Children are Left Flat Footed, Right?
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1. Introduction
Foot posture of children, in particular flat feet, is a frequent cause of concern for parents, and one that practitioners face on a regular basis. When is the use of orthoses appropriate as an intervention in younger children?

2. Case Presentation
A 7-year-old girl presents with flat feet and altered gait. She experiences knee swelling and pain and discomfort in her groin, which is aggravated by running and prevents her from engaging in prolonged activity. She was diagnosed with Congenital Hip Dysplasia (CHD) in both hips at birth for which she was treated at 4CHD with a Spica cast. She continues to be monitored for CHD, however this is not considered by her orthopaedic surgeon to be connected to her flat feet.

3. Examination and Findings
On examination, hypermobility of both hips, knees and ankle joints evident. Both feet are significantly pronated with bowing of achilles tendons, and moderate degree of knee valgus. Arch is present when non-weight bearing indicating flexible flat foot. Right tibia is externally rotated. No apparent leg length discrepancy. Anterior pelvic tilt. Passive knee extension of both legs causes pain at anterior knee. Hypertonicity and tenderness in peroneals, popliteus, TFL and adductors. Shortening of muscles surrounding hip joints due to dysplasia. Rapid wearing down of shoe support evident with significant wear of heel at the inner sides.

4. Treatment Plan & Rationale
Treatment goals were to relieve knee and groin pain, address biomechanical misalignment in foot, knee, hip and pelvis and consider intervention of foot orthoses. Foot pronation can abnormally rotate the knee and hip, causing excessive tension on the knee resulting in pain. Concern as to whether flat feet were contributing, through their influence on kinetic chain, to slow growth of acetabulum in CHD condition.

Effects of Non-Surgical Treatment for Pes Planus (flat feet) in children

Powell, M. et al. (2005) N=40 Custom made orthoses reduced pain intensity in children presenting with Juvenile Arthritis
Whitford, D. et al. (2007) N=178 No difference was found in level of foot pain of 7-11 yr olds with bilateral flat foot who wore custom made orthoses.

5. Treatment & Response
Treatment addressed shortened muscles, anterior pelvic tilt and included mobilisations to foot and ankle. Home care of stretching and strengthening exercises, footwear selection and postural modifications.

Treatment was beneficial in relieving muscle tightness and reducing frequency of knee swelling and groin pain. Client reported less discomfort in her activities and greater ease of movement. The biomechanical impact of her foot pronation however continues to persist causing continued pressure on the knee and strain through groin and pelvis, and altered gait.

6. Considerations
Flat feet are normal in infants with lack of arch development. Studies show that the prevalence of flat feet decreases significantly with age and rapid development of the arch occurs between 2 and 6 years, with structural maturity occurring at 12 years. Flat feet has found to be more prevalent in boys and in overweight children.

Orthosis as an intervention aims to control excessive foot pronation and reduce the abnormal force through the kinetic chain. Although ligamentous laxity is considered to be a contributing factor to flat feet in children, some think that the condition of pes planus will resolve spontaneously without treatment and that the use of orthoses provides little benefit especially for the purpose of improved athletic ability or preventing injury during sports. Furthermore, some authors suggest that flat arch supports can weaken the muscles and further perpetuate the problem. Shoe wearing (closed toe) can prevent normal development of a longitudinal arch and activity without shoes should be encouraged. Interestingly, a recent study showed that movement patterns at the hip, knee and ankle joints were similar between children with flexible flatfeet and those with normal arches, suggesting minimal influence of flat feet on dysplastic hips. The use of orthoses is recommended in children where flat feet are linked with a congenital disorder.

7. References