
UNDERSTANDING YOUR PAIN

**Compiled By
LARRY J. WHITE, M.A.**

**Presented By
Pain Discomfort Strategies LLC
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Foreword

This e-book is a compilation of theories and practices from some of the most noted pain management physicians in the world. I have given them the credit (see Appendix-Resourse); at times I have copied their work to the letter. At other times I have made the content simpler for the lay person. I have paraphrased some of the content. The source I have used to compile this e-book is open source as long as the material is used for educational and/or training purposes and presented without fees. I have composed, rearrange and try to present these experts' material in a way that is easier for a layperson to understand. I have set up an important definition section following this forward that present some of the definitions that are helpful in understanding pain management. I need to make it very clear that I am not a medical professional and do not prescribe, treat or even advice in that area. Please read the health disclaimer in the appendix. I do have a graduate degree in psychology and have been studying human behavior for 50 years. I have had the pleasure of studying under noted psychologist Carl Rogers; been involved in transactional analysis under a program set up by Eric Berne. I have graduate work in rehabilitation therapies and administration from the Universities of North Texas State, University of California and the University of Oklahoma. I received a Master of Art from Western New Mexico University. I was administrator of a health care facility for over 40 years.

From the recipient of pain I hold the degree of having two hip replacements, having rotator cuff surgery, my left wrist completely restructured and too many joint with no cartilage left. I wear a brace on one knee, have orthotics for both feet and many times walk with a cane. A good day for me is walking 30 yards without having to stop. I tell you these things so you'll know that I have some knowledge and some experience when it comes to pain management. Pain management is an important subject as is the psychological trauma that goes with pain.

I did substitute person for patient and people for patients in many place as the patient/patients term has, to me, the suggestion a problem unable to be corrected or helped without medical assistance. Please remember I am not advocating that you should be able to handle all the pain

you encounter by yourself. In fact I would encourage you to seek out professional help when you cannot handle the pain management yourself. It is my hope that this e-book show you that there are many more options to pain management than M.D.s, Drugs, Injections and Surgeries.

It is also my hope that when you do have to go to one of the pain management professionals that you have a better idea on what's available to you and that you can become an active part of your pain management program. The more you're involved the more successful pain management program.

I do not talk about pain that comes from HIV or Cancer but hope those individual find the resources they need to manage their pain.

I hope you get some benefit from this e-book.

I have made a recommendation in the book Chapter 10 New Science for Pain Relief!

Larry J. White

Important Definitions

Arthritis - Arthritis is the inflammation of a joint, with typical symptoms including stiff ness (especially in the morning), warmth, swelling, redness, and pain

Chronic pain - Chronic pain is diagnosed if pain persists longer than 6 months.

Gelling Phenomenon – the perception of stiffness, usually lasting less than 20 minutes in the affected joint.

Hypoalgesia - Diminished pain in response to a normally painful stimulus.

Hyperalgesia - An increased response to a stimulus that is normally painful.

A **migraine aura** can also occur without an associated headache. ... Some people with migraines experience a more distinct migraine warning sign in a second phase, called the migraine aura. Auras are usually visual but can also be sensory, motor or verbal disturbances. Visual auras are most common.

Myofascial pain - Myofascial pain is characterized by muscle pain and tenderness.

A **nociceptor** is a sensory neuron (receptor) that responds to damaging or potentially damaging stimuli by sending “possible threat” signals to the spinal cord and the brain.

Nociceptive pain is the most common type. It's caused by potentially harmful stimuli being detected by nociceptors around the body. Nociceptors are a type of receptor that exists to feel all and any pain that's likely to be caused by the body being harmed.

Nonsteroidal anti-inflammatory drugs (NSAIDs) NSAIDs inhibit cyclooxygenases, the enzymes that catalyze the transformation of arachidonic acid (a ubiquitous cell component generated from phospholipids) to prostaglandins and thromboxanes.

Opioids - Opioids act on heptahelical G-protein-coupled receptors. Three types of opioid receptors have been cloned (mu, kappa, and delta).

Pain threshold - The least experience of pain that a subject can recognize.

Pain Chronification describes the process of transient pain progressing into persistent pain; pain processing changes as a result of an imbalance between pain amplification and pain inhibition; genetic, environmental and bio-psychosocial factors determine the risk, the degree, and time-course of Chronification.

Pain tolerance level - The greatest level of pain that a subject is prepared to tolerate. As with pain threshold, the pain tolerance level is the subjective experience of the individual.

Phantom pain - Pain that develops after an amputation in the area of the missing limb.

Osteoporosis Thinning of the bones with reduction in bone mass due to depletion of calcium and bone protein.

Phonophobia in Migraine (sound sensitivity) ... Persons with phonophobia have a more rapid growth in their discomfort level, or perhaps a lower threshold for discomfort, than other people.

Photophobia in Migraine (light sensitivity) ... Persons with photophobia have a more rapid growth in their discomfort level, or perhaps a lower threshold for discomfort, than other people.

Receptor In cell biology, a structure on the surface of a cell (or inside a cell) that selectively receives and binds a specific substance

Rheumatoid arthritis - An autoimmune disease that causes chronic inflammation of the joints and the tissue around the joints, as well as other organs in the body.

Sciatica Pain - resulting from irritation of the sciatic nerve, typically felt from the low back to behind the thigh and radiating down below the knee.

Somatic pain is a type of nociceptive pain that is also referred to as skin pain, tissue pain, or muscle pain. Unlike visceral pain (another type of nociceptive pain that arises from internal organs), the nerves that detect somatic pain are located in the skin and deep tissues.

Chapter 1

History and Viewpoints

The experience of pain is fundamental and has been part of the cultural development of all societies. In the history of pain, “supernatural” powers played an equally important role as natural factors. To view pain as the result of a “communication” between mankind and divine powers has been a fundamental assumption in many societies. The more societies are separated from Western medicine or modern medicine, the more prevalent is this view of pain. On the other hand, a purely medical theory based on natural phenomena independent of divine powers developed very early on. It happened to a greater extent in ancient China, while in ancient India medicine was heavily influenced by Hinduism and Buddhism. Pain was perceived in the heart—an assumption familiar to ancient Egyptians. The medical practitioners in pharaonic times believed that the composition of body fluids determined health and disease, and magic was indiscriminable from medicine.

The question of how pain should be treated has led to different answers over time. If supernatural powers had to be pleased to get rid of pain, certain magical rituals had to be performed. If scientifically invented remedies were not used or not available, ingredients from plants or animals had to be used to ease the pain.

The discovery of drugs and medical gases was a cornerstone of modern medicine because it allowed improvements in medical treatment. It was modern anesthesia in particular that promoted the development of surgery. Surgery itself changed to procedures that were not necessarily connected with a high level of pain. The role of surgery changed. Surgeons had more time to perform operations, and people were no longer forced to suffer pain at the hands of their surgeons. Thus, within the scope of anesthetic practice, pain management as a therapeutic goal did not exist at that time. Chronic pain was not a topic at all.

It took many years before a broader audience became interested in pain therapy. In the year 1973, to make this topic more popular, the International Association for the Study of Pain (IASP)

coined the important definition of pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage or described in terms of such damage,” which is still valid. This definition was important because for the first time it implied that pain is not always a consequence of tissue damage but may occur without it. Western science then began to realize that “somatic” factors (tissue damage) cannot be separated from “psychological” factors (learning, memory, the soul, and affective processes). Together with the recognition of social influences on pain perception, these factors form the core of the modern biopsychosocial concept of pain.

“CONSTANT PAIN NEEDS CONSTANT CONTROL”

Chapter 2

Obstacles to Pain Management

How do people handle their pain problems?

Usually, the first attempt at pain management is the use of home remedies, including herbal and over-the-counter (OTC) medications. These can be simple analgesics, herbal preparations, or complementary drugs. Self-prescription and recommendations from nonmedical practitioners (friends, relatives, other people, patent medicine vendors, and traditional medical practitioners) are common. Such recommendations may be effective for simple, uncomplicated pain, but when pain is severe or persistent, people then seek medical help as a last resort. In the hospital setting, most pain problems are treated by general medical practitioners, family physicians, or first-line specialists such as orthopedic surgeons, neurologists, and oncologists. Pain management specialists and dedicated pain clinics or acute pain teams are few and sometimes nonexistent in many rural areas. Although relief of pain is part of the fundamental right to the highest attainable standard of health, this aim is difficult to achieve in all settings, where some of the population lives in rural areas and under the current state of limited care without “adequate” insurance or private assets .

Unrelieved pain causes a lot of suffering to the individuals affected, whether rich or poor. All efforts must, therefore, be made to promote effective pain management for all people.

Chapter 3

Physiology of Pain

Pain is not only an unpleasant sensation, but a complex sensory modality essential for survival. There are rare cases of people with no pain sensation. An often-cited case is that of F.C., who did not exhibit a normal pain response to tissue damage. She repeatedly bit the tip of her tongue, burned herself, did not turn over in bed or shift her weight while standing, and showed a lack of autonomic response to painful stimuli. She died at the age of 29.

The nervous system mechanism for detection of stimuli that have the potential to cause tissue damage is very important for triggering behavioral processes that protect against current or further tissue damage. This is done by reflex reaction and also by preemptive actions against stimuli that can lead to tissue damage such as strong mechanical forces, temperature extremes, oxygen deprivation, and exposure to certain chemicals.

The term nociception (Latin nocere, “to hurt”) refers to the sensory process that is triggered, and pain refers to the perception of a feeling or sensation which the person calls pain, and describes variably as irritating, sore, stinging, aching, throbbing, or unbearable. These two aspects, nociception and pain, are separate and a person with tissue damage that should produce painful sensations may show no behavior indicating pain. Nociception can lead to pain, which can come and go, and a person can have pain sensation without obvious nociceptive activity.

Pathophysiology of pain

Pain sensations could arise due to:

- 1) Inflammation of the nerves, e.g., temporal neuritis.
- 2) Injury to the nerves and nerve endings with scar formation, e.g., surgical damage or disk prolapse.

- 3) Nerve invasion by cancer, e.g., brachial plexopathy.
- 4) Injury to the structures in the spinal cord, thalamus, or cortical areas that process pain information, which can lead to intractable pain; deafferentation, e.g., spinal trauma.
- 5) Abnormal activity in the nerve circuits that is perceived as pain, e.g., phantom pain with cortical reorganization.

Modulation of the perception of pain

It is well known that there is a difference between the objective reality of a painful stimulus and the subjective response to it. During World War II, Beecher, an anesthesiologist, and his colleagues carried out the first systematic study of this effect. They found that soldiers suffering from severe battle wounds often experienced little or no pain. This dissociation between injury and pain has also been noted in other circumstances such as sporting events and is attributed to the effect of the context within which the injury occurs. The existence of dissociation implies that there is a mechanism in the body that modulates pain perception. This endogenous mechanism of pain modulation is thought to provide the advantage of increased survival in all species.

Chemical or mechanical stimuli that activate the nociceptors result in nerve signals that are perceived as pain by the brain. Research and understanding of the basic mechanism of nociception and pain perceptions provides a rationale for therapeutic interventions and potential new targets for drug development.

Chapter 4

Psychological Factors in Chronic Pain

Everyone is familiar with the sensation of pain. It usually affects the body, but it is also influenced by psychological factors, and it always affects the human consciousness. This connection between the mind and body is illustrated by the many widely known metaphors and symbols. Unsolved problems and conflicts have us racking our brains over them, and the folk term for low back pain in German (Hexenschuss—witch’s shot) entails the medieval psychosomatic belief that a proud man can be shot in the back by a witch’s magical powers, producing the kind of agonizing pain that can cripple him. Many cultures believe in magical (often evil) powers that can cause pain. This belief in magical powers reflects the experience that the cause of pain cannot always be determined. Sometimes, the somatic structures of the body are completely normal and it is not possible to find a lesion or physiological or neuronal dysfunction that is a potential source of pain. The belief in magical powers is also rooted in the experience that psychological factors are just as important for coping with pain as is addressing the physical cause of the pain. Modern placebo research has confirmed such psychological factors in many different ways.

It should be mentioned, however, that certain lay theories such as the modern legend of the “worn out disk” only describe the actual cause of these symptoms in very few cases. In more than 80% of all cases of back pain, there is no clear organic diagnosis. The diagnosis for these cases is usually “nonspecific” back pain, concluding the reverse, that the lack of somatic causes indicates a psychological etiology, would be just as wrong.

The International Association for the Study of Pain (IASP) has defined pain as “an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.” This definition is fairly lean, but it encompasses the complexity of pain processing, contradicts over simplified pain definitions that pain is a purely nociceptive event, and also draws attention to the various psychological influences.

Pain is often accompanied by strong emotions. It is perceived not only as a sensation described with words such as burning, pressing, stabbing, or cutting, but also as an emotional experience (feeling) with words such as agonizing, cruel, terrible, and excruciating. The association between pain and the negative emotional connotation is evolutionary. The aversion of organisms to pain helps them to quickly and effectively learn to avoid dangerous situations and to develop behaviors that decrease the probability of pain and thus physical damage. The best learning takes place if we pay attention and if the learned content is associated with strong feelings. With regard to acute pain, and particularly when danger arises outside the body, this connection is extremely useful, because the learned avoidance behavior with regard to acute pain stimulation dramatically reduces health risks. When it comes to chronic pain, however, avoiding activities and social contact affects the person by leading to even less activity, social withdrawal, and an almost complete focus of attention on the pain. This tendency leads to a vicious circle of pain, lack of activity, fear, depression, and more pain.

People often have a somatic pain model

In Western medicine, pain is often seen as a neurophysiological reaction to the stimulation of nociceptors, the intensity of which—similar to heat or cold—depends on the degree of stimulation. The stronger the heat from the stove, the worse the pain is usually perceived to be. Such a simple, neuronal process, however, only applies to acute or experimental pain under highly controlled laboratory conditions that only last for a brief period of time. Due to the manner in which pain is portrayed in popular science, people also tend to adhere to this naive lay theory. This leads to unfavorable person assumptions, such as (1) pain always has somatic causes and you just have to keep looking for them, (2) pain without any pathological causes must be psychogenic and (3) psychogenic means psychopathological.

Physicians only start considering psychogenic factors as a contributing factor if the causes of the pain cannot be sufficiently explained by somatic causes. In these cases, they would say, for example, that the pain is “psychologically superimposed.” Consequently, people worry that they will not be taken seriously and will insist even more that the physician look for somatic

causes. This situation leads to a useless dichotomy of somatogenic vs. psychogenic pain. But pain always consists of both factors—the somatic and the psychological. This obsolete dichotomization must be addressed within the context of holistic pain therapy.

The interaction of biological, psychological, and social factors

A complete pain concept for chronic pain is complex and attempts to take as many factors as possible into consideration. Psychologically oriented pain therapists cannot have a naive attitude toward the pain and neglect somatic causes, because otherwise, people with mental disorders (e.g., depression or anxiety) will not receive the somatic care they require; just because someone has a mental disorder does not mean he or she is immune from physical disorders and the pain associated with them. Conversely, people with clear somatic symptoms often do not receive adequate psychological care: pain-related anxiety and depressive moods, unfavorable illness-related behavior, and psychopathological comorbidities may be neglected.

From a psychological perspective, it is assumed that chronic pain disorders are caused by somatic processes (physical pathology) or by significant stress levels. There could be a physical illness, but also a functional process such a physiological reaction to stress in the form of muscle tension, vegetative hyperactivity, and an increase in the sensitivity of the pain receptors. Only as the disorder progresses do the original trigger factors become less important, as the psychological chronification mechanisms gain prevalence. The effects of the pain symptom then may themselves become a cause for sustaining the symptoms.

Modern brain-imaging techniques have confirmed psychological assumptions on pain and provide the basis for an improved understanding of how psychological and somatic factors act together. There is not just one pain center associated with the pain, but a neuronal matrix made up of all areas that are activated by sensory, affective, and cognitive data processing, particularly the primary sensory cortex, the insula, the cingulate gyrus, the periaqueductal gray, and the frontal cortical area.

One of the important results of this research is that in studies using fMRI (functional nuclear magnetic resonance imaging of the brain), negative feelings such as rejection and loss that are generally referred to as painful experiences also create neuronal stimulation patterns similar to those created by noxious stimulation. This finding is of great clinical significance, because socially outcast and traumatized people not only may have post-traumatic stress disorder (PTSD), but also show high levels of pain that can persist even after the body had healed.

Psychological pain therapy

Psychological interventions play a well-established role in pain therapy. They are an integrative component of medical care and have also been successfully used for people with somatic disorders. Together with psychotherapeutic techniques, they can be used as an alternative or an addition to medical and surgical procedures. People with chronic pain usually need psychological therapy, because psychosocial factors play a crucial role in the chronicity of pain and are also a decisive factor in terms of enabling the person to return to work.

Below is a list of psychological interventions and their usual therapy targets. The targets refer both to individual and group therapy. The interventions may be used within the context of various therapies and require different levels of psychological expertise, as shown in Table 1.

Due to the strong focus on physical processes, certain processes such as biofeedback and physical and psychological activation are particularly well received by many people. People with chronic pain often feel incapable of doing something about their pain themselves. Due to many failed therapies, they have become passive and feel hopeless and depressed. Therefore, one main goal of psychological pain therapies is to decrease the person's subjective feeling of helplessness.

The person's active involvement is not always helpful, particularly if the person cannot actively manage and change what is going on. This can occur if freedom from pain is seen as the only therapy target. It is not uncommon that the resulting disappointment, with its far-reaching impact on all areas of life, becomes the person's actual problem. One of the "protection

factors” against depression is the person’s flexibility in adjusting personal goals: a lack of flexibility results in intense pain and depression.

Acceptance does not equal resignation, but allows for:

- Not giving up the fight against pain,
- A realistic confrontation of the pain, and
- Interest in positive everyday activities.

The most important psychological therapies are based on the principles of the theory of learning and have led to the following rules:

- Let the person find out his or limits with regard to activities such as walking, sitting, or climbing stairs, with no significant pain increase.
- Plan together gradual, systematic, and regular increases and set realistic interim goals (“better to go slowly in the right direction than quickly in the wrong direction”).
- Medications must be taken in accordance with a schedule and not just when needed.
- Gradually confront situations that create anxiety (e.g., lifting heavy objects, rotation movements, or sudden movements).
- Behavioral changes are not given as doctor’s orders, but are taught through carefully worded information (education).
- Psychological therapy is combined with medical and physiotherapeutic procedures.

Interdisciplinary teams, with a biopsychosocial treatment concept, do not distinguish between somatic and the psychological factors, but treat both simultaneously within their individual specialties and through consultation with one another.

Table 1

Person training	Educate, i.e., expand person’s subjective pain theory (integration of psychosocial aspects)
Handling of medications	Reduce medication, use correct medication, and prevent misuse
Relaxation training	Learn how to use relaxation to cope with pain and stress
Resource optimization	Analyze and strengthen own resources for coping with pain
Activity regulation	Optimize activity levels (balance between rest and activity): reduce fear-motivated avoidance and increase activity level
Pain and coping	Optimize pain-coping capabilities
Involvement of caregivers	Involve person’s caregivers in reaching therapy targets
Improvement of self-observation	Find a personal connection between the pain and internal or external events, which can help establish ways to control the pain. Analyze conditions that increase pain and stress
Stress management	Learn systematic problem-solving tools and how to cope with stress
Learning how to enjoy activities	Strengthen activities the person enjoys and likes to do
Communication	Change inadequate pain communication and interaction
Developing perspectives for the future	Develop realistic perspectives for the future (professional, private) and initiate action plans
Special Therapies	
Cognitive restructuring	Modify catastrophizing and depressive cognitions
Biofeedback	Learn how to activate specific motor and neuronal (vegetative and central nervous) functions and learn better self-regulation
Functional restoration	Restore private and professional functionality; reduce subjective impairment perception and movement-related anxiety

Behavioral therapy interventions

Psychological pain therapy methods attempt to change pain behavior and pain cognition. Behavioral processes are geared toward changing obvious behaviors such as taking medication and using the health care system, as well as other aspects relating to general professional, private, and leisure activities. They focus particularly on passive avoidance behaviors, a pathological behavior showing anxious avoidance of physical and social activity. One significant aspect of this therapy is to increase activity levels. This step is accompanied by extensive education initiatives that help reduce anxiety and increase motivation to successfully complete this phase.

The goal of therapy is to reduce passive pain behavior and to establish more active forms of behavior. The therapy begins with the development of a list of objectives that specify what the person wants to achieve, e.g., to be able to go to the soccer stadium again. These objectives must be realistic, tangible, and positive; complex or more difficult objectives can be addressed successively, and unfavorable conditions must be carefully taken into consideration. It does not make sense to encourage a person to return to work and to make this an objective if this is unlikely, due to the conditions on the job market. A better therapy objective might be to achieve better quality of life by getting involved in meaningful leisure activities. Expanding one's activities also makes social reintegration (with family, friends, and associates) more likely. The support people receive in therapy makes it more likely that they will continue these activities after the end of therapy. Often, however, therapists must not only encourage activities, but also plan phases of rest and relaxation to make sure they do not overly exert themselves.

Cognitive-emotional modification strategies, on the other hand, predominantly focus on changing thought processes (convictions, attitudes, expectations, patterns, and "automatic" thoughts). They focus on teaching coping strategies and mechanisms. These are various techniques that teach people a new, more appropriate set of cognitive (and behavioral) skills to help them cope with pain and limitations. People are taught, for example, how to identify

thoughts that trigger and sustain pain, how to perceive situational characteristics, and how to develop alternative coping strategies. If they are taught appropriate coping techniques, they are better able to control a situation; new confidence in their abilities leads to a decrease in feelings of helplessness, and they become more proactive. One of the goals of therapy is for people to learn to monitor the function of expressing symptoms (something people are usually not aware of) to be able to better manage and manipulate their social environment. The therapy should teach appropriate social skills, for example, about how to assert one's own interests to prevent the pain behavior from taking on this (so-called "instrumental") function.

Functional problem analysis is another important tool of behavior therapy. During the course of this analysis, one systematically collects information on how internal or external events are connected to the pain experience and pain behavior. At the same time, detailed information is collected on the effects of the behavior and the functions the behavior might have (e.g., in the professional environment or in personal relationships). By analyzing these situations, it is possible to develop an overview of how the pain experience is incorporated into situational, cognitive-emotional, and behavioral aspects and how it is maintained. This analysis can then be used to make further assumptions about the person's pain triggers and maintenance conditions, followed by goals and initiatives that could break the pain cycle. Particularly important for the analysis of these conditions is the person's self-observation with the help of pain diaries. The analysis can also be the basis for the person's own education, especially if the person's description specifies overall assumptions regarding the pain, its prognosis, and its treatment.

Relaxation techniques

Relaxations techniques are the most commonly used techniques in psychological pain therapy and constitute a cornerstone of cognitive-behavioral therapy. They are effective because they teach people to intentionally produce a relaxation response, which is a psychophysiological process that reduces stress and pain.

Well-done relaxation exercises can counteract short term physiological responses (at the neuronal level) and prevent a positive feedback loop between pain and stress reactions, for example, by intentionally creating a positive affective state. As people progressively learn these techniques, they are better able to recognize internal tension, which also makes them more aware of their personal stress situations and triggers (at the cognitive level). Some techniques (e.g., progressive muscle relaxation) often lead to better body perception in terms of tight muscles, which can help identify stressful situations.

The most commonly known relaxation techniques are progressive muscle relaxation as per Jacobson (PMR), autogenic training (AT), and other imagination, breathing, and meditation techniques. All these techniques must be practiced for quite some time before they can be mastered. Sustainable success can only be achieved through prolonged effort. Relaxation techniques are less successful in acute pain situations, which is why they are more usually used to treat chronic pain.

Biofeedback

Biofeedback therapy involves physiological learning by measuring physiological pain components such as muscle activity, vascular responses, or arousal of the autonomic nervous system and providing visual or acoustic feedback to the person. Biofeedback therapy is helpful for migraines, tension headaches, and back pain. Several different methods are used for migraines, such as hand warming techniques and vascular constriction training (targeting the temporalis artery).

In the hand-warming or thermal biofeedback technique, the person receives information on the blood supply to one finger, usually by measuring the skin temperature with a temperature sensor. The person is asked to increase the blood supply to the hand (and thereby reduce vasodilatation in the arteries of the head). In autogenic feedback training, the hand warming is supported by the development of formula-type intentions from autogenic training (heat exercises).

The processes are demonstrated and used only during pain-free periods. First, the person practices with feedback and heat imagery. Then, the conditions of the exercise are made harder, and the person, supported by the temperature feedback, is asked to remain relaxed while imagining a stressful situation. And finally, the person is asked to increase the temperature of the hand without any direct feedback, and is told subsequently if he or she was successful.

In electromyography (EMG) biofeedback for tension headaches or back pain, the feedback usually consists of the level of tension in the forehead, neck muscles or lumbar muscles and is used to teach people how to reduce tension. People with pain in the locomotor apparatus might also, however, practice certain movement patterns. These patterns are then practiced not only in a reclined position or while resting, but also in other body positions and during dynamic physical activity. It is important that the muscle groups are selected on the basis of physiological abnormalities—on the basis of muscle activity on the surface EMG or physical diagnostic parameters such as active myogeloses (localized muscle tension that is painful to the touch). One specific application is a portable biofeedback device that can be used under normal day-to-day conditions.

Multimodal processes

Multimodal pain psychotherapy is based on two assumptions:

- 1) Chronic pain does not have individually identifiable causes, but is the result of various causes and influential factors.
- 2) A combination of various therapeutic interventions has proven successful in the treatment of chronic pain (usually independent of the specific pain disorder).

In a modern pain therapy, therapeutic processes are usually not isolated, but are used within the context of an umbrella concept. The process is centered on a reduction of the (subjectively perceived) handicap by changing the patient's general situational conditions and cognitive processes. These kinds of programs can be applied according to the shotgun principle, e.g., all

modules are used with the view that we will definitely hit upon the most important areas, or the therapist can use the diagnosis to put together a specific modular treatment plan. The latter method should be used if an individual diagnosis is possible. In a group setting, the standardized process works better due to the expected differences between the patients.

Functional restoration programs

These programs are characterized by their clear focus on sports medicine and underlying behavioral therapy principles. Pain reduction as a treatment goal plays a minor role. Due to learning theory considerations pertaining to the “enhancement character” of pain behavior, the pain itself is basically pushed out of the therapeutic focus. These programs try to help people function again in their private and professional lives (functional restoration). The primary goal of therapy is to reduce the subjective adverse effect and the consequent fear and anxiety.

The treatment integrates sport, work therapy, physical exercises, and psychotherapeutic interventions into one standardized overall concept. The physical therapy components usually include an increase in overall fitness level, improvement in cardiovascular and pulmonary capacity, coordination and body perception, and an improved capacity to handle stress. The psychotherapeutic interventions try to change adverse emotional effects (antidepressive therapy). The person’s behavior is based on rest and relaxation, along with changing cognitively represented attitudes or anxieties with regard to activity and the ability to work.

The focus of this psychological (cognitive-behavioral) therapy is similar to that of the psychological methods described above. The therapy is highly somatically oriented, but the psychological effects of the training are just as important as the changes achieved in terms of muscle strength, endurance, and coordination. Intense physical activity is included in order to:

- 1) Decrease movement-related anxiety and functional motor blockages.
- 2) Sever the learned connection between pain and activity.
- 3) Provide the necessary training to cope with stress.
- 4) Provide fun and enjoyment, which is usually experienced during the playful parts of therapy and can lead to new emotional experiences.

Insights gleaned from the theory of learning show that pain must lose its discriminating function for people to be able to manage their pain behavior. Therefore, the entire physical training cannot be geared toward the pain it causes, or be limited by it, but must instead be geared toward personalized preset goals. Goal plans strengthen the patient's experience of manageability and self-efficacy. Failures at the beginning of therapy (e.g., if goals are not reached) could significantly reduce the person's motivation, initial goals should be very simple (weight, number of repetitions). People's beliefs about their illness, particularly with regard to movement-related fears, must be given particular attention during therapy. These fears must be specifically recorded and decreased in a gradual training process that mimics the behavior as closely as possible.

Physical training machinery can be used during the training (the person feels safe due to the guided, limited movements), but they constitute "artificial" conditions and thus hinder the necessary transfer to daily life. Consequently, routine everyday activities should be incorporated into the training as early as possible. Since there is a close connection between back pain and the workplace, the therapy must be enhanced by socio-therapeutic interventions (adjustment of the individual's capabilities to his or her profile of professional requirements [behavior prevention]) and a change in the variables of the professional environment (e.g., transfer within the workplace or retraining [conditional prevention]).

Educating People about pain

Fear of pain and anxiety about having a "serious" disease are important factors in the chronification process. Uncertainty and the lack of explanations are significant factors contributing to the person's worries. Fearful assumptions regarding the presence of a serious illness have negative behavioral consequences and foster passive pain behavior. To reduce this uncertainty, people should be provided with information and knowledge using written or graphic materials as well as videos. It is especially important that the training should not criticize the person's often very simplistic somatic pain concept, but rather expand on their subjective theories about the disorder, thus opening up new ways of how they can be actively

involved. Based on easy-to-understand information on pain physiology and psychology, psychosomatic medicine, and stress management, people should be able to understand that pain is not only a purely somatic phenomenon, but is also influenced by psychological aspects (perception, attention, thoughts, and feelings). Informational materials are an important addition to therapist-linked activity, and education is an important therapeutic element that can form the basis for other interventions. Successful, informative training provides people with the foundation they need to jointly develop and select therapy goals.

Effectiveness of psychologically based therapies

The effectiveness of psychological pain therapy for chronic pain patients is sufficiently documented. Several meta-analytical studies have shown that about two out of three chronic patients were able to return to work after having undergone cognitive-behavioral pain therapy. Cognitive-behavioral therapy techniques, compared to exclusively medication-based therapy, are effective in terms of a reduction of the pain experience, an improvement in the ability to cope with pain, a reduction of pain behavior, and an increase in functionality; most effects can be maintained over time.

Behavioral therapy is not just one homogenous therapy, but consists of several intervention methods, each of which is geared toward a specific modification goal. However, this multidimensional advantage is also a disadvantage, because it is often not quite clear what kind of content is needed. The effect itself has been proven without a doubt, but it is much less clear why and in which combination the interventions are effective.

Pearls of wisdom

- Psychogenic processes play an important role in the complex processing of pain information. The pain, therefore, affects not only the body, but the human being as a whole. It becomes more severe if the person does not know the causes or the significance of the pain, which, in turn, leads to anxiety and increased pain levels.

- In terms of chronic disorders, various factors in their individual development have an additive effect. Therefore, an explanatory model can help determine the best therapeutic approach, which equally includes biological (somatic), psychological, and sociological components. This model focuses not on details that are no longer identifiable, but on the interactive whole.
- The person himself is only a fixed, actively functioning component of the process, if he is willing to actively participate in the necessary behavioral changes and to generally take on more responsibility for himself, his disease, and the course of his disease. The results of many years of psychological pain research provide important insights for this process.
- This is not about replacing medical therapy with psychological therapy, but about using the insights of different specialties in an integrated manner to treat this difficult group of people in the best possible way.
- On the other hand, chronic patients are impressed by reports on medical interventions such as surgeries, injections, or medications, which raise high expectations for a quick removal of the pain without their own active involvement as patients. Repeatedly, high hopes of curing pain are raised by the medical system, and usually dashed in careful long-term studies.
- Neither opiates nor the development of specific medications or surgery for certain types of pain have led to the expected solutions to end chronic pain.

Chapter 5

Therapies for Pain Management

Is conventional pharmacotherapy always the best option for pain control?

Both acute and chronic pain may be treated with prescription pharmaceuticals, but they also may be controlled by complementary therapies such as chiropractic, acupuncture, massage therapy, and other modalities discussed in this chapter at less cost and typically with fewer side effects.

Each year about nine million cancer patients worldwide experience moderate to severe pain most of the time. Thirty percent of newly diagnosed cancer patients and 70–90% of patients with advanced disease suffer significant pain. Pain experienced by cancer patients can be chronic, caused directly by tumor invasion or by cancer treatment itself, or acute pain, such as following surgery. Pain in terminal stages of disease has its own characteristics and special issues. The World Health Organization (WHO) recommends use of analgesics for pain, starting with non-opioid drugs followed by opioids for uncontrolled and persistent pain. But, pharmacological interventions, although effective, do not always meet patients' needs, and they may produce difficult side effects. They are also costly and may be difficult to obtain. These issues pose a great challenge for patients requiring long-term pain management, often forcing them to choose between living in pain or living with undesirable side effects.

Complementary therapies have an important role to play everywhere, and especially in the low-resource setting.

How often are complementary therapies used by people?

Complementary therapies are increasingly used to alleviate pain and other symptoms, such as nausea and fatigue. Internationally, 7% to more than 60% of cancer patients use complementary therapies, depending on definitions used in numerous surveys. These therapies also are frequently used for pain that is not cancer-related.

How do complementary therapies work?

Complementary therapies may work by direct analgesic effects (e.g., acupuncture), by anti-inflammatory action (e.g., herbs), or by distraction (e.g., music therapy), to affect pain perception, assist relaxation, improve sleep, or reduce symptoms such as nausea, neuropathy, vomiting, anxiety, or depressed mood, as well as pain. These therapies often work when used alone, but they are also used with pharmaceuticals, often reducing the dosages required, and thus decreasing side effects and cost. When complementary therapies work synergistically with a pharmaceutical pain regimen, effectiveness may be improved and costs reduced.

But do complementary therapies actually work?

Every culture throughout time and in every corner of the world has developed herbal remedies. When subjected to study, some of these remedies are shown to be worthwhile, but others often prove ineffective. In addition, the public internationally is confronted with magical or superstitious remedies. These may have great appeal because they are inexpensive, readily available, and perceived as safe and effective because they are viewed as “natural.” However, two false beliefs about “natural” products are seen around the world: the belief that “natural” remedies are harmless; and the belief that remedies in use for decades or centuries must work. Both myths are incorrect. This is a special problem when treatable diseases are not managed properly, as people may die or their disease may worsen when they fall prey to useless remedies and waste precious time.

For many reasons, therefore, it is important to distinguish between evidence-based, helpful therapies and those that have no value. Baseless promises may come from well-intended people, or they may be promoted by unscrupulous vendors, as has been recognized in many parts of the globe, especially in Western Europe, Australia, and the United States. Early in the 21st century, the WHO named 2001 to 2010 the decade for modernization of African traditional medicine. Africa would thereby join Western nations, China, and other areas of the world in a

dedicated effort to modernize traditional medical practices: The WHO advised Africa to establish standards and process for intellectual property rights, research herbal compounds to determine their value, formalize the training of traditional medicine practitioners, and deal with quackery. Quackery in Africa may be similar to that in other continents, where it is a lucrative business that preys on vulnerable people facing pain, cancer, or other serious health problems. Robert L. Park, University of Maryland, writes about quackery in several publications, including his book *Voodoo Science: The Road from Foolishness to Fraud*. He talks about the seven “Warning Signs of Bogus Science and Medicine.” These are:

1) The discoverer pitches the claim directly to the media or the public. The integrity of science rests on the willingness of scientists to expose new ideas and findings to the scrutiny of other scientists. An attempt to bypass peer review by taking a new result directly to the media or the public suggests that the work is unlikely to stand up to examination by other scientists. A health-food company marketed a dietary supplement called Vitamin O in full-page newspaper advertisements. Vitamin O turned out to be saltwater.

2) The discoverer may say that powerful people are trying to suppress his work. Often, he claims that mainstream medicine is part of a larger conspiracy that includes industry and government.

3) The scientific effect involved is difficult to detect.

4) The evidence is anecdotal. The main thing that modern science has learned in the past century is not to trust anecdotal evidence. Because anecdotes have a strong emotional impact, they keep superstitious beliefs alive in an age of science. The most important discovery of modern medicine is not vaccines or antibiotics— it is the randomized trial, which shows what works and what does not. The plural of “anecdote” is not “data.”

5) The discoverer says a belief is credible because it has endured for centuries. There is a persistent myth that long ago, before anyone knew that blood circulates throughout the body or that germs cause disease, our ancestors possessed miraculous remedies that modern science

cannot understand. In fact, much of what is ancient cannot match the results of modern scientific study.

6) The discoverer works in isolation. In fact, scientific breakthroughs are almost always the work of many scientists.

7) The discoverer proposes new laws of nature to explain how it works. A new “Law of Nature,” invoked to explain some extraordinary result, must not conflict with what is already known. If new laws are proposed to account for an observation, the observation is almost certainly wrong.

The seven “signs” noted above separate quackery from helpful therapies.

To identify useful therapies, including complementary and traditional methods, seven other signs may be used:

- 1) The therapy was studied and shown to be useful for a particular problem.
- 2) The study included a methodologically sound trial in humans, such as a randomized clinical trial.
- 3) Safety and efficacy were established.
- 4) Results were made public, preferably through a peer-reviewed medical journal.
- 5) Agents taken by mouth were standardized and active ingredients documented.
- 6) It is helpful, but not necessary, to have information about mechanisms of action. First it is determined that something works, and then its mechanism (how it works) is explored.
- 7) Risk/benefit ratio is an important aspect to consider. Most of the non-oral complementary therapies are low-risk and beneficial.

What is the first step in choosing complementary medicine?

In selecting a particular traditional or complementary therapy, the person's preferences for use of a passive therapy (e.g., massage or acupuncture) versus an active therapy (e.g., meditation or self-hypnosis) should be considered—each of these is effective in relieving pain. Herbal medicines must be considered in terms of any prescription medication the person is using.

Would acupuncture be a good choice?

Acupuncture, an important component of Traditional Chinese Medicine, originated more than 2,000 years ago. It involves the stimulation of predetermined points on the body with sterile, filiform, disposable needles, sometimes using heat (moxibustion), pressure (acupressure), or electricity to enhance therapeutic effect. The ancient theory underlying acupuncture assumed that “qi” (pronounced “chee”), or life energy flows through meridians, which were thought to connect the body organs. It was believed that disease occurs when the meridians become blocked. Acupuncture was thought to relieve the blockage and permit the normal flow of qi, thereby restoring health. The idea of “life energy” or “vital energy” has never been substantiated by scientific understanding. Instead, physiological and imaging studies indicate that acupuncture induces analgesia and activates the central nervous system. Additional studies of acupuncture's mechanisms are underway.

The WHO supports the use of acupuncture as an effective intervention for low back pain, postoperative pain, and adverse reactions to radiotherapy and chemotherapy. A 1997 Consensus Conference at the U.S. National Institutes of Health (NIH) concluded that acupuncture is effective in relieving pain, nausea, and osteoarthritis. Since that conference, a large research literature has expanded the evidence for additional benefits, and the NIH continues to support clinical trials of acupuncture as well as studies of its mechanisms. Substantial data support acupuncture's ability to alleviate pain.

What about massage therapy?

Massage therapy dates back thousands of years and is practiced by cultures around the world. It involves manipulating, applying pressure to, rubbing, or stroking soft tissue and skin to

promote circulation, relaxation, and pain relief. Particular techniques and degrees of pressure may vary in each of the many types of massage therapy. Swedish massage is the predominant style used in the Western world. Sports massage, Shiatsu, and deep tissue massage are modalities that involve deeper pressure, whereas Reiki (very light touch therapy) involves the gentle brushing of hands over the body. The degree of pressure used must be adjusted to ensure that no damage is done to wounds, fractures, and the like. Reflexology (massage of the feet, hands, or scalp) is especially useful for people who are frail or are recovering from surgery. All types of massage therapy relieve and loosen sore muscles, as human touch itself is usually beneficial and can reduce pain. The many physiological effects of massage include enhanced immune function, as measured by increased levels of natural killer cells, decreased cortisol and epinephrine, and improved blood and lymph circulation, in addition to patients' self-reports. In studies, massage effectively reduced pain and other symptoms, including nausea, fatigue, depression, stress, and anxiety associated with cancer treatments.

And mind-body therapies?

Mind-body medicine includes teaching patients how to control aspects of their physiology to help reduce pain, anxiety, tension, and fear. This category encompasses yoga and hypnosis, where a therapist suggests changes in perceptions of sensations, thoughts, and behaviors. Guided imagery and relaxation techniques such as progressive muscle relaxation and controlled deep breathing are also types of mind-body medicine. These therapies can be learned and used by patients. Training may be given by therapists, but training often is available on compact disk (CD).

And hypnosis?

Hypnosis is a state of focused attention or altered consciousness in which distractions are blocked, allowing a person to concentrate intently on a particular subject, memory, sensation, or problem. It helps people relax and become receptive to suggestion. A CD developed at Memorial Sloan-Kettering teaches patients self-hypnosis for use prior to surgery or at any time to control pain. Hypnosis has been studied extensively and found effective for a wide range of

symptoms, including acute and chronic pain, panic, surgery, burns, post-traumatic stress disorder (PTSD), irritable bowel syndrome (IBS), allergies, and certain skin conditions, and for controlling unwanted habits. In 1996, the U.S. National Institutes of Health judged hypnosis an effective intervention for alleviating pain from cancer and other chronic conditions. Research suggests that hypnotic sensory analgesia is at least in part mediated by reduction in spinal cord antinociceptive mechanisms in response to hypnotic suggestion. Hypnotic analgesia also may be related to brain mechanisms that prevent awareness of pain once nociception has reached higher centers via brain mechanisms. It also may reduce the affective dimension, perhaps as the subject reinterprets meanings associated with the painful sensation.

And yoga?

Yoga is a physical and mental exercise that combines postures and meditation to calm the mind, body, and spirit. The practice promotes relaxation and blood flow, keeping the spine limber and the muscles flexible. Sessions, usually conducted in small groups, are tailored to individual capabilities, with gentle, meditative classes for cancer patients and others with severe pain. The combined aspects of yoga—its gentle postures, deep breathing, meditation, and group interaction—reduce pain perception and assist coping and recovery. For example, in a small study of women with metastatic breast cancer, participants reported significantly lower levels of pain and fatigue the day after yoga practice.

Chiropractic Care

Chiropractic is a health care profession that focuses on the relationship between the body's structure—mainly the spine—and its functioning. Although practitioners may use a variety of treatment approaches, they primarily perform adjustments (manipulations) to the spine or other parts of the body with the goal of correcting alignment problems, alleviating pain, improving function, and supporting the body's natural ability to heal itself.

Most research on chiropractic has focused on spinal manipulation. Spinal manipulation appears to benefit some people with low-back pain and may also be helpful for headaches, neck pain, upper- and lower-extremity joint conditions, and whiplash-associated disorders.

Side effects from spinal manipulation can include temporary headaches, tiredness, or discomfort in the parts of the body that were treated. There have been rare reports of serious complications such as stroke, but whether spinal manipulation actually causes these complications is unclear. Safety remains an important focus of ongoing research.

The term “chiropractic” combines the Greek words *cheir* (hand) and *praxis* (practice) to describe a treatment done by hand. Hands-on therapy—especially adjustment of the spine—is central to chiropractic care. Chiropractic is based on the notion that the relationship between the body’s structure (primarily that of the spine) and its function (as coordinated by the nervous system) affects health.

Spinal adjustment/manipulation is a core treatment in chiropractic care, but it is not synonymous with chiropractic. Chiropractors commonly use other treatments in addition to spinal manipulation, and other health care providers (e.g., physical therapists or some osteopathic physicians) may use spinal manipulation.

Many people who seek chiropractic care have low-back pain. People also commonly seek chiropractic care for other kinds of musculoskeletal pain (e.g., neck, shoulder), headaches, and extremity (e.g., hand or foot) problems.

An analysis of the use of complementary health approaches for back pain, based on data from the 2002 NHIS, found that chiropractic was by far the most commonly used therapy. Among survey respondents who had used any of these therapies for their back pain, 74 percent (approximately 4 million Americans) had used chiropractic. Among those who had used chiropractic for back pain, 66 percent perceived “great benefit” from their treatments.

During the initial visit, chiropractors typically take a health history and perform a physical examination, with a special emphasis on the spine. Other examinations or tests such as x-rays

may also be performed. If chiropractic treatment is considered appropriate, a treatment plan will be developed.

During follow up visits, practitioners may perform one or more of the many different types of adjustments and other manual therapies used in chiropractic care. Given mainly to the spine, a chiropractic adjustment involves using the hands or a device to apply a controlled, rapid force to a joint. The goal is to increase the range and quality of motion in the area being treated and to aid in restoring health. Joint mobilization is another type of manual therapy that may be used.

Chiropractors may combine the use of spinal adjustments and other manual therapies with several other treatments and approaches such as:

Heat and ice

Electrical stimulation

Relaxation techniques

Rehabilitative and general exercise

Counseling about diet, weight loss, and other lifestyle factors

Dietary supplements.

Music therapy

Music can reach deep emotional levels, and particular types of music may hold special meanings for each individual. Music therapy is particularly effective in the palliative care setting, where it improves quality of life and enhances comfort and relaxation. Music may involve active patient participation such as singing, song writing, or playing musical instruments, or private listening. The use of music to ease pain, anxiety, and depression is increasingly popular, and its effects on pain intensity and distress associated with pain have been documented in studies.

Does physical activity or exercise reduce cancer pain?

Exercise has shown to provide multiple benefits, and the advantages of exercise for patients is well documented for both noncancer pain and cancer pain. In addition to pain reduction, there are positive effects on mood, as well as on muscular, pulmonary, and cardiovascular functioning. Studies have shown that cancer patients may even reduce fatigue symptoms with exercise.

Herbs and other dietary supplements: what should be considered?

Herbs are used in medical practices around the world. Some of today's most powerful pharmaceuticals are plant-derived. Herbs and herbal compounds should be viewed as dilute, unrefined pharmaceuticals. They may produce physiological effects, and those effects can be positive or negative, depending on a person's specific clinical situation. Herbal agents also may contain harmful constituents, and in patients on prescription medication, serious adverse effects may result from herb-drug interactions. Numerous herbal agents are said to relieve pain. When studied, some are found to be useful and others useless.

Concerns about topical agents

Allergic reactions

Some common essential oils, such as tea tree, lavender, bergamot, and ylang-ylang, are capable of causing contact dermatitis.

Transdermal absorption of phytoestrogens

Many herbal skin products, like lavender or tea tree oil, have mild estrogenic effects. When applied in large quantities over prolonged periods of time, significant amounts can be absorbed through the skin. Patients with estrogenreceptor- sensitive cancer should avoid these products.

Direct toxicity on skin

Some herbs can cause necrosis of skin tissues. Bloodroot, which contains sanguinarine, is an example. Topical use of bloodroot can lead to severe adverse effects including disfigurement. People should be advised not to use this product.

Herbs and other dietary supplements: what to use?

White willow (*Salix alba*), also known as willow bark, bay willow, black willow, and white willow bark, is in common use in Africa. The active preparation is derived from the bark of the tree. Willow bark contains salicin, the phytotherapeutic precursor of aspirin (acetylsalicylic acid). Products should be standardized to the content of salicin with daily doses ranging from 60–120 mg per day. Caution should be exercised in patients with known allergy or intolerance to aspirin or nonsteroidal anti-inflammatory drugs (NSAIDs). Willow bark should not be administered to children with a fever, because of the risk of Reye's syndrome. Adverse reactions are analogous to those seen with aspirin, including gastrointestinal bleeding, nausea, and vomiting. Willow bark may have additive effect with aspirin and NSAIDs and should therefore not be administered concurrently. Clinical studies demonstrate efficacy of willow bark in the management of back pain and osteoarthritis. A systematic review of clinical trials suggests that it may also be effective in treating low back pain.

Boswellia preparations, used to treat inflammation, come from the gum of the *Boswellia serrata* tree. Randomized controlled trials show that they reduce pain and swelling in osteoarthritic knee joints. Animal studies suggest these effects may result from the agent's suppression of pro-inflammatory cytokines.

Corydalis rhizome was studied in only one trial. Conducted in human patients, the results showed that after a single, oral administration of *C. yanhusuo* or *A. dahuricae* extracts, pain scores significantly decreased.

Devil's claw (*Arpagophytum procumbens*). Analysis of commercial products reveals wide variation in chemical components. Limited side effects are reported. A clinical study suggests that devil's claw may benefit patients with osteoarthritis of the hip or knee.

Henbane (*Hyoscyamus niger*) can be toxic and even fatal, even at low doses. Common effects of henbane ingestion in humans include hallucinations, dilated pupils, and restlessness. Less common problems (tachycardia, convulsions, vomiting, hypertension, hyperpyrexia, and ataxia) are reported. Henbane is a toxic plant and should not be ingested!

Passion flower (*Passiflora incarnate*) is used primarily to treat insomnia, anxiety, epilepsy, neuralgia, and withdrawal syndromes from opiates or benzodiazepines. It has not been studied in humans for pain control. Poison hemlock (*Conium maculatum*) apparently is used in parts of Africa for neuralgia and cancer pain, but it has not been shown to be useful for this purpose. Instead, its historic role in producing death is corroborated in literature reports.

Prunus africana (*Pygeum africanum*, Rosaceae) is a plum tree found in tropical Africa and widely used in Europe and the United States to treat benign prostate hypertrophy (BPH). Mice fed *Pygeum africanum* showed a significant reduction of prostate cancer incidence, but no prostate cancer human studies have been conducted.

Valerian (*Valeriana officinalis*), although a popular remedy in Africa, was found no better than placebo when studied.

Verbena (*Verbena officinalis*) has been studied only for the treatment of topical inflammation. Its topical analgesic activity was less than the analgesic activity of methyl salicylate ointment.

Pearls of wisdom

- Complementary therapies serve as adjuncts to mainstream cancer care and can relieve physical and mental symptoms for people with pain and other symptoms.
- They address body, mind, and spirit and enhance patients' quality of life.

- They are low-cost, minimally or non-invasive, and comforting, and they allow patients a choice of treatment.
- Their largely favorable risk-benefit ratio suggests that complementary therapies can play an important role in physical and emotional rehabilitation and can be especially useful in pain management.
- Oral agents should first be determined to be safe. Some plants used for medicinal purposes have no benefits and are dangerous; physicians and patients should be alerted to the serious negative effects, including death that these agents may produce. Herbs may be contraindicated for patients on prescription medication.

Chapter 6

Pain History and Pain Assessment

Assessing your pain

These components are most commonly embodied in the “PQRST” approach: Provokes and Palliates,

Quality, Region and Radiation, Severity, and Time (or Temporal). In this approach, typical questions asked by a health care provider include:

P = Provokes and Palliates

- What causes the pain?
- What makes the pain better?
- What makes the pain worse?

Q = Quality

- What does the pain feel like?
- Is it sharp? Dull? Stabbing? Burning? Crushing?

R = Region and Radiation

- Where is the pain located?
- Is it confined to one place?
- Does the pain radiate? If so, where to?
- Did it start elsewhere, and is it now localized to one spot?

S = Severity

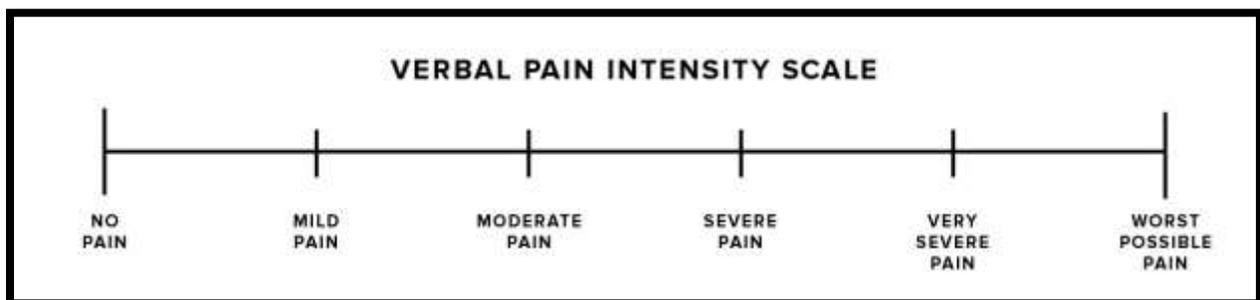
- How severe is the pain?

T = Time (or Temporal)

- When did the pain start?
- Is it present all the time?
- Are you pain-free at night or during the day?
- Are you pain-free on movement?
- How long does the pain last?

Numerical rating scale

Using this scale, the health care provider asks patients to rate their pain intensity on a numerical scale that usually ranges from 0 (indicating “No pain”) to 10 (indicating the “Worst pain imaginable”).



When using this scale, the health care provider describes the meaning of pain to the patient (e.g., significant feelings of unpleasantness, discomfort, and distress, and the significance of the experience for the individual). Then either verbally or visually, the patient is asked to choose one of six descriptors (i.e. “No pain,” “Mild pain,” “Moderate pain,” “Severe pain,” “Very severe pain,” and “Worst pain possible”) that best represents the level of pain intensity he or she is experiencing. Sometimes (as in Fig. 3), numbers are also used to ease the recording of the results.

Why is musculoskeletal pain such an important medical problem?

Pain is an essential component of musculoskeletal function. It is the signal we use to limit activities, which if continued, will lead to damage of the functional elements of the system—muscle, nerve, blood vessel, tendon, ligament, bone, and articular cartilage. The value of this feedback loop is better appreciated in situations where pain perception is impaired and a rapid disintegration of musculoskeletal elements ensues. This is seen in congenital syndromes, acquired neuropathic conditions (diabetic neuropathy), and situations of anesthetic use to enhance performance during athletic activities. Pain produced by musculoskeletal pathology, trauma, infection, or tumors must be managed as a component of the treatment of those conditions. The pain associated with certain chronic pain syndromes appears out of proportion to the initial stimulus. The history and physical examination provide the key to establishing a working differential diagnosis.

Pain is the most common symptom of patients seeking medical help for a musculoskeletal problem. It is often accompanied by other complaints such as swelling, discoloration, or the inability to perform certain tasks, such as walking upstairs, lifting the arm over one's head, or gripping chopsticks, fork, or spoon, but pain is commonly involved. Thus, pain is a useful tool for diagnosis and treatment and a way to measure progress and healing as function is restored. In treating patients we are always working on this edge of comfort versus function.

Pain provides the starting point for the orthopedic examination; both the history and physical components.

- Where does it hurt?
- For how long?
- How did it begin?
- What makes it worse?
- What makes it feel better?

The answers provide the clues needed to begin the physical examination. Fortunately the basic orthopedic exam is not complex. It consists of a rather limited set of maneuvers, coupled with some knowledge of the anatomy involved.

Why is psychological assessment of pain important?

People who have painful conditions or injuries are often additionally affected by emotional distress, depression, and anxiety. Chronic pain involves more than the subjective experience of the intensity of pain. In the last 30 years a biopsychosocial model for understanding chronic pain has evolved. According to this model, chronic pain is a syndrome with consequences such as physical and psychosocial impairment. This model contains variables such as central processes on the biological dimension as well as on psychological dimensions, including somatic, cognitive, and affective dimensions.

The cognitive dimension contains, besides attention processes, attempts to come to terms with the pain experienced. For example, thoughts like “the pain is unbearable” or “the pain will never end” can have an effect on the affective dimension and intensify reactions like anxiety. Suffering from chronic pain has social consequences, for example, on activities of daily living, family environment, and cultural factors, or it may be affected by previous treatment experiences. Illness can be viewed as the effect of the complex interaction of biological, psychological, and social factors. Emotional and cognitive aspects like anxiety or helplessness in coping with chronic pain are correlates that can significantly strengthen pain perception and intensity.

The cause of increased pain perception can include emotional components such as despair, sadness, anger or fear, but it can also be a reaction to impairment due to pain. In correlation with these processes, the cognitive component is the belief that it is not possible to have any relief of pain after unsuccessful treatments. Believing this can, for example, increase feelings of helplessness. The loss of belief in the functionality of one’s own body is experienced as a psychological threat. Thoughts will increasingly focus on the apparently unchangeable pain problem. Very often the result is a restriction of one’s whole perspective on life through the

focus on pain. The consequence is that the person concerned very often retires from physical and social activities. Family conflicts arise because of the feeling of being misunderstood. Self-esteem is affected by the subsequent inability to work. The main focus is on consulting a doctor and obtaining a cure. The increasing consumption of medication is accompanied by fear and apprehension of side effects. Inactivity because of the impairment by the pain and the whole symptomatology can cause and intensify depressive reactions such as passivity, increasing cogitation, lack of sleep, and decreased self-esteem. In a vicious circle, chronic pain can lead to depressive reactions, which influence the perception of and reactions to the pain. For example, biological processes such as muscle tension can cause pain but can also be caused by increased depression. Depression can lead to more physical passivity, and in consequence the lessened activity leads to an increase of pain because of degeneration of muscles. The result can be chronic pain. The main aims of treatment depend on the complexity of chronic pain and demand consideration of all the factors involved.

What are typical cognitive factors influencing pain?

The classical as well as the operant conditioning model presuppose the existence of pain. The flaw in both models is that they do not take cognitive-emotional factors into account. Moreover, physiological processes are not considered in the operant model. An extension occurs in the theory of the cognitive-behavioral approach. In this model the interaction between pain and cognitive, affective, and behavioral factors is the central point. The central assumption here is that the affective, as well as the behavioral, levels are decisively determined by a person's convictions and attitudes toward pain. Within the cognitive framework of pain, it is necessary to differentiate between self-verbalization, which refers to the moment, and metacognition, which refers to a long period of time. The tendency to a single cognition generally leads to behavioral consequences. Attributable self-verbalization such as catastrophizing, such as, "The pain will never end" or "Nobody can help me" leads to an overestimation of pain. Hypothetically, as a result of an overestimation of the level of pain, avoidance tendencies may result, as a consequence further pain stimuli are not freshly evaluated, and adaptive strategies to cope with pain will not be carried out. Maladaptive

metacognitions such as fear-avoidance beliefs are accompanied by the assumption that the pain scenario will definitely not proceed favorably and by the assumption that every strain for the body will affect the state negatively. There is no longer a belief in the restoration of physical functionality

Chapter 7

Chronic Nonspecific Back Pain

Why is chronic back pain so important?

Chronic nonspecific back pain is very common. Few of us never have back pain; most people have periodic back pain and some have chronic back pain. Chronic back pain is mostly located in the lumbosacral and posterior neck region.

In industrialized countries, low back pain (LBP) is the most common cause of activity limitation in persons younger than 45 years. It is defined as pain in the low back that persists longer than 12 weeks. Although acute LBP has a favorable prognosis, the effect of chronic LBP and its related disability on society is tremendous. For example, approximately 80% of Americans experience LBP during their lifetime. An estimated 15–20% develop protracted pain, and approximately 2–8% have chronic pain. Every year, 3–4% of the population is temporarily disabled, and 1% of the working-age population is disabled totally and permanently, because of LBP. It is estimated that the costs of LBP approach \$30 billion annually in the United States.

Why is the “6-week rule” so important?

Most normal connective tissues heal within 6–12 weeks unless instability or malignant or inflammatory tissue destruction is present. Therefore, in any prolonged back pain, these pain etiologies should be ruled out. Pain that radiates to the legs in a radicular pattern should be thoroughly investigated, especially if sensory or motor deficits are noted in the patient

When is periodic back pain “normal” and chronic back pain “not normal”?

The lumbar spine can support heavy loads in relationship to its cross-sectional area. It resists anterior gravitational movement by maintaining lordosis in a neutral posture. Unlike the thoracic spine, the lumbar spine is unsupported laterally. The intervertebral disks are composed of the outer annulus fibrosis and the inner nucleus pulposus. The outer portion of the annulus

inserts into the vertebral body and accommodates nociceptors and proprioceptive nerve endings. The inner portion of the annulus encapsulates the nucleus, providing the disk with extra strength during compression.

The nucleus pulposus of a healthy intervertebral disk constitutes two-thirds of the surface area of the disk and supports more than 70% of the compressive load. Until the third decade of life, the gel of the inner nucleus pulposus is composed of approximately 90% water; however, the water content gradually diminishes over the next four decades to approximately 65%. Until the third decade of life, approximately 85% of the weight is transmitted across the disk. However, as disk height decreases and the biomechanical axis of loading shifts posteriorly, the posterior articulations (facet joints) bear a greater percentage of the weight distribution. Bone growth compensates for this increased biomechanical stress to stabilize the trijoint complex.

Therefore, to some extent, hypertrophy of the facets and bony overgrowth of the vertebral endplates constitute a normal physiological reaction to the age-dependent degeneration of the disks to stabilize the spine. Only in patients with inadequate “self-stabilization” do these changes contribute to progressive foraminal and central canal narrowing. Spinal stenosis reaches a peak later in life and may produce radicular, myelopathic, or vascular syndromes such as pseudoclaudication and spinal cord ischemia. LBP is most common in the early stages of disk degeneration and “self-stabilization.”

What types of pain may be identified?

Specific pain

Back pain that lasts longer than 3 weeks with major functional impairment should be thoroughly evaluated to identify serious causes, inflammation, instability, or local compression. It has to be repeated that generally the proportion of back pain patients with specific pain is rather low (around 5%). On the one hand, the pain causes mentioned above should never be overlooked, but on the other hand, over interpretation of radiographic results should be avoided. As a rule of thumb, unrelenting pain at rest should suggest a serious cause may exist. Imaging studies and blood workup are usually mandatory in these cases and in cases of

progressive neurologic deficit, too. Other historical, behavioral, and clinical signs that should alert the physician to a non-mechanical etiology will require diagnostic evaluation. Evidence for specific back pain might be the following diagnostic “red flags”:

- Colicky pain or pain associated with visceral function (or dysfunction).
- History of cancer or fatigue, or both, and weight loss.
- Fever or immunosuppressed status.
- History of older age and osteoporosis (with increased risk of fractures).
- Progressive neurological impairment or bowel and/or bladder dysfunction.
- Severe morning stiffness as primary complaint.

Nonspecific Pain

Evidence for nonspecific back pain might be the following diagnostic “red flags” (nonorganic signs and symptoms):

- Dissociation between verbal and nonverbal pain behaviors.
- Use of affective pain descriptions.
- Little pain modulation, with continuous high pain intensity.
- Compensable cause of injury, out of work, seeking disability (conflict of interest between compensation and wanting to be cured).
- Signs of depression (having difficulty falling asleep, waking up early in the morning, loss of interest, and loss of energy and drive, especially in the first half of the day) and anxiety (continuous worrying and restlessness).
- Psychoactive drug requests.
- History of repeated failed surgical or medical treatments.

Diskogenic pain

Many studies have demonstrated that the intervertebral disk and other structures of the spinal motion segment can cause pain. However, it is unclear why mechanical back pain syndromes commonly become chronic, with pain persisting beyond the normal healing period for most

soft-tissue or joint injuries. Inflammatory factors may be responsible for pain in some cases, in which epidural steroid injections provide relief. Corticosteroids inhibit the production of arachidonic acid and its metabolites (prostaglandins and leukotrienes), inhibiting phospholipase A2 (PLA2) activity. Levels of PLA2, which plays a role in inflammation, are elevated in surgically extracted samples of human herniated disks. Furthermore, PLA2 may play a dual role, inciting disk degeneration and sensitizing annular nerve fibers.

Radicular pain

Surprisingly, the pathophysiology of radicular pain is unclear. Likely etiologies include nerve compression because of foraminal stenosis, ischemia, and inflammation. Often, the cause of radiculopathy is multifactorial and more complex than neural dysfunction due to structural impingement. In clinical practice, structural impairment is usually considered to be responsible, if inflammation is found. Therefore local epidural, often para-radicular, steroid injections are used for therapy, although their long-term effect is rather questionable.

Facet-joint pain

The superior and inferior articular processes of adjacent vertebral laminae form the facet or zygapophyseal joints. They share compressive forces with the intervertebral disk. After trauma or with inflammation they may react with pain signaling, joint stiffness, and degeneration. Interestingly, there is no strong relation between radiographic imaging results and pain; therefore, the diagnosis is strictly clinical (pain radiating to the buttocks and dorsal aspects of the upper limb, provoked by retroflexion of the back and/or rotation). Unfortunately, long-term effects of local steroid injections into the joint or into the vicinity as well as electrical ablation of the nerves innervating the joints (“medium bundle block”) have failed to demonstrate long-term effects.

Sacroiliac pain

The sacroiliac joint receives its primary innervation from the dorsal rami of the first four sacral nerves. Arthrography or injection of irritant solutions into the sacroiliac joint provokes pain with

variable local and referred pain patterns into regions of the buttock, lower lumbar area, lower extremity, and groin. Certain maneuvers may provoke typical pain, too. Local blocks sometimes accelerate recovery and facilitate physical therapy.

Muscular pain

Muscular pain is most often the cause of chronic back pain. Pain receptors in the muscles are sensitive to a variety of mechanical stimuli and to biomechanical overload. Anxiety and depressive disorders often play an important role in sustaining muscular pain due to the “arousal reaction,” with a continuous increase of muscular tension. Muscular pain may be described as “myofascial pain,” if muscles are in a contracted state, with increased tone and stiffness, and contain trigger points (small, tender nodules that are identified on palpation of the muscles, with radiation into localized reference zones). In most patients myofascial pain is the result of a combination of factors: the “arousal reaction,” direct or indirect trauma, exposure to cumulative and repetitive strain, postural dysfunction, and physical deconditioning.

On the cellular level, it is presumed that abnormal and persistently increased acetylcholine release at the neuromuscular junction generates sustained muscle contraction and a continuous reverberating cycle. If muscular back pain does not resolve within a few weeks (usually 6 weeks is seen to be crucial), it should be seen as a complex disease with physiological (“biological”), psychological, and psychosocial influences (according to the biopsychosocial model of chronic pain evolution). Therefore, when local therapies alone fail to give long-term pain relief, a major diagnostic and therapeutic workup including physical, psychosocial, and neuropsychological aspects (“multimodal therapy”) may be needed.

If adequate therapy is delayed over several months with a trial of unimodal therapies, such as analgesics or injections only, long-term positive effects of multimodal therapeutic approaches become unlikely or very limited.

Chapter 8

Headache

How is headache classified?

Headache is a leading reason for medical consultation and particularly for neurological consultation. A tremendous range of disorders can present with headache. A systematic approach to classification and diagnosis is therefore essential both for clinical management and research.

Headaches are classified into 14 major groups. This headache classification with operational diagnostic criteria was an important milestone for clinical diagnosis and is accepted worldwide. For each disorder, explicit diagnostic criteria are provided. These diagnostic criteria are very useful for the clinician because they contain exactly what needs to be obtained from the patient while taking the history. Nevertheless, it is surprising and disappointing that headache patients remain poorly diagnosed and treated in most countries.

There are four groups of primary headache disorder: (1) migraine, (2) tension-type headache, (3) trigeminal autonomic cephalalgias, and (4) other primary headache. The criteria for the primary headaches are clinical and descriptive and, with a few exceptions (i.e., familial hemiplegic migraine) are based on headache features and the exclusion of other disorders, not etiology. In contrast, secondary headache are classified based on etiology and are attributed to another disorder.

Table 1
Tension-type headache (episodic form): general diagnostic criteria (ICHD-2)
General Diagnostic Criteria
A. Headache lasting from 30 minutes to 7 days
B. At least 2 of the following pain characteristics:
<ul style="list-style-type: none"> • Bilateral location • Pressing/tightening (non-pulsating) quality

- Mild or moderate intensity
 - Not aggravated by routine physical activity such as walking or climbing stairs
- C. Both of the following:
1. No nausea or vomiting (anorexia may occur)
 2. No more than one of photophobia or phonophobia
- D. Not attributed to another disorder

What are important issues for non-headache specialists?

Caring for a patient complaining of headaches requires above all a thorough history taking and physical examination that includes a neurological examination. First, one needs to distinguish primary from secondary headaches. To evaluate the likelihood of a secondary, symptomatic headache, the most crucial feature, besides clinical examination, is the duration of the headache history. Patients with a short history require prompt attention and may need quick complimentary investigations, while those with a longer headache history generally require time and patience rather than speed and imaging. Patients with a headache history of more than 2 years definitely have a primary headache disorder. Red flags (see Table 2) that should alert to the possibility of a secondary headache include pain of sudden onset, fever, marked change in pain character or timing, neck stiffness, pain associated with neurological disturbances, such as cognitive dysfunction or weakness, and pain associated with local tenderness, for example of the superficial temporal artery.

Table 2
Migraine with aura diagnostic criteria (ICHD-2)
Diagnostic Criteria for Migraine without Aura
A. At least 5 attacks fulfilling criteria B–D
B. Headache attacks lasting 4–72 hours (untreated or unsuccessfully treated)
C. At least 2 of the following pain characteristics: <ul style="list-style-type: none"> • Unilateral location

- Pulsating quality
- Moderate or severe intensity
- Aggravation by or causing avoidance of routine physical activity (e.g., walking or climbing stairs)

D. During headache at least one of the following:

1. Nausea and/or vomiting
2. Photophobia and phonophobia

E. Not attributed to another disorder

People with recent onset headache or with neurological signs require at the least brain imaging with computed tomography (CT) or magnetic resonance imaging (MRI). To classify primary headaches, the following questions are crucial:

- Frequency and duration of attacks.
- Headache severity.
- Is the pain on one or both sides?
- Is it aggravated by physical activity?
- The presence of trigger zones and lancinating quality suggest a neuralgia.
- Is a migraine aura present?
- Very importantly, are there accompanying symptoms such as nausea, hypersensitivity to light and sound, or autonomic symptoms such as tearing, stuffy nose, sweating, ptosis, or miosis?

The next question is whether the person has one or more different kinds of headache. This must be elucidated skillfully. The reason for the consultation must be made clear. Is it because the usual headache is getting worse, or is it because of a new kind of headache? We have to keep in mind that if headache is the fifth most common complaint seen in United States emergency department, the minority of these patients have a secondary cause for headache,

and an even smaller number have a grave and potentially catastrophic cause for headache, such as meningitidis or subarachnoid hemorrhage.

In clinical practice, it is known that patients may not easily identify and recall certain features of their headaches, such as the presence and type of aura symptoms, specific associated symptoms, and the coexistence of several types of headache. Therefore, the use of monitoring instruments becomes crucial in the diagnosis of these disorders. Using headache diaries and calendars, the characteristics of every attack can be recorded prospectively, increasing the accuracy of the description and making it possible to distinguish between coexisting headache types. Moreover, headache diaries provide the physician with information concerning other important features, such as the frequency and temporal pattern of attacks, drug intake, and the presence of trigger factors. Use of acute drugs can be checked for optimal dosing. Frequent use (10 days or more per month) of acute medication is an alert for medication overuse headache. The diary could even be sent to headache patients before their first consultation at the headache center as it can improve the clinical diagnosis from the first interview.

What is essential to know about migraine?

Migraine is the commonest cause of severe episodic recurrent headache. Migraine affects approximately 12% of Western populations, and prevalence is higher in females (18%) than males (6%). Migraine is a recurrent headache manifesting in attacks lasting between 4 and 72 hours. Typical features of this headache are unilateral location, pulsating quality, moderate or severe intensity, aggravation by routine physical activity, and association with nausea and/or photophobia and phonophobia (see Table 3 for diagnostic criteria of migraine without aura from the ICHD-2).

The headache may be preceded in 15–20% of patients by an aura, so-called migraine with aura. The aura may last between 5 and 60 minutes. The most common type is visual aura, causing scotomas, teichopsia, fortification spectra, and photopsias. It can also comprise other

neurological symptoms such as focal paresthesias, speech disturbances and, in hemiplegic migraine, a unilateral motor deficit. The heterogeneity of the clinical phenotype of migraine is underestimated. Despite a common diagnostic denominator, some clinical features such as type of aura symptoms, pain intensity, presence of prodromes, coexistence of migraine with and without aura, or associated symptoms such as vertigo, may characterize subgroups of patients bearing different underlying pathophysiological and genetic mechanisms.

In migraine, premonitory symptoms and trigger factors are many fold, and they may vary between patients and during the disease course. The most frequently reported premonitory symptoms are fatigue, phonophobia, and yawning. Concerning trigger factors, the most common ones are stress, the premenstrual period, and alcohol. Overuse of acute antimigraine drugs, in particular of combination analgesics and ergotamine, is another underestimated factor leading to chronification.

	Migraine	Tension-Type Headache
Sex ratio (F:M)	2 to 3:1	5:4
Pain		
• Type	Pulsating	Pressing/tightening (non-pulsating) quality
• Severity	Moderate to severe	Moderate to severe
• Site	Unilateral	Bilateral
Aggravated by routine physical activity	Yes	No
Duration of attack	4 to 72 h	30 minutes to 7 days
Autonomic features	No	No
Nausea and/or vomiting	Yes	No
Photophobia and/or phonophobia	Yes Both	No more than one of photophobia or phonophobia

What is essential to know about tension-type headache?

Tension-type headache (TTH) is an ill-defined and heterogeneous syndrome; of which diagnosis is mainly based on the absence of features found in other headache types such as migraine (see Tables 4 and 5 for diagnostic criteria). It is thus above all a “featureless” headache, characterized by nothing but pain in the head. The diagnostic problem most often encountered is to discriminate between TTH and mild migraines. TTH is the most common form of headache, but it receives much less attention from health authorities, clinical researchers, or industrial pharmacologists than migraine. That is because most persons with infrequent or frequent TTH never consult a doctor; treat themselves, if necessary, with over-the-counter analgesics. However, chronic TTH, which causes headache ≥ 15 days per month, represents a major health problem with an enormous socioeconomic impact. In a population-based study, the lifetime prevalence of tension-type headache was 79%, with 3% suffering from chronic TTH, i.e., headache ≥ 15 days per month.

It still is a matter of debate whether the pain in TTH originates from myofascial tissues or from central mechanisms in the brain. Research progress is hampered by the difficulty in obtaining homogeneous populations of patients because of the lack of specificity of clinical features and diagnostic criteria. The present consensus, nonetheless, is that peripheral pain mechanisms are most likely to play a role in infrequent episodic TTH and frequent episodic TTH, whereas central dysnociception becomes predominant in chronic TTH.

Simple analgesics (i.e., ibuprofen 600 to 1200 mg/d) are the mainstay of treatment of episodic TTH. Combination analgesics, triptans, muscle relaxants, and opioids should not be used, and it is crucial to even avoid frequent and excessive use of simple analgesics to prevent the development of medication overuse headache. Prophylactic pharmacotherapy should be considered in patients with headaches for more than 15 days per month (chronic TTH). A prophylactic treatment is useful to prevent the transformation of episodic TTH into medication overuse headache. The tricyclic antidepressant amitriptyline is the drug of first choice for the prophylactic treatment of chronic TTH, but nonpharmacological management strategies

(relaxation, biofeedback, physical therapy) are equally effective. The initial dosage of tricyclics should be low: 10–25 mg of amitriptyline at bedtime. Many patients will be satisfied by such a low dose. The average dose of amitriptyline in chronic TTH, however, is 75–100 mg per day. If a patient is insufficiently improved on this dose, a trial of higher doses of amitriptyline is warranted. If the headache has improved by at least 80% after 4 months, it is reasonable to attempt discontinuation of the medication. Decreasing the daily dose by 20–25% over 2–3 days may avoid rebound headache. The best results are obtained by combining tricyclics with relaxation therapy.

What is essential to know about cluster headache and other trigeminal autonomic cephalalgias?

Trigeminal autonomic cephalalgias (TACs) are a group of rare primary headache syndromes that include cluster headache, paroxysmal hemicrania, SUNCT (shortlasting unilateral neuralgiform headache attacks with conjunctival injection and tearing), and SUNA (shortlasting unilateral neuralgiform headache attacks with cranial autonomic symptoms). Although rare, they are important to recognize because of their excellent but highly selective response to treatment. They share the same features in their phenotype of headache attacks, which is a severe unilateral orbital, periorbital, or temporal pain, with associated ipsilateral cranial autonomic symptoms, such as conjunctival injection, lacrimation, nasal blockage, rhinorrhea, eyelid edema, and ptosis. The distinction between the syndromes is made on duration and frequency of attacks.

As cluster headache (CH) is the commonest of the TACs, we will describe only this kind of headache in the present chapter. CH has a prevalence of about 0.3%, and male-female ratio of 3.5–7:1. The attacks of CH are stereotypical, being severe or excruciating, lasting 15–180 minutes, occurring once every other day up to eight times per day, and associated with ipsilateral autonomic symptoms. In most patients, CH has a striking circannual and circadian periodicity. Diagnosis is based on IHS criteria for the phenotype of attacks, but an MRI of the brain with contrast should be performed in order to rule out a secondary/symptomatic CH.

Cluster headache patients should be advised to abstain from taking alcohol during the cluster period. Because the pain of CH builds up so rapidly, abortive agents have to act quickly to be useful. By far the most efficient one is a subcutaneous injection of sumatriptan 6 mg. Inhalation of 100% oxygen, at 10 to 12 L/minute Headache 219 via a nonrebreathing facial mask for 15 to 20 minutes, can be effective in up to 60–70% of attacks, but pain frequently recurs. The aim of the preventive therapy is to produce a rapid remission of the disorder and to maintain that remission with minimal side effects until the cluster bout is over according to its natural history, or for a longer period in patients with chronic CH. Steroids are very effective in interrupting a bout. Suboccipital injections of long-acting steroids should be preferred to oral treatment, to lessen the risk of “cortico- dependence.” Verapamil is the next preventive drug of choice, but lithium, topiramate, methysergide, or corticosteroids can also be used. Functional imaging data suggest the hypothalamus to be the origin for CH.

Chapter 9

Rheumatic Pain

What is rheumatology?

Rheumatology is a subspecialty of internal medicine dealing with bone and joint diseases (connective tissue and related tissue disorders of bone, cartilage, tendons, ligaments, tendon sheets, bursae, muscles, etc.). Although modern rheumatology is based on advanced molecular biology, immunology, and immunogenetics, the daily practice and routine diagnosis is mainly clinical and based on symptoms and signs. In the majority of cases, laboratory tests and imaging have a confirmatory role, instead of being mandatory. Simple tests, such as complete blood count (CBC), erythrocyte sedimentation rate (ESR), C-reactive protein (CRP), rheumatoid factor (RF), uric acid, and urinalysis, are sufficient in many cases. Sophisticated investigations are rarely mandatory in routine practice. The same is true regarding elaborate imaging technics.

How are rheumatological diseases classified?

They are divided in three groups: articular, extra-articular, and bone diseases. Articular manifestations can be divided into six categories: inflammatory, mechanical, metabolic, neurological, infectious, and tumoral disorders. Extra-articular manifestations are also called soft tissue rheumatism (tendonitis, tenosynovitis, bursitis, etc.). Bone diseases are divided into metabolic (osteoporosis, osteomalacia), infectious, tumoral (benign, malignant, metastatic), and genotypic malformations.

What is the connection between rheumatology and pain?

The most important symptom in rheumatology is pain. The pain can be inflammatory, mechanical, or continuous. Inflammatory pain occurs during rest and disappears or improves gradually with activity. It is accompanied by some degree of stiffness, especially in the morning when the patient wakes up. Mechanical pain appears with activity, increases gradually, and

disappears with rest. It can be accompanied by gelling pain, which resembles inflammatory pain, but is of very short duration (a few minutes or less). Pure continuous pain is rare; usually one can find an inflammatory or mechanical feature. Joint swelling is the second most important symptom in rheumatology. It can be due to either effusion or synovial hypertrophy. Bony enlargement of the joint (bone hypertrophy) is the differential diagnosis. Limitation of joint movement is an indicator of joint involvement. Abnormal movement is an indicator of joint dislocation (cartilage destruction, ligament tear, and epiphyseal collapse).

What are the principles of treatment?

Although treatment has made great advances in the last decade (biological agents, sophisticated immune modulators, etc.), in many cases good advice and minimal medications will control the patient's pain efficiently. The majority of low back pain will respond well to a few days of rest and anti-inflammatory drugs. After resting, patients have to be taught how to strengthen their musculature with adequate exercises and must be advised about maintaining daily activities. The same is true for cervical pain, osteoarthritis, and many of the soft-tissue rheumatisms. It is a false idea that mechanical pain, like osteoarthritis, needs analgesics or anti-inflammatory drugs for a long time or forever. Continuous use of analgesics will lead to more cartilage damage in the joint, while correct use of the joint will help to arrest or slow down the cartilage degradation.

What do you need to know about osteoarthritis?

Osteoarthritis (OA) is the mechanical disorder par excellence. It is due to degeneration of the cartilage and may be primary (related to age or menopause) or secondary (related to mechanical effort, metabolic disorders, or genetic malformation, inflammatory arthritis, infectious arthritis). It is seen in 9.6% of the population aged 15 or older in Asian-Pacific countries [1]. The starting age depends mainly on the joint, with individual variation, which is probably due to variation in genetics. At the beginning, OA may not be painful, or the pain may be episodic.

Plain X-ray is not necessary for the diagnosis, helping essentially to demonstrate the severity of cartilage destruction. The radiographic signs appear late (months or years after the onset) and are mainly joint space narrowing and osteophytes.

There is no specific treatment to cure or even stop the progress of OA. Pain, on the contrary to what the patient thinks, is acting in his/her favor. Pain shows what activity is harmful to the joint and how much activity it can afford without interfering with the normal physiology of the cartilage. Pain-killing techniques are usually harmful for the joint, unless they are given concomitantly with rest. In many instances, there is no need for complete rest or medication. Explaining the physiology of pain is the best treatment for the prevention of fast degradation of the joint. Joint activity is permitted to the degree that pain is not too severe. In severe cases, anti-inflammatory drugs, either NSAIDs or steroids, are preferable as analgesics. They are given for 2 to 3 weeks (150 mg indomethacin or diclofenac, 15 mg prednisolone), along with moderate joint rest. After this period, medication is stopped, and the patient is advised about adequate joint activity. Exercise to improve muscle strength is very important, which by improving joint physiology helps to slow down the disease process.

What are specific recommendations for osteoarthritis of the knee?

Osteoarthritis of the knee is the most frequent type of OA, seen in 15.3% of cases. The pain starts with walking, in the beginning or later, depending of the severity of cartilage damage. With rest, pain disappears gradually. Gelling pain is seen at the start of walking, disappearing quickly. Pain may be located in the knee joint itself, or projected to the calf or thigh, or even to the hip. Physical examination reveals cold skin with normal coloration. Scraping the patella against the femoral knee epiphysis will produce a sensation of shaving an irregular surface. The maneuver is usually painful. The range of motion is normal at the beginning, deteriorating gradually. Full extension and full flexion become impossible, and gradually the limitation increases. Abnormal movement (lateral motion in full extension) is a sign of advanced cartilage destruction. X-rays, especially if taken in a standing position, will demonstrate joint space narrowing, which is more pronounced in the internal compartment. Episodically, an

inflammatory attack of OA will occur, and the knee will become swollen. The pain worsens and becomes continuous, while maintaining its mechanical character. Physical examination reveals synovial effusion with limitation of joint movement. It will disappear with rest, in a few days to a few weeks, and symptoms will settle to what they were previously. Laboratory tests are not necessary when the history is evocative. They remain normal, as during the normal course of the disease. X-rays do not change during the inflammatory attack. Treatment is indicated mainly for inflammatory attacks, when walking must be limited to allow the joint to rest. Exercise to strengthen quadriceps is essential, especially when walking is limited. When possible, bicycling is a very good choice, by preventing long displacements that are harmful to the knee joint, while exercising the quadriceps.

What about osteoarthritis in other locations?

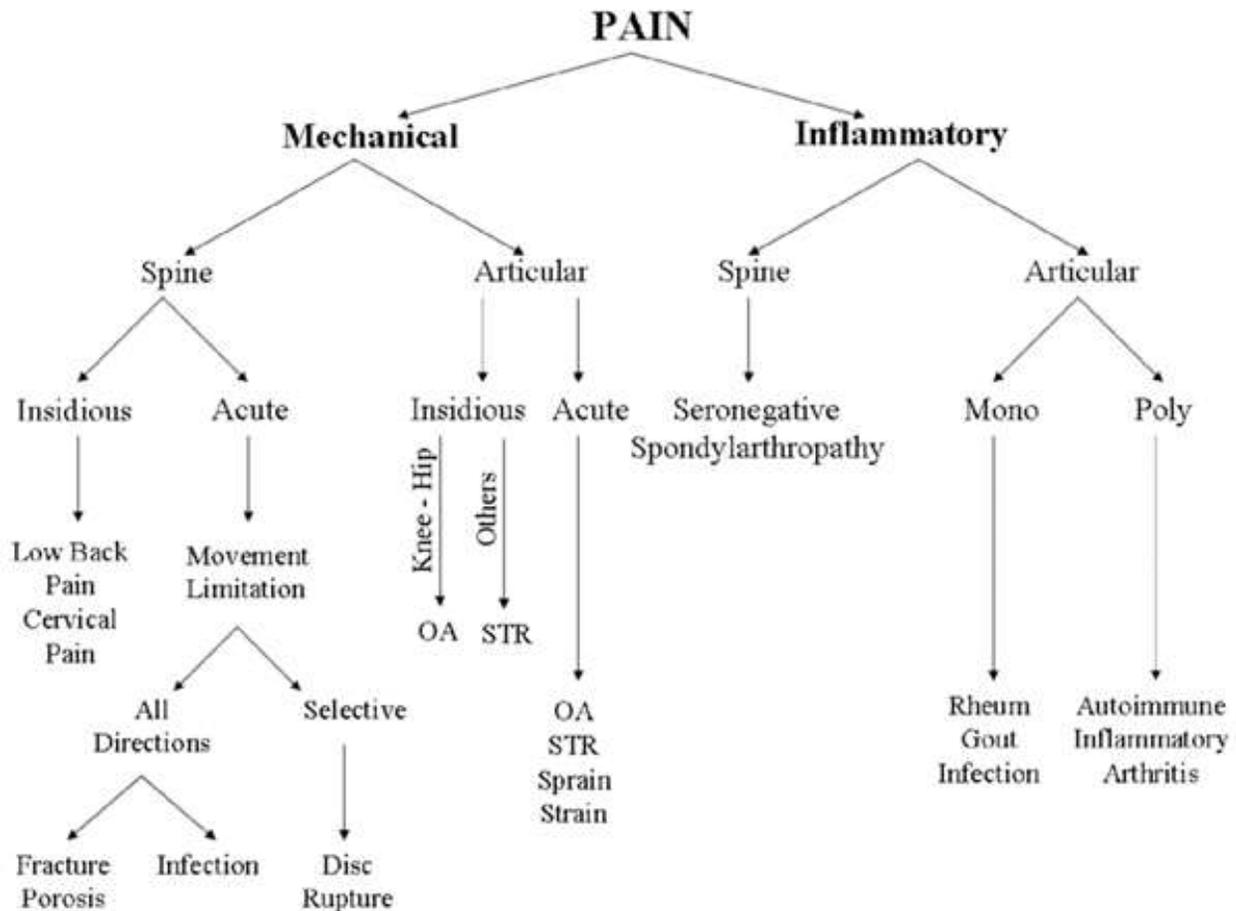
Osteoarthritis of the hip is much like knee OA, except that the pain is localized to the groin and buttock. It can project to the thigh or even the knee joint. Distal interphalangeal joint (DIP) OA is named as Heberden's node. It is characterized by two nodes on the dorsal aspect of the joint. After a long progression, slight to moderate deformity may appear. The pain is sporadic and is mainly seen when the nodes appear, and thereafter during progressive attacks. No treatment is effective. NSAIDs are effective only for the duration of attacks. Proximal interphalangeal joint (PIP) OA is named Bouchard's node. It is characterized by a single node on the dorsal aspect of the joint. It has the same characteristic as Heberden's node. EULAR guidelines for diagnosis are of interest.

Pain in OA of the toes is mechanical. Deformity is seen after long progression. Moderate activity and a short of course NSAIDs with joint rest are the best strategy. Surgery, when possible, can be a good alternate choice. Primary OA of the elbow is very rare. Among the secondary forms, using a jackhammer produces a special type of OA. Patients have night pain, very similar to inflammatory pain, improving or disappearing as work resumes. In the ankle, shoulder, wrist, and metacarpophalangeal joints, OA is usually secondary.

The decision tree (below) is self-explanatory.

As an example: If the pain is mechanical and the spine is involved, it is important to find out if the pain started insidiously or if it had an acute onset. In case of insidious onset, ordinary low back pain or cervical pain is by far the most likely cause.

- The decision tree cannot give you a diagnosis, but it may be of help as to where to search for the diagnosis.
- The first step is to distinguish between mechanical and inflammatory pain, which should not be too difficult.
- Clinical examination will help to elucidate the diagnosis. If necessary, laboratory tests and X-rays will be of help.
- The remainder of the decision tree is used in a similar manner.



Chapter 10

New Science for Pain Relief!



In the simplest terms, PAIN FAST AWAY is a card comprised of three polymers. When placed near the body, it absorbs healing energy and then acts as a mirror to reflect that positive energy back into the body. As the energy works to help strengthen cells that have become weakened, it delivers pain relief through a process known as plasmon resonance.

The PAIN FAST AWAY (2 inches by 3 inches) is comprised of a patented 3 layer polymer compound designed to reduce pain without use of pills or injections. The PAIN FAST AWAY CARD absorbs and replenishes the body requirements from your good energy by acting as an electromagnetic field mirror.

If you've tried various methods for pain relief but without success, you don't necessarily have to resort to surgery or prescription medications. With Pain Fast Away, you have a revolutionary alternative. One that's safer, easier and far less expensive than medication or surgery.

We have all heard of the aura of the body. An energy field of the human body, which shows life! All living things plants and animals have this same aura surrounding them.

The Pain Fast Away card is a reflector of this energy helping to improve wellbeing and help to relieve pain. Main advantages are: no battery, it is convenient, long lasting and no skin contact required! Positive response has occurred with hundreds of users (90 to 95% effective). For simple aches a relief occurs quickly, with deeper needs just tape the card on for a longer time.

The science behind our product is newly developed combination of patented polymers which work hand in hand with your body. Proprietary combination of these polymers causes a certain frequency parallel to our bodies in concert causing pain relief. There is a similarity to a resonant activity such as metals for other products on the market. Physics and bio-chemistry is a firm bases for these polymers in the way they are combined. In both clinical and non-clinical tests around the world we are getting positive responses.

I have been using the Pain Fast Away Card for my knee and my arch for about 10 months with great results. My chiropractor Dr. Kenneth B. Large suggested I try it. I was amazed at how well it worked for me. You can read more about it at <https://paindiscomfortstrategies.com/products.html>.

Chapter 11

The Role of Acupuncture in Pain Management

Why has acupuncture become so popular for pain management?

Acupuncture, as an alternative treatment for pain management, is becoming popular. The main reason is growing evidence on the effectiveness of acupuncture, even though studies on efficacy (e.g., specificity of standard acupuncture points compared to needling sham points) have shown contradictory results. A low rate of adverse events and a high degree of patient satisfaction are other main arguments for the growing use of acupuncture in Western countries. Another reason could be that the framework of traditional Chinese medicine (TCM) regards the human body as “whole,” rather than a complex of individual symptoms. There is a strong tendency toward the biopsychosocial model of pain management, an idea that has become an integral part of modern pain management. Another reason is that in small remote hospitals with a limited supply of drugs, acupuncture sometimes remains one of the few possible methods of treatment to provide pain relief. Also, acupuncture maybe a reasonable alternative in patients with contraindications to various drugs or who are intolerant of side effects or in situations where drugs are not affordable. When used in a rational way and as part of a comprehensive pain management program, acupuncture can be effective, especially if the patient is receptive toward it. Another advantage is that acupuncture can be simply applied without technical support or devices. The only preconditions are the presence of a skilled acupuncturist and a supply of sterile acupuncture needles.

What is more effective in the management of chronic pain?

As always, specialists are convinced that their own method is superior, and therefore acupuncturists tend to see acupuncture as a panacea (cure-all). Nevertheless, experienced pain therapists who use acupuncture and go through a thorough training would use a more sophisticated view: creating an antagonism between these two approaches of acupuncture and conventional pain management would be counterproductive for acupuncture in the long run,

since its effects are considerable but not overwhelming. Therefore, pain specialists are trying to incorporate acupuncture as a complementary technique into regular pain management as one module together with manual therapy, therapeutic exercises, and psycho- and pharmacotherapy within a therapeutic, rehabilitative, and preventive management complex.

What are the complications and side effects of acupuncture?

If the practitioner is adequately qualified, side effects and complications are rarely observed. Care must be taken in certain regions in the body where vulnerable structures are close to the skin, such as the lung in the thoracic area or superficial blood vessels and nerves, none of which should be needled. Hence, basic knowledge of anatomy is essential.

Chapter 12

Psychological Principles in Pain Management

What can we use for acute pain?

Acute pain occurs mainly in connection with an illness or injury or as an effect of a treatment of an illness (e.g., postsurgical pain). In contrast to chronic pain, acute pain is an alarm signal to the body. Normally, the cause is noticeable, and the treatment is mostly rest and management of the cause of pain. The psychological effect is the hope that the treatment will be successful and the pain will be over soon. It is possible that anxiety and apprehension may appear within the period of acute pain, for example, the fear of surgery and anesthesia that could form part of the treatment.

Practical consequences

As part of preparation for surgery, interventions such as relaxation techniques, a good explanation of the procedure and possible outcomes, and an optimistic outlook have been proven to be helpful. It is possible to reduce postoperative pain experience through such knowledge. Knowledge about the treatment can often reduce one's anxiety. Relaxation techniques can minimize psychological agitation patterns such as a high heart rate and inner restlessness.

What are the options in chronic non-cancer pain?

In the context of chronic abdominal pain, which is quite often difficult for the patient to locate and come to terms with, often together with the threat of incurability and looming death. Commonly, the physician wonders, "Why is the patient coming now?" Possible reasons for the patient can be a fear of serious diseases after deaths in the family, psychological comorbidities, emotional distress because of sexual abuse, but also trouble within the actual context of life and poor coping strategies, which may lead to an increase in the pain.

Practical consequences

Indicators of stress mentioned above should be looked for, which can affect the development and maintenance of pain. Therapeutic interventions including a good explanation of the disease, continuing psychological support, advice on balanced nutrition, and so on should be added over time.

How can we tackle chronic headache?

Most headaches have no organic cause. Very often we find interactions between headache and dysfunctional patterns of the muscles, such as increased tension, which can then, by itself, become a trigger for headaches. Social stress factors such as excessive demands at the workplace or poor coping strategies with stress, can make headaches intense and chronic.

Practical consequences

Important in the treatment of headache is understanding that stress can lead to an increase in the intensity and frequency of the headache. The most important psychological interventions are education in coping skills and in the importance of stress management, and the reduction of hyperactivity with lessons in cognitive behavioral therapy, relaxation techniques, and so on.

What can we use for chronic back pain?

Chronic back pain, in most cases, is musculoskeletal in origin, accompanied by poor coping skills along with other “yellow flags.” A special problem in coping with back pain is the fact that sometimes no sufficient explanation can be given to the patient regarding the cause and origin of the pain. For example, a diagnosis of “nonspecific back pain” leads to an extreme uncertainty on the part of the patient, often leading to increased fear of serious pathology and the desire for repeated diagnostic procedures. Often there is an iatrogenic component when repeated investigations are ordered—partly because the patient insists on it, and partly because the physician may be uncertain: “Is there a tumor or a serious disk prolapse causing the pain?” There may be a reluctance “to miss something.”

Practical consequences

A comprehensive compilation of all available findings, as well as discussion about previous diagnosis and treatment, can be useful to get a complete picture. The patient should be advised against unnecessary and often very expensive invasive diagnostic procedures. After considering all possible factors including psychiatric comorbidity or risks of chronification, a treatment plan can be developed. Good models on interactions, for example between depression and chronic pain, can help the patient to cope successfully with pain.

Chapter 13

Herbal and Other Supplements

What is the definition of natural health products?

Natural health products include vitamins, minerals, herbal medicines, homeopathies and other naturally derived substances (e.g., glucosamine, bee pollen) to prevent or treat various health conditions. You should get instructions on how to use them safely. Always think about the risk/benefit ratio, since natural health products might contain “unnatural” ingredients, such as heavy metals or other contaminants. Therefore, the use of natural health products depends on mutual trust between the caregiver and the healer, since there are few evidence-based data and standardized products available. It is advisable to seek cooperation between the “official” and “unofficial” medical sector, both to broaden therapeutic options and to avoid counterproductive interactions.

What supplements are best for acute pain?

Surgical procedures and acute trauma may be addressed by several natural health products. For example, the homeopathic remedies Arnica and Hypericum may be useful prior to and after surgery. Arnica is particularly useful for decreasing pain, bruising discoloration, and discomfort in the patient. Homeopathic Hypericum is very useful to heal incisions and eliminate pain. These remedies can be given orally at 200C potencies every 2–4 hours on the day prior to surgery and after surgery until the incision is healed. For acute trauma to muscles, ligaments, and tendons, topical creams or ointments containing *Harpagophytum procumbens* (Devil’s claw), *Capsicum frutescens* (cayenne), homeopathic Arnica, or methylsulfonylmethane (MSM) may be applied 3–4 times per day on the affected site as long as the skin is intact. What supplements are best for neuropathic pain? Peripheral neuralgias, if caused by malnutrition, may be treated by supplementation with vitamins. Vitamins E, B1, B3, B6, and B12 are essential for adequate nerve would include these vitamins, or alternatively a simple multivitamin mineral formula would be sufficient. In patients with diabetic neuropathy, besides adequately

controlling blood sugar, vitamin B6 at 150 mg or vitamin E at 800 IU per day may be effective. These supplements may be used together. A simple dietary intervention to aid in blood sugar control is the regular consumption of beans and legumes.

What supplements are best for chronic pain?

Chronic unspecified back pain may be treated with oral *Harpagophytum procumbens* (Devil's claw) at 2000–3000 mg per day, delivering 50–100 mg of the active constituent harpagoside; oral willow bark (*Salix alba*, *Salix daphnoides*, or *Salix purpurea*) at 1200 mg per day, delivering 120–240 mg of the active constituent salicin; or topical capsicum cream. Dysmenorrhea may be treated with oral calcium at 1000–1500 mg per day, magnesium at 300–400 mg per day, vitamin B6 at 100 mg per day, vitamin E at 400–800 IU per day, or *Vitex agnus-castus* (chaste berry) at 20–40 mg per day. For migraine headaches the following are effective: vitamin B2 400 mg per day, *Tanacetum parthenium* (feverfew) 100 mg per day, magnesium 500 mg per day, or *Petasites hybridus* (Butterbur) 150 mg per day. These can be used individually or in combination. Rheumatic pain in the form of osteoarthritis (OA) may be successfully treated with oral glucosamine sulfate at 1500 mg per day together with oral chondroitin sulfate at 1200 mg per day; oral unsaponifiable fractions of avocado and soybean oils at 300 mg per day; oral *Harpagophytum procumbens* (Devil's claw) 2400 mg per day; and topical creams containing a combination of camphor, glucosamine sulfate, and chondroitin sulfate. Mild to moderate OA may respond to a treatment starting with glucosamine sulfate (1500 mg/day) and chondroitin sulfate (1200 mg per day) for 4–6 weeks, and if there is a limited effect adding oral unsaponifiable fractions of avocado and soybean oils and Devil's claw. Rheumatoid arthritis may be treated with oral borage seed oil at 1–1.5 grams per day, oral fish oil providing eicosapentaenoic acid (EPA) and docosahexanoic acid (DHA) at 2 grams/day, oral vitamin E at 800 IU per day, or oral *Tripterygium wilfordii* (thunder god vine) at 200–600 mg per day.

What supplements are best for special therapeutic situations?

Dementia of the Alzheimer's type may be effectively treated with oral *Ginkgo biloba* (Ginkgo) at 120–240 mg per day, oral *Melissa officinalis* (lemon balm) at 60 drops of a 45% alcohol extract,

oral *Salvia officinalis* (sage) at 1000 mg per day, or oral vitamin E at 2000 IU per day. These supplements may be used in isolation or in combination. It may take 3–4 months before any effects of these interventions are seen.

Appendix

Resources used:

Guide to Pain Management in Low-Resource Settings

Editors

Andreas Kopf, MD | Department of Anesthesiology | Charité Medical University | Berlin, Germany

Nilesh B. Patel, PhD | Department of Medical Physiology | University of Nairobi | Nairobi, Kenya

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Contributing Authors to Guide to Pain Management in Low-Resource Settings

Justin N. Baker, MD

Department of Pediatric Medicine

Division of Palliative and End-of-Life-Care

St. Jude Children's Research Hospital

Memphis, Tennessee, USA

Kay Brune, MD

Institute of Pharmacology and Toxicology

Friedrich-Alexander University of Erlangen-Nurnberg

Erlangen, Germany

Barrie Cassileth, PhD

Integrative Medicine Service

Memorial Sloan-Kettering Cancer Centre

New York, New York, USA

Maged El-Ansary, MD

Department of Anesthesiology

Al-Azhar University

Cairo, Egypt

Susan Evans, MD

Endometriosis Care Centres of Australia

Adelaide, Australia

Richard C. Fisher, MD

Orthopedic Overseas Division

Health Volunteers Overseas

Washington, DC, USA

Arnaud Fumal, MD

Neurology and Headache Research Unit

University of Liege

Liege, Belgium

David E. Joranson, MSSW

Pain & Policy Studies Group

University of Wisconsin Carbone Cancer Center

School of Medicine and Public Health

Madison, Wisconsin, USA

Javier R. Kane, MD

Department of Pediatric Medicine

Division of Palliative and End-of-Life Care

St. Jude Children's Research Hospital

Memphis, Tennessee, USA

Dr Natalia Samoilova

Department of Pain Medicine

National Research Centre of Surgery B.V. Petrosky

Russian Academy of Medical Science

Moscow, Russia

Michael Schäfer, MD, PhD

Department of Anesthesiology

Joel Gagnier, ND, MSc, PhD

Department of Epidemiology

School of Public Health

University of Michigan

Ann Arbor, Michigan, USA

Dr Lars Garten

Otto Heubner Centre for Pediatric and Adolescent Medicine

Charite University Hospitals

Berlin, Germany

Hans J. Gerbershagen, MD, PhD

Department of Anesthesiology

Division of Perioperative and Emergency Care

University Medical Center Utrecht

Utrecht, The Netherlands

Jyothirmai Gubili, MS

Integrative Medicine Service

Memorial Sloan-Kettering Cancer Centre

New York, New York, USA

Uriah Guevara-Lopez, MD, MSc

Department of Pain Medicine and Palliative Care

National Institute of Medical Sciences

Mexico City, Mexico

Maija Haanpää, MD, PhD

Department of Neurosurgery

Helsinki University Hospital

Helsinki, Finland

Aki Hietaharju, MD, PhD

Pain Clinic

Department of Neurology and Rehabilitation

Tampere University Hospital

Tampere, Finland

Vladimir Hrabal, Dr phil.

Department of Medical Psychology

University of Ulm

Ulm, Germany

Sabu Kumar James, MBBS

Department of Anaesthesiology

University of Glasgow

Glasgow, Scotland

United Kingdom

Katarina Jankovic, MD

Department of Anesthesiology

MP Shah Hospital

Nairobi, Kenya

Oseremen Aisuodionoe-Shadrach, MBBS

Charite University Hospitals
 Berlin, Germany
 Barbara Schlisio, MD
 Department of Anesthesiology
 University Medical Centre
 Tubingen, Germany
 Dr Jean Schoenen
 Headache Research Unit
 Department of Neurology and GIGA Neurosciences
 Liege University
 Liege, Belgium
 Claudia Schulz-Gibbins, Dipl.-Psych.
 Department of Anesthesiology
 Charite University Hospitals
 Berlin, Germany
 Andreas Schwarzer, MD, PhD
 Department of Pain Management
 Clinic for Anesthesiology
 University Clinic Bergmannsheil
 Ruhr-University
 Bochum, Germany
 Olaitan A Soyannwo, MB BS, MMed
 Department of Anesthesia
 Ibadan College of Medicine
 Ibadan, Nigeria
 Christoph Stein, MD
 Department of Anesthesiology
 Charite University
 Berlin, Germany
 Paula Tanabe, RN, PhD
 Department of Emergency Medicine
 Institute for Healthcare Studies
 Northwestern University
 Chicago, Illinois, USA
 Mohamed Omar Tawfi k, MD, MBCh
 (deceased, June 2009)
 Pain Unit
 National Cancer Institute
 Cairo University
 Cairo, Egypt
 Josephine M. Thorp, MRCP, FFARCS
 Anaesthetic Department, Monklands Hospital
 Airdrie, Lanarkshire
 Scotland, United Kingdom
 Knox H. Todd, MD, MPH
 Department of Emergency Medicine
 Beth Israel Medical Center
 New York, New York, USA
 Dr Harald C. Traue
 Medical Psychology
 Department of Psychosomatic Medicine and Psychotherapy
 University of Ulm
 Ulm, Germany
 Rolf-Detlef Treede, MD
 Department of Neurophysiology
 Faculty of Medicine Mannheim, University of Heidelberg
 Mannheim, Germany
 Steven Waldman, MD

Department of Surgery
 University of Abuja
 Abuja, Nigeria
 Dr Gona Ali
 Faculty of Medicine
 University of Sulaymaniyah
 Sulaymaniyah, Iraq
 Andrew O. Amata, MBBS
 Department of Anaesthesia and Intensive Care
 Georgetown Public Hospital Corporation
 Georgetown, Guyana
 Corrie C. Avenant, MB ChB
 Fontainebleau, Randburg
 South Africa
 Dr Frank Boni
 Department of Anesthesiology
 University of Ghana Medical School
 Accra, Ghana
 Alfredo Covarrubias-Gomez, MD
 Vasco De Quiroga 15, Col. Seccion XVI
 Torelio Guerra, Tlalpan
 Mexico City 14000, Mexico
 Ferydoun Davatchi, MD
 Rheumatology Research Center
 Division of Rheumatology
 Tehran University for Medical Sciences
 Tehran, Iran
 Dr Henry Ddungu, MD
 African Palliative Care Association
 Kampala, Uganda
 Julia Downing, PhD
 African Palliative Care Association
 Kampala, Uganda
 julia.downing@apca.co.ug
 Glenda E. Gray, MD
 Perinatal HIV Research Unit
 University of Witwatersrand
 Diepkloof, South Africa
 Thomas Jehser, MD
 Pain and Palliative Care Department
 Havelhohe Hospital
 Berlin, Germany
 Lucia Jerg-Bretzke, PhD
 Medical Psychology
 Department of Psychosomatic Medicine and Psychotherapy
 University of Ulm
 Ulm, Germany
 Paul G. Kioy, MBChB, MMed
 Department of Medical Physiology
 University of Nairobi
 Nairobi, Kenya
 Andreas Kopf, MD
 Pain Unit, Department of Anesthesiology
 Charite University Hospitals
 Berlin, Germany
 Visiting Professor, Department of Medical Physiology
 University of Nairobi, Kenya
 Winfried Meissner, MD

The Headache and Pain Centre
 Leawood, Kansas, USA
 Wilfried Witte, MA
 Department of Anaesthesiology
 Charite University Hospitals
 Free University of Berlin
 Berlin, Germany
 Fatima Laher, MBBCh
 Perinatal HIV Research Unit
 University of Witwatersrand
 Diepkloof, South Africa
 Dr Erica Lazarus
 Perinatal HIV Research Unit
 University of Witwatersrand
 Diepkloof, South Africa
 Christoph Maier, MD
 Department of Pain Management
 Clinic for Anesthesiology
 University Clinic Bergmannsheil
 Ruhr-University
 Bochum, Germany
 Angela Mailis-Gagnon, MD
 Comprehensive Pain Program
 Toronto Western Hospital
 Toronto, Ontario, Canada
 angela.mailis@uhn.on.ca
 Dilip Pawar, MBBS
 Department of Anesthesiology
 All India Institute of Medical Sciences
 New Delhi, India
 Michael Pfi ngsten, PhD
 Pain Clinic
 Department of Anaesthesiology
 University Medicine
 Gottingen, Germany
 Richard A. Powell, MA, MSc
 African Palliative Care Association
 Kampala, Uganda
 Lukas Radbruch, MD
 Palliative Care Unit
 University Hospital Aachen
 Aachen, Germany
 M.R. Rajagopal, MD
 Pallium India (Trust)
 Trivandrum, Kerala India

Department of Internal Medicine
 University Medical Centre
 Jena, Germany
 Dr Gaman Mohammed
 Diabetes Centre
 Avenue Healthcare
 Nairobi, Kenya
 Lutz Moser, MD
 Department of Radiology
 Charite University Hospitals
 Berlin, Germany
 Faith N. Mwangi-Powell, PhD
 African Palliative Care Association
 Kampala, Uganda
 Mathew O.B. Olaogun, PT
 Department of Medical Rehabilitation
 Obafemi Awolowo University
 Ife-Ife, Nigeria
 Michael Paech, MBBS, FRCA, FANZCA,
 FFPMANZCA
 Division of Anaesthesiology
 University of Western Australia
 Crawley, Western Australia
 Australia
 Nilesh B. Patel, PhD
 Department of Medical Physiology
 University of Nairobi
 Nairobi, Kenya
 Dr. Raul Ribeiro, MD
 Department of Oncology
 International Outreach Program
 St. Jude Children’s Research Hospital
 Memphis, Tennessee, USA
 Rainer Sabatowski, MD
 Interdisciplinary Pain Clinic
 University Hospital Carl-Gustav Carus
 Dresden, Germany

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