

Upper Cervical Therapy

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Statistical Results of Upper Cervical Therapy

0. Contents

1. Basic assumptions and measurement method

2. Sample description

3. Working hypotheses

4. Overview of rotatory results

4.1 Rotation pre-post comparison

4.2 Durability of treatment success by example of rotation

4.3 Lateral flexion pre-post comparison

4.4 Flexion & extension pre-post comparison

5. Spontaneous written comments

6. Discussion of results

Upper Cervical Therapy

Robert Emmanuel Picard

1. Basic assumptions and measurement method

Fundamentally, an increase and simultaneous symmetrization of head rotation angles, lateral flexion and flexion/extension allows conclusions about the functionality of the upper cervicals. Such rotatory results reveal whether a reallocation of the digastric muscle has taken place or not and whether it is durable.

In order to carry out the neutral zero method, a commercially available compass goniometer (CMS Cervical Measurement Systems, www.gesunde-es) has been used. The person was sitting upright on a chair touching the backrest or a folded towel, the arms resting on her lap. The experimenter ensured by blocking the shoulders that the thoracic spine was, as far as possible, not involved in the movement of the cervical spine.

2. Sample description

Over a period of approximately two years (from 07/22/07 to 10/30/09), the resulting values of the neutral-zero-method were recorded and entered into an electronic chart, so that descriptive statistics could be yielded.

Table: Number and percentage of the sample by age and gender

<u>Gender</u>	N	%
Men	187	37,93
Women	306	62,07
Total	493	100

<u>Age</u>	M	SD
Years	47,04	16,23

Comment: Women are more receptive to upper cervical therapy (ratio: women:men / 3:2). With regard to age and its distribution, the sample has a mean age of 47 years with a standard deviation of 16 years.

Upper Cervical Therapy

Robert Emmanuel Picard

3. Working hypotheses

Hypothesis 1: After therapy, an enhanced head's capacity of horizontal rotation is expected: A medial position of the atlas, that is, the left posterior digastric muscle is no longer positioned dorsally and ventrally of the left apophysis of the atlas, allows for an increased and symmetrical rotation angle of the head than an atlas which is pushed anteriorly to the left front position by the left posterior digastric muscle.

Hypothesis 2: After therapy, an enhanced head's capacity of flexion and extension is expected, because the upper cervicals are no longer tilted relatively immobile, but could, as a whole, be involved in the sagittal movement of the cervical spine.

Hypothesis 3: After therapy, an enhanced and symmetrized head's capacity of lateral flexion is expected, because the left-sided upper cervical immobility is annulled. From then on, the lateral bending will be possible on the left side of the upper cervicals as on the right side.

4. Summarized rotatory results

Table: Number, mean and standard deviation of the average rotation values before and after upper cervical therapy, average flexion & extension, and lateral flexion before and after treatment in degrees. Degrees and percentage of pre-post differences of rotation angles

	N	M	SD	%
Lateral rotation before therapy	491	131,4	24,54	
Lateral rotation after therapy	459	145,87	22,92	
Difference of rotation		14,48		9,92
flexion/extension before therapy	302	108,31	26,28	
flexion/extension after therapy	301	118,73	23,91	
Difference flexion/ extension		10,41		9,62
Lateral flexion before therapy	327	63,74	17,96	
Lateral flexion after therapy	326	70,74	17,46	
Difference of lateral flexion		7		10,98
Average increase in percent				10,17

Comment: With respect to all parameters (rotation, lateral flexion, flexion & extension), an average increase of the radius by about 10 percent ensued after therapy. The rotation takes up by 14 degrees, the flexion / extension by 10 degrees, and lateral flexion by 7 degrees.

Upper Cervical Therapy

Robert Emmanuel Picard

4.1 Rotation pre-post comparison

Table: Number, mean and standard deviation of average horizontal rotation values before and after upper cervical therapy in degrees

Rotation pre-post-comparison

	M	SD	N
Rotation left before therapy	67,99	12,76	484
Rotation right before therapy	63,41	11,78	
Rotation left after therapy	73,26	11,54	459
Rotation right after therapy	72,61	11,38	
Increase left before massage	3,48	7,3	484
Increase right before massage	7,14	7,76	
Increase total before massage	10,62	10,83	
Increase left after massage	5,47	8,24	459
Increase right after massage	9,26	8,62	
Increase total after massage	14,74	13,48	

Comment: After therapy, a pre-existing limitation of the average horizontal rotation of about 5 degrees to the right ends up in a symmetrical rotation of 72-73 degrees. After vibratory action upon the upper cervical muscles, the average increase is about 15 degrees relative to the condition before treatment.

Tabelle: Frequencies of right versus left rotatory limitation before therapy (left) and the respective proportions of the limitation in degrees (right). Rotation symmetry is defined as the difference between right and left rotation, which is less than or equal to 5 degrees.

<u>Rotation diff. before therapy</u>	N	%	cum%
Rotation limitation right	309	62,93	
Rotation limitation left	139	28,31	91,24
Symmetry without therapy	43	8,76	
Total	491	100	

<u>Rotation diff. before therapy</u>	M	SD
Rotation limitation right	11,2	6,64
Rotation limitation left	-8,87	5,27
Total difference	4,6	10,93

Comment: 63 percent of the subjects had a right-handed rotatory limitation, whereas only 28 percent had a left-handed rotatory limitation. In the process of scoliotic development, right-handed rotatory limitation transforms into a left-handed rotatory limitation which makes compression of the upper cervicals obvious.

Table: Number of subjects, in whom rotation symmetry was measured, before and after therapy. Standing next: correlation coefficients of raw values of horizontal rotation

<u>Rotation</u>	Number	N	%
Symmetry before Th.	152	491	30,96
Symmetry after Th.	396	459	86,27
Difference of percentage			55,32

<u>Correlation of rotation</u>	R
Rotation before Th.	0,61
Rotation after Th.	0,84
Rotation after Th.& Mass.	0,91
Rotation on 2nd appointment	0,89

Upper Cervical Therapy

Robert Emmanuel Picard

Comment: According to the above definition, before therapy, only 31 percent of the subjects had rotation symmetry. However, after therapy, there were 86 percent of subjects with rotation symmetry: The upper cervicals usually permit rotation symmetry after therapy. Before therapy, the series of measurements correlate with only $r = 0.61$, after treatment, they raise to $r = 0.91$ and, at a second appointment, they remain at the high level of $r = 0.89$. The latter suggests that the qualitative change had remained stable over periods of time.

Table: Frequency table of increase versus decrease of rotation angle in degrees,

Increase/decrease of rotation in grades			
Categories	N	%	cum%
increase 0 <=10	123	26,8	
increase 11 <= 20	140	30,5	57,3
increase 21 <= 30	92	20,04	77,34
increase 31 <=40	31	6,75	84,1
increase 41 <=50	12	2,61	86,71
increase 51 <=60	3	0,65	87,36
decrease -1 >= -10	45	9,8	
decrease -11 >= -20	11	2,4	12,2
total	457	99,56	99,56

Comment: There are 87 percent rotation angle increases versus 12 percent rotation angle decreases. In 77 percent of subjects, an increase of rotation angle by up to 30 degrees was found. Interestingly, extreme rotation angle increases above forty degrees can occur, but also rotation angle decreases, which belong to the category of twenty degrees. This means that it depends on the respective muscle plasticity and severity of previous symptoms, whether a significant rotation angle increase or decrease occurs, The basic phenomenon consists in that a rotation angle increase of about 20 degrees is to be expected.

4.2 Durability of treatment success by example of rotation

Table: Number, mean and standard deviation of rotation angle in degrees at second treatment time

<u>2nd appointment</u>				
Left before massage	71,1	11,29	M	SD
Right before massage	69,77	11,44	M	SD
Number	226		N	
Left after massage	72,77	12,2	M	SD
Right after massage	72,54	11,6	M	SD
Rotation symmetry	188	83,19	N	%

Upper Cervical Therapy

Robert Emmanuel Picard

Comment: At second treatment time, durability of treatment outcome with regard to rotational symmetry and increase turned out. A persistent rotatory symmetry ensues. Therefore, therapy success and its durability are acquired, and, once acquired, functionality of upper cervicals no longer gets lost.

4.2 Lateral flexion pre-post comparison

Table: Number, mean and standard deviation of average lateral flexion values before and after upper cervical therapy in degrees

<u>Lateral flexion pre-post comparison</u>			
	M	SD	N
Lateral flexion left before therapy	30,67	8,67	327
Lateral flexion right before therap	33,07	9,29	
Lateral flexion left after therapy	34,57	8,62	326
Lateral flexion right after therapy	36,17	8,84	
Increase left	3,93	5	
Increase right	3,12	5,62	
Total increase	7,05	8,79	

Comment: The lateral flexion is more limited to the left than to right. There is a difference of nearly three degrees. This suggests that the upper cervicals are rather immobilized on the left side than on the right side and that the resulting movability is especially due to the lower cervical spine. After therapy, lateral flexion increases on both sides, the increase on the left side is more significant.

Table: Number of subjects in whom lateral flexion symmetry was established before and after therapy. Lateral flexion symmetry is defined as the difference between right and left side flexion, which is the less than or equal to three degrees. Standing next correlation coefficients of lateral flexion values before and after therapy

<u>Lateral flexiion</u>	Number	N	%
Symmetry before therapy	134	327	40,98
Symmetry after therapy	212	326	65,03
Difference of percentage			24,05

Lateral flexion before therapy	0,75
Lateral flexion after therapy	0,87

Comment: Before treatment, 41 percent of subjects were having lateral flexion symmetry, after therapy, 65 percent. The increase of lateral flexion symmetry of around 24 percent indicates that symmetry is fostered as in rotation symmetry. In addition, a clear-cut increase of the pre-post correlation coefficient is evidenced.

Upper Cervical Therapy

Robert Emmanuel Picard

4.3 Flexion & extension pre-post comparison

Table: Number, mean and standard deviation of average flexion-&-extension values before and after therapy in degrees. Below: differences of the latter before and after therapy

<u>Flexion & extension pre-post comparison</u>				
	M	SD	N	
Flexion before therapy	52,79	10,84	302	
Extension before therapy	55,52	15,44		
Flexion after therapy	55,09	9,84	301	
Extension after therapy	63,64	14,07		
			M	SD
Flexion after therapy minus flexion before therapy			2,31	9,71
Extension after therapy minus extension before therapy			8,27	9,38
Sum of flexion plus extension differences			10,57	12,37

Comment: After therapy, increase of both flexion and extension is evidenced. The increase of extension is four times greater than the increase of flexion. This suggests that, due to therapy, a qualitative change of head position or rather head-body relationship has taken place,

Table: Frequencies of increases or decreases in flexion and extension as well as combinations of flexion and extension in percent

<u>Frequencies flexion & extension</u>	N	%
Increase flexion	164	54,49
Decrease flexion	109	36,21
No increase / no decrease of flexion	27	8,97
Increase extension	237	78,74
Decrease extension	49	16,28
No increase / no decrease of extension	14	4,65
Increase of flexion and extension	123	40,86
Decrease flexion and extension	9	2,99
Decrease flexion, increase extension	92	30,56
Increase flexion, decrease extension	35	11,63
Only increase of flexion	8	2,66
Only increase of extension	23	7,64
Special cases	12	3,99
Total	301	

Comment: There were mainly increases in flexion and extension, especially in extension. Combining the most frequent combinations of categories, that is, 'increase in flexion and extension', and 'decrease in flexion, increase in extension', both categories taken together account for about 72 percent of the cases. This indicates a qualitative change in head position and in the ability of flexion and extension.

Upper Cervical Therapy

Robert Emmanuel Picard

5. Spontaneous written comments

Table: Number and type of sensations named shortly after upper cervical therapy (multiple responses, N = 357)

Written spontaneous comments	357	
<u>Categories</u>	N	%
Sensation of warmth left	15	2,87
Symptom reduced/vanished	52	9,96
No knack any more	6	1,15
Head rotation improved	95	18,2
Increased movibility, lightness	109	20,88
Agreable, relaxed, better	214	41
Impression of having grown	41	5,94
Total	532	100

Comment: The immediate therapeutic effect, which is recognizable in these statements, is a sensation of lightness of head movements. A temporary loss of control of head movements is rarely reported. First among the most frequently mentioned feelings, is the statement that the new head mobility was ‚pleasant‘. An increased head mobility was usually reported, for example: "Head rotation is easier." More specific comments relating to head rotations were also related, for example: "Mobility is improved to the right side." In many cases, after a relatively short period, it has been reported that aforementioned symptoms had vanished, for example: "My headache has gone!"

Overall, these statements provide the image of a new quality in the upper cervicals: Subjects immediately found out that something had changed physiologically in significant ways. They could confirm the measured increase of rotation, lateral flexion, and flexion & extension by their own sensations.

6. Discussion of results

Very consistent and coherent results have been yielded which clearly point at the focussed phenomenon: The above-mentioned upper cervical asymmetry restricts the movements of upper cervicals. Restrictions of rotation, flexion and lateral flexion as well as movibility asymmetries aren't noticed, until they are measured and changed.

Once this is done and the upper cervicals have been centered, clearcut before-&-after differences appear in all

Upper Cervical Therapy

Robert Emmanuel Picard

feature dimensions: rotation and lateral flexion symmetrize and increase, flexion & extension also clearly increase. Thus, the three hypotheses stated above were confirmed.

Many of the sample results presented here are probably significant in inferential statistics. The data reproduce the robust phenomenon in a satisfactory manner.

In addition, the stability of the measurement results over time has been revealed, which suggests that there usually is no regression to the previous state of upper cervicals, that is, to upper cervical asymmetry.

The convergence and consistency of results together with the acknowledged sensations, the generally positive assessment of therapy success and its durability make no doubt that this is a profound therapeutic measure.