Efficiency survey of complex physiotherapy cures at spa hotels on patients with coxarthrosis

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In relation to the effectiveness of treatments with medicinal water, several high-standard publications by Hungarian authors – meeting easily the requirements of "evidence-based medicine" – have been published in past years in Hungarian and foreign scientific reviews. (1,2, 3, 4,5)
Several important publications dealt with the complex treatment of locomotor disorders too. (6, 7, 8, 9)

According to the domestic and Central European medical approach, complex treatments applying the entire arsenal of physiotherapy are a lot more effective than monotherapy. There are therefore no health resorts or institutions in Hungary treating every disease with the exclusive application of a single – no matter how effective – local curative factor. There are no mud or irrigation health institutions, where every disorder is treated with mud-packs or by rinsing all bodily orifices with medicinal water (e.g. in the event of lesions of the accessory nasal cavities or gastro-intestines, or gynaecological diseases).

We have deemed it expedient to investigate the status of patients participating in cures of two and three weeks at the domestic spa hotels (spa guests) upon arrival and departure, and to ascertain their subjective complaints and their opinions relating to the efficiency of the treatments.

We have involved in the survey the spa guests of Danubius Health Spa Resort Hotel Margaret Island, Hotel Helia, the spa operating in the same building as Danubius Hotel Gellért, the Spa Hotels Hévíz and Aqua, and the Spa Hotels in Sárvár and Bük.

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The data of 94 patients with coxarthrosis have been computer-processed in total. The patients were treated between December 2007 and May 2008 at the above-mentioned institutions.
Every patient received all the treatments necessary for his/her condition and his/her complaints (spa treatments, hydrotherapeutic procedures, mud treatments, medicinal gymnastics, electrotherapy, etc).
Spa treatments were performed using certified medicinal water at all locations.
From the outset, we have excluded from the survey patients who had undergone operations involving hip- or knee-joint prothesis, as well as those restricted in their motion due to their cardiac condition or spine complaints.

We have compiled the assessment form based on the documentation recommendations of *Csermely* (10), proposed for the qualification of medicinal water.

The forms were completed during the first medical examination and on the last treatment day; they were always completed by the same person.

The patients came from eight countries:

HOME COUNTRY	WOMEN	MEN	TOTAL
Grand Total:	59	35	94
Germany	32	25	57
Hungary	12	3	15
Austria	7	3	10
Switzerland	3	2	5
Russia	3	0	3
USA	1	1	2
Australia	0	1	1
Israel	1	0	1

German citizens traditionally have made up the decisive majority of patients receiving complex treatment, although their number decreased in past years in the absolute sense due to the restriction of domestic insurance subsidies, as well as economic recession.

The proportion of men (35 people) to women (59 people) represents the typical ratio split of spa guests since, according to general experience, women take more care of their health than men and are willing to spend money on it too.

There is little difference between the average age of men and women (men: 67.3 years, women: 67.5 years).
The highest average age is found in patients at the two hotels in Hévíz (men: 70.14 years, women: 70.43 years).
At the Budapest hotels, the average age of men is 62.5 years and the average age of women 65.7 years; this proportion is almost identical at the Sárvár and Bük hotels as well.

Of the 94 patients examined, 58 received a three-week treatment and 36 received a two-week treatment. The three-week cure was primarily taken by the Germans (20 women and 13 men) and the Hungarians. The latter all received a three-week treatment.
Contrary to our expectations, we found no significant discrepancy between the therapeutic results of those having participated in a two- and a three-week cure, and we have therefore – on assessment – merged the two groups.
There was also no significant difference between the results achieved at the respective establishments. This fact has confirmed our conviction that improvement has been independent of the spa hotel where the patients received treatment.

18% of men and 32% of women had bilateral hip process. Unfortunately we could only rely on physical examination, measurable data (walking time, distance of pace, etc) and the patients' complaints upon completion of the forms because the decisive majority of patients had not brought an x-ray photograph or medical finding with them.

During the assessment, we compared the data of the respective examined parameters prior to complex treatment and subsequent to it.

We recorded alterations in five sorts of pain sensation, based on the patients' subjective opinions.

(PT: prior to treatment; ST: subsequent to treatment)

PT AT REST	PT PCS	ST AT REST	ST PCS
none	49	none	63
mild	25	mild	25
medium	16	medium	6
strong	4	strong	0

PT UPON MOTION	PT PCS	ST UPON MOTION	ST PCS
none	1	none	14
mild	29	mild	46
medium	39	medium	33
strong	25	strong	1

PT UPON START-UP	PT PCS	ST UPON START-UP	ST PCS
none	4	none	9
mild	21	mild	47
medium	38	medium	34
strong	31	strong	4

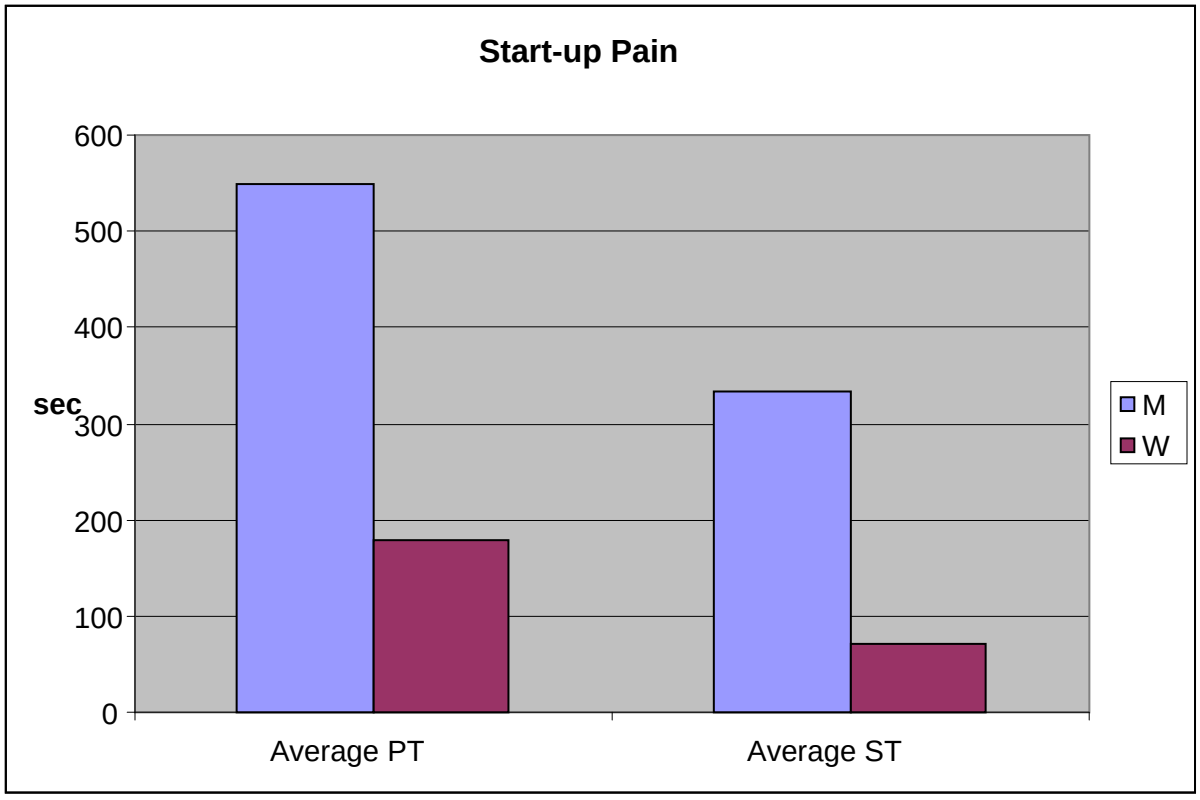
PT UP THE STAIRS	PT PCS	ST UP THE STAIRS	ST PCS
none	6	none	9
mild	24	mild	52
medium	36	medium	30
strong	28	strong	3

PT DOWN THE STAIRS	PT PCS	ST DOWN THE STAIRS	ST PCS
none	12	none	18
mild	33	mild	54
medium	31	medium	22
strong	18		0

It is interesting to observe that pain registered upon start-up, both prior to and subsequent to treatment lasted a lot longer in the case of the men than the women. However, the assessments show significant improvement in the case of both genders.

Average duration of pain upon start-up (in seconds)

Gender	Average PT	Average ST
Men	550	333
Women	180	71
All	317	167



Significance – Men:

$H_{0:}$ the value of start-up pain is identical prior to and subsequent to treatment.

$H_{1:}$ the value of start-up pain is not identical prior to and subsequent to treatment.

$$s_z = \sqrt{\frac{\sum (z_i - \bar{z})^2}{n-1}} = \sqrt{\frac{174857.5}{30-1}} = \sqrt{6029.56} = 77.65$$

$$t = \sqrt{n}\,\frac{\bar{z}}{s_z} = \sqrt{30}\,\frac{83.5}{77.65} = 5.88$$

Significance – level: p = 0.05

Degree of freedom: f = n – 1 = 30 – 1 = 29

tp = 2.042

t > tp

We reject H_0. The difference is significant.

Significance – Women:

$H_{0:}$ the value of start-up pain is identical prior to and subsequent to treatment.

$H_{1:}$ the value of start-up pain is not identical prior to and subsequent to treatment.

$$s_z = \sqrt{\frac{\sum (z_i - \bar{z})^2}{n-1}} = \sqrt{\frac{386876.7}{53-1}} = \sqrt{7439.93} = 86.25$$

$$t = \sqrt{n}\frac{\bar{z}}{s_z} = \sqrt{53}\frac{86.60}{86.25} = 7.3$$

Significance – level: p = 0.05

Degree of freedom: f = n – 1 = 53 – 1 = 52

tp = 2.009

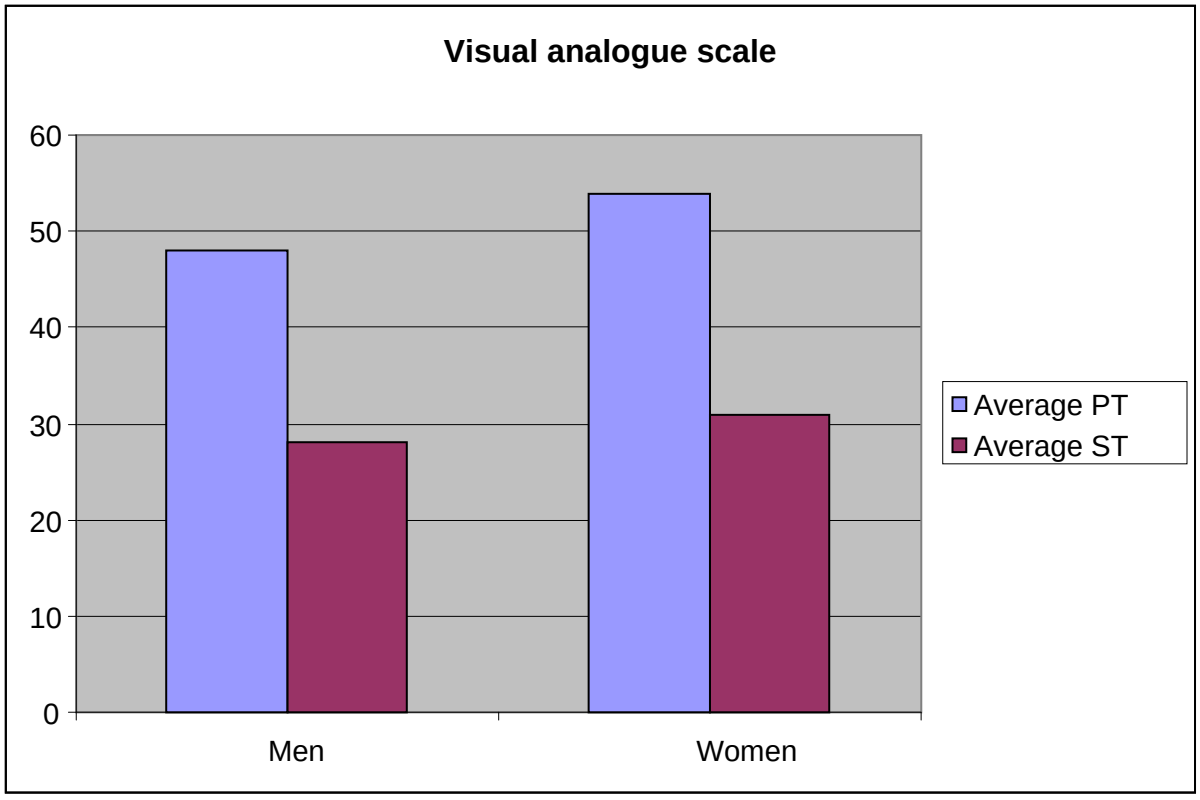
t > tp

We reject H_0. The difference is significant.

We obtained a similarly favourable result while assessing using the visual analogue scale (VAS). (In eight cases, the patients indicated “0” pain upon conclusion of the treatment.)

Average of visual analogue scale (VAS):

Gender	Average PT	Average ST
Men	48	28
Women	54	31
All	52	30



Significance – Men:

$H_{0:}$ the VAS value is identical prior to and subsequent to the treatment.

$H_{1:}$ the VAS value is not identical prior to and subsequent to the treatment.

$$s_z = \sqrt{\frac{\sum (z_i - \bar{z})^2}{n-1}} = \sqrt{\frac{8692.23}{34-1}} = \sqrt{263.4} = 16.22$$

$$t = \sqrt{n}\,\frac{\bar{z}}{s_z} = \sqrt{34}\,\frac{18.58}{16.22} = 6.67$$

Significance – level: p = 0.05

Degree of freedom: f = n – 1 = 34 – 1 = 33

tp = 2.030

t > tp

We reject H_0. The difference is significant.

Significance – Women

$H_{0:}$ the VAS value is identical prior to and subsequent to the treatment.

$H_{1:}$ the VAS value is not identical prior to and subsequent to the treatment.

$$s_z = \sqrt{\frac{\sum (z_i - \bar{z})^2}{n-1}} = \sqrt{\frac{20712.98}{59-1}} = \sqrt{357.12} = 18.89$$

$$t = \sqrt{n}\frac{\bar{z}}{s_z} = \sqrt{59}\frac{23.01}{18.89} = 9.35$$

Significance – level: p = 0.05

Degree of freedom: f = n – 1 = 59 – 1 = 58

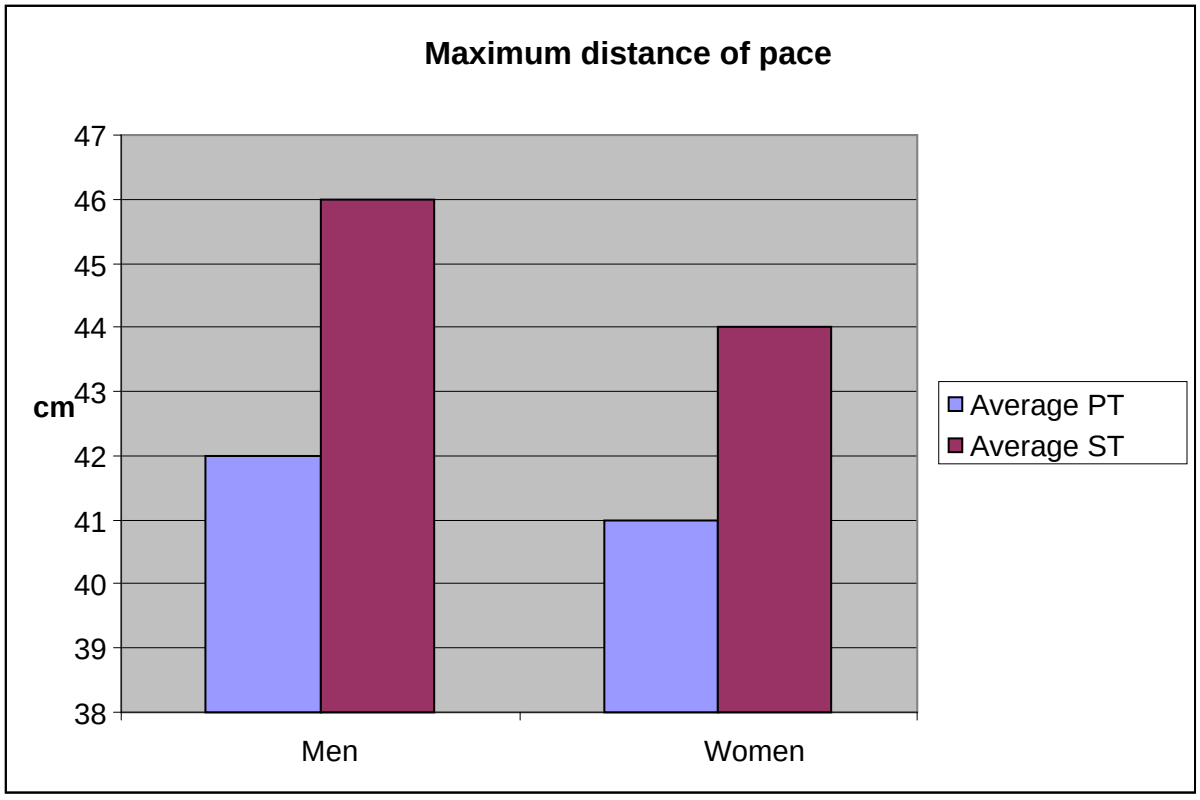
tp = 2.000

t > tp

We reject H_0. The difference is significant.

Survey of the maximum distance of pace (cm) brought the following result:

Gender	Average PT	Average ST
Men	42	46
Women	41	44
All	41	45



Maximum distance of pace - Significance – Men:

$H_{0:}$ the value of maximum distance of pace is identical prior to and subsequent to treatment.

$H_{1:}$ the value of maximum distance of pace is not identical prior to and subsequent to treatment.

$$s_z = \sqrt{\frac{\sum (z_i - \bar{z})^2}{n-1}} = \sqrt{\frac{468.74}{35-1}} = \sqrt{13.78} = 3.71$$

$$t = \sqrt{n}\,\frac{\bar{z}}{s_z} = \sqrt{35}\,\frac{4.08}{3.71} = 6.5$$

Significance – level: p = 0.05

Degree of freedom: f = n – 1 = 35 – 1 = 34

tp = 2.030

t > tp

We reject H_0. The difference is significant.

Significance – Women:

$H_{0:}$ the value of maximum distance of pace is identical prior to and subsequent to treatment.

$H_{1:}$ the value of maximum distance of pace is not identical prior to and subsequent to treatment.

$$s_z = \sqrt{\frac{\sum (z_i - \bar{z})^2}{n-1}} = \sqrt{\frac{627.53}{59-1}} = \sqrt{10.81} = 3.28$$

$$t = \sqrt{n}\frac{\bar{z}}{s_z} = \sqrt{59}\frac{3.25}{3.28} = 7.83$$

Significance – level: p = 0.05

Degree of freedom: f = n – 1 = 59 – 1 = 58

tp = 2.000

t > tp

We reject H_0. The difference is significant.

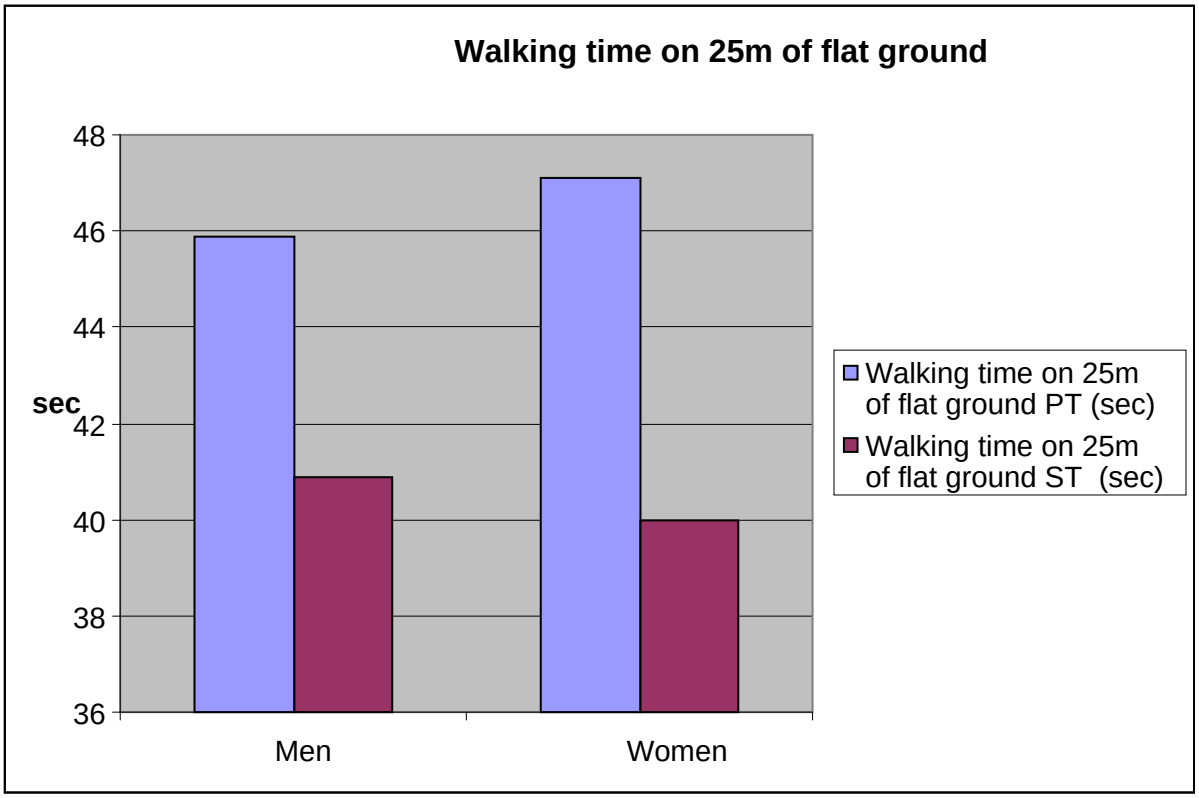
Walking time both on flat ground (25 metres) and up and down 20 stairs has shown improvement. Such improvement is most marked on flat ground, with lesser (although still significant) improvement in the case of walking the stairs.

On 25m of flat ground:	Men	t=5.16	tp=2.030	t>tp
	Women	t=7.45	tp=2.000	t>tp
Up 20 stairs:	Men	t=6.14	tp=2.030	t>tp
	Women	t=7.45	tp=2.000	t>tp
Down 20 stairs:	Men	t=6.99	tp=2.030	t>tp
	Women	t=6.80	tp=2.000	t>tp

Gender	Walking time on 25m of flat ground PT (sec)	Walking time on 25m of flat ground ST (sec)
Men	46	41
Women	47	40
All	47	40

Gender	Walking time up 20 stairs PT (sec)	Walking time up 20 stairs ST (sec)
Men	47	41
Women	52	43
All	50	42

Gender	Walking time down 20 stairs PT (sec)	Walking time down 20 stairs ST (sec)
Men	55	40
Women	47	41
All	50	41




Walking time up 20 stairs
60
50
40
30
20
10
0
sec
Men
Women
Walking time up 20 stairs PT (sec)
Walking time up 20 stairs ST (sec)


Walking time down 20 stairs
60
50
40
30
20
10
0
sec
Men
Women
Walking time down 20 stairs PT (sec)
Walking time down 20 stairs ST (sec)

The patients' ability to walk has essentially improved upon ascending and descending the stairs. (We have not examined men and women separately.)

	Prior to treatment			
	With both feet		With one foot	
	Holding on to something	Without holding on to something	Holding on to something	Without holding on to something
Upstairs	41	18	32	3
Downstairs	33	29	30	2
	Subsequent to treatment			
	With both feet		With one foot	
	Holding on to something	Without holding on to something	Holding on to something	Without holding on to something
Upstairs	45	25	20	4
Downstairs	29	42	17	6

We have detected improvement of a similar degree in the case of those requiring a walking aid in the street or at home. Of the eight patients walking with an aid at home, two have been able to abandon it; of the 27 people using a stick or an elbow-crutch, four have been able to abandon the aid altogether.

	Prior to treatment		Subsequent to treatment	
	With aid	Without aid	With aid	Without aid
At home	8	86	6	88
In the street	27	67	23	71

Many of the patients have taken regularly non-steroid antiphlogistics, primarily diclofenac derivatives. There has been no one taking regularly steroids among the patients examined. By the end of the treatment period, the number of those able to reduce their dose of non-steroids was significant, moreover, in a few cases, they could even eliminate it (in case of men, 4 out of 20, in case of women, 10 out of 38).

Upon conclusion of the treatment, we asked the patients to judge their condition pre- and post-treatment. Of the 94 patients, one person spoke of a deterioration, 30 deemed their condition practically unchanged, 20 reported a medium improvement, 31 an expressly significant amelioration, and five reported an excellent result.
It is equally important to emphasise that every overseas patient declared he/she would be happy to return to Hungary for a repeated complex cure.

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Summary

The authors have performed a multi-centric survey at six spa hotels belonging to Danubius Hotels Nyrt, as well as at the spa operating in the same building as Danubius Hotel Gellért. They studied the therapeutical results of complex cures of two or three weeks on 94 patients with coxarthrosis.

The survey has compared the condition of patients prior to and subsequent to the treatment. In the case of the decisive majority of patients, an improvement has manifested itself both objectively and subjectively.

In the case of the quantifiable parameters, statistical calculations have been carried out, confirming a significant improvement in every case.

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