



ORAL PRESENTATION

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Power generation of the midfoot in children wearing sports shoes

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Background

During propulsion of walking the midfoot generates 35 to 48% of the peak power from the foot and ankle. This study aimed to investigate the effect of children's sports shoes on midfoot kinetics during propulsion of walking and running.

Methods

Twenty children performed five walking and running trials at a self-selected velocity while barefoot and wearing a common sports shoe. Footwear testing order was randomised. A 14 camera motion analysis system was used to calculate retro-reflective marker trajectories at 200Hz. Markers were attached to the leg and to the foot through holes in the shoe to measure three-dimensional motion of the midfoot and ankle. Ground reaction force data were recorded at 1,000Hz. Data were normalised to the stance phase and analysed from 60% to 100%.

Results

Peak midfoot power generation during walking reduced from 1.67W/kg (SD 0.59) barefoot to 0.50W/kg (SD 0.26) in the sports shoe ($P<0.0005$). Peak ankle power generation during walking was increased from 1.49W/kg (SD 0.42) barefoot to 1.89W/kg (SD 0.44) in the sports shoe ($P<0.0005$). Peak midfoot power generation during running was significantly reduced from 3.92W/kg (SD 1.33) barefoot to 1.56W/kg (SD 0.76) in the sports shoe ($P<0.0005$). Peak ankle power generation during running increased from 4.77W/kg (SD 1.02) barefoot to 6.03W/kg (SD 1.14) in the sports shoe ($P<0.0005$).

Conclusion

Children compensate for a reduction in midfoot power generation in sports shoes by increasing ankle power generation with potential implications for overuse of the Achilles tendon and triceps surae muscle complex.

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