Should a Preventable Condition Be a Life Sentence?

A story about how point of care ultrasound can expedite early detection for neonatal hip dysplasia, leading to reduced financial burden of surgery and a better quality of life for our kids

A Case Study by

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Introduction

It may shock you to learn that joints do not simply “wear out” like tires or brake pads.

Many people run marathons and live to old age with no degenerative changes. Arthritis only appears when the shape of the joint is mismatched and uneven load bearing occurs.

So how is it then that so many of us develop hip arthritis, a quality-of-life limiting affliction that often leads to surgical joint replacement?

The answer may equally shock you.

Hip dysplasia occurs when the ball and socket of the hip joint are underdeveloped in utero. This results in a mismatch, where the socket is too shallow. When detected and treated in infancy, a simple non-operative intervention can allow hips to develop normally. When left undetected, uneven wear on the underdeveloped joint results in early arthritis.

Hip dysplasia is not life-threatening, but seriously affects the affected individuals’ quality of life, and the cost of treatment is a tremendous strain on the resources of any healthcare system. A single hip replacement costs $US 80,000. As many as one in ten adults demonstrate signs of hip dyspasia. As populations age globally, one could consider this a burgeoning global health crisis.

Even in a high-density, high-tech medical community such as New York, an ultrasound exam of the neonatal hip to look for hip dysplasia is not commonplace. This is a significant barrier to early detection.

Pediatricians do an excellent job examining baby hips, and are very aware that this condition is prevalent. However, most hip dysplasia is silent in onset, and their ability to detect it is limited. By using point of care ultrasound, a noninvasive imaging modality which carries no risk to the patient and involves no radiation, clinicians can enhance the physical exam to detect even minor deformities early.

Unfortunately, for too many kids, visits to the pediatrician are infrequent and ultrasound-enhanced examinations are rare. Some countries have mandated ultrasound as part of the routine screening for newborns. The United States is not one of them.

Imaging Exam

The standard neonatal hip ultrasound is performed between the optimal ages of 6 weeks and 6 months.

The examination is performed bilaterally for comparison. Technique is demonstrated below in Fig 1.

Fig 1. Positioning for dynamic assessment of neonatal hip dysplasia

The examination below was performed on baby Camilla with Butterfly iQ, using the Musculoskeletal preset at a typical depth of 4cm. Findings of both the affected hip and the contralateral hip are shown below.

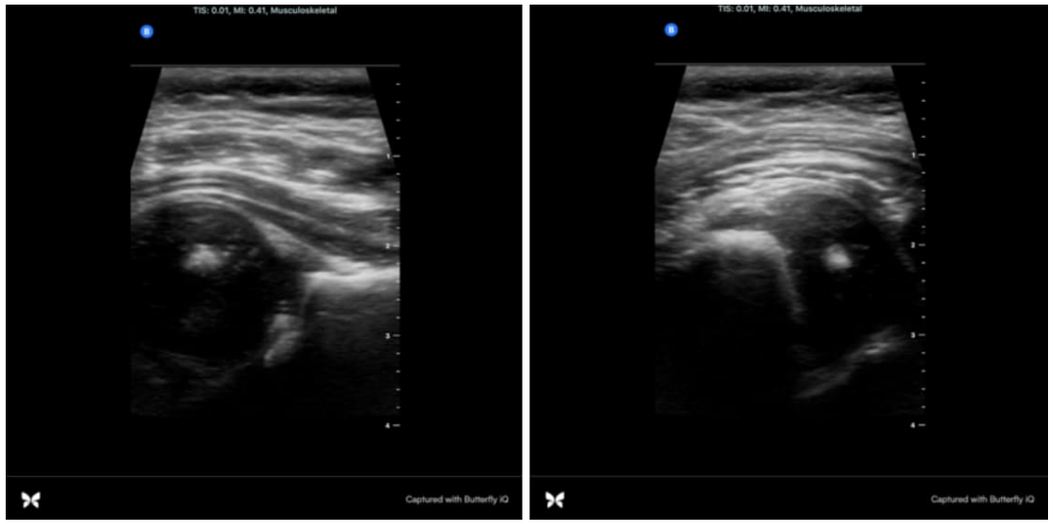

Fig 2. and 3. demonstrate typical findings of a normal hip
Three characteristics are shown . (1) Normal relationship between the femoral head and the acetabulum: the head is touching the “socket”. (2) Normal stability on dynamic stress. The head can be seen to remain stable in the socket. (3) Normal shape of the socket: a line drawn continuing along the white horizontal line bisects the head by at least 50% and the angle it forms with the line that goes down is a sharp corner (measuring at least 60 degrees).

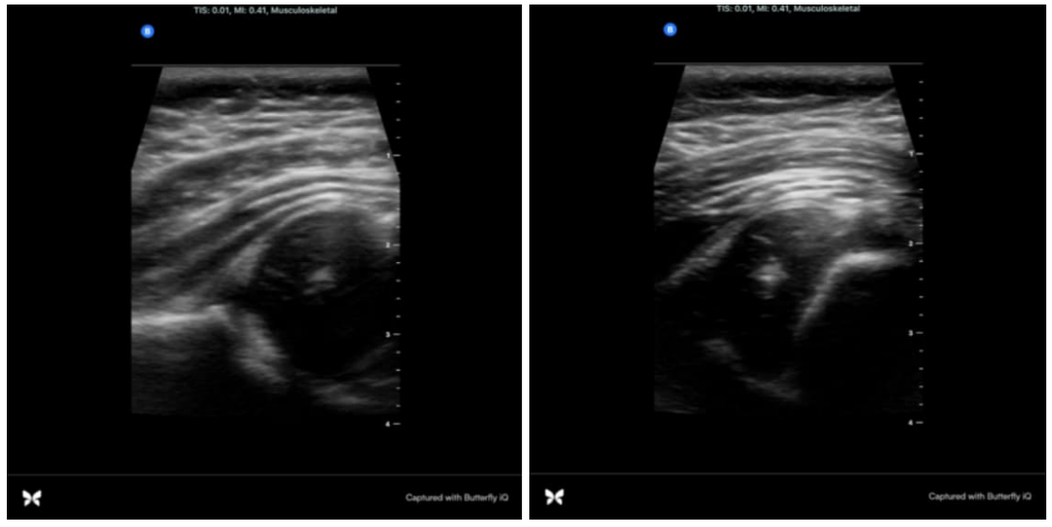

Fig 4. and 5. demonstrate typical findings of a dysplastic infant hip.
In this case the head is touching the “socket”, but it is seen to move away under stress. When looking at the shape of the socket a line drawn continuing along the white horizontal line does not bisect the head by at least 50% and the angle it forms with the line that goes down not form a sharp corner (and measures less than 60 degrees).

What Does This Teach Us?

Point of care ultrasound is easy, safe, effective, and provides the best possible outcome for babies with hip dysplasia. It enables early detection of this often silent-onset affliction, detectable in as many as 1 in 10 adults, who will often go on to develop joint arthritis. This is a painful and debilitating disease which has significant burden on quality of life and the hip pocket of the global health system.

References

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