



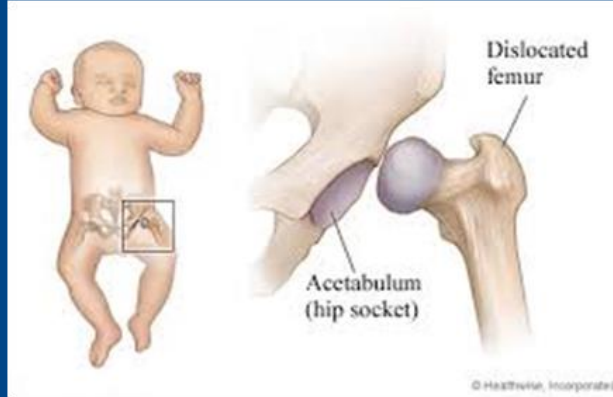
# Development, validation and evaluation of an Artificial Intelligence (AI) supported diagnostic portable ultrasound scanner for novice users.

## Developmental Dysplasia of the Hip (DDH) Surveillance

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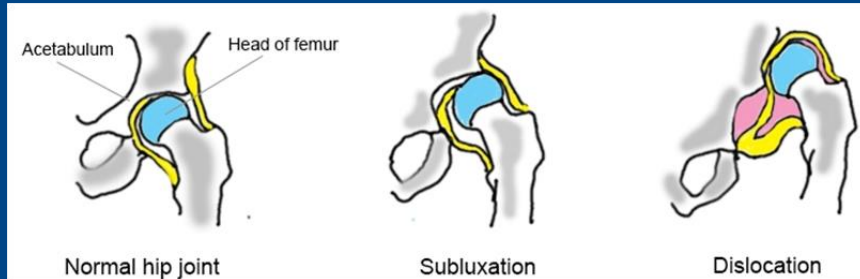
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# Background



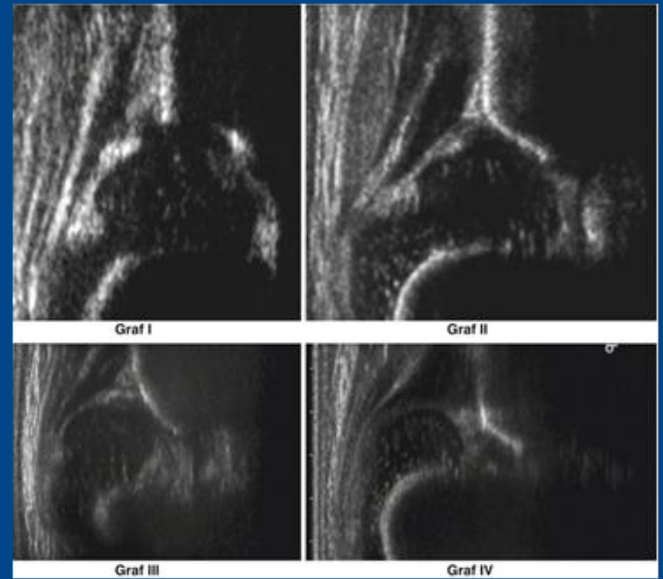
The most common paediatric orthopaedic condition in Newborns

DDH - " Ball and Socket " Hip fails to develop normally in babies and young children



Leading cause of hip arthritis in women under 50

Ultrasound is the gold standard assessment with near 100% sensitivity.

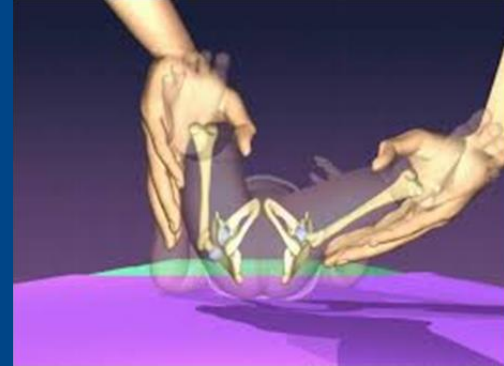
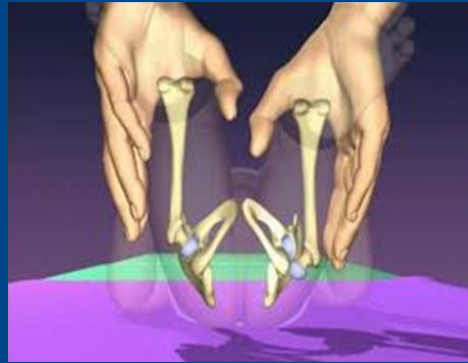


Scotland has a selective ultrasound screening programme due to the lack of well-trained staff and financial constraints

# Newborn exam at birth and 6 - 8 week baby check - Clinical examination



## Barlow and Ortolani



Missed and late presentation case  
Complex and expensive – Reidy et al 2019

Early intervention - Pavlik Harness - £22.00

Lack of data - Pathogenesis of hip disease

## Challenge



# 1 in 10

Total Hip Arthroplasty underlying aetiology of Hip Dysplasia



**1 in 10** Babies born with hip instability.  
**1 in 100** babies treated DDH affects girls > boys  
Hip Dysplasia - Arthritis

Total Hip Arthroplasty (THA) expected to increase by **28%** by 2038.  
**THA - 12,000** cases pa.

Cost of each surgical procedure

Recurring costs to the NHS of **£10 million** pa



**Solution**



**AI supported portable  
ultrasound diagnostic tool for  
novice users**



**Diagnostic  
opinion in less  
than 1 minute**

## Method – 4 phase approach

### Phase 1

**Co - develop and test the feasibility of the AI diagnostic tool within a clinic environment, bespoke the app for Fife / Scotland.**

### Phase 2

**Neonatal Unit and collect comparator data of Newborn measurements for machine learning.**

### Phase 3

**Develop pilot study validating the diagnostic tool with novice users, acute and community settings.  
Co. - CE marking**

### Phase 4

**Implement universal ultrasound scanning in NHS Fife and make recommendations for whole Scotland uptake via the ANIA pathway.**

## Currently Phase 1



Copyright of NHS Fife

On tablet AI – Medo Hip ARIA

ARB, DPIA, Cloud access, Red cap

Comparator data

Co-develop app and future apps

Bespoke App - Scottish  
environment - Onboarding local  
networks

# Improved Clinical Pathway

Novice users



Enhanced diagnostic  
decision support

Equitable access for ALL

Realistic medicine and  
Value based health & care

Affordable and sustainable  
Existing resource



## Improved Patient Outcomes



Early Detection - Early Intervention

Reduced surgical rate of  
Late presentation DDH

Future generation cost avoidance

Population ageing well  
women under 50

# Triple Helix



Expert motivated clinical,  
academic and industry  
team

Transformational change  
Global impact  
Substantial cost savings

Improve population Hip  
Health - Meta data analysis  
OA and Frailty

Commercial opportunities  
First to market,  
Intellectual property



" Vulnerability  
is the birthplace  
of innovation..."

Brene Brown

# Any questions ?

