

PAI 00886

## Chronic Headaches in Adolescents: Treatment in a School Setting with Relaxation Training as Compared with Information-Contact and Self-Registration

Bo Larsson \* and Lennart Melin \*\*

*\* Department of Child Psychiatry, and \*\* Department of Clinical Psychology,  
Akademiska Sjukhuset, 75 185 Uppsala (Sweden)*

(Received 9 November 1984, revised received and accepted 15 November 1985)

---

### Summary

An experimental study was conducted on 33 adolescent students with various types of chronic headaches (tension and combined tension and migraine headaches), all treated in a school setting. After a 4-week baseline period during which the subjects rated their headache activity, they were randomly assigned to a 9-session relaxation training programme or to an information-contact condition, both contrasted with an untreated self-registration group. Relaxation therapy alone led to significant improvement in headache activity, particularly in reduction of the frequency of complaints which still was significantly reduced at a 6-month follow-up evaluation. The effects obtained in the information-contact condition were comparable to those in the self-registration group, both achieving only minor improvements after treatment or at the follow-up assessment. The majority of students in the relaxation treatment, however, was much improved, attaining more than 50% reduction in headache activity.

The findings in the present study are consistent with results from similar treatment outcome studies, reported on adult populations with chronic headaches, and demonstrate that relaxation training programmes can be of substantial help in a school setting.

---

Requests for reprints should be sent to Lennart Melin, Dept. of Clinical Psychology, Box 1225, University of Uppsala, S-751 42 Uppsala, Sweden.

## Introduction

Chronic recurrent headaches of either the tension or vascular type are frequent in paediatric populations and health services, as reported from several investigations and different countries [5,11,18,20,23] and are usually managed by pharmacological and other medical procedures. Although very rarely, it occurs early in childhood [24] and increases steadily in prevalence throughout adulthood. Its prognosis, based on a few longitudinal [6,21] studies, has demonstrated that the chronic headache in children and adolescents is a relatively stable phenomenon. In the most extensive follow-up study so far published, Bille [6] reported that 60% of the subjects, diagnosed as migraine sufferers in childhood, were still troubled when at least 30 years of age.

The research efforts concentrated on the two principal, non-pharmacological treatments for chronic headaches [9], biofeedback and relaxation training, have been mainly applied to adult populations and conducted in clinical settings.

However, surprisingly few controlled outcome studies on either chronic headaches or some other types of chronic pain in children or adolescents have been conducted [25]. In a review [7] of the psychological assessment and treatment of chronic headaches, the authors concluded that only a few controlled treatment studies are available. Most of these studies consisted of case reports [2,3], where biofeedback had been successfully used in the treatment of migraine and tension headaches. In another report [26], contingency management reduced the headache complaints successfully. Using a group design format, two uncontrolled studies [12,14] have focussed on migraine in children. In one [12] of the studies a treatment package, consisting of different kinds of biofeedback, autogenic and relaxation training practised in the home, reduced the headache in 26 of 32 children, aged 9–18 years. Another study [14] investigated the relative contributions of 3 forms of group counselling, education and monitoring the children's diet, relaxation training and finally a non-directive psychological condition in a non-varied sequence design. Only the relaxation condition reduced the frequency of complaints in all treated children (4 boys, 4 girls) aged 8–11 years. The relative chronicity of headache symptoms, highlighted by the prognostic studies above [6,21], its early onset in childhood and thereafter increasing frequency throughout the years in school seem altogether to constitute strong arguments for devoting more attention to well-controlled treatment research in paediatric or adolescent populations.

In the present study, the effects of an untreated condition (self-registration only), information-contact and relaxation training administered in a school setting to adolescent students with chronic headaches were evaluated.

## Experimental design

Following a prevalence study, conducted in two Swedish highschools in Uppsala, students 16–18 years of age with different types of chronic headaches, were offered treatment which was given during regular school hours. After a baseline phase of at

least 3 weeks during which the subjects kept a headache diary, they were randomly assigned to a no-treatment condition (self-registration only), an information-contact group and a relaxation training group. The treatment phase encompassed 5–6 weeks, followed by a post-measurement period, covering 3–4 weeks. During post-treatment and at a 6-month follow-up evaluation, the students kept their headache diaries for a period of 4 weeks.

Thus, this study attempted to compare two active treatment forms to the effects of a regular contact with a professional person and systematic self-observation of the chronic headache symptoms.

## Subjects

In the investigation of headache prevalence ( $n = 1217$ ), 60% of the adolescents with a headache frequency of at least once per week, expressed their interest to participate in the treatment study. From this population 72 students attended an information meeting and during the following baseline phase 40 subjects dropped out. Finally, 32 students (30 girls and 2 boys), aged 16–18 years, completed their 4 weeks of baseline self-registration, having also fulfilled the inclusion criteria related to headache chronicity, consisting of a duration of more than 1 year and a symptom frequency of at least once per week. Diagnosis of headache type was based on the criteria suggested by Vahlquist [23]. A clinical interview with each subject, conducted by a child psychiatrist together with information from a standardized headache questionnaire [13], was the basis for the final clinical headache diagnosis. Two separate, independent diagnoses were made by the child psychiatrist and a child neurologist on selected students ( $n = 15$ ) and the overall agreement was 80%. The distribution of the 32 adolescents related to treatment group, sex, headache type and duration, is listed in Table I. No subject was excluded during the medical screening due to somatic diseases, e.g., acute infection. During treatment, however, one boy from the relaxation treatment group dropped out because of 'lack of interest' and

TABLE I  
TREATMENT GROUP, CLINICAL HEADACHE DIAGNOSIS, DURATION AND SEX DISTRIBUTION OF HEADACHE SAMPLE

Treatment group	Headache type		Duration (years) **			Sex		
	Combined	Tension	≥ 1–2	2–5	≥ 5	F	M	n
REL	2	9	7	3	1	10	1	11
INF	2	11	8	3	1	13	0	13
SR	1	6	4	2	0	7	0	7
Drop-out *	0	1				0	1	1
	5	27				30	2	32

\* The figures refer to drop-out during treatment.

\*\* Data unavailable for 3 subjects.

two girls in the information-contact group did not complete the last session, due to a school trip abroad.

## **Procedures**

### *Pre-treatment assessment*

Since psychological disturbance, particularly depression, among adult chronic headache sufferers has recently been shown to correlate with outcome of relaxation training [9,16], the students were given several psychological tests, aimed at assessing anxiety [19], depression [1] (a Swedish translation of Children's Manifest Anxiety Scale and the Achenbach self-report instrument for adolescents) and the experience of stress. Following the administration of these tests a medical-neurological examination was performed and baseline phase was initiated, during which the subjects started to keep a headache diary. In the diary, headache activity was recorded 4 times/day, using a 6-point scale ranging from 0, representing 'no headache,' to 5, representing 'intense, incapacitating headache.' Additionally, all medication was recorded. The students were encouraged to carry the registration cards with them during regular school hours. In order to increase motivation to follow the self-registration guidelines, a lottery was used in which the students each week on deliverance of the card to the school nurse had an opportunity to win 50 Swedish crowns, corresponding to \$6, and also smaller sums of money.

From the headache diary a set of different measures were derived on a weekly basis [2,3].

(a) Headache sum (being the 'total' measure of headache activity, since it combines frequency, intensity and duration of headache) was calculated by summing the values of the 28 (4 ratings/day for 7 days) weekly ratings.

(b) Headache frequency; the number of discrete headaches/week. To be scored as a headache, there had to be a rating of zero before and after each headache for that day.

(c) Headache-free days; number of days when no headache at all was scored.

(d) Headache duration; average length of discrete headaches/week.

(e) Peak headache intensity; the single highest intensity rating/week.

Additionally, all medicine (most commonly used acetylsalicylic acid and paracetamol) was recorded as the number of tablets consumed per week, without weighing their different potencies. In the randomization procedure, consideration was taken to the fact that the number of students recruited from the two separate schools was not evenly distributed. Therefore, in one school they were divided into 3 treatment groups, while in the second only into relaxation training and information-contact groups.

## **Treatment procedures**

### *Therapists*

The relaxation treatment groups were conducted by two graduate students in

clinical psychology, one female and one male, who also held the first sessions of the information-contact group. The following 5 sessions were held by the child psychiatrist with 10 years of clinical experience.

#### *Relaxation training*

After the 4 weeks of baseline registration, 11 students were given a 9-session relaxation training regime (REL), administered 45 min twice a week for 5 weeks, following the guidelines suggested by Bernstein and Borkovec [4]. The purpose of the procedures was to teach a rapid relaxation method, 'cue-controlled' or applied to be used regularly in everyday situations, e.g., at school or at home at early headache symptoms or increased bodily tensions, particularly in the head muscles. During the first 4 sessions, conducted within a group format of 3–4 individuals, the training was focussed on teaching discrimination between a tensed and relaxed state of different muscle groups throughout the body. In the following sessions the relaxation training was aimed at teaching and encouraging the students to apply the rapid relaxation technique paired with their breathing during which a cue word ('relax!') was subvocalized. The importance of regular home practise, at least twice a day, for 15–20 min, was continually emphasized by the therapists. Minor modifications, compared to the Bernstein and Borkovec manual, were made to tailor the treatment regime more to the students' everyday problems and needs. All sessions were conducted at the school nurses' offices in adjacent waiting rooms during regular school hours or recesses. No taped or written instructions were provided for the students throughout the study.

#### *Information-contact*

In order to control for the attention given by a professional person and the effects of medical advice, very often provided in regular health services, an information-contact group (INF), consisting of 12 adolescents, was included. During the first 4 sessions they met with the two psychologists and were informed about the outlines of the treatment, prevalence and sex differences in chronic headache, and in addition performed a behavioural analysis in which factors like stress and types of situations in which headache was likely to occur, were particularly noted. The information from this self-performed analysis was discussed with the students during the sessions without any direct suggestions from the therapist to change the situation. At the end of the first sessions the student's expectancies for therapeutic improvement were rated [10]. During the following 5 sessions, the child psychiatrist briefly discussed common psychological and physiological causes of migraine and tension headaches and finally summed up the results of each individual's medical examination and headache diagnosis. In line with the sessions conducted by the psychologists, no attempt whatsoever was made to give the students specific, individual advice related to their headache complaints and particular questions raised were answered deliberately on a general common sense level.

#### *Self-registration only*

Seven students in this group performed only pre- and post-self-registration (SR) and thus received no treatment. The child psychiatrist informed all of them by the

telephone concerning their group membership and their possibilities to seek help at regular school health service. However, no student used that opportunity or any other treatment facility during the pre-post-measurement periods.

#### *Post-treatment and follow-up*

At post-treatment and follow-up the students continued to keep their headache diaries for at least 3 weeks after completed treatment, a period coinciding with the last month of the school term. Moreover, the participants in the relaxation group were encouraged during the last session to continue to practise relaxation on a daily regular basis. Unfortunately, one student's registration cards in the information-contact group were lost during post-treatment measurement.

Six months after treatment a follow-up evaluation was conducted, based on 4 weeks of headache diary-keeping by the students, a period during which they were given a smaller sum of money corresponding to \$1.5/week contingent on delivering their registration cards to the school nurse. All of them took part in the follow-up phase, except one girl in the relaxation group who then was living abroad. Due to malocclusion two students, both from the information-contact group, had been treated by dentists before the evaluation.

## **Results**

#### *Pre-treatment assessments*

Separate one-way ANOVAs performed on the students' pre-test scores for the various headache activity measures, anxiety/depression or experience of stress revealed non-significant results, suggesting that the 3 groups were equivalent. Moreover, the credibility evaluations conducted prior to treatment showed equally high ratings of the students' perception of expectancies for improvement in the REL and INF groups ( $X = 30.33$  and  $X = 29.77$ , respectively). Similarly, no significant differences between the 3 groups regarding age, sex, clinical headache diagnosis or duration of headache were obtained in chi-square analyses.

#### *Effects of treatment*

*Headache activity measures.* Table II lists the mean values and percentage of improvement for each of the dependent variables related to headache activity (headache sum, headache frequency, headache-free days, peak headache intensity, headache duration) for the 3 groups during baseline, post-treatment and at the 6-month follow-up. In addition, the results of within-group comparisons based on differences between pre-follow-up scores on each of these variables by using paired *t* tests are presented in Table II. The pre- and post-treatment scores on the questionnaires assessing the students' stress experience across the various group conditions are shown in the same table. All dependent measures were subjected to split plot ANOVAs, calculated on the pre-post and pre-follow-up differences (gain scores).

#### *Headache sum*

ANOVA performed on the total sum of the weekly intensity scoring yielded a

TABLE II

RESULTS OF RELAXATION TRAINING (REL), INFORMATION-CONTACT (INF) AND SELF-REGISTRATION (SR) IN VARIOUS HEADACHE ACTIVITY PARAMETERS AND STRESS LEVEL

Group means, percent improvement <sup>a</sup> and within-group changes.

Treatment group	Base-line	Post-treatment	% improvement from baseline	Follow-up 6 months	% improvement from baseline	Within-group change (pre-FU) <i>t</i> values
<b>Headache sum</b>						
REL (n = 11)	31.8	10.6	67	18.9	41	2.77 *
INF (n = 13)	33.7	34.0	-1	29.9	11	0.69
SR (n = 7)	23.3	23.6	-1.6	19.7	15	0.62
<b>Headache frequency</b>						
REL	5.6	3.3	40	2.2	62	5.02 **
INF	5.1	4.5	10	4.2	16	1.90
SR	4.8	35.1	-6	4.2	11	0.79
<b>Headache-free days</b>						
REL	1.6	4.1	163	4.1	162	3.44 **
INF	2.3	2.6	15	2.9	29	1.49
SR	2.3	2.1	-8.7	3.0	31	1.48
<b>Headache duration</b>						
REL	2.5	1.6	37	2.2	14	1.11
INF	2.2	2.3	-2	2.3	-6	0.85
SR	2.2	2.4	-8	2.2	1	0.10
<b>Peak headache intensity</b>						
REL	3.4	2.6	22	3.1	9	0.97
INF	3.4	3.3	2	3.1	9	1.38
SR	3.1	3.1	4	2.7	14	1.29
<b>Stress</b>						
REL (n = 8)	27.0	22.3	17			6.14 <sup>b,***</sup>
INF (n = 11)	22.2	22.0	0			0.12
SR (n = 6)	28.0	27.0	4			1.94

\*  $P < 0.05$ ; \*\*  $P < 0.01$ .

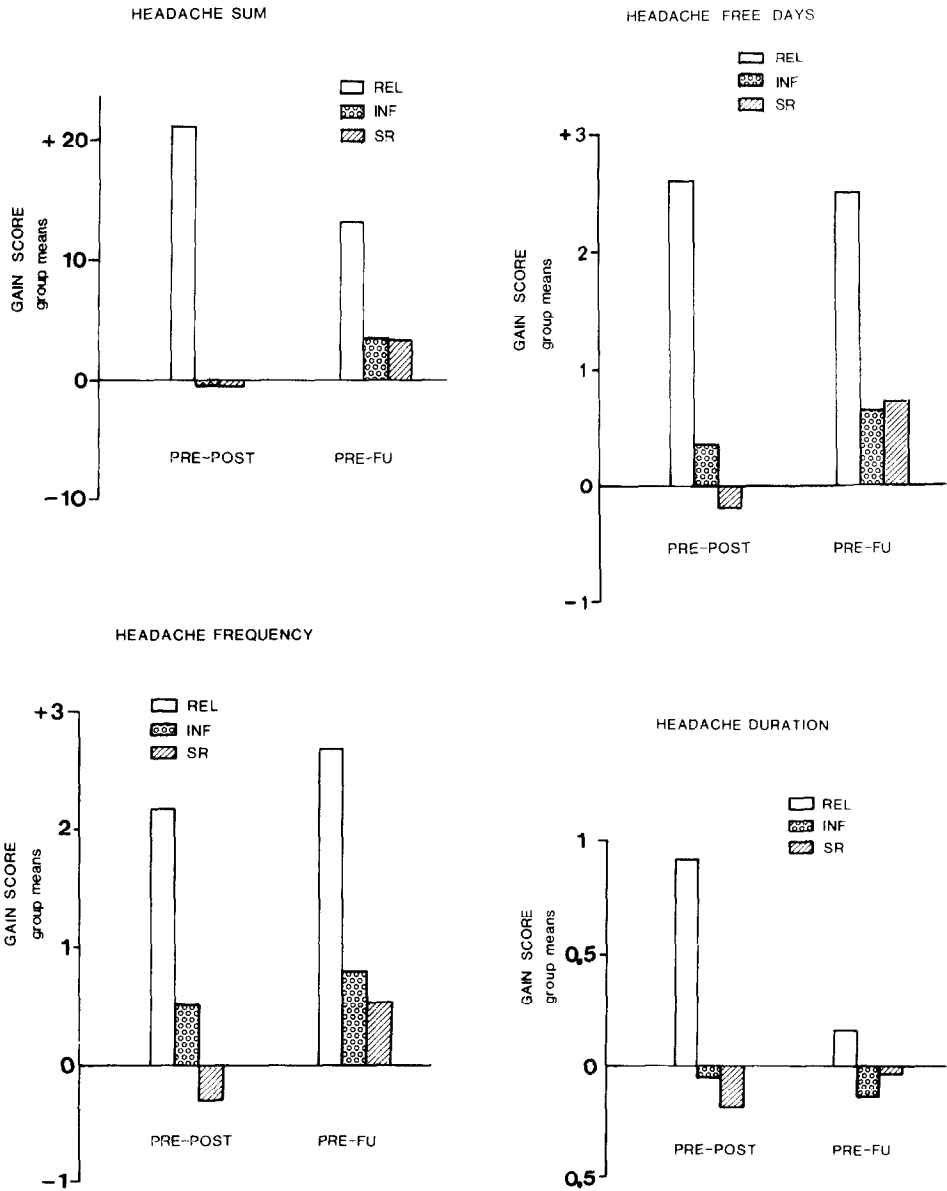
<sup>a</sup> Calculated by the formula: % improvement from baseline =  $\frac{\text{mean baseline level} - \text{mean period level}}{\text{mean baseline level}} \times 100$ .

<sup>b</sup> The within-group changes are calculated on pre-post differences.

significant overall difference between the groups,  $F(2, 28) = 4.16$ ,  $P < 0.05$ . A subsequent *a posteriori* test (Tukey's) was performed to locate where the difference between the groups occurred and it indicated that the REL group was significantly more improved than the INF/SR groups, but only between pre-post measurements ( $P < 0.01$ ).

#### Headache frequency

A significant difference in this variable between the groups,  $F(2, 28) = 6.4$ ,  $P < 0.01$ , was found and an *a posteriori* test revealed that the relaxation treatment



Figs. 1-4. Mean pre-post and pre-FU differences (gain scores) across the REL (relaxation), INF (information-contact), SR (self-registration) groups. + indicates a decrease, - an increase in headache activity as expressed in the various parameters.

achieved a significantly greater reduction than the SR group at both pre-post ( $P < 0.05$ ) and pre-follow-up ( $P < 0.05$ ) comparisons.

*Headache-free days*

On this measure the ANOVA revealed an overall significant difference between

the groups,  $F(2, 26) = 4.16$ ,  $P < 0.01$ . Tukey's *a posteriori* test indicated that the relaxation group was superior to both information-contact and self-registration groups ( $P < 0.05$ ), however, only at pre-post and assessment period.

#### Headache duration

The split plot ANOVA showed an overall significant difference between the 3 experimental conditions on this measure,  $F(2, 26) = 3.18$ ,  $P < 0.06$ .

#### Peak headache intensity

Although there is an obvious trend for the relaxation group to be superior on the peak headache intensity variable in the pre-post comparison, no significant difference between the groups in the ANOVA was obtained.

However, the results of the within-group analyses presented in Table II demonstrate significant pre-follow-up reductions in headache activity (headache sum, headache-free days and headache frequency), but only for the relaxation treatment approach.

*Medicine intake.* The weekly medicine intake revealed a non-significant tendency for both relaxation and information-contact groups to be superior to the self-registration condition. The average weekly intake of different types of tablets was estimated to roughly 2.5–3 tablets/week across groups and during different assessment periods. Thus, clinically the consumption of tablets was of minor importance.

*Stress experience, depression-anxiety.* A one-way ANOVA, performed on pre-post differences (gain scores) across the 3 group conditions, revealed an overall significant difference between the groups,  $F(2, 22) = 3.73$ ,  $P < 0.04$ , only on the stress experience variable. Additionally, the results of the within-group analyses (Table II) yielded a highly significant pre-post reduction of the students' experience of stress, but only for those treated with relaxation.

TABLE III  
OVERALL OUTCOME RESULTS ACROSS TREATMENT GROUPS

Percentage of improvement.

	Treatment group	Headache sum	
		pre-post *	pre-FU
Much improved ( $\geq 50\%$ )	REL (n = 11)	9	6
	INF (n = 13)	1	5
	SR (n = 7)	0	2
Slightly improved (0–49%)	REL	2	3
	INF	4	4
	SR	4	3
Unimproved or worse ( $\leq 0\%$ )	REL	0	2
	INF	8	4
	SR	3	2

\*  $P < 0.05$ .

A more clinically meaningful way of testing efficacy suggested [15] is to examine the proportion of individuals in relation to their varying degrees of improvement or deterioration respectively as expressed in the different headache parameters. In Table III is shown the number of students in each treatment condition who achieved such a clinically meaningful reduction of their headache complaints, defined as a 50% change or more, and those who did not. Chi-square analyses performed on the 'total' measure of headache activity, headache sum, revealed significant differences between the groups in favour of the relaxation group.

Due to the relatively small sample, no attempt was made to test for differential effects in relation to clinical headache diagnosis.

### **General discussion**

The results from the present study on adolescents with different types of chronic headaches, particularly of tension type, show that these problems can be effectively treated in a non-clinical school setting. These findings are in line with the results of previous outcome studies [7] conducted on adult populations with the same type of chronic headaches, but generally treated in clinical settings. Moreover, recent reports [17,22] show that a home-based relaxation approach may be as efficacious as a clinically delivered treatment.

In this study relaxation training was also shown to affect all dimensions of the students' headache complaints, but particularly the frequency of headache in comparison with both information-contact and self-registration conditions. The results were, however, somewhat weakened at a 6-month follow-up evaluation. Due to this type of controlled design, these results should be considered rather conclusive.

The small sample size of combined tension and migraine sufferers did not permit any detailed analysis of differential effects related to clinical headache diagnosis. The larger proportion of students, diagnosed as chronic tension headache sufferers in the present study, reflects the higher prevalence of this particular type of headache in adolescent populations. Outcome data on adults with chronic headaches [8,9] indicate, however, that relaxation training is probably less effective for combined tension and migraine headache than for pure tension headache.

Although relatively inexperienced therapists and a standardized number of sessions were used in our study, most students in the relaxation group obtained a reduction in their headache complaints, which clearly was of clinical importance. However, no student was completely symptom-free at follow-up evaluation. In spite of equally high expectations in information-contact and relaxation groups prior to treatment, a lack of effect in the information group points out that non-specific factors might be of minor importance in the treatment of adolescent chronic headaches. This finding is in line with the average improvement reported for psychological placebo conditions used in the treatment of adult tension (35%) or migraine (27.6%) headaches [7]. Another notable finding is the significantly reduced stress experience among the students in the REL group as compared to the other conditions, as this dimension was not a prime target in the treatment, indicating a

general feeling of reduced work load achieved by the rapid relaxation approach employed in the study.

A practical problem related to the implementation of relaxation technique might be worthwhile considering. In the REL group some adolescents had obvious difficulties in finding relevant and easily identified cues for application, and follow-up evaluations, partly made by telephone, revealed that only a few subjects still practised their attained relaxation skills. Further efforts in research to concentrate on finding effective means to increase the adolescents' motivation to continue practising an earlier well-learned relaxation technique to create more stable treatment effects seem to be necessary.

The findings of the present study and others [7] suggest that relaxation training mainly affects the frequency dimension of headache activity.

Thus, the effects of the regime seem to be an 'all-or-none' phenomenon. Two possible explanations for this finding might be proposed. The first one is that students learn to abort headache in some specific situations but not in others, the second is that they occasionally do not apply the technique at all. From the results in our study it is impossible to discriminate between those two suggested explanations, but as the development of relaxation training methods is dependent on which of the two that is plausible, this is an important question that needs to be further addressed.

### Acknowledgements

This research was supported in part by a grant from the Swedish Board of Education (Skolöverstyrelsen).

We gratefully express our appreciation to the therapists Eva Fristorp-Wasteby and Timo Laaksonen; to Dr. David Henley for assisting in reliability checks on clinical headache diagnosis.

### References

- 1 Achenbach, T.M. and Edelbrock, C., *Manual for the Child Behavior Checklist*, Univ. of Vermont, Burlington, VT, 1983, pp. 162-168.
- 2 Andrasik, F., Blanchard, E.B., Edlund, S.R. and Rosenblum, E.L., Autogenic feedback in the treatment of two children with migraine headache, *Child Fam. Ther.*, 4 (1983) 12-23.
- 3 Andrasik, F., Blanchard, E.B., Edlund, S.R. and Attanassio, V., EMG biofeedback treatment of a child with muscle contraction headache, *Amer. J. clin. Biofeedback*, 6 (1983) 96-102.
- 4 Bernstein, D.A. and Borkovec, T.D., *Progressive Relaxation Training*, Research Press, Champaign, IL, 1973.
- 5 Bille, B., Migraine in school children, *Acta paediat. (Uppsala)*, 51, Suppl. 136 (1962) 1-151.
- 6 Bille, B., Migraine in childhood and its prognosis, *Cephalalgia*, 1 (1981) 71-75.
- 7 Blanchard, E.B. and Andrasik, F., Psychological assessment and treatment of headache: recent developments and emerging issues, *J. consult. clin. Psychol.*, 50 (1982) 859-879.
- 8 Blanchard, E.B., Andrasik, F., Arena, J.G., Neff, D.F., Saunders, N.L., Jurish, S.F., Teders, S.J. and Rodichok, L.D., Psychophysiological responses as predictors of response to behavioral treatment of chronic headache, *Behav. Ter.*, 14 (1983) 357-374.

- 9 Blanchard, E.B., Andrasik, F., Neff, D.F., Arena, J.G., Ahles, T.A., Jurish, S.E., Pallmeyer, T.P., Saunders, N.L., Teders, S.J., Barron, K.D. and Rodichok, L.D., Biofeedback and relaxation training with three kinds of headache; treatment effects and their prediction, *J. consult. clin. Psychol.*, 50 (1982) 562–575.
- 10 Borkovec, T.D. and Nau, S.D., Credibility of analogue therapy rationales, *J. behav. Ther. exp. Psychiat.*, 3 (1972) 257–260.
- 11 Deubner, D.C., An epidemiologic study of migraine and headache in 10–20 year olds, *Headache*, 17 (1977) 173–180.
- 12 Diamond, S. and Franklin, M., Autogenic training with biofeedback in the treatment of children with migraine, *Ther. psychosom. Med.*, (1975) 190–192.
- 13 Ekblom, K.A., Ett frågeformulär vid diagnos av kronisk huvudvärk, *Forskn. Praktik (Sandoz)*, 8 (1976) 113–120.
- 14 Green, B.J. and Sallade, J.B., Group counseling with children who have migraine headaches, *Element. Sch. Guid. Counsel.*, 15 (1980) 87–89.
- 15 Hugdahl, K. and Öst, L.-G., On the difference between statistical and clinical significance, *Behav. Assessm.*, 3 (1981) 289–295.
- 16 Jacob, R.G., Turner, S.M., Szekely, B.C. and Eidelman, B.H., Predicting outcome of relaxation therapy in headaches; the role of 'depression,' *Behav. Ther.*, 14 (1983) 457–465.
- 17 Jurish, S.E., Blanchard, E.B., Andrasik, F., Teders, S.J., Neff, D.F. and Arena, J.G., Home- versus clinic-based treatment of vascular headache, *J. consult. clin. Psychol.*, 51 (1983) 743–751.
- 18 Öster, I., Recurrent abdominal pain, headache and limb pains in children and adolescents, *Pediatrics*, 50 (1972) 429–436.
- 19 Reynolds, C.R. and Richmond, B.O., What I think and feel: a revised measure of children's manifest anxiety, *J. abnorm. Child Psychol.*, 6 (1978) 271–280.
- 20 Sillanpää, M., Prevalence of migraine and other headache in Finnish children starting school, *Headache*, 15 (1976) 288–290.
- 21 Sillanpää, M., Changes in prevalence of migraine and other headaches during the first seven school years, *Headache*, 23 (1983) 15–19.
- 22 Teders, S.J., Blanchard, E.B., Andrasik, F., Jurish, S.E., Neff, D.F. and Arena, J.G., Relaxation training for tension headache; comparative efficacy and cost-effectiveness of a minimal therapist contact versus a therapist-delivered procedure, *Behav. Ther.*, 15 (1984) 59–70.
- 23 Vahlquist, B., Migraine in children, *Int. Arch. Allergy*, 7 (1955) 348–355.
- 24 Vahlquist, B. and Hackzell, G., Migraine of early onset. A study of 31 cases in which the disease first appeared between 1 and 4 years of age, *Acta paediat. (Uppsala)*, 38 (1949) 622.
- 25 Varni, J.W., Katz, E.R. and Dash, J., Behavioral and neurochemical aspects in pediatric pain. In: D.C. Russo and J.W. Varni (Eds.), *Behavioral Pediatrics*, Plenum Press, New York, 1982, pp. 177–224.
- 26 Williamson, D.A., Behavioral treatment of headache. In: M. Hersen, R.M. Eisler and P.M. Miller (Eds.), *Progress in Behavior Modification*, Vol. II, Academic Press, New York, 1981, pp. 163–201.