

ORIGINAL ARTICLE

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Spa therapy for gonarthrosis: a prospective study

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Abstract The objective of this study was to evaluate the effect of spa therapy on clinical parameters of patients with gonarthrosis. Patients with gonarthrosis ($n=33$) underwent a 2-week spa therapy using three treatment regimes and a 20-week follow-up as follows: group I ($n=11$) had mineral water baths and hot native mineral mud packs, group II ($n=12$) had mineral water baths and rinsed mineral-free mud packs and group III ($n=10$) had tap water baths and mineral-free mud packs. The patients and the assessing rheumatologist were blinded to the difference in the treatment protocols. A significant improvement in the index of severity of the knee (ISK), as well as night pain scores, was achieved in group I. Improvement in physical findings and a reduction in pain ratings on a visual analogue scale (VAS) did not reach statistical significance. Analgesic consumption was significantly decreased in both groups I and III for up to 12 weeks. Global improvement assessed by patients and physician was observed in all three groups up to 16 weeks but persisted to the end of the follow-up period in group I only. Patients with gonarthrosis seemed to benefit from spa therapy under all three regimes. However, for two parameters (night pain and ISK) the combination of mineral water baths and mud packs (group I) appeared to be superior.

Key words Spa therapy · Gonarthrosis

Introduction

Balneotherapy is a subject of debate in rheumatology. While historically it has been considered effective in the palliation of rheumatic diseases, its role in modern medicine has not been well established. We have recently shown statistically significant improvement in patients with osteoarthritis (OA) of the knees after a 2-week period of treatment at a Tiberias spa [1]. This previous work was an uncontrolled one. We therefore report now the effectiveness of mud packs and mineral baths from Tiberias' springs on patients with OA of the knees in a double-blind controlled prospective study.

Patients and methods**Patients**

Thirty-three patients with primary OA of the knee(s) were treated for a period of 2 weeks, during the same 2-week period at the same Tiberias spa hotel. They were symptomatic for at least 6 months prior to the study and showed radiographic evidence of moderate or severe OA of at least one knee. Uncontrolled hypertension, ischaemic heart disease or peripheral vascular disease were exclusion criteria. Patients treated with nonsteroidal anti-inflammatory drugs (NSAIDs) were on these medications for at least 1 month before starting the study.

The participants were randomly allocated to three groups (Table 1), a treatment group (group I) and two control groups (groups II and III). The patients in group I ($n=11$) were treated with a combination of daily mineral water baths at 38 °C for 20 min and mud packs applied on the knees for 20 min at an initial temperature of 45 °C on alternate days. The patients in group II ($n=10$) were treated with a combination of daily mineral water baths at 38 °C for 20 min and every second day, with rinsed mud packs (depleted of soluble mineral components) applied on the knees for 20 min at the same initial temperature. The patients in group III ($n=12$) were treated with a combination of daily tap water baths at 38 °C for 20 min and every second day, with washed mud packs applied to the knee joints for 20 min at an initial temperature of 45 °C. The treatment protocol did not include any means other than those indicated above. The study was double blind i.e. neither the patients nor the evaluating rheumatologist knew the true nature of the treatment. Table 2 summarizes the demographic and clinical characteristics of the patients.

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Table 1 Treatment programme

Group I	Mineral water baths and mud packs
Group II	Mineral water baths and rinsed mud packs
Group III	Tap water baths and rinsed mud packs

Table 2 Demographic and clinical characteristics of patients with osteoarthritis

	Group I	Group II	Group III
Male/female ratio	1/10	1/9	2/10
Mean age (years)	66	63	65
(range)	(52-77)	(56-75)	(54-85)
Mean disease duration (years)	8	10	7
(range)	(3-15)	(8-19)	(5-12)

Each patient was assessed by his or her rheumatologist 3 days before arrival at the spa (week 0), 1 week after beginning treatment (week 1), at the completion of treatment (week 2) and at 3, 8, 12, 16 and 20 weeks from the start of treatment. The clinical parameters assessed at each examination included:

- Functional impairment using the index of severity of OA of the knee (ISK) [2]
- Pain intensity using a visual analogue scale (VAS) 10 cm in length
- Night pain using the severity rate scale (SRS; none=0, mild=1, moderate=2, severe=3) [3]
- Pain on passive motion using the SRS
- Tenderness on palpation using the SRS
- Patient assessment of disease severity on a scale from -3 to +3, in which -3=severe deterioration and +3=impressive improvement
- Physician assessment according to the same scale
- Daily analgesic drug consumption

Statistics

Statistical analysis was done by ANOVA test with repeated measures. Multiple comparisons were tested using Student's paired *t*-test.

Results

Index of severity (ISK; Fig. 1)

All three groups had a similar initial ISK (Fig. 1). In group I, a significant reduction in the ISK was observed after 1 week of treatment. This improvement was sustained until week 16. At the end of the follow-up period (week 20) in this group, the ISK was lower than at the beginning although this difference did not reach statistical significance. In group III, we observed a reduction in the ISK after the first week of treatment but it did not reach statistical significance; at both week 8 and week 12, there was a further reduction in ISK values, which reached statistical significance ($P=0.05$), but toward the end of the follow-up period, the ISK almost returned to the initial values. In group II, although some reduction in ISK values was observed, it was short-lived and not significant.

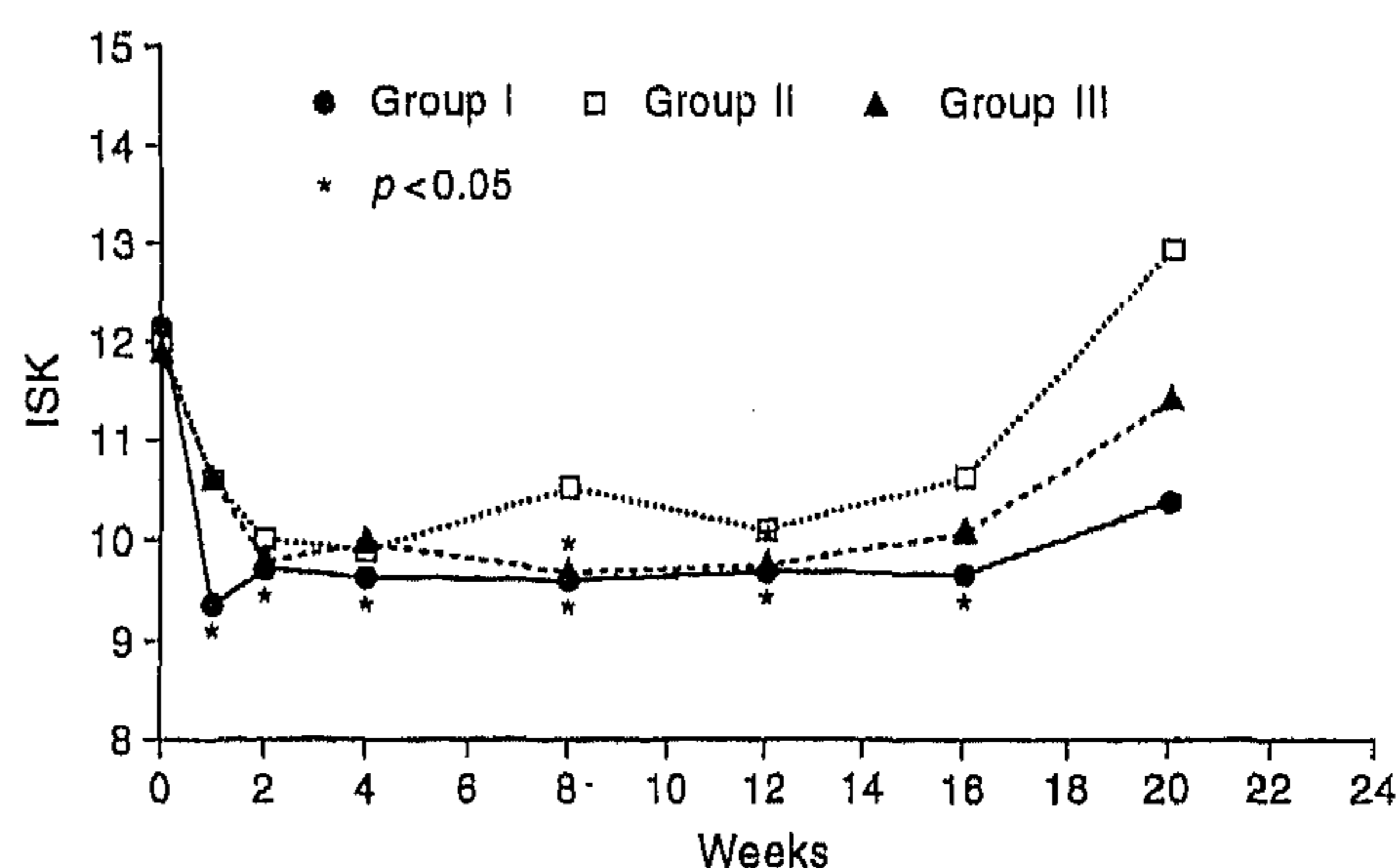


Fig. 1 Index of severity of osteoarthritis of the knee (ISK). Results represent mean values

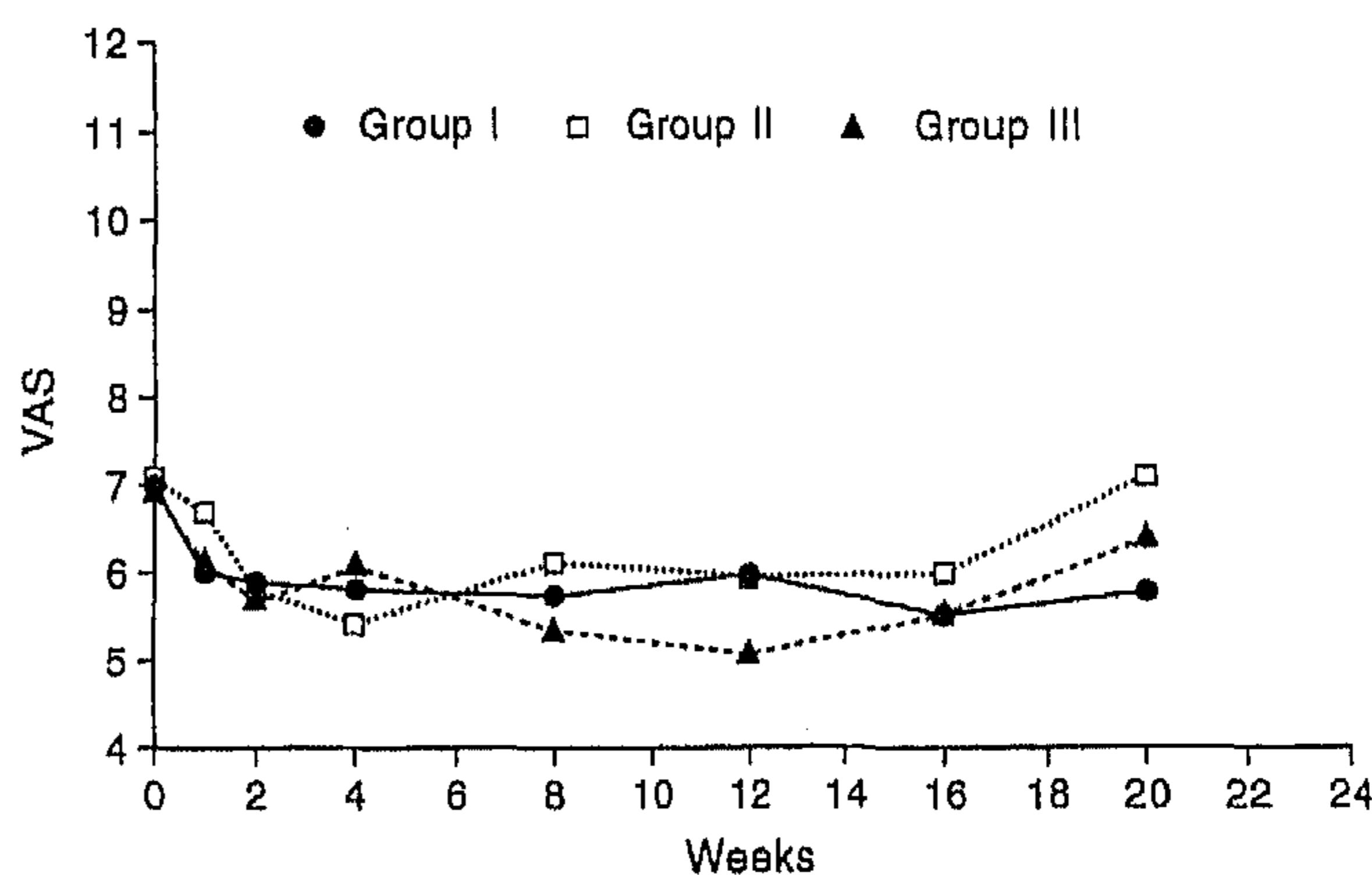


Fig. 2 Visual analogue score (VAS) of pain intensity

Pain intensity (VAS; Fig. 2)

A reduction in pain ratings was observed in the three groups. However, it did not reach statistical significance in any of them.

Night pain (Fig. 3)

In group I, a significant reduction in night pain was found after 1 week of treatment; this improvement was maintained until the end of the follow-up period (week 20). In groups II and III, no significant changes were observed.

Tenderness on palpation and pain on passive motion (Figs. 4 and 5)

No significant changes from baseline were found in these variables in either group I or the control groups.

Patient and physician assessment of disease severity (Figs. 6 and 7)

Significant improvement in patient and physician assessment of disease severity was found in both group I and in

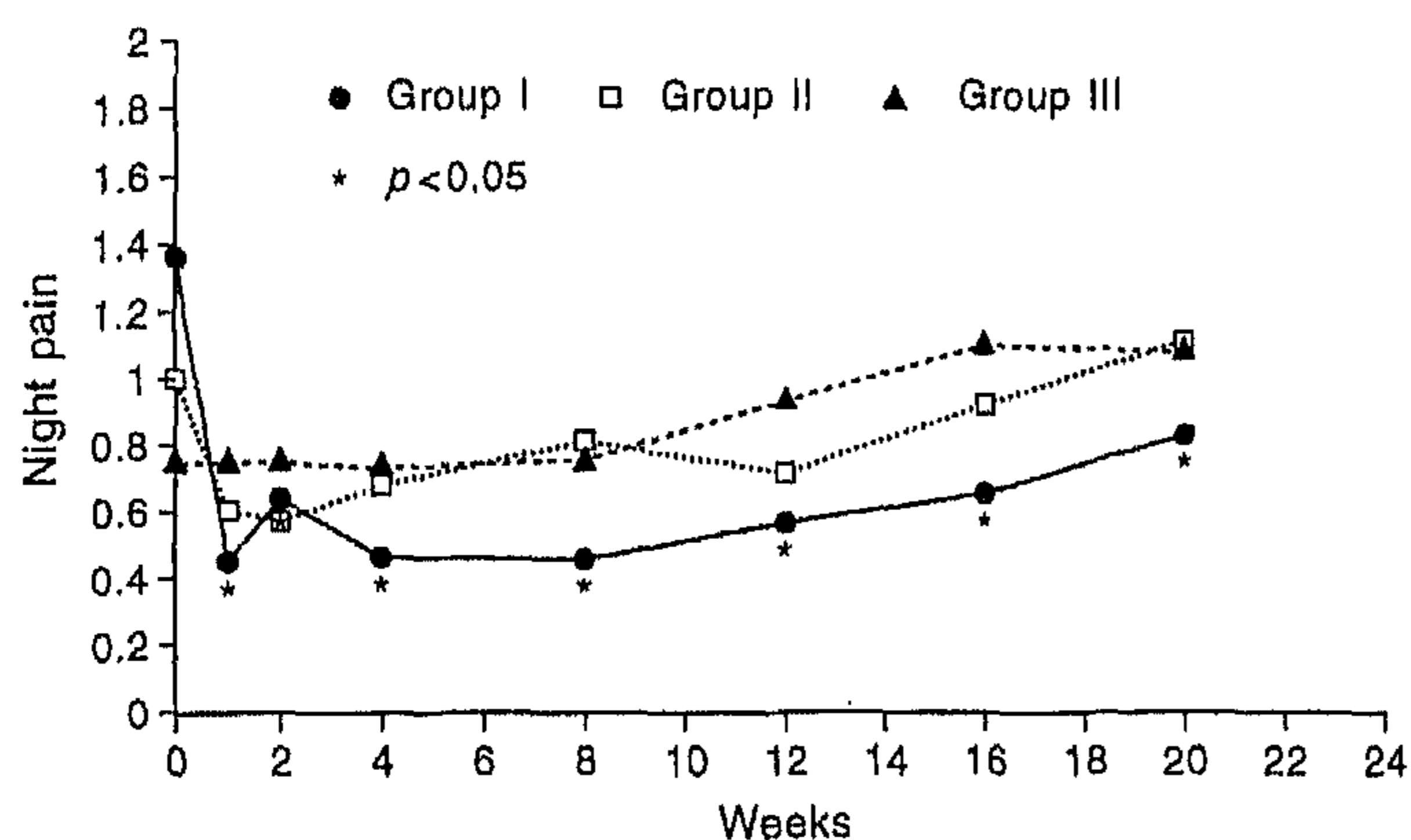


Fig. 3 Night pain

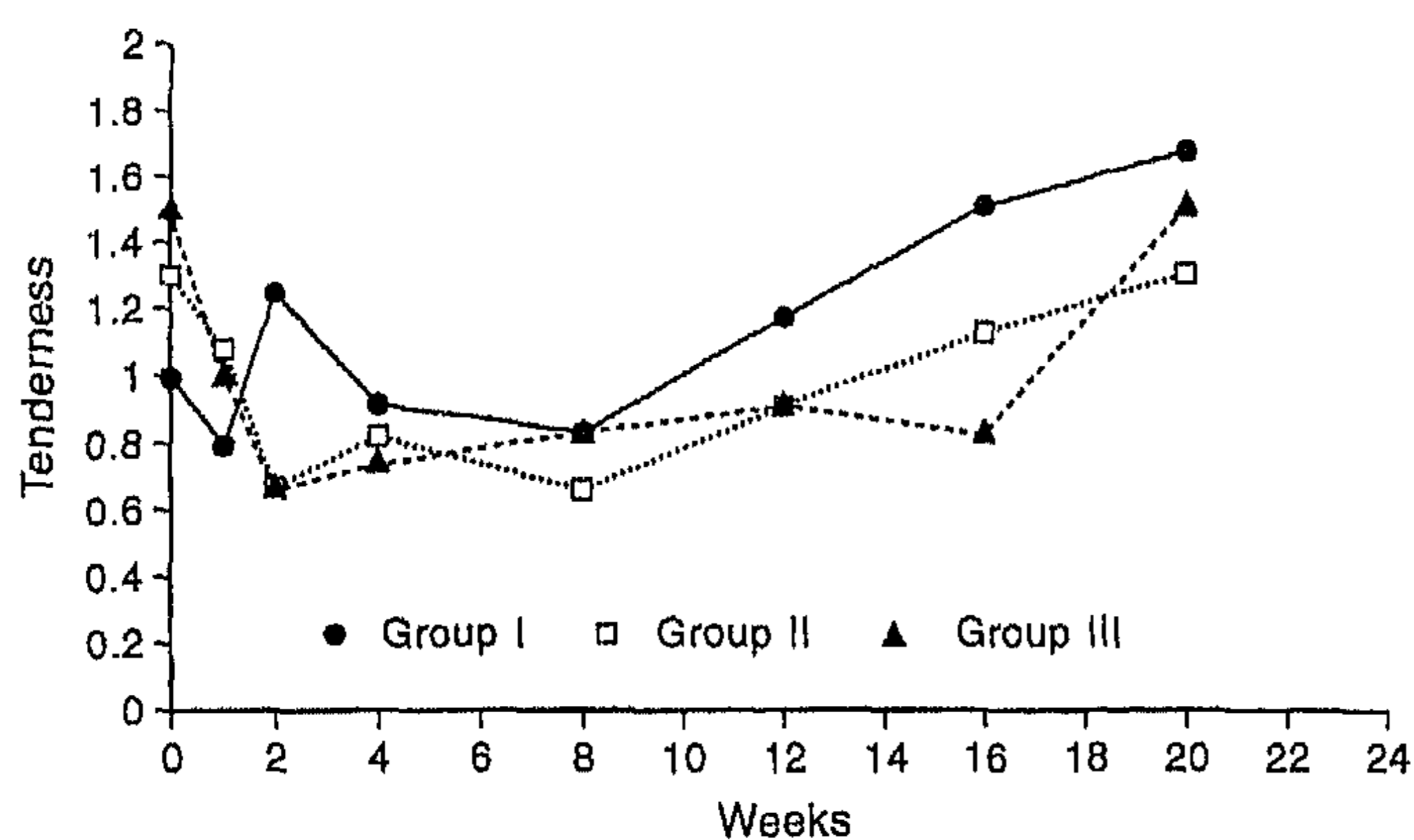


Fig. 4 Tenderness on palpation of the knee

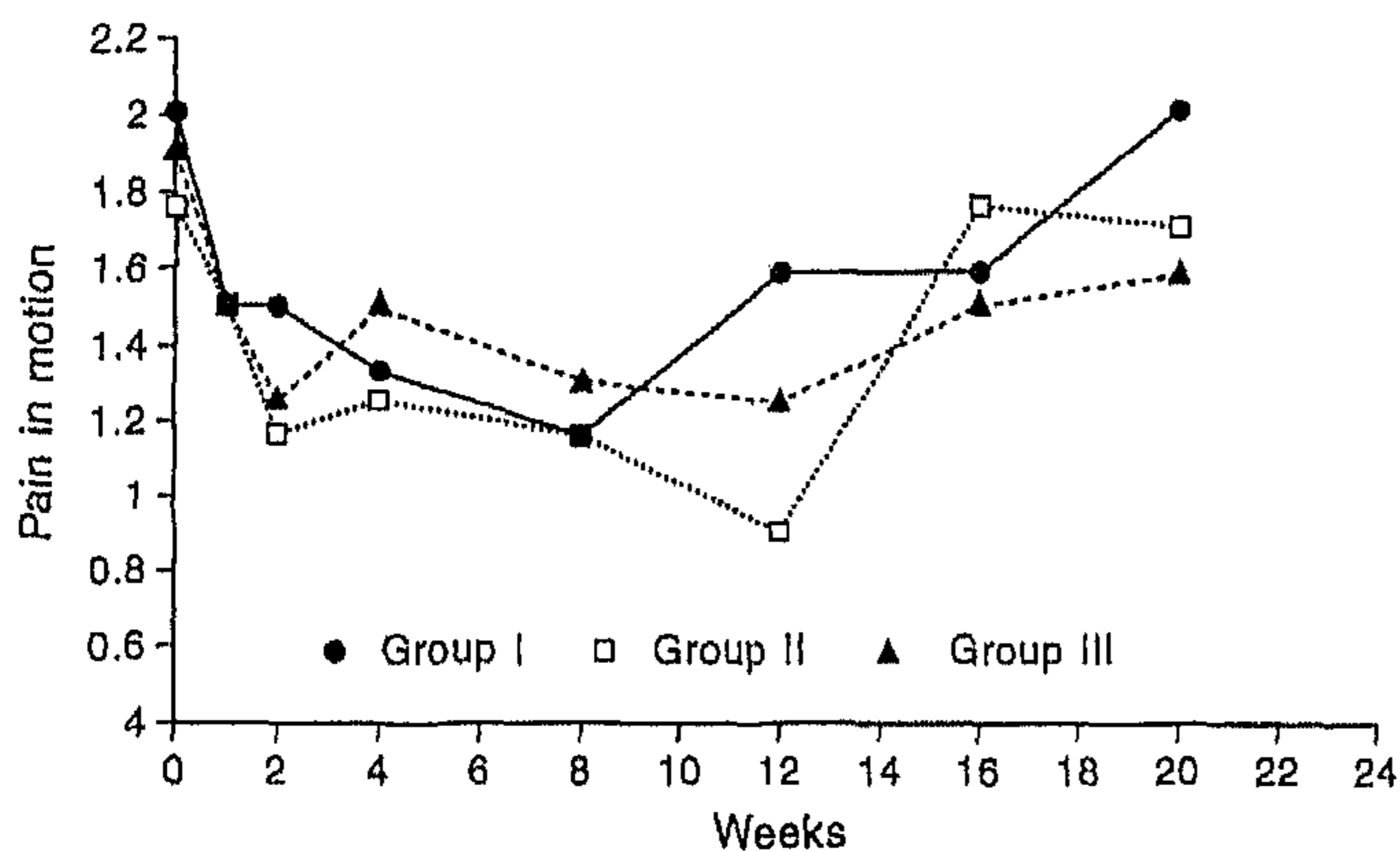


Fig. 5 Pain on passive motion of the knee

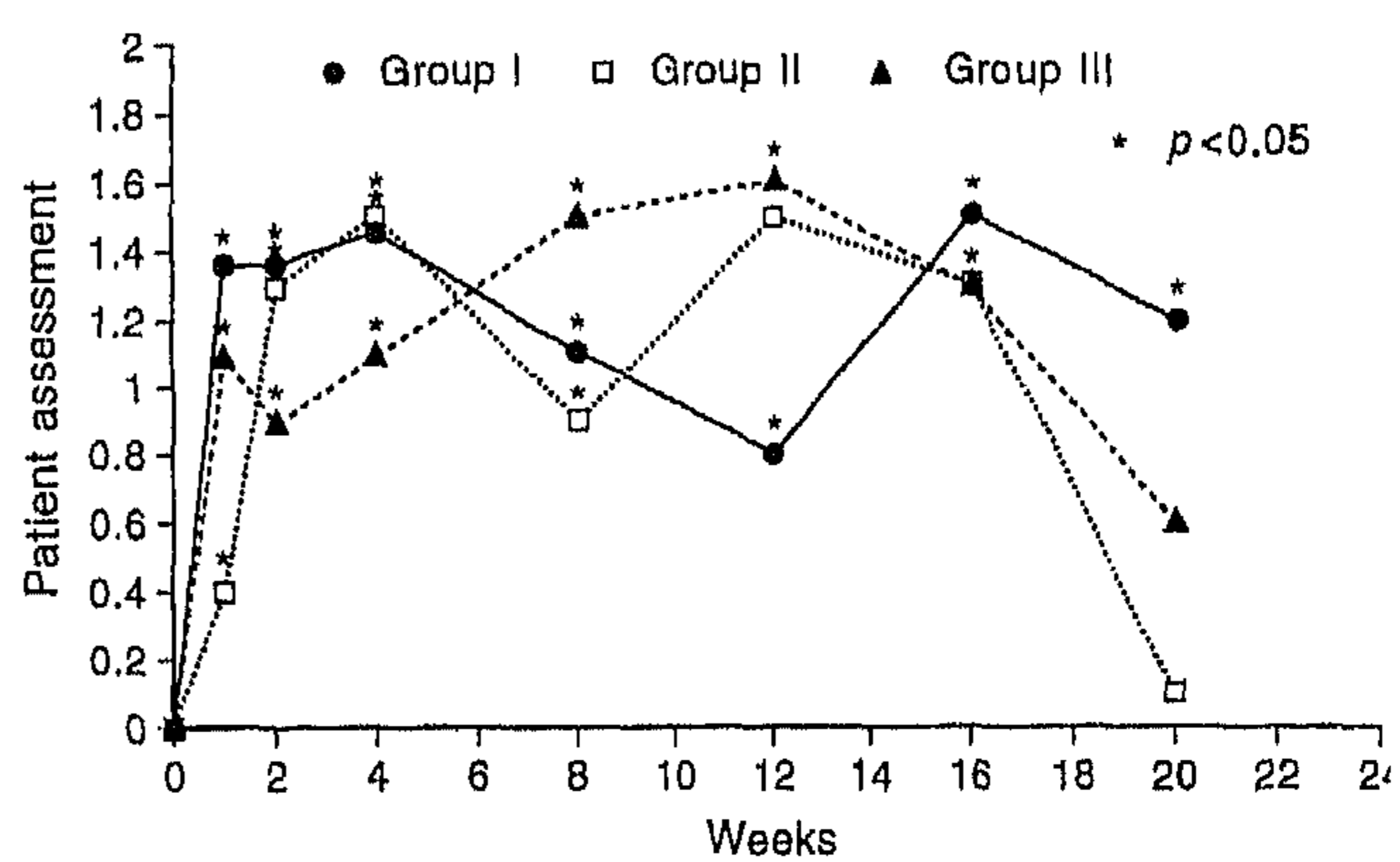


Fig. 6 Patient assessment of disease severity

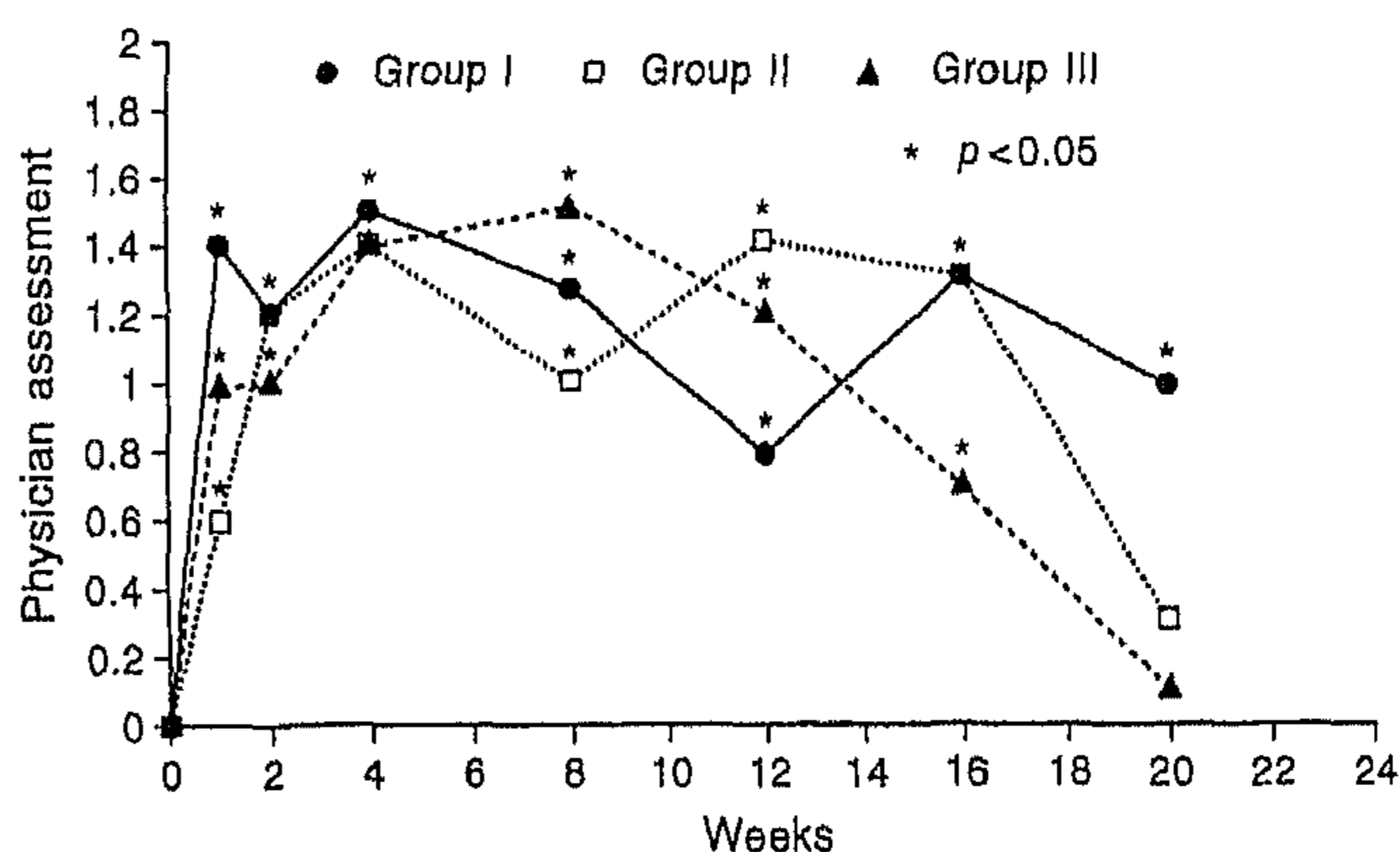


Fig. 7 Physician assessment of disease severity

Table 3 Analgesic drug consumption

Week	0	1	2	4	8	12	16	20
Group I								
Analgesics ^a	9	2	3	3	5	3	4	4
No analgesics	2	9*	8*	8*	6	8*	7	7
Group II								
Analgesics	6	4	5	5	4	5	5	4
No analgesics	4	6	5	5	6	5	5	6
Group III								
Analgesics	10	4	5	6	6	4	6	7
No analgesics	2	8*	7*	6	6	8*	6	5

* P < 0.05 (statistical analysis was done using chi square)

^a Non-steroidal anti-inflammatory drugs and common analgesics

the control groups; it was sustained until the end of the follow-up period for group I and until week 16 for the control groups.

Analgesic consumption (Table 3)

A significant decrease in analgesic consumption was found in group I and group III. This decrease was sustained un-

til week 12. As shown in Table 3, there was no difference between these two groups. There was no significant change in analgesic consumption in group II.

Side effects

No side effects were observed during the treatment period.

Discussion

Conservative treatment of OA is mainly based on physical therapy and analgesics or anti-inflammatory medications in order to provide relief of pain. Drug treatment is often accompanied by serious side effects, especially in older patients [4]. On the other hand, balneotherapy has been believed to be effective in the treatment of degenerative disorders of the joint, although this issue has not been well studied. The purpose of our study was to evaluate the short- and medium-term effects of mineral baths and mud packs in patients with OA of the knees. The results of this study showed that spa therapy in a Tiberias resort was effective and safe in patients who suffer from OA of the knee. Generally, better results were obtained in group I, which included patients who received warm baths and mud containing minerals. Regarding the ISK, significant improvement was achieved in group I after 1 week of treatment and was sustained until week 16; in group III, although a reduction was observed at weeks 8 and 12, it was transient and disappeared at the next follow-up. At the end of the follow-up period, the ISK returned to initial values in groups II and III, while in group I it was still lower. Most impressive was the improvement in night pain, which was observed in group I only and was maintained until the end of the follow-up period.

With regard to physician and patient assessments and analgesic consumption, significant improvement was observed in both group I and in the control groups. This was not totally unexpected as we know that rest and heat have a beneficial effect on OA. However, for the ISK and night pain, improvement was more impressive in group I, and this suggests that at least part of the improvement was due to the therapeutic virtues of balneotherapy. These results confirmed our previous observations [1] and are similar to those of Szucs et al. who have examined the effectiveness of the thermal water of Puspokladany on 62 patients with OA of the knee in a double-blind study [5]. At the end of treatment, thermal water decreased pain on movement and tenderness of the knees significantly compared with the control group. That study assessed the short-term effect of spa therapy on OA patients. In the present study, we found that significant improvement was maintained for 12 weeks in ISK values and other parameters (such as patient and physician assessment and analgesic consumption) and was sustained until the end of the follow-up period.

All the recruited patients completed the 2-week treatment programme, and we did not observe any deterioration in any of the groups. This is in contrast with a common belief that balneotherapy may exacerbate rheumatic symptoms [6]. Our results confirmed previous observations about the safety of balneotherapy [7, 1].

The mechanism by which spa therapy improves OA is not clear. Tiberias' hot mineral springs produce mineral water that flows from a depth of 2 km at a constant temperature of about 62 °C. It is rich in sodium chloride, sul-

phate, calcium and trace elements such as zinc and cobalt. Immersion in spa water causes many physiological changes such as significant diuresis [8] and haemodilution [9]. Muscle tone, joint mobility and pain intensity may be influenced by these hydromechanical and thermal stimuli. Trace elements such as zinc and copper may play a role in the therapeutic effect of spa therapy. However, it is not clear whether these elements can be absorbed through the skin [8, 10]. The observation that patients in group II (mineral baths and rinsed mud packs) improved less than those in group I suggests that mineral-rich and packs could play a role in the benefit on OA patients.

We concluded that mud packs and mineral baths are safe and effective for the short- and medium-term treatment of OA of the knee. The beneficial effect is in part due to rest and local heat, but it seems that balneotherapy in itself has a positive effect on OA patients. Further studies based on larger patient populations are needed to confirm our findings about the efficacy of these modes of treatment. Studies are also needed to clarify possible mechanisms of action of spa elements in patients suffering from OA or other rheumatic diseases.

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