

The effect of Lycra compression on upper limb muscle activity during a functional task

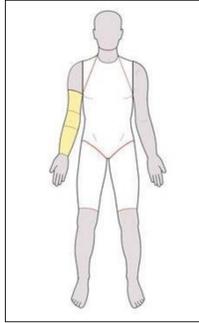
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Background

- Lycra compression garments have been used in neurological rehabilitation for some time as a treatment adjunct.
- They have been reported to contribute to improved function in adult stroke survivors¹.
- The physiological effect of these garments is still not clearly understood, recent research has found increases in muscle activity around the shoulder girdle and proximal arm muscles in static positions².
- Effects on muscle activity during functional tasks have not been investigated.



Aim

The aim of this research project was to investigate the effect of wearing a Lycra compression garment on muscle activity in the upper limb during a functional task.

Methods

A same subject crossover design was used. 19 healthy adult participants (14 female; age 22 SD±4; BMI 23 SD±3) were recruited and randomised to condition 1 (Lycra) or condition 2 (no Lycra). Surface electromyography (EMG) was applied to the biceps brachii, triceps and common wrist/finger extensor muscle groups. Readings for maximum voluntary contraction (MVC) were taken. Subjects undertook three repetitions of a standardised low intensity loaded (1Kg) reaching task with activity measured as %MVC. Following a standardised interval subjects completed the alternate condition for comparison. Data was analysed with SPSS using a Wilcoxon signed-rank test for non-parametric data.



Lycra sleeve

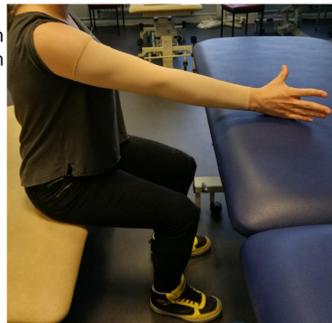
Surface EMG electrodes



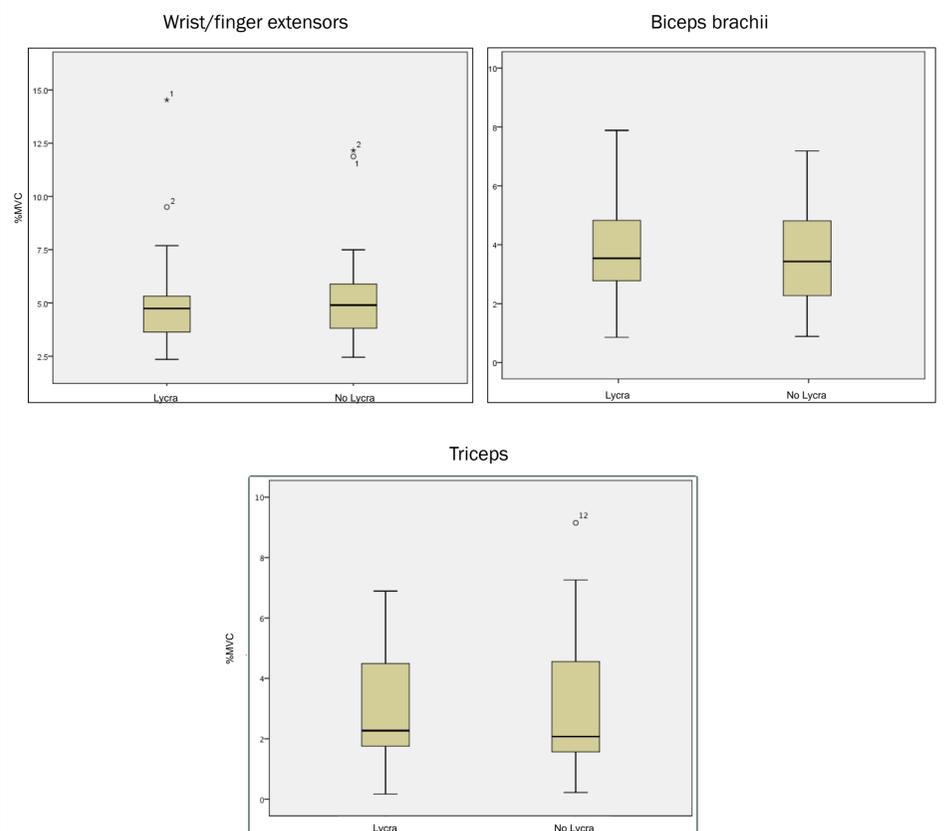
Start position



Finish position



Results



When wearing the Lycra garment there were small increases in biceps brachii (+3%; $p=0.06$) and triceps activity (+10%; $p=0.73$) and a small decrease in common extensor activity (-3%; $p=0.84$) however these findings were not statistically significant.

Conclusions

Results indicated no significant change in muscle activity when wearing a Lycra garment during an upper limb functional task. These findings are contrary to results in more proximal muscles in static positions. This may indicate that changes in muscle activity when wearing a Lycra garment occur more proximally. It may also indicate that changes seen in static positions may not be maintained during task performance. The task undertaken was of a low intensity, it is possible that changes in activity may be seen at higher intensities.

Further investigation of more proximal muscles and upper limb tasks of varying intensity are indicated to expand the evidence base for this adjunctive treatment option.

Study limitations

The study used healthy subjects which limits transferability of findings to people with neurological injury, such as stroke.

Garments used in the study were standardised sizes (e.g. small, medium, large). Each participant was fitted with the most appropriate size however manufacturers recommend garments to be individually measured and manufactured. The use of standardised sizes may have impacted the results.

Clinical implications

Lycra garments are increasingly used as a treatment adjunct in neurological rehabilitation. This project adds to the evidence base in this developing area. Further study is indicated to understand any physiological changes that Lycra garments provide.

Ethical approval

Ethical approval to conduct this research was obtained from the Cardiff University School of Healthcare Sciences Research Governance and Ethics Committee.

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References

- Watson M. et al. 2007. An evaluation of the effects of a dynamic lycra orthosis on arm function in a late stage patient with acquired brain injury. *Brain Injury* 21 (7), pp.753-761.
- Kumar, P. et al. 2016. Investigating the effects of Lycra sleeves on shoulder girdle: A study to inform management of glenohumeral subluxation in post-stroke hemiplegia. UK Stroke Forum. Liverpool, 28th-30th November, 2016.

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