

SCIENTIFIC PHYSICAL THERAPY

The Swedish SBU Report on Back and Neck Pain

A Reprint

Pain is a signal that something is wrong. Regardless of its location, pain should be investigated to confirm or eliminate its association with a specific cause or serious disorder.

Although pain in the low back or neck affects most people at some time during their lives, it is seldom a sign of serious illness. In some people, the effects are more severe and more frequent, but most experience mild effects and only occasionally. Few experience constant, persistent pain.

Research seldom explains why or how pain in the low back or neck originates, or how long it will last; i.e., whether it is acute and temporary or will remain a chronic problem. It can result from different, but perhaps associated factors. The relationship of these factors often remains unknown. Although it is not always possible to cure back pain, treatment methods are available which can effectively relieve pain in most people.

Numerous studies have analyzed whether factors related to the individual, e.g., gender, age, body length, weight, anatomic changes in the spine, and smoking, correlate in any way with back pain. The data currently available do not reveal any specific, individual risk factors for back pain. Most studies find no differences in the risk for back pain, neither between men and women nor among individuals of different height, weight, etc. The only exception would be sciatica resulting from herniated discs, a disorder that appears more frequently in people aged 40 to 45 years.

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Heavy physical labor and poor working environments are often cited as reasons for back pain. Many studies also report a clear correlation between reported low back problems and heavy lifting or working positions in which the back is bent or twisted repeatedly and over a longer period of time. This also includes "shaky" vehicles such as forklifts, trucks, and tractors. As regards neck problems, studies have found a clear association between repetitive, monotonous work and fixed working positions. Neck and low back problems are also associated with poor psychosocial conditions in private life and the workplace, including poor work satisfaction.

Pain in the neck or low back can influence functional capacity and cause worry, anxiety, and depression. It has been known for some time that this, in turn, can amplify the perception of pain, but only recently have psychological factors been viewed as a link in the causal chain underlying the occurrence and persistence of neck and low back problems. There is well-documented scientific evidence that numerous psychological factors can influence the development and persistence of acute and chronic pain in the neck and low back. These problems occur since mental

state, feelings, and behavior are partly dependent on factors such as work demands, time pressure, monotonous work, a low level of influence over the situation, poor social support, experienced pain, stress, worry, and anxiety.

Despite the insight on the important roles of these factors, research has contributed little by way of studies to assess preventive interventions against back pain. The studies which have been conducted in the field have focused primarily on rather narrowly defined preventive measures such as ergonomic methods, physical exercise, education on back anatomy, various supportive devices for the lumbar spine, and interventions to influence smoking, obesity, and certain psychosocial factors. The results of these studies are discouraging in the sense that most of the preventive measures studied are shown to be ineffective. *The only exception is moderate, but regular physical training or exercise, where the results of several studies show good effects.*

There are many different methods to treat back and neck pain. Naturally, for both the caregiver and the person with pain it is important to know which methods can help and which methods have been shown by scientific studies to have no effect. Far from all methods have been studied scientifically in terms of

patient outcomes. This review presents what we know and what we do not know about the effects of different treatment methods, based on comparative studies found in the international scientific literature.

Project

During the late 1980s, the Swedish Council on Technology Assessment in Health Care (SBU) initiated a project on the diagnosis and treatment of back pain. The project report, published in 1991, was well received.

Since then, the body of scientific literature on back pain has expanded greatly. For example, when the previous report was published, the project group had identified around 6000 studies, whereof approximately 100 were randomized controlled trials. Today, approximately 25,000 studies on back and neck pain have been identified, whereof approximately 1000 are randomized and/or controlled studies. Methods for searching and classifying scientific literature and methods for assessing the weight of the evidence presented have also advanced and have improved substantially during the past decade.

Approximately 4 years ago, SBU appointed an international project group of 13 people who were charged with complementing the



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previous report with results from scientific studies published during the 1990s. Approximately 80% of the studies referenced in this report have been published since the previous report was completed. The current SBU report consists of two volumes.

The first volume addresses how the work situation and social, psychological, and individual factors can influence back pain. It also discusses what is known about the origins of pain, the potential for preventing back pain, and how often it appears in different populations and age groups.

The second volume presents scientific facts on

theresults of conservative, surgical, and psychological treatment methods and the cost-effectiveness of various treatment methods. Volume two also presents an estimate of the total socioeconomic costs for neck and low back pain and a comparison of different social insurance systems.

The Scientific Literature

Many of the studies available present only descriptions, perspectives, and opinions about the causes of the problem and discuss what can be done by way of cure, relief, and rehabilitation. Others present data from comparative studies on the outcomes of different treatment methods.

The group working with this review selected around 2000 studies which they found to present relatively strong scientific evidence on different issues concerning back pain. Each chapter of the report describes how the literature was selected for that chapter.

In most chapters on treatment methods, the studies selected were limited to randomized controlled trials - i.e., studies where patients were randomly allocated to different types of treatment to analyze whether the treatment had effects, and if so, which treatment yielded the best results. This methodology is the most reliable for assessing the

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outcome of treatment, even if it is not completely objective and may somewhat limit the conclusions.

All studies that use this methodology are, however, not equally strong scientifically. Therefore, each study was graded according to the strength of the scientific evidence. This was done as objectively as possible with the help of different protocols for grading the quality of the scientific assessments. However, in all chapters it was not possible to follow exactly the same procedure to grade the evidence of studies. As a rule, however, the studies were classified into groups that reflect: (A) strong scientific evidence, (B) moderate evidence, (C) limited evidence, and (D) no evidence.

Studies classified into group A) offer strong scientific evidence that a particular treatment has good effects or strong scientific evidence that a particular treatment is shown to be ineffective by randomized controlled trials and has no positive effects on a patient's back problems. The same applies to studies in groups (B) and (C), i.e., that moderate or limited evidence is available to show the effectiveness or ineffectiveness of a particular treatment. Finally, placement in group (D) means that no studies are available that meet the standards for good

scientific quality.

A summary of the results from the literature search is presented below.

Diagnosing Pain in the Neck and Low Back

Thorough, systematic anamnesis and physical examination are a good foundation for diagnosing back pain according to many studies reflecting moderate evidence (B). Furthermore, many studies show that the caregiver's involvement and ability to listen to the patient's concerns-not only about pain and its location but also about the consequences of pain and how it is dealt with-are essential to good diagnosis. Along with the anamnesis and physical examination, listening and talking allow the patient and caregiver to reach agreement on the best treatment. In most cases, this is a sufficient basis for developing a treatment strategy. It is also sufficient for identifying the few cases that must be referred for further investigation when a specific cause or serious disease may be responsible for the pain.

If pain persists for three to four weeks, further investigation should be carried out using one of the validated questionnaires which are available, and which can identify other relevant problems, e.g., in the work environment or the psychosocial situation in

general (B).

Basic x-ray examination seldom provides guidance in diagnoses, except in cases where specific trauma or serious disease is present or suspected. As a rule, computed tomography (CT) and magnetic resonance imaging (MRI) studies do not identify where pain is located, again, except in patients where specific disease is suspected. A herniated disc pressing on a nerve root can cause severe sciatica. This condition can be visualized and confirmed by computed tomography or magnetic resonance imaging.

The advantage of CT examination is that the procedure is noninvasive, and MRI examination does not involve a radiation risk. However, false positive findings are a risk associated with these types of studies. This risk is substantial, both regarding herniated discs and changes in discs resulting from aging or narrowing of the spinal and root canals, which appear in approximately 40% to 50% of symptom-free individuals.

Only limited evidence is available for many other diagnostic methods and their benefits (C.) This applies to measurement of range of motion, muscle strength and condition, facet joint or nerve root blockades, spectrometry, discography, electromyography or neurophysiology studies, and radiographic measurement of

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segmental movements and various spinal diameters.

Moderate evidence (B) suggests that thermography and ultrasound studies do not contribute information toward establishing a diagnosis.

Conservative Treatment of Acute and Chronic Low Back Pain

Conservative treatment refers basically to all non-surgical treatment methods, excluding psychological treatment (discussed separately below). Conservative treatment methods include drugs, acupuncture, injections of various types, back exercises, back school, manual treatment, manipulation,

physical methods, traction, corsets, TENS (transcutaneous electrical nerve stimulation), behavioral therapy, multidisciplinary treatment, biofeedback, rest, and activation. The appendix to this summary presents an overview of the effects of various treatment methods. Here, the only conclusions presented on conservative treatment methods are those supported by strong evidence (A). However, the treatment methods graded as B-level evidence are also supported by relatively good scientific documentation (Appendix 1).

For acute low back pain, there is strong evidence (A) that:

- continuing with normal activities results in

faster recovery and fewer chronic functional disorders,

- anti-inflammatory and muscle relaxant drugs offer effective pain relief for uncomplicated, acute low back pain (however, these drugs have some side effects),

- bed-rest is not effective treatment for acute low back pain, and

- exercises involving bending, traction, aerobics, and stretching do not effectively cure acute low back pain.

For chronic low back pain, there is strong evidence (A) that:

- manual treatment/manipulation, back training,

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and multi-disciplinary treatment are effective in relieving pain,

- intensive treatment at a health resort reduces pain in the short term for elderly patients (over 60 years of age) with chronic low back problems.

Conservative Treatment of Acute and Chronic Neck Pain

Conventional treatment methods that are normally used to treat neck pain are largely similar to those used to treat low back problems. The treatment methods reviewed in this report include drugs, physical training, manual treatment, massage, body exercises, muscle training, heat packs, ergonomic counseling, traction, acupuncture, TENS, electromagnetic treatment, magnet therapy, patient education, behavioral therapy, steroid injections, and treatment involving neck collars, infrared light ultrasound, lasers, cooling spray, and stretching.

Only a few studies in this field are of high scientific quality. In summary, only moderate or limited evidence is available to show that any of the treatment methods are effective in treating acute or chronic neck pain. However, there is strong evidence to show that acupuncture is not an effective method in treating chronic neck pain (A).

Surgical Treatment

When assessing the results of surgical treatment, the importance of weighing the risks and benefits of intervention increases.

Low Back Pain

Surgery for low back pain usually involves treating herniated discs in patients with sciatica, reducing pressure on painful nerve roots, or treating degenerative disc disease (which is a common age-related syndrome) where surgery is used to reduce pressure and/or stabilize vertebrae through fusion. Numerous surgical methods are used to treat herniated discs, e.g., with or without the help of lasers or microscopes, or through minimally invasive surgery. There is no scientific evidence to show that these surgical methods would yield better results or fewer serious complications than conventional surgery (D).

The reviewed studies reveal many methodological deficiencies, mainly the studies on surgery for degenerative disc disorders aimed at measuring outcomes (which were often based on rough estimates by either the surgeons themselves or by patients who underwent surgery.)

There is limited evidence on the outcome of surgery for herniated discs, but there is strong, indirect

evidence on its effectiveness. The randomized studies that were reviewed showed herniated disc surgery to be more effective than placebo (A). Chemonucleolysis is an alternative to surgery and involves using the chymopapain enzyme to chemically dissolve the soft nucleus of the disc. The results of surgery are inferior when following failed chemonucleolysis.

Several surgical fusion methods are available to treat degenerative disc disorders or spinal stenosis, but there is no consensus on the definition and importance of spinal "instability". No randomized controlled trials compare the effects of fusion with conventional treatment, placebo, or with the natural course of degenerative disc disease. There is no scientific evidence on the results from this type of surgery (D).

Neck Pain

The studies reviewed address the surgical treatment of chronic pain resulting from whiplash injuries, herniated discs, or spondylosis.

Only one randomized controlled trial was found on surgery for spondylosis, with or without herniated disc involvement. This study reported no advantages from surgery (B). Regarding whiplash injuries, there is no evidence that surgery is superior to conservative treatment.

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Psychological Treatment Methods

Psychological treatment methods are used to complement other treatments and are often included as part of the increasingly common multidimensional pain treatment programs. Cognitive behavioral therapy focuses on managing the problems, feelings, thoughts, and behaviors that pain and functional disabilities may cause.

Many randomized controlled studies have addressed cognitive behavioral therapy. Although it is difficult to assess the specific impact of cognitive behavioral therapy in multidimensional programs, studies show that programs which include this type of treatment achieve better results than other types of treatment in patients with chronic back problems (A). This particularly applies to treatment effects on anxiety, physical function, and medication use.

Influence of Social Factors

Social factors which have been reviewed include: the role of culture and family; the influence on unemployment on the consequences of back pain, its intensity, and duration; the role of access to social welfare payments and early pensions; and the importance of relations with work colleagues and the degree of work satisfaction in this context.

Neck and back pain occur in all societies, but cultural groups differ in how they perceive symptoms and react to them. No scientific evidence shows that genetic factors play a role in the occurrence of back pain, except possibly in disc aging. *(Continued on Page Eleven)*



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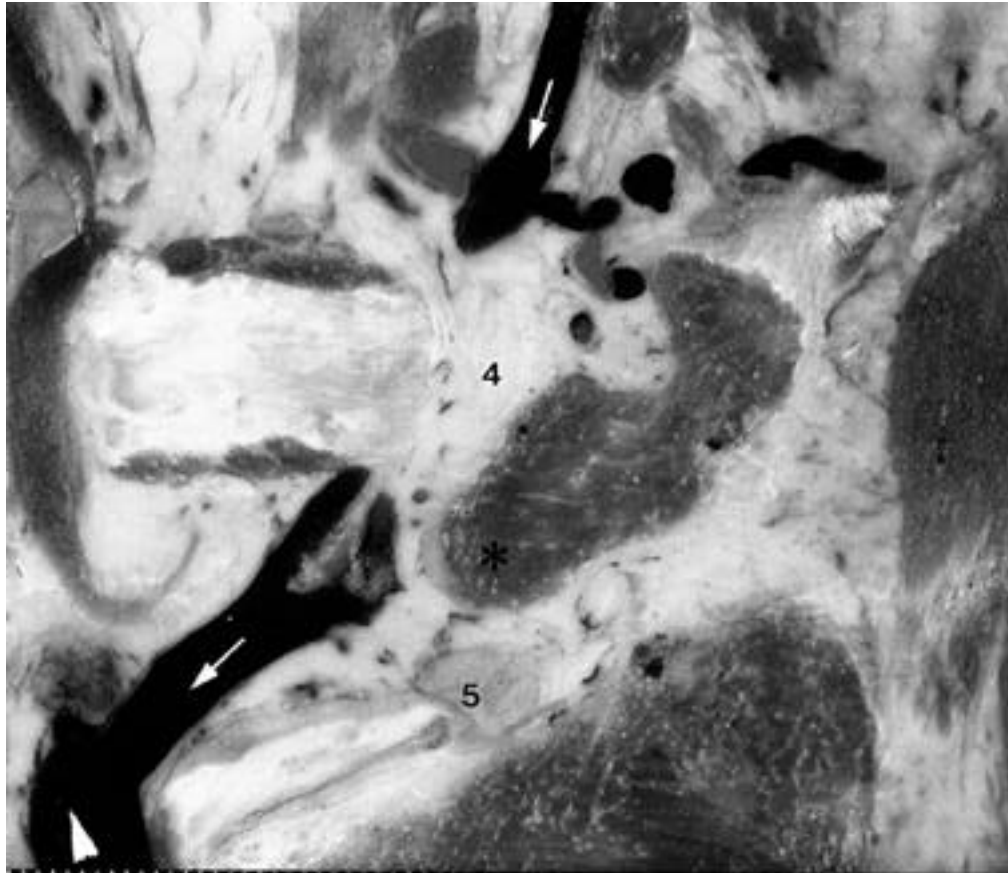
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Severely degenerated lower lumbar spine of a 70-year-old man who had a history of long-standing low back pain. This sagittal section through the lateral borders of the L4-L5 and L5-S1 discs illustrates the topographic relationships of the L4 and L5 nerves to the discs and the venous structures. The left iliac vein runs immediately anterior to the (degenerated) L5-S1 disc space and also receives the ascending lumbar vein at this level. The L5 nerve, snugly following the lower L5 endplate, is severely deformed by the posteriorly projecting spondylosis flanges. Inferiorly the L5 nerve is bounded by the ala of the sacrum, superiorly by the heavy transverse process of L5. The metric scale at the baseline illustrates that a few millimeters' scoliotic tilt could compress the L5 nerve outside its neuroforamen (far-out-syndrome).

***With Permission from Wolfgang Rauschnig, MD, PhD
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Many studies show that poor social conditions are closely associated with poor general health status, including back pain. Regarding back problems as a risk factor for unemployment and early retirement, several studies clearly show conflicting results without a clear *cause-and-effect* relationship. Rather, it appears that age, psychological factors, and access to insurance are important explanatory variables in this context.

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Several studies show that neck and back pain are not always isolated clinical problems, but are often associated with other pain, other diseases, stress-related symptoms, and work-related or other social problems. Scientific evidence show, e.g., that negative psychosocial aspects in working life, such as poor work satisfaction and poor relationships with others are associated with higher reporting of neck and back problems. There are no confirmed biological mechanisms that can explain how psychosocial factors would cause back pain, nor any evidence of a direct causal relationship.

In summary, there is extensive, but scientifically weak, evidence that social factors can influence the tendency to recognize back pain and that they can influence attitudes toward pain, functional disabilities,

absenteeism, and early retirement. Some of these factors can be rather powerful and, at least in some situations, may have a greater impact on the back or neck than physical problems.

Economic Aspects

The total socio-economic costs associated with back pain in Sweden in 1995 were 29.4 billion Swedish kronor (SEK), equivalent to about \$377 million USD per million population. Most of these costs (98%), 27 billion SEK, were costs for sick leave and early retirement attributed to back pain. The remaining sum of 2.4 billion SEK represents the direct costs to health services, including physician visits, diagnostic studies, drugs, surgery, hospitalization, etc.

The direct cost to health care increased by 35% from 1987 to 1995. The overwhelming share of the increases in these direct costs can be attributed to a doubling of the costs for physiotherapy from 1987 to 1995. In fixed prices, these costs increased from 435 million SEK in 1987 to 950 million SEK in 1995.

Studies on the cost-effectiveness of various treatment methods were reviewed in developing this report. These studies addressed, e.g., preventive programs involving physiotherapy, education,

back school, workplace adaptation, early activation, manipulation, exercises, and various types of surgery. The review shows it is not possible to draw reliable conclusions on the cost-effectiveness of any treatment method.

Role of Primary Care

Many earlier reviews from different countries have led to evidence based guidelines for care of patients with back pain. These have focused on primary care.

The scientific studies currently available show that the interventions provided within primary care are the only ones needed by most patients with back problems. These studies also show that a primary care physician's most important task is not to intervene unnecessarily. Subjecting a patient to ineffective examinations and treatments carries the risk, e.g., that the patient's back problem can develop into a chronic, life-long disorder.

In primary care, the consultation itself offers a major opportunity to influence both the acute and the more long-term course of back problems. An essential aspect of the consultation is the involvement of the caregiver and the ability to work with and listen to the patient's perceptions on back pain, mainly how it impacts on daily life. The opportunity for the physician and the patient to arrive at a common

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understanding about the nature and course of back pain is of major importance for the prognosis and is highly dependent on a good patient-doctor relationship.

Conclusions

- Pain in the low back and neck is common. Low back pain affects up to 80% of all people at some time during life, and neck pain affects up to 50% of the population. In the overwhelming majority of people, back pain does not signal a serious disease or suggest that one should avoid normal daily activities. On the contrary, *scientific studies show that healing is promoted by staying active, returning to work, and exercising at an appropriate and increasing intensity.*
- A thorough anamnesis and physical examination is important for relieving anxiety about the consequences of pain and sufficient for identifying the patients who should be referred to another specialists for examination and treatment (e.g., due to severe infection, specific rheumatic disease, suspected cancer, or other serious conditions.)
- For most people with back pain, the interventions which can be offered in primary care are the only ones needed. The physician's attitude and ability to listen to and express empathy with the patient is important for achieving a common understanding with the patient concerning which treatment strategies would be effective. This also has importance for the future course of back pain and compliance with treatment advice.
- Back pain and its consequences are not isolated physical problems but are associated with other conditions such as social, psychological, and workplace-related factors. These factors, e.g., stress, worry, and anxiety- along with the patient's own perceptions of and ability to manage the problem-can have a decisive impact on the transition from acute to more chronic pain. The obvious role of psychosocial factors in this respect suggests that such factors should be considered an integral part of back pain in relation to preventive efforts, in the initial phase of treatment, and later during rehabilitation.
- Knowledge on how to prevent back pain is not directly deficient, but has been applied and assessed to a surprisingly small degree. The knowledge currently available should be applied and thoroughly assessed.
- The relatively large resources that have been invested locally, regionally, and nationally to prevent and rehabilitate back problems, including interventions to improve the work environment, should be subject to systematic assessment based on current knowledge about the effects of various interventions. The sporadic research on prevention and rehabilitation of back problems should also be assessed in terms of its relevance and scientific quality.
- Many treatment methods are currently used, but there is little scientific evidence on their benefits. Some treatment methods are used despite scientific evidence showing that they do not benefit the patient. The appropriateness of subsidizing ineffective treatments with public funds should be investigated.
- The primary focus concerning back pain should be on the pain itself and on the human

suffering it involves. Furthermore, back pain has an extensive economic impact on the individual and society. The direct healthcare costs and the costs resulting from sick leave and early retirement due to back pain reach an annual sum that is over three times higher than the corresponding costs for all cancer diseases. Against this background, it is remarkable that research on back pain, particularly research related to prevention, pain relief, and rehabilitation is relatively limited in scope. Agencies which have responsibility for and interest in effectively managing back problems should take initiatives to stimulate and focus research in this field, and disseminate information that is currently available, e.g., in this report.

Evidence for treatment of Low Back Pain (From SBU's Summary and Conclusions)

	<u>Acute</u>	<u>Chronic</u>
Rest/bed-rest	Strong evidence against	
Traction	Limited evidence	Strong evidence against
Antidepressants	No evidence	Moderate evidence against
Biofeedback	No evidence	Moderate evidence against
Epidural steroid injections		
- No nerve root pain	No evidence	Moderate evidence against
Cold	No evidence	No evidence
Heat	No evidence	No evidence
Injections in triggerpoints	No evidence	No evidence
Injections in ligaments	No evidence	No evidence
Injections in facet points	No evidence	No evidence
Massage	No evidence	No evidence
Shortwave diathermy	No evidence	No evidence
Ultrasound	No evidence	No evidence
Acupuncture	No evidence	No evidence
Corsets	No evidence	Limited evidence
Back evidence	No evidence	Strong evidence for
Health resorts	No evidence	Strong evidence for
Multidisciplinary	No evidence	Strong evidence for
All forms of surgery		
- Except for herniated disc	No evidence	No evidence
Back school	Limited evidence	Limited evidence
TENS	Limited evidence	Limited evidence
Epidural steroid injections		
- nerve root pain	Limited evidence	Limited evidence
Colchicine	Limited evidence	
Cortisone	Limited evidence	
Behavioral therapy	Limited evidence	Strong evidence for
Manual therapy	Moderate evidence for	Strong evidence for
Paracetamol	Moderate evidence for	
NSAIDs	Strong evidence for	
Continued activity	Strong evidence for	
Surgery for herniated disc	Strong evidence for	

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