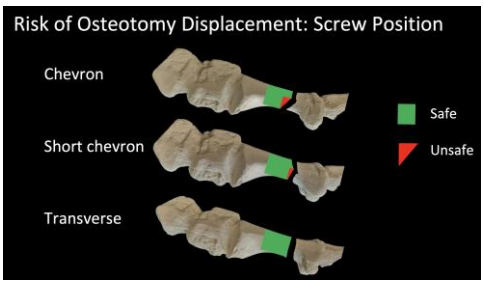


Figure 1: Transverse and Chevron osteotomy for MIS HV deformity correction



Figure 2: Transverse and Chevron osteotomy on post-operative radiographs for MIS HV deformity correction



Figure 3: Safe zones for screw placement to reduce risk of late osteotomy displacement for chevron and transverse osteotomy

	CHEVRON (Lewis et al JBJS 2021)	TRANSVERSE (Unpublished)	P-Value
Date	2014-2018 (45 months)	2019-2021 (23 months)	-
Feet	292	228	-
Symptomatic Delayed Union	5 (1.5%)	10 (4.4%)	P=0.07
Revision for Non-Union	4 (1.2%)	6 (2.6%)	P=0.30

Figure 4: A comparison of the outcomes of both methods of osteotomy in MIS HV surgery

MEAN FOLLOW UP CHEVRON = 4.1 YEARS
MEAN FOLLOW UP TRANSVERSE = 2.2 YEARS

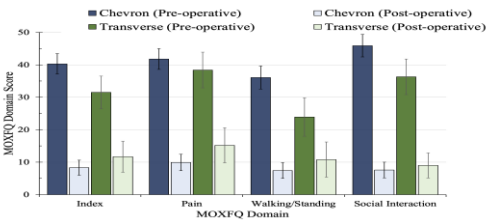


Figure 5: MOXFQ domain outcomes for Transverse and Chevron osteotomy for MIS HV deformity correction

Results:
Between 2014-2018, 292 feet underwent MICA and between 2019-2021 228 feet underwent META. The symptomatic delayed union rate was higher in the META cohort compared to the MICA cohort (4.4% vs 1.5%) but not statistically significant (p=0.07). The revision for non-union rate was also higher in the META cohort compared to the MICA cohort (2.6% vs 1.2%) but not statistically significant (p=0.30). There was no statistically significant difference between the two cohorts in any of the MOXFQ domains at final follow up (p>0.05).

Conclusion:
There was a higher, but not statistically significant, rate of symptomatic delayed union and revision for non-union in patients undergoing MIS HV with a transverse osteotomy compared to those treated with a chevron osteotomy.

Is Immobilisation and routine follow-up necessary after all distal radius fracture fixation?

M Jones, **O Ambler**, I D Rusell

Introduction

Fixation of distal radius fractures with volar locking plates is associated with positive patient-reported outcomes and provides enough stability to permit early mobilisation[1-3]. Nevertheless, many clinicians continue to immobilise patients in plaster to improve patient comfort, protect wounds or support fixation.

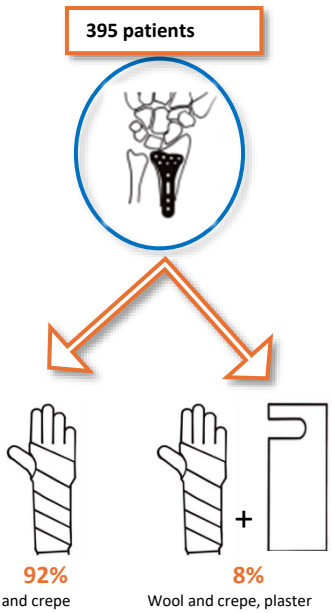
In practice, we do not routinely immobilise patients following fixation of distal radius fractures. We take a practical approach to follow-up and many patients attend therapy-only follow-up and initiate follow-up with the surgeon when required. We think that this is safe practice and does not increase the rate of complications

Methods

We performed a retrospective review of all patients who underwent acute, isolated distal radius fracture fixation over a six-year period in a day surgery unit. All procedures were carried out under regional anaesthesia using the same volar locking plate system. Data collected included postoperative dressings, complications, and follow-up appointments. For patients who received postoperative immobilisation, the records were reviewed to determine the surgeon's rationale for immobilisation.

Results

A total of 395 patients were included, each with a minimum follow-up of three months. Of these, 92% were not immobilised post-operatively and were managed with a wool and crepe bandage. This group had a complication rate of 9.1% and a re-operation rate of 5.8%, including a fixation failure rate of 1.1%. The overall complication rate was lower in the non-immobilised group compared to those immobilised in plaster (12.9%), but this was not statistically significant. Among non-immobilised patients, 44% did not undergo routine postoperative imaging, with 1 wound infection, and no other complications. Additionally, 37 patients in this group were discharged without surgeon follow-up and had no reported issues. In the immobilised group, a documented rationale for plaster application was available in 65% of cases, with several recurring themes identified.



9.1% complications
5.8% further surgery
44% no post op imaging
10% patient-initiated follow-up only

12.9%of cases complications
65% had documented reasons to immobilise
Reasons included:
Significant comminution
Poor bone stock
DRUJ laxity

Conclusions

Post-operative plaster immobilisation following distal radius fracture fixation does not appear to increase complication rates, with outcomes comparable to previously reported rates (11.7%)[4]. A pragmatic approach to follow-up and selective use of postoperative imaging is appropriate for most cases. Immobilisation may still be considered in specific scenarios, including significant fracture comminution, poor bone quality, proximal fracture extension, DRUJ instability, or a conservatively managed ulna neck fracture.

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A family centred core outcome set for infants with Developmental Dysplasia of the Hip undergoing brace treatment

J Craven, WWES Theunissen, O O'Malley, DMG Winson, E Morely, M Asher, C Carpenter, DC Perry

A core outcome set (COS) is a standardised set of outcomes defined by key stakeholders, that should be measured and reported in all clinical trials for a particular condition. A family-centred COS defines key outcomes assessing the impact of infant brace treatment for DDH on families. This study aims to identify the necessary outcome domains through consensus.

Literature review and initial survey

- 131 survey participants
- A comprehensive list of potential outcomes was developed through a literature review and survey involving key stakeholders.
- 14 outcomes identified for inclusion in Delphi (12 from literature review; further 2 from survey)

Round 1 Delphi

- 190 participants
- Potential outcomes were then evaluated on a 9 point Likert scale.
- "Consensus in" required ≥ 70% of participants to rate the outcome 7-9, with ≤15% rating the outcome 1-3. "Consensus out" required ≥70% of participants to rate the outcome 1-3, with ≤15% rating the outcome 7-9.

Round 2 Delphi

- 127 participants
- 6/14 outcomes met consensus definition through Delphi round 1
- Outcomes which did not reach consensus were re-rated,
- A further 2 outcomes reached consensus in during round 2.

Final consensus meeting

- 25 participants
- Outcomes that did not reach consensus were discussed during a final consensus meeting, where a broad group of stakeholders voted on the inclusion or exclusion of these outcomes.
- Final COS agreed with 9 outcomes (3 parent centred; 5 infant centred)

Final core outcome set



- Parental well-being
- Availability of information and resources
- Infant- parent bonding



- Infant cleanliness
- Infant sleep
- Infant comfort
- Infant development
- Infant skin irritation

This family-centred COS is the recommended minimum for trials on infants undergoing brace treatment for DDH. Further work is needed to develop a suitable data collection tool. This COS will enhance clinical trials by ensuring consistent reporting of family-centred outcomes ensuring the impact to the family unit is considered when evaluating treatment options.

NIHR | National Institute for Health and Care Research

steps We don't take walking for granted

UNIVERSITY OF LIVERPOOL

Abstract 47 WOS 2025

GOOD TRAINING SHOULD BE PATIENT-CENTRED: AN ANALYSIS OF PATIENT-CENTREDNESS AMONG T&O TRAINEES IN WALES

Deepika Pinto[1], Peter Cnudde[1], Stefan Bajada[1], Clare Carpenter[2]
[1] Hywel Dda University Health Board
[2] Cardiff and Vale University Health Board

BACKGROUND

Patient-Centred Care (PCC) is a model of healthcare which encourages collaboration and shared decision-making between patients, families and healthcare providers; to provide holistic and bespoke care.

AIM

To assess the current state of PCC and its training among T&O trainees in Wales.

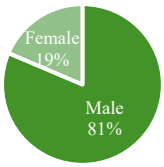
METHODS

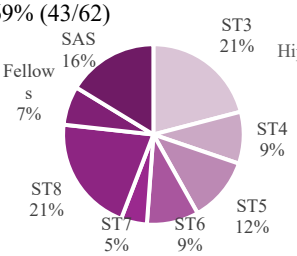
A survey was designed, refined by trialling in a pilot group and then electronically circulated among trainees. Anonymised responses were collected.

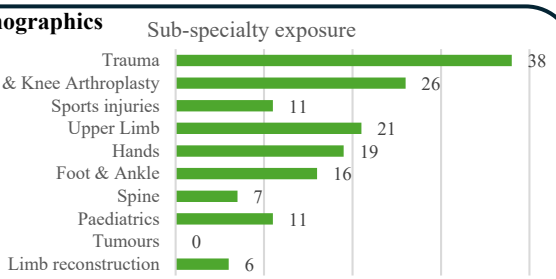
RESULTS

Demographics

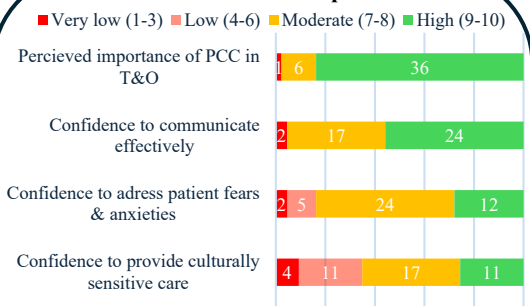
Response rate: 69% (43/62)

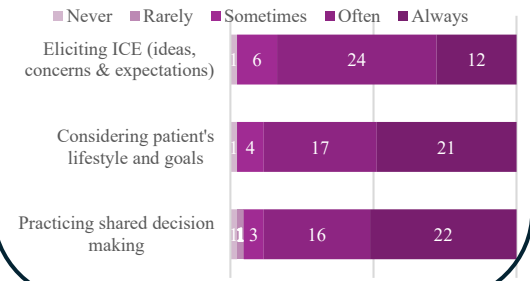




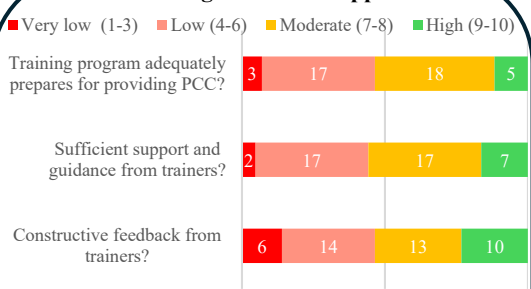


Attitudes & Competencies



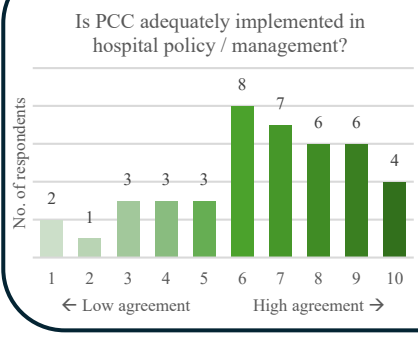


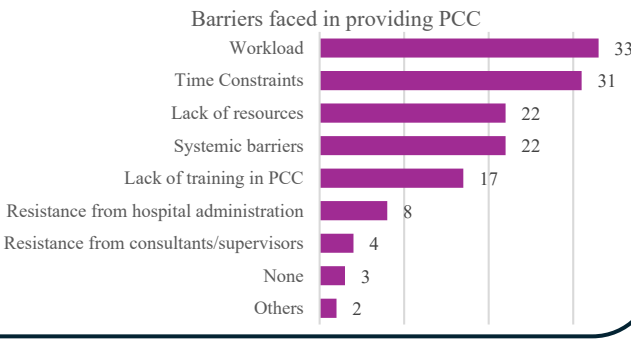
Training & Trainer support



- 74% trainees reported receiving no formal PCC training.
- 63% trainees expressed interest in receiving PCC training.
- Preferred modalities for PCC training:
  - ✓ Courses/workshops (47%)
  - ✓ Simulation exercises (37%)
  - ✓ Webinars (33%)
  - ✓ Mentorship programmes (30%)
  - ✓ Lectures (21%)

Administrative Support & Barriers





CONCLUSION

Orthopaedic trainees in Wales are cognizant of PCC and are reasonably confident in providing it but would welcome further training and development of resources.

For further information, please contact Deepika Pinto (deepika.pinto@wales.nhs.uk)

Bwrdd Iechyd Prifysgol Hywel Dda University Health Board

Radiation Safety in Orthopaedic Trauma Theatre:

A Two-Cycle Audit in Hywel Dda University Health Board

Foziazeb Khan[1] , Hamid Daud[2], Guddhika Premarathna, Ravi Ponnada

BACKGROUND

Ionising radiation is classified as a Group I human carcinogen, with occupational exposure in orthopaedic trauma theatres posing significant potential health risks, including cancer, cataracts, infertility, and birth defects. (1) For this reason, the International Commission on Radiation Protection that establishes the occupational dose limits for radiation exposure recommends an overall limit of either 20mSv per year, or 100mSv in 5 years, with no 1 year > 50mSv. (2)

The fundamentals of radiation protection are based on the three pillars of time, distance, and shielding (Figure 2). In addition to the ALARA principle (As Low As Reasonably Achievable), these serve as part of the foundation for the Ionising Radiation Regulations 2017 enforced by the Health and Safety Executive, along with local Trust guidelines, to

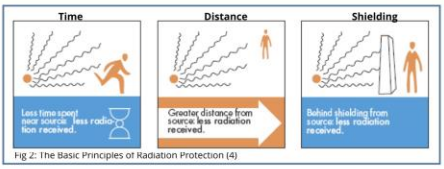


Fig 2: The Basic Principles of Radiation Protection (4)

AIMS AND METHODS

Our aim was to assess three key Domains:

1. Knowledge of the Trust's radiation guidelines
2. Awareness of radiation safety principles
3. Use of radiation protective gear (RPG) in theatre*

*Domain 3 was tested with regards to specific RPG used by staff in theatre (such as lead aprons, thyroid collars, and leads glasses), as well as the frequency with which these were used during different types of surgeries (mainly wrist, ankle, and hip surgeries).

Information was collected using an online questionnaire distributed among Trauma and Orthopaedics (T&O) Consultants, Middle Grade Doctors, Junior Doctors (SHOs), Anaesthetists, Anaesthetic Team members, Scrub Nurses, and Other theatre staff.

Following the first cycle, as both additional gear and information leaflets about Radiation guidelines had been introduced throughout the Trust, an important part of this second cycle was to conduct a comparative analysis in order to evaluate the impact of the initial changes, and help identify any remaining areas of weakness that could be further improved.

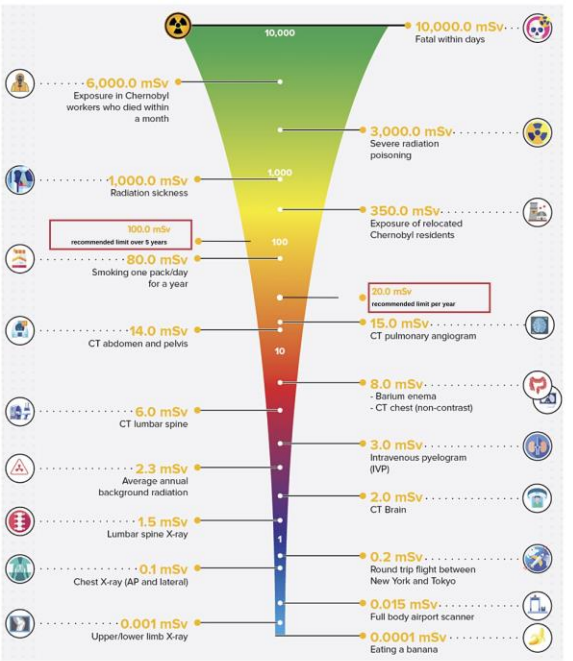


Fig 1: Radiation sources and the doses in milliSieverts (mSv) that are absorbed by the body. (5)

RESULTS

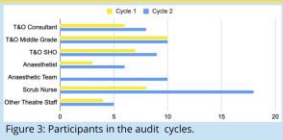


Figure 3: Participants in the audit cycles.

In this audit cycle, we received responses from 66 staff members, compared to the 38 staff members that participated in Cycle 1. (Figure 3)

When asked about the provision of additional RPG since Cycle 1, 49% of participants reported more lead aprons were available to use, 9% reported more thyroid guards were available, and about 20% responded "Not Applicable" due to being new staff who were unaware of the changes.

As in Figure 3, all results in the subsequent tables and charts pertaining to data from Cycle 1 have been highlighted in yellow, and all results of Cycle 2 data have been highlighted in blue.

DOMAIN 1

	Yes	No
Have you come across the Radiation Guidelines for the Trust?	21.1%	78.9%
	43.9%	56.1%

DOMAIN 2

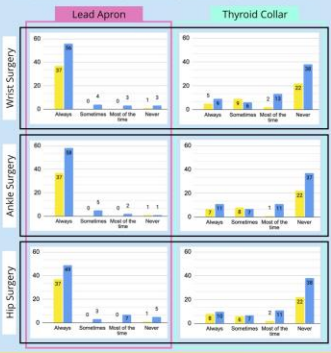
	Yes	No
Are you aware of the 3 Principles of Radiation Safety?	55.3%	44.7%
	43.8%	56.3%
Are you aware of the radiation risk to the thyroid gland?	81.6%	18.4%
	84.8%	15.2%
Are you aware of the radiation risk to the eyes?	44.7%	55.3%
	56.1%	43.9%
Have you heard of lead glasses?	36.8%	63.2%
	54.5%	45.5%
Do you think standing behind a person wearing RPG provides enough protection to a person without RPG? (Note: In Cycle 1, 13.2% answered "Maybe" as this was an option given)	13.2%	73.7%
	10.6%	89.4%

How far from an Xray machine should a person be without a:

	Lead Apron	Thyroid Collar
1 meter	0%	5.3%
	3%	6%
1.5 meters	5.3%	15.8%
	6%	9.1%
2 meters	21%	15.8%
	15%	25.8%
2.5 meters	2.6%	23.6%
	0%	7.6%
3 meters	5.3%	15.8%
	11%	16.7%
Outside theatre	65.8%	23.6%
	65%	34.8%

DOMAIN 3

Frequency of RPG use by staff during different types of surgeries:



CONCLUSIONS

Although the second audit cycle involved increased staff participation, and awareness of the Trust's Radiation Guidelines was noted to have somewhat improved between the two cycles, the overall awareness of Radiation safety principles remains suboptimal, with marginal increases in most categories tested.

When it came to use of protective gear during surgery, there was no significant positive change noted in the frequency with which lead aprons and thyroid collars were used. There unfortunately also continued to be noncompliance among some staff members who never used these RPG when they should have, both endangering themselves by exposing themselves to high levels of radiation, and going directly against Trust policy in some cases.

Additionally, although it is not included in the results below, only one staff member reported "Always" using lead glasses during Ankle surgery in Cycle 1, compared to Cycle 2 where four reported "Always" doing so during both Ankle and Wrist Surgeries, and one doing so during Hip surgeries as well. All other participants reported "Never" using them for any type of surgery. This may be due to the fact that lead glasses are not routinely provided by the Trust, and any surgeons utilizing them would most likely be a Specialist Consultant using a pair they had purchased themselves.

Overall, these results indicate a clear need for further Trustwide improvements in all three domains tested, with more audit cycles to be conducted in order to assess the differences made after the introduction of new changes to the availability of both information and radiation protective equipment for theatre staff.

NEXT STEPS

After completing this audit cycle, we intend to enact the following changes in order to make lasting improvements in each of the three domains that were tested:

1. Educate all staff working in Trauma theatres on the Trust's guidelines and the Radiation Safety Principles. In order to accomplish this, we will need to:
   a. Present our audit findings in the monthly Trauma and Orthopaedics departmental meeting, which we have already been able to do for both cycles of the audit.
   b. Present our audit findings in the Anaesthetic departmental meeting and the Theatre staff departmental meeting.
   c. Create and post information leaflets in theatre areas in all hospitals within the Trust with local Radiation guidelines.
2. Liaise with the Radiology Lead Superintendant to facilitate organizing for radiation Dosimeters to be provided to the Trust Registrars and main Trauma Consultants operating in theatre cases that utilize portable Xray machines in order to measure their actual annual radiation exposure over the course of 4-6 months.
3. Evaluate whether lead aprons provide adequate protection to female staff members against radiation to the breasts as the aprons used in our Trust have a generic shape that better fits a male body.
4. Liaise with the Radiology and Theatre departments to order more lead aprons and thyroid collars to improve availability, and hopefully compliance with their use
5. Repeat another cycle of the audit once the above have been done in order to assess the impact of the newly introduced changes.

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