

OBJECTIVE

To determine whether functional thumb/wrist taping improves hand use and posture and reduces disregard of the affected upper limb in young children with hemiplegic cerebral palsy.

INTRODUCTION

- Around 12,000 UK children have **hemiplegic cerebral palsy (HCP)**, a neurological disorder caused by damage to the developing brain, resulting in movement impairments and weakness on one side of the body
- The affected upper limb is often disregarded, with an abnormal **thumb in palm** posture [Fig. 1] and **bending of the wrist**¹[Fig. 2]
- The developing nervous system is highly **plastic**, changing throughout life, so earlier interventions could lead to better results
- Current interventions such as botulinum toxin A, surgery and splinting are problematic in young infants, necessitating a less invasive approach²
- **Kinesio® Tex Tape**, when stretched up to 30-40% its normal length, recoils and creates a pulling force on the skin
- It encourages a more **open hand posture** which could improve hand use, plus brightly coloured tape could attract attention to the affected limb

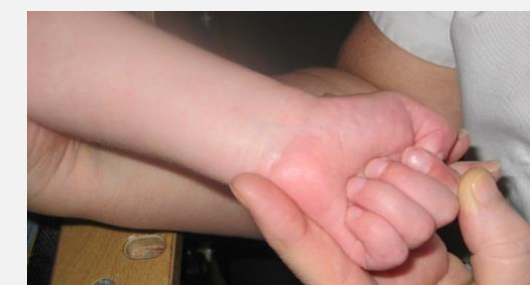


Fig 1. Thumb in palm

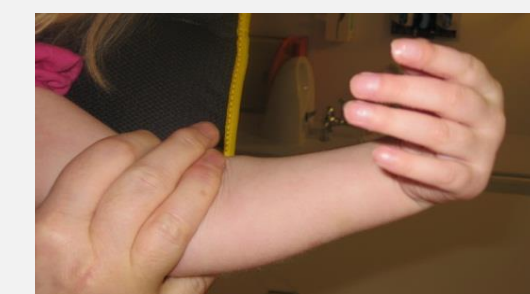


Fig 2. Wrist flexion



METHOD

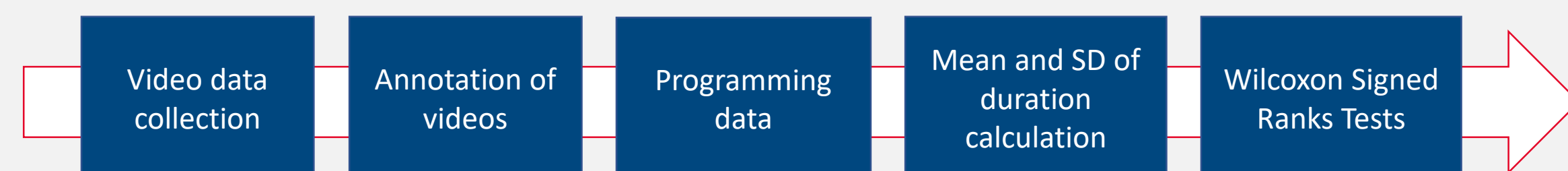
- Video data of 20 children undertaking the Assisting Hand Assessment (AHA) compared tape on [Fig. 3] with tape off. The AHA utilised toys requiring bimanual hand use e.g. taking apart Lego bricks [Fig. 4]
- Using ELAN software, the videos were annotated as follows:
 - **Duration of visual attention to the affected hand**
 - **Duration of thumb in palm**
 - **Duration of contact of affected hand with toys**
- 'Do not use' data included children who were distracted, upset or not on task
- Matlab – a programming language – extracted information on the duration of the 3 annotated behaviours (seconds) corrected for overall assessment time
- The mean and standard deviation of the 3 durations was calculated
- Wilcoxon signed ranks tests determined the statistical significance of the data



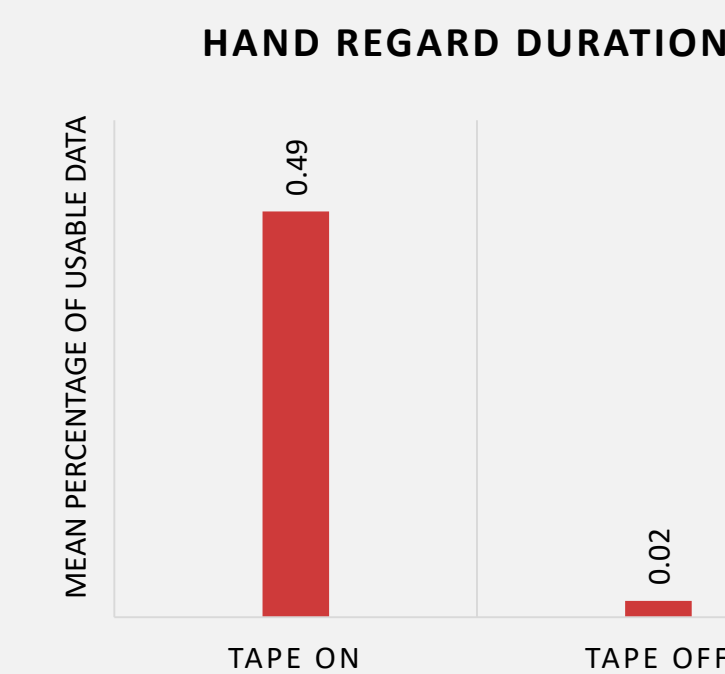
Fig 3. Kinesio® Tex Tape



Fig 4. Toys used in the AHA

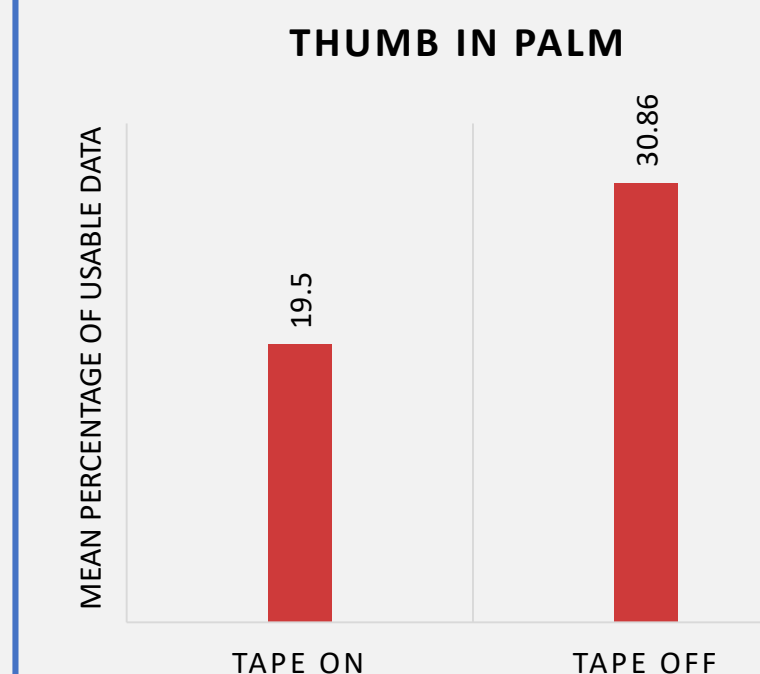


RESULTS



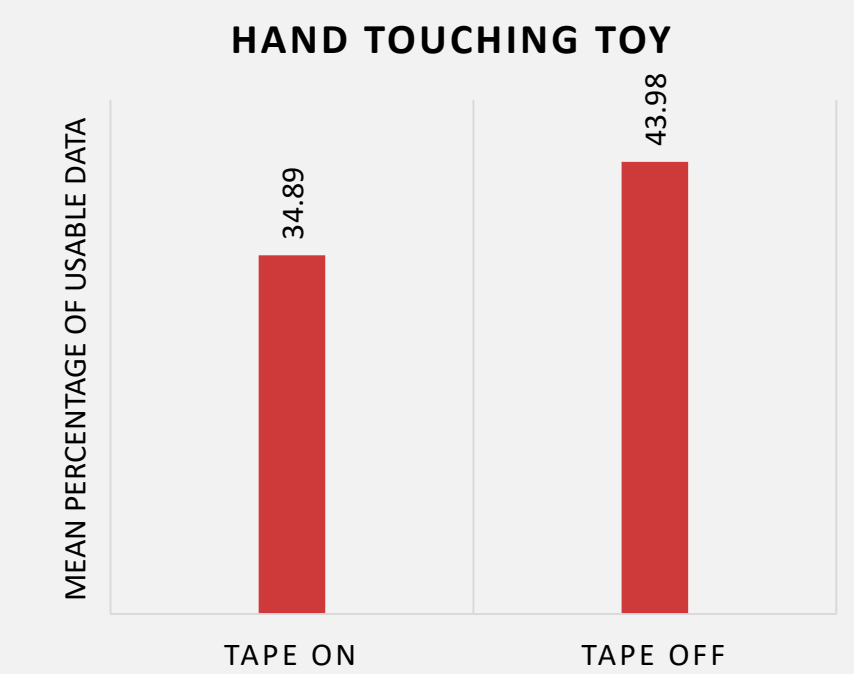
Graph 1. This graph displays the mean percentage of time spent looking at the affected hand was increased with tape on compared to tape off.

WSRT p-value: 0.011*



Graph 2. This graph shows that the mean percentage of time spent with the thumb in palm is reduced with the tape on compared to tape off.

WSRT p-value: 0.381



Graph 3. This graph represents the mean percentage of time spent with the affected hand touching toy was reduced with the tape on compared to tape off.

WSRT p-value: 0.044*

- Hand regard duration and duration of hand touching toy are **statistically significant** results, with both being less than 0.05
- Duration of thumb in palm is not statistically significant, at 0.381

WSRT: Wilcoxon Signed Ranks Test

DISCUSSION

- Increase in hand regard duration with tape on is statistically but not clinically significant – it could merely be as a result of the novelty of the taping and attempts to remove it
- Decrease in duration of thumb in palm with tape on not statistically significant
- Duration of hand touching toy decreased with tape on, perhaps because the children were not yet accustomed to the tape, although this might change after 2/4 weeks of tape on
- However, this evaluation included the baseline data only and not the data collected after 2 and 4 weeks of wearing or not wearing the tape

CONCLUSION

- Analysis of the baseline data shows potential, next steps are to evaluate the data after the 2- and 4-week period of tape on/tape off to observe possible long-term progress with functional taping
- This data is predicted to show improved hand posture with the thumb out, and increased hand usage and general awareness
- Future studies must consider lesion (damage) type, different post-lesional reorganisations of the brain, as well as cognitive ability, vision and sensation which introduce a degree of diversity in the study population