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# PSYCHOLOGICAL INTERVENTIONS FOR PATIENTS WITH CHRONIC BACK PAIN

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BEHAVIOURAL SCIENCE  
LEARNING MODULES

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## PSYCHOLOGICAL INTERVENTIONS FOR PATIENTS WITH CHRONIC BACK PAIN

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### Introduction

The problem of chronic pain, at least in the Western world, has reached alarming proportions and now exhausts considerable economic resources. Statistics from a number of countries show that back pain is a leading consumer of health-care, early retirement and compensation payments (Andersson, 1981; Ergonomics, 1985; Linton, 1987). As an example, low back pain accounts for roughly 25% of all sick absenteeism in these countries. Not in the least, back pain causes extensive problems for the individual sufferer. Family welfare, personal economy, self-esteem, lifestyle, social content and satisfaction are all variables that may be affected in addition to enduring the pain experience itself.

Despite the urgency of the chronic pain problem, it has been difficult to develop adequate medical treatments. Although medical treatments are typically effective in alleviating acute pain, problems in diagnosing pathology in chronic pain have resulted in a large array of relatively ineffective treatment methods. One conclusion that has become clear during the past two decades is that medical methods for relieving acute pain do not necessarily work for chronic pain and some may in fact be contraindicated. For instance, surgical treatments are ordinarily counterproductive and only a very small minority of patients may be successfully

treated with these methods (e.g. Nachemson, 1983). Analgesics may be very helpful for acute pain problems, but prolonged use may lead to dependency problems. Consequently, most medical treatments for chronic back pain are either ineffective or have little evidence concerning their effectiveness (e.g. Nachemson 1983). It is also clear that most patients continue to suffer from pain problems and functional impairments and do not return to pre-pain levels of functioning even if they have experienced improvements after medical treatments.

While conventional medical treatments have had difficulties in successfully managing chronic pain problems, recent advances in the behavioural sciences have provided new insights into the syndrome. One result has been to consider chronic pain as a multifaceted phenomenon where behavioural processes are central, rather than viewing pain simply as a neurophysiological state. (See figure 1.) Early books on the subject (Fordyce, 1976; Sternbach, 1974) stressed that pain involved several behaviours and that these behaviours could be influenced by systematically applying the principles of learning. Today, behavioural programmes for the treatment of chronic pain have been incorporated into a large number of rehabilitation clinics and are deemed to be effective.

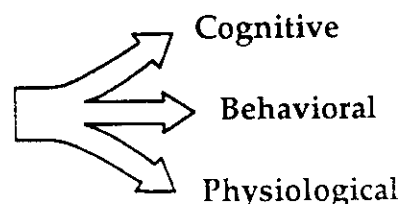
### Culture

### Family

Sensory signal



PAIN



Learning  
Depression  
Anxiety

Figure 1. The modern model of pain

## What is chronic back pain?

An extremely important distinction is made between acute and chronic back pain. Acute pain usually occurs as a result of a definable trauma (even if it is minor e.g. picking up a piece of paper) and disappears when the injury has healed. The duration of the acute stage is ordinarily a maximum of three weeks. Acute pain serves a very useful purpose, warning that tissue damage has occurred and this "motivates" the person to take appropriate action.

A *subacute* transition period is said to occur after approximately three weeks and extends to three months time. The subacute period is believed to be of vital importance in the development of chronic pain (Fordyce, 1976; Linton, 1987).

Intractable or **chronic** back pain, on the other hand, is quite different from acute or subacute pain. For the purposes of applying these interventions, the pain should have persisted for at least three consecutive months even though healing should have occurred. Other causes for persistent backache such as tumours, osteoporosis and congenital defects have been ruled out by a consultant physician. Under these circumstances, chronic pain does not seem to serve a biological "warning signal" function, but may in some cases be a result of secondary pain behaviour. Typically, the patient gradually develops an increasing number of symptoms. These include functional disability, over-use of medications, sleep disturbances, decreased social activity, and detrimental changes in pain intensity, type, and location.

Chronic pain is interesting because the time involved in the development of the problem allows for much learning. Moreover, the health-care system, family and friends may reinforce so-called "pain behaviours" so that these behaviours increase in frequency. Thus, although the patient may have little or no pathology, the experience of pain and the pain behaviours persist. The way the patient attempts to control his/her pain, that is their coping, often is successful in reducing short-term pain and discomfort, but is ineffective or even contributes to rehabilitation problems in the long term.

### Definition

For purposes of the treatments discussed in this document, chronic back pain is defined as pain from the back which persists at least three months. Although headache, neck and shoulder pain may be related, they are not included, since distinct behavioural-medical treatment regimes for these problems are available.

Exclusion criteria for the treatment being considered are:

- Presence of a clean cut physical cause of backache.
- Presence of serious mental illness e.g. major depression or psychosis.
- Presence of terminal disease.
- Presence of marked learning difficulties.
- Lack of functional disability i.e. the activity level is normal despite the pain.
- Other treatments are available and of greater interest to the patient.

## Psychological interventions

The treatment of chronic backache ordinarily takes place in a comprehensive treatment context which includes a number of health-care providers. The most thoroughly researched psychological methods which have demonstrated their efficacy are the *cognitive-behavioural* methods (e.g. Linton, 1986; Pearce and Erskine, 1989). These treatment procedures have been derived from cognitive and behavioural theories of pain and behaviour. In this section, five of the most common techniques will be briefly reviewed: relaxation, operant, cognitive, social training, and coping therapies.

### Relaxation therapies

There are many forms of relaxation therapy. These include muscular biofeedback (EMG biofeedback), progressive relaxation, cognitive relaxation, applied relaxation, cue controlled relaxation, autogenic training, and meditation. Relaxation therapy is probably the most frequently used treatment in cognitive-behavioural pain programmes.

The aim of relaxation therapy is either to reduce muscle tension and thereby break the tension-pain cycle, or to provide the patient with an effective method of controlling the pain. The latter involves the use of relaxation as a coping strategy, and is an active method designed to be used in everyday situations rather than in a hospital or while lying in bed. Since some basic research has shown that having control over pain is directly related to pain perception, there is an increasing trend of applying relaxation as a coping strategy. As a result, the aim of such relaxation training is not merely to reduce tension or pain (although both are considered very important), but to provide a coping strategy that allows the patient to function better.

The efficacy of relaxation therapy for chronic back pain conditions has been researched and its value confirmed in reducing pain intensity, increasing activity and decreasing medication use (e.g. Linton, 1986; Turner, 1982; Tunks, 1988). Biofeedback has produced mixed results and may be too simplistic an approach for such a complex problem. Pearce and Erskine (1989) conclude that "as a general rule there seems little reason for routinely including it in a pain programme" (p.96).

### Operant techniques

Operant techniques are based on learning and are aimed at identifying problem behaviours and modifying them by means of reinforcement delivery. Fordyce (1976) developed the classic operant programme which included measures for decreasing medication intake, pain levels and pain behaviours and increasing activity levels. For example, rather than providing attention for inactivity, an operant programme might reinforce activity by providing attention and feedback contingent upon a specific activity increase. Pain behaviours are viewed as any other behaviours might be and therefore they may be modified by appropriate learning methods.

### Activities training

One problem which has been found to be extremely prevalent with chronic pain patients is functional disability. Almost all patients complain that they are unable to participate normally in many everyday activities (e.g. Linton, 1985). Moreover, many chronic back pain patients have very low activity levels and are in poor physical condition compared to healthy people of the same age and sex. Although one would anticipate an increase in activity level when pain is decreased, this is not always the case: low activity levels may become a problem in itself for chronic back pain patients. Research evidence indicates, for example, that although patients believe there is a clear relationship between their pain and their functional disability, there is in fact little relationship (Fordyce et al., 1981; Linton, 1985; Nachemson, 1983).

The aim of activities training is to increase the patient's activity level. As a consequence, disability levels and fear should decrease, physical fitness and body image should improve. Programmes typically select target activities and subsequently reinforce increases according to a quota system. The quota system involves measuring pretreatment levels of the target activity and then gradually increasing the activity

by setting a "quota". If the quota is successfully reached, the increase is reinforced by providing for example feedback and verbal praise. It is also important to point out that initial quota levels are at approximately the baseline level to ensure success and quotas are increased in very small steps.

Scientific research shows that operant activity training is very effective in increasing activity levels (Bradley, 1983; Keefe, 1982; 1988; Linton, 1986; Pearce and Erskine, 1989; Tunks, 1988). Indeed, increases of 50 to several hundred percent are commonly recorded. At the same time, moderate improvements in pain intensity, depression, medication intake and sleep quality are regularly reported in connection with activities training. Consequently, activity programmes have become a staple in cognitive-behavioural back pain treatment programmes. It is very important to underscore the fact that activity increases have not been found to increase pain intensity for chronic pain patients. On the contrary, activity increases are almost always associated with decreases in pain intensity ratings.

### Medication reduction

Another common problem in the chronic back pain syndrome is medication overuse. In its worst form, patients become addicted to narcotic pain killers. Sadly, patients who become dependent or addicted to medications do not experience adequate pain relief and consequently suffer from the pain as well as from the side-effects of the drugs. Overuse of medications may be in part related to health-care access. The easier the access to the medications, the more overuse. Statistics concerning sales indicates a very high consumption rate in Europe and North America.

The problem develops since pain medications reduce pain in the short term. Patients become dependent, since the behaviour of taking medication is reinforced by pain relief. Since the medication loses its pain relieving potency very gradually, the patient may not be aware of this and in essence continues to take the medication from learned "habit" or to relieve side-effects/withdrawal. Moreover, patients are ordinarily instructed to take pain medications "as needed" which strengthens the learning association between having pain and taking medicines. Whereas the "as needed" approach is recommended when dealing with cancer pain, it seems unwise for chronic back pain.

Behavioural treatment has centred on the "pain cocktail" technique (Fordyce, 1976). In this method, pretreatment levels of medicine consumption are first determined and the

programme is discussed with the patient. Subsequently, medicines are suspended in a thick, strong tasting liquid which camouflages the type and amount of pain killer. Thus, the patient does not know the exact content of the medicine being consumed. The amount of medication is then systematically reduced.

A critical aspect is that the medication is provided on a *time contingent* rather than *pain contingent* basis. Ordinarily, patients take pain killers as needed up to a certain limit (e.g. two tablets, four times a day). Thus the taking of medication is based on (is contingent upon) pain. A time contingency associates the taking of pain killers to the time of day (e.g. 8:00, 12:00, 16:00) rather than the pain. Consequently, it is less likely that the patient learns, "by habit", to take pain medications every time he/she experiences pain, and therefore the risk for overuse is reduced.

Recent variations on this technique allow it to be used with outpatients and without masking the medications in the cocktail. In this method, decreases in medication level are tried for a period of one-week and evaluated in conjunction with pain intensity ratings. Decreases are continued until no medications are being given or until pain ratings begin to increase. Consequently, while an "optimization" theoretically allows for an increase in medication levels, results show that this is virtually never needed (Linton and Götestam, 1984; Götestam and Linton, 1985).

Investigations into operant medication management programmes have demonstrated both statistically significant and clinically significant reductions in medication intake. Even with patients that are not addicted or dependent on medications, the programme has been shown to be effective in decreasing medication usage. Furthermore, this occurs at the same time as pain intensity levels decrease. Therefore, decreases in analgesic levels do not result in increases in pain.

### Cognitive strategies

Cognitive methods have been divided into two broad categories: those dealing with stress, and those modifying pain-related cognitions. The stress-oriented techniques have already been discussed in the section on the relaxation therapies (techniques trying to decrease muscle tension). By and large, cognitive methods designed to alter subjective aspects of the pain experience have developed from laboratory studies (Pearce, 1983; Turk, Meichenbaum and Genest, 1983). As a result, the cognitive techniques have almost exclusively been tested with laboratory produced, acute pain, but they have also been clinically applied to chronic pain.

There are a large number of possible techniques, some of the most frequently used are described below.

*Imaginative inattention* involves thinking about something incompatible with the pain experience e.g. relaxing in a beautiful quiet place on holiday. In *transformation of context* on the other hand, the task is to imagine that the pain is actually occurring but under different, more appropriate circumstances. Thus, one might imagine being a mythically strong person experiencing back pain while saving people, for instance, holding up a bridge filled with cars and people. Since the pain would be associated with a positive affective state rather than fear, anxiety or depression, the pain might be reduced. *Attention diversion* is another common method where attention is oriented towards another task e.g. counting or reading. The idea seems to be based on the fact that acute pain is greatly modified in certain situations that require tremendous concentration e.g. injuries during a battle or during a competitive sporting competition.

The results of purely cognitive techniques has been difficult to document. However, laboratory work has failed to show that any specific technique is more effective than others.

### Social training and assertiveness

The chronic pain patient may become socially withdrawn due to a lack of social skills or assertiveness. Social skills training aims at increasing adequate social behaviour and often is directed toward situations at work or home as well as other situations requiring social competence. Assertiveness training is similar, but focuses more on communication skills. In particular, the ability to say "no", to state wants and feelings clearly, and to compromise, are all stressed. These procedures were originally applied mainly to the treatment of alcoholism. However, by teaching chronic back pain patients better social, assertiveness, and communication skills it is hoped that this will enhance their quality of life and thereby reduce their pain problem. Since these procedures are ordinarily combined with other treatments for pain, little is known about their effectiveness with chronic back pain patients.

### Coping strategies approach

This approach combines the cognitive-behavioural techniques described above and adds the aspect of how a patient interprets his/her pain problem. It has been shown that chronic back pain patients, for example, often

have passive methods of dealing with their pain (Rosentiel and Keefe, 1983). However, these passive, and generally ineffective methods (e.g. hoping the pain will go away, resting) may be replaced by more effective and active methods.

Coping skills training helps patients to identify their methods of dealing with pain and might include new methods of interpreting their situation, applying relaxation, and introducing an activities programme. Specific quotas and techniques would be set out. Furthermore, very specific situations would be identified where these techniques should be used. Finally, the techniques would be practiced during the therapy to ensure their proper and successful use. Many therapists believe that coping is a key to treatment success, since it activates the patient and deals with core issues such as the patient's beliefs about his/her pain and resulting disability.

The coping approach is most often used as a multidimensional treatment for chronic back pain. As such there are few studies which specifically call their treatment "coping". Nevertheless, as the relaxation section indicated, there is some evidence that coping may be useful.

### **Activities training enhances physical therapy**

Although the operant activities training method has close ties to traditional physical therapy, it is nonetheless a distinctly different technique. Furthermore, there is substantial evidence that employing the operant activities training programme will enhance the results of physical therapy. Cairns and Pasino (1977) compared, for example, physical therapy "as usual" with the operant activities programme and found that the operant programme produced activity increases approximately twice as large as did "normal" physical therapy. Sanders (1983) as well as Linton, Melin, and Stjernlöf (1985) have also found that the activities programme produces very substantial improvement.

Another good reason for selecting the activities training programme is its ease of administration in the physical therapy setting. While instruction in this technique is essential for its proper use, the techniques do not appear to be as difficult for non-psychologists to administer as most other psychological techniques. A special concern when non-psychologists are using "psychological" methods is competency. Health-care professionals who do not understand the underlying purpose or theory of a given treatment may have difficulty in dealing with clinical problems that arise. At worst, this may result in complications for the patient. In the

case of operant activities training, the chance of "misuse" is not judged to be large, and the consequences of failure to comply with proper administration practices would not be thought to be serious. Thus, one advantage of the operant activities programme would be that it is relatively easy to teach to non-psychologist, health-care professionals.

Another advantage to the operant activities training programme is that it requires no special equipment or place of administration. Usually the patient will be instructed in the hospital or clinic, but a considerable part of the training may occur in other settings e.g. at home. The activities selected will depend on the patients' needs, but are not necessarily typical physical therapy exercises. Rather, everyday activities, including social ones may be selected as target activities. Consequently, the technique is not limited to any particular setting or equipment.

### **Patient selection: who benefits?**

The operant activities programme has been shown to be of benefit to a wide variety of groups. Since the technique is based on selecting activities that the patient thinks are relevant and important, motivation or interest in exercising does not seem to be a limiting factor.

However, the recommendations stated in the section on "exclusion criteria" should be followed. In addition, patients suffering primarily from other types of problems (but that also have pain) may not respond as desired since the treatment does not actually match the problem. For example, depressed patients or alcoholics may not benefit greatly from the activities programme until the depression or alcoholism has been treated.

### **Why should the programme work?**

The operant approach considers that activity problems develop following two learning models: avoidance and reinforcement of passive behaviours. This is sometimes referred to as the acquisition of the "sick role".

Avoidance learning in the activities situation is based on fear of pain. In the acute pain stage, the patient may experience excruciating pain in connection with performing a certain activity. The patient very quickly learns to "avoid" that activity. Avoidance learning is special since it is particularly resistant to extinction, i.e. the behaviour continues even when there is no longer a risk of provoking pain. The reason for this is that opportunities to engage in the specified activity arouse the patient, creating muscle tension, fear, and anxiety. When the

patient successfully avoids participating in the activity, such as by refusing, the result is a reduction in muscle tension, fear and anxiety. Since this is experienced positively it reinforces the avoidance behaviour (see Linton, Melin and Götestam, 1984). Fordyce (1976) has stressed that avoidance may even involve such activities as work and that the avoidance behaviour "buys" the patient "time out" from unpleasant activities.

Over the course of time, a chronic pain problem develops, the patient is selectively reinforced for engaging in passive behaviours and thereby learns to take on a new lifestyle. Compared with previous behaviour and with norms for sex and age, this new lifestyle is rather passive and tends not to include vigorous activities. This often occurs during the recuperation period, when the patient is not at work. In these situations the patient does several behaviours such as: rests, watches TV, reads, does hobbies, etc. This may be reinforced by its natural consequences (e.g. it is fun, rewarding or exciting). Because of this, the patient may gradually come to spend a good deal of time in these activities which provide reinforcement in the short-term, but which contribute to problems in the long-term.

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## LEARNING MODULE TO ACCOMPANY THE SCIENTIFIC PAPER ON PSYCHOLOGICAL ITNERVENTIONS FOR PATIENTS WITH CHRONIC BACK PAIN

### Learning objectives and methods

Upon completion of this module the student should know:

1. The differences between acute and chronic stages of a pain problem and their implications for choice of treatment.
2. The reasons for excluding patients from this approach to treatment.
3. The properties of 5 separate behavioural approaches to pain reduction and the basic steps involved in applying each.
4. The reasons behind use of an "Activities Training Programme".

Upon completion of the module the student will be able to:

1. Take a history of a back pain problem and carry out a behavioural inquiry into its current properties.
2. Select suitable patients for an "Activities Training Programme" for chronic back pain.
3. Carry out an "Activities Training Programme" with selected patients, using the following six steps.

### Methods used to promote learning

It is proposed that the student gain the necessary knowledge in 3 stages:

- a. Careful study of the written materials by each student (2 hours).
- b. Group discussion of the material to answer questions and ensure it has been understood, discussing its application to one or more hypothetical cases ( 1/2 hour).

- c. After students have completed work with at least one patient, the group meets again and reviews the information provided and defines what more they need to know (1/2 hour) .

It is proposed that the students acquire the necessary skills in 3 stages.

- a. Practice interviewing and examining skills first, with pairs of students role playing doctor and patient and then reversing roles. The tutor should develop several "case examples" of patients of different ages and gender and with different histories of injury and subsequent treatment. The pairs of participants should "role play" several cases. The checklist provided at the end of this module, serves as a useful help in assessing patients.
- b. When this level of experience is completed each participant should ideally demonstrate his/her skills by doing this clinical interview and examination with a student playing a "new case" before a group including one instructor.
- c. The next step in learning is for the students - either singly or in small groups - to apply the "Activities Training Programme" to a patient with chronic back ache who will need to be seen weekly for up to 8 weeks. The students will assess the patient to exclude an obvious organic cause and then decide whether to proceed with the programme. (This decision could be monitored by a supervisor).

The students will explain the process of the programme to the patient, carry out a baseline study over the first week, set up goals and quotas and then monitor the patients at each weekly session, increasing the amount of activity as appropriate. Each days activity should be plotted on a graph, so visually representing progress, to allow patients to see how they are doing and facilitate supervision by the tutor.

## The Activities Training Programme: Step by Step Description

In this section a straightforward, step by step approach to operant activities training is presented.

*The programme described assumes that the patient has been examined by a physician as well as the treating physical therapist in order to rule out other disease processes and acute cases where activity training may not be warranted.*

The activities training programme is made up of six basic steps which are described in detail below. An important part of the programme is that the patient is given "homework" to do between therapy sessions. The patients will also be asked to do some very simple monitoring of their progress, such as by noting the level of their pain or by recording carefully what they have done since their last therapy session. A basic goal of the programme is to increase activity levels without increasing pain. Using psychological methods, patients are encouraged to be active and discouraged from being inactive.

### The Activities Training Programme Steps

1. Explain the programme to the patient
2. Select a target activity which the patient is unable to do, but wishes to do
3. Measure baseline level of these activities
4. Set a goal/quota for gradually increasing the amount of the target activity done each day
5. Check progress and modify the quota as necessary
6. Select a new activity when appropriate

#### *1. Inform and discuss the programme with the patient.*

It is important that the patient understands the programme and is willing to try and increase his or her activity levels.

- a. The problems that the patient may be having with activities is discussed (e.g. "It seems that your pain is limiting your participation in certain activities. How do you feel about this?")
- b. The programme for increasing activity levels should be described. It should be pointed out that this method is based on *teamwork* between the physical therapist and patient and that it requires homework on the patient's part. *Overall treatment goals* should also be discussed and documented (e.g. the

patient should eventually be able to walk to the local shops).

- c. Finally, examinations and treatments previously received should be reviewed to ensure that no contradictory medical procedures are pending and that the patient is not getting treatment elsewhere that would interfere with the programme.
- d. Use the checklist provided at the end of this module to make sure you have covered the important points.

### *2. Select "target" activities*

Selecting relevant activities is the key to a successful programme since activities should be chosen that the patients really want to do but feel they are unable to do. In this way the patients will really try and feel very encouraged when they succeed.

In order to find out which activities to choose, the patient should be interviewed as to find out which activities he/she enjoys doing. Most often these are activities which the patient enjoys but which have decreased substantially in frequency because of the pain problem. The therapy will lead to an increase in frequency which the patient will experience as rewarding. The second criteria for selection is that the activity should be able to occur frequently. Selecting an activity like going to the cinema would present practical problems since this behaviour would not occur often. Activities such as hobbies, household tasks or going for a walk, are best.

It is best to start with, only one activity. When the programme is functioning well a second and third activity may be added. Subsequently, the patient, may use the programme on his/her own at home as needed.

### *3. Measure the baseline (present) level.*

In order to increase activity levels without increasing the pain, it is necessary to know what the patient's present level of performing the target activity is before trying to increase it. The unit of measure must first be decided upon. Almost all activities may be measured in units of time (e.g. seconds, minutes) or various units of production (length/distance, number of times). The unit of measurement selected must be sensitive enough so that small increases may be detected, and simple enough so that it may be readily noted. If going for a walk is chosen as the target behaviour for example, both metres or even number of paces walked and number of

minutes would be sensitive enough to detect improvements. However, the number of minutes would probably be easier for patients to monitor by themselves.

The target activity is then monitored by the patient (or therapist if necessary) a number of times. The patient is instructed to carry out the activity "as usual" and not to exacerbate their pain. The patient is also instructed to stop if he/she feels tired. The amount of activity (in minutes, paces or metres) is immediately noted on a special, but simple form designed for the purpose. This test should be repeated at least five times and if the patient is doing this at home, over several days of the week. This provides a baseline level or rate.

Instructions should be given to the patients on how to do the monitoring of the target activity so that they may do this on their own during treatment. The patient should be shown the form as well as how and when it should be marked. An opportunity should be provided for the patient to practice this under supervision.

The baseline (current, before treatment) rate should be plotted on a graph, as seen in figure 1, and shown to the patient. This sets the stage for the next step.

### Activities Training

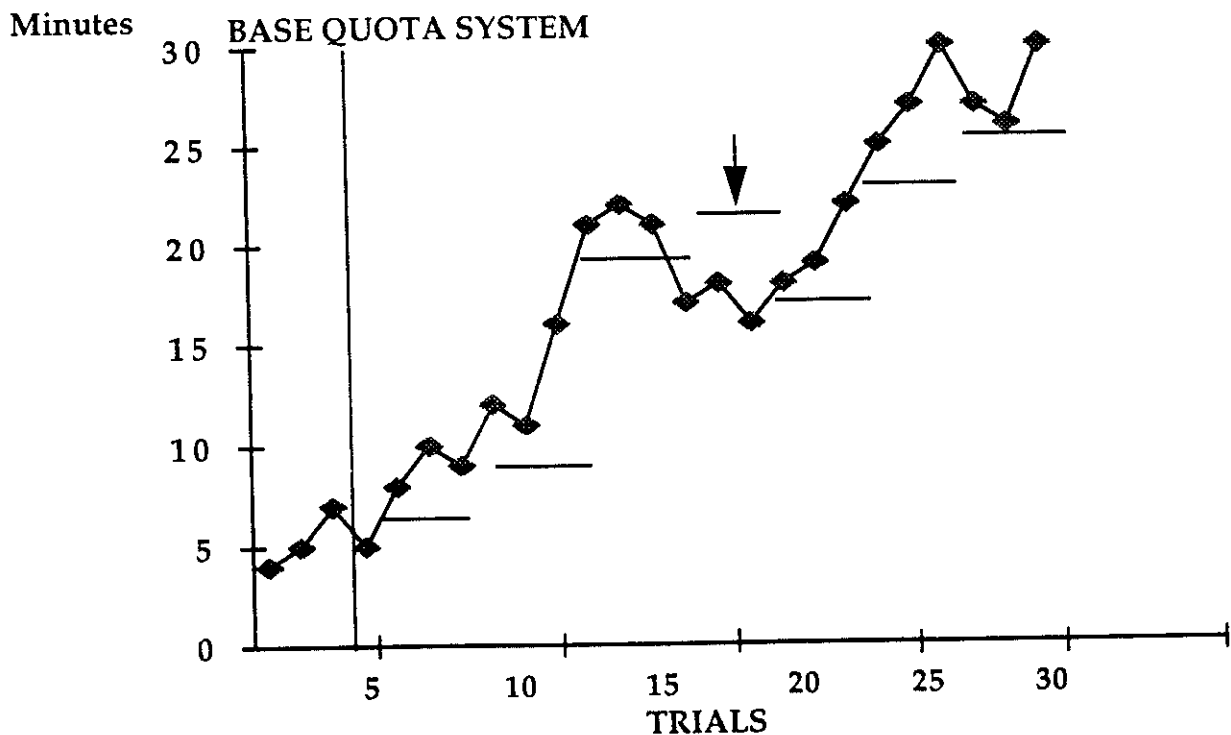


Figure 1. Example of the results of the activities training programme. Quota levels were maintained for three-day periods since the patient practiced at home and met the therapist twice per week. The arrow denotes where the patient did not meet the goal. As a result, the quota was lowered.

#### 4. Goal setting

Once the baseline level of the target activity is established, the treatment may begin. The therapist and patient should discuss what the "goal" for the first test period will be and agree on this. However, the final decision rests with the therapist since some basic rules are necessary to obtain proper goals. Select the first goal at a rate that is very similar to the baseline rate, but nonetheless an increase. The first increase should be so small that the patient virtually cannot fail. For example, in "walking" the patient may have a baseline time of about 10 minutes. The first goal might be set at 10 minutes and 20 seconds. It is highly unlikely that a person could walk 10 minutes and not manage another 20 seconds. Moreover, a vast body of experience indicates that patients almost always succeed with the first goal.

Sometimes patients may want to attempt large increases. However, it is unwise to set the goal higher than recommended above, since it increases the risk for failure. It may on the other hand, be pointed out that the goal is a minimum quota. The patient may do more than is contracted, but preferably not less.

#### 5. Check progress/reinforce increases.

Praise and encourage the patients if they reach the goal. This reinforces the increase in activity. This requires continued monitoring of the activity level. In addition, checking the monitored level should be given top priority as this motivates the patient and demonstrates its importance. If the goal has been successfully reached, reinforcement may be provided by plotting the data on a graph which visually shows the increase (see figure), as well as by telling the patient that he/she has done a good job. Discussion may centre on the satisfaction of doing that little bit more.

If the activity is useful or fun, the patient will be reinforced naturally by just having done it. Consequently, it is of value to discuss with the patient whether he/she experiences the increase positively.

Other types of reinforcers may be considered. For example, the patients may allow themselves some special benefit or "treat" which can depend upon completing the goal. The patient him/herself in this case monitors progress and subsequently provides the reinforcer, thus the term "self-reinforcement".

Another method which may be very effective is by giving the patient something extra on completion of part of the activities programme. These may be such things as privileges (a free massage, ticket to the pool, tour

of the hospital etc.) or desired items e.g. t-shirts etc. These are usually provided when specified amounts of increase are achieved. One method is to provide some small reward after an increase (compared to baseline) of 10% 25% 50% and 100%. At least one programme has simply provided a diploma and badge at each of these points.

*Evaluate failures.* At some point, the patient will probably not meet the goal. The patient should not be reprimanded for this. Instead, failures should be viewed as a result of the goal increasing too much, too fast. Thus, the contracted goal level should be decreased to a level that the patient can meet. A rule of thumb is to lower the goal to the level at which the patient performed just before the "failure" period. One common error that a therapist may make, is to engage in a lengthy discussion of why the goal was not met. This may be a difficult discussion, since patients often do not really know why the goal was not met. Furthermore, the discussion may very easily centre on the patient's pain, thus inadvertently reinforcing "pain behaviour". It is better to reinforce further activity by immediately trying a new goal which is at a level which will ensure success.

The natural course of pain is to vary over time. Usually problems in meeting a goal are related to natural variations of the pain rather than to the activities programme itself. Consequently, it is important to concentrate on continuing the programme rather than spend time discussing "pain" which may in fact undermine progress. As figure 2 shows progress does not occur on an even basis, periods of good progress may be followed by temporary problems (arrow on graph). However, the overall picture should nevertheless be one of improvement.

Research shows that pain intensity, under normal activity conditions has little to do with activity levels for chronic pain patients, even if the patients believe that the pain is the cause of functional disability. On the other hand, periodic programme checks, as described below, are necessary to evaluate overall progress and detect any potential problems.

#### 6. Programme checks

A thorough check of progress in the activities programme is needed periodically. This is done with the patient. The graphic presentation of results (as in the attached example) is reviewed and discussed as well as questions as to whether, in the patient's opinion, the therapy is resulting in improvements. If the programme is resulting in consistent increases in the target activity, then

a new activity may be added. This is done following the same methods that were used for the first activity as described above.

However, if the programme is not resulting in consistent increases, it is necessary to rework the activities training programme. Failure is most often related to lack of motivation or the improper administration of the activities programme. Check to be sure that all steps have been carefully followed. If it seems that there was something wrong with the administration of the programme, then another attempt may be made to implement it.

If the programme has followed all of the administration rules, but still has not resulted in consistent improvements, then the patient's motivation may be checked. Failure to reach the agreed goals may be caused by problems of motivation or by special needs that have not been recognized. For example, many people have problems remembering to do the activity at the specified time, which may be overcome by redesigning the programme.

Occasionally patients have "secondary gains" financially or at home, which prevent them from doing the activities as agreed. Problems of motivation involving secondary gain are often complicated and usually cannot be solved in individual physical therapy sessions. However, it may be pointed out to the patient that therapy is not progressing. The patient and therapist may then choose to discontinue therapy. Continuation is only warranted in this case, if the patient accepts the idea that activity increases will not undermine their secondary gains or if the patient is prepared to give up such gains.

Another possible problem, though ordinary initial examinations very rarely miss them, is that failure may be related to a medical status where activity increases does in fact lead to increased pain. If this is suspected, additional medical examination may be necessary and further training might be suspended. It is wise however, to consider maintaining some training rather than discontinuing it entirely, so as not to reinforce "sick behaviour". Examination of the activities graph, in the failed medical case, should show that as activity levels have increased, so have pain levels. Typically, a successful case will have the opposite picture.

## Duration of treatment

The duration of treatment is best determined by progress as measured in the programme above. The quotas of therapy may be set at helping the patient increase three activities by 50% for example. Some patients may need more help, some less. However, for the busy practicing physical therapist a maximum of 12 sessions is recommended. These may be spaced over a 6 to 12 week period. If good improvements have not been achieved by this point, it is highly unlikely that continued treatment will help.

## Treatment variations

Once the basic technique has been mastered, it may be used in a variety of situations for chronic pain patients. For example, Fordyce (1976) has described how this method may be combined with training of proper gait. Since activity problems may be associated with gait problems, this is an interesting variation to the programme. Another variation is so-called pacing. Some chronic pain patients seem to have problems in judging "when to stop" a particular activity. As a result, rather than varying the activity by taking pauses or adjusting the intensity of the activity, the patient may work at the activity at the same intensity until he/she is exhausted. This may in turn result in lowered activity levels. Pacing, by providing the patient with rules about how much to do and when to take breaks, is a method to help the patient learn to take "natural" pauses and variations in activity intensity while nevertheless increasing his/her activity to normal levels.

Finally, the techniques may be used in other physical therapy situations besides the treatment of chronic back pain, where increases in activity level is the goal.

## Checklist of items to be covered in the assessment of patients with chronic back pain

Patients should be assessed before treatment. The following is a prepared checklist to help in the assessment.

1. *Description of the pain*
  - a. Started when?
  - b. Course since start
  - c. Current description of its quality, intensity and fluctuations during the day and over the week
  - d. Things that make it worse or better
  - e. Does it disturb sleep?
2. *Behaviours that cannot be done because of pain, or reduced activities.*
  - a. List their importance for the patient and how much the patient wants to do them.
  - b. Obtain an estimate of how much of each behaviour can be done each day, and how much he would like to do.
3. *What does the patient do to avoid pain? How does the patient manage despite not being able to do certain things?*
4. *What does the patient understand about his condition? What does he think is wrong?*
5. *How is the patient's social life (including marital/family life) affected? Does he have social problems?*
6. *Does the patient have emotional problems? Anxiety/fear, depression, guilt?*
7. *Does the patient have certain social, financial or other advantages because of the pain?*
8. *Does the patient take analgesics?*
  - a. How are they obtained?
  - b. How are they taken?
  - c. To what extent are they helping?
  - d. Does it seem as if the patient is abusing them?
9. *Is the patient abusing other substances, e.g. alcohol?*
10. *What does the patient expect from treatment? How does he understand treatment?*



## Case Study

### Background

Mrs. X, a 38 year old custodian at a hospital, applied for help for her pain problem. She had been employed at the hospital for 10 years, was married and had two children, 11 and 7 years old.

At examination, the patient had been suffering continually for one and a half years although the pain first appeared 10 years earlier. Pain onset was gradual. She complained of pain in the low back region and previous medical examinations resulted in a diagnosis of lumbago. The pain was diffuse and aching in character. She also complained of aches and pains from several body areas e.g. legs, arms, breast, upper back etc.

Because of the current pain the patient was off work. She had been sicklisted for more than a year. Prior to this she had been off work, for short periods, several times. She was taking nonprescription medications for the pain twice per day.

The patient reported having a very low activity level. In fact, she said that she spent a good deal of her day "resting" either in a chair in the living room or in bed. She had few social contacts outside of the home, and had symptoms of being depressed. However, the latter, after examination, was judged to be a result, rather than a cause of the pain and inactivity.

Prior to the current sicklisting the patient reported having a reasonable activity level and had been interested in a number of hobbies. She stated that she felt that just being able to go outside for a walk would be a significant improvement.

### Treatment Programme

In order to evaluate the patient's situation further, her pain and activity levels were monitored for one week. This helped establish a baseline level as well as build rapport with the patient.

The patient's treatment goals were discussed in session two. It became clear that she was interested in increasing her activity level and that she felt physically handicapped by her pain problem. The patient was informed about the programme and given informational materials to read as home-work.

In session 3, the programme was again explained and a target activity was selected. Since the patient believed that being able to go for a walk outside would improve her quality of life, this was selected as an immediate goal. The patient had often gone for walks prior to the onset of her pain problem. She was given a form and instructed to monitor how often (frequency) and how long (duration) she went for walks during the week. She was told that she should not provoke pain or tiredness.

The results of the monitoring showed that she did little walking (see figure 3). On most of the days she had only gone out for a walk to do simple errands like collect the mail. The goal was consequently set at a very low level, but required her to walk everyday. Since the patient's walking varied between 0 and 10 minutes, it was important not to set the quota over 10 minutes. The average walking time for the week was about 6 minutes a day, thus an ideal quota seemed to be 7 minutes per day. This quota was discussed with the patient. She believed that the goal was too low for regular days and too high for days when she suffered "extreme" pain. After discussing this with the patient, a 6 minute quota *per day* was agreed upon.

At the next session, one week later, progress was checked. As seen in the figure, the patient managed to go for a walk every day and walked an average of more than 10 minutes each day. The patient was pleased with this progress, and the therapist provided reinforcement by complementing her and discussing the new possibilities this improvement provided for her life. The results were also monitored graphically by the patient so she could see the results everyday. A new goal was then negotiated. Although the patient had enjoyed the success of reaching the previous goal, she was nevertheless skeptical about further increases. The new goal was thus agreed upon at 11 minutes per day for the next week.

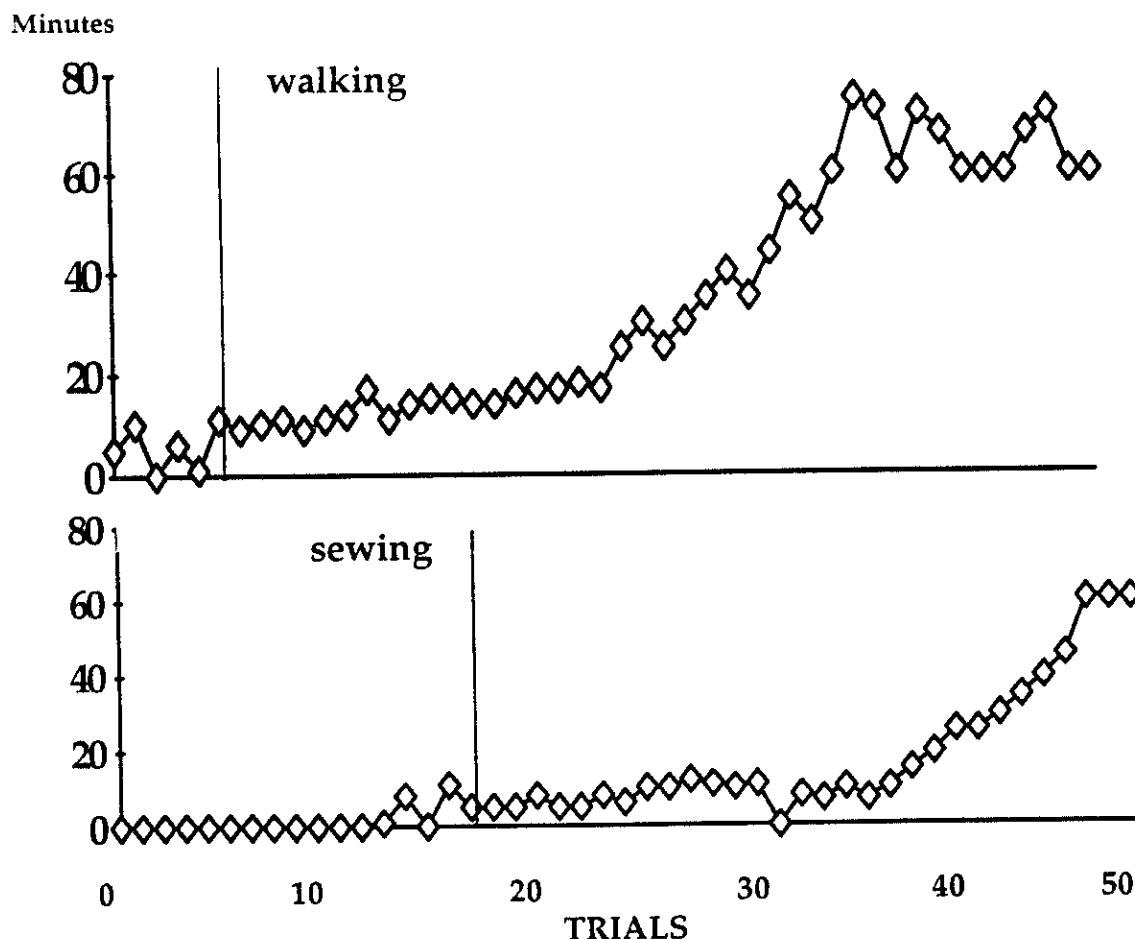


Figure 2. Results from the case study for walking (upper) and sewing (lower) activities. This patient met the therapist once per week and worked on the activities programme at home.

These improvements continued over several sessions. The patient was now around and moving about at almost "normal" levels. Consequently, a second activity was selected. The patient enjoyed sewing very much, but had not done any sewing for over one year. This was then selected as a target activity. Over the course of a week, the patient's sewing activity was monitored (without increasing pain or tiredness). Again, the baseline showed a very low level. However, it was extremely variable. On some days the patient did no sewing during this period, and on others she sewed until she had "extreme" pain. The quota level was consequently agreed upon at a low, but *consistent* rate. The patient was instructed to *pace her activity, i.e. to work consistently but to stop before the onset of a bout of pain*.

The first results, although the average was about the same as baseline, showed a consistent number of minutes sewing thereby meeting the goal. The patient reported no pain increases in connection with the sewing and again was happy and surprised that she was able to sew everyday. The patient was verbally reinforced. As seen in the figure the goal was increase gradually over the next sessions.

However, after several days the patient suffered a bad bout of pain and did not meet the goal. She was upset and explained that she did not meet the goal because of the pain. The therapist, rather than discussing pain, began negotiating a new goal. It was concluded that the previous goal was simply too high. The question was how much lower it needed to be to ensure success. The patient believed that she could not sew very much at all. Thus, the goal was lowered dramatically, almost to the baseline level.

Fortunately, the patient was able to sew considerably more than the amount agreed upon. Thus, the rate of sewing increased rapidly to new levels.

A third target activity was selected and subsequently the patient was allowed to apply the programme herself. Although the therapeutic programme had concerned basic and hobby activities, the patient selected work and household tasks. Consequently, she was able to improve to the point that she could return to work on a half-time basis after therapy. At follow-up one year later she was still working, as well as maintaining her household chores and hobby activities.)