

# REPRODUCIBILITY OF MANUAL MOBILITY TEST RESULTS IN SPECIFIC INTERVERTEBRAL SEGMENTS

*(Translated and abridged from Swedish, with notations by Kaltenborn)*

Freddy Kaltenborn<sup>1</sup> and Olov Lindahl<sup>2</sup>

<sup>1</sup>FK is a physiotherapist and osteopath practicing in Oslo, Norway

<sup>2</sup>OL is a professor in Orthopedic Surgery at Karolinska Institute, Stockholm, Sweden, and Chief Physician at the Orthopedic Clinic, Gävle Hospital, Sweden.

## Summary

*The authors investigated the reproducibility of manual mobility tests of vertebrae using a specific osteopathic method. Ten specially trained [manual therapy] instructors examined 13 vertebral segments in four subjects. There was good agreement in the test results of individual examiners, with a 7% error rate for all examiners and a 2.2% error rate for the top (most experienced) 7 instructors.*

During the past 10 years, Nordic physicians have had increasing interest in the evaluation and treatment of spine disorders using osteopathic techniques. This treatment approach has been received either with uncritical enthusiasm or, perhaps even more often, with uncritical scepticism. Physicians with an interest in this type of therapy have formed a Nordic Society with local societies in different countries. Within the Nordic Society a number of courses have been organized for both physicians and physiotherapists, with a number of orthopedists and other physicians in Sweden attending a few or many of these courses. These physicians regularly used this therapy in their practice, often together with Norwegian physiotherapists who had extensive training and certification in manual therapy diagnosis and treatment.

The theory behind this therapy is that patients with more or less diminished mobility between two individual vertebrae, *with* pain that can be provoked upon movement at the vertebral segment, can with specific manual treatment, become symptom-free or have their condition improved and normal mobility restored.

In order to apply this therapy, the practitioner must be able to examine mobility between individual vertebrae, i.e., a specific spinal examination.

Those with several years training in this methodology, who work with these techniques daily, and who compare their findings with their colleagues, are convinced that the method is reliable. At the same time they are aware that the method is

difficult, requires extensive training and specific skills for different vertebrae, and that the degree of difficulty may vary at different vertebral segments and in different movement directions.

Those with a more skeptical nature, who have not been trained in this technique, or who have tried to apply it without success, need more concrete proof of its usefulness than just the conviction of those within the “inner circle”.

In connection with a course in manual therapy evaluation and treatment at Falsterbo, Sweden, June 1968, the authors carried out a pilot study of the reproducibility of specific manual mobility tests in the spine.

## Subjects

Four out of 85 course participants were jointly selected by the authors [and were examined by Kaltenborn,] as described below:

1. A 23-year-old woman without a history of neck or spine problems. Mobility between the occiput and atlas, as well as between T6-7, T7-8, and T8-9, was examined. Findings were normal.
2. A 43-year-old man with occasional neck and head pain. Mobility between the occiput and atlas was examined. Upon left sidebending movement, decreased mobility was found between the occiput and atlas. Right sidebending movement was normal.
3. A 26-year-old woman with occasional minor pain between the shoulder blades and fatigue during activity. The mobility between T6-7, T7-8 and T8-9 was examined. Decreased mobility was found at T7-8. Otherwise normal results.
4. A 44-year-old woman with pain in the lower back during activity. Mobility between L3-4, L4-5, and L5-S1 was examined. Hypermobility was found at L4-5. Otherwise normal results.

## Method

The subjects were placed in separate examination rooms with an assistant to document findings and oversee the procedure. Throughout the investigation, patients maintained the same position (lying or sitting). Kaltenborn (chief instructor) first examined the patients after which his findings were documented. Thereafter, nine instructors with various qualifications and backgrounds, but trained in manipulative medicine, independently examined all patients and had their findings documented. Finally, after the nine instructors were finished, the chief instructor once again examined each subject in order to exclude any change in status before and after the tests. [A 5th subject was excluded from the study, as their condition improved significantly during the testing procedures.]

## Examination procedure

Examiners<sup>1</sup> used only their hands for palpation of the vertebrae in connection with specific passive movements of the patients. Examiners had no prior information about the patients nor access to X-ray images. Sidebending right and left between the occiput and atlas were examined separately. Between the four thoracic vertebra as well as the three caudal lumbar vertebrae and sacrum, total sagittal mobility was examined.

Each examiner selected from five mobility classifications:

B	=	Blocked. No movement.
R	=	Hypomobile (Restricted)
N	=	Normal
H	=	Hypermobile
X	=	Unable to test

From B (Blocked) to H (Hypermobile) there is a stepwise increased mobility on the 4-grade classification scale.

The deviation between the result of the chief instructor and those of the majority of the examiners was noted and, in addition, the size of this deviation was related to the 4-level classification scale mentioned above.

The uppermost vertebra of the thorax or lumbar vertebral segment to be examined was marked with a line on the skin in order to exclude confusion about vertebral levellocation. The goal of the study was not to test identification of the location of a vertebral segment.

## Results

As shown in Table 1, the findings of ten examiners had good agreement [with the chief instructor]. If we assume that an identical finding by seven of ten instructors reflects actual mobility status, then four examiners correctly determined mobility status in all 13 tests, while three examiners had 1 or 2 errors, and three instructors had 4 or 5 errors.

An analysis of incorrect findings shows that, in all cases, the error was no more than one mobility classification level. The seven examiners with the most accurate findings had [an average of] 4 errors out of 91 possible, or a 4.4% error rate. The error rate of all ten examiners was 14%.

---

1 [Each examiner was dual-certified as a physical educator and athletic trainer, as well as a practicing physiotherapist.]

On a 4-point mobility classification scale from 0 to 4, a simple guess would produce an average error of 2 classification levels for each test.

[delete?] The percentage values for a possible error range then amounts to 2.2% and 7% respectively, which must be considered very good result. ?????

**Table 1**

Instructor	Patient 1					Patient 2		Patient 3			Patient 4			Correct	Incorrect
	Occiput-Atlas Sidebending		Thoracic Sagittal Movement			Occiput-Atlas Sidebending		Thoracic Sagittal Movement			Lumbar Sagittal Movement				
	Right	Left	6-7	7-8	8-9	Right	Left	6-7	7-8	8-9	3-4	4-5	5-6		
1	N	N	N	N	N	N	R	N	R	N	N	H	N	13	0
2	N	N	N	N	N	N	R	N	R	N	N	H	N	13	0
3	N	N	N	N	N	N	R	N	R	N	N	H	N	13	0
4	N	N	N	N	N	N	R	N	R	N	N	H	N	13	0
5	N	N	N	N	N	N	R	N	R	N	N	N	N	12	1
6	N	N	N	N	N	N	R	N	R	N	N	H	R	12	1
7	N	N	N	N	N	N	R	R	N	N	N	H	N	11	2
8	N	R	R	R	N	N	R	R	X	N	N	H	N	8	4
9	N	R	N	R	N	R	N	N	R	N	N	H	R	8	5
10	N	R	N	R	R	N	R	N	N	R	N	H	N	8	5
Correct	10	7	9	7	9	9	9	8	7	9	10	9	8		
Incorrect	0	3	1	3	1	1	1	2	2	1	0	1	2		
<b>TOTAL</b>														<b>111</b>	<b>18</b>

N = normal    R = hypomobile (restricted)    H = hypermobile    X = unable to test    1 Undecided

## Discussion

Even without full statistical analysis of the data, it is clear that the intertester reliability of manual mobility intervertebral test findings performed by experienced and trained practitioners is good. For those who have a theoretical and practical knowledge of the method, it is equally apparent that it is difficult to acquire the manual sensitivity required to accurately palpate small differences in movements without a significant investment in practice.

It is equally apparent that skill in this diagnostic method varies between individuals. A non-trained person feels almost nothing or at best can only recognize very large differences in mobility. Those who have taken a 1-year course in this method, only slowly acquire this sensitivity in the fingers and individual performance varies considerably. From this perspective it may be said that this method is undesirable since not

everyone can learn the method and since it requires years of practice. However, in this context a comparison with a other skills and methods with similar challenges must be made. For instance, it is equally difficult to learn the language of the blind, or to learn to play the piano.

Physicians who are accustomed to attending short-duration continuing education courses and using various medical instruments for patient examination, may have little interest in learning such a difficult skill over a long period of time. It may be more attractive for them to take only theoretical courses. For gifted and interested physicians, however, it is possible to acquire this knowledge, if they invest in up to five 1-week-long courses exclusively devoted to practicing these skills, and year-long practical applications of the knowledge between course intervals.

A relevant question is whether this diagnostic method might be carried out using some kind of instrument, e.g., X-ray. Obviously, X-ray could provide high-resolution images of the vertebrae in different positions and thereby provide a means to measure angles in different planes. However, X-ray is a time-consuming, cumbersome and expensive procedure, which seems less suitable compared to a manual method which only takes 3-5 minutes for the entire spine and “only” requires certain skills and two hands.

Another limitation of X-ray is that, although one can measure vertebral angles in two different positions with great accuracy, one must still have the skill to maneuver the spine and vertebrae to produce the necessary range of movement. It is unrealistic to expect an X-ray technician to know the dynamics of the spine sufficiently well to insure that the correct positions are photographed without need for collaboration with another person (specially trained physician-physiotherapist) who is skilled with the manual technique.