The “Lasso-o” tape: stretchability and observer variability in head circumference measurement

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Short Report

Head circumference is an important clinical measurement in children. The stretchability of the Lasso-o tape and the intra- and inter-observer reproducibility of measurements using it were investigated. Old Lasso-o tapes stretch significantly. The intra-class coefficients were 0.999 for intra-observer and 0.979 for inter-observer measurements. Nonetheless in 9% of measurements inter-observer variability was over 1 cm.

Methods

Head circumference was measured using the Lasso-o tape. The reliability of measurement was assessed by analysis of variance, as this is the only method which directly compares all three: an F value greater than or equal to F critical indicates a significant difference.

Results

In the clinical force range (fig 1), the length of new Lasso-o tapes increased from a mean of 70.0 to 70.2 cm (95% CI 0.0 to 0.3; p = 0.28). Old tapes increased from a mean of 70.1 to 70.6 cm (95% CI 0.3 to 0.7; p = 0.02).

Intra-observer measurements

The Pearson correlation coefficient was 0.996 and the intra-class correlation coefficient 0.999. The limits of agreement were −0.71 to 0.65 cm, which indicates that 5% of measurements differed by 0.65 cm or more. Standard error of measurement was 0.24 cm, with repeatability of ±0.66 cm and relative bias of ±0.47 cm, which means that in statistical terms 95% of the time when the observer takes two measurements they will be within 0.66 cm of each other and within 0.47 cm of the underlying “true” value. The mean difference between measurements was 0.26 cm.

Inter-observer measurements

Pearson’s correlation matrix and a mean difference matrix showed good overall agreement between observers. Intra-class correlation coefficient was 0.979. Analysis of the variance gave an F value = 0.574 with F critical = 3.051, which shows no significant difference. In seven patients (9%) the difference was greater than 1 cm.

Discussion

We found that with forces used in clinical practice Lasso-o tapes stretch significantly and that this increases after multiple use. For new tapes this is statistically but probably not clinically significant. However, for old tapes (0.5 cm mean stretch appears both statistically and clinically significant. Currently there is no advice on when the tape should be replaced. Our study was not designed to address this question, but we suggest replacement at regular intervals.
and especially when the tape looks “used”, as these tapes are often unreliable.

In statistical terms the intra- and inter-observer differences were both small. As reported in studies using other tapes, the intra-observer differences were smaller than inter-observer ones, giving weight to the recommendation that repeated measurements should ideally be carried out by the same observer. Despite this the reliability of both was very high. Nonetheless the larger variability in 9%, especially if compounded by stretch in older tapes, could result in clinically significant differences in measurements in an important minority of children. This supports the recommendation that those responsible for measuring should be taught the appropriate method for the growth chart used and that everyone should use the same method.

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REFERENCES

Gastrostomy feeding of children with cerebral palsy and carers’ quality of life

The parents of children with severe cerebral palsy often worry about their child’s nutrition and general health. Feeding through a gastrostomy tube may improve the child’s nutrition and make life easier for the parents. Even though some are at first resistant to, or afraid of, the idea few parents regret agreeing to a gastrostomy. Now research in Oxford, Manchester, and Watford (Peter B Sullivan and colleagues. Developmental Medicine and Child Neurology 2004;46;796–800) has shown that there are significant improvements in the quality of life of carers after beginning gastrostomy tube feeding. The study included the main carers of 57 children who were severely disabled (53 unable to use their hands to feed themselves, 50 unable to sit independently) with cerebral palsy (43 with spastic quadriplegia). The children’s mean age was 4 years and 4 months (range 5 months to 17 years) and 44 of the carers were the child’s mother (four fathers, two grandmothers, and seven foster parents). The children all had their medical care provided by specialist multidisciplinary teams and the domestic carers were recruited to the study after the children had been referred to a paediatric surgeon for gastrostomy tube implantation.

Quality of life was measured, using the UK Short-Form 36 version II (SF-36 II), at baseline (before gastrostomy), at 6 months, and at 12 months. Over the first 6 months there were substantial improvements in SF-36 II scores for mental health, role limitations due to emotional problems, physical functioning, social functioning, and energy/vitality. Between 6 and 12 months there were further improvements in mental health, social functioning, and energy/vitality scores. Although most carers improved, some did not and at 12 months one third of respondents had worse scores for energy/vitality, and a quarter for social functioning, compared with baseline. For most domains of the SF-36 II carers had significantly worse scores than a normal population at baseline but by 12 months their scores were not significantly different from the population norm (only the scores for role limitations due to emotional problems remained significantly worse than in the general population at 12 months). There were significant improvements in daily duration of feeding times (from 2.5 hours to 1 hour), ease of drug administration, and parental concerns over nutritional status.

For the carers of children with severe cerebral palsy and feeding difficulties gastrostomy tube feeding may result in significant improvements in quality of life.

Competing interests: none declared

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