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LITERATURE REVIEW:

Use of Lycra Suits in the Management of Cerebral Palsy and Multiple Sclerosis

INTRODUCTION

Cerebral palsy (CP) is a complex group of syndromes characterized by motor and postural dysfunction. An important feature is alteration of muscle tone which can lead to a reduction of movement, coordination and function. This problem of too much or too little tonicity is addressed by the use of Lycra splints.

Dynamic Lycra splints (also referred to as Lycra suits, orthoses, or garments) are sections of Lycra of varying thicknesses, stitched together using specific tensions and directions of pull. They are made-to-measure and designed specifically to fit the shape of the wearer and so individual assessment is needed. These splints are made from strong Lycra material which is flexible and allows skin to breathe. They are designed to move with the wearer and hence referred to as dynamic. Dynamic splinting may be used in whole body suits, vests, trousers or may cover a small area such as a glove for hand and wrist.

The purpose of this document is to review the evidence surrounding the management and use of Lycra Suits for patients with cerebral palsy.

METHOD

A number of databases were searched including Medline, EMBASE, NHS Evidence and PEDro; using combinations of the keywords 'Lycra', 'Cerebral Palsy', 'Multiple Sclerosis', 'Orthotic Devices' and 'Clothing'.

The Medline search generated 120 titles, of which 22 were selected based on the relevance of the title. The EMBASE search generated 51 titles, of which 18 were selected based on the relevance of the title. A search in NHS Evidence generated 40 results, of which 7 were selected based on the relevance of the title. A search in PEDRO generated one relevant title.

An additional Google search generated an additional 4 useful documents, bringing the overall total to 28 references. Evidence was also sought from a physiotherapist. The 28 references identified were reviewed, and a summary of the key findings are presented below.

FINDINGS

Upper limbs

Elliot (2011) showed that Lycra arm splints provided an improvement in selected functional tasks in some children with cerebral palsy. However, this was a short term study (three months) and included 16 children.

Corn (2003), studied 4 children using upper-limb Lycra splints and found the effects were highly variable between participants. Whilst one participant showed a statistically significant improvement, another had a statistically significant decline in function.

In a study of 12 children using upper-limb Lycra splints, Nicholson (2001) found that Lycra garments provided some functional improvements in the participants. However, the study had a small sample size, the garments were associated with significant difficulties and were impractical, thus limiting their usefulness.

Lower Limbs

In a 2009 study of 5 patients using hip/pelvis Lycra splints, Flanagan observed some improvements in gait and functional skills in children with CP.

In a pilot study of 8 patients using Lycra full-length leggings, Matthews (2009) reported benefits on gait for some children with cerebral palsy, but suggest a larger study is required to confirm these findings.

Williamson (2009) found that use of lower-limb Lycra orthoses (n=28) did not have a significant effect on gait symmetry of children with CP.

Whole Body

Mol (2012) concluded there was no significant difference in sleep disturbances in children with cerebral palsy using night orthoses than those without.

Raper (2011) conducted an audit of patient views and reported that parents and staff perceived that Lycra splints were a useful component in the management of children with cerebral palsy. This is despite the lack of high quality systematic reviews or randomised controlled trials to support this as well as no quality standards regarding their use.

Knox (2003) found an improvement in function following the use of Lycra suits, but discomfort was a barrier to sustained use. The study featured only eight participants, half of whom withdrew from the study due to discomfort.

Literature reviews

Eddison's (2013) systematic review suggested that ankle-foot orthoses have the potential to improve gait in children with cerebral palsy. However, the review highlighted a lack of well-designed and adequately powered studies in this field.

Morris (2011) also noted a lack of high-quality evidence due to small numbers, inadequate reporting and lack of transparency in studies in the use of Lycra splints. Furthermore, the short length of follow-up periods limited the usefulness of these studies.

Coghill and Simkiss (2010) concluded that Lycra garments are useful given they improve proximal stability thereby improving functional abilities. However they also

agree with the studies suggesting children and carers find the suits inconvenient to use.

Figueiredo (2008) found that there was a lack of high-quality studies to support the use of ankle-foot orthoses for children with cerebral palsy.

A systematic review by Blackmore (2006) found that there was no evidence to support the use of upper-limb soft splinting in children with cerebral palsy. Blackmore noted the lack of high-quality randomised controlled trials and suggests that further robust research is required.

Finally, a health technology scoping report from Healthcare Improvement Scotland in 2013 concluded that there was limited clinical and no cost-effectiveness evidence on the use of dynamic orthoses for cerebral palsy.

CONCLUSIONS

1. There are little published data on the use of Lycra suits in the management of cerebral palsy.
2. Of the available data, there is a lack of high-quality studies, especially randomised controlled trials and systematic reviews
3. The number of participants is generally small ($n < 10$)
4. There is also a lack of consistent, agreed outcome measures.
5. Studies to date have shown variable results. While some studies showed a beneficial effect from the use of Lycra suits, others have shown a negative or detrimental effect. Clinical effectiveness is unclear
6. Study withdrawal is common, due to practical or comfort issues in wearing the suits
7. Long-term studies are lacking.
8. There is little evidence on cost-effectiveness in the use of Lycra suits in the management of cerebral palsy
9. More research is required.

RECOMMENDATIONS

1. Current evidence does not support routine commissioning of Lycra suits in the management of Cerebral Palsy
2. Lycra suit orthoses for cerebral palsy should be assigned low priority

SUMMARY

1. *In general there is a lack of high-quality studies*
2. *The majority of studies focus on highly specific patient groups, or are case-series with small patient numbers*
3. *There is some evidence of short-term benefit for individual patients but there have been no long term or large trials to date*
4. *There is little evidence on cost-effectiveness.*
5. *Evidence does not support routine commissioning of Lycra suits in the management of Cerebral Palsy.*
6. *It is suggested that Lycra suit orthoses for cerebral palsy should be assigned low priority.*

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