



Compensatory Motor Behaviour in Children with Limb Differences

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Introduction

How flexible are motor skills during development? A child born with a partial or missing hand develops remarkably efficient motor skills. Whilst their motor actions may look very different to their two-handed peers, children with a congenital hand difference perform everyday tasks, like tying shoelaces, with ease. Here we study how this is achieved through compensatory motor strategies, further exploring how these converge with age.



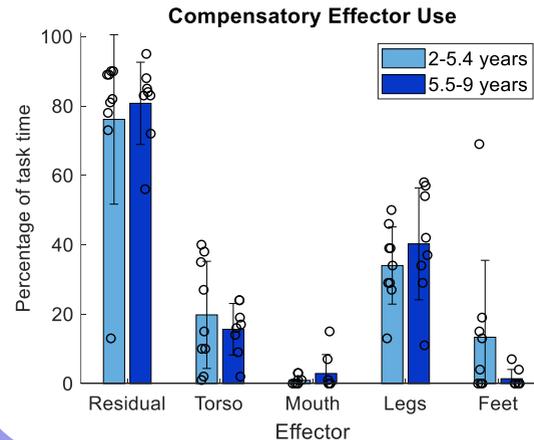
Participants

17 children aged 2 to 9 years ($M = 6.15$ years, $SD = 2.25$) born with one functional (pincer-gripping) hand. Participants were split at 5.5 years, the average age school children regularly sit at a desk.

Methodology

Participants completed our 'Surprise Suitcase' test of bimanual function containing 14 semi-ecological subtasks. Participants were asked to manipulate a series of everyday objects. Tasks included undoing buttons, separating Lego bricks, and removing a pen lid. Compensatory motor strategies were coded offline as the proportion of task time each body part (effector hereafter) was engaged.

Preliminary Findings



Key Findings

Preliminary analysis of the pilot revealed:

- Compensatory strategies involved multiple body parts including the residual limb, torso, mouth, legs, and feet.
- Residual limb use was consistently higher than other effectors (78% vs 18%, 2%, 37%, and 8%, $p < .001$ per comparison).
- Around 5.5 years we observed a marginally significant reduction in foot use (13% vs 1.3%, $p = .054$).

Discussion

Children with a congenital limb difference flexibly adapt their behaviour to compensate for their missing hand by using a variety of effectors. Compensatory motor strategies converge with age. Social factors may play a role in this convergence: at 5-6 years when foot use declines, children's seated school environment may physically inhibit the use of the feet and raise awareness that this is not common among peers.