

Fibromyalgia: towards an unifying model

A.A. KNIPPING, A.C.E. DE BLÉCOURT.

Introduction

Fibromyalgia has been examined from different viewpoints by different type of researchers. It has been perceived as a non-disease (1), a psychiatric disease (2), a variant of depressive disease (3), the result of a sleep disturbance (4), a primary somatic phenomenon (5), a result of inappropriate stress coping (6) and so on. Many research reports seem to shed light on part of the problem without illuminating the whole. In the previous chapters is illustrated that fibromyalgia is a complex phenomenon which cannot be explained or dealt with in a simple manner.

The presence of tender points seems to be the most important feature in fibromyalgia. On the basis of tender points these patients can easily be distinguished from other patient groups, which has been demonstrated in chapter 7.

But it is also clear that the fibromyalgia syndrome contains more than just widespread pain and the presence of tender points, or else the visions on fibromyalgia as stated above would not have emerged.

The etiology and pathogenesis of fibromyalgia are presently not known. The consensus document on fibromyalgia: the Copenhagen declaration (7) states that psychological factors play a role but not an etiological one. Fibromyalgia patients often suffer from depression and other psychological problems, but this is thought to be the consequence of the fibromyalgia complaints. Whether this is true or not can only be determined by means of longitudinal studies. Another aspect that is not addressed in this declaration is the reciprocal relation between psychological factors, such as anxiety, depression and coping styles, and pain. In this way the emotional distress can become part of the problem.

Chapter 2 of this dissertation shows the increasing evidence for centrally induced pain problems in fibromyalgia, in which neurohormonal dysfunctions are present. So far studies have failed to show clear global defects of muscle metabolism in fibromyalgia, making a peripheral mechanism unlikely.

But then again: neurohormonal dysfunctions do not stand on itself. At this level psychological factors play their part, either as a consequence (e.g. feeling depressed as a result of a shortage of serotonin in the brain) or as a possible cause (e.g. noradrenergic arousal as a result of fright).

For a good understanding of the fibromyalgia complaints one has to bear in mind that somatic and psychological factors are entangled and can not be seen apart from each other.

Fibromyalgia models

Central versus peripheral explanations

An evaluation of studies in the field of fibromyalgia was made by Yunus (8). He postulates that the main problem in fibromyalgia is a complex network of

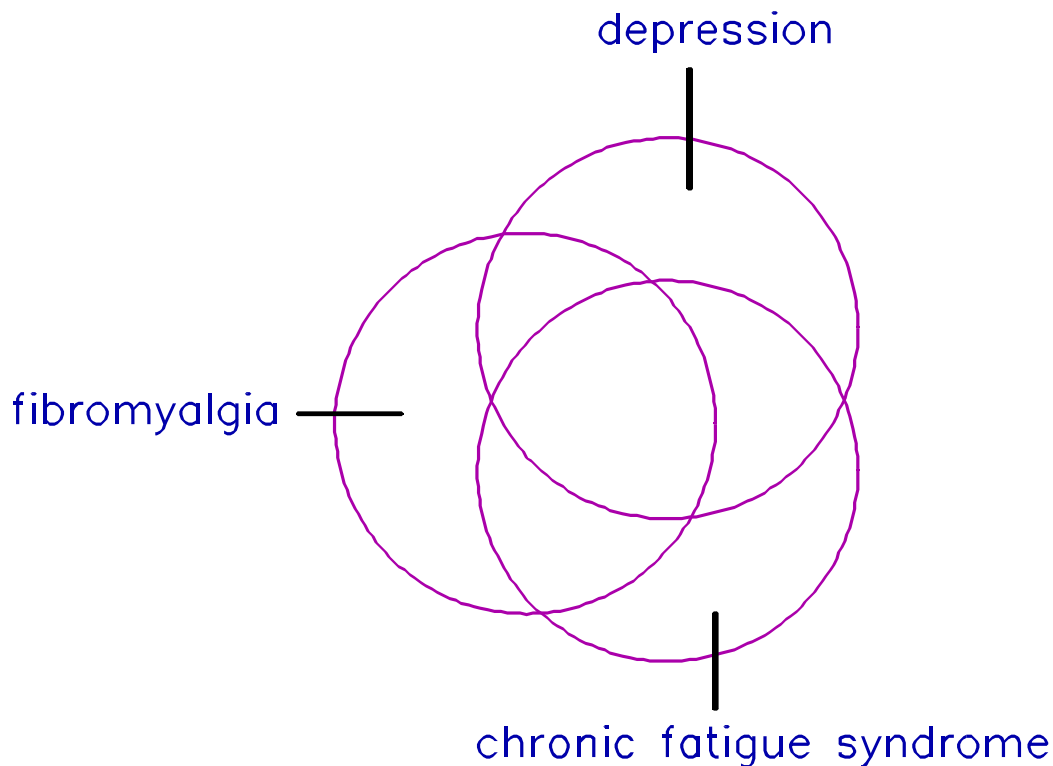
Fibromyalgia and related syndromes

Although fibromyalgia is no longer regarded as being a purely psychiatric problem, it is often related to psychological problems. Depression and anxiety are the most frequently mentioned problem in this respect. In a study of Hudson et al. (13) current major depression was present in 26% of the fibromyalgia patients (n=31) according to DSM-III criteria, and in none of the RA patients (n=14). Seventy-one percent of the fibromyalgia patients had current or past diagnoses of major depression versus 14% in the RA group. The fibromyalgia patients also had significantly higher scores on the Hamilton Rating Scale for Depression. An extension of this study (14) showed similar results. It seems that there is a relation between fibromyalgia complaints and depression, although not all the fibromyalgia patients can be diagnosed as having a depression. Depressive symptoms should be distinguished from the diagnosis of major depression in patients with fibromyalgia as has been argued in chapter 10. Hudson and Pope (15) assume that fibromyalgia and depression share a common basic trait. There are also other syndromes that share many characteristics with fibromyalgia, e.g. chronic fatigue syndrome (CFS). Fatigue, for example, is often mentioned as one of the main problems by fibromyalgia patients and pain is not uncommon in CFS. Associations between related syndromes can be depicted with the help of Venn diagrams (see figure 2) (16).

An integrated model for fibromyalgia

Preceding chapters and what has been described above make it clear that the fibromyalgia syndrome is a complex phenomenon that cannot be understood in terms of a single cause and effect relation. Fibromyalgia is more than muscle pain or tender points alone and regarding fibromyalgia as (the result of) a psychological problem does not give the ultimate insight either. Approaching the fibromyalgia problem in this way leads to the pitfall of

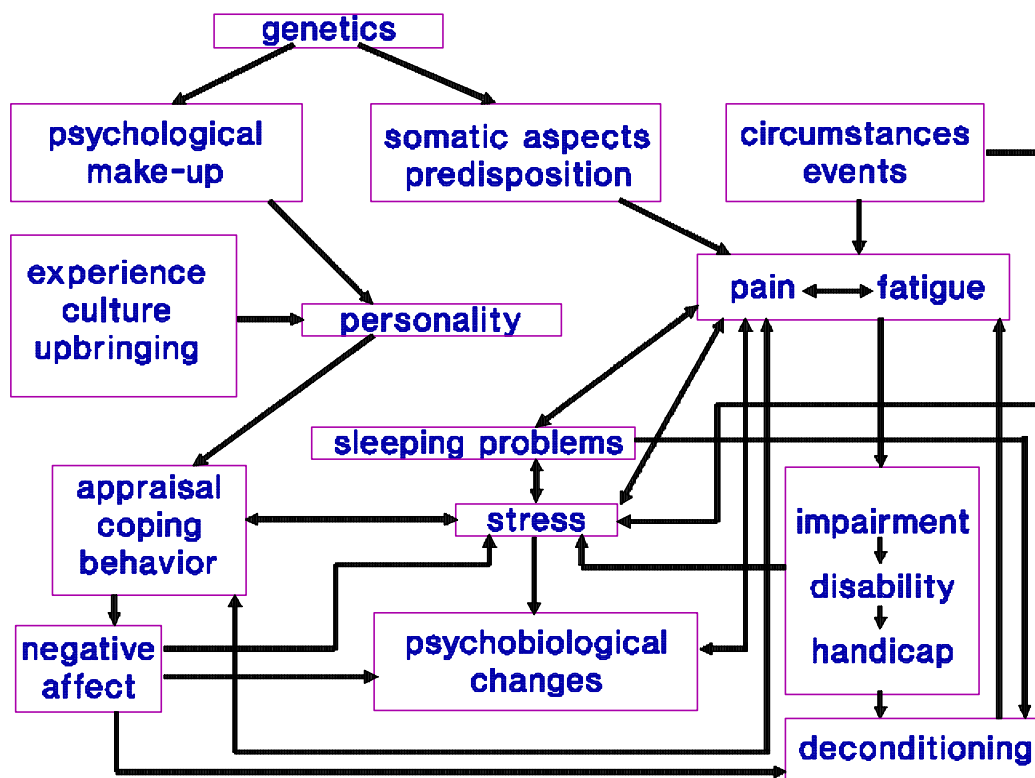
Figure 2
FIBROMYALGIA AND RELATED SYNDROMES



cartesian dualism or to an analogy of the famous story in which blind visitors all give very dissimilar descriptions of an elephant after researching the animal. For a better understanding of fibromyalgia it has to be considered as a multi-caused syndrome, in which somatic, psychological and (social)-environmental aspects have to be taken into consideration. Efforts in this respect have been made by only a few authors, of which Yunus is mentioned above. Bennet (17) hypothesizes a proneness to muscle micro-trauma which can lead to fibromyalgia complaints under influence of a defective repair mechanism, such as defective growth hormone production. In its turn this defective repair mechanism is caused by α - δ sleep anomalies and deconditioning. Deconditioning further enhances proneness to muscle micro-trauma, which causes pain intensified by eccentric contractions. Pain leads to sleeping problems and inactivity, which, in its turn leads to deconditioning etc. Inactivity, fatigue and sleeping problems are also interrelated, which makes up a vicious cycle of influencing factors. The role of psychological aspects remains underexposed in this model.

The model that is presented in figure 3 is an attempt to illustrate the complex interrelations between the factors that are thought to play a role in the development and continuation of the fibromyalgia complaints. The findings described in the previous chapters are included in this model, in which somatic and psychological factors are interrelated.

Figure 3
A PROPOSED FIBROMYALGIA MODEL



A somatic predisposition (e.g., proneness to muscle micro-trauma, or a low pain threshold) in combination with certain circumstances or eliciting events (injury, illness, operation, period of physical strain) can have pain and fatigue as a consequence. Pain and fatigue may act as a stressor and it may also have a negative effect on the quality of the sleep. Stress and sleeping problems also have a negative effect on the amount of pain and fatigue. Cognitions about pain and stress are also important factors. If a patient experiences the pain as a threatening phenomenon (e.g., a serious illness), the reactions of such a patient will differ from those who regard pain as a signal for an excess of physical or psychological strain. Thus, the way a person copes with pain, stress and sleeping problems is dependent of attributions and other cognitions about pain and stress (appraisal). Illness behavior or adapting, "healthy" behavior are the results. These cognitive and behavioral aspects are influenced by the personality of the patient, which is formed by a combination of genetic aspects (psychological make-up) and environmental factors (e.g., childhood experience, culture and upbringing). If pain and stress are present over a longer period of time, as a result of inadequate coping and reinforced pain behavior, other problems may arise. If phasic stress passes into tonic stress, psychobiological (neuro-hormonal) changes take place, which may have a negative effect on the pain and fatigue. If the patient experiences his situation as uncontrollable, a depressive mood (negative affect) will

emerge, which influences the amount of stress and it may also lead to psychobiological changes. Depressed patients become inactive which has a negative effect on the physical condition of the patient. Deconditioning increases fatigue and it makes the patient less able to cope in an active way (increasing of pain experience). In terms of rehabilitation models (18), the patient may become increasingly handicapped as result of the sequence impairment→ disability→ handicap. In this respect an impairment is defined as every possible deviation in anatomical, physiological or psychological function (e.g., strength, mobility of joints, coordination of movement, pain). An impairment is not restricted to somatic factors, but it also contains psychological aspects. If impairments cannot be dealt with by means of direct treatment, disability is the result. This is defined as being less able or unable to perform normal skills and actions (problems with activity of daily living, driving a bicycle, walking for more than 500 meters, being unable to work etc.). The term handicap concerns the disadvantageous position of the patient as a result of the disabilities. This has to be seen in the light of the role the patient plays with regard to age, social-cultural background, gender etc.

This process can form a source of stress and may have as a result a deconditioned patient. In this model the predominantly psychological aspects are depicted on the left hand side of the model and the somatic aspects more on the right. Stress, pain and fatigue are the central aspects of this model. They influence each other and are influenced by several other aspects that are of importance in the understanding of fibromyalgia. This model illustrates that fibromyalgic complaints cannot be relieved by diminishing the pain alone (analgesics) or treating one of the other aspects. All aspects of the syndrome have to be taken into consideration for a successful management. Patient education and increasing the patients' control over the complaints are important features in this respect, thus making the patient more responsible for his own situation.

Recommendation for further research

In spite of extensive research in this field an adequate treatment for fibromyalgia has not been developed yet. Given the fact that fibromyalgia is a complex syndrome that is influenced by many factors this is not very surprising. Treatment, therefore, should not be based on a single cause and relation model, but the complexity and multicausal aspects must be taken into consideration. Further research has to shed light onto those aspects that are suitable for a treatment approach. Fibromyalgia syndrome should be seen as a phenomenon with chronic aspects, which makes it clear that learning to cope is more important than cure. Attempts to cure fibromyalgia have not been very successful so far. The attentional focus of the researchers should be aimed at maintaining the "quality of life" aspects of these patients and maintaining a full-fledged role for the patients in the society, thus minimizing their handicap. For a

better understanding of the syndrome the psychobiological aspects and their relation to (tonic) stress must become clear. These aspects could be important mediating factors in fibromyalgia and related syndromes, such as chronic fatigue syndrome. Our studies (chapter 14 and 15) and other clinical therapy trial have been aimed at effects for the total group that was treated. But it is conceivable that only a certain number of patients respond partially to any single therapeutic intervention. Future research should try to identify subgroups which respond more effectively to a particular intervention or combination of therapies.

In clinical practice and also in research situations patients who have only recently developed their complaints are rarely seen. Most patients (66% in our patient group; see chapter 9) state that their complaints have developed gradually over time. Their is very little knowledge about the early stage of fibromyalgia. Therefore controlled risk factor studies as well as longitudinal course of illness research on fibromyalgia patients starting in the earliest stage of the complaints is essential in order to determine factors that may contribute to onset and prognosis versus those which result from the pain and dysfunction of this chronic condition. Only then an attempt can be made to develop treatment programs to prevent a process of chronization.

Recommendations for management of fibromyalgia in clinical practice

The remark that "fibromyalgia is not life-threatening and that swimming in warm water is good for you" is not enough to improve the situation of a fibromyalgia patient.

The foremost important action that has to made before any type of treatment is given, is giving the patient accurate information about what fibromyalgia is. An increased understanding is likely to decrease anxiety and to lead to better treatment compliance. If a patient is misinformed, there is a great risk that incorrect cognitions about their complaints are formed, which yields inadequate coping strategies and the risk of depression.

Another important factor is the risk that the patient becomes increasingly deconditioned, as a result of a decreased activity level, caused by pain, fatigue and depression. The activity level of the patient should be increased gradually, by means of concrete directives. If there is already a progressive deconditioning, a moderate fitness program can be useful which must be aimed at increasing the activity level of the patient. Only active forms of physical therapy serve this purpose. Passive forms (e.g., UKG, massage) can make the fibromyalgia patient believe the problems can be dealt with in a passive way. The emphasis of any treatment given to fibromyalgia patients should be based on the premiss that the patient is responsible for his or her situation, thus increasing the motivation for an intern locus of control.

Drug treatment (painkillers, anti-depressive drugs, sleeping-tablets) should be regarded as a possible support for other types of treatment, not as a treatment in itself, because of the possible side effects when used for a prolonged time. Drug treatment can be effective however when it is important to break through the vicious cycle of interrelating factors concerning pain, poor sleep and depression, making the patient more motivated for other types of treatment. Multidisciplinary treatments which employ a combination of approaches using modalities such as patient education, aerobic conditioning, behavioral therapy and cognitive restructuring seem to be the best option if such a treatment form is available.

We feel that the patient should be given the diagnosis fibromyalgia, if appropriate, because this probably decreases the feelings of uncertainty and anxiety in the patient, but immediately after that the patient should be educated in what the consequences are of this diagnosis (e.g. not automatically a justification for disability coverage) and that regaining control is very important for improvement of the situation. The emphasis should be on breaking through the vicious cycles these patients find themselves in, not on relieving the symptoms, because this will make the patient believe that only the doctor has control, which will make the patient passive and feeling helpless.

References

1. HADLER NM. A critical reappraisal of the fibrositis concept. *Am J Med* 1986;81:26-30.
2. BOLANDEW. Psychogenic rheumatism: the musculoskeletal expression of psychoneurosis. *Ann Rheum Dis* 1947;6:195.
3. HUDSON JI, HUDSON MS, PLINER LF, GOLDENBERG DL POPE JR HG. Fibromyalgia and major depressive disorder: a controlled phenomenology and family history study. *Am J Psychiatry* 1985;142:441-446.
4. MOLDOFSKY H, SCARISBRICK P, ENGLANDR, SMYTHE HA. Musculoskeletal symptoms and non-REM sleep disturbance in patients with "fibrositis syndrome" and healthy subjects. *Psychosom Med* 1975;37:341-351.
5. KALYAN-RAMANUP, KALYAN-RAMANK, YUNUS MB, MASI AT. Muscle pathology in primary fibromyalgia syndrome: a light microscopic, histochemical and ultrastructural study. *J Rheumatol* 1984;11:808-813.
6. LORENTZEN F. Fibromyalgia: a clinical challenge. *J Int Med* 1994;235:199-203.
7. EXPERT PANEL AND CONSENSUS PANEL MYOPAIN '92. Consensus document on fibromyalgia: the Copenhagen declaration. *Musculoskeletal Pain, Myofascial Pain Syndrome, and the Fibromyalgia Syndrome*. Edited by SJ Jacobsen, B Danneskiold-Samsoe, B Lund. New York, Haworth Medical Press, 1992.
8. YUNUS MB. Towards a model of pathophysiology of fibromyalgia: aberrant central pain mechanisms with peripheral modulation. *J. Rheumatol.* 1992;19(6):846-850.
9. YUNUS MB, DAIL JW, MASI AT ET AL. Plasma tryptophan and other amino acids in primary fibromyalgia: a controlled study. *J. Rheumatol* 1992;19:90-94.
10. RUSSEL IJ, BOWDEN CL, MICHALEK J ET AL. Platelet ³H-imipramine uptake receptor density and serum serotonin levels in patients with fibromyalgia/fibrositis syndrome. *J. Rheumatol* 1992;19:104-109.
11. GOLDENBERG DL, FELSON DT, DINERMAN H. A randomized controlled trial of amitriptyline and naproxen in the treatment of patients with fibromyalgia. *Arthritis Rheum* 1986;29:1371-1377.
12. SCUDDS RA, MCCAIN GA, ROLLMAN GB, HARTH M. Improvement in pain responsiveness in patients with fibrositis after successful treatment with amitriptyline. *J Rheumatol* 1989;(suppl 19)16:98-103.
13. HUDSON JL, HUDSON MS, PLINER LF ET AL. Fibromyalgia and major affective disorders: a controlled phenomenology and family history study. *Am J Psychiatry* 1985;142:441-446.
14. GOLDENBERG DL. Psychologic studies in fibrositis. *Am J Medicine* 1986; 81(suppl 3A):67-70.
15. HUDSON JI, POPE HG. Fibromyalgia and psychopathology: is fibromyalgia a form of "affective spectrum disorder"? *J Rheumatol* 1989;(suppl19)16:15-22.
16. GOLDENBERG DL. An overview of psychologic studies in fibromyalgia. *J Rheumatol* 1989;(suppl 19)16:12-14.
17. BENNETT RM. The origin of myopain: an integrated hypothesis of focal muscle changes and sleep disturbances in patients with the fibromyalgia syndrome. *J Musculoskeletal Pain* 1993;1(3/4):95-112.
18. BANGMA BD, POMPE R, PRONK CNA. Revalidatie-geneeskunde. *Methodologie en praktische uitwerking*. Rotterdam, PAOG Faculteit der Geneeskunde Erasmus Universiteit, Nederlandse Vereniging van Revalidatie (VRA), 1984.