



Striding towards good foot health

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When infants take their first steps it is an important milestone for families. It also poses many questions about foot development, footwear and how best to protect and support the growing foot. A significant challenge is just how little we actually understand about how feet develop. Thankfully, researchers from the Universities of Brighton and Salford in the United Kingdom have been awarded £1.5 million by the William M. Scholl Endowment Fund to undertake a five year research programme.

The programme will investigate what parents, health professionals and industry think about children's foot health and footwear, and how infant's feet develop during those first few months of walking. Their work is creating a new foot health initiative titled 'Great Foundations', which it is hoped will elevate the awareness of

issues relating to children's feet and foot health.

Our understanding of children's feet has remained largely unchallenged for several decades, and a greater awareness of how contemporary issues such as obesity, physical activity and social determinants of health affect child foot health is much needed. Advances in gait analysis and medical imaging techniques offer a unique opportunity to learn about children's foot structures and look at how feet change as they grow.

DEVELOPING FEET AND FOOTWEAR

Throughout infancy and childhood, the foot and lower limbs undergo a number of changes in response to the loads applied during physical activities such as crawling, walking and eventually running. Changes in foot

shape and the rotational alignment of the pelvis, thigh, leg and foot bones are expected and these typical developmental changes should follow a fairly consistent pattern.

Despite this, these changes are often poorly understood by both parents and health professionals and this can lead to anxiety and demands for access to healthcare and questioning of the role of items such as footwear. This may include using footwear 'too early', blaming footwear or seeing it as a means to 'correct' what are often perfectly normal stages of development.

In early walking, for example, the paediatric foot is a flat, mobile structure which lacks an underlying bony architecture. As the foot begins to develop and the main bones ossify, the medial arch of the foot begins to form. The development of the arch is ongoing and is often complete around 4–6 years

of age. It is therefore no surprise that the absence (or perceived absence) of the medial arch in children's feet is a common concern for parents.

Concerns about footwear and orthotic insole interventions often arise and worried parents might seek access to podiatry or other clinical services for orthotic intervention for their young children. The provision of orthoses for young children requires careful assessment and intervention is often not required.

It is therefore not surprising that parents increasingly turn to online communities and forums for information on how their children's feet should be developing. The concern here is that we know very little about what parents understand about their children's feet, where this knowledge originates from and how it influences their health behaviour in relation to footwear.

Online forums can empower parents in very effective ways; they can also result in unrealistic expectations, unnecessary concern, increased demands for access to clinical services and lead to the use of poor information about foot care and footwear purchasing habits. Yet, it is this understanding and the related foot health behaviours which set the trajectory for the future foot health of our children.

There is a real opportunity here for the footwear industry to step up to the challenge of supporting well informed public foot health messages, since it has considerable reach and gravitas. It follows that there are clear opportunities for aligning footwear technologies and innovations to the needs of infants that respect what we know about infant and walking development that can also be commercially viable.

MESSAGES ABOUT THE RIGHT FOOTWEAR

Footwear remains important throughout childhood and it is necessary that parents are well-informed of the appropriate features to look for in a supportive, well-fitted shoe. Issues about when to buy shoes, where to buy shoes and how much to spend on shoes have been around for years and still prevail today. Through their research, the teams at the Universities of Brighton and Salford will review the wide range of marketing



Starting to walk begs the question of when to start using shoes?

CREDIT: SALFORD UNIVERSITY

and educational materials produced by the footwear industry to inform parents about foot health and position footwear products appropriately or, perhaps in some cases, less so.

In regards to the provision of health materials, it is important that the industry works collaboratively and draws on the experience and knowledge of health practitioners. Clear, evidence-based messages are fundamental to helping educate parents and de-mystify the common misconceptions about children's shoes.

There exists an array of advice for parents such as footwear which states it promotes natural movement of the soft bones of the infant foot through flexible soles and uppers. Others have suggested less obvious links and benefits such as learning is improved if young children are barefoot in classrooms. Clarity and honesty of these messages is key to parents making informed choices to aid the foot health of their children.

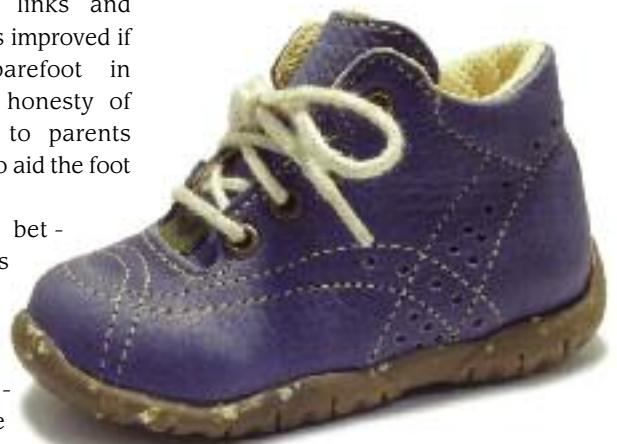
Greater collaboration between health professionals and the footwear industry (i.e. retailers and brands) is important for shared success and the empowering of parents to make appropriate footwear choices. It can open new avenues for footwear

development and product ranges too. Bringing together health professional and industry knowledge provides a unique opportunity to step forward to improve foot health for all. It can help fill any void between retail choices, purchasing habits and professional foot health advice, and link the messages from health professionals to those from footwear brands to mutual benefit.

Emerging trends in health and healthcare pose a number of challenges to footwear design, which can be met with successful delivery of health promotion and footwear education to wearers and designers alike. Prof. Nester and Dr. Price outlined the problems and opportunities that related to global changes in foot health related to the ageing population, obesity and diabetes (*World Footwear* Nov/Dec 2015).

A similar trend is emerging in child health with the increasing burden of childhood obesity. Childhood obesity places greater demand on the immature musculoskeletal system and its impact on the structure and function of the child's foot is well documented. It is therefore important that the footwear industry is responsive to this shift and takes into account the optimum materials that withstand the greater forces and wear-and-tear associated with increased body mass. The design and shape of the footwear is also key to ensuring the shoe offers appropriate space and protection whilst maintaining the required support and shock attenuation.

What is needed therefore is a consortia approach to meet children's foot health challenges and their implications for footwear, drawing in parents, health professionals with



Footwear design choices have a profound effect on foot behaviour and development.

CREDIT: KAVAT



Parents often listen to a range of opinions which is often unqualified insight rather than evidence-based information as to what is best.

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footwear industry partners, so that all voices are heard. This will create a genuine opportunity for shared learning and this is some of what the Great Foundations initiative hopes to achieve.

Footwear companies do of course cover a vast range in terms of position in the marketplace, business models, brand values and scale. Nevertheless, all are ultimately interacting with parents each day and affecting children's foot health each time a step is taken. The aspiration should therefore be to allow all actors in the footwear market to have a voice and to enable all those who can to take up and promote the best foot health messages.

Dr Morrison from the University of Brighton says: "Whilst the footwear industry is already listening carefully to parents in order to understand market issues, we want to explore the wider ones that drive parental perspectives so that these too can be blended into what the footwear industry understands about children's foot health. It is also important to have footwear sector issues raised by those dealing with them in healthcare and to work towards solutions together. This could be about future collaborative projects or simply better information sharing between health and retail sectors." The Great Foundations teams will be drawing together stakeholder groups from various sectors including industry partners and welcome any input.

UNDERSTANDING HOW FEET DEVELOP

An area that we perhaps know least about, and is most difficult to research, are the changes in the foot and lower limb that occur as children learn to walk and how the acquisition of walking affects foot development. In the first few months of life feet 'follow the legs' during rolling and crawling, but eventually they start to bear weight and then change rapidly.

Infants' feet are small and change so quickly that capturing these changes and relating them to walking development is very challenging. Dr Price and colleagues at Salford and Brighton have established unique 'baby walking labs' to monitor changes in skin, muscles, foot movement and pressures under the feet as infants develop from being barely able to stand, to walking independently.

We already know that applying load to feet is important for development and maintenance of foot and leg structures. This is evident from earlier studies on the effects of bed rest but also the effect of space travel, where a lack of weight bearing leads to loss of bone and muscle tissue and strength. However, we do not know how the first experiences of load bearing influence these issues as the ability to walk is gradually acquired or perhaps how the experience of learning to walk might affect development.

The baby labs are designed to replicate a typical crèche environment with developmental toys and bright, visual decoration. They also have pressure plates in the floor and cameras to monitor baby's movements. Dr Price says: "We are already noticing simple but important aspects of infant walking that differ from adult walking, such as the more complex directional changes involved and the more varied use of different parts of the foot across different steps." The teams hope to follow 100 children for 18 months as they learn to walk and use the data obtained to recalibrate both our understanding of foot development and the role of footwear.

WHAT NEXT?

Children's health and development is always an emotive topic. The footwear industry's contribution is often driven by those passionate about doing right by the children and their parents, and laying the foundations for normal healthy feet fit for an active and fulfilling life. The teams at Salford and Brighton want to support the children's footwear sector in a way that research has never previously done by providing a unique insight into parental beliefs and footwear behaviours, and by describing how feet develop around the time footwear is often first used. This requires good communication between the research team and those who can use the research. The Great Foundations initiative is an open invitation for members of the footwear industry to participate. If you are interested in further discussion, please contact us:

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