AI (Artificial Intelligence) enabled diagnostic ultrasound in the hands of novices could support infant population screening for **hip dysplasia.**

8K

Cost of each surgical procedure is approx **£8k**

1 in 10 babies born with hip instability
1 in 100 babies treated for hip displasia

Scan the QR code to view an example of an AI powered portable ultrasound diagnostic tool

1 in 10
Total Hip Arthroplasty underlying aetiology of Hip Dysplasia

10m

Recurring costs to the NHS of approx **£10 million** per year

Transforming the diagnosis of Developmental dysplasia of the hip: Validation and Implementation modules of an AI supported handheld ultrasound scanner.
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Purpose
Developmental Dysplasia of the hip (DDH) is the most common paediatric orthopaedic condition in newborns. Timely and accurate diagnosis is required to prevent long term complications in infancy and early adulthood. However due to the lack of access to well trained staff and resources, early diagnosis can be challenging.
This international innovation project, in collaboration with industry and academia, focuses on the validation and real world translation of an artificial intelligence (Hip AI) supported handheld ultrasound scanner. Hip AI has the potential to significantly improve the speed and accuracy of diagnosis and improve the management of this condition by identifying cases early.
In the hands of novice users, Hip AI could transform the diagnostic landscape of DDH across the world, particularly in nations where access to specialist centres, staff and equipment can be prohibitive.

Methods and materials
This study includes :
1.Validation study
2000 babies will be scanned at birth within the neonatal unit using conventional ultrasound immediately followed by Hip AI. This will be repeated with the same babies at 6-8 weeks of age in an out patient clinic setting.
Data analysis will evaluate the accuracy of Hip AI (SN/SP/PPV/NPV/LR+/LR-/accuracy, Two central expert readers - blinded.
b) Screening at Birth - We will evaluate the test characteristics (SP, SN, PPV, NPV, LR+, LR-, accuracy) of screening at birth with Hip AI relative to gold-standard 6-8 week scan. We will determine whether this is non-inferior.
2. Implementation Study: 250 scans will be undertaken by minimally trained staff. Analysis using the Consolidated Framework for Implementation Research (CFIR) will include health economic analysis.

Results
In the UK, successful implementation could improve late presenting DDH rates and outcomes and demonstrate health economic benefits by transforming models of care.

This project aims to :
1. Test the effectiveness of Hip AI compared to gold standard conventional ultrasound
2. Evaluate if screening with Hip AI can be accurately performed at Birth
3. Evaluate if Hip AI can be utilised by minimally trained staff
4. Determine if Hip AI can be implemented within the NHS ecosystem demonstrating favourable health economic analysis.

Conclusion
This validation and implementation study is funded by UKRI MRC and will run from September 2024 to August 2026.
If initial investigation is successful a four nation multicentre clinical trial would be proposed.
AI category: AI – Horizon and future potential : latest AI developments & potential future impact.

Poster design by Marilou Poliquin