

## **How does the upper limb activity of adolescents with upper limb absence differ from anatomically intact adolescents, and does this change when doing sport?**

Alexandra Clarke-Cornwell , Natalie Chinn , Alix Chadwell , Laurence Kenney , Malcolm Granat and John Head

**Background:** Despite physical and psychosocial benefits, disabled people are half as likely to participate in sport than able-bodied peers. Active adolescents typically become active adults; therefore, early engagement in sport is encouraged. For those with an upper limb absence, sport participation levels are poorly understood, with limited literature on how prostheses are used. Previously, we developed methods to objectively evaluate patterns in upper limb prosthesis wear and use, including the display of 7-day time-series data using spiral plots. Building on this, the aims of this feasibility study were to capture objective prosthesis wear and usage pattern data from physically active adolescents using prostheses, gather data on sports participation, capture participants' views on prostheses and reasons for use/non-use in sport, and identify whether activity patterns reflect those found in adult myoelectric prosthesis users.

**Methods:** Data for two unilateral prosthesis users and four anatomically intact adolescents were collected and analysed. Participants wore an Axivity sensor on each wrist over a 2-week period and completed activity diaries. We also conducted semi-structured interviews with the prosthesis users.

**Results:** In line with previous findings, prosthesis users were 72% reliant on their intact arm overall, and 68% reliant during sports where a prosthesis was worn. Anatomically intact adolescents showed a similar level of reliance on both arms (51% on dominant overall, 50% during sport).

**Conclusions:** Accelerometer and interview data suggest minimal use of prostheses during sport, with devices only being used when the user felt they offered a specific benefit. When prostheses were worn for sport, patterns of activity were still skewed towards the anatomical side. The findings raise questions over the value of currently available upper limb prostheses to adolescents for use during sport, and larger studies using similar techniques are warranted.