



## The Effect of a Complex (3-week) Therapy on the Hip and Knee Joints in Obese Patients

Anett TÓVÁRI<sup>1</sup>, Mária HERMANN<sup>1</sup>, Ferenc TÓVÁRI<sup>2</sup>,  
Gyöngyvér PRISZTÓKA<sup>2</sup>, János KRÁNICZ<sup>2</sup>

[drmancs@gmail.com](mailto:drmancs@gmail.com)

(1 Railway Occupational Health Public Non-Profit Company,  
Harkány, Hungary;  
2 University of Pécs, Pécs, Hungary)

Received: 30.12.2014; Accepted: 04.21.2015

**Abstract:** *Currently, overweight and obesity are the most widespread problems in life-style having a significant impact on everyday life, and thus, conduct of life. Further contributory problems may develop in patients with weight problems: deformities of the joints and skeleton (coxarthrosis and gonarthrosis), circulatory problems and arrhythmia.*

*Overweight definitely has an effect on motion: some people are not involved in certain activities as it is impossible for them because of their weight problem. Thus, even more health problems are generated because of the overweight. The first question arising in discussing the actuality of this issue is what effect the applied therapy (massage, therapeutic exercises, electrotherapy and balneotherapy) has on the knee and hip joints of patients with weight problems hospitalised in our Institute for a 3-week complex therapy. Based on my prior hypothesis, positive changes are detected in a minimum percentage in the condition of overweight or obese patients. My hypothesis was that the range of flexion and extension of the hip and knee joints would improve compared to other movements.*

*Based on the results of the studied population (n=30), my hypothesis seems to be proven. After the 3-week complex therapy of obese patients, positive changes were found in the prearranged assessments and tests, thereby improving the general health, life-style, life quality and mental status of the patients. After the end of the complex therapy, patients were provided life-style counselling and exercise schemes to be performed in their home to maintain the achieved health status.*

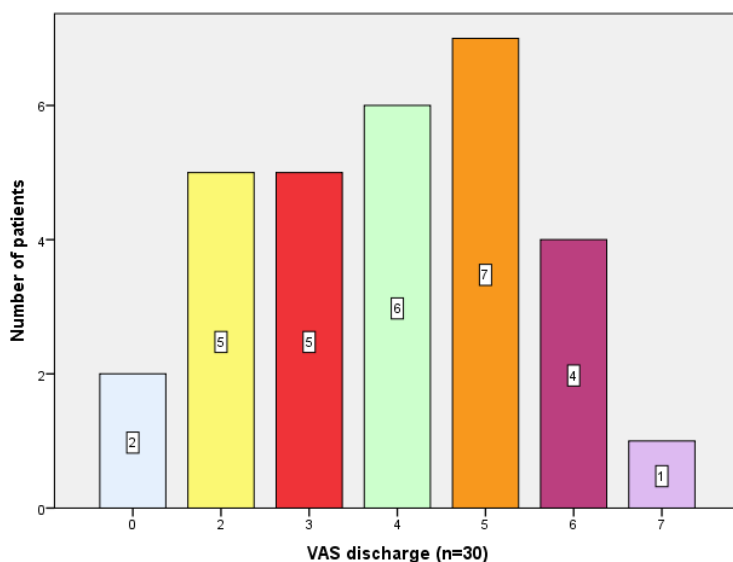
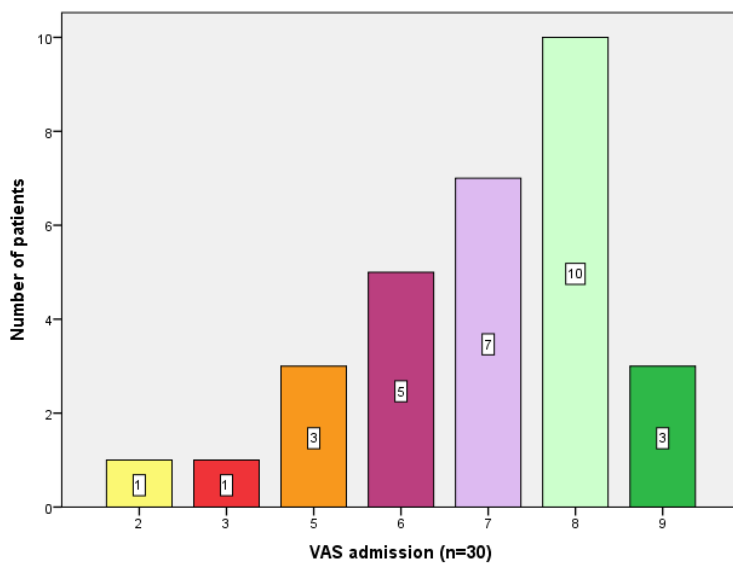
**Keywords:** obesity, articular range of motion, decreasing pain, change of lifestyle, improvement in quality of life

The number of obese, overweight patients is around 1 billion in the world. Unfortunately, this number is on the rise continuously and at a rapid rate. In Hungary, it is the most common health problem with all its concomitant diseases. In Hungary more than 60% of the population is overweight, and more than 25% is obese. This high number may be due to the inactive lifestyle in our country as well as the unhealthy eating habits.

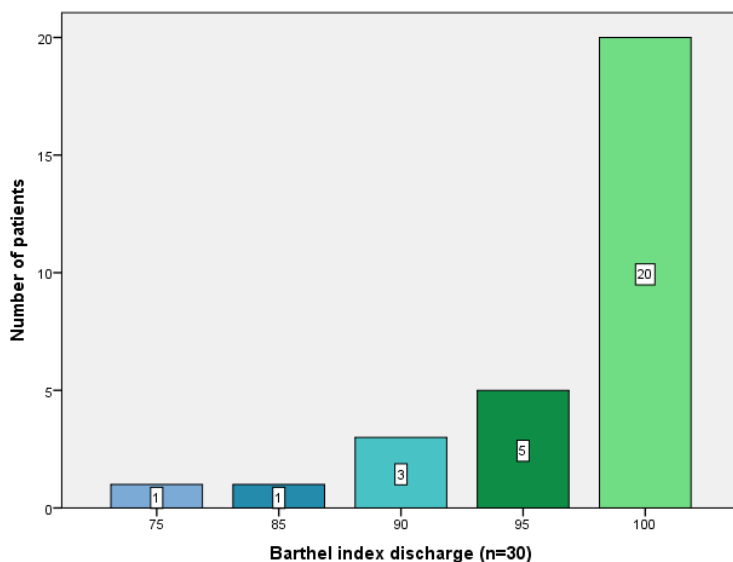
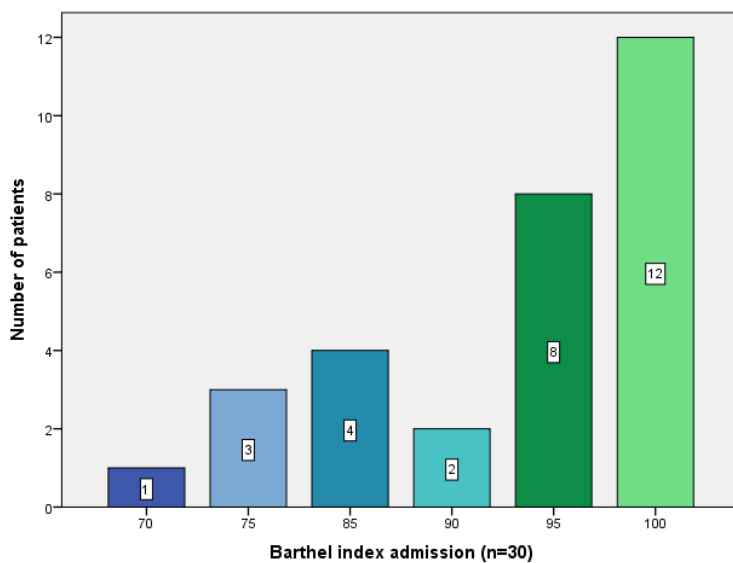
In our study, we aimed at investigating the effects of a complex therapy on the hip and knee joints of obese and overweight patients. We also wished to find out whether the results in the Visual Analogue Scale, Barthel Index and Functional Independence Measure Scale would change during the 3-week complex therapy. Based on the results, we set up 3 hypotheses: first, positive changes are expected to be found in minimal percentage in the condition of overweight and obese patients; second, the range of both active and passive flexion and extension in the hip joint should improve compared to the measures on entering the therapy; and third, the range of both active and passive flexion and extension in the knee joint should improve compared to the measures on entering the therapy.

The site of our study was the Railway Occupational Health Public Non-Profit Company, Health Centre in Harkány, Hungary. Patients hospitalized at this rehabilitation ward were provided a 3-week complex therapy that involved daily sessions of massage, electrotherapy, ultrasound therapy, individual and group therapeutic exercises, ergotherapy and balneotherapy. The study was initiated in February 2014. Since then, individuals has been continuously enrolled and studied. 30 subjects: 14 men and 16 women participated in the present study. Their mean age was 68.76 years. Their average BMI calculated from the body height and weight was 30.72 kg/m<sup>2</sup>. 50% (n=15) of the studied patients were overweight, 40% (n=12) were obese, 6.7% (n=2) had secondary obesity, and 3.3% (n=1) had morbid obesity. The study had two phases: one with a questionnaire and another one with the measurements. A self-developed questionnaire was used parallel with 4 standardized questionnaires (the SF-36 health survey questionnaire, the Visual Analogue Scale, the Barthel Index and the FIM Scale). A goniometer with pain scale ruler was used for the measurements. The data gained during the study were assessed by IBM SPSS Statistics Version 20, Microsoft Excel 2013 and by plain mathematical statistical calculation of percentage.

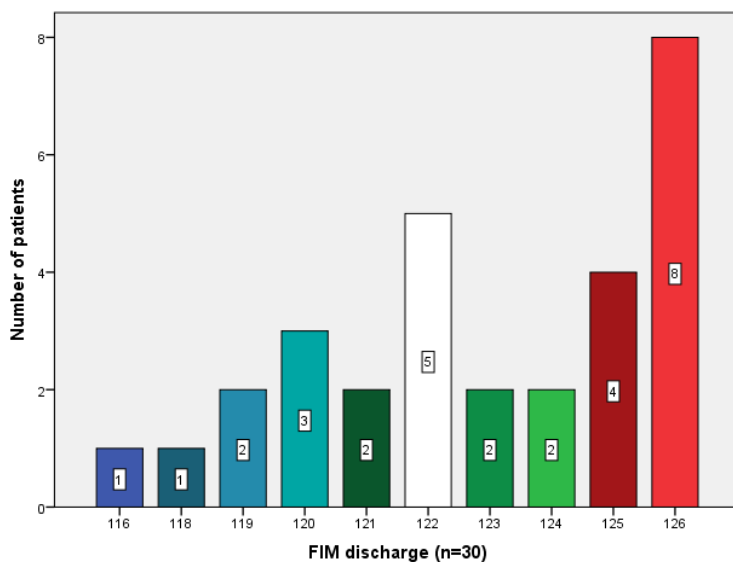
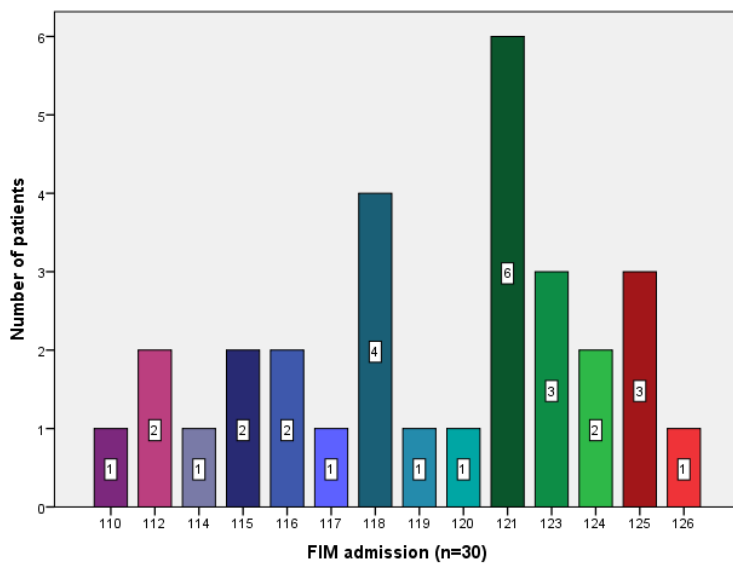
Patients had to assign on the pain scale ruler the strength of their pain both on admission and on discharge. This is a scale of 0 to 10. Patients subjectively assessed their actual pain. The average of pain assessment on admission was 6.87. 33.3% (n=10) of the patients assessed their pain as being 8 on the 10-score scale. The lowest assessment was 2, and the highest value was 9. On discharge, the average value was 3.83. On discharge, 23.3% (n=7) of the patients assessed their pain as being 5, and 20% (n=6) as being 4 out of 10. The lowest assessment was 0, and the highest value was 7.



Barthel Index is a functional test that measures performance in activities of daily living. The maximum value is 100 scores in the test. In our study, the average value of patients on admission was 92.5 scores. 40% (n=12) of the patients achieved the maximum value even on admission. The minimum and the maximum values on admission were 70 and 100 scores, respectively. On discharge, 66.7% (n=20) of the patients achieved the maximum score of 100. The average score on discharge was 96.83. The minimum and the maximum values on discharge were 75 and 100 scores, respectively.



The FIM Scale also assesses performance in activities of daily living, but the scoring system is stricter than in the Barthel Index. The maximum score that can be achieved in this test is 126, which can be achieved by answering 18 items in 6 different topics, and in each item 7 scores can be achieved at most. On admission, the average score measured in this test was 119.4 in our patients. 20% (n=6) of the patients scored 121 on admission. The minimum and the maximum values on admission were 110 and 126 scores, respectively. The average score on discharge was 122.87. 26.7% of the patients achieved the maximum score, that is 126 scores on discharge. The minimum and the maximum values on discharge were 116 and 126 scores, respectively.



The range of both active and passive flexion and extension of the hip joint was assessed in the study. On admission, the range of flexion in the right hip was 106.67° on active movement. On discharge, this value improved to 113.17°. The improvement on average was 6.5°. On admission, the range of flexion in the right hip was 120.33° on passive movement, whereas on discharge this value was 125°. The rate of improvement was 4.67° in this case. On admission, the range of flexion on active movement in the left hip was 109.83° on average, and it was 115.33° on discharge. The rate of improvement was 5.5° in this case. The assessment of passive movement resulted in similar values: the average value on admission was 122.17°, and on discharge it was 127.67°. The rate of improvement was 5.5° in this case. It may be claimed that the complex therapy resulted in positive changes in the range of both active and passive movements of the hip joint.

## Statistics

		Right hip flexion active admission	Right hip flexion active discharge	Left hip flexion active admission	Left hip flexion active discharge
N	Valid	30	30	30	30
	Missing	0	0	0	0
	<b>Mean</b>	<b>106,67</b>	<b>113,17</b>	<b>109,83</b>	<b>115,33</b>
	Std. Error of Mean	1,767	1,910	1,599	1,457
	Median	110,00	115,00	110,00	115,00
	Mode	110	115	110	110 <sup>a</sup>
	Std. Deviation	9,679	10,462	8,758	7,980
	Variance	93,678	109,454	76,695	63,678
	Range	35	45	30	40
	<b>Minimum</b>	<b>85</b>	<b>85</b>	<b>90</b>	<b>90</b>
	<b>Maximum</b>	<b>120</b>	<b>130</b>	<b>120</b>	<b>130</b>
	Sum	3200	3395	3295	3460

a. Multiple modes exist. The smallest value is shown

## Statistics

		Right hip flexion passive admission	Right hip flexion passive discharge	Left hip flexion passive admission	Left hip flexion passive discharge
N	Valid	30	30	30	30
	Missing	0	0	0	0
	<b>Mean</b>	<b>120,33</b>	<b>125,00</b>	<b>122,17</b>	<b>127,67</b>
	Std. Error of Mean	2,047	2,433	1,603	1,853
	Median	120,00	130,00	120,00	130,00
	Mode	120 <sup>a</sup>	130	130	130
	Std. Deviation	11,214	13,326	8,777	10,148
	Variance	125,747	177,586	77,040	102,989
	Range	50	50	35	35
	<b>Minimum</b>	<b>90</b>	<b>90</b>	<b>105</b>	<b>105</b>
	<b>Maximum</b>	<b>140</b>	<b>140</b>	<b>140</b>	<b>140</b>
	Sum	3610	3750	3665	3830

a. Multiple modes exist. The smallest value is shown

On admission, the range of movement in the right hip on active extension was  $8.83^{\circ}$  on average, whereas this value was  $10.33^{\circ}$  on discharge. The rate of improvement was  $1.5^{\circ}$  in this case. This value was  $9.17^{\circ}$  in the left hip on admission, and it was  $10.67^{\circ}$  on discharge. The rate of improvement was  $1.5^{\circ}$  in this case. On admission, the range of movement in the right hip on passive extension was  $15.67^{\circ}$  on average, whereas this value was  $17.00^{\circ}$  on discharge. The improvement on average was  $1.33^{\circ}$ . On admission, the range of movement in the left hip was  $16.00^{\circ}$  on average, whereas this value was  $17.00^{\circ}$  on discharge. A minor improvement,  $1^{\circ}$ , was also found in this joint.

## Statistics

		Right hip extension active admission	Right hip extension active discharge	Left hip extension active admission	Left hip extension active discharge
N	Valid	30	30	30	30
	Missing	0	0	0	0
	<b>Mean</b>	<b>8,83</b>	<b>10,33</b>	<b>9,17</b>	<b>10,67</b>
	Std. Error of Mean	,460	,675	,421	,622
	Median	10,00	10,00	10,00	10,00
	Mode	10	10	10	10
	Std. Deviation	2,520	3,698	2,306	3,407
	Variance	6,351	13,678	5,316	11,609
	Range	10	20	10	20
	<b>Minimum</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
	<b>Maximum</b>	<b>10</b>	<b>20</b>	<b>10</b>	<b>20</b>
	Sum	265	310	275	320

## Statistics

		Right hip extension passive admission	Right hip extension passive discharge	Left hip extension passive admission	Left hip extension passive discharge
N	Valid	30	30	30	30
	Missing	0	0	0	0
	<b>Mean</b>	<b>15,67</b>	<b>17,00</b>	<b>16,00</b>	<b>17,00</b>
	Std. Error of Mean	,785	,743	,809	,743
	Median	15,00	15,00	15,00	15,00
	Mode	15	15 <sup>a</sup>	15	15 <sup>a</sup>
	Std. Deviation	4,302	4,068	4,433	4,068
	Variance	18,506	16,552	19,655	16,552
	Range	20	15	20	15
	<b>Minimum</b>	<b>5</b>	<b>10</b>	<b>5</b>	<b>10</b>
	<b>Maximum</b>	<b>25</b>	<b>25</b>	<b>25</b>	<b>25</b>
	Sum	470	510	480	510

a. Multiple modes exist. The smallest value is shown

Flexion on active movement was also measured in the right and left knees. On admission, the range of movement on flexion in the right knee was 108.83° on average, whereas this value was 109.50° in the left knee. On discharge, these values were 114° and 114.5°, respectively. The improvement was 5.17° in the right knee and 5° in the left knee. On admission, the range of passive movement on flexion in the right knee was 124.67° on average, whereas this value was 125.17° in the left knee. On discharge, these values improved to 129.17° in the right knee and 129.83° in the left knee. An improvement was identified on passive movement as well, 4.5° in the right knee and 4.66° in the left knee.

## Statistics

		Right knee flexion active admission	Right knee flexion active discharge	Left knee flexion active admission	Left knee flexion active discharge
N	Valid	30	30	30	30
	Missing	0	0	0	0
<b>Mean</b>		<b>108,83</b>	<b>114,00</b>	<b>109,50</b>	<b>114,50</b>
Std. Error of Mean		2,730	2,496	2,437	2,353
Median		110,00	117,50	110,00	115,00
Mode		110 <sup>a</sup>	120	120	125
Std. Deviation		14,953	13,671	13,349	12,889
Variance		223,592	186,897	178,190	166,121
Range		50	45	50	45
<b>Minimum</b>		<b>85</b>	<b>90</b>	<b>85</b>	<b>90</b>
<b>Maximum</b>		<b>135</b>	<b>135</b>	<b>135</b>	<b>135</b>
Sum		3265	3420	3285	3435

a. Multiple modes exist. The smallest value is shown

## Statistics

		Right knee flexion passive admission	Right knee flexion passive discharge	Left knee flexion passive admission	Left knee flexion passive discharge
N	Valid	30	30	30	30
	Missing	0	0	0	0
<b>Mean</b>		<b>124,67</b>	<b>129,17</b>	<b>125,17</b>	<b>129,83</b>
Std. Error of Mean		2,680	2,616	2,485	2,379
Median		130,00	130,00	125,00	130,00
Mode		120 <sup>a</sup>	130	120	130 <sup>a</sup>
Std. Deviation		14,677	14,329	13,613	13,031
Variance		215,402	205,316	185,316	169,799
Range		55	55	55	55
<b>Minimum</b>		<b>95</b>	<b>95</b>	<b>95</b>	<b>95</b>
<b>Maximum</b>		<b>150</b>	<b>150</b>	<b>150</b>	<b>150</b>
Sum		3740	3875	3755	3895

a. Multiple modes exist. The smallest value is shown

Measurements of extension in the knees also resulted in some minimum improvement. On admission, the active extension of the right knee was  $1.03^{\circ}$  on average, whereas this value was  $0.7^{\circ}$  in the left knee. On discharge, this value was  $0.43^{\circ}$  in the right knee and  $0.13^{\circ}$  in the left knee. The improvement was  $0.33^{\circ}$  in the right knee and  $0.27^{\circ}$  in the left knee. On passive movement, the extension in the right and left knees was  $0.3^{\circ}$  and  $0^{\circ}$  on admission, and on discharge, it was  $0.2^{\circ}$  in the right knee and  $0^{\circ}$  in the left knee. It should be mentioned that however small these changes are, they might be essential for these patients.



## Statistics

		Right knee extension active admission	Right knee extension active discharge	Left knee extension active admission	Left knee extension active discharge
N	Valid	30	30	30	30
	Missing	0	0	0	0
<b>Mean</b>		<b>1,03</b>	<b>,43</b>	<b>,70</b>	<b>,13</b>
Std. Error of Mean		,294	,177	,250	,079
Median		,00	,00	,00	,00
Mode		0	0	0	0
Std. Deviation		1,608	,971	1,368	,434
Variance		2,585	,944	1,872	,189
Range		5	4	5	2
<b>Minimum</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Maximum</b>		<b>5</b>	<b>4</b>	<b>5</b>	<b>2</b>
Sum		31	13	21	4

## Statistics

		Right knee extension passive admission	Right knee extension passive discharge	Left knee extension passive admission	Left knee extension passive discharge
N	Valid	30	30	30	30
	Missing	0	0	0	0
<b>Mean</b>		<b>,30</b>	<b>,20</b>	<b>,00</b>	<b>,00</b>
Std. Error of Mean		,193	,147	,000	,000
Median		,00	,00	,00	,00
Mode		0	0	0	0
Std. Deviation		1,055	,805	,000	,000
Variance		1,114	,648	,000	,000
Range		5	4	0	0
<b>Minimum</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Maximum</b>		<b>5</b>	<b>4</b>	<b>0</b>	<b>0</b>
Sum		9	6	0	0

As a conclusion, it might be claimed that our hypotheses were proven as improvement in the quality of life could be supported by standardized questionnaires as well. An improvement of 3.04 scores was seen in the Visual Analogue Scale comparing the admission and discharge values. The improvement measured by the Barthel Index was 4.33 scores, and the improvement measured by the FIM Scale was 3.47 scores. Therefore, we may conclude that the quality of life of patients improved during the 3-week complex therapy. The second and the third hypotheses were also proven as an improvement was found in the range of movement of the hip and knee joints both on active and passive movement.

In the future, we are to involve even more patients in our study. It would be a continuous process as the examinations are performed at a department for patients with acute diseases of the locomotor system. It would also be sensible to compare the results measured in male and

female patients, and to assess the rate of the improvement. We might also assess the results of other hip and knee joint measurements. The assessment of some further joints might also be involved in the study, especially the ones that are affected by obesity and overweight. We also aim at finding similar therapies applied in Hungary and abroad, and we plan to compare their results with ours.