



Barefoot running and walking: the pros and cons based on current evidence

In response to the recent debate on barefoot running and walking of children published in the *New Zealand Herald*¹ we have put together an argument relating to the pros and cons based on current evidence.

There is very limited evidence specifically relating to barefoot running and walking in children. One study from Germany reported that the increased prevalence of flatfoot and hallux valgus (bunions) in modern societies may be the consequence of inadequate footwear in childhood.² The German study postulated that barefoot walking represents the best condition for the development of a healthy foot.

Walking and running on different types of surfaces such as grass, sand, and artificial running tracks may indeed enhance healthy foot development. However, the problem of barefoot walking on hard surfaces such as pavements may alter the biomechanics of walking and running. This may lead to potential arthritic changes and consequently a reduction in foot function.

A more worrying concern is the impact of obesity and overweight on children's feet. A recent study from New Zealand suggested that three lifestyle risk factors related to obesity: low physical activity, skipping breakfast, and insufficient sleep on weekdays.³

To prevent children undertaking physical activity may exacerbate a major issue already within New Zealand. A recent study from Australia suggests that the function of the arches of the feet in overweight and obese children may change and this might worsen if excess weight impacts on the foot throughout childhood and into adulthood.⁴

Another problem to address relating to barefoot walking is the issue of children with diabetes. The long-term complication of diabetes on the foot includes infection, ulceration, and a loss of peripheral sensation. A UK study by Karabouta⁵ found over 50% of adolescents with Type 2 diabetes had peripheral neuropathy and weak posterior tibial pulses. The authors recommend that all children with Type 2 diabetes need podiatric surveillance for complications from the time of diagnosis. A study from rural Australia suggested that walking barefoot is a risk factor for diabetic foot disease.⁶

It is interesting to note that certain types of footwear may cause injuries in children. A study from Ireland showed that there was an increasing trend in orthopaedic injuries using Heelys and Street Gliders.⁷ Another study using a cloth sport shoe showed inferior cushioning capability but the same lateral stability as the other sports shoes for children.⁸ However, a study from Germany reports shows that slimmer and more flexible children's shoes do not change foot motion as much as conventional shoes and therefore should be recommended for children of all ages.¹

Painful feet in children are often caused by flatfeet or mechanical instability of the arches of the foot. A recently conducted New Zealand review on children's shoes found no evidence to support the suggestion that different types of footwear reduced pain in children's flatfeet.⁹

Finally, a study from Australia found significant structural differences between the feet of European and Australian children.⁹ The German children displayed significantly longer and flatter feet relative to their Australian counterparts, whereas the Australian children reveal a significantly smaller ball angle, implying that the forefoot of the Australian children is squarer in shape.

These findings imply that footwear must be designed to cater to the unique foot dimensions of children in different continents to ensure that shoe shape matches foot shape. Most footwear companies do not vary the dimensions of their shoe lasts to accommodate intercontinental differences in foot morphology based on racial and/or environmental factors. The results of this study will have immediate implications for the design of comfortable footwear suitable for the developing feet of children.¹⁰

In summary, further research is required in this area.

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References:

1. Johnston M. Running debate over going barefoot. New Zealand Herald, 31 March 2008. http://www.nzherald.co.nz/section/1/story.cfm?c_id=1&objectid=10501075
2. Wolf S, Simon J, Patikas D, et al. Foot motion in children's shoes: a comparison of barefoot walking with shod walking in conventional and flexible shoes. *Gait Posture*. 2008;27:51–9.
3. Duncan JS, Scholfield G, Duncan EK. Risk factors for excess body fatness in New Zealand children. *Asia Pac J Clin Nutr*. 2008;17:138–47.
4. Mickle KJ, Steele JR, Munro BJ. The feet of overweight and obese young children. *Obesity*. 2006;14:1949–53.
5. Karabouta Z, Barnett S, Shield JP, et al. Peripheral neuropathy is an early complication of type 2 diabetes in adolescence. *Pediatr Diabetes*. 2008 [in press].
6. Jayasinghe SA, Atukoraia I, Gunethilleke B, et al. Is walking barefoot a risk factor for diabetic foot disease in developing countries? *Rural Remote Health*. 2007;7:692.
7. Vioreanu M, Sheehan E, Glynn A, et al. Heelys and street gliders injuries: a new type of paediatric injury. *Paediatrics*. 2007;119:1294–6.
8. Fong DT. Cushioning and lateral stability functions of cloth sport shoes. *Sports Biomech*. 2007;6:407–17.

9. Rome K, Ashford RA, Evans AE. Conservative interventions for paediatric pes planus (protocol). *Cochrane Systematic Review*. 2007;2.
10. Mauch M, Mickle KJ, Munro BJ, et al Do the feet of German and Australian children differ in structure? Implications for children's shoe design. *Ergonomics*. 2008;51:527–39.