Welsh Orthopaedic Society Annual Meeting 2025

Podium Presentation Session 2: Foot and Ankle; Paediatrics

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Minimally Invasive Chevron Akin (MECA) for Hallux Valgus Surgery

A Prospective Observational Study with Mean 6.8 Year Follow Up



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Disclosures

- Niall Hill – no disclosures
- David Gordon – Paragon 28 consultant / royalties
- Oliver Townsend – no disclosures
- Togay Koç – no disclosures
- Adam Reaney – no disclosures
- Tom Lewis – no disclosures

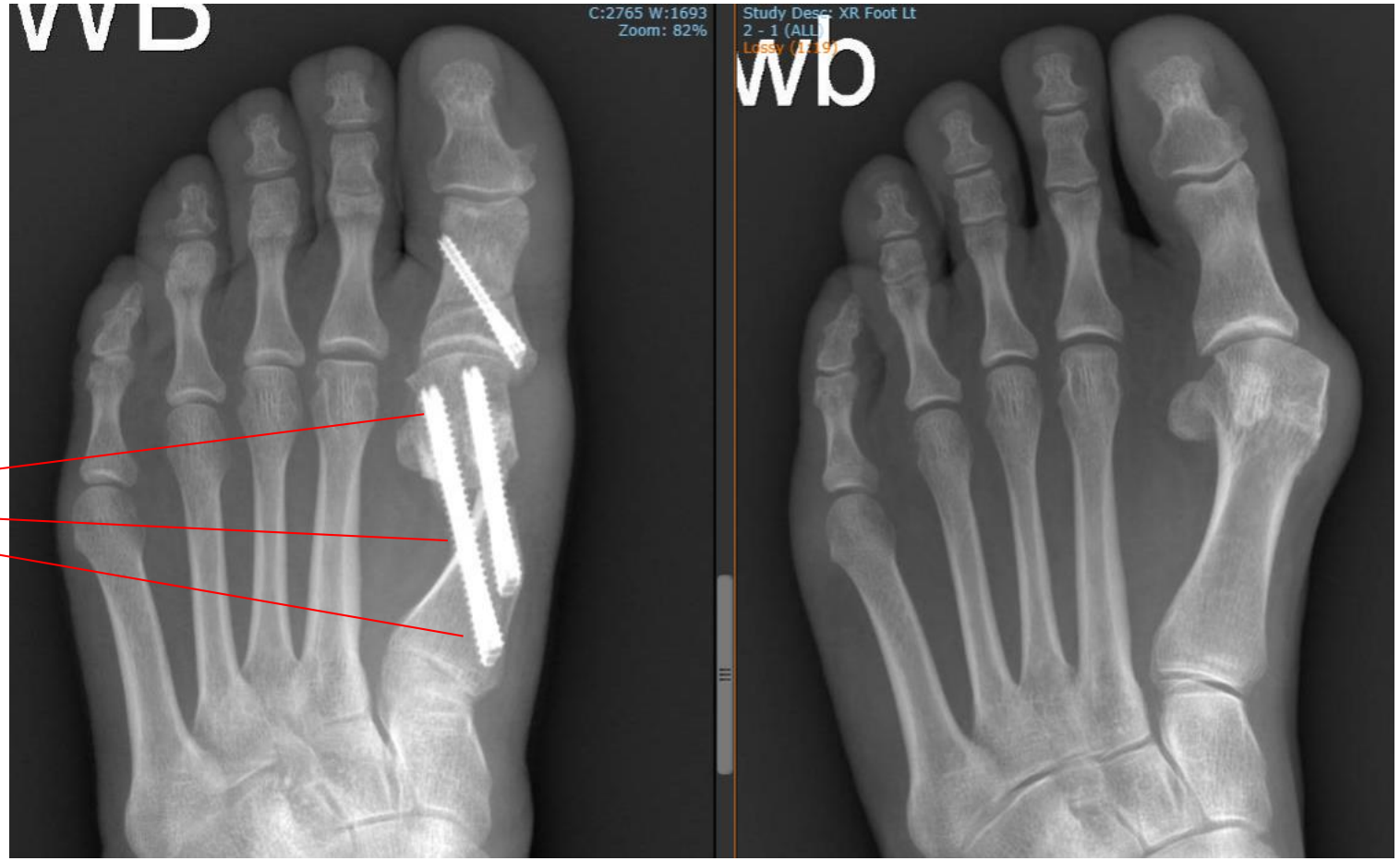
4th Generation Minimally Invasive Surgery for Hallux Valgus

- Percutaneous distal M1 osteotomy
- Chevron (MECA) / transverse (META)
- 2 screws
- 3, 3.5 or 4mm holding screws



4th Generation Minimally Invasive Surgery Terminology Continued

3-point fixation



4th Generation Minimally Invasive Surgery Terminology



- MECA/MICA
  Minimally Invasive Chevron & Akin
- META
  Metaphyseal Extra-Articular Transverse & Akin

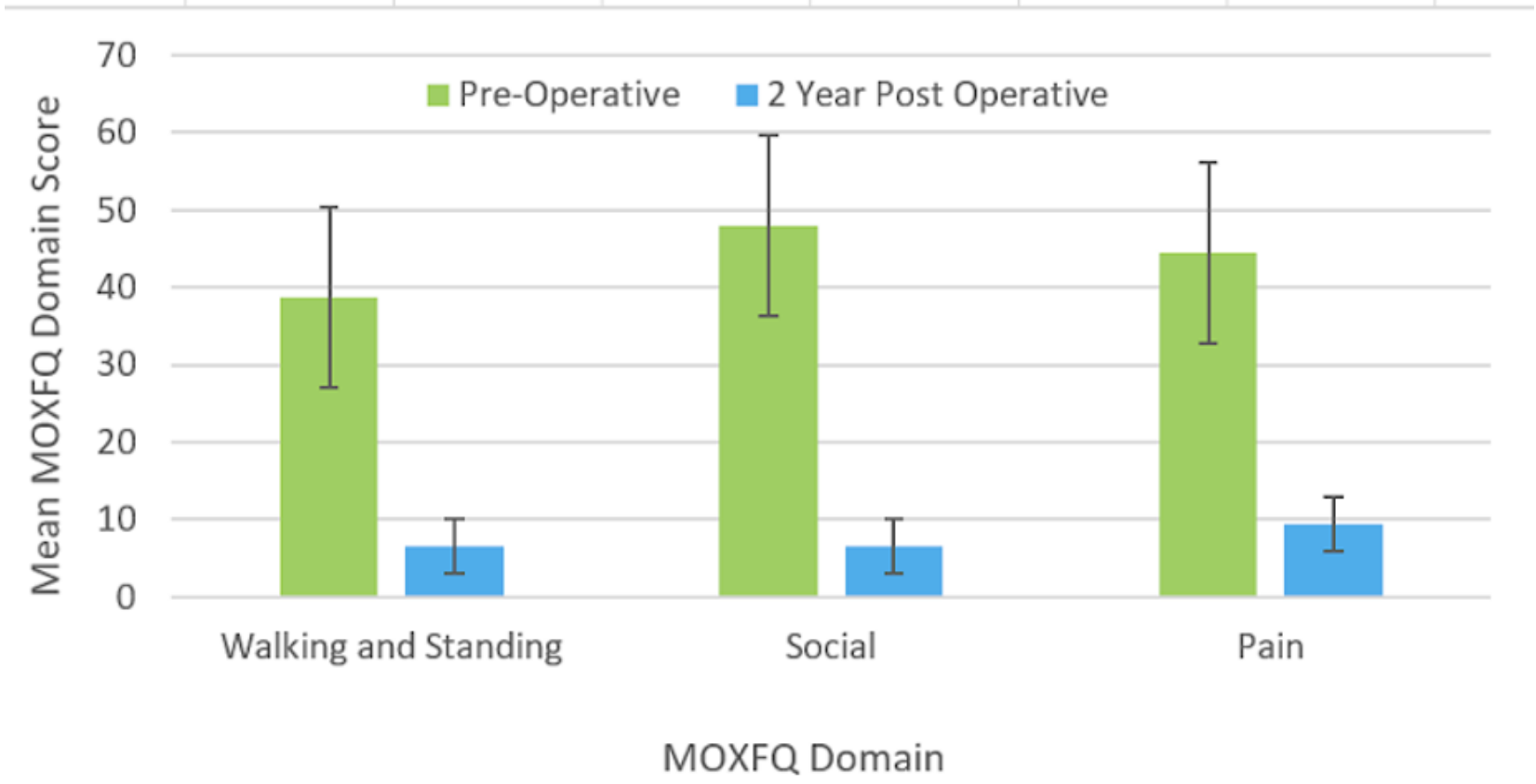


Introduction

- Lewis et al JBJS Am 2021
- Single surgeon (DG) prospective series
  - 2 year follow up
  - 333 consecutive feet
- Mild to severe deformities
- PROMs
- Radiographs: Pre- and 6-week post-op (HVA and IMA)

	IMA *(deg)*				**HVA** *(deg)*			
	Preop.	Postop.	**Mean Deformity Correction**	P Value	Preop.	Postop.	**Mean Deformity Correction**	P Value
Mean ± SD	15.3 ± 3.6	5.7 ± 3.2	**9.6 ± 3.8**	<0.001	32.9 ± 10.2	8.7 ± 5.2	**24.1 ± 9.7**	<0.001
Minimum	6.5	−0.7 (valgus)			8.6	−4.1 (varus)		
Maximum	27.0	18.1			63.9	32.1		

2 Year Follow Results: 2021 (MOXFQ)



n=292 feet

- Significant improvements PROMs

MOXFQ



- Manchester-Oxford Foot Questionnaire
- Validated PROM for hallux valgus surgery
- Index comprising of 3 domains (0-100):
  - Walking & standing, social interaction, pain

This Study - Aims

- Follow up 2-year cohort
- Re-evaluate PROMs
- At minimum 5 years



Hypotheses

- Between Pre-op and 5 years, post MECA
- Clinically significant improvement in PROMs

- Between 2 and 5 years, post MECA
- No clinically significant change in PROMs

Method

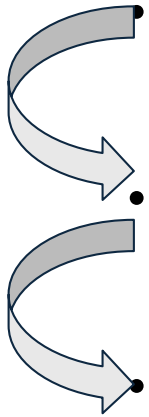
- All 2-year patients contacted for up-to-date PROMs:
  - Manchester-Oxford Foot Questionnaire (MOXFQ)
  - EuroQol-5 Dimensions Index (EQ-5D)
  - EuroQol Visual Analogue Scale (EQ-VAS)
  - VAS for pain (VAS-pain)
- Database review (Amplitude, UK)
- 3 x emails
- Then 3 x telephone calls
- No radiological follow up

Method

- PROMs compared:
  - Paired t-test ($p<0.05$)
  - Pre op vs 5 years
  - 2 years vs 5 years



Recruitment Results



- 230 patients / 333 feet (Initial)
- 200 patients / 292 feet (2 yr study - 88%)
- 164 patients / 240 feet (5 yr study - 72%)

- Mean follow-up: 6.8 years +/- 1.0
  - Minimum 5 years
- Mean age: 55.2 years (range 23.5-79.9)
- 96 % female
- 128 left, 112 right

Results: Pre-Op vs 5 Years & 2 vs 5 Years

- Statistical Improvements in all PROMs
- Except EQ-VAS (quality of life)

Table 1: Patient Reported Outcome Measures for 240 feet

Domain		Pre-Operative	Min Two Year Follow Up	Final Follow Up	P-value (2yr-Final)	P-value (Base-Final)
MOXFQ	INDEX	42.4±19.7	7.0±12.2	8.5±16.5	0.129	<0.001
	PAIN	44.6±20.9	8.8±14.9	9.5±17.7	0.502	<0.001
	SOCIAL	47.9±22.0	6.2±12.3	7.8±17.1	0.118	<0.001
	WALKING	37.7±23.6	6.1±13.7	8.0±17.5	0.077	<0.001
EQ-5D-5L	VAS	82.9±14.6	85.1±15.6	84.8±14.2	0.921	0.247
	INDEX	0.748±0.132	0.905±0.133	0.906±0.12	0.775	<0.001
	VAS PAIN	31.7±22.8	7.9±15.6	12.3±21.0	0.016	<0.001

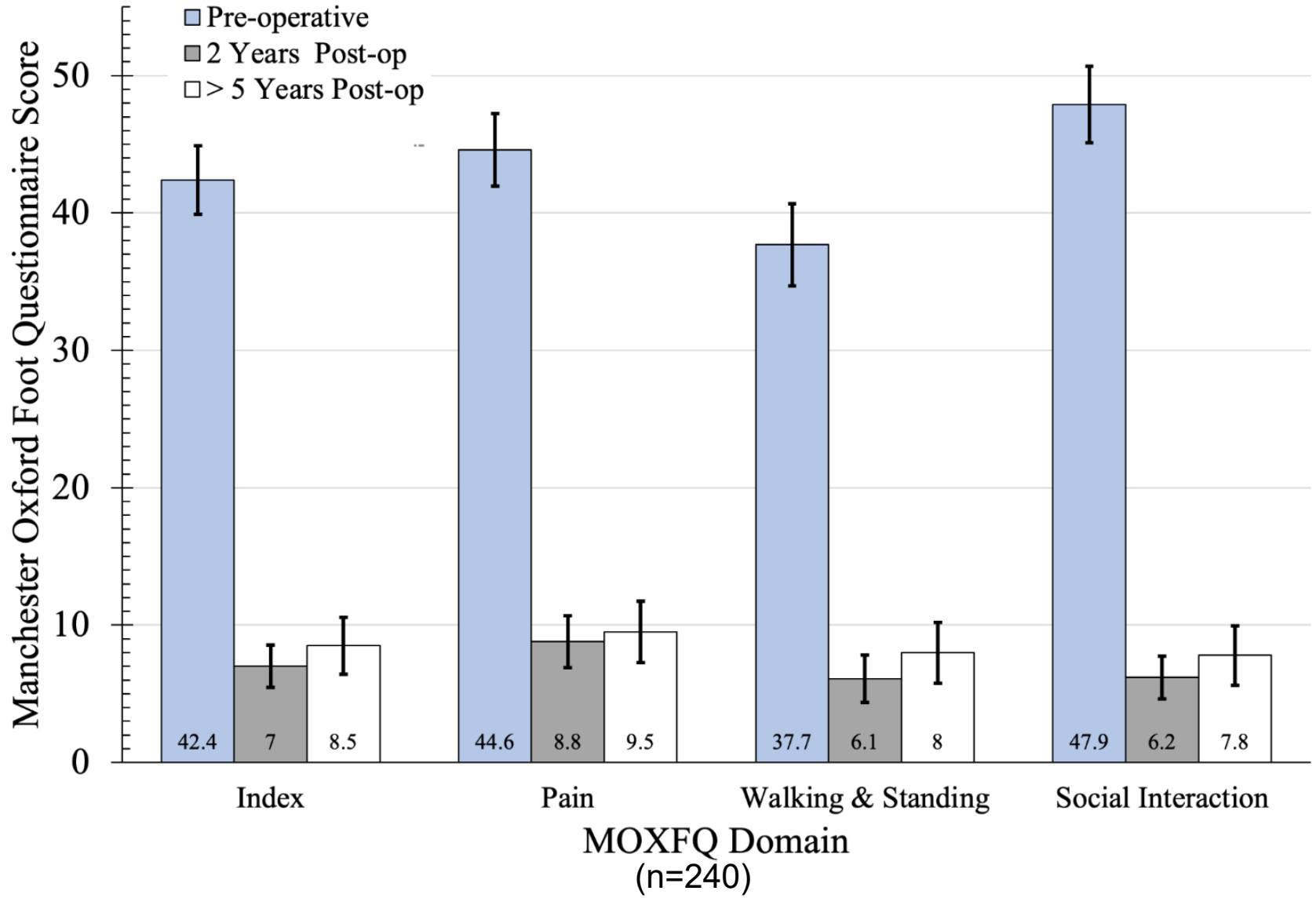
Results: 2 Years vs min 5 Years

Table 1: Patient Reported Outcome Measures for 240 feet

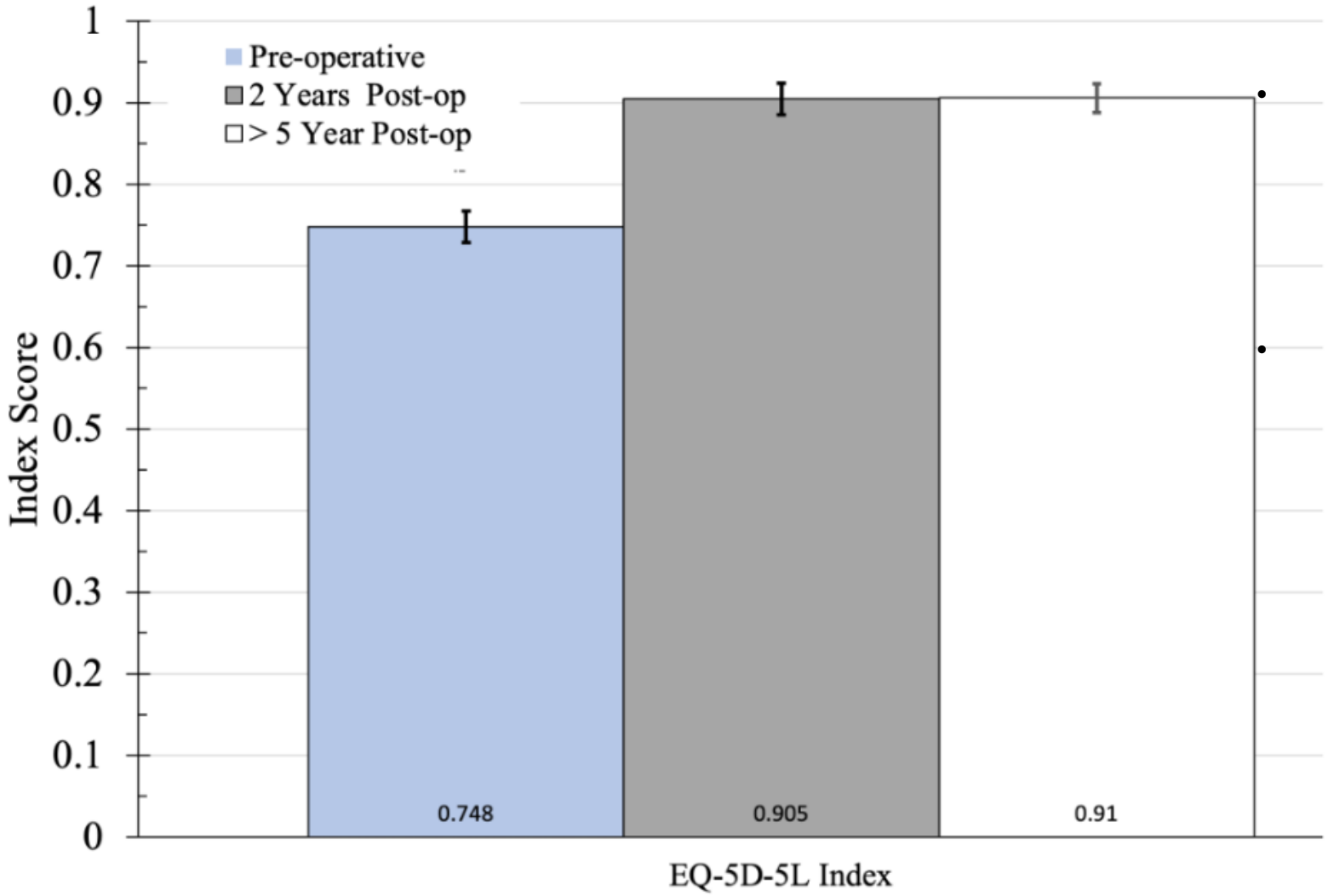
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	VAS PAIN	31.7±22.8	7.9±15.6	12.3±21.0	0.016	<0.001

- No statistically significant changes in any domains between 2 and min 5 years except VAS pain

Pre-op, 2 Year & 5 Year: MOXFQ

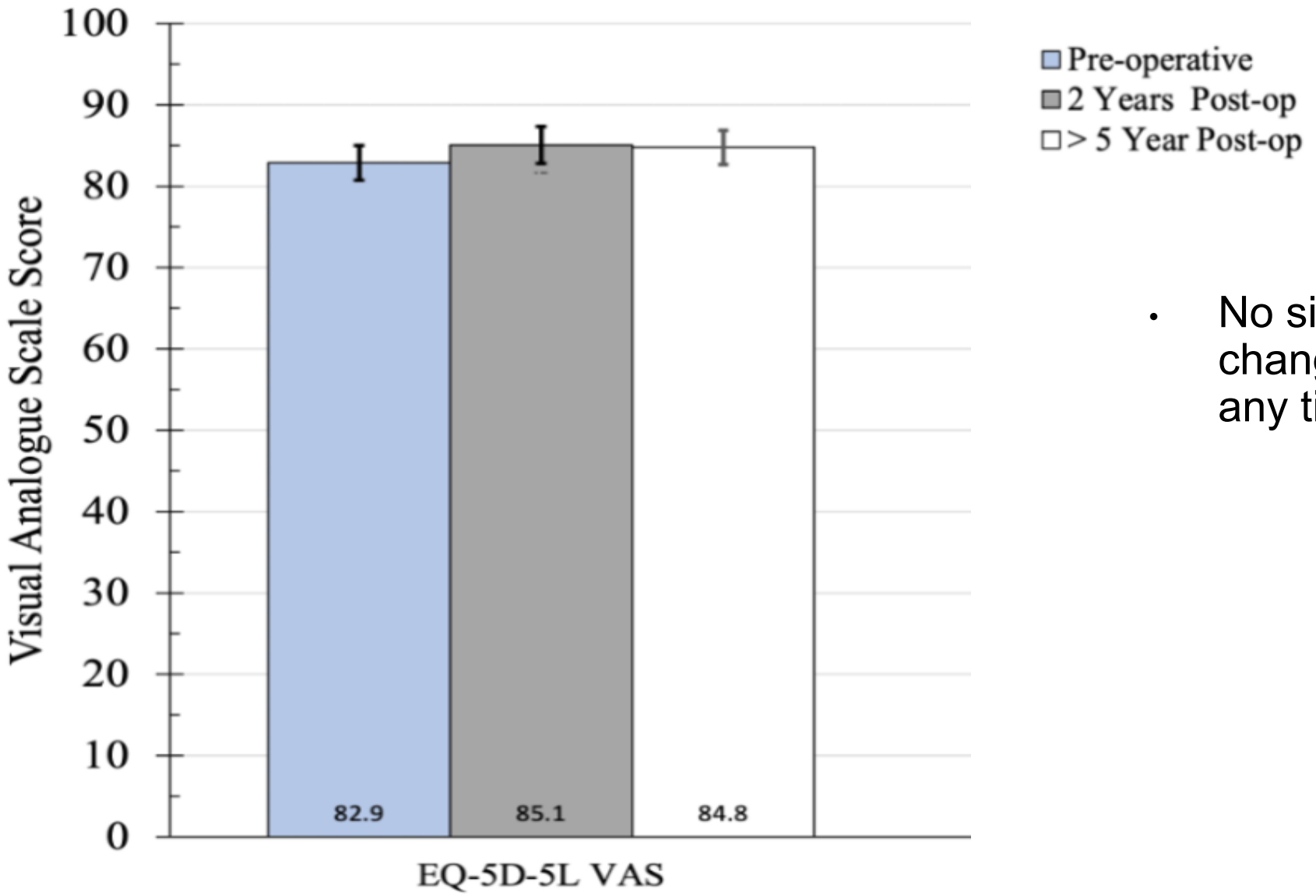


Pre-op, 2 Year & 5: EQ-5D Index



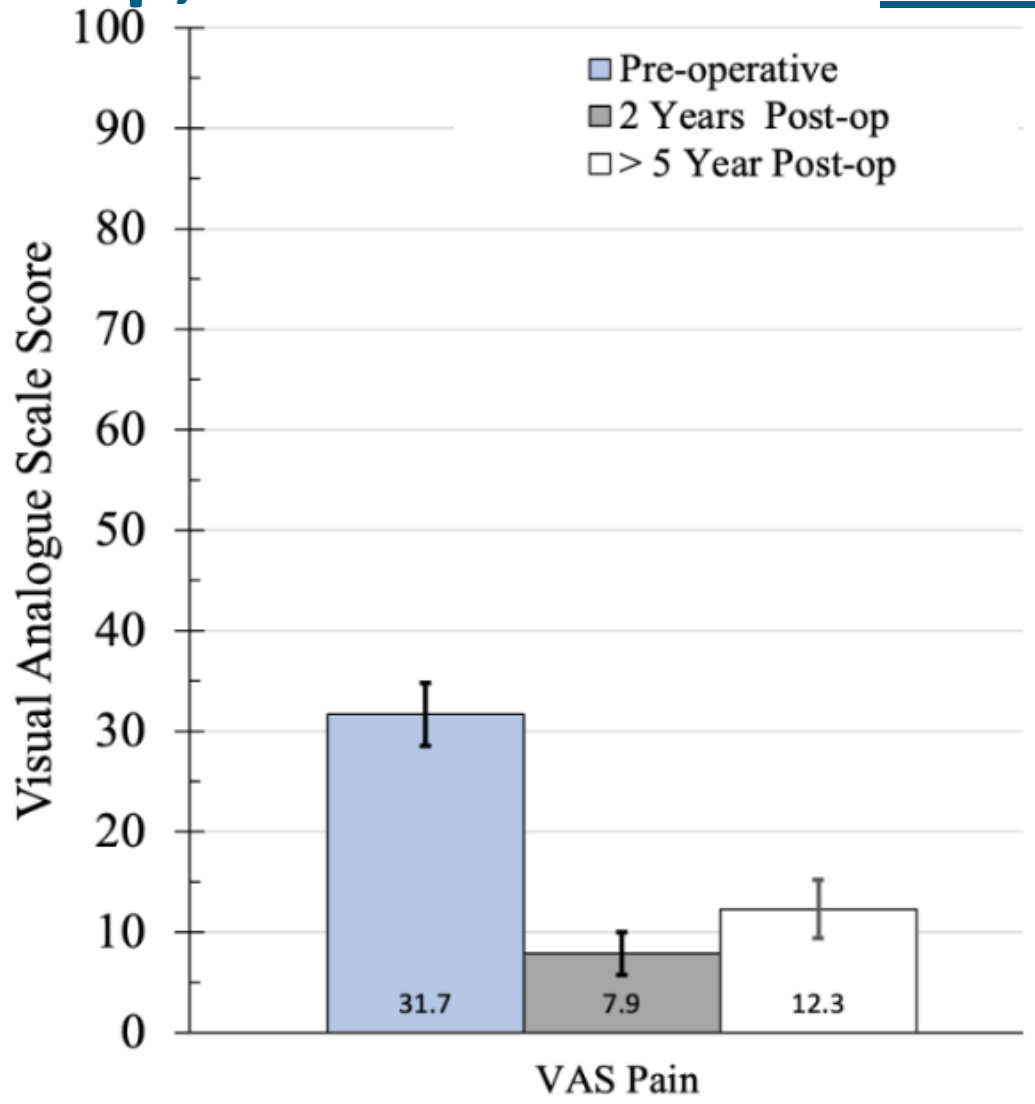
- Increase between pre op and 5 years (0.75>0.9)
- No change between 2 and 5 years

Pre-op, 2 Year & 5 Year: EQ-VAS



- No significant change between any time point

Pre-op, 2 Year & 5 Year: VAS-Pain



- Large decrease between pre op and 5 years
  - 31.7 → 12.3
- Small increase between 2 and 5 years
  - 7.9 → 12.3
  - p = 0.016

Strengths & Limitations

Strengths

- Largest cohort at this time point (n=240)
- Longest follow-up for MIS HV surgery (mean 6.8 years)

Limitations

- Loss to follow-up
  - 82% of 2-year respondents; 72 % of original cohort
- Lack of radiological follow-up
- PROMs may lack some specificity for hallux valgus

Conclusions

- Significant improvement in PROMs at minimum 5 years after 4th generation MECA
- No statistically significant changes in MOXFQ or EQ-5D between 2-5 years
  - Small increase in VAS pain - ?non-specific to MECA
- Further radiological analysis planned to correlate with PROMs

Thank you





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STEPPING INTO THE FUTURE: THE ROLE OF COMBINED DYNAMIC IMAGING IN FOOT AND ANKLE SURGERY

S. Hanna, M. Thekkinithethil, A. Evans, S. Dalavaye, K. Somasundaram

Background

- Accurate diagnosis in foot and ankle surgery is key
- Challenging
- Complex anatomy of foot and ankle
- limitations of static imaging modalities



Combined Ultrasound scan

- MSK radiologist + F&A surgeon
- Dynamic examination
- Source of pain
- Targeted injection if required

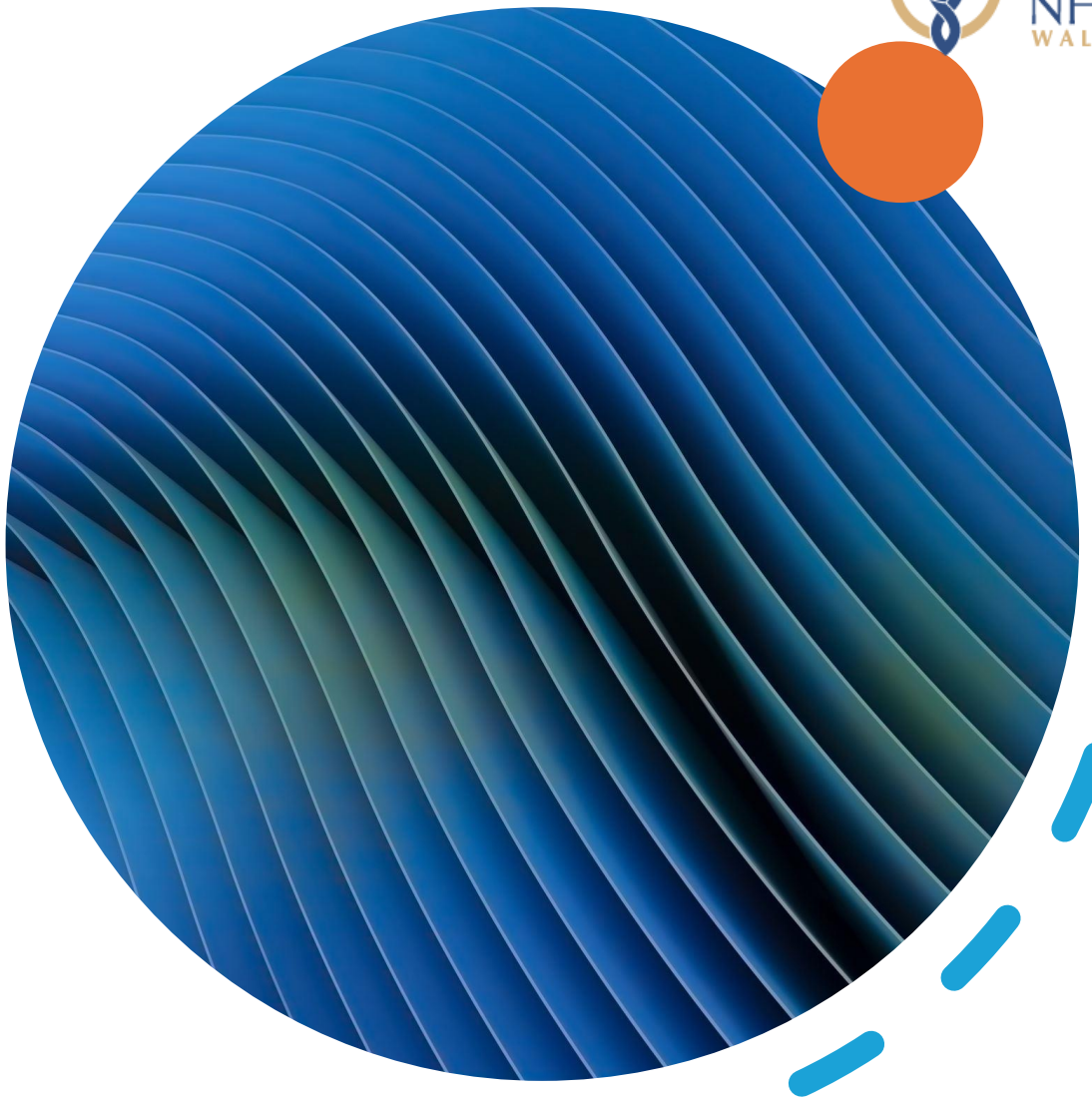


Advantages

1. provide real-time visualization of motion
2. help in diagnosing subtle instabilities
3. Improve accuracy of injections and interventions
4. detect dynamic pathologies that static images may miss

Aims of this study

- Analyse the effectiveness of combined ultrasound scanning to identify complex foot and ankle pathology
- Assess the impact of a combined ultrasound scan on improvement of patient symptoms
- Measure the benefit to surgical team



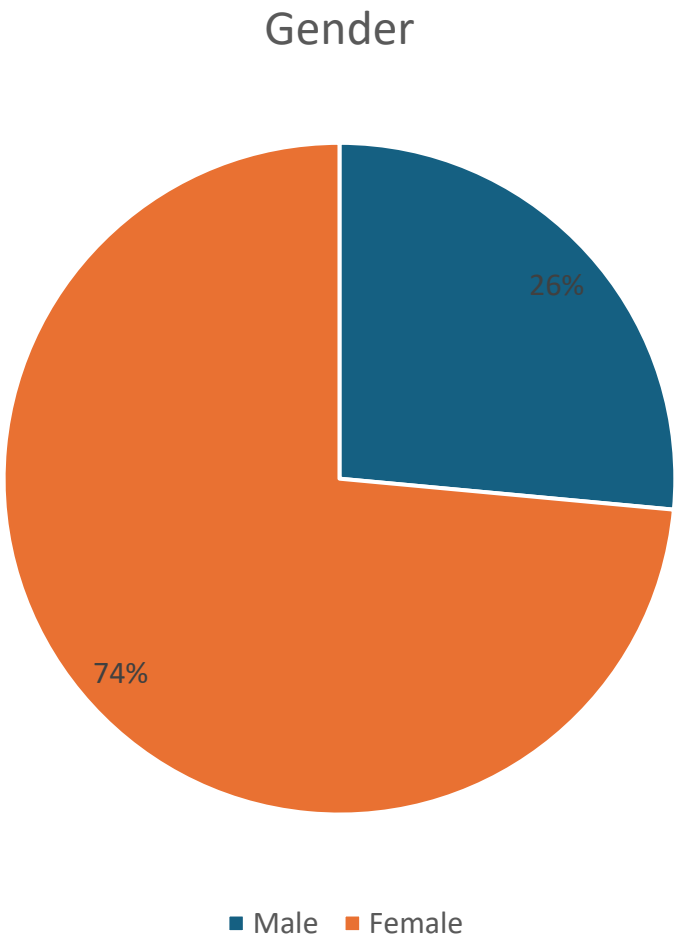
Methodology

- All scans
- Single F&A surgeon
- Single MSK radiologist
- Jan – Dec 2024



Results

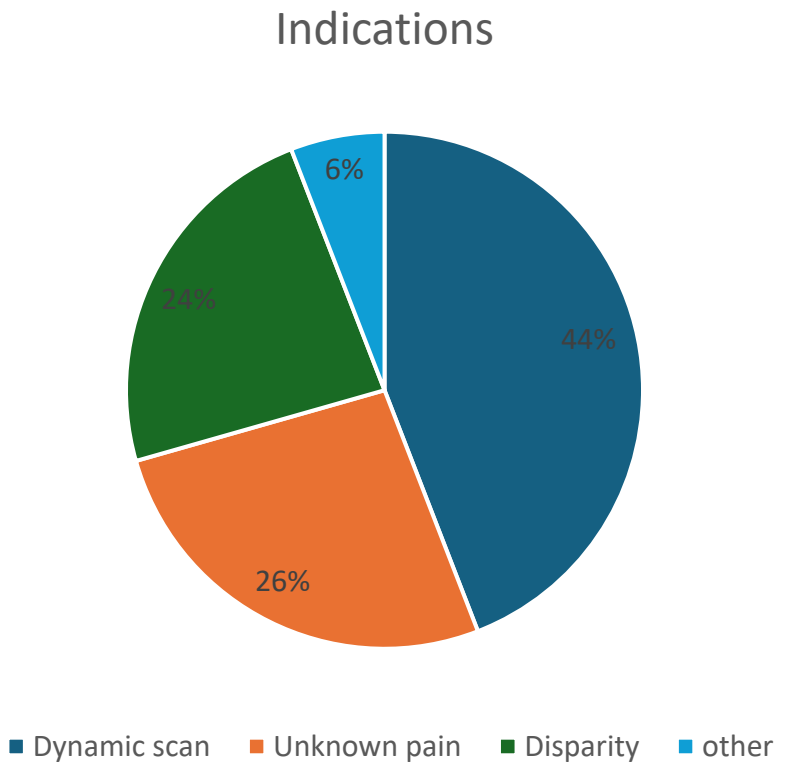
- A total of 34 patients in the study period.
- Female 25 (74%), Male 9 (26%)
- Age range from 17 to 86 (mean 49.2)
- Average waiting time for a scan 28.76 days



Results

- **Indications of scans:**

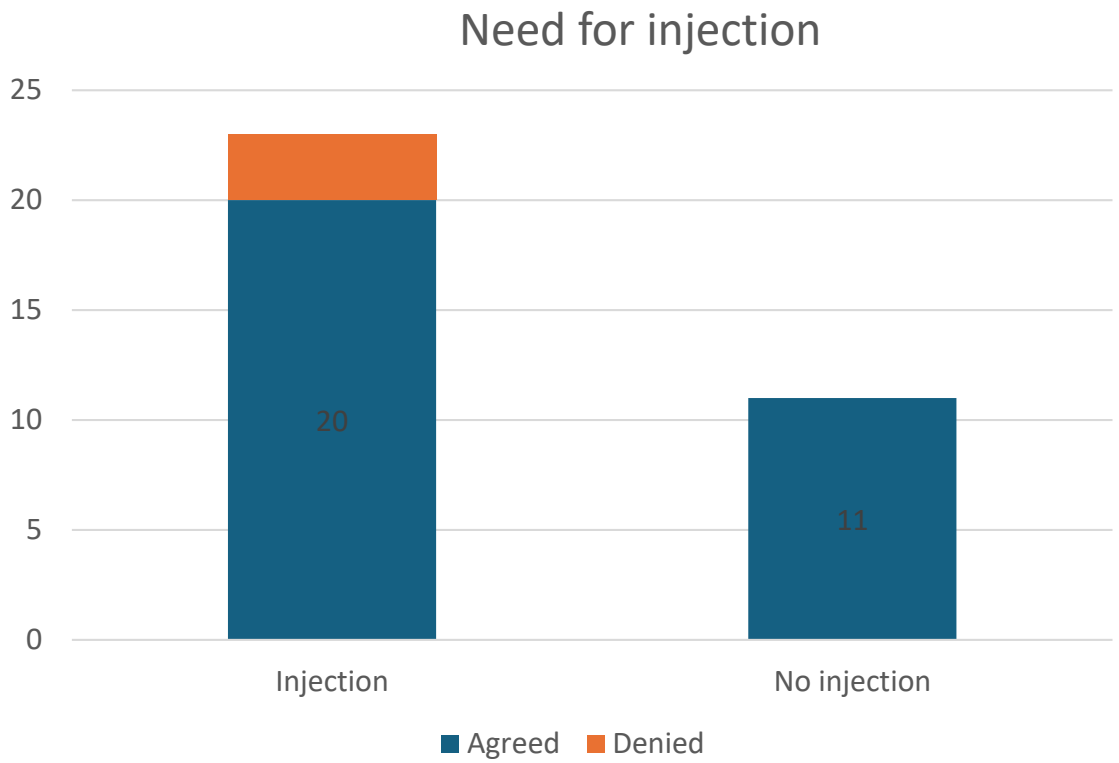
1. Dynamic ligament stability: 15
2. Unknown source of pain: 9
3. Disparity between clinical symptoms and MRI findings: 8
4. Other: 2



Results

Injections:

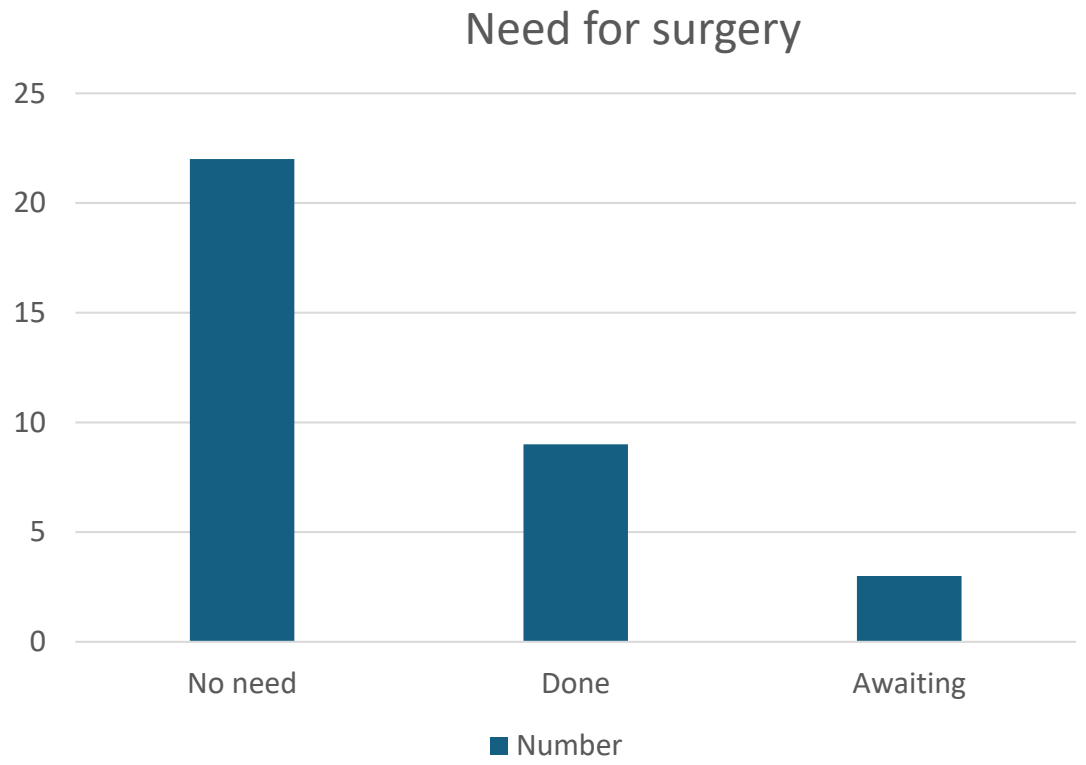
- 23 out of the 34 patients required injections
- 20 received and 3 declined



Results

Surgery:

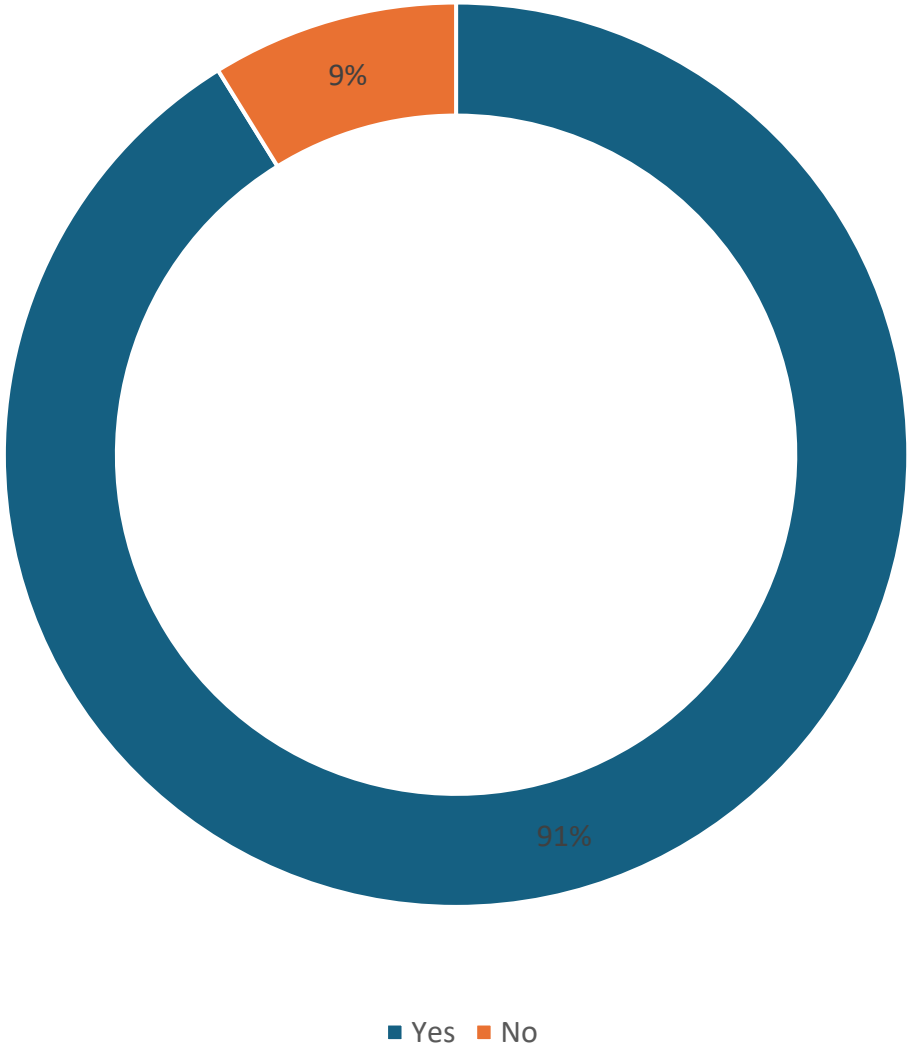
- 22 patients did not require furthersurgical intervention, while 12needed surgery after the scan.
- 9 patients had surgeries donewhile 3 are still on the waiting list



Results

Did the scan help/aid the diagnosis?

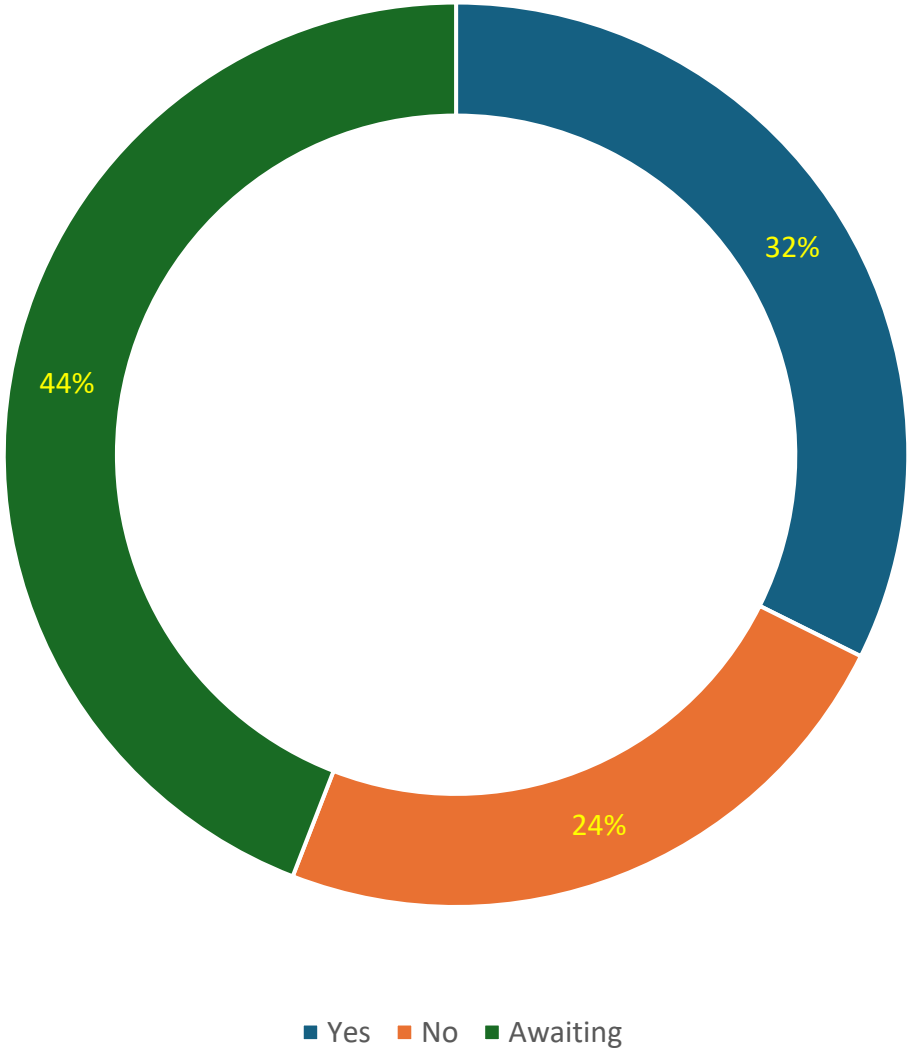
- Yes: 31
- No: 3



Results

Eventual clinical improvement:

- Yes: 11
- No: 8
- Awaiting review: 15



Case example 1

- 36 Y, F
- Chronic ankle pain following injury 7 years ago
- Clinical examination inconclusive for instability
- MRI scan shows intact ATFL and CFL

- Dynamic USS shows insufficiency of ATFL and CFL
- Patient was offered surgery and is on the waiting list currently

Case example 2

- 56Y, Female
- Chronic right lateral ankle pain, peroneal tendinopathy and ?instability
- Persistent pain instead of repeated injections

- Combined USS shows stable ligaments but suggested SPN neuroma as well as peroneal tendinopathy.
- Patient listed for neuroma excision and peroneal tendon decompression

Case example 3

- 58Y, Female
- Chronic post-traumatic right ankle pain and ?instability
- MRI findings are inconclusive

- Combined dynamic USS shows stable ankle ligaments but CCJ instability on dynamic testing.
- Diagnostic injection offered but declined by the patient and asked to be rescheduled

Conclusion

- Combined USS helps in the accurate diagnosis of foot and ankle pathologies and can guide the treatment
- This has demonstrated a positive impact in the patient clinical outcome in our study

Limitations

Retrospective study

Single surgeon and single radiologist

Short-term follow up

Recommendations

To look at combined USS done by all foot and ankle surgeons in the same study period

Prospective study with collection of baseline and follow up functional scores

Long-term studies to evaluate the impact of this service in treatment of foot and ankle pathologies



Thank you

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Evaluation of the clicky hip in the diagnosis of Developmental Dysplasia of the Hip

Arwel T Poacher, **Muslim Bilal,** Max Ross, Ella Daisy, Lily Scourfield, Hari Bhanchoo, Amy Smith, Elliot Kimber, Eleanor C Carpenter

Introduction:

- Developmental dysplasia of the Hip (DDH): is a disorder of abnormal hip development[1].
- Early identification <12 weeks is key to reducing the risk of surgical interventions.
- An extended screening program is utilised in Wales that also utilises clinical examination outside of NIPE/NICE guidance.
- British Society for Children's Orthopaedic Surgery (BSCOS) consensus statement identified the need for understanding of the efficacy of using a clicky hip as a 'risk factor' for ultrasound screening[2].

Type of Screening Program	Criteria for invitation to USS investigation:	Breakdown of risk factors included:	NIPE guidance
Current NIPE guidance (selective)	Abnormal exam and/or presence of a primary RF	Breech presentation at 36 weeks Family History Multiple birth (where any of the risk factors are present in one or more of the siblings)	Endorsed by NIPE and undertaken in NHS England.
Current practice within Wales (extended)	Abnormal exam, presence of primary and/or secondary RF	Oligohydramnios Foot deformities (CTCV, CTEV) Plagiocephaly Torticollis Syndromic	Not endorsed by NIPE only practiced in Wales.
Universal	All new-borns screened using USS	n/a	Not endorsed in the UK but utilised in mainland Europe.

Table 1: demonstrating the breakdown of different classification of screening programs for developmental dysplasia of the hip within the UK. CTCV, congenital talipes calcaneovalgus; CTEV, fixed congenital talipes equinovarus; NIPE, newborn and infant physical examination; RF, risk factors; USS, ultrasound.

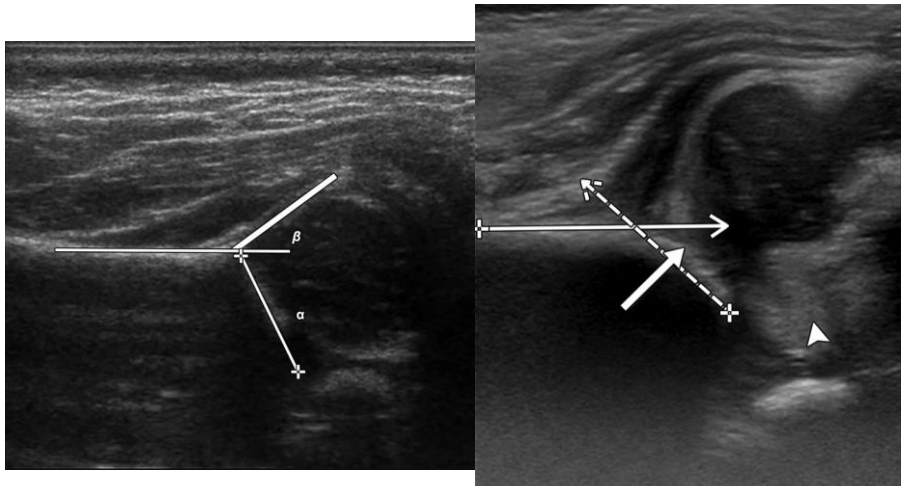


Figure 1: Radiographical images remonstrating the alpha and beta angle that form with Graf's classification of DDH (a) normal (b) abnormal[3]

Aim:

- **To evaluate the use of a ‘clicky’ hip as an indication for secondary assessment as per the British Society for Children’s Orthopaedic Surgery (BSCOS) consensus statement.[2]**

Methods:

- This was a retrospective evaluation of prospective registry of all patients born within the catchment area of a single tertiary centre (n=42,567) all of whom underwent a new-born and 6-8-week examination.
- Multivariate odds ratios and cumulative risk difference were calculated in relation to DDH (Graf type IIb-IV that required treatment) for those with ‘clicky’ hips (n=1,125).

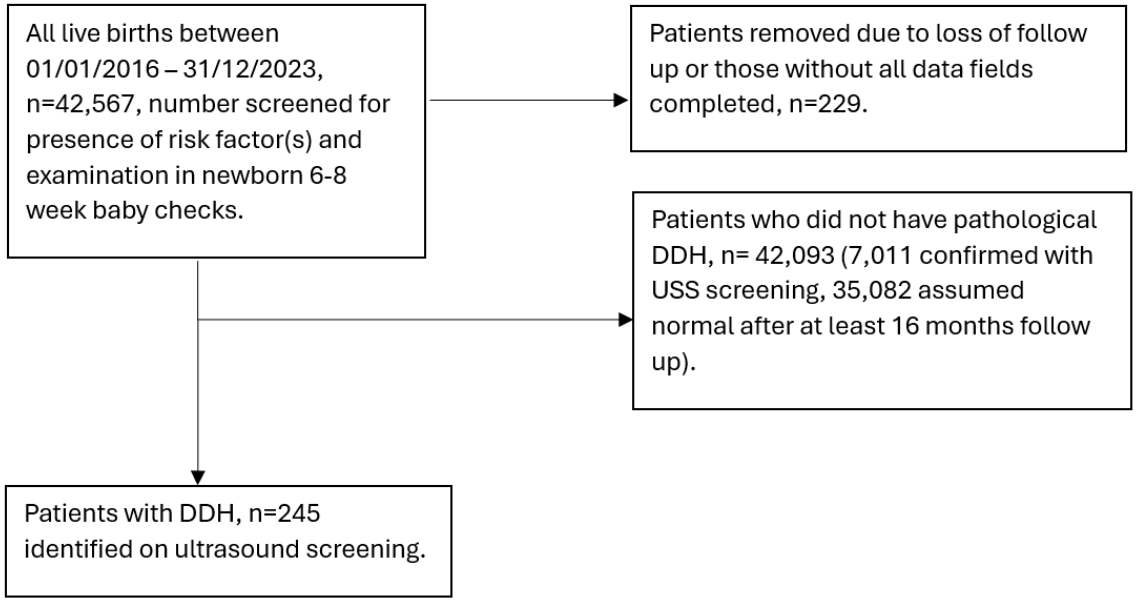


Figure 1. Flow chart demonstrating the inclusion/exclusion criteria and relevant cohort and investigation numbers of the study. DDH, developmental dysplasia of the hip.

Results:

- The prevalence of pathological DDH that required treatment in our population was **5.8/1000 live births (n=245).**
- Prevalence of a clicky hip in our population was **26.4/1000 live births.**
- A ‘clicky’ hip had a sensitivity of **16.3%** (n=40/245) for DDH.
- A ‘clicky hip’ had a positive predictive value (**PPV) of 3.56%** (CI: 2.69 – 4.69%) for DDH.

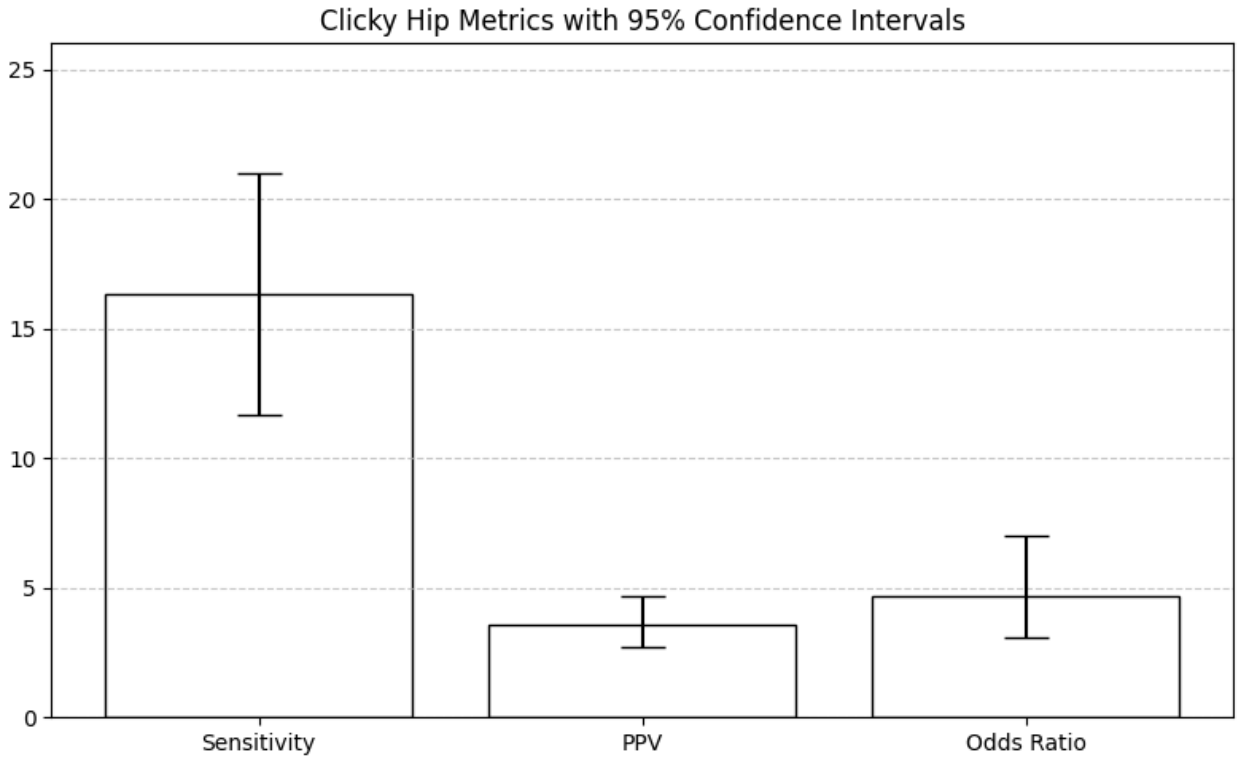


Figure 1: A graph to show the sensitivity, odds ratio, and PPV for ‘clicky hip’ on examination. Error bars demonstrate 95% confidence intervals, P-<0.0001. PPV (positive predictive value).

Results:

- The adjusted OR for a clicky hip was **4.68**, comparable to other NIPE accepted risk factors such as breech presentation (OR = 5.80) and family history (OR = 6.97).
- Statistically there is **no significant difference** between multivariate odds ratios of clicky hip and breech presentation or family history.

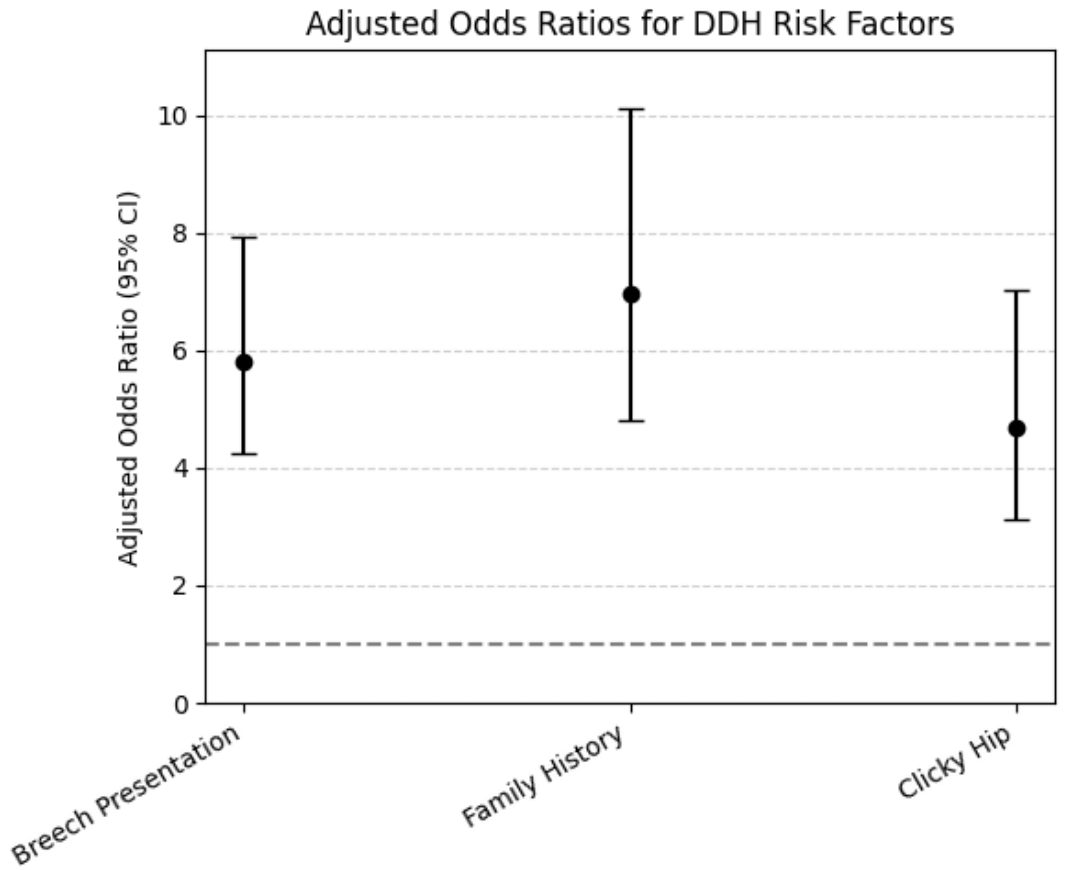


Figure 2: A graph to show multivariate adjusted odds ratio of each risk factor. Error bars demonstrate 95% confidence intervals. ***, p-<0.0001

Results:

- The risk difference of having DDH with clicky hip is **3.06%**, comparable to that of primary risk factors breech (2.10%) and family history (4.24%).
- Statistically there is **no significant difference** between risk difference of clicky hip and breech presentation or family history.

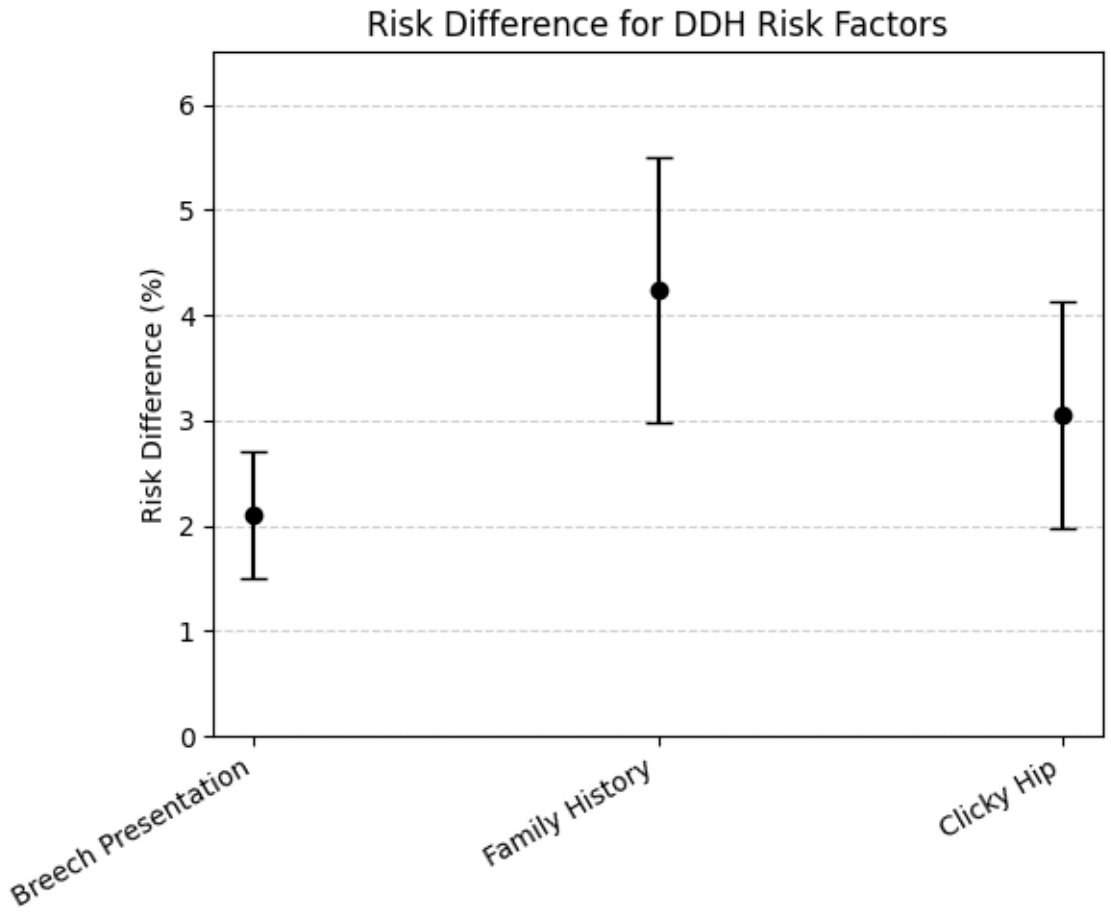


Figure 2: A graph to show risk difference of each risk factor. Error bars demonstrate 95% confidence intervals. ***, p-<0.0001

Conclusions:

1. This study has evaluated the role of the ‘clicky’ hip in neonatal hip screening.
2. Demonstrating a statistical association between pathological DDH and the clicky hip equal or superior to that of other primary risk factors, addressing the BSCOS consensus statement.
3. This study suggests ‘clicky’ hips should be included as part of the referral criteria for ultrasound screening within the national neonatal hip screening programme to reduce the rates of missed cases.

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Thank you for listening!

Are there any questions?

Conflict of Interest: None

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Effective radiation exposure in a missed case of developmental dysplasia of the hip

Arwel Poacher[1] **Aled Evans (Presenting)*[2]**, *Daniel Thomas[3]*, *Amy Smith[1]*, *Lily Scourfield[4]*, *Gregor Ramage[1]*, *Kendra Nwamadi[1]*, *Joanna Craven[5]*, *Clare Carpenter[6]*

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[2]Royal Glamorgan Hospital, Llantrisant, United Kingdom
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[4]Imperial College Healthcare NHS Trust,, London, United Kingdom
[5]Liverpool Univeristy, Liverpool, United Kingdom
[6]Noah's Ark Children's Hospital, Cardiff, United Kingdom

Introduction:

- Developmental dysplasia of the Hip (DDH): is a disorder of abnormal hip development[1]
- Early identification <12 weeks is key to reducing the risk of surgical interventions
- An extended screening program is utilised in Wales to prevent missed cases of DDH
- A missed case is associated with significant radiation exposure however this has never been investigated or quantified[2]

Type of Screening Program	Criteria for invitation to USS investigation:	Breakdown of risk factors included:	NIPE guidance
Current NIPE guidance (selective)	Abnormal exam and/or presence of a primary RF	Breech presentation at 36 weeks Family History Multiple birth (where any of the risk factors are present in one or more of the siblings)	Endorsed by NIPE and undertaken in NHS England.
Current practice within Wales (extended)	Abnormal exam, presence of primary and/or secondary RF	Oligohydramnios Foot deformities (CTCV, CTEV) Plagiocephaly Torticollis Syndromic	Not endorsed by NIPE only practiced in Wales.
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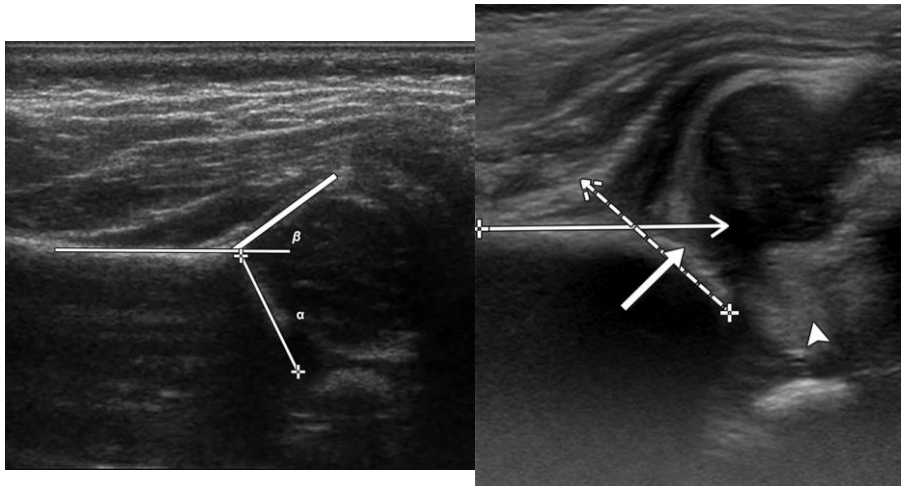


Figure 1: Radiographical images remonstrating the alpha and beta angle that form with Graf's classification of DDH (a) normal (b) abnormal[3]

Aim:

- **To define the effective radiation exposure post-diagnosis, secondary to missed case of DDH**

Methods:

- This was a retrospective evaluation of a prospective registry of all patients born within the catchment area of a single tertiary centre who had a missed case of DDH with at least 5 years of follow up. (n=110)
- Other radiological examinations that were unrelated to DDH were not included in the estimates generated
- Accordingly, the estimates of radiation exposure reflect only that exposure which relates directly to DDH.
- Data on radiation exposure were obtained from ICPR 60
- Statistical evaluation analysed in R, 4.0.5 “Shake and Throw”. With regression modelling for confounders to model

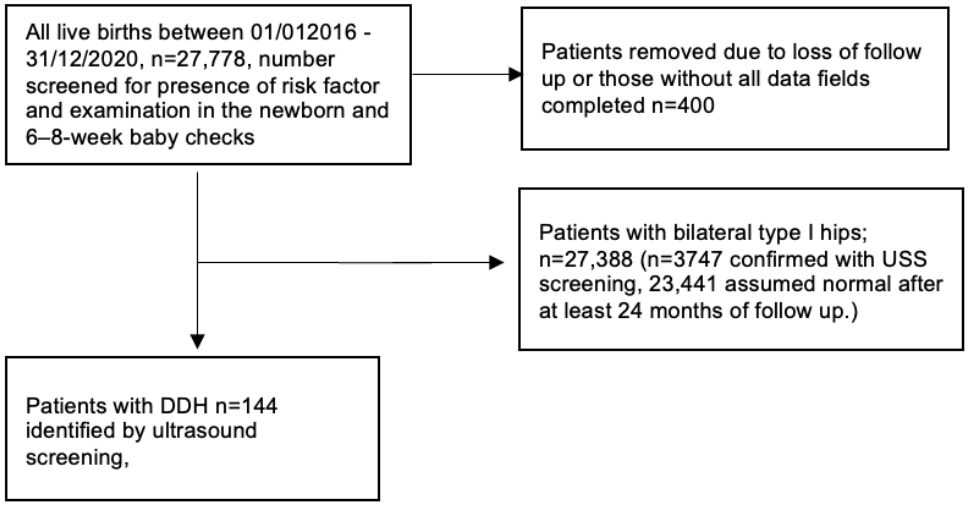


Figure 1: A flow chart demonstrating the inclusion/exclusion criteria and relevant cohort and investigation numbers in our study. DDH, developmental dysplasia of the hip.

Results:

- A total of 1337 conventional radiographs, 36 CT hip and 134 CT pelvis scans were performed
- Median radiation exposure from all sources was 17.1mSv (range 8.82 to 62.5)
- 20.7mSv for males 17.0mSv for females, p=0.047)
- Mean gonadal exposure 23.2mSv
- Most of this exposure is early in life with 90% of radiation exposure between 6-18 months

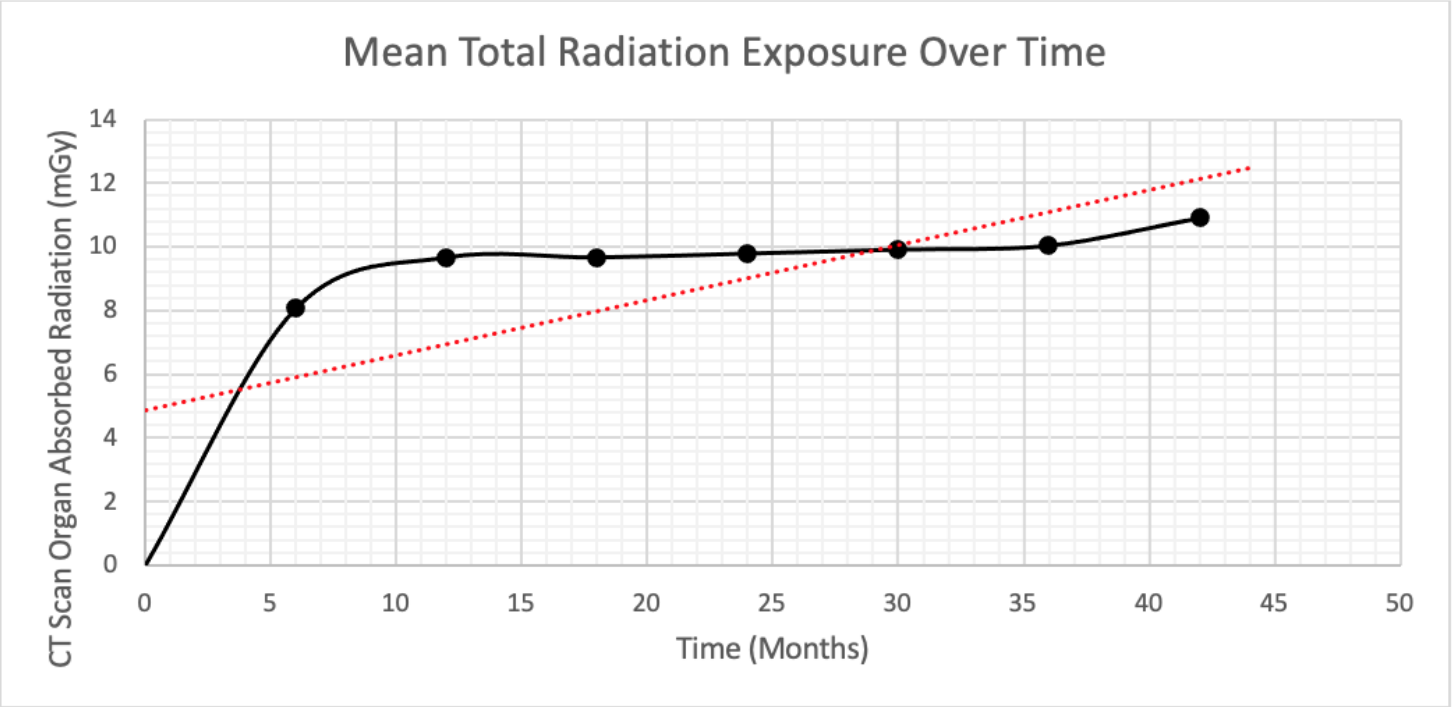


Figure 1: A graph to demonstrating effective radiation dose by time post diagnosis

Conclusions:

1. High radiation dose associated with missed DDH of 17mSv, with some children receiving 3-4 times this
2. This is the mean radiation exposure for those living in Chernobyl during the 1986 disaster and the risk of **fatal** cancer is 0.1-0.5% in adult exposure
3. Gonadal exposure is significantly higher which is concerning for fertility and malignant changes in a young population
4. Future research- cross-reference national data (e.g SAIL/SMART4NIPE/UKBiobank) to validate findings and expand on long-term follow-up assessing cancer and fertility outcomes

References:

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11. THe Standing Medical Advisory Committee (SMAC) (1996) Screening for the detection of congenital dislocation of the hip. Department of Health and Social Security, London..

Thank you for listening!

Are there any questions?

Conflict of Interest: NONE

Welsh Orthopaedic Society Annual Meeting 2025

Podium Presentation Session 2: Foot and Ankle; Paediatrics

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The association between social deprivation and screening program success in Developmental Dysplasia of the Hip.

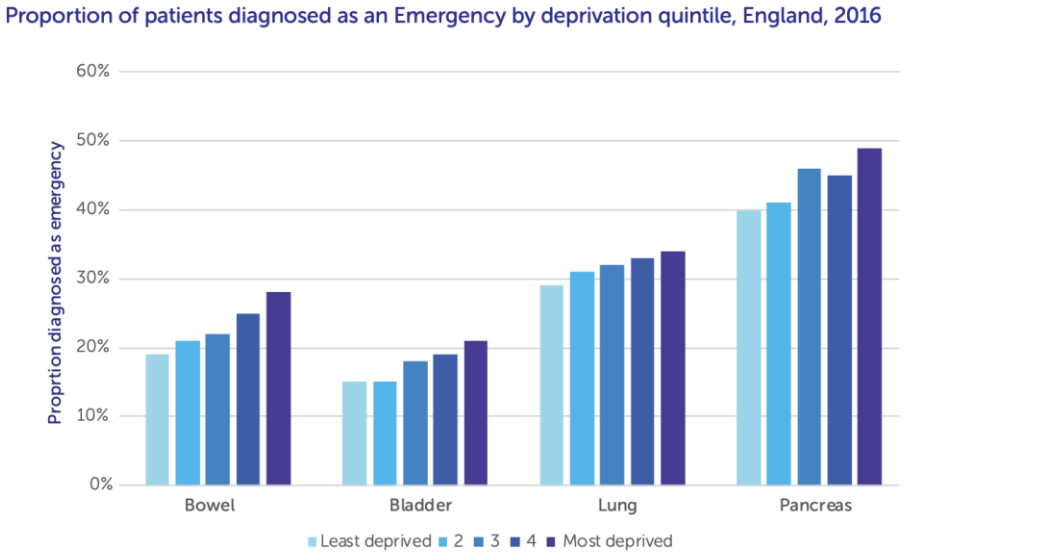
A.T. Poacher*, D. Crook, J.Froud, O.Ellis, A. Smith, M.Abdelrazak, EC.Carpenter

Introduction:

- Developmental dysplasia of the Hip (DDH): is a disorder of abnormal hip development[1]
- Early detection (<12 weeks) of DDH is associated with success of non-surgical treatment[2]
- An extended screening program is utilised in Wales
- Socioeconomic status impacts screening and general health
- but its effect has not been evaluated in the screening or outcomes of DDH

Type of Screening Program	Criteria for invitation to USS investigation:	Breakdown of risk factors included:	NIPE guidance
Current NIPE guidance (selective)	Abnormal exam and/or presence of a primary RF	Breech presentation at 36 weeks Family History Multiple birth (where any of the risk factors are present in one or more of the siblings)	Endorsed by NIPE and undertaken in NHS England.
Current practice within Wales (extended)	Abnormal exam, presence of primary and/or secondary RF	Oligohydramnios Foot deformities (CTCV, CTEV) Plagiocephaly Torticollis Syndromic	Not endorsed by NIPE only practiced in Wales.
Universal	All new-borns screened using USS	n/a	Not endorsed in the UK but utilised in mainland Europe.

Table 1: demonstrating the breakdown of different classification of screening programs for developmental dysplasia of the hip within the UK. CTCV, congenital talipes calcaneovalgus; CTEV, fixed congenital talipes equinovarus; NIPE, newborn and infant physical examination; RF, risk factors; USS, ultrasound.



Aim:

- **To assess the impact of deprivation on DDH screening and treatment outcomes**

Methods:

- Cohort registry study 2011-2020 of children who underwent screening for DDH (n=102,731)
- Patient variables and treatment outcomes were prospectively recorded in a local registries
- The Welsh Index of Multiple Deprivation (WIMD) was used to assess socioeconomic status
- DDH was defined as Graf type 2B-IV

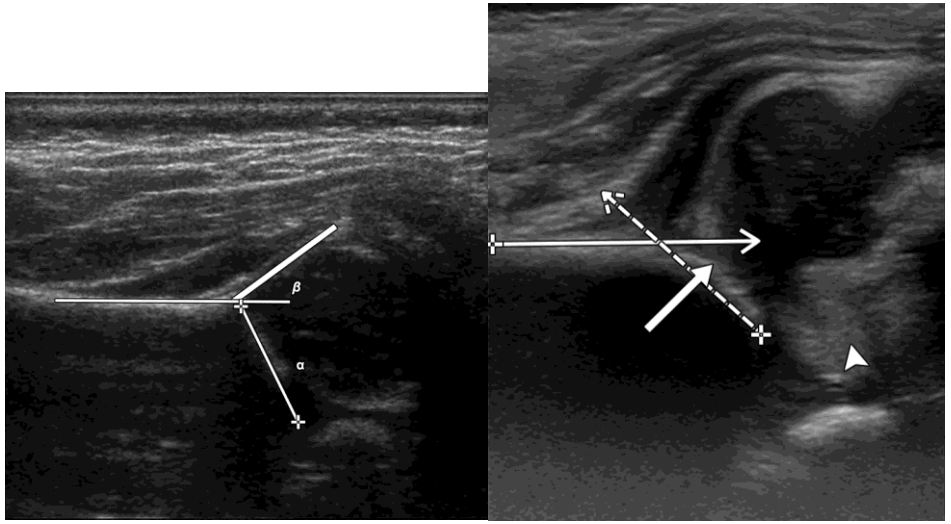


Figure 1: Radiographical images remonstrating the alpha and beta angle that form with Graf's classification of DDH (a) normal (b) abnormal[3]

Results: comparison of deprivation between missed and screened cases

- The was a significant (p=0.005) increase in the level of deprivation in children who were missed by screening [WIMD rank 876.48] compared to children whose DDH was detected by the extended selected screening program [WIMD rank 1043.47]
- Employment, health and education had the most impact on likelihood of a case being missed case
- Access to services was not a significantly associated with a missed case of DDH

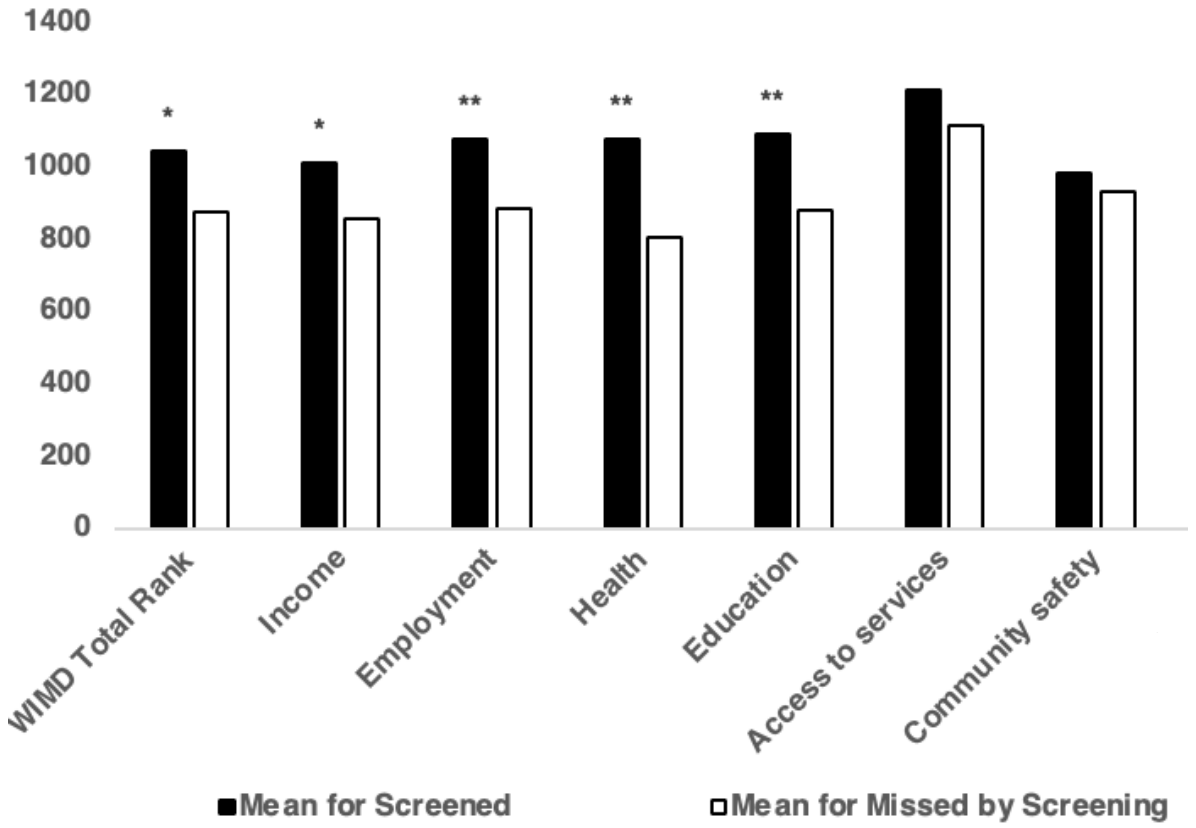


Figure 1: Graph comparing Welsh Index of Multiple Deprivation (WIMD) between Children Screened and Those Missed for Developmental Dysplasia of the Hip (DDH) Note: * = $p < 0.01$, ** = $p < 0.001$.

Results: the impact of deprivation on the outcomes of conservative therapy

- Following regression to account for cofounders to treatment failure, there was no significant difference in those who were successfully treated by conservative therapy and those who weren't

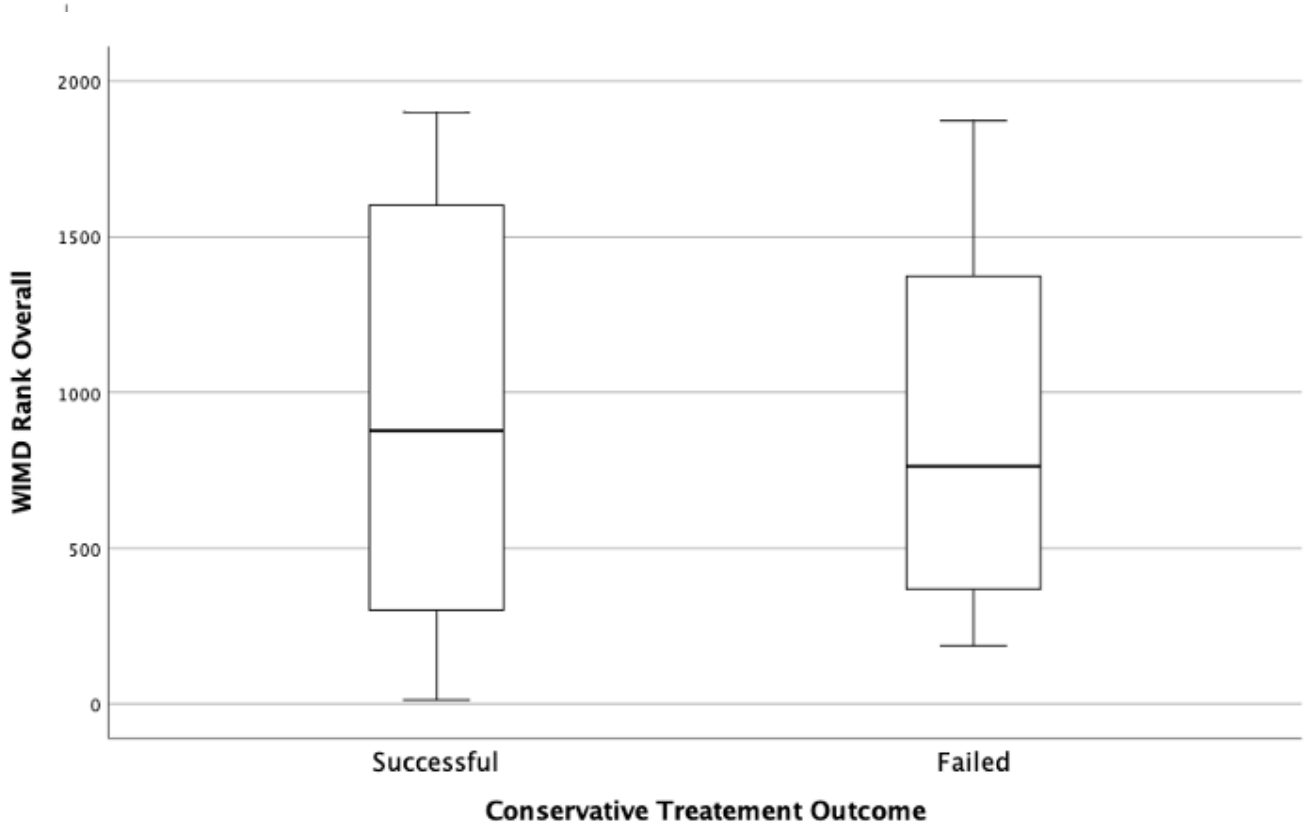


Figure 1: Comparison of Welsh Index of Multiple Deprivation (WIMD) between Children Successfully Treated and Those Failing Conservative Management for Developmental Dysplasia of the Hip (DDH) t = -0.269, p = 0.789, (CI 95% -61.658 - 420.43), means (888.6 vs 930.9), n (45,22).

Conclusions:

1. Socioeconomic deprivation is a significant factor in the likelihood of a missed case
2. Access to services is not a significant factor, but instead the factors of employment, health and education
3. There is no significant impact of deprivation on the outcomes of conservative management

Future – aim resources at the groups most at risk and develop qualitative evaluation of the risk factors for being missed

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1. Mahan ST, Katz JN, Kim YJ (2009) To screen or not to screen? A decision analysis of the utility of screening for developmental dysplasia of the hip. J Bone Joint Surg Am 91: 1705-1719.
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Are there any questions?

Conflict of Interest: NONE

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