

Letters to the editor

'Prevalence and severity of feeding and nutritional problems in children with neurological impairment: Oxford Feeding Study'

SIR—There are many parallels between the paper by Sullivan and colleagues¹ and a similar study published in 1996². Both highlight how common feeding problems are in children with neurological impairment and illustrate that nutritional and feeding problems in children with disabilities continue to be under recognized.

There is, however, one interesting difference in the two studies which I feel is worth highlighting. In the above study, maternal stress was associated with increased duration of mealtimes. Twenty eight percent of the carers reported prolonged mealtimes (i.e. more than 3 hours per day). We reported similar findings². However, we found there was a significant difference between parental reports of mealtime durations and the actual length of mealtimes observed by the researchers, even though parents described these as typical. Of concern was the fact that children with the most severe oral-motor dysfunction tended to have the shorter mealtimes. The finding that mealtimes were in reality far shorter than they were perceived to be by caretakers was surprising and, we felt, may have contributed to some of the chronic under-nourishment seen in some of these children, particularly those with severe oral-motor dysfunction.

Sullivan and colleagues suggest that feeding time can be used as a reliable measure of the severity of feeding impairment. However, I would caution clinicians about relying solely on carers' reports of mealtime durations, as we clearly showed a substantial discrepancy between the lengthy durations of mealtimes reported and those actually observed. This highlights the importance of always observing feeding, preferably in the home.

*Professor Sheena Reilly
Professor of Paediatric Speech Pathology
Royal Children's Hospital and
School of Human Communication Sciences
La Trobe University
Bundoora 3086
Australia*

References

1. Sullivan PB, Lambert B, Rose M, Ford-Adams M, Johnson A, Griffiths P. (2000) Prevalence and severity of feeding and nutritional problems in children with neurological impairment: Oxford Feeding Study. *Developmental Medicine & Child Neurology* 42: 674–80.
2. Reilly S, Skuse D, Poblete X. (1996) Prevalence of feeding problems and oral motor dysfunction in children with cerebral palsy: a community survey. *The Journal of Pediatrics* 129: 877–82.

'Sullivan and colleagues reply'

SIR—Professor Reilly rightly cautions clinicians about relying solely on carer's reports of mealtime durations as we agree that there can be a significant discrepancy between the length of mealtimes reported and that observed. Reports from parents in our study were validated by home

visits and observed feeding by a trained paediatric dietitian in 100 severely disabled children and whilst it is true that there were instances of over-reporting, we found these to be in the minority. We remain confident that prolonged feeding times can indeed be one marker for the severity of oral-motor dysfunction. In our epidemiological study, which investigated feeding in a very much larger number of disabled children than in the community survey by Reilly and colleagues, 57 of 263 (22%) of those with a motor disorder were reported to take longer than three hours per day to feed. This contrasted with only 4 of 66 (6%) of our comparison group with no reported articulation or motor problems. Moreover, prolonged mealtimes correlated very significantly with maternal stress as measured on a Likert scale. There may have been differences in the severity of motor impairment of children in the two studies as only 20 children in the study of Reilly and colleagues had spastic quadriplegia compared with 147 in our series.

Our research experience also accords with our clinical experience and one of the main advantages reported to us by caregivers following insertion of a gastrostomy tube in a disabled child with severe feeding difficulty is that mealtimes are much easier, quicker, and less stressful. We plan to report in detail our current study of the impact of gastrostomy tube feeding on the quality of life of caregivers of disabled children.

*Peter B Sullivan^a
Bridget Lambert^a
Mandy Rose^a
Martha Ford-Adams^a
Ann Johnson^a
Paul Griffiths^b*

*^aCorrespondence to PB Sullivan at:
University of Oxford
Department of Paediatrics
John Radcliffe Hospital
OX3 9DU, Oxford, UK*

*^bOxford University Computing Services
Oxford, UK*

'Effects of acupuncture on skin temperature in children with neurological disorders and cold feet'

SIR—Reduced peripheral circulation resulting in cold extremities is observed in children with neurological damage.¹ Skin temperature is low both indoors and outdoors and is a cause for parental concern. The unpleasant feeling of cold hands and feet may reduce the child's wish to move. Physical ability is relatively low in children suffering severe motor disabilities and low temperatures add to the functional limitations. At present, treatment by sensory stimulation using massage or direct heating using elements covered in, for example, socks, rarely works satisfactorily.

Another mode of sensory stimulation with a strong vasodilatory effect is acupuncture.

Considering acupuncture's vasodilatory effect,^{2,3} we initiated a small exploratory study to assess any skin temperature effect obtained in six children with different

neurological damage and extremely cold feet.

The reason for selecting different characters of neurological lesion was that no previous study had assessed the effects of acupuncture on skin temperature in children with neurological dysfunction. The aim was to assess if further investigation could be of interest in a larger and well characterized group of children.

Our pilot study included six children, 4 to 16 years old, with severe motor disabilities and mental retardation*. The children were selected after consultation with a senior physician, taking into account the parents' concern for their child's symptoms. The parents volunteered their children after our offer of treatment and information had been provided about the purpose of the trial. Four children had cerebral palsy: one dystonic and three with spastic-type cerebral palsy. Two had neurological symptoms with incomplete diagnoses, both generally hypotonic, one of them with definite spasticity in the feet and the other with emaciated legs and blue-tinged feet. All six children selected were non-walkers to avoid the influence of physical activity. Their pharmacological and physical treatment continued normally during the courses of treatment. Approved was given by the Ethical Committee at Karolinska Hospital in Stockholm.

The investigation was based on a single subject design

with each child comprising their own control⁴. Skin temperature was assessed at fixed body points with an instrument measuring infrared radiation and instantaneously converting it to degrees celsius. Various body temperatures were noted before any acupuncture, before and after each session, and at one month follow-up

Each child received four weekly test sessions to select the best points and mode of stimulation according to a naturalistic protocol⁵. The child's subsequent acupuncture series was based on the test treatment producing the greatest foot temperature increase. The evaluation resulted in needles positioned in the legs of five children and in one of them combining these with points in the arms. One child had needles set only in the arms. The needles were stimulated manually three times in 20 minutes, or by low-frequency electro-acupuncture. The stimulator supplied biphasic pulses with pulse width 0.1 ms, frequency 2 Hz, intensity 2 to 5 mA so that non-painful local muscle contractions were achieved. Crown of the head was stimulated manually in all children and on all occasions, as that acupuncture point has been empirically shown to be effective in reducing anxiety. Sessions lasted 20 minutes and the course comprised eight twice-weekly sessions

To investigate if there was a significant momentary temperature change in the different parts of the body, an ordinary t-test was applied to the differences between the before session and after session measurements. The change in basal skin temperature as a result of repeat sessions was

*US usage. UK usage: learning disability.

Table I: Momentary skin temperature change

Forehead			Suprasternal fossa		
Child	Mean	95% CI	Mean	95% CI	
I	-0.2	(-1.1 - 0.6)	0.2	(-0.7 - 1.2) ^b	
II	0.6 ^a	(0.2 - 1.0)			
III	0.9	(-0.1 - 1.9)	0.4	(-0.3 - 1.2)	
IV	1.0 ^a	(0.4 - 1.6)	0.2	(-0.7 - 1.2)	
V	0.4	(-0.4 - 1.1)	0.6 ^a	(0 - 1.2)	
VI	0	^c	1.0 ^a	(0.2 - 1.8)	

Hand dorsal					Hand palm				
Child	left		right		left		right		95% CI
	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI	
I	3.9 ^a	(2.1 - 5.7)	3.4 ^a	(1.6 - 5.2)	3.9 ^a	(1.7 - 6.0)	3.9 ^a	(1.7 - 6.1)	
II	3.6 ^a	(1.9 - 5.4)	3.2 ^a	(1.7 - 4.8)	4.0 ^a	(1.2 - 6.8)	4.4 ^a	(2.3 - 6.5)	
III	3.7 ^a	(1.5 - 5.9)	3.4 ^a	(1.4 - 5.5)	3.9 ^a	(1.5 - 6.2)	3.7 ^a	(1.9 - 5.5)	
IV	0.1	(-1.1 - 1.3)	1.6 ^a	(0.6 - 2.6)	0.4	(-0.1 - 0.8)	2.1 ^a	(0.8 - 3.4)	
V	-0.1	(-1.2 - 0.9)	0.1	(-0.6 - 0.8)	0.8	(-0.6 - 2.1)	0.8	(-1.0 - 2.5)	
VI	-0.6	(-1.6 - 0.4)	-1.0	(-2.3 - 0.3)	0.0	(-1.0 - 1.0)	-0.2	(-1.4 - 0.9)	

Foot dorsal					Foot sole				
Child	left		right		left		right		95% CI
	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI	
I	1.9 ^a	(0.4 - 3.4)	1.6 ^a	(0.1 - 3.2)	2.2 ^a	(0.5 - 4.0)	2.6 ^a	(0.4 - 4.8)	
II	0.5	(-1.0 - 2.0)	1.2 ^a	(0.3 - 2.2)	0.5	(-0.7 - 1.7)	1.6 ^a	(1.2 - 2.1)	
III	0.9	(-1.1 - 2.8)	0.6	(-0.9 - 2.1)	0.6	(-0.6 - 1.8)	0.4	(-0.8 - 1.6)	
IV	-0.5 ^a	(-1.0 - 0.0)	-0.4	(-0.8 - 0.1)	0.0	(-0.4 - 0.4)	-0.6	(-1.4 - 0.1)	
V	0.5	(-0.3 - 1.3)	0.2	(-1.1 - 1.6)	0.6	(-0.4 - 1.6)	0.2	(-0.8 - 1.3)	
VI	0.2	(-0.7 - 1.2)	-0.2	(-1.3 - 0.8)	-0.5	(-1.6 - 0.6)	-0.6	(-1.4 - 0.1)	

^a $p < 0.05$

^bNo observations; ^cNo standard deviation in the measurements

estimated by linear regression⁶ with temperature as the y-variable and time point as the x-variable.

The results showed that skin temperature was affected momentarily and over time. The change is mainly seen in the extremities and the effects are varied. Four children displayed a significant increase in hand temperature and two in the feet ($p < 0.05$; Table I). A significant cumulative effect was seen after repeat sessions in three children at hand and/or foot measuring points ($p < 0.05$). One child did not respond at all to acupuncture. Those children who appeared to respond best to the courses received low frequency stimulation (2 Hz) in the legs. In our opinion and that of the parents, no child in this study experienced any suffering from acupuncture.

The symptoms of cold extremities in children with neurological disorders should not be neglected where this results in feelings of discomfort and unnecessary functional limitations.

It is interesting that the course indicated possible cumulative effects and, since the treatment form was acceptable to the children, it is attractive from a humane point of view. Thus, further investigations evaluating varying acupuncture applications to clarify the effects on skin temperature are in order. However, further research should be based on a larger number of children with neurological lesions of different pathology.

Lena Svedberg PT^a
Gunnar Nordahl MSc
Thomas Lundeberg PhD MD

^aCorrespondence to:
Child Habilitation
First Floor, Wemer Building
Örnsköldsvik Hospital
S-89189, Sweden

References

1. Sanner G. (1992) Cerebral palsy. In: Bille B, Olow I, editors. *First supply. Barnhabilitering vid rörelsebinder*. Uppsala: Almqvist & Wiksell. p 61–84. (In Swedish).
2. Lundeberg T. (1993) Peripheral effects of sensory nerve stimulation (acupuncture) in inflammation and ischemia. *Scandinavian Journal of Rehabilitation Medicine* 29: (Suppl. 1) 61–86.
3. Jansen G, Lundeberg T, Kjartansson J, Samuelson UE. (1989) Acupuncture and sensory neuropeptides increase cutaneous blood flow in rats. *Neuroscience Letters* 97: 305–9.
4. Gonella C. (1989) Single-subject experimental paradigm as a clinical decision tool. *Physical Therapy* 69: 601–9.
5. Thomas M, Lundeberg T. (1996) Does acupuncture work? *Pain Clinical Updates* 4: 1–4.
6. Draper NR, Smith H, editors. (1998) *Applied Regression Analysis*. 3rd edn. New York: John Wiley & Sons.

A major three day seminar with invited international speakers: 'New Mobility Strategies in Cerebral Palsy'

**A plethora of choice – a paucity of guidance
(How we match treatment to the individual child)
28–30th November 2001**

Key topics:

- The place of SDR in the treatment of CP
- Gait analysis, surgical treatment and outcome measures in CP – which treatment modality?
- The relevance of muscle strength in CP
- Surgical treatment for the non-walking child – hips and lower limbs
- Innovations in Botulinum therapy (the multilevel approach)
- How do we identify the child who will benefit from intrathecal Baclofen?
- What physical techniques improve the locomotor capabilities of children with CP?
- Orthotic therapeutic management
- Less orthodox treatments

Fee: £300 if booked before 30 June 2001, £385 thereafter

FOR FURTHER DETAILS AND APPLICATION FORMS CONTACT:

Karen Edwards, ORLAU, Robert Jones & Agnes Hunt Orthopaedic & District Hospital NHS Trust
Oswestry, Shropshire, SY10 7AG www.orklau.com
Tel: 01691 404531 Fax: 01691 404058
Email: edwarkj@aol.com