

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

*This is not a conclusive list and will be updated on an ongoing basis. Please note that the papers reviewed examine a range of manufacturers of DEFOs, who each use different fabrication techniques.*

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT				REFERENCE				ORTHOSIS
<b>WORLD HEALTH ORGANISATION ICF - Activity and Participation</b>								
<p>From a biopsychosocial point of view, as suggested by the WHO, their needs should be understood not only in terms of impairments, but also with respect to activity limitations and/or participation restrictions in a dynamic interaction with environmental factors. A recent version of the ICF for children and youth, adds that the temporal perspective should not be neglected, with the related changes in terms of body functions and structures, but also of interests, desires and relevant activities and participations.</p> <p>... Increased feeling of independence from both parents and therapist... and the improved quality of life of both the patient and his family</p> <p>... he was able to start driving the motorbike in his backyard, later following his parents' car in a country road and a couple of months later on his own.</p>				<p>Grandi A et al (2012) "Listening to the patient as a possible route to cost effective rehabilitation: a case report." J Med Case Rep 6:19</p>				Glove
<p>...pain interfered less with activities of daily living...</p>				<p>Drivsholm et al (2018) Evaluation of Dynamic Movement Orthoses (DMO) as a means to relieve pain and fatigue in patients with facio-scapulo-humeral muscular dystrophy (FSHD)</p>				Vest
<p>...increased confidence, improvements in walking posture or style, more steady/stable on feet ...improvements in walking distance and range ...more able to participate in hobbies ....required less support.</p>				<p>Finlayson et al (2018). Lycra splinting garments for adults with intellectual disabilities who fall due to gait or balance issues: a feasibility study. Journal of Intellectual Disability Research</p>				Shorts & Socks
<p>...she could use both modalities together, but if she wanted to go out for the evening or to a social event she could wear the beige coloured sock under her tights to give her the stability and dorsiflexion she needed without being too obvious and was able to wear a dress or skirt.</p>				<p>Betts, L (2015). Dynamic movement Lycra® orthoses in multiple sclerosis' British Journal of neuroscience and Nursing. April/May Vol 11 No 2 pp60-64</p>				Shorts, Glove, Sock
<p>Parents also reported greater participation in gym class and improved handwriting, buttoning and tying.</p>				<p>Flanagan, A et al (2009). "Evaluation of short-term intensive orthotic garment use in children who have cerebral palsy." Pediatr Phys Ther 21(2): 201-204.</p>				Theratogs shorts & vest

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT				REFERENCE				ORTHOSIS
Functional benefits were recorded on standardised testing and by clinical observation in several participants, such as improved sitting balance, grasping of objects and self-feeding.				Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." British Journal of Occupational Therapy 66(2):7				Shorts, Glove, Vest, Suit
On review, 3 weeks later, the patient reported that after 'sustained physical activity', i.e. supermarket shopping, she was able to get over the threshold of the house more easily.				Betts, L (2015). Dynamic movement Lycra® orthoses in multiple sclerosis' British Journal of neuroscience and Nursing. April/May Vol 11 No 2 pp60-64				Shorts, Glove, Sock
Overall, the current evidence suggests that Lycra® garments can provide functional benefits for children with cerebral palsy and, in this trial, seven out of eight participants reported such benefits.				Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." British Journal of Occupational Therapy 66(2):7				Shorts, Glove, Vest, Suit
Performance improvements noted by the parents on the COPM included functional activities such as stepping in and out of the shower independently as well as up and down curbs.				Flanagan, A et al (2009). "Evaluation of short-term intensive orthotic garment use in children who have cerebral palsy." Pediatr Phys Ther 21(2): 201-204.				Theratogs shorts & vest
This [Shoulder stability orthosis] seemed to provide relatively immediate support and functional facilitation, and improved compliance for physical therapy exercises.				Matthews, M. J; Payne, C and Watson, M (2011). "The use of a dynamic elastomeric fabric orthosis to manage painful shoulder subluxation: A case study." Journal of Prosthetics and Orthotics 23(3): 155-158				Shoulder
Physically study participants spent more time participating in physically challenging activities including riding a bicycle and in physical education class.				Flanagan, A et al (2009). "Evaluation of short-term intensive orthotic garment use in children who have cerebral palsy." Pediatr Phys Ther 21(2): 201-204.				Theratogs shorts & vest
Participant drove powered chair more easily when wearing Lycra® gloves because these assisted her to extend her wrist when pressing on the joystick.				Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." British Journal of Occupational Therapy 66(2):7				Shorts, Glove, Vest, Suit
The patient showed a slight increase in the GMFM but the improvement in MACS scores were significant, not only in terms of raw scores but also as an improvement of his functioning.				Grandi, A et al (2012) "Listening to the patient as a possible route to cost effective rehabilitation: a case report." J Med Case Rep 6:19				Glove
She reported an improvement in driving, having previously driven one-handed with a knob on the steering wheel. She was also able to carry items with both hands rather than one sided, but more surprisingly she reported that she was now able to put her earrings in, although she had to steady her elbow on the table.				Betts L, (2006). "Lycra® orthoses and their use in MS" Way Ahead, MS Trust. <a href="http://www.mstrust.org.uk">www.mstrust.org.uk</a>				Shorts, Glove, Sock

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK	
EFFECT								REFERENCE	ORTHOSIS
The results demonstrated improvements in the position of the arm and hand, with some clients reporting an improvement in function, including a significant improvement in the ability to play the piano in one case.								Betts L, (2006). "Lycra® orthoses and their use in MS" Way Ahead, MS Trust. <a href="http://www.mstrust.org.uk">www.mstrust.org.uk</a>	Shorts, Glove, Sock
In the weeks that followed fitting Mary became more confident functionally and socially and was more aware of her affected side, thus attempted bilateral tasks more readily...								Attard, J. & Rathalia, S (2004). "A review of the use of Lycra® pressure orthoses for children with cerebral palsy." Intl Journ of Ther & Rehab Vol 11(3): 120 – 126	Suit, Shorts, Gloves, Socks
<b>POSTURE - Proximal Stability</b>									
The results of the high-quality RCTs showed that wearing the suit along with conventional therapy improved proximal stability, gross motor function, and gait. The Class II-III and IV studies supported the findings of the Class I studies.								Karadag-Saygi, E; Giray, E (2019). The clinical aspects and effectiveness of suit therapies for cerebral palsy: A systematic review. Turk J Phys Med Rehab 2019;65(1):93-110	Suit
Significantly lower body sway values/trunk oscillations were found in the DMO.								Serrao et al (2017). Use of dynamic movement orthoses to improve gait stability and trunk control in ataxic patients. European Journal Phys and Rehab Med Jun 19	Suit
In hEDS patients (notably the most unstable cases), the wearing of somatosensory orthoses seems to reduce their proximal instability (ie sway area)... comparable to those of the controls in eye-open conditions... even more pronounced in the absence of visual information. Wearing the two orthoses in combination seems to help patients stabilise their balance and minimise their AP sway and SD. <b>Thus, the combined wearing of orthoses could induce a synergetic effect.</b>								Dupuv et al (2017). Ehlers-Danlos Syndrome, Hypermobility Type: Impact of Somatosensory Orthoses on Postural Control (A Pilot Study). Fontiers in Human Neuroscience 2017; 11: 283	Suit & Insole
...sitting independently for several minutes and 'felt less afraid' when sitting.								Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." British Journal of Occupational Therapy 66(2):7	Shorts, Glove, Vest, Suit
4 of the 5 children who followed the upper limb protocol and 5 of the 8 following the lower limb protocol showed greater proximal stability using Lycra® suits.								Attfield, S et al (2008). "Evaluation of Stability of Lycra® Soft Orthoses using 3-D Kinematic Analysis." Orthopadie-Technik Quarterly, Eng Ed	Suit
... suits improved postural stability and upper limb movement in children presenting with increased muscle tone and/or involuntary movement and proximal instability, making the suits particularly suitable for dystonic and athetoid patients.								Attard, J. & Rathalia, S (2004). "A review of the use of Lycra® pressure orthoses for children with cerebral palsy." International Journal of Therapy & Rehabilitation. Vol 11(3): 120 - 126	Suit, Shorts, Gloves, Socks

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE							ORTHOSIS
<b>POSTURE - Distal influencing Proximal</b>								
...unexpected improvements in postural control were demonstrated at the conclusion of the splint wearing period.... displayed decreased thorax flexion (reach front, hand to mouth tasks) following splinting.... These results indicate that the Lycra® arm splint also improves whole body coordination rather than merely affecting movement of the splinted limb in isolation.	Elliott, et al (2011). "Lycra® arm splints in conjunction with goal-directed training can improve movement in children with cerebral palsy." <i>NeuroRehabilitation</i> 28: 8.							Gloves
<b>POSTURE - Handling</b>								
Wearing Lycra® suits was shown to enhance function, improve posture, aid handling and be a valuable adjunct to therapy.	Attard, J. & Rathalia, S (2004). "A review of the use of Lycra® pressure orthoses for children with cerebral palsy." <i>Int Journal of Therapy &amp; Rehab.</i> Vol 11(3): 120 - 126							Suit, Shorts, Gloves, Socks
Parent found it easier to perform transfers because the participant pulled less into flexion at her shoulders and hips.	Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." <i>British Journal of Occupational Therapy</i> 66(2):7							Shorts, Glove, Vest, Suit
<b>POSTURE - Postural Correction</b>								
...It seems that the DEFO can assist the knee and hip extension moment similar to an external extension assist, and therefore improve the crouch position in children with CP.	Bahramizadeh et al (2015). Effect of Dynamic Elastomeric Fabric Orthoses on Postural Control in Children with Cerebral Palsy. <i>Pediatric Physical Therapy</i> pp 349 – 354							Suit
The patient's height was marked on the wall prior to fitting and reviewed afterwards. Within 5 minutes of fitting the patient was able to stand straighter and appeared 5–6 cm taller, according to the mark on the wall.	Betts, L (2015). Dynamic movement Lycra® orthoses in multiple sclerosis' <i>British Journal of neuroscience and Nursing.</i> April/May Vol 11 No 2 pp60-64							Shorts, Glove, Sock
Legs more symmetrical with less hip adduction [therapist observation].	Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." <i>British Journal of Occupational Therapy</i> 66(2):7							Shorts, Glove, Vest, Suit
DEFOs appear to treat the unbalanced muscle tone thereby causing an effect on the resultant muscle forces impacting on the scoliosis progression.	Matthews, M. (2010). "Efficacy of dynamic elastomeric fabric orthoses in the management of scoliosis." <i>Scoliosis</i> 5 (Suppl 1): 051							Scoliosis suit

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE						ORTHOSIS	
The dynamic Lycra® spinal corrective orthosis when combined with an appropriate heel raise has been found to reduce thoracic scoliosis with improved compliant and comfort..	Matthews, M. and Crawford, R. (2006). "The use of dynamic Lycra® orthosis in the treatment of scoliosis: A case study." Prosthetics and Orthotics International 30(2): 171-174						Scoliosis suit	
...to date the garments have proven to be very effective with the orthotic treatment of mobile, idiopathic and neuropathic scoliotic presentations.	Matthews, M. and Crawford, R. (2006). "The use of dynamic Lycra® orthosis in the treatment of scoliosis: A case study." Prosthetics and Orthotics Int 30(2): 171-174						Scoliosis suit	
X-rays of the patient wearing the orthosis have indicated a halving of the Cobb angle from 33° to 15°. Unlike rigid bracing this angle has been held, even when not wearing the suit, suggesting that the patient has developed the muscle control to counter the natural curve progression  One year later, at the age of six years the x-rays showed curve reduction of the 35°, a vertebral rib angle closer to 20° difference, with the symmetry line closer to mid line and a reduced pectus carinatum protrusion.	Matthews, M. J. A. and Chatterjee, S (2011). "Spinal bracing for the child with neurological dysfunction: is the future rigid?" Orthopaedic Product News (Nov/Dec): 3.						Scoliosis suit	
<b>MOBILITY - Gait</b>								
...decrease in stance phase, double support, swing duration variability and increase in swing phase duration. ...increase in knee joint ROMs in sagittal plane and a decrease in pelvic ROMs in both sagittal and frontal planes. ...decrease in body sway in mediolateral direction and decrease in trunk oscillations in sagittal plane. ...suggests stabilize the pelvis during walking without restraining movement of the hip, knee and ankle joints.... may reflect better control of knee flexion during swing phase.	Serrao et al (2017) Use of dynamic movement orthoses to improve gait stability and trunk control in ataxic patients. European Journal of Physical and Rehabilitation Medicine 2017 Jun 19						Suit	
Visual Analogue Scale (VAS) Figure 3 (left side) illustrates a trend for cumulative perceived improvement in walking performance, as scored by seven of the subjects' main carers.	Matthews, M. J; Watson, M and Richardson, B (2009). "Effects of dynamic elastomeric fabric orthoses on children with cerebral palsy." Prosthetics and Orthotics International 33(4): 339-347						Leggings	

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK	
EFFECT				REFERENCE				ORTHOSIS	
These data suggest an intervention effect, specifically that the orthosis had a positive influence on the physiological cost of walking. This effect is indirectly reflected in Figure 2 (right side), wherein walking velocity is seen to be progressively more consistent with time.				Matthews, M. J; Watson, M. and Richardson M (2009). "Effects of dynamic elastomeric fabric orthoses on children with cerebral palsy." Prosthetics and Orthotics International 33(4): 339-347				Leggings	
Legs more symmetrical with less left hip adduction [therapist report].				Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." British Journal of Occupational Therapy 66(2):7				Shorts, Glove, Vest, Suit	
Perceived changes in fatigue level, improved gait and confidence corroborated the results of the PCI [physiological cost index] and thus appeared to endorse a treatment effect.				Matthews, M. J; Watson, M and Richardson, B (2009). "Effects of dynamic elastomeric fabric orthoses on children with cerebral palsy." Prosthetics and Orthotics International 33(4): 339-347				Leggings	
Post intervention kinematic gait data showed that peak hip extension at terminal stance increased during the wear-period and did not return to baseline at the 2- and 4-month follow up.  ...the subjects were noted to have pelvic and hip kinematic gait data that resembled children who were developing typically.				Flanagan, A et al (2009). "Evaluation of short-term intensive orthotic garment use in children who have cerebral palsy." Pediatr Phys Ther 21(2): 201-204.				Theratogs Shorts & Vest	
The child was also able to stand unaided and able to walk with greater reduced support.				Matthews, M. J. A. and Chatterjee, S; (2011). "Spinal bracing for the child with neurological dysfunction: is the future rigid?" Orthopaedic Product News (November/December): 3.				Scoliosis suit	
An overall reduction (i.e. improvement) in walking time values leading up to and/or during the intervention phase is suggested. A reduction in walking time suggests that the subject is more controlled and walking within their base of support.				Matthews, M. J; Watson, M; and Richardson B (2009). "Effects of dynamic elastomeric fabric orthoses on children with cerebral palsy." Prosthetics and Orthotics International 33(4): 339-347				Leggings	
Swings of ROM of all joints were improved at with DEFO socks... Footdrop in swing phase were prevented by wearing DEFO equipment.				Takeuchi et al. Effects of Dynamic Elastomeric Fabric Ankle Foot Orthosis for Paralytic Footdrop in Paediatric Siblings with Charcot-Marie-Tooth Disease. Aichi Children's Health & Medical Centre, Japan (unpublished)				Sock	

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE						ORTHOSIS	
The subjects became increasingly more consistent in their performance (i.e; less variability in walking time), by the end of the intervention phase. A carry-over of this effect into the next (A2) phase, when the intervention was withdrawn was also identified.	Matthews, M. J; Watson, M; and Richardson B (2009). "Effects of dynamic elastomeric fabric orthoses on children with cerebral palsy." Prosthetics and Orthotics International 33(4): 339-347						Leggings	
Improved walking and more complex skills.... Patients walked more comfortably with the garment on and had more confidence in the arm.	Attard, J. & Rathalia, S (2004). "A review of the use of Lycra® pressure orthoses for children with cerebral palsy." International Journal of Therapy & Rehab. Vol 11(3): 120 – 126						Suit, Shorts, Gloves, Socks	
<b>MOBILITY - Balance / Falls</b>								
Seven participants experienced a reduction in falls during the 6 weeks of LSG wear...most noticeably in the group of five participants who wore Lycra® splinting socks.	Finlayson et al (2018). Lycra splinting garments for adults with intellectual disabilities who fall due to gait or balance issues: a feasibility study. Journal of Intellectual Disability Research						Shorts & Socks	
The percent change in balance then increased positively by 58% and 76% at 2 and 4 months, respectively, after discontinuing garment wear.	Flanagan, A et al (2009). "Evaluation of short-term intensive orthotic garment use in children who have cerebral palsy." Pediatr Phys Ther 21(2): 201-204.						Theratogs Shorts & Vest	
Results indicate that wearing WF-CGs [well-fitting compression garments] significantly improved balance time and significantly decreased postural sway variability.	Michael, J.S et al (2014). What is the effect of compression garments on balance task in female athletes? Gait and Posture 39 (2014) 804-809						Shorts	
They reported benefits and functional improvements while these children were wearing this type of Lycra® compression bracing, including: Improved stationary and dynamic balance... Peter’s posture immediately improved; he could sit independently at the edge of the bed, taking weight on both upper limbs, and hold the position for 30s.	Attard, J. & Rathalia, S (2004). "A review of the use of Lycra® pressure orthoses for children with cerebral palsy." International Journal of Therapy & Rehab. Vol 11(3): 120 - 126						Suit, Shorts, Gloves, Socks	
Marked improvements in movement and coordination skills were identified (improved MABC-2) ...mainly as a result of improvements in static balance and manual dexterity tasks.	Rathinam, C. B; Spokes, G; Green, D (2013). "Effects of a Lycra® body suit orthosis on a child with developmental coordination delay: A case study." Journal of Prosthetics and Orthotics 25(1): 4.						Suit	

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE						ORTHOSIS	
<b>RESPIRATION AND SPEECH</b>								
Clearer speech [perceived benefits].	Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." British Journal of Occupational Therapy 66(2):7						Shorts, Glove, Vest, Suit	
His head control and clarity of speech also improved.	Attard, J. & Rathalia, S (2004). "A review of the use of Lycra® pressure orthoses for children with cerebral palsy." Int Journal of Ther & Rehab. Vol 11(3): 120 – 126						Suit, Shorts, Gloves, Socks	
<b>UPPER LIMB - Activity</b>								
...the persons reported a positive effect on upper limb activities.	Drivsholm et al (2018) Evaluation of Dynamic Movement Orthoses (DMO) as a means to relieve pain and fatigue in patients with facio-scapulo-humeral muscular dystrophy (FSHD)						Vest	
...the performance of unilateral activities in both subjects improved significantly while wearing the DMO glove.	Yasukawa and Uronis (2014). The Dynamic Movement Orthosis Glove: A Case Series. Journal of Prosthetics and Orthotics, Vol 26 (2)						Glove	
SO1 demonstrated greater use of left arm and described the comfort and stability he felt while wearing the garment.	Yasukawa et al (2011) Case Study: Use of the Dynamic Movement Orthosis to Provide Compressive Shoulder Support for Children With Brachial Plexus Palsy						Shoulder	
... the percentage time in the primary movement improved over the splinting period.	Flanagan, A et al (2009). "Evaluation of short-term intensive orthotic garment use in children who have cerebral palsy." Pediatr Phys Ther 21(2): 201-204.						Theratogs Shorts & Vest	
<b>UPPER LIMB - Fluidity</b>								
A significant increase in percentage of time in the primary movement was established from baseline to three months for both children with dystonic hypertonicity (p = 0.001) and spastic hypertonicity (p = 0.048). A significant decrease in normalised jerk was established between baseline and three months for both children with dystonic hypertonicity (p = 0.001), and spastic hypertonicity (p = 0.016). By the completion of three months of splint wear the percentage of time in the primary movement increased, hence the movement is more efficient, and this may be suggestive of increased central control of upper limb movement.	Elliott, C et al. (2011). "Lycra® arm splints improve movement fluency in children with cerebral palsy." Gait and Posture 33: 6.						Glove	

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE						ORTHOSIS	
The upper limb actively took part in the assisted rolling with the shoulder showing more self-controlled movement... She could reach out with both hands in different directions in the sitting position.	Cheng, C. and Chan, I (2003). "Use of a Lycra®-based Garment in Facilitating Postural Stability in Children with Cerebral Palsy." Brainchild 4(1): 18-20						Suit	
<b>UPPER LIMB - Position</b>								
Lycra sleeve has potential to alter shoulder biomechanics in people with stroke... changes notes in muscles and scapula position suggest the lycra sleeve tends to provide better alignment to the shoulder joint.	Kumar et al (2018) The effects of a lycra sleeve on acromion-greater tuberosity distance (AGT), muscle activity and scapula position in people with post-stroke hemiplegia. University of the West of England.						Sleeve	
On putting on the glove, there was an immediate and visible effect; the wrist extended to a neutral position and there was extension of all the metacarpophalangeal joints, accompanied by extension and abduction of the thumb. This allowed the hand to be placed in a more functional position. Proximally, elbow extension was more evident when in a state of rest, thus rendering a more symmetrical overall posture of the upper body.	Attard, J & Rathalia, S (2004). "A review of the use of Lycra® pressure orthoses for children with cerebral palsy." International Journal of Therapy & Rehabilitation. Vol 11(3): 120 - 126						Suit, Shorts, Gloves, Socks	
In the distal limb, they [the sleeves] reduce swelling, improve wrist posture, and reduce wrist and finger flexor spasticity.  ... in healthy subjects, we found that a garment designed to supinate the forearm could stretch pronator muscles by producing significant supination lasting 2 to 3 hours and increase rotational stiffness of the forearm.  Resting posture was significantly improved at the wrist; flexion was decreased.  The results showed that custom-fitted Lycra® garments worn on the paretic arm for a few hours in patients with hemiplegia: (1) were comfortable, (2) improved wrist posture and reduced spasticity of wrist and finger flexors, (3) reduced swelling in those patients with a swollen paretic arm, (4) improved PROM at the shoulder.  Active finger flexion was reduced by an average of 16°	Gracies, J M et al (2000). "Short-term effects of dynamic Lycra® splints on upper limb in hemiplegic patients." Archives of Physical and Medical Rehabilitation 81.						Gloves	

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE						ORTHOSIS	
<p>The displacement into supination by the supinator garment occurred in every subject.</p> <p>Specifically designed Lycra® garments rotated the forearm in healthy subjects but this effect was significant only when the garments were carefully fitted to obtain the desired effect. The present study showed that Lycra® garments designed to supinate the forearm produced immediate and potentially long- lasting supination of the forearm of the healthy subjects tested.</p>	<p>Gracies, J M et al (1997). "Lycra® garments designed for patients with upper limb spasticity: Mechanical effects in normal subjects." Archives of Physical and Medical Rehabilitation 78: 1066-1071.</p>						Gloves	
CARRYOVER/MOTOR LEARNING/PLASTICITY								
<p>By the 6-month mark, S1 was able to actively extend his wrist against gravity without the DMO.</p>	<p>Yasukawa &amp; Uronis (2014). The Dynamic Movement Orthosis Glove: A Case Series. Journal of Prosthetics and Orthotics, Vol 26 (2)</p>						Gloves	
<p>The percent change in balance then increased positively by 58% and 76% at 2 and 4 months, respectively, after discontinuing garment wear. These findings seem to supplest that motor learning took place while wearing the garments, which may have promoted more physical activity with their peer group during the study.</p>	<p>Flanagan, A et al (2009). "Evaluation of short-term intensive orthotic garment use in children who have cerebral palsy." Pediatr Phys Ther 21(2): 201-204.</p>						Theratogs Shorts & Vest	
<p>On review, 3 weeks later, the patient reported that after 'sustained physical activity', i.e. supermarket shopping, she was able to get over the threshold of the house more easily.</p>	<p>Betts, L (2015). Dynamic movement Lycra® orthoses in multiple sclerosis' British Journal of neuroscience and Nursing. April/May Vol 11 No 2 pp60-64</p>						Shorts, Glove, Sock	
<p>Overall, the children showed increased confidence in attempting motor tasks.</p>	<p>Attard, J. &amp; Rathalia, S (2004). "A review of the use of Lycra® pressure orthoses for children with cerebral palsy." International Journal of Ther &amp; Rehab. Vol 11(3): 120 – 126</p>						Suit, Shorts, Gloves, Socks	
<p>The authors favour the view that the 'Lycra® orthosis' had a positive impact on this child with DCD because of a substantial improvement in MABC-2 score at 24 weeks (intervention and post-intervention) and is unlikely a result of natural maturation.</p>	<p>Rathinam, C. B; Spokes, G; Green, D. (2013). "Effects of a Lycra® body suit orthosis on a child with developmental coordination delay: A case study." Journal of Prosthetics and Orthotics 25(1): 4.</p>						Suit	
<p>Muscle tone also appears to improve, resulting in children with cerebral palsy often able to wean out of the orthosis in time.</p>	<p>Matthews, M. (2010). "Efficacy of dynamic elastomeric fabric orthoses in the management of scoliosis." Scoliosis 5 (Suppl 1): 051</p>						Scoliosis suit	

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK	
EFFECT								REFERENCE	ORTHOSIS
During this week carers generally reported an improvement in sitting balance which was not apparent when the suit was removed, although as the trial progressed it was observed that in many instances the effect of the suit was maintained for some time after its removal.								Edmonson, J. (1999). "How effective are Lycra® suits in the management of children with cerebral palsy." A.P.C.P. Journal (March): 7.	Suit
Subsequent x-rays have indicated that the curve has been held for 30 months at 20°. Unlike rigid bracing this angle has been held, even when not wearing the suit, suggesting that the patient has developed muscle control to counter the natural curve progression.								Matthews, M. and Crawford, R (2006). "The use of dynamic Lycra® orthosis in the treatment of scoliosis: A case study." Prosthetics and Orthotics International 30(2): 171-174	Scoliosis suit
The third and fourth assessments showed progressive improvements in symptoms, marked also by objectively visible changes in x-ray evidence, such that the subject was eventually able to function without the orthosis and ultimately return to normal activity.								Matthews, M. J; Payne, C and Watson, M (2011). "The use of a dynamic elastomeric fabric orthosis to manage painful shoulder subluxation: A case study." Journal of Prosthetics and Orthotics 23(3): 155-158	Shoulder
The subjects became increasingly more consistent in their performance (i.e. less variability in walking time), by the end of the intervention phase. A carry-over of this effect into the next (A2) phase, when the intervention was withdrawn was also identified.								Matthews, M. J; Watson, M and Richardson, B (2009). "Effects of dynamic elastomeric fabric orthoses on children with cerebral palsy." Prosthetics and Orthotics International 33(4): 339-347	Leggings
<b>BIOMECHANICAL EFFECTS - Joint Structure</b>									
Radiographs taken 1 month after supply of the orthosis and commencement of physical activity ... indicated relocation of the humeral head whilst wearing the orthosis.								Matthews, M. J; Payne, C. and Watson, M. (2011). "The use of a dynamic elastomeric fabric orthosis to manage painful shoulder subluxation: A case study." Journal of Prosthetics and Orthotics 23(3): 155-158	Shoulder
The head of the humerus was less obvious on visual inspection and palpation, that is, it was more contained within the glenoid socket [Therapist report].								Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." British Journal of Occupational Therapy 66(2):7	Shorts, Glove, Vest, Suit

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE						ORTHOSIS	
<b>BIOMECHANICAL - Planes of Movement</b>								
Correction of the spine appears to be continuous with the natural elasticity of the fabric and designed pressure and void areas combining to enable lateral and de-rotational shifting to occur.	Matthews, M. (2010). "Efficacy of dynamic elastomeric fabric orthoses in the management of scoliosis." <i>Scoliosis</i> 5 (Suppl 1): 051						Scoliosis suit	
The prescription of an orthosis [shoulder stability orthosis], which was supportive and corrective, whilst also permitting more normal joint activity (including restorative exercise) was probably instrumental in initiating the recovery process.	Matthews, M. J; Payne, C and Watson, M (2011). "The use of a dynamic elastomeric fabric orthosis to manage painful shoulder subluxation: A case study." <i>Journal of Prosthetics and Orthotics</i> 23(3): 155-158						Shoulder	
Improved stability in the transverse plane at the trunk... Improvements were seen in both trunk and elbow abduction/adduction.	Attfield, S et al. (2008). "Evaluation of Stability of Lycra® Soft Orthoses using 3-D Kinematic Analysis." <i>Orthopadie-Technik Quarterly, Eng Ed</i> IV:1-7						Suit	
<b>BIOMECHANICAL EFFECTS - Base of Support</b>								
An overall reduction (i.e improvement) in walking time values leading up to and/or during the intervention phase is suggested. A reduction in walking time suggests that the subject is more controlled and walking within their base of support.	Matthews, M. J; Watson, M. and Richardson, (2009). "Effects of dynamic elastomeric fabric orthoses on children with cerebral palsy." <i>Prosthetics and Orthotics International</i> 33(4): 339-347						Leggings	
Dynamic neoprene orthosis appears to provide an improved base of support for functional gains in balance, dynamic stability, general and specific movement control with improved postural and muscle readiness.	Mirbagheri, S et al (2012). "Effect of Neoprene Dynamic Orthosis on Gait Parameters in Child with Spastic Diplegia Cerebral Palsy: A Case Study." <i>Quarterly Journal of Rehabilitation</i> 12(4): 22-29.						Leggings	
<b>BIOMECHANICAL EFFECTS - Biomechanical Compensations</b>								
All movements were smoother and more in line with normal profiles.  ...both distal and proximal joints appear to have more control.	Attfield, S. F et al (2008). "Evaluation of Stability of Lycra® Soft Orthoses using 3-D Kinematic Analysis." <i>Orthopadie-Technik Quarterly, Eng Ed</i> IV:1-7						Suit	
It appears clinically that the DMO not only heightens awareness to carers, staff and family members but has a biomechanical effect on the whole of the shoulder joint...	Sadler A and Betts L. (2015) Orthoses to improve rehabilitation after stroke. <i>BJNN Stroke Supplement</i> pp5-9						Shoulder	

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT				REFERENCE				ORTHOSIS
<b>MUSCULAR CHANGES/CONTINUOUS STRETCH/RANGE OF MOVEMENT</b>								
<p>“passive range of motion” exercises performed in physiotherapy sessions or by the patient are often unable to prevent progressive muscle contracture, presumably because they provide only intermittent muscle stretch. In children with CP, it is probably essential to stretch spastic muscles continuously for several hours each day to prevent contractures.</p> <p>Unlike bandages that rarely produce long-lasting stretch of underlying tissues, the current garment produces significant stretch lasting more than 3 hours.</p>				<p>Gracies, J. M et al (1997). "Lycra® garments designed for patients with upper limb spasticity: Mechanical effects in normal subjects." Archives of Physical and Medical Rehabilitation 78: 1066-1071.</p>				Gloves
<p>Shoulder flexion improved significantly (<math>p &lt; 0.01</math>) from 45° to 57° at the conclusion of splinting, with an effect size of 0.87. Similarly, total range of shoulder flexion increasing from 39° at baseline to a total of 56° following splinting, a significant improvement (<math>p &lt; 0.01</math>) with an effect size of 0.71. Significant improvements were also demonstrated in thorax flexion (<math>p &lt; 0.01</math>), decreasing from baseline (40°) to the completion of splinting (33° - ES = 0.78).</p>				<p>Elliott, C. M et al (2011). "Lycra® arm splints in conjunction with goal-directed training can improve movement in children with cerebral palsy." NeuroRehabilitation 28: 8.</p>				Gloves
<p>The continuous stretching forces exerted are low compared with the transient forces applied during manual stretch made by a physiotherapist or with the constraint of a rigid splint. This suggests that these garments may be more appropriate for early stages of recovery, to minimize contractures, rather than when muscles are already shortened.</p>				<p>Gracies, J. M et al (1997). Lycra® garments designed for patients with upper limb spasticity: Mechanical effects in normal subjects." Archives of Physical and Medical Rehabilitation 78: 1066-1071.</p>				Gloves
<p>The effect was greatest for shoulder extension and was statistically significant when considered by itself; the range of passive shoulder ex-tension increased with the garment and decreased without it. A striking observation was the increase in PROM at the shoulder, a joint not covered by the garment.</p>				<p>Gracies, J. M et al (2000). "Short-term effects of dynamic Lycra® splints on upper limb in hemiplegic patients." Archives of Physical and Medical Rehabilitation 81.</p>				Gloves
<p>They [finger sleeves] are most effective in acute cases, where passive correction is still possible or where the flexion contracture is less than 30°.</p>				<p>Kennedy, S. P; Stone, J. (2000) "Balancing contracture management and function." Journal of Hand Therapy (Jan-March):4</p>				Gloves

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK	
EFFECT				REFERENCE				ORTHOSIS	
...improvements were demonstrated in selected maximum range of movement and joint kinematics during functional tasks at the elbow and shoulder joints and thorax segment in children with CP.				Elliott, C. M et al (2011). "Lycra® arm splints in conjunction with goal-directed training can improve movement in children with cerebral palsy." <i>NeuroRehabilitation</i> 28: 8.				Gloves	
In our opinion the reinforced Lycra® sleeve can be used in the prevention and control of flexion contractures of the proximal interphalangeal joints, an in our unit they have proved to be a valuable addition to currently available treatment modalities in a variety of conditions.				Kennedy, S. P; Stone, J. (2000). "Balancing contracture management and function." <i>Journal of Hand Therapy</i> (Jan-March):4				Gloves	
[Lycra® wearer] also reported improved passive range of motion in the more proximal shoulder joint not covered by the garment.				Attard, J. & Rathalia, S (2004). "A review of the use of Lycra® pressure orthoses for children with cerebral palsy." <i>International Journal of Therapy &amp; Rehabilitation</i> . Vol 11(3): 120 – 126				Suit, Shorts, Gloves, Socks	
The outcome of the 3D motion analysis demonstrated improved performance of elbow pronation (front reach, hand to mouth tasks) shoulder flexion (front reach task) and shoulder abduction (side reach task) following three months of splint wear. Furthermore, significant improvements in elbow extension were evident across the reaching tasks. This outcome provides crucial evidence in support of the main aim of the supination–extension Lycra® splint for children with CP that is to improve range of elbow extension.				Elliott, C. M et al (2011). "Lycra® arm splints in conjunction with goal-directed training can improve movement in children with cerebral palsy." <i>NeuroRehabilitation</i> 28: 8.				Gloves	
EFFECTS OF DYNAMIC ORTHOSES AND FUNCTIONAL ELECTRICAL STIMULATION (FES) COMBINED									
The intervention had little influence upon walking speed but improved stride length. ...3cm improvement (splint alone) and a further 5cm with FES [combination].				Lane et al (2015). Combined dropfoot treatment using dynamic splinting with FES: a case study				Sock & FES	
It was interesting to see that the sock compared favourably with the FES, but when the two were combined, i.e. the FES switched on and the sock applied over the top, the effects were further enhanced. She was more stable around the ankle and walking was less effortful.				Betts, L (2015). Dynamic movement Lycra® orthoses in multiple sclerosis' <i>British Journal of neuroscience and Nursing</i> . April/May Vol 11 No 2 pp60-64				Shorts, Glove, Sock	

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE						ORTHOSIS	
<b>HYPERTONIA</b>								
The secondary aim of the study was to investigate if the Lycra® arm splints resulted in differential effects on movement sub- structures for children of predominately spastic type hyper-tonicity compared to predominately dystonic type hyper-tonicity. A significant difference was observed between baseline and three months of Lycra® splint wear ... The magnitude of changes in normalised jerk and the percentage of jerk in the primary movement from baseline to three months was greatest in children with dystonic hypertonia.							Gloves	
In spastic hemiplegic patients, the increased resistance against pronation provided by these garments should oppose involuntary pronator contraction. Individual data showed a trend for the supinator garment to exert a greater effect in more pronated healthy subjects. This would be appropriate for the treatment of spastic arms that are naturally more pronated.							Gloves	
Consider orthoses for children and young people with spasticity based on their individual needs and aimed at specific goals such as: <ul style="list-style-type: none"> <li>- Improving posture</li> <li>- Improving upper limb function</li> <li>- Improving walking efficiency</li> <li>- Preventing or slowing development of contractures</li> <li>- Preventing or slowing hip migration</li> </ul> Relieving discomfort or pain.							Gloves	
The muscles with improved spasticity when wearing the garment were those subjected to the strongest postural effects, ie, the wrist (figs 1, 2) and finger flexors.							Gloves	

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE						ORTHOSIS	
<b>ATAXIA &amp; ATHETOSIS - Balance and Stability</b>								
.... The DMO reduced the upper body motion and improved balance-related gait parameters... We propose use of DMO as an assistive/rehabilitative device in the neurorehabilitation of cerebellar ataxia to improve trunk control and gait stability.	Serrao et al (2017). Use of dynamic movement orthoses to improve gait stability and trunk control in ataxic patients. European Journal of Physical and Rehabilitation Medicine 2017 Jun 19						Suit	
In terms of walking ability, energy efficiency whilst moving and balance and steadiness whilst standing, most participants appeared to show some improvements during the period of DLO wear.	Watson et al (2009). An investigation of the effects of Dynamic Lycra Orthoses (DLOs) in the management of movement control problems caused by cerebellar ataxia. Ataxia UK						Shorts & Leggings	
Upon donning the dynamic movement orthosis (DMO) suit and sneakers the patient's gait significantly improved and she exhibited a heel-strike bilaterally with markedly improved gait pattern and no near falls.	Hon & Armento (2014). Dynamic Movement Orthosis Suit Promotes a Near Normal Gait in a Significantly Ataxic Pediatric Patient: A Case Report. Abstracts of Scientific Papers and Posters Presented at the Annual Meeting of the Association of Academic Physiatrists. Nashville, Tennessee February 2014						Suit	
<b>ATAXIA &amp; ATHETOSIS - Reduction in Involuntary Movements</b>								
... significant differences were established for normalised jerk across the splint wear conditions (p = 0.002) ... Following the wearing of Lycra® arm splints for 3 months, ...movements that were faster, more efficient, and required less secondary corrections. Notably, children with dystonia showed the greatest improvements in movement jerkiness with splinting.	Elliott, C. R; Hamer, S; Alderson, J; Elliott, B. (2011). "Lycra® arm splints improve movement fluency in children with cerebral palsy." Gait and Posture 33: 6.						Gloves	
Reduced range of involuntary movements at the shoulder [perceived benefits].	Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." British Journal of Occupational Therapy 66(2):7						Shorts, Glove, Vest, Suit	
"Athetoid dancing" of the legs was reduced in standing position.	Cheng, C. and Chan, I (2003). "Use of a Lycra®-based Garment in Facilitating Postural Stability in Children with Cerebral Palsy." Brainchild 4(1): 18-20						Suit	
<b>ATAXIA &amp; ATHETOSIS - Dampening Tremor</b>								
It appears that children with dystonic hypertonia showed the greatest improvements in movement jerkiness following splinting.	Elliott, C. R; Hamer, P.; Alderson, J; Elliott, B (2011). "Lycra® arm splints improve movement fluency in children with cerebral palsy." Gait and Posture 33: 6.						Gloves	

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE						ORTHOSIS	
<b>SENSORY PROCESSING</b>								
...it is noteworthy that removal of visual information increases the impact of somatosensory orthoses on postural stability, especially in the AP direction. ...the removal of vision obliges patients to rebalance using their sensory modalities in favour of somatosensory information, thus reinforcing the somatosensory input provided by the orthosis.	Dupuv et al (2017). Ehlers-Danlos Syndrome, Hypermobility Type: Impact of Somatosensory Orthoses on Postural Control (A Pilot Study). <i>Frontiers in Human Neuroscience</i> 2017; 11: 283						Suit & Insole	
'Enhanced sensory and proprioceptive awareness, leading to a better and more secure exploration of the environment'....'In the weeks that followed fitting Mary became more confident functionally and socially and was more aware of her affected side, thus attempted bilateral tasks more readily'.....'Improved sensory cutaneous and proprioceptive feedback enhances the execution of accurate movement by facilitating or inhibiting motor responses from the motor cortex'.	Attard, J. & Rathalia, S (2004). "A review of the use of Lycra® pressure orthoses for children with cerebral palsy." <i>International Journal of Therapy &amp; Rehabilitation</i> . Vol 11(3): 120 - 126						Suit, Shorts, Gloves, Socks	
<b>SENSORY PROCESSING - Reduction in Hypersensitivity</b>								
Improved tolerance of auditory and visual over-stimulation.	Attard, J. & Rathalia, S (2004). "A review of the use of Lycra® pressure orthoses for children with cerebral palsy." <i>Int Jour of Ther &amp; Rehab</i> Vol 11(3): 120 – 126						Suit, Shorts, Gloves, Socks	
<b>SWELLING/PAIN</b>								
It is clear that oedema control is paramount in the prophylaxis of the contractures, and the Lycra® finger sleeve is effective because it affords constant circumferential pressure.	Kennedy, S. P; J Stone, J. (2000). "Balancing contracture management and function." <i>Journal of Hand Therapy</i> (Jan-March):4						Gloves	
Pain had apparently been relieved within a month of supply [of the shoulder stability orthosis] and near-normal function restored by the time of the final x-ray.	Matthews, M. J; Payne, C and Watson, M (2011). "The use of a dynamic elastomeric fabric orthosis to manage painful shoulder subluxation: A case study." <i>Journal of Prosthetics and Orthotics</i> 23(3): 155-158						Shoulder	
Clinically, 6 patients initially had a swollen hemiparetic arm, and the swelling increased over the study period when no garment was worn. In these patients, wearing the garment produced a small but significant reduction in swelling at the fingers and forearm at the end of the 3-hour period.	Gracies, J. M et al (2000). "Short-term effects of dynamic Lycra® splints on upper limb in hemiplegic patients." <i>Archives of Physical and Medical Rehabilitation</i> 81.						Gloves	

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE							ORTHOSIS
OUTCOME MEASURES								
Dynamic elastomeric fabric orthosis groups showed greater improvements compared to the control group in Sitting Assessment Scale The Sitting Assessment Scale and Box and Block Test scores also improved immediately after the patients put on the orthosis.	Giray et al (2018). The effects of a vest type dynamic elastomeric fabric orthosis on sitting balance and gross manual dexterity in children with cerebral palsy: a single blinded randomised controlled study. Disability and Rehabilitation							Vest
... increased the step length on the affected side accounting for the 3cm improvement (splint alone) and a further 5cm with FES [combination]. The improved PCI [physiological cost index] indicated that changes to the gait (improved cadence) made a large difference to the effort required to walk, the subject reported at the time that she much preferred the ease of walking with the splint and FES.	Lane et al (2015). Combined dropfoot treatment using dynamic splinting with FES: a case study							Sock & FES
Significant improvements were obtained in the total score for FM and in the sub-test for motor function... significant improvements also noted in the scores for time and strength for WMFT.	Gonzalez et al (2017). Efficacy of a dynamic orthosis on the upper limbs in the chronic phase of strokes. A longitudinal study							Gloves
Maximum standing knee extension for children with CP improved after 6 weeks of wearing DEFOs.	Bahramizadeh et al (2015). Effect of Dynamic Elastomeric Fabric Orthoses on Postural Control in Children with Cerebral Palsy. Pediatric Physical Therapy pp 349 – 354							Suit
GMFM scores improved, especially within crawling and standing, QUEST scores improved, especially grasps and dissociated movements.	Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." British Journal of Occupational Therapy 66(2):7							Shorts, Glove, Vest, Suit
The subjects' mean composite score on the BOTMP was 22.4 at baseline, which improved to 35.2 with the garment on and 33.6 with the garment off.	Flanagan, A et al (2009). "Evaluation of short-term intensive orthotic garment use in children who have cerebral palsy." Pediatr Phys Ther 21(2): 201-204.							Theratogs Shorts & Vest
X-rays of the patient wearing the orthosis have indicated a halving of the Cobb angle from 33° to 15°.	Matthews, M. J. A. and Chatterjee, S (2011). "Spinal bracing for the child with neurological dysfunction: is the future rigid?" Orthopaedic Product News (November/December): 3.							Scoliosis suit

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE						ORTHOSIS	
The mean performance on the COPM at baseline was 4.7 and at two months after wear was completed measured 6.63. Examining the subtest standard scores on the BOTMP, for which a 15% increase is considered significant, scores with the garment on increased between 17% and 37%.	Flanagan, A et al (2009). "Evaluation of short-term intensive orthotic garment use in children who have cerebral palsy." <i>Pediatr Phys Ther</i> 21(2): 201-204.						Theratogs Shorts & Vest	
Subject number - Target behaviour - Before & after score (increase = improvement) (1) To be able to weight-bear symmetrically whilst stood at table playing: 3>7 (2) To be able to climb a flight of stairs with a bannister without physical assistance: 2>10 (5) To be able to rise from the floor unaided: 3>8 (6) To be able to walk to the bus stop unaided: 0>8 (8) To be able to get up from the floor and to stand still once stood: 2>6.	Matthews, M. J; Watson, M; and Richardson, B (2009). "Effects of dynamic elastomeric fabric orthoses on children with cerebral palsy." <i>Prosthetics and Orthotics International</i> 33(4): 339-347						Leggings	
One year later, at the age of six years the x-rays showed curve reduction of the 35°, a vertebral rib angle closer to 20° difference, with the symmetry line closer to mid line and a reduced pectus carinatum protrusion.	Matthews, M. J. A. and Chatterjee, S (2011). "Spinal bracing for the child with neurological dysfunction: is the future rigid?" <i>Orthopaedic Product News</i> (November/December): 3.						Scoliosis suit	
Thirteen out of the 14 timed tasks from the WMFT showed improvement in speed.  Comparing strength using a dynamometer ... there was a 2.5lb increase in strength while wearing the DMO.	Yasukawa et al (2011) Case Study: Use of the Dynamic Movement Orthosis to Provide Compressive Shoulder Support for Children With Brachial Plexus Palsy						Shoulder	
COMPLIANCE IN COMPARISON TO RIGID ORTHOSES								
Muscle tone does not appear to be diminished. In rigid bracing reduced muscle strength has been noted. All exercise, including swimming, is possible in the suit, the only orthotic spinal treatment to allow this.	Matthews, M. and Crawford, M (2006). "The use of dynamic Lycra® orthosis in the treatment of scoliosis: A case study." <i>Prosthetics and Orthotics International</i> 30(2): 171-174						Scoliosis suit	
It is our clinical experience that night splintage using rigid thermoplastics alone is not sufficient to prevent or control particularly aggressive contractures, and that some patients require daytime splintage to provide constant stretch of the affected finger into extension.	Kennedy, S. P; Stone, J. (2000) "Balancing contracture management and function." <i>Journal of Hand Therapy</i> (Jan-March):4						Gloves	

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT				REFERENCE				ORTHOSIS
Conventional spinal orthoses have been known to reduce muscle tone in this patient group due to muscle inactivity causing the scoliosis to progress.				Matthews, M. (2010). "Efficacy of dynamic elastomeric fabric orthoses in the management of scoliosis." <i>Scoliosis</i> 5 (Suppl 1): 051				Scoliosis suit
Consider and assess whether an orthosis might (a) cause difficulties with self-care or care by others (b) cause difficulties in relation to hygiene (c) be unacceptable to the child or young person because of its appearance. These areas may be improved by the use of Lycra® orthoses and a case be made using the NICE guidance.				Health, N. C. C. f. W. s. a. C. s. (2012). Spasticity in children and young people with non-progressive brain disorders: management of spasticity and co-existing motor disorders and their early musculoskeletal complications. London, RCOG Press: 209. NICE clinical guideline 145, July 2012				Gloves
The use of dynamic elastomeric fabric orthoses therefore can provide a viable opportunity to manage scoliosis management, by providing an improved cosmetic, improved compliance and a truly dynamic option to the rigid bracing used for the last 30 years since the introduction of the modular scoliosis brace.				Matthews, M. J. A. and Chatterjee, C (2011). "Spinal bracing for the child with neurological dysfunction: is the future rigid?" <i>Orthopaedic Product News</i> (November/December): 3.				Scoliosis suit
...to prevent contractures in the long term, muscle stretch is probably more effective when applied continuously for several hours daily. Rigid splints are often poorly tolerated when used for long periods of time; they restrain motion and may induce learned disuse.				Gracies, J. M et al (2000). "Short-term effects of dynamic Lycra® splints on upper limb in hemiplegic patients." <i>Archives of Physical and Medical Rehabilitation</i> 81.				Gloves
SOCIO-EMOTIONAL FEEDBACK - User Satisfaction								
All five reported that the Lycra socks were very/easy to put on and very/comfortable to wear. ...reported benefits of socks ...increased confidence, improvements in walking posture or style, more steady/stable on feet ...improvements in walking distance and range ...more able to participate in hobbies ...required less support ...shorts gave him better position at legs, which led to an initial reduction in scissoring ...shorts improved her posture when sitting, which led to a reduction in back ache.				Finlayson et al (2018). Lycra splinting garments for adults with intellectual disabilities who fall due to gait or balance issues: a feasibility study. <i>Journal of Intellectual Disability Research</i>				Shorts & Socks
We found a high level of user satisfaction (95%) with the dynamic orthosis among all the patients..... led them to decide to acquire the orthosis after finishing the study.				Gonzalez et al (2017). Efficacy of a dynamic orthosis on the upper limbs in the chronic phase of strokes. A longitudinal study				Gloves

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE							ORTHOSIS
At 1-month post treatment, 75% of parents of children in the dynamic elastomeric fabric orthosis groups reported that their child's sitting balance and confidence had improved.	Giray et al (2018). The effects of a vest type dynamic elastomeric fabric orthosis on sitting balance and gross manual dexterity in children with cerebral palsy: a single blinded randomised controlled study. Disability and Rehabilitation							Vest
... the subject reported at the time that she much preferred the ease of walking with the splint and FES.	Lane et al (2015). Combined dropfoot treatment using dynamic splinting with FES: a case study							Sock & FES
Out of 11 patients, 10 were either quite satisfied or very satisfied with the assistive device.	Serrao et al (2017) Use of dynamic movement orthoses to improve gait stability and trunk control in ataxic patients. European Journal of Physical and Rehabilitation Medicine 2017 Jun 19							Suit
[i.e. the FES switched on and the sock applied over the top] ... when walking longer distances or being on her feet for longer periods, she could use both modalities together, but if she wanted to go out for the evening or to a social event she could wear the beige coloured sock under her tights to give her the stability and dor-siflexion she needed without being too obvious and is able to wear a dress or skirt.	Betts, L (2015). Dynamic movement Lycra® orthoses in multiple sclerosis' British Journal of neuroscience and Nursing. April/May Vol 11 No 2 pp60-64							Shorts, Glove, Sock
SO1 ...described the comfort and stability he felt while wearing the garment.	Yasukawa et al (2011) Case Study: Use of the Dynamic Movement Orthosis to Provide Compressive Shoulder Support for Children With Brachial Plexus Palsy							Shoulder
Motivation on the part of the participant was recognised as important in this trial, because those participants who achieved the wear time of 4 hours and the participants who continued to wear the garment all perceived some definite functional improvements.	Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." British Journal of Occupational Therapy 66(2):7							Shorts, Glove, Vest, Suit
Confidence in the subjects' own physical abilities increased.	Flanagan, A et al (2009). "Evaluation of short-term intensive orthotic garment use in children who have cerebral palsy." Pediatr Phys Ther 21(2): 201-204.							Theratogs Shorts & Vest
All patients responded affirmatively to whether they would wear the garment for a few hours each day for a few weeks. A consistent comment was having greater "confidence in the arm," reported by 7 of 16 patients.	Gracies, J. M et al (2000). "Short-term effects of dynamic Lycra® splints on upper limb in hemiplegic patients." Archives of Physical and Medical Rehabilitation 81.							Gloves

## Summary of Literature Findings into the Effects of Dynamic Elastomeric Fabric Orthoses

ORTHOSIS COLOUR KEY	SUIT	MIXED	SCOLIOSIS SUIT	SHORTS	LEGGINGS	VEST/SHOULDER	GLOVE	SOCK
EFFECT	REFERENCE						ORTHOSIS	
<b>SOCIO-EMOTIONAL FEEDBACK - Carer Satisfaction</b>								
Increased feeling of independence from both parents and therapist... and the improved quality of life of both the patient and his family - in being able to ride his bike independently.	Grandi A et al (2012) "Listening to the patient as a possible route to cost effective rehabilitation: a case report." J Med Case Rep 6:19						Glove	
Parent found it easier to perform transfers because the participant pulled less into flexion at her shoulders and hips.	Knox, V. (2003). "The use of Lycra® garments in children with cerebral palsy: a report of a descriptive clinical trial." British Journal of Occupational Therapy 66(2):7						Shorts, Glove, Vest, Suit	
Figure 3 (left side) illustrates a trend for cumulative perceived improvement in walking performance, as scored by seven of the subjects' main carers.	Matthews, M. J; Watson, M and Richardson, B (2009). "Effects of dynamic elastomeric fabric orthoses on children with cerebral palsy." Prosthetics and Orthotics International 33(4): 339-347						Leggings	
Generally, the parents found the garments easy to don and care for with limited problems toileting. The parents reported that walking and confidence level was improved.	Flanagan, A et al (2009). "Evaluation of short-term intensive orthotic garment use in children who have cerebral palsy." Pediatr Phys Ther 21(2): 201-204.						Theratogs Shorts & Vest	
<b>COST-EFFECTIVENESS</b>								
Her psychologist also noted an improvement in her mood and self-esteem. ...the consideration that this is a cheaper and much less invasive solution to managing spasticity than the ITB pump, but also the effect on the psychological wellbeing of the patient, as well as the physical impact.	Betts, L (2015). Dynamic movement Lycra® orthoses in multiple sclerosis' British Journal of neuroscience and Nursing. April/May Vol 11 No 2 pp60-64						Shorts, Glove, Sock	
... shows that the orthosis is effective even if we had to use it on its own. Moreover, when compared in terms of mere costs with functional taping over a one-year period, the orthosis proves to be profitable. ...the 'total cost' we calculated does not include costs we could not quantify, such as the time spent by the parents to bring our patient to the rehabilitation centre.	Grandi A et al (2012) "Listening to the patient as a possible route to cost effective rehabilitation: a case report." J Med Case Rep 6:19						Glove	
The reported case highlights the importance of paying attention to specific needs indicated by a patient, but also the utility and cost effectiveness of using orthosis in this context even in resource limited settings.	Grandi A et al (2012) "Listening to the patient as a possible route to cost effective rehabilitation: a case report." J Med Case Rep 6:19						Glove	