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REGULAR ARTICLE

Manual therapy in infantile torticollis: a randomized, controlled pilot study

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ABSTRACT

Aim: Torticollis in infancy is routinely treated by child physiotherapists. The addition of manual therapy to the treatment is a new approach in Norway. As the effect of manual therapy for this condition is poorly documented, we designed a pilot study to evaluate measurement methods and examine the short-time effect of manual therapy in addition to child physiotherapy.

Methods: Randomized controlled trial, double blinded. Thirty-two patients aged 3–6 months were randomized to intervention group (manual therapy and child physiotherapy) and control group (child physiotherapy alone). Primary outcome: Change of symptoms because of torticollis evaluated by video recordings. Secondary outcomes: 12 parameters including spontaneous movements, active and passive range of motion and head righting reaction.

Results: We found a nonsignificant tendency to greater improvement in lateral flexion ($p = 0.092$) and head righting reaction ($p = 0.116$) in the intervention group.

Conclusion: In this pilot study, we found that in patients with moderate symptoms related to torticollis, the short-time effect of manual therapy in addition to physiotherapy is not significantly better than physiotherapy alone.

BACKGROUND

An abnormal posture in the neck, torticollis, is a usual problem in infants and toddlers. The condition has many names, and the description of the clinical picture varies. The incidence varies according to the criteria applied, from 0.1% to 1.9% for the so-called congenital muscular torticollis to 8.2% for the so-called positional preference of the head (1,2). In many cases, infants with asymmetric posture improve spontaneously. The improvement rate rises significantly when the child is treated with physiotherapy (3). Child physiotherapists in most developed countries routinely treat children with torticollis. The treatment involves passive and active movement exercise and encouragement of symmetrical motor performance.

In Germany, manual therapy has been a common treatment for children with torticollis for decades because the asymmetry by some physicians was considered to be mainly because of a functional disturbance in the joints, in particular the atlanto-occipital and atlanto-axial joints (4). In German, this condition is called Kopfgelenk Induzierte

Symmetrie Störung (KISS). In English, it is called Kinematic Imbalance due to Suboccipital Strain. KISS and torticollis are not synonyms. Torticollis refers to an asymmetric neck position that may be due to several different causes, whilst KISS refers to a specific causative factor. The effect of manual therapy has not yet been documented by randomized, blinded protocols, and there are many unresolved issues in the diagnosis, classification and methods to measure results of treating children with torticollis/KISS. Several different studies should be conducted to lay a foundation of knowledge. We therefore conducted a double-blinded, randomized, controlled pilot study to investigate whether manual therapy is an effective addition to child physiotherapy for children with torticollis and to evaluate measurement methods and design for further studies.

We hypothesized that symptoms in children with torticollis recede quicker if manual therapy is used in addition to child physiotherapy than with child physiotherapy alone.

MATERIALS AND METHODS

Patients groups, inclusion and randomization

Since 2001, children with torticollis and suspected reduced joint function have been offered manual therapy at the Department of Physiotherapy at Akershus University Hospital (Ahus), as an addition to child physiotherapy. In the

Abbreviations

KISS, Kopfgelenk Induzierte Symmetrie Störung/Kinematic imbalance due to suboccipital strain; ICF, International classification of function; VAS, Visual analogue scale.

following years, other hospitals and community health care practitioners in Norway have joined this practice. Few treatments are given, usually 1–3, with several weeks interval. Manipulation is conducted with the child supine and the head in neutral position, without extension of any structures. Only very moderate force is used.

Child physiotherapists at Ahus included 32 patients with torticollis in the age span 3–6 months from May 2007 to May 2008. They were recruited by physiotherapists in community health care or at the hospital, or by paediatricians at the hospital. Inclusion criteria were reduced mobility in the neck in at least one axial plane. Exclusion criteria were other proven cause of asymmetry, or serious pathology. Eight recruited patients were not included, one because the child had already received manual therapy and seven because they had full mobility despite asymmetric movement patterns. One included patient did not meet for the final clinical examination, whilst some data are lacking for another. All examinations and data collection were otherwise complete. The final clinical examinations were conducted in July 2008.

The children were randomized to intervention or control group using sealed envelopes. Both groups received child physiotherapy from the primary health care services. These physiotherapists were blinded for the group assignment. The assessment period was 8 weeks. On inclusion, and after 2 and 8 weeks, all patients underwent a clinical examination by one of four experienced child physiotherapists at Ahus. The examination was videotaped in a standardized way. On inclusion and after 4 weeks, all patients visited the manual therapist at the hospital, on both occasions without the parents present. The envelope was opened only by the manual therapist on the first visit, and only children in the intervention group received manual therapy. Thus, both the examining child physiotherapist at the hospital and the parents were blinded about randomization to manual therapy or child physiotherapy alone. We consider this study to be double blinded, because the child is not aware about effects of manual therapy. The statistician was also blinded.

The primary health care physiotherapists who followed up the children at home were instructed not to stretch the neck against resistance from the child. The main focus was encouragement of symmetrical motor performance through a variety of methods.

Processing of measurement methods and study design

Torticollis has a complex symptomatology. There is no gold standard for the classification of severity. In earlier studies, passive rotation is the most used end point. In our point of view, this is not enough. We measured mobility in the same way as the manual therapeutic classification of KISS (5) and collected a variety of clinical data.

We aimed to have a primary end point that could summarize the hospital physiotherapist's examination. Evaluation of the video clips by three independent assessors blinded to which group the child was randomized to, was the most appropriate tool to achieve this. To investigate the reliability of this evaluation method, we performed an interreliability study, based on the same study population, where three

child physiotherapists at Ahus assessed the videos independently of each other. They were blinded for group assignment. The video clips on inclusion were compared to the clips from week 2 and 8 for each patient. Changes over time were scored on a four-point scale: (1) 'Worse' (2) 'No Significant Change' (3) 'Better' and (4) 'Much Better.' The result was presented as a median of the three therapists' score.

As secondary end points for the study, we chose a combination of 12 measurement parameters that involve body function, activity and participation, corresponding to the International Classification of Function (ICF) (6). The 12 parameters were taken from a total of 36 parameters collected through patient history, visual analogue scales (VAS) questionnaires filled in by the parents and from the hospital physiotherapist's examination. The parameters were chosen after the collection of data was completed, but before revealing of the randomization. The parameters were as follows: parent's evaluation of hypersensitivity of the neck region, the child's motor asymmetry of the neck (three items), sleeping position and truncal curvature. The hospital physiotherapist's evaluation of the child's ability to find a symmetrical head position, measurement of active lateral flexion against gravity (Head righting reaction), active rotation of the neck, passive ventral flexion and rotation of the neck, and passive lateral flexion in the upper cervical joints.

Statistics

The effect of manual therapy in this patient group was not known prior to the study, and it was not possible to calculate power in advance. Intratester reliability was evaluated using a weighted kappa, Spearman's correlation coefficient, intraclass correlation coefficient (ICC) and Cronbach's alpha. To measure the effect of the treatment method, the mean, standard variation and range (min, max) were used for continuous variables, frequencies (percentage) for categorical variables and median for the primary end point. Changes in the different parameters from inclusion to week eight were analysed using Friedman's ANOVA. In addition, Spearman's correlation coefficient was calculated. Mann-Whitney and the chi-squared test were used to compare cases with controls.

Ethical considerations

The study has been approved by the Regional Ethics Committee and by the Norwegian Social Science Data Service (function now transferred to the Privacy Ombudsman for Research at Ahus). All parents gave oral and written consent.

RESULTS

In the interreliability study, the primary end point showed satisfactory intertester reliability (Cronbach's Alpha 0.790 and 0.820, weighted kappa, ICC and Spearman's correlation coefficient varied from fair to good).

When comparing the two groups, there was no significant difference considering the primary outcome measure

Table 1 The primary end point, change in torticollis symptoms, assessed by video footage. Comparison of intervention and control groups

	Intervention		χ^2 -test p-value
	Frequency (%)	Control	
Week 0–2			
Worse	0	0	0.313
No significant change	8 (50.0)	6 (40.0)	
Better	8 (50.0)	7 (46.7)	
Much better	0	2 (13.3)	
Week 0–8			
Worse	0	0	0.848
No significant change	3 (20.0)	3 (18.8)	
Better	7 (46.7)	9 (56.3)	
Much better	5 (33.3)	4 (25.0)	

Table 2 Selected parameters in which we see a tendency to a positive effect of manual therapy. Change in lateral flexion $>10^\circ$ is considered a real change and qualifies as 'worse' if the change is negative, and 'better' if the change is positive. Differences within these limits are considered 'unchanged'

Variable	Intervention	Control	χ^2 test p-value
Week 0–8			
Passive lateral flexion to the affected side	N = 15	N = 16	
Worse	0 (0)	3 (18.8)	0.116
Unchanged	5 (33.3)	7 (43.8)	
Better	10 (66.7)	6 (37.5)	
Active lateral flexion against gravity to the affected side (head righting reaction)	N = 15	N = 16	
Worse	0 (0)	2 (12.5)	0.092
Unchanged	5 (33.3)	9 (56.3)	
Better	10 (66.7)	5 (31.3)	

(Table 1). Neither did we find significant differences between the groups in secondary outcome measures; however, a tendency towards better results in passive lateral flexion ($p = 0.116$) and active lateral flexion against gravity ($p = 0.092$) in the intervention group compared to the control group from inclusion to week 8 (Table 2) was observed. Calculations show the need for 52 patients in each group to find whether the tendency to better passive lateral flexion is representative for a larger group, 36 patients in each group for active lateral flexion against gravity and 61 patients in each group if we include both variables.

DISCUSSION

The use of manual therapy in children with torticollis is rapidly increasing as more therapists learn the techniques, and the media has become interested. The method is controversial because it has little documentation in scientific studies. Books and articles describe good clinical effects of the treatment, and uncontrolled, non-randomized studies suggest promising results (4). Factors that increase the risk of KISS are also well described (7). A systematic review article by Brand et al. (8) emphasizes that diagnostic tools and the

effect of the treatment of KISS are not documented by controlled and scientific methods. The Norwegian Knowledge Center for the Health Services has also reviewed the literature (9). They identified no risk of complications associated with the treatment, but it should be noted that the strength of the evidence was low.

During the study, we detected sources of errors that must be avoided in further studies. The selection of patients in this study is not representative for the whole spectrum of children with torticollis. Those with the most troublesome problems related to torticollis were not eligible because they had already received manual therapy. A more representative selection of patients including those with severe torticollis may have given other results. Some of the measurements were only moderately reliable because of variations in the level of activity and cooperation of children on clinical examination. This is difficult to avoid. We believe that the hospital physiotherapist's examination of passive mobility in the suboccipital area was so specific that we could not exclude a treatment effect. This has also been identified as a problem by several manual therapists with whom we have discussed the study design. It may have strengthened the study if the evaluation of the patients had been undertaken by a professional not involved in the project. Still, we argue that the physiotherapists that evaluated videotapes were absolutely blinded and not biased to group.

Although there was no significant difference between the groups, it is of interest that the intervention group tended towards greater improvement in passive lateral flexion and active lateral flexion against gravity. It is this mobility that is most directly influenced by the manual therapeutic treatment. Results based on this study can be used to calculate power for a new, larger study.

CONCLUSION

In patients with moderate symptoms related to torticollis, the short-time effect of manual therapy in addition to physiotherapy is not significantly better than physiotherapy alone. However, the study was relatively small, and further studies are necessary to determine the effect of manual therapy for children with torticollis, including children with the most troublesome problems related to the condition.

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CONFLICTS OF INTEREST

None.

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