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# Factors Affecting Late Diagnosis of Developmental Dysplasia of the Hip

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## Introduction

Developmental dysplasia of the hip (DDH), a condition affecting 1-3% of newborns, is the result of a failure in the normal development of the hip (Sewell et al. 2009). The term DDH describes the spectrum of hip defects ranging from acetabular dysplasia to frank dislocation. If left untreated these abnormalities can result in long term complications such as gait abnormalities, pain, and early onset osteoarthritis. DDH presently accounts for 29% of all hip replacements performed in patients under the age of 60 (Sewell et al. 2009).

Given a timely diagnosis and appropriate treatment the risk of long term sequelae is significantly diminished. The first-line treatment for DDH involves non-invasive management with a Pavlik Harness or other abduction orthosis. The timeline for an optimal response to Pavlik Harness treatment is within the first few months of life. As the child ages, however, the risk of failing first line treatment and requiring surgical reduction increases dramatically. Hips that require surgical reduction are at an increased risk for re-dislocation, functional limitation, and early onset osteoarthritis. Current Canadian guidelines dictate that all newborns should be screened for DDH at every primary care visit until they are able to walk (Patel 2001). This screening is done by physical examination of the child's hip. Signs of DDH on physical examination are asymmetric thigh skin folds, limb length discrepancy, limited hip abduction and hip instability noted on Barlow or Ortolani maneuvers.

Our study aimed to identify the rate of late diagnosis DDH in Southwestern Ontario due to concerns over the number of surgical reductions being performed at the London Health Sciences Center. Furthermore, we hoped to identify any factors that could be contributing to the rate of late diagnosis that we observed. It was our hope that the identification of these factors would allow us to address any potential deficiencies that may exist in our screening practices. We hypothesized that community centers are less exposed to patients that require the care of paediatric subspecialists, and as a result, an association would be found between patients referred from a community center and patients receiving a delayed diagnosis of DDH.

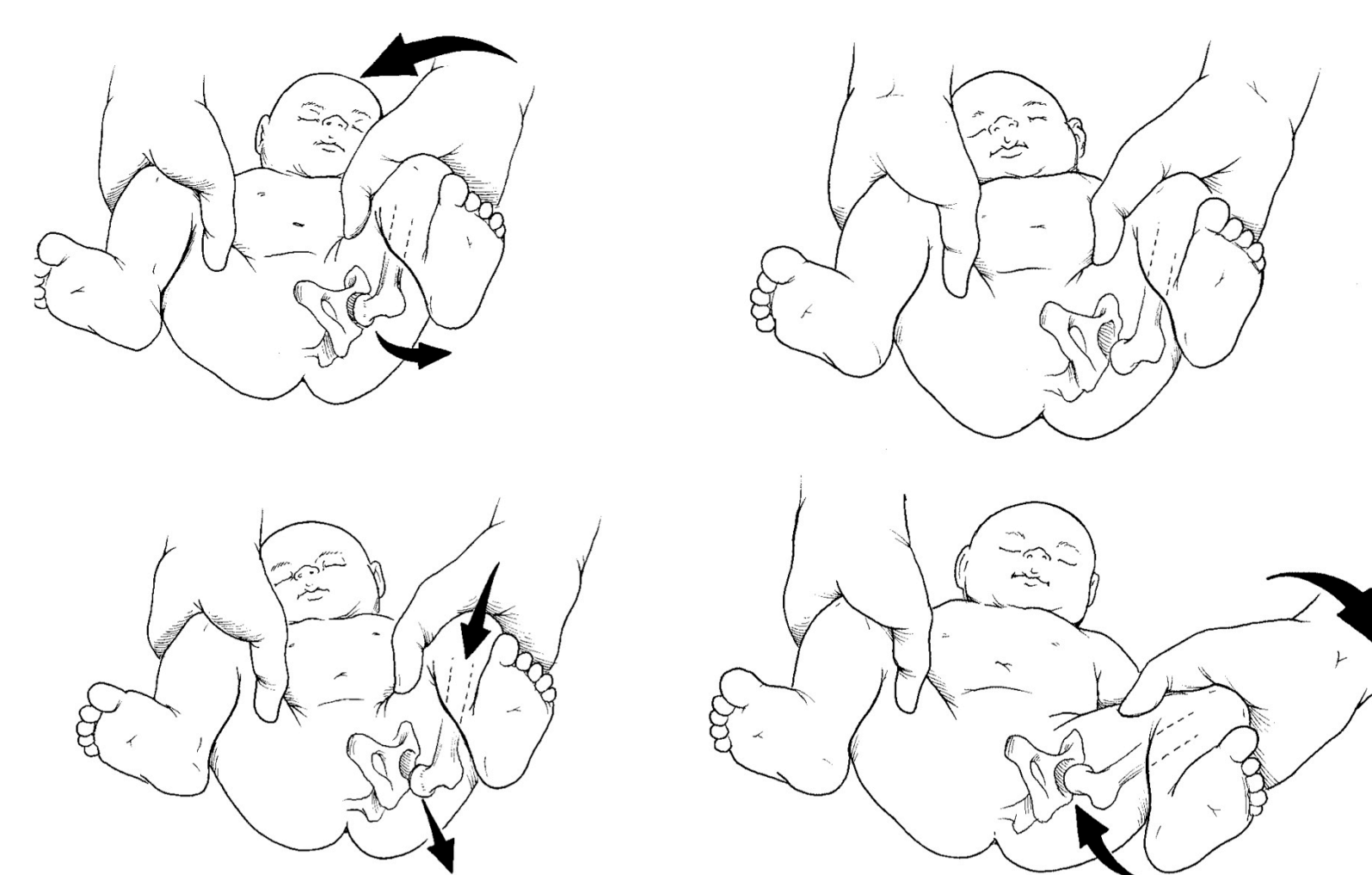


Figure 1. Barlow Maneuver

Figure 2. Ortolani Maneuver



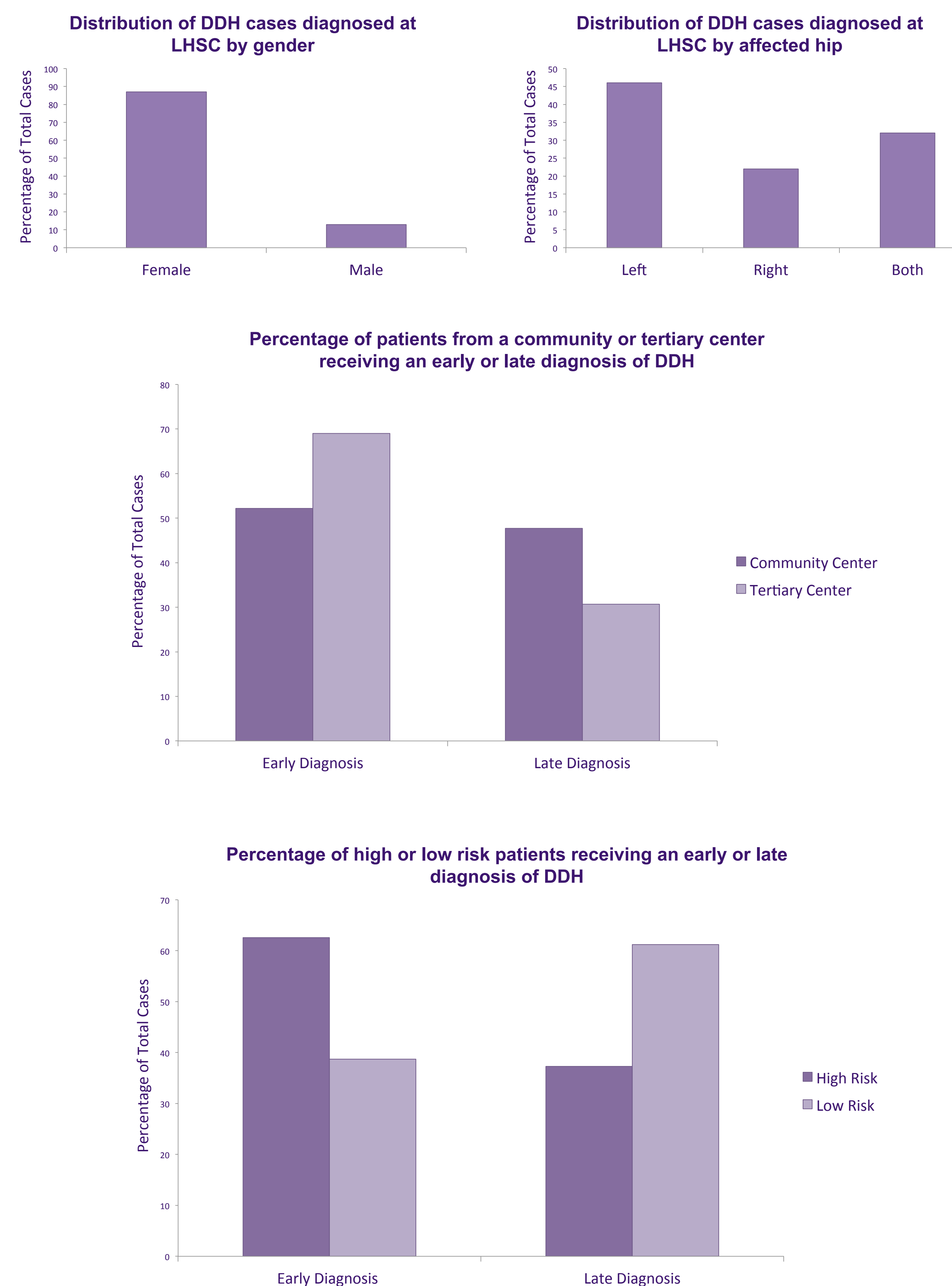
Figure 3. Pavlik Harness

## Methods

We performed a retrospective chart review of 114 patients diagnosed and treated for DDH at the London Health Sciences Center between January 1, 2006 and March 2, 2014. Patients were grouped based on the timeline of their diagnosis as well as the location of their original referral. Our early and late diagnosis patients were divided based on a diagnosis made before or after three months of life. Our community and urban groups were divided between those patients referred from London, Ontario (urban) and those patients referred from any other center (community).

Our inclusion criteria was treatment for DDH within our study timeframe. Our exclusion criteria was a diagnosis of syndromic hip dysplasia or teratologic dislocated hip. All data was collected using Cerner's Powerchart and GE Healthcare's Centricity.

## Results



## Discussion

Our study showed very similar demographics to the risk factor distribution reported in the literature (Guille et al. 1999). This is reassuring as it indicates that there are no specific risk factors being missed in our screening. The lack of association between patients referred from a community center and patients receiving a late diagnosis of DDH tells us that this problem is not isolated to community centers but is a problem shared amongst all of Southwestern Ontario. Our secondary analysis indicated that there is an association between those patients with no known risk factors of DDH and those patients receiving a late diagnosis. While this seems intuitive, it indicates that there may be variations in the screening practices applied to low risk infants. If these variations do indeed exist they may play an important role in the late diagnosis rate we have observed.

Our rate of late diagnoses is approximately 10x greater than reported in the literature (Azzopardi et al. 2011). Therefore, it is clear that many patients with known risk factors for DDH are also receiving a late diagnosis. There are many factors that may be contributing to this high incidence such as inconsistent screening practices, a lack of awareness of DDH and its associated risk factors, and a lack of adequate teaching at both the undergraduate and resident level in the detection of DDH. All of these factors may play a role in our current detection rates, and we believe that a strong emphasis on awareness and education may improve our detection rates.

## Conclusion

While a majority of DDH cases are being detected and treated well within the clinical guideline time frame we believe that efforts to improve awareness and education of DDH in Southwestern Ontario will help to further improve our rate of early detection. Potential next steps in our investigation may include formal surveys of physicians, residents, and medical students to assess their level of awareness of DDH as well as their comfort level in diagnosing this condition. These surveys will allow us to gauge and hopefully address any deficiencies that may exist in DDH education at this time.



Figure 4. Galeazzi's sign

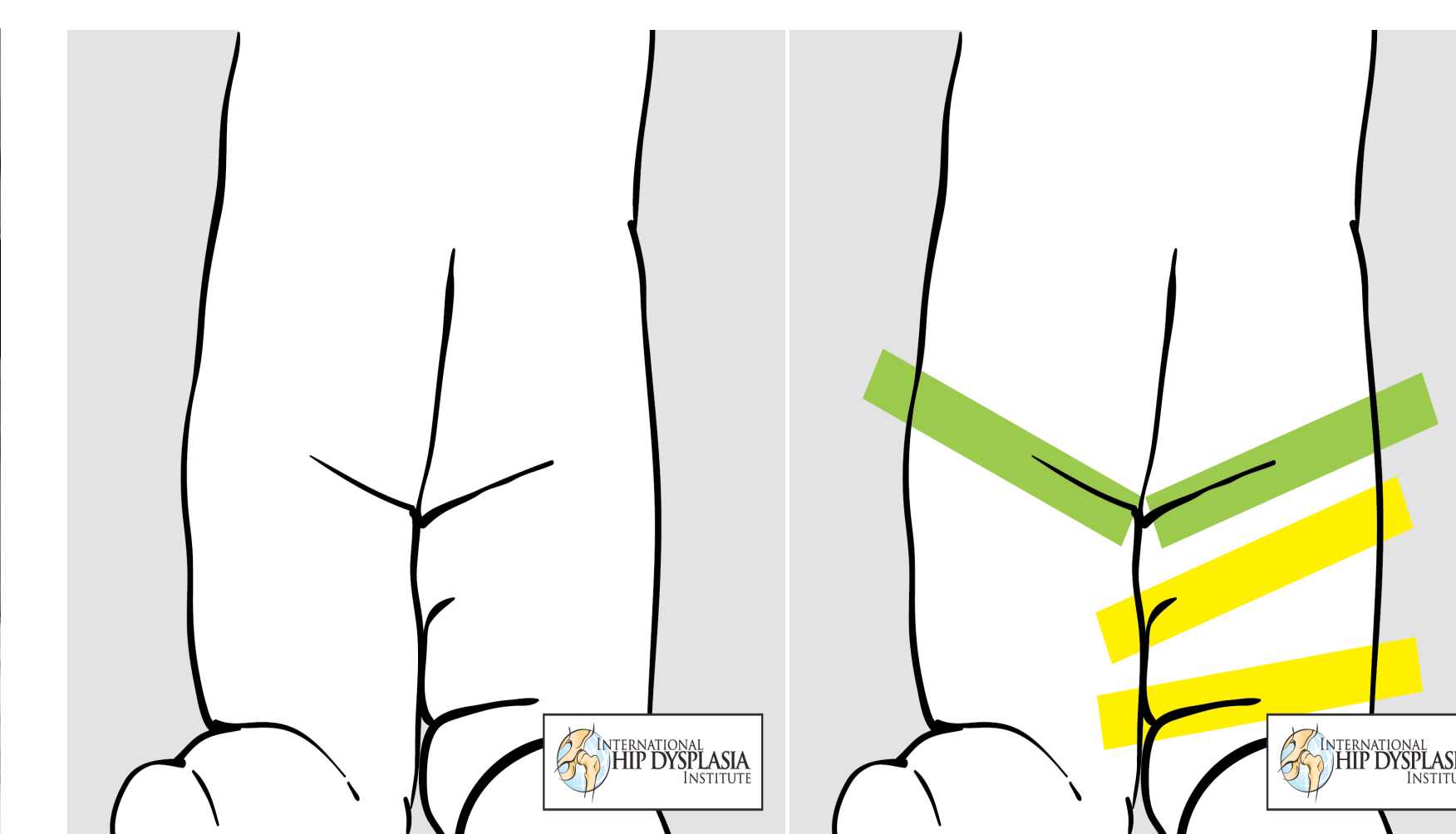


Figure 5. Thigh skin fold asymmetry

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- Figure 3. [http://www.superpharmacy.com.au/wp-content/uploads/2014/09/IMG\\_0746-e1410227901847.jpg](http://www.superpharmacy.com.au/wp-content/uploads/2014/09/IMG_0746-e1410227901847.jpg)
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- Figure 5. <http://www.hipdysplasia.org/wp-content/uploads/2011/01/baby-thigh-creases-asymmetry.png>

## Acknowledgments

We would like to thank the London Health Sciences Center for allowing us to access and utilize their patient database in this study