Ankle Sprain Guideline

Prof. Dr. Rob de Bie
Chair of Physiotherapy Research

Contents

- Rationale
- Process
- Evidence
- Of use for daily practice?

Auch…!!!

Dutch data

- 600,000 patients present annually with an ankle sprain that requires medical treatment: 75% inversion injury
- Prevalence of functional instability: 10 - 60%

Influencing factors

- Proprioception
- Muscle strength
- Mechanical instability
- Mobility
- Reduced nerve conduction velocity
- How one copes with the complaint
EBP is the VOODOO of the 3rd millennium

Evidence Guideline

Literature review
- Searches up to 2004 in MEDLINE, EMBASE, CINAHL, Cochrane
  Rehabilitation and Related Therapy Field & DocOnline
- Methodological quality assessment

Limitations of studies
- Methodological quality score
- Outcomes reported
- Healthy volunteers
- Small groups
- Left/right comparisons

Diagnostic process
- History taking
- Inspection
  - No passive tests
  - No assessment of severity
- Palpation
  - Only for differential diagnostic purposes
- Function score

Differential Diagnosis
- (osteochondral) lesions, osteophytes
- loose bodies, fractures
- artrosis
- distal tibio-fibular syndesmosis rupture
- sinus tarsi syndrome
- subtalar instability
  - OTTAWA ANKLE RULES!

No passive tests
No assessment of severity
Only for differential diagnostic purposes
function score
Diagnostic rationale

- Extensive history taking
- Gait analysis
- Proprioception
- Strength
- Mobility
- Function
- Exclusion of other / previous residual complaints (of a previous ankle sprain)

Function score

- Diagnosis
- Prognosis
- Evaluation healing process
- Replaces talar tilt test

Function score

- Pain 0 - 35 points
- Dynamic stability 0 - 25 points
- Load bearing capacity 0 - 20 points
- Swelling 0 - 10 points
- Gait pattern 0 - 10 points

Ankle function score

Goals of therapy

- Optimal functional recovery
- Prevention of re-injury, exacerbations, dysfunction

Sub targets of therapy

- Load bearing
- Gait pattern

- Stability
  - coordination & balance
    - Level 2
  - strength & endurance
    - Level 3
- Mobility
**Evaluation**

- VAS - patient specific complaint (3x)
- Gait analysis score Nijmegen
- Function score

**Therapeutic process:**

**phases of wound healing**

- Inflammation phase 0 - 3 days
- Proliferation phase 4 - 10 days
- Early remodelling phase 11 - 21 days
- Late remodelling phase 3 - 6 weeks

**Inflammation phase**

- 0 - 3 days
  - Health education
  - Advice
  - Exercise of functions
    - Level 2

**Proliferation phase**

- 4 - 10 days
  - Taping or bracing
    - Level 1
  - Advice
    - Walking, work
  - Exercise of functions (ADL)
    - Level 2

**Early remodelling phase**

- 11 - 21 days
  - Education
  - Taping or bracing
    - Level 1
  - Exercise of functions (ADL)
    - Level 2

**Late remodelling phase**

- 3 - 6 weeks
  - Education
  - Exercise of functions (ADL)
    - Level 2
  - Evaluation
Data show otherwise!

Ice / compression

Effect on pain (short term)
- ice: $0.53 (-0.33, 1.42)^*$
- compression: $0.85 (0.23, 1.46)^*$

Effect on swelling (short term)
- ice: $0.12 (-0.17, 0.41)^*$
- compression: $0.37 (-0.15, 0.89)^*$

• Pooled effects (95% CI)
Changes in therapy?

- Ice/cold only in early stages
  - Level 2
- No modalities
  - Level 1
- Bracing or taping
  - Level 1
- Education
- Exercise
  - Level 2
- Prevention
  - Level 3

Thank you for your attention
Evidence-Based Medicine and Physical Therapy: Practical Issues in Developing Guidelines

Roger M. Nelson, PT, PhD, FAPTA
Vice President
Expert Clinical Benchmarks, LLC

Overview

- Practical Issues in Developing PT Guidelines
- Practical Issues in Reviewing PT for WC Claimants

Practical Issues in Developing Guidelines: What Doesn't Work

- Generic guidelines that are not WC-specific
  - WHY? Group Health plans focus on reducing medical costs through barriers to care, not on restoring function and focusing on return-to-work
- PT Yes / PT No criteria
  - WHY? PT is a conservative alternative that is generally worth using for most musculoskeletal injuries
Practical Issues in Developing Guidelines: What Doesn’t Work

- Visit maximums (e.g., CA 24)
  - WHY? Real outliers exist and become huge lost-time and med-loss exposures without good management
- Broad categories of diagnoses (e.g., ACOEM)
  - WHY? Diagnosis differentiation greatly impacts appropriateness of care

Practical Issues in Developing Guidelines: What Doesn’t Work

- Broad categories of direction (e.g., ACOEM)
  - WHY? Generic direction does not educate providers on best practices
- Number-of-Visit only guidelines
  - WHY? The number of visits required is greatly impacted by the specific services delivered

Practical Issues in Developing Guidelines: What Doesn’t Work

- Expert-based guidelines
  - WHY: Experts are a good resource and a good first step, but evidence/outcomes is the gold standard
- National guidelines
  - WHY? While “a back is a back”, regional differences exist and need to be considered especially in non-mandated jurisdictions
Practical Issues in Developing Guidelines: What Doesn't Work

- Static guidelines
- WHY: Best practices evolve over time; static guidelines become stale

Practical Issues in Developing PT Guidelines: Dos and Don'ts

Expert Clinical Benchmarks Guidelines

- Workers Compensation specific
- Regionally adjusted
- Condition and modality-specific
- Evidence-based
  - Expert-consensus
  - Outcomes-validated
  - Literature-supported
- Annually reviewed and updated to reflect evolving best-practice
Six-step process that spans six-years

**Step 1:** Established board of scientific advisors representing leading national and international clinicians, academicians and researchers
- Paul Beattie, PT, PhD, OCS
- Rob de Bie, PT, PhD
- Erik Hendricks, PT, PhD
- Phil McClure, PT, PhD
- Lori Michener, PT, PhD, SCS, ATC
- Gordon Waddell, MD, ScD, CPE

**Step 2:** Created guideline precepts
- Employ taxonomy and nomenclature of APTA Guide to PT Practice
- Utilize body-part categorization further delineated by “sentinel” events and severity that affect outcomes
- Develop “Time/Choice/Sequence” of interventions

**Step 3:** Tested conceptual framework
- Focus groups
- Scientific advisors
- Clinicians
- Researchers
- International community
Expert Clinical Benchmarks
Guideline Development

Step 4: Developed guidelines
- 5 body parts
- 10 sentinel events
- Visits and modalities
  - Recommended
  - Not recommended
  - Conditional (case specific)

Expert Clinical Benchmarks
Guideline Development

Expert-based, literature-supported guidelines addressing time/choice/sequence:

<table>
<thead>
<tr>
<th>Week One</th>
<th>Week Two</th>
<th>Week Three</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Expert Clinical Benchmarks
Guideline Development

Step 5: Outcomes validated the guidelines
- Expert guidelines tested against 140,000 MedRisk EPO claims
  - Created histograms of visits by diagnostic groupings
  - Compared expert-developed visits to histograms to tailor to WC and to reflect current best practice clinical results
Expert Clinical Benchmarks

Guideline Development

Step 6: Adjusted the outcomes validated guidelines to reflect jurisdictional variations based on:
- MedRisk data
- WCRI data
- Expert feedback

Use of Guidelines

Took the Time/Choice/Sequence Guidelines and crafted treatment protocol/education tools

Expert Clinical Benchmarks

Guideline Objectives

- Deliver consistent management of PT services
- Ensure appropriate treatment and eliminate unnecessary PT treatment and cost
- Promote and expedite return-to-work through active physical therapy interventions
- Enhance communications among all parties
- Promote better outcomes through change in provider behavior
# Table of contents

**Practice guidelines**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>3</td>
</tr>
<tr>
<td>I Diagnostic process</td>
<td></td>
</tr>
<tr>
<td>I.I Referral and registration</td>
<td>7</td>
</tr>
<tr>
<td>I.II History-taking</td>
<td>7</td>
</tr>
<tr>
<td>I.III Analysis to formulate the assessment objectives</td>
<td>8</td>
</tr>
<tr>
<td>I.IV Assessment</td>
<td>8</td>
</tr>
<tr>
<td>I.V Analysis to formulate the manual therapeutic diagnosis</td>
<td>9</td>
</tr>
<tr>
<td>I.VI Plan of treatment</td>
<td>10</td>
</tr>
<tr>
<td>II Therapeutic process</td>
<td></td>
</tr>
<tr>
<td>II.I Treatment of patients with low back pain in the acute phase (0-6 weeks)</td>
<td>10</td>
</tr>
<tr>
<td>II.II Treatment of patients with low back pain in the sub acute phase (7-12 weeks)</td>
<td>11</td>
</tr>
<tr>
<td>II.III Treatment of patients with low back pain in the chronic phase (&gt;12 weeks)</td>
<td>12</td>
</tr>
<tr>
<td>II.IV Evaluation</td>
<td>13</td>
</tr>
<tr>
<td>II.V Final evaluation, conclusion and reporting</td>
<td>13</td>
</tr>
<tr>
<td>III Literature</td>
<td>13</td>
</tr>
</tbody>
</table>

**Review of the evidence**

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>A Introduction</td>
<td>14</td>
</tr>
<tr>
<td>A.1 Objectives of the KNGF-guidelines Manual therapy for of Low back pain</td>
<td>14</td>
</tr>
<tr>
<td>A.2 Clinical questions</td>
<td>15</td>
</tr>
<tr>
<td>A.3 Formation and procedure of the working group</td>
<td>15</td>
</tr>
<tr>
<td>A.4 Procedure of the working group</td>
<td>15</td>
</tr>
<tr>
<td>A.5 Structure, output and implementation of the guidelines</td>
<td>15</td>
</tr>
<tr>
<td>A.6 Relation with other guidelines</td>
<td>16</td>
</tr>
<tr>
<td>A.7 Definition low back pain</td>
<td>17</td>
</tr>
<tr>
<td>A.8 Scope of the problem</td>
<td>17</td>
</tr>
<tr>
<td>A.9 Prognosis and natural course</td>
<td>17</td>
</tr>
<tr>
<td>A.10 Manual therapy in astrict and a general sense</td>
<td>20</td>
</tr>
<tr>
<td>A.11 Classification of patients having low back pain</td>
<td>20</td>
</tr>
<tr>
<td>A.12 Way of coping with complaints</td>
<td>21</td>
</tr>
<tr>
<td>A.13 Co-operation with other professions</td>
<td>21</td>
</tr>
<tr>
<td>B Diagnostic process</td>
<td>22</td>
</tr>
<tr>
<td>B.1 Referral/registration</td>
<td>22</td>
</tr>
<tr>
<td>B.2 History-taking</td>
<td>22</td>
</tr>
<tr>
<td>B.3 Contraindications</td>
<td>23</td>
</tr>
<tr>
<td>B.4 Measuring instruments</td>
<td>23</td>
</tr>
<tr>
<td>B.5 Analysis to formulate the assessment objectives</td>
<td>24</td>
</tr>
<tr>
<td>B.6 Assessment</td>
<td>24</td>
</tr>
<tr>
<td>B.7 Analysis to formulate the manual therapeutic diagnosis</td>
<td>24</td>
</tr>
<tr>
<td>B.8 Plan of treatment</td>
<td>26</td>
</tr>
</tbody>
</table>
Practice guidelines


Introduction
These guidelines describe the manual diagnostic and therapeutic process among patients with non-specific low back pain. Manual therapy has been recognized by the KNGF as a particularization of physical therapy. Based on his expertise in the field of impairments in artrogenic, muscular and neurogenic functions of the musculoskeletal system and based on his knowledge of arthrokinematics and osteo-kinematics, the understanding of nocisensorics and pain and the musculoskeletal system (including the controlling mechanisms), the manual therapist can, among other things, make use of specific articular techniques. These specific techniques can be used both diagnostically and therapeutically and are characterized by using articular movements. The Dutch Association for Manual Therapy (NVMT) thought it desirable to have guidelines as supplement to the already existing 'KNGF-guidelines Low back pain'1). The structure of both guidelines is identical. In these guidelines no distinction is made between the various opinions within manual therapy. In the Review of the evidence the choices are elucidated, also stating the references to literature. As appendix a vocabulary has been added to explain the abbreviations and concepts.

Definition low back pain
Low back complaints are usually divided into specific and non-specific back complaints. In these guidelines the term ‘low back pain’ refers to ‘a-specific low back complaints’.

Specific low back complaints are back complaints caused by a specific pathophysiological mechanism and/or impairments in anatomical structures, like compression of a nerve root (radicular syndrome), spondylolisthesis, spinal channel stenosis, trauma (fracture), infection, osteoporosis, a visceral anomaly, an inflammatory disorder (like M. Bechterew), a tumor or a metastasis.

Non-specific low back complaints are back complaints for which no apparent specific cause can be found.

In about 90 percent of all patients with low back pain no specific cause can be found which offers an explanation for the symptoms. The diagnostic and therapeutic process regarding specific low back pain is beyond the scope of these guidelines. Indications of specific low back pain have been represented as ‘red flags’ in the guidelines.

---

1 Marcel Heijmans MSc, physical therapist/manual therapist; Dept. Research & Development, Dutch Institute of Allied Health Care, Amersfoort, the Netherlands.
II Erik Hendriks, physical therapist/epidemiologist; Dept. Research & Development, Dutch Institute of Allied Health Care, Amersfoort, the Netherlands (program physical therapy manager "Guidelines Development & Implementation); Capacity group Epidemiology, University of Maastricht, Maastricht, the Netherlands.
III Martin van Esch, physical therapist/manual therapist/epidemiologist; Jan van Breemen Institute, Centre for Rheumatology and Rehabilitation; Tutor at Hogeschool van Amsterdam, Institute Physical therapy, Amsterdam, the Netherlands.
IV Pool-Goudzwaard, physical therapist/manual therapist, Paramedic Centre Impact, Zottegem, the Netherlands; scientific researcher Dept. Biomedical Technology and Physics, Erasmus Medical Centre, Rotterdam, the Netherlands.
V Wendy Scholten-Peeters MSc, physical therapist/manual therapist, researcher, Dutch Institute of Allied health, Amersfoort; the Netherlands, teacher of practical training GGS Manual Therapy, Faculty of Medical Science and Pharmacy, Free University of Brussels, Belgium.
VI Maurits van Tulder, epidemiologist, senior researcher EMGO-Institute, Free University, Amsterdam, the Netherlands.
VII Anton de Wijer, physical therapist Service manual therapy, director Foundation Academy Institute Faculty Healthcare Hogeschool Utrecht, the Netherlands; Dept. of Oral-Maxillofacial Surgery, Prosthetics & Special Dental Care, University Medical Centre Utrecht, the Netherlands.
VIII Rob Oostendorp, physical therapist/manual therapist, scientific director Dutch Institute of Allied Health Care, Amersfoort; the Netherlands; professor of Allied Health Care, University Medical Centre St Radboud, Centre for Quality of Care Research (WOK), Nijmegen, the Netherlands; professor of Manual Therapy, Faculty of Medical Science and Pharmacy, GGS Manual Therapy, Free University of Brussels, Belgium.
Red flags are signs/signals of spinal problems which indicate a specific cause of low back pain. These red flags can indicate serious pathology and ask for additional diagnostics. For example: progressive increase of pain in spite of medication, nocturnal pain or neurological failure.

In patients with non-specific low back pain, pain in the lumbo-sacral region is prominent. Radiating pain in the gluteal region and/or upper leg can also occur. The pain can be aggravated by certain postures, movements and external load (like lifting) and morning stiffness may occur. There are no common symptoms like fever or loss of weight. The pain can be continuous or intermittent. The first episode of low back pain is mostly seen in patients between 20 and 55 years old.

The classification according to the duration of the low back pain episode is as follows:

- 0-6 weeks: acute low back pain;
- 7-12 weeks: sub acute low back pain;
- >12 weeks: chronic low back pain.

Low back pain is considered to be recurrent if more than two back pain episodes have occurred within one year and the total duration of the back pain (episode) is shorter than six months.

Scope of the problem

Estimates show that about 60 to 90 percent of the population once suffered from low back pain. Yearly low back pain occurs in about 5 percent of the population. Primary care physicians (PCP) see low back pain in 3 percent of all their patients each year. Low back pain constitutes a major economic problem in the Netherlands. Of all complaints of the musculoskeletal system, low back pain causes the most costs due to disablement and absenteeism.

In the Netherlands the PCP refers two percent of the patients with acute non-specific low back pain to the manual therapist.

Of the patients who are referred to the manual therapist 94 percent are referred by the PCP, 5 percent by the medical specialist and one percent by others.

Causes and determinants of non-specific low back pain

Relatively little is known about causes of low back pain. Risk factors for low back pain can be divided into personal and labor-related factors. Personal factors are: age, physical health, strength of back and abdomen musculature and mental health (among other things the presence or absence of fear or depression, labor dissatisfaction and emotional instability). Labor-related factors are: physical stress during work (lifting, bending, turning, pushing and shoving, vibrations) and the chance of labor-related accidents.

Low back pain is the result of the interaction of biological, psychological and social factors. Starting point for these guidelines is the bio-psycho-social model.

Prognosis and natural course

The natural course of low back pain is mostly favorable. In 80 to 90 percent of the patients, the complaints disappear spontaneously within 4 to 6 weeks. Of the patients with low back pain who visit their PCP, 65 percent is free of complaints after 12 weeks, 35 percent remain with complaints. Low back pain often appears to be recurrent.

Absenteeism

Low back pain leads to absenteeism in 10 percent of the employed. Of the patients who do not work 75 percent have resumed work within 4 weeks. It is unknown whether this group has had any treatment or that they have resumed all their activities regarding their work. Factors related to a delayed resumption of work are the number of relapses and a lower social-economic background.

Standard and deviating natural course

These guidelines distinguish between patients having a standard and a deviating natural course with regard to their complaints. In the standard natural course, impairments in functions of the musculoskeletal system restrictions of activities decrease in the course of time and participation increases gradually (to the pre-symptomatic level). In most patients the pain complaints decrease. This does not necessarily mean that the low back pain has disappeared completely. The low back pain does no longer impede activities or participation.

The natural course is considered to be deviating if within three weeks after the first complaints the pain does not decrease, the impairments in functions of
the musculoskeletal system do not diminish, and activities and participation are still restricted. The following (bio-psychosocial) factors can cohere with, and/or maintain a deviating natural course:

- biomedical factors, e.g. reduced mobility, reduced muscular strength/stability or a reduced coordination;
- psychological factors, e.g. fear to move or imaginary ideas about low back pain;
- social factors, e.g.: working conditions or the lack of support and/or acceptance of the environment.

Psychological and social factors are called ‘yellow flags’. Yellow flags can negatively influence the natural course and enhance the chance of developing and maintaining long lasting restrictions and absenteeism because of low back pain. The manual therapist has to recognize these factors.

Yellow flags are psycho-social factors which can indicate an enhanced chance of continued existence or chronicity of low back pain. E.g.: fear (to move) or catastrophizing ideas about pain and problems at work.

Among patients with (chronic) low back pain psycho-social factors have in general a greater impact on the restrictions in activity and participation problems than biomedical or biomechanical factors. It is often impossible to diagnose a disorder in the anatomic qualities of structures as cause for the complaints in patients with non-specific low back pain. When choosing the diagnostic treatment for these patients the therapist watches the intensity of the relations between impairmentsin the musculoskeletal system, in sensory functions and pain, in mental functions, in anatomic properties of structures, and restrictions in activity and participation. If there is a strong relation, the manual therapist concentrates on the manual therapeutic possibilities to decrease or dissolve the articular impairments, in these guidelines defined as manual therapy in a strict sense. In manual therapy in a general sense the manual therapist will mainly focus on, besides the earlier mentioned impairments, restrictions in activity and participation problems, and the psychosocial factors that can be influenced (cf. KNGF-guidelines Low back pain).

Manual therapy in a strict sense concentrates on diagnostics and the treatment of articular impairments by inducing articular movements, giving the proper information, specific exercise therapy and individual exercises.

Manual therapy in a general sense concentrates on diagnostics and treatment of restrictions in activity and participation problems (and the psychosocial factors that can be influenced) by supervision (advise/inform) and exercising the functions and activities, if necessary supported, or followed by diagnostics and treatment of articular impairments.

**Classification in time**

On basis of the duration of low back pain we distinguish acute (0-6 weeks), sub acute (7-12 weeks) or chronic (>12 weeks) low back pain. In doing so these guidelines are in accordance with the classification of the ‘NHG-Standard Low back pain’ and other international guidelines. According to natural course, classification in time, presence c.q. absence of red and/or yellow flags, a number of profiles can be distinguished (cf. Table 1).

**Role of the manual therapist**

Manual therapeutic intervention in a strict sense is not indicated for patients with a standard natural course of low back pain.

This is in accordance with the ‘KNGF-guidelines Low back pain’. In general, supervision by the PCP suffices with these patients to decrease problems in activities and enhance the level of participation. If this supervision leads to insufficient results, or if it is the PCP’s estimate that articular impairments play a role in low back pain, the PCP can refer the patient to a manual therapist.

Manual therapeutic intervention in a strict sense is indicated for patients with low back pain with a deviating natural course in the sub acute phase (profile 1b and 2a) and for patients in the chronic phase during an exacerbation of complaints (profile 3a).

Main objectives of the manual therapeutic intervention of patients having profile 1b, 2a and 3a are recovery of the articular function and improvement of the level of functioning. The more indications there are for yellow flags (profile 2b), the more the treat-
ment will concentrate on adjusting negative behavioral factors in relation to the proper functioning of the patient and to a gradual increase of the level of activity and enhancing the level of participation of the patient. If necessary, the treatment can be supported or followed by manual therapy in a strict sense, if articular impairments exist.

Manual therapeutic intervention in a general sense is indicated for patients having profile 2b and profile 3b.

Coping with complaints
The way in which patients cope with their complaints can be adequate or inadequate. Patients with low back pain, who continue their activities and/or duties in an ‘adjusted’ way, cope with their complaints adequately. That is to say the patient is capable to adjust the load on the back (all activities and/or tasks someone wishes to do or is supposed to do) to the load tolerance (the feasible level of activities and/or tasks). If complaints continue, strategies like trying to find diversion when in pain and striving for an active lifestyle are indications that the patient copes with his complaints adequately. Lack of exercise and avoiding certain activities or substantial resting periods, imply that the patient copes with the complaints inadequately.

Co-operation with other professions
The ‘Brochure on the assessment of indication’, ‘Brochure on consultation’, ‘Brochure on the referral note’, ‘Brochure on interim consultation’, and the ‘Brochure on documentation’ are specially developed to improve the co-operation and communication between PCPs and manual therapists. If low back pain causes problems in the work situation of the patient, co-operation with an occupational physician is advisable. These present guidelines are in accordance with the wait and see policy of the NHG-Standard Low back pain (with the emphasis on giving adequate information and advice), but deviates from the NHG-standard, with its advice for manual therapy in a strict sense in the acute phase. The NHG-Standard does not advise manual therapy in the (sub)acute phase. These present guidelines, however, are in line with the international guidelines, which advise manual therapy in the acute phase in a deviating natural course. The guideli-

### Table 1. Classification in profiles according to characteristics of low back pain in the acute, sub acute and chronic phase.

<table>
<thead>
<tr>
<th>Phase</th>
<th>Profile</th>
<th>Characteristic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute phase</td>
<td>profile 1a</td>
<td>• normal course</td>
</tr>
<tr>
<td></td>
<td>profile 1b</td>
<td>• deviating course</td>
</tr>
<tr>
<td>Sub-acute phase (7-12 weeks)</td>
<td>profile 2a</td>
<td>• deviating course;</td>
</tr>
<tr>
<td></td>
<td>profile 2b</td>
<td>• no yellow flags;</td>
</tr>
<tr>
<td></td>
<td>profile 3a</td>
<td>• adequate handling of complaints;</td>
</tr>
<tr>
<td></td>
<td>profile 3b</td>
<td>• high degree of self-discipline;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• adequate coping;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• fine tuning of load and load tolerance;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• adjusted participation;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• episodes of increased pain complaints;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• inadequate handling of complaints;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• hardly any self-discipline;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• no adequate coping;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• no fine tuning of load and load tolerance;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• decreased participation</td>
</tr>
<tr>
<td>Chronic phase (&gt;12 weeks)</td>
<td>profile 3a</td>
<td>• high degree of self-discipline;</td>
</tr>
<tr>
<td></td>
<td>profile 3b</td>
<td>• inadequate handling of complaints;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• hardly any self-discipline;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• no adequate coping;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• no fine tuning of load and load tolerance;</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• decreased participation</td>
</tr>
</tbody>
</table>
nes are also in line with the ‘Guidelines Low back complaints’ of the NVAB (Dutch Society for Labor and Industrial Medicine), which indicates that manual therapeutic intervention leads to a rapid decrease of complaints if these complaints last longer than two weeks.4

I Diagnostic process
The objective of the diagnostic process is to document the severity the nature and the extent of the patient’s health problem and the extent to which it can be influenced by manual therapy. Starting-point is the patient’s demand. The manual therapist assesses whether there is a standard or deviating natural course. In case of a deviating course the manual therapist examines which factors cause or maintain the complaints. In doing so he* is especially on the look out for red and/or yellow flags, for the consistency of his findings resulting from the physical assessment, and for the consistency of the links between the impairments in functions and the restriction in activities and participation problems. If red flags which indicate a specific cause of low back pain are present or surmised the manual therapist contacts the referring physician.

1.1 Referral and registration
The patient is referred for manual therapeutic intervention by the PCP or the medical specialist. The manual therapist assesses whether the referral is complete and whether the patient qualifies for assessment by the manual therapist. The referral states among other things the reasons for referral. The manual therapist contacts the PCP or medical specialist if the referral note offers insufficient information. Other information in the referral note may be: the patient’s demand, the development of his functioning, information from which contraindication(s) can be deduced, information on supplementary assessment (like specific forms of imaging) and previous treatments.

1.1.1 History-taking
In the history-taking the manual therapist asks questions necessary to chart the patient’s health problem and to formulate assessment objectives for the manual diagnostic assessment. He also assembles information on (relative) contraindication(s) for manual therapeutic intervention.

Focal points in the history-taking are:
1. Establishing the patient’s demand and listing his complaints:
   • changes in daily functioning, listing the patient’s demand in terms of impairments, restrictions in activity and participation problems;
   • Nature and severity of the complaints.
2. Establishing the inception c.q. the beginning of the complaints:
   • timescale;
   • development of the complaints symptoms;
   • functioning before complaints arose (level of activities, degree of participation).
3. Survey of the natural course:
   • (local and general) load and (local and general) load tolerance both at the functional level and at the level of activities and participation;
   • natural course of the symptoms and the functional level;
   • previous diagnostics and treatment and their results.
4. Survey of the present status:
   • red flags;
   • severity and nature of complaints, present functional level (activities and participation);
   • yellow flags.
5. Coping with complaints:
   • does the patient cope with the complaints adequately?
   • does the patient have control over the complaints?
   • what meaning does the patient attribute to the complaints?
6. Further information:
   • secondary disorders;
   • previous and present treatment and its results: medication; further treatment; instructions; appliances;
   • social history-taking in relation to work.
7. Contraindications for manual therapeutic intervention (in a strict sense), like the use of certain medication (Sintrom®).

* To stimulate readability the indication ‘he/she’, ‘his/her’ etc. is avoided in the guidelines. Where this is applicable both sexes are meant by ‘he’ and ‘his’.
To chart and evaluate the functional status and the functioning of the patient the Working group advises to make use of the measuring instruments ‘Patient Specifieke Klachten’ (Patient Specific Complaints’) and the ‘Quebec Back Pain Disability Scale’ (QBPDS).

### I.III Analysis to formulate the assessment objectives

Going by the information obtained during the history-taking the manual therapist formulates a number of assessment objectives. These objectives are determined by the profile of the patient (1a/b, 2a/b or 3a/b).

Classification of the patient in one of the profiles takes place on the basis of the following questions:

1. Is the patient in the acute (0-6 weeks), the sub-acute (7-12 weeks) or the chronic (>12 weeks) phase?
2. Is there a standard or deviating natural course of complaints? If it is deviating:
   a. Are there indications of the presence of red flags (biomedical risk factors)?
   b. Are there indications of the presence of yellow flags (psychosocial risk factors)?

Assessment objectives for patients having profile 1a/b, 2a and 3a are primarily formulated in terms of impairments in functions and secondarily in terms of restrictions in activities. For patients having the profiles 2b and 3b the objectives are primarily formulated in terms of restrictions in activities and the presence of yellow flags, and secondarily in terms of impairments (cf. Table 2).

### I.IV Assessment

#### Inspection/palpation

The manual therapist inspects/observes the posture of the patient and especially watches the position of the legs, pelvis and vertebral column. Points of interest are the antalgic posture of the patient, his (low)back muscular tone and painful areas.

#### Assessing impairments in functions

The functional assessment consists of testing and/or measuring the impairments in functions and anatomic structures which became apparent during the history-taking. The functional assessment takes place on the affected area, in the bio-mechanic and physiological related joints and consists of:

- assessment of the joints of the thoracic, lumbar and lumbo-sacral vertebral column, pelvis and hips; evaluation per segment on range of motion, direction, course of movement, resistance and end feel, as well as evaluation of consistency and provocation of pain and radiation;
- assessment of the muscles by evaluating muscle length, elasticity, end feel, sensitivity on contraction, sensitivity on stretch, tonus, stability and coordination;
- assessment of the nerves by evaluating sensitivity on stretch, pressure and range of motion
- assessment of the (para-spinal) skin by evaluating the level of grasp, shift, pliability and end feel of the skin.

#### Assessing the restrictions in activities

The assessment of the restrictions in activities is focused on activities like lifting, standing up, sitting down and hoisting. If the manual therapist suspects yellow flags on the basis of information from the history-taking, he examines the anxiety to exercise and pain behavior.

#### Red flags

The manual therapist does an exploratory neurological assessment, if, on the basis of information from

<table>
<thead>
<tr>
<th>Profile</th>
<th>Primary direction of assessment objectives</th>
<th>Secondary direction of assessment objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a/b, 2a and 3a</td>
<td>impairments in functions, restrictions in activities</td>
<td>restrictions in activities</td>
</tr>
<tr>
<td>2b and 3b</td>
<td>yellow flags</td>
<td>impairments in functions</td>
</tr>
</tbody>
</table>

Table 2. Primary and secondary assessment objectives per profile.
the history-taking, he suspects a radicular syndrome, (one of the red flags appearing most frequently). This assessment should at least consist of:

- the Straight Leg Raising-test, which is judged by the manual therapist on provocation of radiating pain in one or two areas of the lumbo-sacral spinal nerves (especially L4, L5 and S1) (indicates Lasègue);
- assessment of muscular strength, sensibility and tendon reflexes of the spinal nerve(s) involved.

The treatment of patients with low back pain with a lumbo-sacral radicular syndrome is beyond the scope of these guidelines. A radicular syndrome or any other red flag in a patient is ground for consultation, c.q. referral to the referring physician.

I.V Analysis to formulate the manual therapeutic diagnosis

The following questions are meant to determine whether manual therapeutic intervention in a strict or general sense is indicated for the patient.

1 Are the findings, including the findings of the physical assessment, consistent during the diagnostic process? Are there anomalies in the anatomic properties of structures or impairments of functions of the musculoskeletal system, which are consistent and provocative, and which possibly explain the patient’s complaints? If so, which ones?

2 Are there any indications of the presence of red flags?

3 Are there any indications of the presence of yellow flags?

4 Are there any contraindications of manual therapeutic intervention in a strict sense?

If the answer to question number 1 is ‘yes’ and to questions 2, 3 and 4 ‘no’, then manual therapeutic intervention in a strict sense (profile 1b, 2a and 3a) is indicated for the patient.

If the answer to question number 1, 2 and 4 is ‘no’ and to question number 3 ‘yes’, then manual therapeutic intervention in a general sense (profile 2b and 3b) is indicated for the patient.

Defining the health profile and the extent to which the factors can be influenced

The manual therapist determines the health profile of the patient and defines the personal and external factors which can be influenced by manual therapeutic intervention in a general sense on the basis of the following questions:

1 Is the (local and general) load attuned to the (local and general) load tolerance?

2 What is the manual therapist’s assessment of the connection between impairments and restrictions in activities and participation problems?

3 Can the impairments which have been found be categorized into:
   - Movement impairments in one or more joints;
   - biomechanical patterns;
   - segmental impairments?

4 What are the unfavorable (impeding) factors for recovery at the moment?
   - biomechanical factors;
   - trophic factors;
   - personal factors;
   - environmental factors?

5 Can the unfavorable (impeding) factors, the relevant impairments, and the restrictions in activities and participation problems be manipulated by manual therapeutic intervention? If so, what unfavorable (impeding) factors, relevant impairments restrictions in activities and participation problems are involved?

6 What is the prognosis for recovery?

To round up the diagnostic process the manual therapist answers the following questions:

- Is there an indication for manual therapeutic intervention in a strict or general sense?
- Do the guidelines apply to this individual patient?

If both questions are answered positively the manual therapist, after having consulted his patient, draws up a plan of treatment. In this plan individual treatment objectives are described.

The manual therapist contacts the referring physician, if he is of the opinion that unfavorable (impeding) factors can not (only) be manipulated by manual therapeutic intervention, or if he recognizes one or more red flags.
I.VI Plan of treatment

In the hub of the plan of treatment is the main objective which intends to solve the patient’s demand. Additionally objective the plan of treatment defines the actions which will be performed to realize the objectives, the number of sessions expected, the frequency of treatment, the location of treatment (at home, at the practice), the moments of evaluation and the evaluative measuring instruments to be used.

It is recommended to use the ‘Patient Specifieke Klachten’ (Patient specific complaints) and the ‘Quebec Back Pain Disability Scale’. Manual therapeutic intervention is not indicated for patients having a normal natural course of low back pain (profile 1a). This is in accordance with the ‘KNGF-richtlijn Lage-rugpijn’1 (KNGF-guidelines Low back pain).

For patients with low back pain and deviating natural course in the (sub) acute phase (profile 1b and 2a) and for patients in the chronic phase during an exacerbation of complaints (profile 3a) manual therapeutic intervention in a strict sense is indicated if there are no specific indications of yellow flags, if the findings of the assessment are consistent and if the impairments in functions and the restrictions in activities and participation problems show a strong connection. The main objectives of the manual therapeutic intervention for these profiles are recovery of the articular function and upgrading the functional level.

The more indications for yellow flags in the sub acute (profile 2b) and the chronic phase (profile 3b), the clearer it gets that manual therapeutic intervention in a general sense is indicated. Primarily the treatment is aimed at manipulating the negative behavioral factors in relation to the patient’s functioning and at the gradual increase of activities and participation. In doing so the manual therapist makes use of a number of behavior-orientated principles in relation to the ability for functional movement of the patient. If the negative behavioral factors (like fear of movement and negative thoughts about recovery) have been sufficiently influenced and the restrictions in activities and participation problems have been sufficiently removed, manual therapeutic intervention in a strict sense can follow if articular impairments still exist.

II Therapeutic process

II.I Treatment of patients with low back pain in the acute phase (0-6 weeks)

Treatment of patients having profile 1a

Patients who have been classified as having profile 1a by the manual therapist, qualify for treatment in accordance with the ‘KNGF-guidelines low back pain’1. For this patient manual therapeutic intervention in a strict sense is not indicated.

The main objective of the treatment is that the patient learns to cope with his complaints in an adequate way.

Treatment based on information and advice, sometimes supported by exercises, is indicated for a limited number of sessions, during which the advice should be ‘stay active’, whereas ‘bed rest’ is advised against. The manual therapist does not make new appointments. If necessary, a check-up is possible.

Informing/advising

The manual therapist explains that the natural course of low back pain among most patients is favorable and discusses the relation between load and load tolerance. The message implied is that moderate exercise is beneficial for the low back and not harmful.

The manual therapist supervises the patient and stimulates him to continue his present level of activity and extend it to the level of complete activity and participation. The manual therapist and the patient analyze the possible problems regarding implementation and together they try to find solutions.

Exercising and controlling functions and activities

In addition to the information and advice given, the manual therapist makes the patient realize, if necessary, that exercise is not harmful for the back.

Exercising the functions and activities necessary for the daily routine, works positively for the patient, who can increase the level of exercise to activities and participation necessary for daily life.

Treatment of patients with profile 1b

Patients who have been classified as having profile 1b by the manual therapist, qualify for manual therapy in a strict sense. The manual therapeutic intervention is aimed at the decrease of impairments in the artrogenous, muscular or neurogenous functions of musculoskeletal system, with the objective to attain
the level of activity and participation prior to the period of complaints and preventing the recurrent or chronic low back pains.

Implementing the movements
The actions which are at the manual therapist’s disposal can be subdivided into:

- articular movements to improve, among other things, mobility and end feel
- muscular movements to improve muscle length, elasticity, end feel, muscle tone, stability and coordination;
- neuro-dynamic movements to improve the ‘mobility’ of the nerves and to decrease the sensitivity to stretch and/or pressure;
- skin manipulation to improve the level of grasp, shift, pliability and end feel of the skin.

Variables in implementing articular movements are:

- original position/posture;
- direction;
- rhythm;
- amplitude;
- path;
- force (in end position);
- speed;
- (type) component;
- repetitions.

The choice of variables depends on the findings of the assessment, the targets of the treatment and the response to the treatment.

The intensity is determined by the variables:

- a low intensity is for example: starting from rest, small amplitude, fast rhythm in a non-restricted direction;
- a high intensity is for example: from the most restricted posture, large amplitude, low rhythm in a restricted direction.

Informing/advising
Apart from general information about the treatment, the manual therapist also gives specific information about the articular impairments of the vertebral column in relation to low back pain.

Exercising and controlling functions and activities
The manual therapist gives exercise therapy which is aimed at articular impairments and at individual exercising.

Duration of treatment
Four to six sessions are necessary for the manual therapeutic intervention in a strict sense. If no decrease of complaints is realized within six weeks, the manual therapeutic intervention in a strict sense needs to be stopped and the referring physician is consulted.

II.II Treatment of patients with low back pain in the sub acute phase (7-12 weeks)

Treatment of patients having profile 2a
Patients who have been classified as having profile 2a by the manual therapist, qualify for manual therapy in a strict sense. The findings of the assessments among these patients show a strong connection between the impairments in functions, the restrictions in activities and participation problems. The treatment is similar to that of patients having profile 1b, with the same targets and the same duration of treatment.

Treatment of patients having profile 2b
The more indications there are of the presence of yellow flags the more the treatment in the sub-acute phase should be primarily directed at the decrease of those yellow flags. The treatment aims at influencing negative behavioral factors in relation to the recovery and the functioning of the patient and at a gradual increase of activities and participation. In doing so the manual therapist makes use of a number of behavior orientated principles in relation to how the patient functions when in motion. If there are articular impairments, the treatment can be supported/followed by manual therapeutic intervention in a strict sense. In this phase the manual therapist needs to be on the alert whether chronicity develops. The objectives of the treatment are:

- enhancing knowledge and understanding in the patient;
- promoting an adequate way of coping with the complaints;
- increasing of activities and participation;
- improvement of relevant functions.
Informing and/or advising

The manual therapist learns the patient how to control the process of his recovery, to prevent new complaints, and how to handle during recurrences and exacerbations. Therefore the patient gets information about the nature and natural course of low back pain, the relation between load and load tolerance and the importance of an active life-style. The manual therapist explains that pain in the lower back area is not harmful and that the increase of this pain need not necessarily coincide with damage to the anatomic structures. The manual therapist informs the patient how to interpret his complaints correctly. Advice regards for example the correct posture during the daily routine. Informing and advising is an interactive process. The manual therapist regularly checks with his patient whether he understands the information given to him, and whether he can use the given advise in his own environment.

The manual therapist can only achieve a positive outcome if the patient actually acts on his treatment advises, that is, adheres to the therapy. It is therefore required that the patient views his complaints in a realistic way, and has the skill to cope with his future complaints, having the confidence to be able to do so. Therefore the manual therapist needs to give information and advice which are in accordance with the frame of reference of the patient. It is important to prevent conflicting information and advice.

Increasing compliance both in the short run (during the treatment) and in the long run (after the treatment) is also the responsibility of the manual therapist. To increase compliance on the long run, cooperation between manual therapist, patient, the referring physician (if necessary) the occupational physician is important.

Exercising functions and activities

Exercising the relevant functions and/or activities aims at enhancing the level of activity of the patient. The manual therapist uses physiological training principles to exercise functions like: improvement of muscle tone, stamina and mobility. The program is time contingent to promote that the patient resumes or increases his activities (time contingent: a step by step advancement of activities on the basis of a period of time previously determined, and not on the basis of pain, meant to focus the attention of the patient on activities rather than on pain). First the manual therapist determines a baseline, the average of the present level of activities (baseline measurement). With the aid of that baseline and the objective determined by the patient, the manual therapist (together with the patient) makes a treatment schedule. This schedule contains the advancement per activity in time, the frequency and intensity. The patient should not exercise longer, more often or more intensely than what had been agreed upon in the program. The patient also exercises in his own environment and shows his progress in a graph (cf. section C4). If the patient wants to perform an activity he is unable to do at the moment, the activity will be subdivided and exercised step by step.

II.III Treatment of patients with low back pain in the chronic phase (>12 weeks)

Treatment of patients having profile 3a

Patients who have been classified by the manual therapist as having profile 3a, qualify for manual therapy in a strict sense when complaints exacerbate, if there is an articular impairment. The treatment is similar to that of patients having profile 1b (acute phase), with the same targets and the same duration of treatment.

Treatment of patients having profile 3b

Patients who have been classified by the manual therapist as having profile 3b, qualify for manual therapy in a general sense, aimed at functioning while in motion. An exercise program which uses behavior-orientated principles in relation to functioning while in motion is first in prominence. Moreover, the exercise program is aimed at the gradual increase of activities and participation. If needs be, the treatment of the articular impairments can be supported/followed by manual therapeutic intervention in a strict sense. Treatment takes place in accordance with the ‘KNGF-guidelines Low back pain’.1

Exercise therapy has to be applied among patients with chronic low back pain. It is not quite clear which type of exercise is to be preferred. Therefore the guidelines recommend a varied exercise program which is in line with the needs of the patient.
II.IV Evaluation
The manual therapist evaluates regularly and systematically the outcome of the treatment by testing it against the objectives of the treatment. On the basis of this, adjustment of profile and plan of treatment can take place.
In doing so, the manual therapist can make use of subjective findings for all profiles. Subjective findings are findings which have been obtained by applying the Patient Specific Complaints and the QAPS, which are in accordance with the objective of the treatment and the findings of the diagnostic process.
If the manual therapeutic intervention in a strict sense has not had any result (no decrease of impairments in functions, no decrease of the restrictions in activities, no increase of participation) after no more than six sessions or within three weeks in the profiles 1b, 2a, and 3a, the manual therapist consults the referring physician.

II.V Final evaluation, conclusion and reporting
The manual therapist informs the referring physician during the therapy, but at any rate after he has concluded the treatment, about, among other things, the (individually determined) targets, the therapeutic process and its results. He writes his final report for the PCP according to the KNGF-guidelines entitled 'Communicating with and reporting back to primary care physicians'5.
For the contents of the report by the manual therapist, the ‘KNGF-guidelines entitled ‘Physical therapy documentation and reporting’6 is decisive.
The manual therapist concludes the treatment if the targets have been realized and/or the patient has recovered. He also concludes the treatment if no further recovery is to be expected.
A Introduction
As part of further professionalization and with reference to national and international developments, The Dutch Association for Manual Therapy (NVMT) wants to develop professional guidelines for the treatment of different categories of patients. Considering the high incidence and prevalence\(^1,2\) of low back pain in the practice of manual therapists, The NVMT has first of all chosen the subject ‘Patients with non-specific low back pain’. To the present day there are no guidelines for manual therapeutic intervention among patients with low back pain.

KNGF-guidelines should be considered as ‘the state of the art’ of manual therapeutic or (physical therapeutic) intervention. These guidelines aim at optimizing the manual therapist’s intervention according to the latest scientific literature, and according to the current views within the profession.

Definition
KNGF guidelines are defined as “a systematic development from a centrally formulated guide, which has been developed by professionals, that focuses on the context in which the methodical physical therapy of certain health problems is applied and that takes into account the organization of the profession”\(^3-5\). Methodical intervention by the manual therapist also falls within this definition, because manual therapy is an acknowledged particularization arising from physical therapy.

Relation between physical therapy and manual therapy
Manual therapy (being a particularization arising from physical therapy) is based both on the manual diagnostic and therapeutic skills as well as the conceptual model with its resulting contents of methodical intervention. Above mentioned skills are characterized by inducing articular movements on the basis of knowledge of artro-kinematics, osteo-kinematics and the musculoskeletal system (including the controlling mechanisms), the understanding of nocisensorics and pain, and the patho-physiology and patho-morphology of the joints.\(^6\) The manual therapist differs from the physical therapist, because the former is able to judge the quality of the (articular) movement for diagnostics and treatment, in particular the vertebral column.

In the national function-educational profile Manual Therapy (LFOF-MT) \(^6\) it says that professional assumptions of four institutes (SOMT, OOMT, Maitland and the Free University of Brussels) are similar to a high degree.\(^6\) The professional assumptions of the institute for manual therapy at Utrecht differ fundamentally. This makes it extremely difficult trying to develop guidelines for all schools. The working group has endeavored to draw up guidelines which are acceptable for every school.

A.1 Objectives of the KNGF-guidelines
manual therapy for Low back pain
The objective of the guidelines is describing the diagnostic and therapeutic process of manual therapy among patients with low back pain, which should lead to functional recovery, the prevention of recurrence and the restoration of the patient’s ability to cope, based on current scientific views. Studies have shown that there are great differences regarding the objectives, the interventions and the scope of the manual therapeutic care.\(^3-5\)

Apart from the above mentioned objectives the KNGF-guidelines are explicitly meant to:

- change care in the desired direction on the basis of current scientific views, and enhance the uniformity and quality of care;
- define the tasks and responsibilities of the professions, provide insight into them, and stimulate the co-operation between the groups;
- offer support in decision taking.

The guidelines formulate recommendations in terms of professional know-how, so the manual therapist can apply the guidelines in practice.
A.2 Clinical questions
The working group which prepared these guidelines looked for answers to the following clinical questions:

- What is the extent of the problem of low back pain?
- What parts of the manual-diagnostic assessment are reliable, valid and workable for the common practice?
- What parts of the manual-diagnostic process are at least necessary to be able to formulate the objectives of the treatment, a plan of treatment and a prognosis?
- What forms of treatment and prevention have a scientific basis and are useful?
- What forms of treatment need to be mentioned according to the opinion of the working group, despite the lack of a scientific basis?

A.3 Formation and procedure of the working group
In February 2001 a preparatory working group was assembled consisting of four members. To be able to answer the clinical questions, the working group was extended by four experts on implication in August 2001. The formation of the working group in went successfully. Manual therapists and researchers having the desired skills were willing to become members of the working group in primary health care, to develop the new ‘KNGF-guidelines Manual therapy among patients with low back pain’. During the formation of the working group, a balanced division of members according to expertise on implication and experience and/or academic background was taken into consideration. All members of the working group stated to have no conflicting interests regarding the guidelines which were to be developed. The development of the guidelines took place from February 2001 to May 2002.

A.4 Procedure of the working group
The guidelines have been developed in accordance with the ‘method to develop and implement guidelines’3-5) In this method practical instructions have been formulated to report the strategy with which literature has been assembled, including the search procedure, the sources consulted and the period in which the literature has been assembled. These instructions also apply to the criteria regarding the acceptance or exclusion of literature and the scientific level on which the recommendations have been based. If no scientific evidence was available, the recommendations have been formulated on the basis of consensus within the working group c.q. their colleagues. The whole working group expressly pursued consensus regarding the recommendations for the practice. When decision taking became difficult the rule of consent was made use of.

The project group prepared the selection and assessment of the literature. Results were discussed in the entire working group. Per item of the therapy, the scientific evidence has been summarized in a conclusion, including the extent of evidence. Apart from the scientific evidence other aspects are of importance for the recommendations, like: reaching common consensus, efficiency (costs), availability of means, required expertise and schooling, organizational aspects and the aspiration to tune in to other mono or multidisciplinary guidelines.

After completion, the concept guidelines were sent to the scientific committee of the NVMT and to external experts and/or professional bodies (members of the working group consisting of other health professionals) to tune in the guidelines to other professional groups c.q. professional bodies and/or other mono and/or multidisciplinary guidelines’ NHG standard low back pain7, CBO guidelines; non-specific low back complaints8 so there is consensus between the various professional groups about the guidelines.

A.5 Structure, output and implementation of the guidelines
The guidelines consist of three parts, namely the (Practice guideline), the Review of the evidence) and a plasticized schematic survey of the key points of the guidelines (the summary). This tripartite approach has been chosen out of didactic considerations and to promote the utility in practice. The parts of the guidelines can be read separately and independently.

The review of the evidence contains an explanation of the choices that were made to realize the guidelines. An appendix explains abbreviations and some concepts. This ‘KNGF-guidelines Manual Therapy among patients with Low back pain’ are in accordance with the ‘KNGF-guidelines Low back pain’9 It has been based as much as possible on scientific evidence as regards diagnostics, prognosis, therapy and complications.
Apart from the literature consulted, professional developments and other considerations (like practical implications) played a role in the drawing up of these guidelines.

A.6 Relation with other guidelines

To a great extent the guidelines are in line with the recommendations of existing Dutch guidelines, like the ‘NHG-Standard Low-back pain’ (PCPs), the ‘KNGF-guidelines Low back pain’ (physical therapists) and the ‘NVAB-guidelines’ (occupational physicians), and with the recommendations in international guidelines relating to the treatment of low back pain.10-14

A major difference between the various guidelines concerns the recommendation for manual therapeutic intervention. According to the NHG-Standard, manual therapeutic intervention in the acute phase is not useful.7 Australian and Israeli guidelines do not recommend manual therapeutic intervention in the acute phase either, whereas other foreign guidelines (American, New Zealand, Finnish, Swedish, Danish, British, Swiss and German) do recommend treatment.11 Though literature does not reveal why the editors of above mentioned guidelines adopted a reserved attitude regarding manual therapy in low back pain during the first six weeks of complaints, some comment is possible on the ‘negative’ effects they mention. The NHG-standard for example claims that manual therapeutic intervention in the acute phase is not indicated because of possible side effects, its passive character and the costs of the treatment. For the editors of the NHG-standard the positive effects mentioned by some of the researchers do not counterbalance these negative effects.16-18

Comment: Firstly the guidelines do not give scientific proof for alleged side effects, like being dependent on the therapist. The passive character of manual therapy is true for ‘causing articular movements’, but manual therapy also includes advice regarding posture and movement and exercise therapy. The study Profile patients’ population manual therapy shows that manual therapists give advice, information and exercise therapy to about 50% of their patients with low back pain.19

Secondly, regarding the costs, it is a moot point how the costs of manual therapeutic intervention relate to the costs of absenteeism among patients who did not have manual therapeutic intervention. Manual therapeutic intervention consists of a limited number of sessions; in above mentioned study the average is 5.5 sessions.19 The fact that chiropractors were on the foreign committees for guidelines and not on the Dutch (NHG-committee), probably played a role in determining the point of view regarding manual therapy in the ‘NHG-standard low back pain’.

Functions, activities and participation

The manual therapist describes the health problems of patients with low back pain in terms of impairments in functions, restrictions in activities and participation problems. Impairments are manifestations of a disorder/disease. They are related to the anatomical structure or to a function of the musculoskeletal system: e.g. decreased mobility, diminished muscle strength, pain, sensibility disorders or anxiety to exercise. Restrictions are related to problems regarding activities like bending, reaching or walking. Participation problems are related to problems like doing your work or fulfilling your social role. The concepts ‘impairments in functions’ and ‘restrictions in activities and participation problems’ have been derived from the International Classification of Human Functioning.20 The guidelines use these concepts to enhance unity of language within manual therapy. In ICF terms, (dys)function is a coordinating concept for the different meanings of the terms ‘functions’, ‘activities’ and ‘participation’. The NHG-standard low back pain uses the term ‘dysfunction’, defined as ‘being unable to meet the requirements of the patient or his environment, regarding his functioning in activities in daily life and his usual work’.7

Target group

To be able to implement the recommendations in these guidelines adequately, manual therapists need to know the natural course of low back pain. They ought to have the necessary manual therapeutic skills (both in a strict and a general sense) at their disposal. They should have insight in supporting and/or interfering factors regarding the natural course of low back pain, in behavior-orientated principles, and in methodically giving information. Furthermore they need to have knowledge of scientific evidence of manual therapy among patients with low back pain.
A.7 Definition low back pain

The ‘KNGF-guidelines manual therapy among patients with low back pain’ concern patients with non-specific low back pain. Forms of specific low back pain were left aside.

For the definition of non-specific low back pain use was made of the description of a ‘simple backache’ by Waddell. Clinical presentation usually at age 20-55 years, lumbo-sacral region, buttocks and thighs, pain is ‘mechanical’ in nature; varies with physical activity and varies with time, patient well.

There seems to be no relation between deviations on X-rays and non-specific low back complaints. Recurrent back complaints are complaints which occur within a period of one year with several intervals; the total duration of the complaints is less than six months.

Research on the profile of patients with non-specific low back pain, for whom manual therapeutic intervention is indicated, shows that there are differences between patients referred to physical therapists or manual therapists. Characteristics of patients indicated for manual therapy are: age group 35-44, higher education (intermediate vocational education/higher vocational education/university), paid employment.

It is conspicuous that most guidelines do not report what specific characteristics of patients with low back pain are indications for manual therapeutic intervention. Although the guidelines do report that manual therapy can have a positive effect during the first 4 to 6 weeks of the complaints (in the NHG-Standard low back pain after 6 weeks), they do not give any criteria on the basis of which a physician can decide whether or not to refer the patient to the manual therapist.

The perspective of the patient and the referring physician is one of the starting points to refer to the manual therapist (e.g. previous positive experience by the patient).

Red and yellow flags were introduced in the New Zealand guidelines. Red flags are biomedical factors (warning signals), like the cauda equina syndrome, fever, intravenous drug use, prolonged use of corticosteroids, loss of weight, serious continuous nocturnal pain, tumor in the previous history or a serious trauma. These red flags can be indicative of (severe) pathologies of the vertebral column and ask for additional diagnostics. The guidelines describe yellow flags during prognosis and natural course of the complaints (see Section A.9).

A.8 Scope of the problem

In his survey Frymoyer describes that 60 to 90 percent of the complete population at some time experience a period of low back pain. The annual incidence of low back pain is 5 percent. The incidence and prevalence of non-specific low back pain in PCPs’ practices are 30 and 35 episodes per one thousand registered patients per year, respectively. Since the year 1998 the policy of PCPs has mainly been in line with that of the ‘NHG-standard low back pain’. In 72 percent of all patients with low back pain the PCP diagnosed ‘non-specific low back pain’.

In the Netherlands the PCP refers 1 percent of the patients to the manual therapist; in comparison: the PCP refers 16 percent of this group of patients to the physical therapist. The study ‘Profile Patients Population Manual Therapy’ shows that non-specific low back pain is a frequent referral diagnosis (31.8 percent manual therapy, versus 13.5 percent of referrals to physical therapy).

In the Netherlands the PCP refers 2 percent of patients with acute non-specific low back pain and 19 percent of patients with chronic non-specific low back pain to the manual therapist.

Low back pain does not only constitute a major health problem, it is at the same time a significant economic problem. In 1991 the social costs of low back pain in the Netherlands were estimated at 1.7 percent of the gross national product. Of these costs the indirect costs (disability benefits, absenteeism) take up the larger part, i.e. 93 percent of the total costs. Estimates are that 7 percent of the total costs in health care and 19 percent of the total paramedic costs are caused by back complaints.

A.9 Prognosis and natural course

In more than half of the patients (60 percent) an episode of low back pain is of a sudden onset. Complaints occur during activities like bending or lifting. Among the other patients (40 percent) complaints start gradually. Usually the cause of low back pain remains unknown, in about 90 percent of the patients no specific medical diagnosis is made.

The natural course of low back pain is related to the population in which the random check was made. In an open population the prognosis is usually favorable. According to estimates low back pain disappears within 4-6 weeks in 75-90 percent of the patients. Of the patients who visit the PCP because of low back
pain, the prognosis is slightly less favorable. Of this
group 65 percent is without complaints after 12
weeks.\textsuperscript{31} Low back pain is often recurrent. Three quar-
ters of the patients who consulted the PCP because of
low back pain had one or more recurrences within
one year.\textsuperscript{31} Earlier episodes of back pain have a nega-
tive effect on recovery and so predict the possibility
of developing prolonged back pain.\textsuperscript{32} There is incre-
asing consensus that the degree of restriction is the
most important outcome in low back pain.\textsuperscript{33}

Prognostic factors (yellow flags) for the continuation
of complaints in the sub acute phase
Psychosocial factors which might indicate an enhan-
ced possibility for chronic low back complaints are
called yellow flags.\textsuperscript{14,32,34} Typical examples of yellow
flags are: fear of pain and injury of the low back, the
conviction that pain is a sign of serious damage, the
idea that passive treatment is to be preferred to active
participation.

Yellow flags are factors which enhance the possibility
developing and preserving prolonged periods of
restrictions and absenteeism in patients with low
back pain. The term ‘yellow flag’ is meant to:\textsuperscript{14,32,34}
1. be able to decide whether a detailed assessment of
the problem concerned is necessary;
2. try to find the core of the problem, to make specific
intervention possible.

See table 3 for a survey of yellow flags in internation-
al literature.

Table 3. Yellow flags\textsuperscript{13,32,34}*

<table>
<thead>
<tr>
<th>Psychosocial factor</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Attitude</strong> (Ideas regarding pain)</td>
<td>The patient thinks back pain is a harming disorder. The patient thinks the pain is uncontrollable. The patient thinks rest advantageous and activities to aggravate the back pain.</td>
</tr>
<tr>
<td><strong>Behavior</strong></td>
<td>The patient uses appliances, medication and palliatives. The patient rests a lot and avoids daily activities. The patient has slept worse since the development of the back pain.</td>
</tr>
<tr>
<td><strong>Compensation issues</strong> (Financial consequences)</td>
<td>The patient does not have financial gain by resuming work Problems regarding the payments of benefits with previous absenteeism from work during a longer period (e.g. 12 weeks), which was related to the back pain problem.</td>
</tr>
<tr>
<td><strong>Diagnosis and treatment</strong></td>
<td>There is confusion about the diagnosis. The patient is dependent on earlier treatment. Passive treatment modalities are used. In the past the patient experienced a series of ineffective treatments.</td>
</tr>
<tr>
<td><strong>Emotions</strong></td>
<td>The patient has apprehensions to resume work. The patient is depressed and more irritable than he* used to be. The patient is anxious and shows an increased attention for bodily sensations (including enhanced arousal)</td>
</tr>
<tr>
<td><strong>Family</strong></td>
<td>The patient has an overprotective partner who emphasizes the dangers of harm and injury. The patient gets insufficient support when resuming activities The patient is a nurse, lorry driver or construction worker or heavy lifting is part of his work. The patient is convinced that work is harmful. The patient experiences problems in the present working environment. The patient has previous negative experiences on resuming work after a period of back pain.</td>
</tr>
</tbody>
</table>

* To stimulate readability the indication ‘he/she’, ‘his/her’ etc. is avoided in the guidelines. Where this is applicable both sexes are meant by ‘he’ and ‘his’.
Judging the psychosocial factors which enhance the development of chronic low back pain has gradually become a major part of the treatment of patients having low back pain. The screening of patients makes early identification of these factors possible, which leads to a more effective treatment. A questionnaire which can be used for this screening is the Screening Questionnaire for Psychological Risk Factors, by now translated into Dutch. The reliability and validity of and response to this Dutch version are as yet unknown. It is therefore that the working group does not recommend this questionnaire as a screening instrument in the present guidelines.

Linton describes five variables (factors) which negatively influence the prognosis of chronic low back pain:  
1. anxiety that activities are harmful;  
2. observed improvement which does not meet the patient’s expectations;  
3. problems regarding functioning at work;  
4. stress;  
5. previous absenteeism.

**Prognostic factors for low back complaints in the chronic phase**

Prognostic factors for chronic pain and restrictions in activities are mainly labor related and psychosocial factors. Prognostic factors might also influence the complaints positively.

This is the case if a patient copes with the complaints adequately, or if the patient’s environment stimulates undertaking activities instead of curbing them. Linton did a systematic review of the relation between psychological factors and low back and neck complaints. In all, 36 prospective studies are included. On the basis of several relevant studies of high quality Linton draws the conclusion that psychosocial factors are strongly related to the transition of acute to chronic pain and restrictions. It has also been shown that in general psychosocial factors have a greater impact on restrictions as a result of back pain than biomedical or bio mechanical factors. The patient’s behavior, attitude and emotions play a major role in this. Passive coping, the perception of pain as a ‘catastrophe’, and emotions like depression and fear, are closely connected with pain and restrictions. There is moderate to strong evidence that these psychosocial factors can predict pain and restrictions in the long run.

Waddell and Waddell made a systematic study of the influence of social factors on neck and low back pain. They come to the conclusion that there are many indications that social factors are related to neck and low back pain, but also remark that surveys are of poor methodological quality. Social factors which show consistent findings in one systematic review or in more than two studies of high quality are lower social class and psychosocial aspects of work (among which dissatisfaction with the work situation). The authors emphasize that social factors are no risk factors for the development of neck and low back pain, but that social factors can influence the development of neck and low back pain and the way patients deal with their complaints. From several studies Waddell comes to the conclusion that returning to employment is delayed in case of specific low back pain, when symptoms recur, among manual laborers and in lower social economic classes.

**Absenteeism**

Of workers with low back pain 90-95 percent are not absent from work. On the basis of several studies Waddell describes absenteeism in time: within one week 67 percent of the patients have resumed work, after one month 84 percent and after two months 90 percent. The graph flattens at three months of absenteeism; patients who are still absent then stand a great chance of staying absent. After one year, absenteeism has decreased to 3 percent. After two years of absenteeism the chances of resuming work are close to zero. In literature, similar ‘resuming of work’ graphs show the same shape; a quick rise at the start which flattens slowly. There is, however, a difference between the percentage of patients who are absent from work after one year. This varies from 1-2 percent to 5-10 percent of the patients. Resuming work depends on the degree of pain and physical restrictions.

**Bio psychosocial model**

In the traditional (biomedical) pathological model, pain is the immediate result of the underlying pathology. According to this model the pain will decrease when the pathology is removed. Non-specific low back pain can not be explained by using this model, because complaints and symptoms do not correlate with the findings of the pathology. Nowadays low
Back pain is therefore approached more and more from a bio psychosocial perspective. From this perspective (low back) pain is the result of interaction between biological, psychological and social factors. Psychosocial factors would especially play a role if complaints continue. The most important assumption of the behavior orientated approach is that not only do somatic factors have their effect on pain and restriction in activities, but psychological and social factors (if found) do as well. Chronic low back complaints are not only a physical problem. They also depend on the patient’s behavior, conviction, the psychological distress and the way the patient copes with his disease.

A.10 Manual therapy in a strict and a general sense

**Manual therapy in a strict sense**

Manual therapy in a strict sense concentrates on diagnostics and treatment of articular impairments by causing articular movements, with the required information (aimed at ways to exercise), specific exercise therapy and individual exercising.

**Manual therapy in a general sense**

Manual therapy in a general sense concentrates on diagnostics and treatment of restrictions in activities and participation problems (and the adjustable psychosocial factors) by supervising (advise/inform) and exercising functions and activities, if necessary supported/followed by causing articular movements.

Manual therapy in a general sense has a specific professional opinion on the patient’s state of health from the bio psychosocial perspective, in which the manual therapist assesses and analyses the impeding and promoting factors for biological and behavioral recovery and adaptation processes. Apart from the (biological) impairments in functions the manual therapist also manipulates the psychosocial factors. Making a survey of the impairments in functions, restrictions in activities and participation problems and their correlation is part of this.

A.11 Classification of patients with low back pain

**Classification in phases**

The working group classifies low back pain according to the duration of the complaints: 0-6 weeks (acute phase), 7-12 weeks (sub acute phase) or > 12 weeks (chronic phase). In doing so the working group is in line with the classification of the NHG-Standard Low back pain and that of other international guidelines.

**Classification in profiles**

In the several different profiles the working group tried to join the existing guidelines. For the positioning of manual therapy a further refinement of a time scale based on more than the duration of the complaints is desirable. The classification in profiles has been realized on basis of evidence and on the basis of the judgement of experts and the members of the working group.

The guidelines distinguish two profiles per phase:

1. Acute phase (0-6 weeks):
   - Profile 1a: the natural course of complaints is normal.
   - Profile 1b: the natural course of complaints deviates.

2. Sub acute phase (7-12 weeks):
   - Profile 2a: the natural course of complaints deviates; there are no yellow flags.
   - Profile 2b: the natural course of complaints deviates; there are yellow flags.

3. Chronic phase (>12 weeks):
   - Profile 3a: the patient handles complaints adequately, has a high level of self-control and an adequate way of coping; the patient can fine tune load to the load tolerance and there is adjusted participation; there are episodes of increased pain.
   - Profile 3b: the patient handles complaints inadequately; has little or no self-control and inadequate way of coping; the patient cannot fine tune load to the load tolerance, there is decreased participation.
A.12  Way of coping with complaints
Some patients handle their complaints adequately (active coping), others do not (passive coping). Coping can be defined as the cognitive and behavioral efforts made by the individual in order to control, reduce and tolerate internal and external demands created by a stress factor. If a patient shows active coping he himself will take steps to control the pain (diversion/exercise). A patient showing passive coping remains inactive in controlling the pain (bed rest or medication), has an attitude of dependency and limits his activities. The characteristics of the patient and the interaction between the patient and his environment, of which the manual therapist is a part, determines the way in which a patient copes with his complaints.

Characteristics of the patient
In the characteristics of the patient a distinction is made between the significance attributed to the complaints by the patient himself, and control over the complaints experienced by the patient. The significance attributed to complaints is based on subjective experiences - varying from 'non threatening' to 'very threatening' - and on their interpretation of sensory stimuli. If a patient is of the opinion that low back pain is a sign of tissue damage and that increasing pain (e.g. during exercise) is a sign of new tissue damage, he experiences the complaints as threatening. This may lead to fear of movement. The more threatening the patient considers these complaints, the greater the possibility he cannot cope with them adequately. If the significance attributed by the patient to the stimulus or situation does not correspond with the reality open to objectification we speak of error of reasoning. Catastrophizing is a frequent error of reasoning. The patient considers the pain and the situation in which the pain occurs as a serious threat, a catastrophe. The degree of the patient's feeling to be able to exercise control over pain, plays an important role as well. The patient can experience his own health as mainly internally controlled ('internal locus of control': someone has control over his own health) or as mainly externally controlled ('external locus of control': someone renders the control over his health to others, e.g. the manual therapist). An 'internal locus of control' often coincides with active coping and therefore with being able to cope with pain better. Both the significances attributed and the observed control are determining factors for the patient's attitude towards movement. If pain is considered to be a signal of ominous injury (catastrophizing) there is a great possibility that fear of movement may develop. Fear of movement is the irrational fear that movements will (again) bring about pain or injury, which may result in the increasing avoidance of movement. The odds are that a patient is going to avoid activities which he expects, on the basis of previous experience, to produce much pain, over which he has no control.

Interaction between patient and environment
Social support helps in coping with drawbacks and adjusting to changes. The most important source of social support is the partner. Patients with low back pain who get social support show faster recovery and resume their desired activities sooner. Social support on the other hand can actually contribute to the continuation of complaints. For example when the partner relieves the patient of all work and by doing so forces the patient to keep up his logical errors. Conflicting information and advice from different health care providers may frighten the patient. The attitude of the manual therapist, e.g. the way he deals with the patient's complaints, seems to have influence on the natural course of the complaints. Among patients with chronic low back pain it is of importance that a time contingent policy is followed. This implies that activities are gradually increased on the basis of time and not on the basis of pain. The primary objective of this policy is to improve the patient's functioning rather than the decrease of pain.

A.13  Co-operation with other professions
Co-operation with other professions and the standards and/or guidelines of those professions will enhance the effectiveness and efficiency of medical care. At a local level the manual therapist needs to reach agreements with the professions involved (like PCP, ergo therapist, psychologist, occupational physician) what the specific policy should be in this group of patients.
To tune in communication between the manual therapist and the PCP, the manual therapist can make use of specially developed auxiliary brochures: The 'Brochure-Consultation', 'Brochure-Referral Note', 'Brochure-Intermediate Contact', and the 'Brochure-protocol'. The 'Brochure on Indication' offers starting points to discuss the 'KNGF-guidelines manual therapy for patients with low back pain' and to tune in the lines of policy.

The (Dutch College of General Practitioners (NHG) has made a standard for low back pain. Starting point of this standard is that in acute low back pain no single treatment shows a better result than awaiting its natural course. In low back pain which lasts longer than six weeks, policy is especially aimed at the prevention or reduction of the patient's dysfunction. The Dutch Association of Occupational Physicians (NVAB) has made guidelines concerning the policy of the occupational physician among employees with low back complaints. Aim of the policy is to prevent employees who have reported sick, from staying away from work unnecessarily long, and from becoming incapacitated for a long time because of that. The occupational physician can advise the employer on adaptations in working conditions if necessary, like adaptations in working hours, assignments, and ergonomics, or on the attitude of management and co workers (the social environment at work). Patients who stay away from work decide, in consultation with the management and the occupational physician, on a plan to gradually build up their work. To link this process in a proper way to the supervision of the manual therapist (i.e. the removal of the restrictions in activities), tuning in is important. If necessary the manual therapist consults the occupational physician about this. Summarizing: ‘(...) among employees who stay absent from work for two weeks with a specific back pain, supervision needs to be aimed at active participation, irrespective of medication used by the employee. Such activation should link up with the daily routine. There is little cause to initiate a certain plan of treatment. If the employee does decide to undergo treatment, manual therapy (in a strict sense) seems to be the best option.

Multidisciplinary guidelines for patients with low back pain in the form of a CBO-Guideline are available. In the CBO-guidelines it is recommended that in the acute and chronic phase, manipulation can be used as part of an activating policy among patients with acute low back complaints, who do not return to their normal level of activities.

B Diagnostic process
Starting point of the methodical behavior of the manual therapist is the process of problem solving behavior. The following phases are to be distinguished: registration/referral, history-taking, assessment, analysis (including the formulation of the manual therapeutic diagnosis), plan of treatment, treatment, evaluation, conclusion and report. During diagnostics an analysis is made of the individual musculoskeletal system with acceptance of asymmetry of shape and function. This analysis serves as starting point for the treatment. Articular functions of the individual musculoskeletal system are approached and considered in connection with biomechanics and control. The manual therapist particularly establishes the quality of the interrelated articular functions (the artrogenous, muscular, neurogenous chain) and relates this quality to the patient’s pattern of complaints and his functioning in the daily routine. The manual therapist defines the patient’s health problem in terms of functions, anatomic properties of structures, activities, participation and external and personal factors.

B.1 Referral/registration
Important referral data among patients with low back pain are: The patient's demand the reason for referral, the functional development (activities and participation) and data about additional assessment and prognosis. Additional referral data are: (relative) contraindication for manual therapy if any, the prescribed medication, co morbidity and the presence of relevant bio psychosocial factors which can influence the natural course.

B.2 History-taking
In the history-taking the patients are asked questions necessary for the manual diagnostic assessment. Taken into consideration are both the patient's needs and complaints (origin, nature, severity, natural course) and the history-taking (red flags), psychosocial factors (yellow flags), external factors (e.g. working conditions, attitude of family members) and personal
factors (e.g. lifestyle, habits) which may influence the origin or the continuation of low back pain. The manual therapist also collects data about the (relative) contraindication for manual therapy. On the basis of these data the manual therapist makes a survey of the actual health problem of the patient. He also determines the prognostic factors in relation to the natural course to be expected.

Among patients with low back pain coping is an important issue. In the history-taking the manual therapist has to find out the significance attributed by the patient to his complaints, whether the patient has irrational thoughts (reasoning error), whether the patient controls his complaints and whether there is fear of movement.

B.3 Contraindications

Absolute contraindications

The absolute contraindications for the manual therapeutic intervention are:\54-\57

- bone: tumors (e.g. metastases); infections (e.g. tuberculosis); bone reduction (e.g. osteomalacia); congenital deviations (e.g. dysplasia); iatrogenic deviations (e.g. prolonged use of corticosteroids) inflammation (e.g. serious rheumatoid arthritis), traumata (e.g. fractures);
- neurological: compression of the spinal cord or the cauda equina; radicular compression with increasing neurological failure;
- vascular: aorta aneurism; intra-articular bleeding;
- the patient does not consent to treatment;
- the patient cannot adopt the starting position necessary for treatment because of pain or resistance.

Relative contraindications

The relative contraindications for the manual therapeutic intervention are:\54-\57

- negative reaction to earlier treatment;
- hernia nuclei pulposi (HNP) (with radicular syndrome);
- artrogenous inflammation;
- spondylosis;
- spondylolisthesis;
- pregnancy;
- osteoporosis;
- use of anti coagulation medicine or prolonged use of corticosteroids;
- serious articular degeneration or spondylosis;
- psychological dependency on manual therapy;
- ligamentary laxity;

B.4 Measuring instruments

These guidelines advise to make use of two measuring instruments. To determine the functional status of the patient, the guidelines advise the measuring instrument Patient Specific Complaints\58. In order to fill in this form the patient first of all draws up a list of physical activities which are impeded by back pain. The activities should be personally relevant (important) to the patient and they should be carried out regularly (per week).

Next, the patient selects three activities which are most difficult, most important and most frequently carried out. At the beginning and end of the treatment, the patient scores the level of difficulty he has in carrying out these three activities on a Visual Analogue Scale (VAS). As yet no data are known as to the reliability of the instrument. Literature has shown Patient Specific Complaints is responsive among patients with low back pain.\59

For making a survey of the restrictions and participation problems the guidelines advise the Quebec Back Pain Disability Scale (QBPS). The QBPS contains twenty items in the sphere of daily activities: bed rest, sitting-standing up, walking, moving, bending and shifting heavy objects. Per question there are six possible answers: ‘no difficulty at all’, ‘hardly any difficulty’, ‘some difficulty’, ‘much difficulty’, ‘extreme difficulty’ and ‘unable to’. The total score is the sum total of all items. It varies from 0 (no restriction) to 100 (fully limited). The Dutch version is valid, reliable and responsive.\60 For both instruments the working group refers to the booklet ‘Measuring instruments chronic pain’.

Linton and Hallden developed the 24-item Acute Low Back Pain Screening Questionnaire (ALBSQ). By means of this instrument it is possible to predict which patients with acute back pain run a greater risk to prolonged restriction because of their back pain. With the authorized Dutch version of the ALBSQ it is possible to make a survey of yellow flags.\32 The reliability and validity of the Dutch version is as yet unknown.
B.5 Analysis to formulate the assessment objectives

By means of the data from the history-taking, the manual therapist formulates a number of assessment objectives which are determined by the profile of the patient (1a/b, 2a/b or 3a/b).

Classification of the patient in one of the profiles takes place by means of the following questions:

1. In which phase is the patient: acute (0-6 weeks), sub acute (7-12 weeks) or chronic (> 12 weeks)?
2. Is there a normal (delayed) or deviating natural course? If there is a deviating natural course:
   a. Are there any indications of the presence of red flags (biomedical factors)?
   b. Are there any indications of the presence of yellow flags (psychosocial factors)?

Among patients with profile 1a/b, 2a or 3a the assessment objectives are primarily aimed at the assessments of impairments in functions. Secondarily they are aimed at the restrictions in activities.

Among patients with profile 2b and 3b the research objectives are primarily aimed at the assessment of the limitations in activities and at the presence of yellow flags. Secondarily they are aimed at the impairments in functions.

B.6 Assessment

The assessment consists of inspection during rest, inspection while exercising and functional assessment. On the basis of the assessment objectives the manual therapist carries out the following assessments:

• anthropometric assessment; aimed at, for example, the position of the legs, the pelvis and the vertebral column;
• assessment of the functions, especially assessment of articular functions (range of motion, direction of movement, motion resistance, end feel, pain (readiness to movement, behavior while in motion); muscle strength and patterns of movement) with manual diagnostic tests, which provide insight into the articular functions and the preference of the joints on the basis of their configuration, among other things by carrying out three dimensional movements within the limits allowed by the joints; physiologic behavior of movement and movement in physiologic directions establish the quantitative and qualitative articular status;
• assessment of activities, meant as addition to or verification of data of history-taking (e.g. bending, lifting, shoving, maintaining posture, going and walking).

On the basis of the common segmental innervation, a segmental link with disregulation can be recognized between the impairments in articular functions, muscles, nerves and skin (segmental impairments).

Little is known about the reliability and validity of the manual diagnostic tests regarding the unequivocal establishing of articular functions. In his review Huijbregts reports that research into the reliability of palpation (techniques) in spinal movements still have methodological and statistic shortcomings and that further research is necessary.

The manual therapist formulates the findings of his assessment in terms of impairments in functions and makes an estimation of the level of functioning in motion. The physical assessment serves as check, adjustment and addition of the profile of history-taking.

B.7 Analysis to formulate the manual therapeutic diagnosis

The manual therapist interprets the data of the history-taking and the data from the functional assessment and on their basis formulates the manual therapeutic diagnosis.

By means of the answer to the following questions, the manual therapist can determine whether manual therapeutic intervention in strict or general sense is indicated:

1. Are the findings, including the findings of the physical assessment, consistent during the diagnostic process? Do the physiologic functions provoke the recognizable complaints of the patient?
2. Are there indications of the presence of red flags (biomedical risk factors)? If so, which ones?
3. Are there indications of the presence of yellow flags? If so, which ones?
4. Are there contraindications for manual therapy in a strict sense? If so, which ones?

Manual therapy in a strict sense

Manual therapeutic intervention in a strict sense is indicated if the answer to question number 1 is ‘yes’ and to questions number 2, 3 and 4 ‘no’ (profile 1b, 2a and 3a).
Manual therapy in a general sense

Manual therapeutic intervention in a general sense is indicated if the answer to questions number 1, 2 and 4 is ‘no’ and to question number 3 ‘yes’ (profile 2b and 3b).

On the basis of the answer to the following questions the manual therapist can determine the health profile of the patient and his personal and external factors, which can be influenced by manual therapeutic intervention in a general sense:

1 Is the (local and general) load tuned in to the (local and general) load tolerance of the human action system?

2 How does the manual therapist value the relation between impairments in functions, restrictions in activities and participation problems?

3 Can the impairments in functions which have been discovered be classified into:
   • movement impairments in one or more joints;
   • biomechanical patterns;
   • segmental impairments?

4 What are the unfavorable (impeding) factors for recovery at the moment?
   • biomechanical factors;
   • trophic factors;
   • personal factors;
   • environmental factors?

5 Can the unfavorable (impeding) factors and the relevant impairments, restrictions and participation problems be influenced by manual therapy? If so, what unfavorable (impeding) factors, relevant impairments, restrictions and participation problems are involved?

6 What is the prognosis for recovery?

Personal factors

The ICF describes personal factors as the individual background of the life of an individual. Those characteristics of the individual are meant which are not part of the functional health situation. Personal factors include among other things:

- age;
- gender;
- race;
- education;
- personality and character;
- abilities;
- life style;

- habits;
- upbringing;
- ability to cope;
- social background;
- profession;
- experiences from past and present.

External factors

The ICF describes external factors as the physical and social environment in which a person lives. Those factors are found outside the individual and can have a negative or positive influence on the participation of the individual as a member of a society, on the carrying out of activities of the individual, or on the functional and anatomic qualities of his organism. They can either be impeding or auxiliary for the functional status of the individual.

The ICF-main divisions are:

- products and technology (with objectives as e.g.: human consumption, culture, communication, relaxation and sports);
- natural environment and its changes made by mankind (e.g. climate, sound);
- support and relations (e.g. family, acquaintances, friends, workers in health care);
- attitudes (e.g. personal attitude of family members and/or friends);
- services, systems and policies (e.g. in relation to the built up surroundings, environmental town and country planning, accommodation, communication, social security, health care, employment and education).

The manual therapist values the health situation of the patient and the degree of manipulation regarding the impeding factors, and judges whether manual therapeutic intervention is indicated, and whether it is possible to work according to the guidelines. If manual therapeutic intervention is not indicated, the manual therapist refers back to the referring physician. After the questions asked during the analysis process have been answered, the manual therapist draws up the plan of treatment in consultation with the patient. Arguments for not applying treatment according to these guidelines are:

- too few referral data;
- a specific cause (red flags) for low back pain;
- contraindications for manual therapy.
Examples of red flags/contraindications are:

- osteophytes;
- signs of pressure on the spinal cord;
- signs of dural adhesion (paraesthesia in the legs which aggravates on traction of the neck);
- lumbo-sacral radicular syndrome with neurological failure;
- traumatic injury with possibility of fracture;
- suspicion of arterial aneurism;
- treatment with anticoagulants or repeated hemorrhages;
- hypertension;
- osteomalacia;
- osteoporosis
- morbus Bechterew (liability to fractures);
- osteogenesis imperfecta;
- tumors or metastases;
- tuberculosis or other inflammations in or close to the bones;
- cauda equina syndrome;
- last few months of pregnancy (common laxity of ligaments);
- the sign of the buttock (if there are pains in the buttock area, the straight leg raising test is painful and limited, passive hip function is even more painful and limited, which indicates severe pathology in or of the pelvis).54-57

Unfavorable personal factors affect the content of the treatment. The extent to which these factors play a role and can be influenced by manual therapy, is an indication for the manipulation of the health problem. The manual therapist needs to judge both aspects critically. At the moment there are no objective criteria for this. If necessary the manual therapist contacts the referring physician.

B.8 Plan of treatment

The plan of treatment is a means to structure, control and evaluate the procedure. In the plan of treatment the manual therapist lays down (in consultation with the patient) the individual targets, the activities, the strategy for treatment and the moments for evaluation.

The main target of the treatment among patients with low back pain is the return to complete (or desired) level of activities and participation, and preventing chronic complaints and recurrences. The manual therapist aims at an activating policy, in which the patient is co-responsible for the result to be achieved. This can be attained by actively engaging the patient in the drawing up of the plan of treatment and in the planning and realization of the treatment.

C Therapeutic process

The recommendations in the therapeutic process are primarily based on available scientific evidence. If evidence is lacking the recommendations are based on consensus. To give the guidelines a solid basis, systematic reviews or meta-analyses about the effectiveness of manual therapy among patients with low back pain have been systematically looked for. The files of MEDLINE (January 1982 to October 2001), CINAHL (January 1982 to October 2001), The Cochrane Library (2001) and the file of the Dutch Institute of Allied Health Care (to October 2001) have been searched with the following key-words: back pain, manual therapy, manipulation, chiropraxis, systematic review, meta-analysis.

The inclusion criteria were: the article should be in English, German, French or Dutch; the design is a systematic review or meta-analysis; the article is about the effectiveness of a manual therapeutic intervention among patients with low back pain, the intervention is within the scope of manual therapy in the Netherlands and the outcome is related to the functional status of the patient.

In general the methodological quality of the published Randomized Clinical Trials (RCTs) is low for the treatment of both acute and chronic low back complaints.65,66 Most shortcomings concern an inadequate randomization procedure, lack of having a blinded review among patients, therapists and results, and an inadequate description of drop-outs. Vernon comes to the conclusion that the quality of the RCTs regarding manipulation in chronic low back complaints is varying; however, not different from other available trials regarding the effectiveness of conventional treatment.67

For further interventions use was made of the reviews of Van Tulder et al.65,68 The reviewers employ four levels of scientific evidence, based on the number of randomized clinical trials and their methodological quality (see table 4).
C.1 Recommendations manual therapy in a strict sense

Mobilizations/manipulations

Van Tulder and Waddell found 16 RCTs of which 2 were of high and 14 of low quality.\(^68,69\) The methodological scores vary from 22 to 51 points (0-100 points). Twelve out of 16 RCTs, among which the two of high quality, mention positive results, four mention negative results. Four reviews compare manipulation with placebo therapy; three out of four mention positive results. Fourteen reviews compare manual therapy with other forms of conservative therapy (like physical therapy, back school, no therapy at all and medication). Ten reviews are positive and four (among which one of high quality) are negative. The reviews of high quality mention negative results, with the exception of the subgroup low back pain with a duration of between 14 and 28 days. Van Tulder and Waddell come to the conclusion that there is moderate evidence (level 2) that manipulation is more effective than placebo therapy, for a short term effect of decreasing pain in acute low back pain.\(^68,69\) Because of the inconsistent findings they could not give their opinion about the effectiveness of manipulation compared to treatment by the PCP (bed rest, palliatives and massage) in chronic low back pain is moderate (level 2).

Regarding the effects of manual therapy Bronfort et al. mention moderate evidence (level 2) for the short term effect of manipulation/mobilization in acute low back pain.\(^72\) There is also moderate evidence (level 2) for the short term effect of manipulation/mobilization in chronic low back pain. There is limited/contradictory evidence (level 3) for the effects of manipulation/mobilization in the long run in acute and chronic low back pain.

Koes et al. came to the conclusion that the effectiveness of manipulation in acute and chronic low back pain can not be shown evidently (level 3) by using the reviewed RCTs.\(^71\) The reviewers, however, do indicate that manipulations can be effective in some sub groups of patients with low back pain.

After three weeks the recovery in the manipulation group is 67 percent versus 50 percent in the control group; this according to the meta-analysis of Shekelle.\(^72\) When symptoms are acute this advantage might be gained. There is, however, too little evidence of effectiveness in chronic low back pain. The short term effect concerns especially ‘uncomplicated’ low back pain.

The findings of the above mentioned are confirmed by Morton et al., who come to the conclusion that treatment consisting of spinal manipulation is less effective for patients with chronic low back pain than for patients with acute low back pain.\(^73\)

<table>
<thead>
<tr>
<th>Level</th>
<th>Evidentie</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>strong</td>
<td>consistent findings in several high quality RCTs</td>
</tr>
<tr>
<td>2</td>
<td>moderate</td>
<td>consistent findings in one high quality RCT and one or several low quality RCTs</td>
</tr>
<tr>
<td>3</td>
<td>limited/contradictory</td>
<td>one RCT (high or low quality), or inconsistent findings between several RCTs</td>
</tr>
<tr>
<td>4</td>
<td>no</td>
<td>no RCTs available</td>
</tr>
</tbody>
</table>
On the basis of the above mentioned the working group formulated the following recommendation:

**Mobilizations/manipulations**
It is likely that manual therapeutic intervention is an effective treatment in low back pain. Manipulation will be more effective for patients with acute low back pain than for patients with chronic low back pain.

**Risk of complication**
The risk of complication regarding manipulation of the lumbar column is zero. The frequency of complications, especially the cauda equina syndrome, is estimated to be 1 in 100 million manipulations.

**Traction therapy**
In 1995 Van der Heijden et al. did a systematic review into the effectiveness of traction for back and neck pain. In this review 17 RCTs are included of which 14 into the effectiveness of lumbar traction. The authors came to the conclusion that the methodological quality of the studies is too little to be able to draw conclusions about the effectiveness of traction in low back pain. The scientific level of evidence is 3. The RCTs in a more recent systematic review of Van Tulder et al. overlap (one RCT excluded) the above mentioned review of Van der Heijden. This RCT (also dated 1995) is of a high methodological quality and compares the effectiveness of traction with placebo traction in patients with chronic low back pain. The study shows no differences in results regarding general improvement, pain and functional status. Also on the basis of this study Van Tulder et al. came to the conclusion that there is strong evidence (level 1) that traction is not effective in chronic low back pain.

On the basis of the above mentioned the working group formulated the following recommendation:

**Traction therapy**
It has been shown that traction therapy is not effective among patients with chronic low back pain. There are indications that traction therapy is not effective among patients with acute low back pain.

---

C.2 Recommendations exercise therapy

The systematic review of Van Tulder et al. consists of 39 RCTs into the effectiveness of exercise therapy among patients with low back pain in primary health care. Moreover all studies evaluate at least one of the following primary effects: pain, general improvement, functional status related to low back pain and return to work. Twelve studies concern patients with acute low back pain and 23 concern patients with chronic back pain. Three studies make use of a mixed group of patients. One study does not mention the duration of the complaint. Among patients with acute low back pain there is strong evidence (level 1) that exercise therapy is as effective as other forms of active/inactive or placebo treatment. Among patients with chronic low back pain there is strong evidence (level 1) that exercise therapy is as effective as conventional physical therapy (consisting of hot packs, massage, traction, mobilization, improvement of coordination and electrotherapy). Apart from this there is strong evidence (level 1) that exercise therapy is more effective than the standard care by the PCP. It is unclear which types of exercises are preferable. The review shows contradictory evidence (level 3) regarding the effectiveness of flexion and extension exercises. There is however strong evidence (level 1) that extension exercises are not effective in acute low back pain and moderate evidence (level 2) that flexion exercises are not effective in acute low back pain. There is strong evidence (level 1) that exercises to strengthen the muscles are more effective than active/inactive treatment.

Hilde and BØ did a systematic review into the effect of exercise therapy among patients with chronic low back pain, in which they stressed the type and quantity of the exercise therapy. Nine RCTs complied with the inclusion criteria. Seven of these RCTs were also included in the review of Van Tulder et al.. Two of them were excluded by Van Tulder et al. on the basis of the patient population. Hilde and BØ came to the conclusion that it is unclear whether the methodological quality, the quantity of exercise therapy or the type of exercise therapy actually influences the results.
Summarizing it may be stated that exercise therapy is effective among patients with chronic low back pain. There is insufficient data about the optimum content of exercise therapy among patients with low back pain.

On the basis of the above the working group formulated the following recommendation:

Exercise therapy
It has been shown that exercise therapy is not effective among patients with (sub) acute low back pain. Exercise therapy needs to be given to patients with chronic low back pain, because it renders better results than no treatment at all. Unclear is which type of exercise is most suitable. Therefore the working group advises to offer a varied exercise program which tunes in to the patient’s needs.

C.3 Recommendation to supervise and/or exercise according to behavior-orientated principles
Behavior-orientated therapy is based on the presupposition that pain and restrictions are not only influenced by somatic factors, but also depend on the patient’s convictions, expectations, emotional stress and behavior towards his disease. Behavior-orientated therapy can be subdivided into the following types: operative oriented, cognitive oriented and respondent oriented therapies. Each type aims at the modification of one of our three emotional response systems: behavior, cognitions and the physiological reactivity.

Van Tulder et al. did a meta-analysis to determine whether behavior-orientated therapy is more effective than other treatment in chronic low back pain and which type is most effective. In the analysis 21 studies are included. The analysis shows strong evidence (level 1) that behavior-orientated therapy (compared to ‘no treatment’, waiting list or placebo therapy) has a moderate positive effect on pain intensity and that there are small positive effects on the general functional status and the behavior-orientated outcome among patients with chronic low back pain. The effectiveness of behavior-orientated therapy compared to other forms of treatment is unclear. There is no evidence that one of the types of behavior-orientated therapies is more effective than the other. There is also moderate evidence (level 2) that the addition of a behavior-orientated component to a standard treatment (e.g. standard physical therapy, back school, multi disciplinary treatment, medical treatment) has a minor positive short term effect on the functional status in chronic low back pain, but no short term effect on pain intensity and behavior-orientated outcome. Finally there is moderate evidence (level 2) for minor long term effects on functional status and behavior-orientated outcome.

Turner did a meta-analysis into the effectiveness of cognitive and behavior-orientated interventions among patients with low back pain in primary health care. Fourteen publications met the required criteria. In the review 10 out of 14 included studies can be traced. Of these, eight studies have been admitted in the review of Van Tulder et al. Moreover, Turner does not present separate results of the RCTs, so it remains unclear what the results of the other studies are. The conclusions of Turner, however, do correspond with those of Van Tulder et al. Turner came to the conclusion that cognitive and behavior-orientated forms of treatment show better effects than check ups like waiting lists. No differences were found between both forms of treatment and other active forms of treatment.

Summarizing, it appears that behavior-orientated therapy among patients with chronic low back pain is more effective than ‘no treatment’ and that it is unclear which type of behavior-orientated therapy is most effective.

On the basis of the above mentioned the working group formulated the following recommendation:

Behavior-orientated therapy
It is likely that behavior-orientated therapy is useful among patients in the sub acute phase with the presence of yellow flags and among patients with chronic low back pain. It is unclear which type of therapy is most effective. For manual therapists the operative type seems to be the most obvious one because behavior (regarding exercise) is the starting point.

Behavior-orientated principles
Behavior-orientated principles aim at the modification of the patient’s behavior in relation to the functional status in motion. The treatments can be focu-
sed at the attitude towards pain (operative approach), at recognizing tensions (respondent approach) and at the expectations and ideas of the patient (cognitive approach). Because of the manual therapists’ sphere of action the operative approach is most suitable. The operative approach was first described by Fordyce et al. in 1973.80 The objective of an operative approach is extending the level of activities and decreasing the pain, so the patient will be able to perform some of his desired activities in spite of the pain.77

Characteristics of behavior-orientated principles are: active participation and time contingent action. Active participation implies that the patient actively participates in the treatment and is co responsible for the final result. The objective of this approach is to further the patient’s control over his own behavior-regarding exercise. We speak of time contingent action if time determines the action instead of pain. This implies that the patient stops doing a certain activity (or exercise) because a previously set time has passed and not because of the increase of pain (cf. extending activities by means of a time contingent program). The objective is to teach the patient to function in a way he can control his pain as much as possible. During the treatment the manual therapist gives the patient positive feedback about his progress.

Exercise and controlling functions and activities

In a time contingent program the selected activities are extended step by step, not on the basis of pain, but according to previously determined steps (‘graded activity’). The objective is that the patient increases his level of activities and learns to cope with his physical possibilities. To be able to tune in to the patient’s wishes the manual therapist inquires what activities are impeding and which ones the patient thinks most important (see B4). These activities are starting point for the treatment. First of all the manual therapist lays down the baseline of the activities to be practiced. This happens by telling the patient to perform the selected activities as long or as often as possible. The patient needs to be informed about the objective of the measurement i.e. adequate estimation of the correct level. The patient has to show his abilities, without straining himself. In order to come to a better estimation of the basic level, it is preferable to do a number of measurements. Based on recorded values (time, duration, severity and frequency) the average value per activity can be computed, the baseline of the activity. While measuring the baseline, the manual therapist pays attention to ‘proper exercising’ (quality of exercising).

Once the baseline has been established the manual therapist sets an attainable target per activity, in consultation with the patient. Based on the proposed time of treatment, the manual therapist develops a step by step build up from the initial level to the attainable target. The initial level of treatment is clearly below the baseline to observe the balance between load – load tolerance. The way the program is built up (the size of the steps; the number of steps) depends on the difference between the initial level and the desired end level of the patient’s load tolerance. The manual therapist tries to make an assessment of this. The patient can practice both at home and at the practice. It is of importance that the occurrence of pain does not influence the assignment. To show the patient’s progress, literature advises to record the steps on a ‘workout form’ in a graphic representation.81

If the level of activity of the patient decreases (e.g. as the result of anxiety to exercise or passive coping) the manual therapist stimulates the patient to exercise in a safe environment and under his supervision. The objective is to make the situation less and less controlled in the course of treatment. In the beginning control comes from the manual therapist, who indicates what, how and how often the patient should do something. In a later stage the manual therapist’s aim is that the patient increasingly takes control over his own activities.

Information and/or advice

With patients having low back pain in the profiles 2b and 3b the manual therapist mainly has a supervisory responsibility. Together with his patient it is his objective to regain control over the functional status in motion. This supervisory task consists of activating, reassuring and motivating the patient, determining his progress, and rewarding him by giving positive feedback. Because of this, information to the patient is quite important within the manual therapeutic care providing process. Giving information requires special skills to attain that the patient benefits optimally and actually uses the information. Research by Knibbe and Van Zuilekom82 shows the importance of informing
the patient in such a way that he understands that his behavior influences his back complaints. The authors write: ‘because of the information the patients must feel responsible for the well being of their backs. The patients should get the feeling that they themselves can exercise control over their recovery and over the prevention of recurrent complaints’.

To give effective information, knowledge and skills are required from the field of information and from behavioral therapy. Van der Burgt and Verhulst give a survey of the models used on information about health, and convert these models into a model of patient information used in paramedic practice. In doing so they integrate the ASE-determinant model Attitude, Social Influence and Personal Efficacy model into the step by step model regarding information by Hoenen et al., in the ASE-determinant model assumes that the patient’s readiness to change his behavior is determined by an interplay between attitude (how does the person perceive the change in behavior), social influence (how do others perceive the change in behavior) and the patient’s perception of his own efficacy, his self-efficacy (will it work or not) The educational model proposed by Hoenen et al. envisages the stages of “being open”, “understanding”, “wanting” and “doing”. For allied health professionals, van der Burgt and Verhulst added two additional steps: “being able” and “keeping on doing”. Van der Burgt and Verhulst view education as being a process in which maintenance of the new behavior is the last step. This final step cannot be achieved if the preceding steps have not been taken. Hence, the six steps must be taken in succession (see table 5).

C.4 Explanation of the treatment profiles in the acute phase

Treatment of patients having profile 1a

The treatment of patients who belong in profile 1a is carried out according to the KNGF-guidelines Low back pain. The manual therapist gives information and advice, if necessary supported by exercises. The advice ‘stay active’ is useful, whereas the advice ‘bed rest’ is not.

Treatment of patients having profile 1b

For the patient who has been put into profile 1b by the manual therapist manual therapeutic intervention in a strict sense is indicated. The four categories of intervention open to the manual therapist are categorized according to the technique used:

1. interventions in which the manual therapist makes use of articular techniques, including manipulations, aimed at: pain reduction and increase of range of motion;
2. interventions in which the manual therapist makes use of muscular techniques:

Table 5. Areas for special attention in the six steps in the information process.

<table>
<thead>
<tr>
<th>Step</th>
<th>Area for special attention</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Being open</td>
<td>The therapist takes care that the information tunes in with the experiences, expectations, questions and cares of the patient.</td>
</tr>
<tr>
<td>2 Understanding</td>
<td>The therapist offers the information in such a way that the patient understands it and can remember it.</td>
</tr>
<tr>
<td>3 Wanting</td>
<td>The therapist lists the factors by which the patient is motivated/discouraged to show certain behavior and offers support and information about possibilities and alternatives. He makes sure that the targets are attainable.</td>
</tr>
<tr>
<td>4 Being able</td>
<td>The patient must be able to meet the required line of conduct. If necessary the patient exercises the required functions and activities.</td>
</tr>
<tr>
<td>5 Doing</td>
<td>The therapist makes a clear, concrete and attainable agreement with the patient and sets concrete targets.</td>
</tr>
<tr>
<td>6 Keeping on doing</td>
<td>During the treatment the therapist asks the patient whether he thinks he can show the required line of conduct. Difficulties, if any, are solved by both therapist and patient.</td>
</tr>
</tbody>
</table>
muscle lengthening, raising of muscle tone, stimulating contraction and improving the co-ordination, during which the manual therapist does not only influence the articular function mechanically, but also strives for (neuro)physiological effects, like improvement of the trophic condition of tissues and organs, stimulation of co-ordination of movement, influencing nocisensorics and pain;

3 skin techniques;
4 nerve techniques.

Articular techniques
Articular techniques for manually causing articular movements can be applied using the following variables:

• starting position of the joint:
  - far from the pain threshold;
  - close to the pain threshold;
  - to the limit of range of motion;
  - through the present limit of range of motion;
• direction of movement:
  - towards the pain and/or towards the restricted direction of movement;
  - away from the pain and/or the restricted direction of movement;
• rhythm
  - vibrate to longer holding time: fast rhythms especially to reduce the pain; prolonged slow rhythms especially to improve mobility;
• amplitude:
  - from very small movements to larger movements of complete chains of movements;
• course:
  - before the end position;
  - across the end position;
• strength:
  - strength in the end position: from little to substantial;
• velocity:
  - from high to low: high speed when using ‘high velocity thrust’ techniques;
• movement components:
  - from single movement components like traction and translation to more complex movement components (three dimensional movements) (with single movement components no complete functional recovery can be achieved in the end; the gradually applied complex movements are meant to restore the articular function as specific as possible);
• repetition and intensity:
  - the more the articular load tolerance increases the larger the progression in the number of possible repetitions and the increase of intensity will be.

The terms mobilization and manipulation have seldom been defined in literature. The risk to wrongly interpret the outcome of clinical research into the effects of these techniques is great. To make the variables operational is possible according to the ‘cockpit model’. This model makes it possible to describe mobilization and manipulation in the variables applied by the manual therapist.

C.5 Explanation of the treatment
profiles sub acute phase

Treatment of patients having profile 2a
Patients who belong in profile 2a (deviating natural course of complaints without yellow flags) are indicated for manual therapy in a strict sense. The treatment is similar to that of patients in phase 1b.

Treatment of patients having profile 2b
The more indications there are of the presence of yellow flags, the more the treatment needs to be initially aimed at their decrease. The treatment aims at influencing the negative behavioral factors in relation to the functional status and the gradual increase of activities and participation. In doing so the manual therapist makes use of a number of behavioral principles in relation to the functional status of the patient. If necessary, at the existence of articular impairments, the treatment can be supported/followed by ‘manual therapy in a strict sense’.

C.6 Explanation of the treatment
profiles chronic phase

Treatment of patients having profile 3a
For patients who have been put into profile 3a by the manual therapist, manual therapeutic intervention in a strict sense is indicated on exacerbation of the com-
plaints, if an articular impairment is connected with this exacerbation.

The treatment, which is similar to the one of patients having profile 1b, is aimed at the decrease of impairments in the artrogenous, muscular or neurogenous function of the movement, to achieve the best possible level of activities and participation and the prevention of recurrent low back pain or its chronicity.

**Treatment of patients having profile 3b**

For the patient who has been put into profile 3b by the manual therapist, manual therapeutic intervention in a general sense is indicated. A exercise program that makes use of behavior-orientated principles in relation to the functional status of the patient holds a prominent place.

Treatment takes place in accordance with the ‘KNGF-guidelines low back pain’. The behavior-orientated policy is based on the active participation of the patient. The patient is co responsible for:

- the (functional) result;
- (again) learning skills (especially motor and cognitive skills);
- time contingent approach of activities and participation;
- redefining the idea of ‘pain’.

Time contingent means that treatment/supervision takes place at set times during a previously assigned period of time, irrespective of the presence of pain. Redefining implies that new ideas originate about pain and the experience of pain, in which pain is not similar to tissue damage. The manual therapist can apply exercise therapy to patients with chronic low back pain, because there is evidence that exercise therapy shows better results than ‘no therapy at all’. It is unclear which type of exercise is to be preferred; that is why the working group advises to offer a varied exercise program, which is in accordance with the needs of the patient. Exercising according to behavioral principles (most important characteristic is time contingent action) is useful among patients with low back pain.

The duration of treatment of patients in this phase is, among other things, related to the course of the complaints, the time axis, the nature of the personal and environmental factors, and the way they can be influenced. The working group advises to come to an unequivocal understanding with the patient about the beginning and end of the treatment. This will improve the patient’s feeling of control about his functional status.

**C.7 Final evaluation, conclusion and reporting**

The manual therapist informs the referring physician about the objectives of the treatment, the treatment results and the advice given (see the KNGF-guidelines Information provision PCP). He does so (if necessary) between times, but at any rate after having finished the treatment. For the way to protocol, see the KNGF-guidelines Physical therapeutic protocol.

To be able to tune in the communication between PCP/occupational physician and the manual therapist, five brochures have been developed: the brochure on the assessment of indication, the brochure on consultation, the brochure on the referral note, the brochure on interim contact, and the brochure on how to report.

**Acknowledgments**

For the realization of this KNGF-guidelines special words of gratitude are in order for the scientific committee of the NVMT: Mr. P. van der Wurff, Mr. L. Lelieveld, Mr. H. Lezeman, Mr. W. Smeets MSc, Mr H. van Mameren, PhD, Mr. R. Swinkels, MSc, Mr. J. Pool and Professor Dr. R.A.B. Oostendorp. We also owe thanks to the members of the working group of other health professionals (in alphabetical order): P. Dijkstra, PhD A.J. Engers, MSc, H. van den Hoogen, PhD, J.M.A. Mens, PhD, Mrs. I. Swinkels-Meewisse MSc and J. Verbeek, PhD.

**D Legal status of the guidelines**

These guidelines are not statutory regulations, but insights and recommendations based on scientific results of research, which have to be met by workers in health care to be able to render good quality care. As the recommendations are mainly based on the average patient, health care workers have to deviate from the guidelines on the basis of their professional autonomy, if the situation of the patient so requires. If the manual therapist deviates from the guidelines he has to offer arguments and support them with evidence.
Revision of guidelines

The manual for guidelines development and implementation requires that after publication all guidelines should be revised after three years to five years at most.\textsuperscript{3-5} This means that in 2008 at the latest the KNGF, in co-operation with members of the working group, is going to determine whether the guidelines are still relevant. If necessary a new group will be installed to revise the guidelines. The validity of the guidelines expire if new developments give rise to start a revisional course.

Previous to the revisional procedure of guidelines, the Manual for Guidelines development and Implementation will be brought up to date on the basis of new insights and agreement on co-operation between the various developers of guidelines in the Netherlands.

Literature
Appendix

Abbreviations

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADL</td>
<td>Activities of Daily Life</td>
</tr>
<tr>
<td>ALBSQ</td>
<td>Acute Low Back Pain Screening Questionnaire (measuring instrument)</td>
</tr>
<tr>
<td>ASE-model</td>
<td>Attitude-Social-influence-own Efficacy model</td>
</tr>
<tr>
<td>CBO</td>
<td>Quality institute for health care</td>
</tr>
<tr>
<td>CVPB</td>
<td>Classification Activities Paramedic Professions</td>
</tr>
<tr>
<td>HVT</td>
<td>High Velocity Thrust technique</td>
</tr>
<tr>
<td>ICF</td>
<td>International Classification of human Functioning</td>
</tr>
<tr>
<td>KNGF</td>
<td>Royal Dutch Association for Physical therapy</td>
</tr>
<tr>
<td>LBP</td>
<td>Low Back Pain</td>
</tr>
<tr>
<td>LFOF-MT</td>
<td>National Function-training profile Manual Therapy</td>
</tr>
<tr>
<td>NHG</td>
<td>Dutch Society of General Practitioners</td>
</tr>
<tr>
<td>NSAID</td>
<td>Non Steroid Anti Inflammatory Drugs</td>
</tr>
<tr>
<td>NVAB</td>
<td>Dutch Society for Labor and Industrial medicine</td>
</tr>
<tr>
<td>NVMT</td>
<td>Dutch Association for Manual Therapy</td>
</tr>
<tr>
<td>OOMT</td>
<td>Institute for Orthopedic Manual Therapy</td>
</tr>
<tr>
<td>PSK</td>
<td>Patient Specific Complaints (measuring instrument)</td>
</tr>
<tr>
<td>QBPDS</td>
<td>Quebec Back Pain Disability Scale</td>
</tr>
<tr>
<td>RCT</td>
<td>Randomized Clinical Trial</td>
</tr>
<tr>
<td>SOMT</td>
<td>Institution Education Manual Therapy</td>
</tr>
<tr>
<td>TENS</td>
<td>Transcutaneous Electrical Nerve Stimulation</td>
</tr>
<tr>
<td>VAS</td>
<td>Visual Analogue Scale (measuring instrument)</td>
</tr>
<tr>
<td>VUB</td>
<td>Free University of Brussels</td>
</tr>
</tbody>
</table>

Explanatory vocabulary

Activity: Each part of human action.
Restriction: Difficulty an individual has in doing an activity.
Functions: Physiological or mental qualities of the human organism.
Meta analysis: Review in which literature was systematically looked for. For the conclusion the results of all studies are combined to one outcome (quantitative).
Participation: Partaking in social life by the individual.
Participation problem: Problem the individual experiences during partaking in social life.
Impairment: Deviation in functions or in structure of the human organism.
Structure: Anatomic quality of parts of the human organism, like position, presence, form, continuity.
Systematic review: Review in which literature was systematically looked for. The conclusion is a description of the results of all studies (qualitative).
Development and Implementation of Clinical Practice Guidelines in physical therapy

Introduction to the method of guideline development

HJM Hendriks, PT, PhD, I, GE Bekkering, PT, MSc, I, II H van Ettekoven, PT, IV JW Brandsma, I, PT, PhD, PhJ van der Wees, MSc, V RA de Bie, PhD, II

Summary
The development of national practice guidelines (NPGs) is an issue of much concern in healthcare policies world-wide to guarantee and to improve the quality and efficiency of care. The development and implementation of NPGs constitutes an important part of the quality of care policy of the Royal Dutch Physical therapy Association (KNGF). This interest is due to pressure from society (policy-makers, healthcare managers, financiers and patients) on physical therapists to ensure quality of care and to justify our position in the healthcare system. The development of NPGs can also be seen as a logical step in the process of professionalization and quality assurance by physical therapists.

An NPG is described as a systematically developed statement, drafted by experts and directed at one aspect of the treatment of a health problem belonging to the domain of the profession. NPGs are based on the different stages of the physical therapy care process, the available clinical evidence and expert consensus. Priority is given to a cost-effective approach and multidisciplinary consensus on diagnosis, treatment and primary or secondary prevention. Recommendations are based on the results of new or recorded systematic reviews or meta-analysis.

NPGs are important state-of-the-art documents, which can guide professionals in their daily practice and make explicit to other relevant people what professionals can do in a certain situation or with a specific condition, and why they do it. NPGs have important functions, including supporting physical therapists in their decision-making process; they are a frame of reference for orientation and educational purposes, they provide criteria for self-evaluation and peer review, and can initiate changes in established practice patterns.

This chapter describes the process and development of NPGs for physical therapists in the Netherlands. In another chapter the method and strategies for the implementation of NPGs and the need for evaluation of their outcome will be discussed.

Introduction
Healthcare policies all over the world consider quality of care to be of paramount importance. Healthcare consists of those activities that are directed at the prevention and treatment of health problems (impairments, disabilities and restriction on participation) and the promotion of independence.1

The major keyword of quality of care in the policy of those who fund healthcare is cost-effective (or efficient) care.2-8 To be able to make justifiable choices in financing healthcare activities it is essential to know what treatments are clinically proven and cost-effective.

Professionalization is the key aspect of quality of care for healthcare providers. The definition of 'professionalization' most commonly used is 'becoming a profession'5, referring to the process by which any new group takes on the characteristics of a
Moreover, professionalization also stands for the position of the professionals in society, including their legal status, and being able to show scientific evidence for the effectiveness of applied techniques. The phenomenon of an ageing society and a shift from secondary to primary care, and more complex primary care pathology, speeds up the process of professionalization, for healthcare is becoming a scarce commodity and demands efficient use of limited means. Professional healthcare providers should therefore be able to define their area of expertise in which assessment (diagnosis), therapy and effectiveness of care are clarified.

In the context of this paper professionalisation also implies paying attention to good healthcare, which should be focused on the needs and demands of individual patients. Negotiations with patients are an important prerequisite to ensure provision of adequate care.

There is some evidence that evidence-based guidelines are one of the instruments to provide insight, quantitatively and qualitatively, in the delivery of healthcare. Ideally, guidelines are a state-of-the-art review of current knowledge about the diagnostic and therapeutic possibilities for a certain health problem – knowledge synthesis – and should be readily accessible to healthcare providers. It has been suggested that guidelines are adequate management instruments for continuous quality improvement and assurance and the structuring and sustainability of healthcare processes.

The development and implementation of national practice guidelines (NPGs) constitute an important part of the quality care policy of the Royal Dutch Physical therapy Association (KNGF). Current interest in the development of NPGs is to some extent due to pressure on physical therapists, from health policy makers, legislation and insurance brokers, to improve quality and efficiency of care. NPGs also help practitioners in decision-making but, more importantly, are also needed to legitimate our position in the healthcare system. The interest in NPGs is also stimulated by epidemiological studies that show wide variations in practice patterns and use of physical therapy services. Research has revealed examples of inappropriate use of physical therapy services and there is often little or no evidence about the efficacy and effectiveness of therapeutic interventions.

Guidelines may play an important role in the process of professionalization by demonstrating the value of physical therapy to governments, healthcare financers, patients, professional bodies and individual healthcare providers.

The term ‘clinical guidelines’ and how it is to be distinguished from other terms used in the field of quality improvement have been obscured for many reasons. However, a useful working definition may be derived from the Institute of Medicine. It defines practice guidelines as being systematically drafted by experts, on the basis of best evidence and/or consensus developed statements, then field-tested, and directed at performing diagnostic and/or therapeutic interventions in persons with definitive, suspected or health-threatening conditions, or directed at areas which have to do with good management and administration of the profession and its members. NPGs are defined as guidelines developed under the auspices of a professional organization. The distinction between this and other terms lies in the level of specificity of the information and the degree of operational detail. Eddy makes a distinction between standards, guidelines and options: ‘Standards are intended to be applied rigidly; they must be followed in virtually all cases. Guidelines are intended to be more flexible; they should be followed in most cases. Options are neutral and leave the practitioner free to choose any course.’

In 2002, four years after the KNGF published the Method for the Development and Implementation of National Practice Guidelines, it issued eight evidence-based clinical practice guidelines. Nine are to follow in the near future (table 1) according to the updated Method for Development and Implementation (expected in 2003), based on new insights and practical experiences. The purpose of this chapter is to provide general information about the development and function of NPGs for physical therapists in the Dutch healthcare system and to describe the phases that can be distinguished in the process of development of a guideline. In a companion paper, important aspects which deal with the method and strategy of their implementation and outcome-evaluation are discussed.
Method
The method for the development and implementation of NPGs for physical therapists in the Netherlands is based on the method developed by the Dutch Association of General Practitioners and guiding principles from international authorities. A literature review did not reveal a methodology that was developed for, and used by physical therapists. Important guiding principles for development of an NPG are:

- The subject matter is clearly delineated on the basis of a clear medical diagnosis of health problems and related conditions that can be addressed by physical therapy.
- The guidelines should be structured according to the phases of the physical therapy process (table 2) as laid down in a guideline by the professional organization.
- A uniform professional language is used. Whenever indicated use is made of available (international) classifications and accepted terminology, in particular the International Classification of Impairments, Disabilities and Handicaps but also the International Classification of Diseases, the Dutch Classification of Procedures and Medical Terms for Health Professionals (fig 1).
- Uniform and valid diagnostic and responsive outcome measurements are used.
- The guideline should be based on the best available clinical evidence if possible, and if none is available, on consensus between experts.
- Clinical considerations have priority over cost-effectiveness.
- The guideline should be consistent with guidelines produced by other professions or groups of professions. The physical therapy guideline can then often be considered as an appendix to those guidelines, in which the

Table 1. National practice guidelines published or being developed in The Netherlands.

<table>
<thead>
<tr>
<th>Subject</th>
<th>Date published or expected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guidelines concerning the organisation of physical therapy practice</td>
<td></td>
</tr>
<tr>
<td>Physiotherapeutic documentation and report (KNGF)</td>
<td>1993</td>
</tr>
<tr>
<td>Communication and information report to the general practitioner</td>
<td>1997</td>
</tr>
<tr>
<td>Guidelines concerning the process of physical therapy practice</td>
<td></td>
</tr>
<tr>
<td>Acute ankle sprains</td>
<td>1998</td>
</tr>
<tr>
<td>Stress urinary-incontinence in adults</td>
<td>1998</td>
</tr>
<tr>
<td>Chronic obstructive pulmonary disease</td>
<td>1998</td>
</tr>
<tr>
<td>Osteoporosis</td>
<td>2001</td>
</tr>
<tr>
<td>Cardiac rehabilitation</td>
<td>2001</td>
</tr>
<tr>
<td>Osteo-arthritis of hip and knee</td>
<td>2001</td>
</tr>
<tr>
<td>Whiplash</td>
<td>2001</td>
</tr>
<tr>
<td>Low back pain</td>
<td>2001</td>
</tr>
<tr>
<td>Chronic ankle sprains</td>
<td>2003 (in press)</td>
</tr>
<tr>
<td>Intermittent claudication</td>
<td>2003 (in press)</td>
</tr>
<tr>
<td>Acute knee sprains</td>
<td>2003 (exp.)</td>
</tr>
<tr>
<td>Repetitive strain injury</td>
<td>2003 (exp.)</td>
</tr>
<tr>
<td>Pelvic pain</td>
<td>2003 (exp.)</td>
</tr>
<tr>
<td>CVA</td>
<td>2003 (exp.)</td>
</tr>
<tr>
<td>Parkinson</td>
<td>2003 (exp.)</td>
</tr>
<tr>
<td>Rheumatoid arthritis</td>
<td>2004 (exp.)</td>
</tr>
<tr>
<td>Neck pain</td>
<td>2004 (exp.)</td>
</tr>
</tbody>
</table>
Table 2. The different phases of the process of physical therapy practice

1. Examination of the referral data
2. History taking
3. Physical examination and evaluation of the patient’s functional status
4. Formulating the physical therapist’s diagnosis and deciding whether or not physiotherapy is indicated.
5. Formulating the treatment plan
6. Providing the treatment
7. Evaluating the changes in a patient’s functional status and one’s own course of action
8. Concluding the treatment period and reporting to the referring discipline

Figure 1. The physical therapy process, relevant data and necessary classifications

<table>
<thead>
<tr>
<th>Phases of physiotherapy process</th>
<th>Relevant data</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Referral</strong></td>
<td>- Referral data</td>
<td>Medial data (CMT, ICPC, ICD)</td>
</tr>
<tr>
<td><strong>History Taking</strong></td>
<td>- Personal data</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>- Patient’s complaints</td>
<td>Health status (ICIDH)</td>
</tr>
<tr>
<td></td>
<td>- Use of technical aids</td>
<td>Technical aids (CHBP)</td>
</tr>
<tr>
<td></td>
<td>- Psychosocial data</td>
<td>...</td>
</tr>
<tr>
<td></td>
<td>- Medical data</td>
<td>Medical data (CMT, ICPC, ICD)</td>
</tr>
<tr>
<td></td>
<td>- Interview technique</td>
<td>Procedures (CVBP)</td>
</tr>
<tr>
<td><strong>Physical examination</strong></td>
<td>- Diagnostic procedures</td>
<td>Procedures (CVBP)</td>
</tr>
<tr>
<td></td>
<td>- Examination findings</td>
<td>Health status (ICIDH)</td>
</tr>
<tr>
<td><strong>Analysis</strong></td>
<td>- Physical therapist’s diagnosis</td>
<td>...</td>
</tr>
<tr>
<td><strong>Formulation of treatment plan</strong></td>
<td>- Treatable components</td>
<td>Health status (ICIDH)</td>
</tr>
<tr>
<td></td>
<td>- Treatment goals</td>
<td>Health status (ICIDH)</td>
</tr>
<tr>
<td></td>
<td>- Frequency/length/amount of sessions</td>
<td>...</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>- Procedures used</td>
<td>Procedures (CVBP)</td>
</tr>
<tr>
<td></td>
<td>- Time/length/place of sessions</td>
<td>...</td>
</tr>
<tr>
<td><strong>Evaluation</strong></td>
<td>- Treatment results</td>
<td>Health status (ICIDH)</td>
</tr>
</tbody>
</table>

Source: Heerkens et al.42

CMT= Classification of Medical Terms (for allied health professions)45
ICPC=International Classification of Primary Care49
ICD=International Statistical Classification of Disease and Related Health Problems43
CVBP=Classification of Interventions and Procedures (for the allied health professions)44
ICDH=International Classification of Impairments, Disabilities and Handicaps40,41
Physiotherapeutic contributions to a health problem are identified.46,47

- The guideline should be based on integration and coherence of care. Physical therapy may be one of the possible interventions in the total care of a patient. It should be evident at which point and why physical therapy may become appropriate.
- The guideline should be patient-oriented and in agreement with the policies of patient organizations. Individual patients also need to have a voice in determining care.48 Are the expectations and treatment goals of patients the same as those of physical therapists?
- The necessary expertise and knowledge that is required from physical therapists should be made clear.

Phases of the physical therapy process

There are four important stages in the development of a clinical guideline:
1. The preparatory phase.
2. The design phase, encompassing the draft guideline and the authorization phase.
3. The implementation phase.
4. The evaluation updating phase.

The preparatory phase involves the selection of a topic based on certain criteria5,6,20,36,50 (table 3). The design phase should guide the task group in the development of the guideline. This phase is, for educational reasons, based on the different stages of the physical therapy process (fig 1, table 2). In the process of physical therapy practice a number of interrelated phases can be distinguished28: a patient is seen by a physical therapist with a medical referral and a request for professional help. The physical therapist takes the patient's history, examines the patient, draws conclusions, and finally informs the patient about the therapist's findings and conclusions. Together with the patient the physical therapist formulates a treatment plan and treatment goals when indicated. During and after a course of treatment the therapeutic process and results are evaluated. The data obtained during the care process are recorded according to the national guideline for documentation that has been developed to ensure systematic and uniform record keeping.15,16,39,51

The implementation phase comprises the dissemination and specific strategy to implement the developed NPG, based on the general method of implementation. The effectiveness of the guideline needs to be evaluated at the level of professionals and patients. The NPG should be updated every two to five years after the guideline is put into practice, or whenever new scientific insights make an update necessary.

Design phase

Five groups contribute to the development of an NPG: the Royal Dutch Physical Therapy Association (KNGF) and four collaborating partners (the Dutch Institute

Table 3. Possible criteria to select a subject for development of a guideline.

- Subject concerns a problem or controversy in health care for which healthcare providers are seeking a solution.
- It is anticipated that consensus about the procedure/intervention is possible.
- Health care providers await guidelines because they need a state-of-the-art document about a subject/topic.
- The Subject is relevant because it has an impact on costs of health care in terms of prevention of health problems or saving of costs.
- There is enough scientific evidence.
- There is a genuine expectation that guidelines fit within existing norms, values and routines.
- The Subject matter can be reasonably delineated.
- It is possible to collect data about the care.

Sources: Grol et al.,20 Grimshaw and Russel6 and Field & Lohr5
Development and Implementation of Clinical Practice Guidelines in physical therapy

of Allied Health Professions and the Dutch Organisation for Quality Assurance (NPI and CBO) which initiate and eventually endorse the guideline; the steering group which plans and co-ordinates the activities; the task group which develops the guideline; a group of clinical experts in the subject matter of the guideline which comments on it or on parts of it as the practice guideline is developed; and a randomly selected group of physical therapists who pilot test the guideline in clinical practice (figure 2). Following the formulation of a plan of activities and basic algorithms, systematic literature searches, reviews and/or meta-analysis are conducted into the efficacy of possible interventions, diagnostic procedures and measurements, prognoses, prevention, patient preferences, and current practice.

The strategy described in table 3 is used. The purpose of these rigorous literature reviews is to document the evidence to justify the recommendations in the guideline. Where scientific evidence in the form of meta-analyses or systematic reviews is not available, the guideline is formulated on the basis of consensus agreement by the task group and the clinical experts.

The task group first develops the diagnostic part of the guideline that may include an algorithm of the process of care and clinical decision-making, to formulate treatment goals and a treatment plan. This part of the guideline is reviewed by 25 practicing physical therapists who have special interest and expertise in the problem area.

Figure 2: Method of guideline development

* The different phases of the process of physiotherapy practice (table 2) within the process of guideline development
Following the plan of activities the task group continues with the therapeutic part of the guideline that, if indicated and possible, should include the recommended intensity, frequency and duration of the intervention(s). This part is reviewed by the same group of therapists who were consulted in the previous phase.

When both the diagnostic and the therapeutic parts of the guideline are completed, the first draft is sent for comments to 60 randomly selected physical therapists for pilot testing. Additional comments are obtained from clinical experts in relevant professions. Based on the comments and experiences of the physical therapists the draft is rewritten. The modified draft is then discussed by the ‘Authorisation Committee’ (fig 2). Following approval of this committee the guideline is published in a scientific journal and introduced and implemented in the field. A specific strategy is developed for implementation, based on the preliminary experiences of the physical therapists who tested it and identified obstacles to successful implementation as a result of the literature searches, new insights in the process of physical therapy practice, the recommended measurement instruments for diagnosis, and evaluation of patient outcome, and discrepancies between actual practice and optimal practice as reflected in the guideline.64,65

This implementation strategy will be described in another chapter.28

The final product, as a result of the method of guideline development, consists of four parts:

- The practice guideline itself.
- A summary or algorithm on an A4 laminated chart for easy reference.
- A scientific justification with references.
- A specific strategy and instruments for implementation of the guideline (eg a knowledge check to test for discrepancies between the actual and the recommended practice as stated in the guideline).

**Characteristics and functions of NPGs**

Generally speaking it can be said that most NPGs help in the decision-making process. They are goal-directed and when applicable form a guide with respect to the interventions and procedures needed to reach the goals.

The characteristics for quality practice guidelines are listed in table 4. For NPGs to be effective they should fulfill most if not all of these criteria. Guidelines should be valid and should result in qualitatively better healthcare.6,7

---

**Table 4. Guides for selecting articles that are most likely to provide valid results**

<table>
<thead>
<tr>
<th>Therapy</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Was the assignment of patients to treatments randomised?</td>
</tr>
<tr>
<td>- Were all of the patients who entered the trial properly accounted for and attributed at its conclusion?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Diagnosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Was there an independent blind comparison with a reference standard?</td>
</tr>
<tr>
<td>- Did the patient sample include an appropriate spectrum of the sort of patients to whom the diagnostic test will be applied in clinical practice?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Harm</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Were there clearly identified comparison groups that were similar with respect to important determinants of outcome (other than the one of interest)?</td>
</tr>
<tr>
<td>- Were outcomes and exposures measured in the same way in groups being compared?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Prognosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Was there a representative patient sample at a well-defined point in the course of disease?</td>
</tr>
<tr>
<td>- Was the follow-up sufficiently long and complete?</td>
</tr>
</tbody>
</table>

Sources: Oxman et al.,55; Sackett et al.,8
The following functions of guidelines are formulated: 20,68

- Providing an up-to-date state-of-the-art document, which helps in taking diagnostic and therapeutic decisions and is a practical guideline in daily practice.
- Revealing the reasons for and reducing variations in clinical management (both inter- and intra-therapist) and giving insight into working methods of a profession. It is thereby possible to see where there are differences and similarities between different health professions.
- Reducing costs for health insurance companies, government and public health agencies and helping in negotiating contracts and budgets.
- Improving patient outcomes and cost-effectiveness and providing a tool to formulate criteria that can be used in evaluation of care.

NPGs can be considered as an up-to-date knowledge synthesis in a nutshell for pre- and postgraduate education that is an incentive for change. An important guiding principle in the development of our NPGs is that the guidelines are primarily developed for the benefit of practicing physical therapists and the professional organization. They are not yet intended to be used as criteria for registration or re-registration or certification, nor for use by third parties such as legislative bodies or insurance companies. They contribute to professionalization by quality enhancement and assurance.

At the level of individual physical therapists, the most important aspect of NPGs is their effect on everyday practice. They will have state-of-the-art documents, well researched and endorsed by experts, to guide them. It is not possible for the ‘average’ physical therapist to keep up with all new developments and insights in the profession. NPGs should support decision-making, provide criteria for self-evaluation, peer review and clinical audit, and be an incentive for physical therapists to change or modify their usual care and use of specific modalities or interventions. Guidelines will facilitate up-to-date care, reflecting current insights from societal, scientific and professional viewpoints, and thereby improving its quality.

For the profession, guidelines further the process of professionalization. They show what the profession stands for, demonstrating its scope of practice, and reduce differences in practice, thus enhancing uniformity. Evidence-based guidelines may serve as state-of-the-art documents and can serve as important reference documents in undergraduate and postgraduate education. NPGs will also be helpful in making tasks and responsibilities of physical therapists explicit and in distinguishing their professional domain from those of other healthcare professionals. In addition, the guidelines may reduce the risk of legal liability for inadequate or insufficient care. Guidelines make healthcare transparent and verifiable, thus ensuring surveillance and improvement of quality of care.

The method of development and implementation of NPGs described here has been tested in The Netherlands with the development of three practice guidelines for specific patient categories: stress urinary incontinence in adults, 69,70 acute ankle sprains71 and chronic obstructive pulmonary disease.72,73 These guidelines are based on summarized evidence from randomized clinical trials described in systematic reviews26,74-78 and have been authorized by the professional organization.

Discussion

The development of guidelines in general, and NPGs in particular, can be seen as an important step in the process of professionalisation and they are promoted as vehicles for continuous quality improvement and assurance in physical therapy practice.

The availability of NPGs does not however guarantee their use in physical therapy practice. This, highlights one of the prerequisites of an NPG; the guideline should be the translation of scientific knowledge in actual practice behavior. Implementation is not however mandatory. Guidelines should as their name implies guide practice in order to improve the quality of care, but they are developed for treatment of the health consequences of diseases and improvement quality of life, and not for treatment of diseases themselves. Physical therapists may therefore deviate from the guidelines if this can be justified.

Critical evaluation of the effectiveness of NPGs includes continuous monitoring of clinical processes and outcomes to improve the quality of care provided. However, following evidence-based guidelines founded on documented efficacy will not
Development and Implementation of Clinical Practice Guidelines in physical therapy

Table 5. Quality criteria for national practice guidelines

<table>
<thead>
<tr>
<th>Validity</th>
<th>Resulting in expected outcomes (health, cost containment, justifiable satisfaction).</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Based on careful and systematic analysis of the research literature.</td>
</tr>
<tr>
<td></td>
<td>Relation between research findings and guideline is clear.</td>
</tr>
<tr>
<td></td>
<td>Strength of evidence is given (consensus versus evidence-based including experts’ judgement behind them).</td>
</tr>
<tr>
<td>Reproducibility</td>
<td>Another task group produces comparable recommendations.</td>
</tr>
<tr>
<td></td>
<td>Guidelines are interpreted and applied consistently by different professionals.</td>
</tr>
<tr>
<td>Clinical applicability</td>
<td>They are written from the perspective, needs and questions of the target population.</td>
</tr>
<tr>
<td></td>
<td>Integration in general practice is relatively simple.</td>
</tr>
<tr>
<td></td>
<td>They specify patient populations and situations to which they apply.</td>
</tr>
<tr>
<td>Differentiated</td>
<td>They take important factors into account which may influence the guideline.</td>
</tr>
<tr>
<td>Clinical flexibility</td>
<td>Frequently occurring exceptions are listed.</td>
</tr>
<tr>
<td></td>
<td>There is room for own judgement, patients' preferences and adjustments to relevant circumstances in the work setting.</td>
</tr>
<tr>
<td>Clarity</td>
<td>Adequate and uniform use of professional language.</td>
</tr>
<tr>
<td></td>
<td>Presentation is logical.</td>
</tr>
<tr>
<td></td>
<td>Important terms are defined.</td>
</tr>
<tr>
<td>Didactic</td>
<td>Design follows usual way of working and decision making.</td>
</tr>
<tr>
<td></td>
<td>Recommendations are concrete.</td>
</tr>
<tr>
<td></td>
<td>Focus is on essential aspects of intervention.</td>
</tr>
<tr>
<td></td>
<td>Most important points stand out clearly.</td>
</tr>
<tr>
<td></td>
<td>Translation to educational aids and evaluation of instruments are relatively simple.</td>
</tr>
<tr>
<td>Attractiveness</td>
<td>Lay-out attracts attention.</td>
</tr>
<tr>
<td></td>
<td>Field test, justification and explanation are included.</td>
</tr>
</tbody>
</table>

Sources: Grol et al.,<sup>20</sup> Grimshaw and Russel<sup>5</sup> and Field & Lohr<sup>5</sup>

lead automatically to a desired outcome. The effectiveness of putting NPGs into practice, on the level of both the patients' health status and practitioners' behavior, should be evaluated. The effect(s) of the implementation of guidelines can be evaluated only when therapists record what they actually do. Although in the method of guideline development control points are described to find out
to what extent guidelines are adopted and adhered to by physical therapists, structural information is needed to investigate and evaluate to what extent the guidelines are followed. This will be dealt with in the near future. In our ongoing prospective cohort studies the developed NPGs will be evaluated on the level of patients (eg patient outcome and patient satisfaction) and therapists (eg experiences with the guideline - Do physical therapists act in accordance with the recommendations? [process of care] How does this affect the nature and volume of the care provided?) However, a continuous monitoring system is essential to provide necessary data on the process and outcome of care for benchmarking, clinical audit, and individual feedback and self-evaluation.

Problems have been noticed with respect to the process of development and implementation of NPGs.13,15 Some of these were known and could have been anticipated:

- Lack of evidence about commonly used diagnostic and interventional procedures within physical therapy. Not all recommended interventions and procedures in physical therapy practice are evidence-based. But this also applies to the work of doctors and other allied health professions.5,12 For users of the guideline, however, it is important to know which parts are evidence-based, including the strength or level of evidence and grade of recommendations; which parts are based on consensus by experts; and where clinical uncertainty is indicated. For example, the strength of evidence can be indicated as described by Bigos et al.,79 Grimshaw et al.,7 or the Canadian Task Force.80
- Lack of an organised infrastructure (network) to test and implement NPGs.
- Lack of widespread use of a uniform professional language.
- Unexplained variations in practice in diagnosis and treatment and use of health services. This is, of course, a very important reason to develop guidelines.

In the method of development and implementation of NPGs the different stages of physiotherapeutic care are described to produce uniform evidence-based or at least research-based guidelines. These phases 'guide and guard' the process as has been explicitly expressed by the various groups, which have been involved in development of the guidelines. There are three stages in development of a guideline when feedback from the field is required. The information from physical therapists in the pilot testing phase has been extremely important for modification of the guidelines and has shed light on their applicability. At the same time it provides the opportunity to discuss progress and difficulties in their development. These pilot studies also provide valuable insight into when and why actual practice differs from the optimal care as proposed in the guidelines.15 For the first two NPGs retrospective reviews of historical data of clinical practice were carried out to facilitate this comparison, which provided important information to enable us to refine the guidelines and identify specific areas that might need special attention when putting them into practice.54,65

The physical therapists were pleased to help by testing the guidelines.15 The fact that practising physical therapists have been involved in development of the guidelines will certainly encourage their acceptance and implementation. Recently multidisciplinary guidelines have been advocated. These describe mutual starting points around policy making in certain disorders, while monodisciplinary guidelines describe the treatment process (eg minimal referral data, physical therapists' diagnosis, treatment and evaluation).

Multidisciplinary guidelines are a professional body of knowledge and can be used to develop monodisciplinary guidelines. (It is very difficult for physical therapists to initiate the development of multidisciplinary guidelines from within the physical therapy profession.) To make sure that all relevant disciplines tune in with each other, our NPGs are checked by external experts such as general practitioners, medical specialists, and patient group representatives. In the Netherlands evidence-based physical therapy guidelines are seen as a body of knowledge of our profession and used as input for the development of multidisciplinary guidelines in, for example, acute ankle sprain46 and osteoporosis.47

The development of guidelines for physical therapy practice is gaining momentum and the acceptance and implementation of guidelines is welcomed by
Development and Implementation of Clinical Practice Guidelines in physical therapy

most therapists. Despite initial problems in development of the first three guidelines, there is confidence that the development of other national guidelines will proceed more smoothly. To maximize the effect of guidelines the method for development and implementation of a specific guideline must be strictly followed. The guideline should be a document with an adequate and appropriate balance of scientific evidence, clinical applicability, and feasibility. All guidelines should be clear, understandable and attractive. Finally, it should be emphasized that the methodology for development of an NPG and strategies for its implementation are strongly interrelated. Both are linked to the initial purposes for the development of guidelines. Particular attention should be paid to the implementation of guidelines that should be specifically directed at the problems experienced by practicing physical therapists. It is important to identify the ‘performance gap’ between actual practice and practice as proposed in the guideline. The development of guidelines will be successful only when they are used by practicing physical therapists and affect their behavior. It should be noted that nationally developed practice guidelines alter practice patterns positively, they can be effectively implemented at local level. To quote Eddy: ‘Implementing national guidelines as a practice policy deserves whatever effort is required to ensure that all the work that preceded it is put to the best use.’
References


22 Kerssen, J J and Groenewegen, P P (1990). ‘Referrals to physical therapy: The relation between the number of referrals, the indication for referral and the inclination to refer’, Social Science and Medicine, 30, 797-804.


Development and Implementation of Clinical Practice Guidelines in physical therapy

Onderzoek: Opzet en interpretatie, Bohn, Staafle van Loghum, Houten, 3rd edn.


49 Jaeschke, R, Guyatt, G and Sackett, D L (1999b). 'User's guide to the medical literature. III. How to use an article about diagnostic tests. B. What are the results and will they help me in caring for my patients?', Journal of the American Medical Association, 271, 703-707.


National practice guidelines for physical therapy in patients with low back pain

GE Bekkering PT MSc, HJM Hendriks PT PhD, BW Koes PhD, RAB Oostendorp PT MT PhD, RWJG Ostelo PT MSc, JMC Thomassen PT, MW van Tulder PhD

I. Introduction
These guidelines describe the diagnostic and therapeutic procedures involved in providing physical therapy for patients with low back pain. Manual therapy is not discussed because the techniques involved demand specific knowledge and specialized skills. A list of abbreviations and a glossary of the key concepts used are provided. The second part of these guidelines, entitled “Review of the evidence”, contains a detailed explanation of the reasons for choosing the particular diagnostic and therapeutic approaches described.

Definition of low back pain
In these guidelines, the term ‘low back pain’ refers to ‘non-specific low back pain’, which is defined as low back pain that does not have a specified physical cause, such as nerve root compression (the radicular syndrome), trauma, infection or the presence of a tumor. This is the case in about 90% of all low back pain patients.

Pain in the lumbosacral region is the most common symptom in patients with non-specific low back pain. Pain may also radiate to the gluteal region or to the thighs, or to both. It may be increased by the patient adopting a certain position, by movement, or by the imposition of an external load (e.g., during lifting). Morning stiffness may also be present. General symptoms of disease, such as fever or weight loss, are absent.

The pain may be continuous or intermittent, with the first episode usually occurring between the ages of 20 and 55 years. An episode of low back pain can be classified according to its duration as either acute (0–6 weeks’ duration), sub-acute (7–12 weeks’ duration) or chronic (> 12 weeks’ duration). Recurrent low back pain is defined as the occurrence of more than two episodes of back pain within one year such that the total duration is less than six months.

Magnitude of the problem
Between 60% and 90% of the population will experience low back pain at least once in their lives. The corresponding annual incidence is 5%. In general practice, 3% of all patients in any year will present with low back pain. In physical therapy, the condition provides the most frequent referral diagnosis: 27% of all patients visiting physical therapists are sufferers. In the Netherlands, low back pain has important economic consequences: of all musculoskeletal complaints, it generates by far the highest costs because of absenteeism from work and disability.

Prognosis and course
The natural course of low back pain is usually favorable. In 80–90% of cases, patients’ complaints diminish spontaneously within 4–6 weeks. Approximately 65% of patients who consult their primary care physician are free of symptoms after 12 weeks. Recurrent low back pain is common.
Absence from work
Over 90% of working people who experience low back pain do not stay off work because of the condition. Of those who do, 75% will return to work within four weeks. However, these persons may not all have been treated and may not have resumed all activities in the work setting. Delayed return to work is associated with recurrent episodes of low back pain and to low socio-economic status.

Bio-psychosocial model
These guidelines are based on a bio-psychosocial model that relates the occurrence of low back pain to the interaction between biological, psychological and social factors. When the complaints of patients with low back pain continue the psychosocial factors will have more impact on the disabilities due to low back pain than the biomedical or biomechanical factors.

Normal and abnormal courses
A long episode of low back pain does not necessarily imply an unfavorable prognosis. However, when an episode is associated with long-lasting disability and with problems with participation in society, the prognosis is poor. Because of this, these guidelines place special emphasis on how disabilities and participation problems progress.

Over time, the courses followed by disabilities and participation problems can be described as either normal or abnormal. In the normal course, the patient’s activity level and degree of participation gradually increase over time to the level existing prior to the episode of low back pain. In most patients, symptoms decrease. This does not always mean that the low back pain will disappear completely but simply that normal activities and the patient’s participation in society will no longer be restricted. Most low back pain patients should expected to follow a normal course.

The course is abnormal when a patient’s disabilities and participation problems do not decrease over time but, instead, either stay at the same level or, even, increase. For most patients, these difficulties will be accompanied by persistent or worsening symptoms. Abnormal courses may be seen in patients with either acute or chronic low back pain. In the guidelines working group, there was a consensus that the course should be defined as abnormal when the patient’s activity level and degree of participation do not increase within three weeks.

An abnormal course may be either caused or maintained by bio-psychosocial factors. These can include (a) biological factors, such as decreased mobility, decreased muscle strength or decreased coordination, (b) psychological factors, such as a fear of movement or faulty cognition about low back pain and (c) social factors related to the work setting or to the support and acceptance offered by family and friends. However, psychosocial factors can also have a positive influence on complaints. For example, the patient’s progress may be quicker when he* is able to cope adequately with his low back pain or when family and friends encourage the patient to increase his activity level.

Coping with low back pain
Patients may cope with their condition either adequately or inadequately. Low back pain patients who are able to adjust their normal activities appropriately can be said to have an adequate coping strategy. These patients are able to adapt the load imposed by all the activities and tasks they would like to or have to carry out to match the load-bearing capacity of their backs, which limits the feasible level of activities and tasks. If the low back pain persists, the use of a strategy such as ‘seeking distraction from the pain’ or ‘maintaining the intention to have an active lifestyle’ indicates an adequate coping style. On the other hand, patients who restrict their movements because of low back pain, who persist in avoiding certain activities, or who rest a lot to relieve pain can be said to have inadequate coping strategies.

The coping strategy adopted depends on the individual patient’s characteristics, among other things. In this respect, the significance the patient attaches to the low back pain and the degree of control he experiences are important. Patients may regard low back pain as being anything from “not threatening at all” to “highly threatening”. A patient

* The combinations ‘he/she’ and ‘his/her’ have been avoided in these guidelines to facilitate readability. The terms ‘he’ and ‘she’ should be understood to apply to both sexes.
may interpret his complaints as threatening if he believes that low back pain is an indication of physical damage and that any increase in pain, for example during movement, is a sign of new damage. The consequence could be a fear of movement. The more a patient feels threatened by his complaints, the higher the chance that he will cope inadequately. In addition, a patient may feel he has a high level of control over his condition when he understands the underlying health problem and has the confidence to manage the back pain himself. These factors depend directly on the significance the patient attaches to his complaints. Someone who understands the underlying health problem and knows what to do will adopt an adequate coping strategy.

The interaction between a patient and his environment (i.e., social factors) also plays a role in the coping strategy adopted. For example, an overprotective partner or the receipt of contradictory information and recommendations from different healthcare providers may frighten the patient and have a negative influence on the coping strategy. In addition, the attitude of the physical therapist may play a role. Giving too much attention to pain and not encouraging the patient enough to become independent may have a negative effect.

Role of the physical therapist
For most patients in whom low back pain follows a normal course, physical therapy is not indicated. Management by the primary care physician will be sufficient to improve the patient’s activity level and participation in society. If this is not the case, or if the primary care physician feels that additional guidance is needed, the patient may be referred to a physical therapist. In contrast, physical therapy is indicated for patients in whom low back pain follows an abnormal course.

Patients’ perspective
In consultation with the Dutch Patients and Consumers Federation (NPCF) the most important wishes and preferences of patients with low back pain are discussed. These are shortly described hereafter in a framework, and they fit in well with the important role of inform/advise in the treatment plan. Therefore in the framework is referred to table 4: ‘Six steps in the process of patient education’ in the ‘Review of the evidence’.

Co-operation with other disciplines
Several guidelines and other documents have been specifically developed by the Dutch Societies of Physiotherapy and General Practice to stimulate and facilitate co-operation and communication between physical therapists and primary care physicians. When a patient has problems related to low back pain in the work setting, co-operation with an occupational physician is useful. The content of the physical therapy guidelines presented here is in line with the recommendations of the Dutch Primary Care Physicians’ Guidelines, which promote an initial ‘watchful waiting’ attitude and the provision of adequate information and advice, and with the recommendations of the Occupational Physicians’ Guidelines, which advise the encouragement of a gradual increase in activities and participation in society.

II. Diagnosis
The main objectives of the diagnostic process are to assess the severity and identify the type of the low back pain, and to evaluate the extent to which physical therapy can improve the patient’s level of activity and participation. Often in patients with non-specific low back pain, it is not possible to find an anatomical impairment underlying the condition. Even when impairments have been identified, they will not normally be sufficient to explain the development or continuation of the complaints. Diagnosis should, therefore, focus on the patient’s level of disability and degree of participation.

Often in patients with non-specific low back pain, anatomical impairments do not provide a sufficient explanation for the condition. Diagnostic procedures should, therefore, focus on the patient’s level of disability and degree of participation.

The starting point is the patient’s needs. The physical therapist will evaluate whether the course of the disability or the course of any problems with participation is normal or abnormal. If abnormal, the physical therapist will determine which (bio-
psychosocial) factors either caused or are maintaining the complaints. The physical therapist will also assess the extent of the patient's knowledge about his condition, his beliefs about what caused it, and the level of control he thinks he has.

The starting point for these guidelines is that the referring physician has excluded the possibility that the low back pain has a specific cause. If the physical therapist suspects there is a specific cause, based on the way the condition changes over time, he should contact the referring physician.

Referral
Referral by a primary care physician or by a medical specialist is a prerequisite for the treatment described in these guidelines. Important referral data are: the patient's needs, the reasons for referral, the previous courses of the disability and of any problems with participation, information on additional diagnostic procedures, and prognosis. The physical therapist should contact the referring physician if the referral documentation contains insufficient data.

History-taking
The key points of history-taking in low back pain patients are listed in Table 1. In cases of recurrent low back pain, the physical therapist will look specifically for a possible cause for the recurrence (for example, changes in work load or activity), and will determine the total duration of the complaint and the time between episodes of low back pain. The physical therapist will also ask about the implementation of any ergonomic recommendations and the patient's compliance with these recommendations. If the patient does not adhere to previously given advice, the physical therapist should identify reasons for non-compliance. The guidelines development group recommends use of the Patient-Specific Complaint questionnaire and the Quebec Back Pain Disability Scale to assess the patient's functional status.

Indications for an abnormal course are:
- the complaints persist or worsen;
- the number of daily rest periods increases;
- analgesic use remains steady or increases;
- there is no return to normal activities or to normal participation, or both;
- the patient specifically asks for diagnosis and treatment by a medical specialist.

These indications relate to low back pain and to a complaint period of three weeks, and take into account the patient's activity level.

Examination
The purpose of the examination is to identify factors that may either hamper or facilitate treatment, and to assess the patient's level of physical fitness and degree of participation. The starting points in any examination are the disabilities and problems with participation that were identified during history-taking (for example, problems in maintaining a sitting position, in picking up an object from the floor, or in standing up from a lying position). The physical therapist will try to identify the impairments (for example, decreased muscle strength in the back extensors, decreased lumbar spine mobility, or decreased physical fitness) that may be related to the disability and participation problems.
If, based on the findings revealed by history-taking, the physical therapist suspects nerve root compression, he will carry out a neurological examination that comprises the straight leg raising test (Lasèque test) and an assessment of muscle strength, sensibility, and the tendon reflexes of the spinal nerves involved. The treatment of patients with the lumbosacral radicular syndrome (that is, a herniated disc) is beyond the scope of these guidelines. If neurological tests give positive results, the physical therapist should contact the referring physician.

Analysis
The following questions should be answered during the diagnostic analysis:

- Which impairments and disabilities are related to the patient’s participation problems?
- Does the back pain follow a normal or an abnormal course?

If the course is abnormal:
- Is there any evidence that (bio-psychosocial) factors maintain or aggravate the complaints?
- Can these hampering factors and the relevant impairment, disability and participation problems be influenced by physical therapy?

At the end of the diagnostic process, the physical therapist has to answer the following questions:
- Is physical therapy indicated?
- Are the guidelines relevant to this particular patient?

If both questions can be answered positively, the physical therapist, together with the patient, will devise a treatment plan and set individual treatment goals.

The physical therapist should contact the referring physician if he thinks the hampering factors or the impairment, disability and participation problems cannot be treated by physical therapy (alone).

Treatment plan
The main goals of the treatment plan are to return the patient to a full (or desirable) level of activity and participation and to prevent recurrences and the development of chronic complaints. Most patients whose low back pain follows a natural course will return to normal levels of activity and participation, irrespective of treatment. Therefore, only one treatment session, to coach the patient, will be sufficient. Patients whose low back pain follows an abnormal course will need therapy, the key elements...
of which are the provision of appropriate information and advice, and exercise therapy. The physical therapist will use an active approach that involves the patient in both constructing the treatment plan and carrying out the treatment.

The physical therapist will use an active approach towards low back pain patients.

III. Therapy
In the following description of the therapeutic process a distinction is made between low back pain that follows a normal course and low back pain that follows an abnormal course.

1. Treating low back pain that follows a normal course
The starting point here is that the patient is able to cope adequately with his complaints. One treatment session should be sufficient. In this session, the physical therapist will give information and advice and, if necessary, will recommend some exercises. Advising the patient to stay active is useful, whereas advising bed rest is not. No further appointments have to be made, with the exception of a single follow-up session, if needed.

It is useful to advise (sub-)acute low back pain patients to stay active. Bed rest is not useful for patients with acute low back pain. If bed rest is unavoidable, it should be for a short period only – for a maximum of two days.

Information and advice
The physical therapist will explain that low back pain usually follows a favorable course and will discuss the relationship between load and load-bearing capacity. The message should be that gradually increasing activities is beneficial and not harmful for the back. The physical therapist will coach the patient and encourage him to continue current activities and to build up to a full level of activity and participation. The physical therapist and the patient will evaluate potential barriers to this process and seek solutions together.

Exercise therapy
To support the information and advice provided, the physical therapist will help the patient to understand through experience that movement and activity are not harmful. Moreover, by practicing the movements needed for normal daily activities, the patient will have positive experiences with those movements and may subsequently be able to transfer these experiences to other activities in daily life.

Evaluation and conclusion
The referring physician is informed about the results of the diagnostic process and the advice given to the patient.

2. Treating low back pain that follows an abnormal course
In these patients, secondary goals of therapy are to:
- increase the patients' awareness and understanding of their conditions;
- gradually increase the level of activity and participation;
- improve relevant physical functions, such as muscle strength, exercise capacity and mobility;
- promote an adequate coping style;
- modify any bio-psychosocial factors associated with a high risk of chronicity that are treatable within the scope of physical therapy (e.g., improve the patient's physical condition, or discuss the patient's workload or the partner's role).

As in the treatment of low back pain that follows a normal course, the most important interventions are giving adequate information and advice and recommending exercise therapy. Exercise therapy is not useful in patients with (sub-)acute low back pain because it has no added value above other treatment forms, such as no treatment. On the other hand, exercise therapy is useful in patients with chronic low back pain because it is more effective than no treatment. It remains unclear which exercises are the most effective. The use of a varied exercise program that meets the patient's needs and preferences is recommended. Exercise coaching employing behavioral principles (e.g., using a time-contingent approach as described below) is useful in chronic low back pain patients. If possible, or desirable, exercise therapy may be carried out in water.
In patients with (sub)acute low back pain, exercise therapy does not have added value above no treatment. Exercise therapy should be used in the treatment of chronic low back pain patients. These guidelines recommend the use of a varied program of exercises. In chronic low back pain patients, time-contingent exercise is useful.

Information and advice
The physical therapist will teach patients to control their ‘recovery’, to prevent any future complaints, and to manage possible recurrences and exacerbations. To achieve treatment objectives, the physical therapist will provide information on the nature and course of low back pain, on the relationship between load and load-bearing capacity, and on the importance of an active lifestyle. The patient should be told that low back pain is not usually harmful and that an increase in back pain does not necessarily imply that the back has been damaged. The physical therapist will teach patients to interpret their complaints accurately. Advice will, for instance, deal with the correct postures that should be adopted for activities in daily life. The provision of information and advice is an interactive process. The physical therapist should regularly check whether the patient understands the information given and whether the information and advice can be put into practice in the patient's daily life.

It is important that the patient adheres to the recommended treatment, in other words, that the patient is compliant, if there is to be a beneficial effect on his condition. Therefore, it is essential that the patient has a realistic understanding of his back pain and that he feels in command of the skills needed to manage back pain in the future. The information and advice given must be tailored to the patient's needs. It is of the utmost importance that contradictory information is avoided. A distinction is made between short-term compliance during the treatment period and long-term compliance after the completion of treatment. It is the task of the physical therapist to promote both short-term and long-term compliance. To promote long-term compliance, it is important that there is co-operation between the physical therapist, the patient, the referring physician and, if involved, the occupational physician. More detailed information is provided in the second part of these guidelines, which is entitled “Review of the evidence”.

Exercise therapy
To increase the patient’s general level of activity, it is necessary to train relevant physical functions, such as muscle strength, exercise capacity and mobility, and to practice relevant activities. Physical functions can be improved by applying the principles of physiological training. In order to resume or increase activities, a time-contingent exercise program is set up. Time-contingency means that activities are gradually increased over a previously agreed span of time and are not limited by any experience of pain. The main purpose of this approach is to focus on the activities rather than on the pain.

The exercise program starts with the determination of a baseline measure of activity, which is the mean of the current levels of a range of activities. The exercise regime is then drawn up in consultation with the patient. It is based on the baseline measurements and on set goals. The program will prescribe increases in the duration, frequency and intensity of each exercise or activity. In following the program, the patient will exercise no less, but also no more, than was mutually agreed for that day. In addition, the patient will also exercise at home and keep a record of his progress. (See the second part of these guidelines, entitled “Review of the evidence”). If the patient would like to learn an activity that he is not able to perform, the physical therapist will break the activity up into a number of parts that can be practiced step by step.

If the patient is anxious about moving, the starting activity level must be set lower and the steps recommended must be smaller. After consulting the patient about his fears, the least threatening activities will be practiced first, with the more threatening activities following later. The physical therapist will encourage the patient to exercise in the practice under his guidance. In this way the patient can move in safe environment. If activities are increased during the therapy sessions, the patient will be expected to increase his corresponding activities at home, thus carrying over the treatment effects. The primary objective is for patients to control their movement behavior.
Neither biofeedback nor traction is recommended because there is no evidence that these interventions are effective. It is not clear whether massage therapy, electrotherapy (including transcutaneous electrical nerve stimulation; TENS), ultrasound therapy or laser therapy is effective for low back pain. Consequently, use of these interventions is not included in these guidelines and, in practice, physical therapists should have reservations about using them. In individual circumstances, the physical therapist may consider these methods but they should never be a key component of the treatment regime. They should only be used for a short time in support of the active approach.

Neither traction nor biofeedback is useful in chronic low back pain patients. Moreover, it is unclear whether massage therapy, electrotherapy (including TENS), ultrasound therapy or laser therapy is useful. These guidelines recommend that these interventions are only used reservedly and only in support of the active approach.

**Evaluation**

The physical therapist will evaluate treatment results regularly and systematically by setting them against treatment objectives. On the basis of this evaluation, the treatment plan may be modified. The physical therapist may use the measuring instruments mentioned above in the description of the diagnostic process. To evaluate the effectiveness of the information and advice given, the physical therapist should ask himself: “Does the patient know what he needs to know?” and “Does the patient cope in the way he should?” If treatment does not improve the patient’s functioning within three weeks, the physical therapist should contact the referring physician.

**Final evaluation, conclusion and reporting**

At the end of treatment, and possibly during treatment, the effects of the interventions used should be evaluated and reported back to the referring physician. The report should also include details of the treatment objectives and of the treatment process. Any report to the primary care physician should be written in accordance with the recommendations made in the Dutch national guidelines entitled “Communicating with and reporting back to general practitioners” and “Physiotherapeutic documentation and reporting”.

---

KNGF-guidelines for physical therapy in patients with low back pain

V-07/2003/US
Review of the evidence

Ia. General introduction

The KNGF-guidelines Low Back Pain provide a guide for the physical therapy treatment of patients with non-specific low back pain. The guidelines describe the diagnostic and therapeutic process in line with the methodic physical therapeutic conduct.

Objective of the KNGF-guidelines: Low Back Pain

The objective of the guidelines is to describe the ‘optimal’ physical therapy treatment (effectiveness and efficiency and tailored care) for patients with non-specific low back pain based upon current scientific, professional and social insights. The care should result in the return to a full (or desired) level of activities and participation in society and the prevention of chronic complaints and recurrences.

Results from research show that there is a large variation between the therapy goals, interventions and the magnitude of physical therapy care in patients with low back pain. However, recent data indicate that there has already been a clear change in the applied interventions in line with the current scientific insights over the past years.

Besides the above mentioned objectives, the KNGF-guidelines are explicitly meant to:
• change the care in the desired direction based on current scientific research and improve the quality and the uniformity of this care.
• to assure insight into and to define tasks and responsibilities and to stimulate cooperation.
• support the physical therapists’ process of decision making and usage of the diagnostic and therapeutic interventions.

To make use of the guidelines recommendations are formulated with regard to professionalism and expertise which are necessary to insure treatment according to the guidelines.

Presenting the clinical questions

The group which has formulated these guidelines wanted to attain an answer on the following questions:
• How can non-specific low back pain be defined?
• How big a problem is non-specific low back pain?
• What is the prognosis and course of non-specific low back pain?
• Which parts of the physical therapeutic diagnostic assessment are valid, reliable and useful in daily practice?
• Which interventions are useful in the treatment of non-specific low back pain?

The mono disciplinary working group

In February 1999 a mono disciplinary working group of professionals was formed to answer these clinical questions. In the formation of the working group an attempt was made to achieve a balance in professionals with experience in the area of concern or with an academic background. All members of the working group have stated that they had no conflicting interests whatsoever in relation to the development of the KNGF-guidelines. The development of the guidelines took place from February 1999 until October 2000.

The guidelines have been developed according to the ‘Methods for the Development and Implementation of Clinical Guidelines’. The method includes practical instruction of the strategies used to collect literature. Later in the Review of the Evidence of these guidelines the specific terms used to gather literature, the consulted sources and the period of time over which the literature was accumulated and the criteria used to select literature are described. The recommendations for the therapeutic process are almost solely based on scientific evidence. If there was no scientific evidence available, the recommendations were formulated based upon consensus within the working group.
The level of evidence is described in four levels (see table 2). An intervention is recommended if there is strong evidence. An intervention is advised against if there is strong evidence that it is not effective. The guidelines use terms as ‘is useful’ and ‘is not useful’, respectively. If the level of evidence is moderate, the intervention is less pronounced recommended; an intervention ‘seems useful’ or ‘seems not useful’. If there is limited, contradictory or no evidence, the interventions is neither recommended, nor advised against: ‘It is unknown whether an intervention is useful’. In consensus with the working group it is decided to advise against the use of passive treatments, such as massage, TENS, Ultrasound, electrotherapy and laser, because the use of passive treatment might lead to dependency of the patient. This is against the objective of treatment, namely to make the patient independent so that he can control the complaints and the recovery by himself.

For the formulation of the recommendations there might be, apart from the scientific evidence, other important considerations, such as the achievement of general consensus, efficiency (costs), availability of means, required professionalism and education, organizational aspects and the attempt to be in line with other mono and multi disciplinary guidelines.

Once the mono disciplinary concept guidelines were completed they were sent off to external professionals and/or occupational organizations (secondary working group). The reason for this step in the process of guidelines development is to attain a general consensus within the other occupational groups or organizations and/or with other mono and multi disciplinary guidelines. Four physical therapists were added to the secondary working group to increase the support of the guidelines by physical therapists.

Validation by the supposed users

Before publication and distribution, the guidelines are systematically reviewed by the target group that will be using the guidelines in the future (validation). The draft KNGF-guidelines ‘Low back pain’ are presented to an at random selected group of 100 physical therapists of the KNGF register. The physical therapists were asked to judge the guidelines by using a questionnaire. This questionnaire included statements about six quality requirements, namely: clinical applicability, validity, specificity/differentiation, flexibility, clarity, and attractiveness. The physical therapists were asked to reason their answers. The comments and remarks from the physical therapists were documented and discussed in the working group and if possible and/or desired included in the final guidelines. The recommendations for the practice are the result of the available evidence, the above mentioned other aspects and the results of testing the guidelines amongst the users (physical therapists).

During the review of the literature no consequences of the interventions were found with respect to side effects and risks. An inventory of the cost implications has been considered but eventually not performed because there are only very few economic evaluations on the physical therapeutic intervention in low back pain, which are methodologically weak.

Constitution, products and implementation of the guideline

The guidelines constitute of three parts: the practical guidelines, a schematic layout of the main points of the guidelines (summary) and the review of evidence section. All parts of the KNGF guidelines can be read individually. Aside from the publication and distribution of the guidelines amongst members of the KNGF, there is a segment promoting professionalism developed and published to stimulate the use of the guidelines in daily practice. The guidelines are implemented according to a standard of implementation strategies which are described in the method.

Experience and expectations of patients

The final guidelines are presented to two patient organizations: Orthopedic Patient Council (SPO) and the Dutch Society of Patients with Low Back Pain (NVVR). The most important remarks concerned the fact that patients would like the physical therapists (and other care takers) to avoid talking about the possible causes of the low back pain. Patients expect physical therapists to take the low back pain seriously, which means that the low back pain is not considered as ‘psychological’ without an explanation. These remarks will be noticed during the revision of the guidelines.
Use of the guidelines
Working together with the Primary Care Physician is recommended for optimal care. The Primary care physician has to know the content of the KNGF-guidelines Low back pain, or the care the physical therapist can provide to patients with nonspecific low back pain. It is preferred that the Primary care physician and the physical therapist make work agreements together, which are regularly being evaluated and regulated.

Ib. Introduction to this guidelines
This review sets out to explain the choices made in deriving the guidelines on the management of low back pain issued by the Royal Dutch Society for Physical Therapy (KNGF). These guidelines are based, as much as possible, on evidence-based science.

In addition to being based on information from the scientific literature, the construction of these guidelines has also taken into account recent professional developments and other factors, including practical considerations. Moreover, the guidelines have also been brought into line with recommendations made in other Dutch national guidelines, such as the guidelines of the Dutch Society of Primary Care Physicians (NHG-guidelines), and those of the Association of Occupational Physicians (NVAB-guidelines), as well as with recommendations made in international low back pain guidelines.

A distinction is made between specific low back pain and non-specific low back pain depending on the origin of the pain. Specific low back pain is back pain that has a specified cause, such as trauma, a tumor, an infection, or nerve root compression (the radicular syndrome). In non-specific low back pain, no physical cause can be demonstrated.

These guidelines are for the management of patients with non-specific low back pain. The various forms of specific low back pain are not taken into consideration. The role and nature of manual therapy for low back pain are detailed in the guidelines entitled “Manual therapy in low back pain”, which were under development in 2003.

Impairments, disabilities and participation problems
Physical therapists describe the health problems of low back pain patients in terms of impairments, disabilities, and participation problems. Impairments are manifestations of a disorder that involve body structure or physiological or psychological functioning. Examples are decreased muscle strength, pain, sensory impairment, or fear of movement. Disabilities are problems with the performance of normal activities, such as bending, stretching or walking. Participation problems are the difficulties an individual may experience in his social life or work. These concepts are derived from the International Classification of Human Functioning, Disability and Health (ICIDH). Their use is intended to promote a uniform approach in the rehabilitation professions. In the ICIDH, the term dysfunction is used as an umbrella concept to cover the above-mentioned three levels of functioning. In the NHG guidelines, dysfunction is defined as “not being able to fulfill the demands made by the patient or his social system regarding normal activities in daily life and work”.

Target group
In order to use these guidelines correctly, physical therapists must know about the natural course of low back pain, about positive and negative factors influencing the natural course, about behavioral treatment principles, and about the methodical use of educational principles. In addition, physical therapists must have some knowledge of scientific findings on the management of low back pain patients by physical therapy.

Definition of low back pain
The definition of non-specific low back pain used in the guidelines is based on Waddell’s description of “simple low back pain”, which is as follows: “Clinical presentation is usually at ages 20–55 years; lumbosacral region, buttocks and thighs; pain is ‘mechanical’ in nature: varies with physical activity and varies with time; patient well.” Recurrent back pain is defined as the occurrence of several episodes of back pain within one year such that the total duration is less than six months. In classifying back pain on the basis of duration into acute (0–6 weeks’ duration), subacute (17–22 weeks’ duration) and
chronic (> 12 weeks’ duration) low back pain, these guidelines are in line with the classification used in the NHG-guidelines.11

Magnitude of the problem
In a review, Frymoyer20 states that 60–90% of the entire population will experience an episode of low back pain at least once in their lives and that the corresponding annual incidence is 5%. The annual incidence and prevalence of non-specific low back pain in the average primary care physician’s practice are 30 and 35 episodes, respectively, per 1,000 registered patients.21 In 1998, the policy of primary care physicians in the Netherlands for dealing with low back pain was, for the main part, in accordance with their guidelines.22 In 72% of all patients with low back pain, the primary care physician made a working diagnosis of “non-specific low back pain”. Most patients received medication and the advice to increase activities. However, contrary to the guidelines, some patients with acute low back pain were referred for primary care (i.e., for physical therapy), some were advised to take lengthy bed rest, and medication was not always prescribed in a time-contingent manner.22 For physical therapists, low back pain is a common referral diagnosis, with 27% of all patients referred having low back pain.23

Low back pain is not only a major medical problem, but also a significant economic problem. In 1991 in the Netherlands, the estimated cost of low back pain to society was 1.7% of the gross national product.24 The indirect costs of low back pain, which include work disability payments and work absenteeism, made up 93% of the total. Direct medical costs, including costs for hospitals, medical specialists, primary care physicians and allied health professionals, made up 7% of the total.24

Prognosis and course
About 60% of patients with back pain state that their first episode had a sudden onset, with the complaint starting during activities such as bending or lifting. The other 40% said that symptoms started gradually.18 Usually, the exact cause of back pain is not known.25 No specific medical diagnosis is made in around 90% of patients.

The usual course followed by low back pain depends on the population from which the sample is drawn. In an open population, the prognosis is usual favorable. In an estimated 75–90% of patients, back pain disappears spontaneously within 4–6 weeks.18 In the population of patients who visit primary care physicians specifically because of low back pain, the prognosis is a little less favorable, with 65% being free of their complaint after 12 weeks.26

Low back pain often recurs. Seventy-five percent of patients who seek help from their primary care physician experience at least one relapse within a year.26 However, persistent low back pain does not necessarily indicate a less favorable prognosis.27 There is a growing consensus that it is the extent of disability that is the most important predictor of outcome in patients with low back pain.27

Absence from work
In 90–95% of the working population, low back pain does not lead to absenteeism.28 On the basis of findings in several studies, Waddell18 describe absenteeism in terms of time: 67% of people go back to work within a week; 84% within a month; and 90% within two months. The return-to-work curve levels off after three months of sick-leave: persons who are still absent from work at this time run a higher risk of not coming back. After one year, absenteeism is down to 3%. The return-to-work curves reported in the literature all look similar. At first, there is a sharp rise, after which the curve levels off slowly. However, the percentage of patients still off work after one year is different in the various studies, ranging from 1–2% to 5–10%. On the basis of the results of several studies, Waddell18 concluded that the return to work tends to be delayed in several groups of patients: in those with specific low back pain, in those who experience recurrence, in manual workers, and in those from lower socio-economic classes.

Bio-psychosocial model
In the traditional biomedical model, pain is a direct consequence of an underlying pathologic condition. Symptoms will diminish when the condition is removed. However, some chronic complaints, such as chronic low back pain, cannot be explained easily
using this model because there is no clear correlation between symptoms and pathology. Therefore, the current approach to chronic low back pain increasingly tends to be inspired by a biopsychosocial perspective. In this view, low back pain, like most pain, is a result of the interaction of biological, psychological and social factors.\textsuperscript{29,30} Psychosocial factors, in particular, are thought to play a role in maintaining complaints.

\textbf{Prognostic factors influencing the maintenance of complaints}

Linton\textsuperscript{31} performed a systematic review of the relationships between psychological factors and neck and back pain. The review included 36 prospective studies. On the basis of several clinically relevant and methodologically sound studies, Linton concluded that psychological factors are strongly associated with a change from acute to chronic pain and with greater disability. In addition, Linton clearly found that psychosocial factors generally have a bigger impact on the disabilities caused by low back pain than either biomedical and biomechanical factors. The patient’s attitudes and emotions are important. A passive coping strategy, the perception of pain as “a catastrophe”, and conditions such as depression and fear are all highly associated with increased pain and disability. Also, there is moderate to strong evidence that these psychosocial factors may, in the long term, predict the level of pain and disability.

Waddell and Waddell\textsuperscript{32} carried out a systematic review of the influence of social factors on back and neck pain. They concluded that, although there are many indications that social factors may be related to back and neck pain, the studies they looked at were methodologically weak. The only social factors for which findings are consistent, appearing in either one systematic review or in more than two methodologically sound studies, are lower social class and psychosocial aspects of work, such as low work satisfaction. The authors point out that these social factors are not risk factors for the development of back or neck pain. However, they may well influence the pain, and the way in which patients cope with their complaints.

\textbf{Coping with low back pain}

Patients may cope with their complaints either adequately or inadequately. Coping is defined as “the cognitive and behavioral efforts made by an individual to control, reduce and tolerate the internal and external demands created by a stressor”.\textsuperscript{33} Coping may be either active or passive. In active coping, individuals undertake actions by themselves to control the pain, for example, by seeking distractions or by moving. In passive coping, individuals adopt a passive attitude, for example, by resting or using medication. They may become dependent on others as a way of controlling pain or may decrease their activities in order to reduce the pain.\textsuperscript{34} Active coping is associated with better functioning, whereas passive coping is associated with poorer functioning.\textsuperscript{34} The way in which a person deals with his complaint is determined by his characteristics and by his interactions with his environment, which may include the physical therapist.

\textbf{Patient characteristics}

The significance the patient attaches to his complaints and his feeling of control over the complaints are two distinct characteristics. Being based on the subjective perception and interpretation of stimuli, the significance attached to a complaint may not correspond with objective reality. In this case, a logical error is being made. One common logical error is to ‘catastrophize’, that is to consider the pain, and the situation in which the pain is present, as being a serious threat, i.e., a catastrophe. The extent to which a person feels he has control over his pain is also important. The patient may feel that his health is mainly controlled by himself (i.e., there is an internal locus of control) or mainly controlled by other people or circumstances (i.e., there is an external locus of control). Some individuals may give other people, for example, the physical therapist, control over their health.\textsuperscript{35} An internal locus of control is often related to active coping and, subsequently, to a better way of dealing with pain.\textsuperscript{34} Both the significance attached to the pain and the perceived sense of control may determine the patient’s movement behavior. For instance, if pain is considered to be a sign of possible injury (i.e., a catastrophe), there is a high risk that fear of
movement will result. Fear of movement is the fear that movement will result in (new) pain or (re)injury. It can, in turn, lead to avoidance. In addition, when, on the basis of previous experience, the patient expects that a certain activity will increase the pain in a way over which he has no control, there is a chance that the situation giving rise to that activity will be avoided.

**Interaction between patient and surroundings**

Social support can help an individual to deal with setbacks and to adjust to change. The most important source of social support is the patient’s partner. Patients with low back pain who have good social support recover more quickly and return to normal daily activities sooner. On the other hand, the particular type of social support can also contribute to maintenance of the condition. For example, a partner who takes everything out of the hands of the patient will, by doing this, ensure that the patient’s logical errors persist.

In addition, both the attitude of the physical therapist and the way in which he approaches the patient’s complaints appear to influence the course of the complaints. In patients with chronic low back pain, it may be very important to use a time-contingent approach in which activities are gradually increased with time and not according to the patient’s symptoms. The primary objective of this approach is to improve function, not to reduce pain.

**Cooperation with other disciplines**

Cooperation with other health workers will improve the effectiveness and efficiency of the care provided. The physical therapist should make formal agreements with other health workers in his area, such as primary care physicians, occupational therapists and psychologists, about adopting a common policy in this particular group of patients. Communication between physical therapist and primary care physician can be improved by making use of specifically designed guides, which include details of letters of referral, indication setting, consultation, maintaining contact during treatment, and writing reports. The guide on indication setting encourages the discussion of each other’s guidelines and the adoption of common policies.

The Dutch Society of Primary Care Physicians has published guidelines on low back pain. The guidelines state that, in acute low back pain, no treatment gives better results than adopting a ‘wait-and-see’ policy. In low back pain that has lasted for more than six weeks, treatment is directed at preventing or decreasing dysfunction.

The Dutch Association of Occupational Physicians has published guidelines on low back pain that deal with the treatment of affected workers. The objective is to prevent sick employees staying off work for an unnecessarily long time, thereby risking long-term disability. Occupational physicians may also advise employers on making adjustments at work (i.e. in the social work environment), such as introducing flexible working hours, assigning different tasks, making ergonomic adjustments, or changing the attitudes of management and of the patient’s colleagues. Patients who are off work should, together with their manager and occupational physician, construct a plan for gradual re-integration. Good communication is essential so that this plan can be matched with the process of gradually increasing activities directed by the physical therapist. If appropriate, the physical therapist should consult the occupational physician.

Multidisciplinary guidelines on low back pain have recently been developed by national consensus at the Dutch Collaborating Centre for Quality Assurance in Healthcare (CBO).

**II. Diagnosis**

The process of problem-solving is central to the methodical management of patients by physical therapy. The following elements are included: referral, history-taking, examination, analysis (including the formulation of a physical therapy diagnosis), devising a treatment plan, treatment, evaluation, conclusion, and report-writing.

**Referral**

Important referral data concerning patients with low back pain are: the patient’s needs; the reasons for referral; the history of the patient’s functioning, in terms of activities and participation; information on
additional diagnostic procedures; and prognosis. Other referral data are: details of prescribed medications, co-morbidity, and the presence of relevant bio-psychosocial factors.

History taking
The physical therapist takes the patient’s history to try to get a clear picture of the health problem. What does the patient expect and what would he like? Which complaint is most important? What impact does the complaint have on the patient’s daily life? Which factors increase, decrease or maintain the complaint? How does the patient feel about his complaints and their consequences?

The patient’s coping strategy is particularly important in low back pain. Consequently, throughout history-taking the physical therapist will try to explore the significance the patient attaches to his condition. Does the patient make logical errors? Does he have control over his complaints? Does he fear movement? Answers to these questions will be used by the physical therapist during treatment. From additional data provided during referral, the physical therapist may be able to identify factors, such as co-morbid conditions, that could have a negative influence on the course of the low back pain or that could influence the choice of intervention.

These guidelines recommend the use of two specific measuring instruments. The first is the Patient-Specific Complaint questionnaire, which is used to assess the patient’s functional status. In it, the patient lists all the physical activities that he has difficulty performing because of back pain. These activities must be relevant and important to the patient and they must normally be performed regularly (i.e., every week). Subsequently, the patient selects three of the most difficult, most important and most frequently performed activities. The patient is scored on these activities at the beginning and end of the treatment episode using a visual-analog scale. To date, no studies have been carried out on the reliability of this instrument, although the Patient-Specific Complaint questionnaire has proved to indicate responses in patients with low back pain.

Another instrument, the Quebec Back Pain Disability Scale, is used to identify disabilities and problems with participation. It contains 20 items on daily activities, in areas such as bed rest, sitting and standing, walking, moving, bending, and moving heavy objects. There are six possible answers to each question, ranging from “no difficulty at all” to “not able to perform”. The total score on this instrument is the sum of the scores for all items. It may vary from 0 (not disabled) to 100 (totally disabled). A Dutch version of the questionnaire is available and has been shown to be valid, reliable and responsive. The Quebec Back Pain Disability Scale is detailed in a supplement to these guidelines. The Patient-Specific Complaint questionnaire may be found in a publication by Köke et al.

Examination
It is recommended that the examination of patients with low back pain focuses on their abilities and problems with participation in society. This recommendation is based on the assumption that the referring physician has excluded the possibility that the back pain has a specific cause and on evidence from previous research showing that the diagnostic tests carried out by physical therapists in low back pain patients have limited reliability and validity.

The objectives of the examination are to identify any conditions that may limit treatment and to assess the actual level of the patient’s physical functioning. The patient will undergo a physical examination and be observed at rest and during movement. Depending on the information obtained during history-taking, the physical therapist may:
- make anthropometric measurements of, for example, the positions of the spine and the legs;
- assess physiologic functions, such as joint functioning, muscle strength, balance, and movement patterns;
- assess the performance of activities, such as bending, lifting, pushing, maintaining posture, sitting and standing, and walking, in order to provide additional information or to verify data obtained during history-taking.

The physical therapist will form an impression of the relationship between the patient’s functional and structural impairments and the extent of his disabilities and participation problems. In addition,
the physical therapist should gain insights into the
way in which the patient controls his complaints,
into his physical functioning, and into the quality of
his movements. A patient who fears movement will
be less inclined to move and may shun exercises.

Analysis
The data collected will be used to define the patient's
health problem. Thereafter, the physical therapist will
assess the patient's health status and decide if
intervention is likely to be effective. If physical
therapy is not indicated, the patient will be referred
back to the physician. If indicated, the physical
therapist will have to determine whether physical
therapy can be carried out according to the
guidelines. When the analysis is complete, the
therapist will draw up a treatment plan in close
consultation with the patient.

It may not be possible to follow the guidelines if
there are insufficient referral data or if there is a
specific cause for the low back pain. If there is any
evidence indicating that the condition has a specific
cause, the physical therapist will contact the referring
physician. In addition, specific personal factors may
have a negative influence on the treatment content.
The outcome of the therapeutic intervention may
depend on the extent to which these factors play a
role in the health problem and on the extent to
which they can be influenced. The physical therapist
will have to make a critical judgment of whether
particular factors can be influenced by physical
therapy. At present, there are no objective criteria for
making this judgment. If necessary, the physical
therapist will contact the referring physician.

Treatment plan
The treatment plan helps the physical therapist
structure, control and evaluate treatment. It is drawn
up together with the patient and details the
individual treatment objectives, the type of
intervention to be used, and the treatment strategy.
The main objectives of treatment are to return the
patient to his highest (or desired) level of activity and
participation and to prevent recurrence and the
development of a chronic complaint. The physical
therapist will pursue an active policy in which the
patient also takes responsibility for the results of
treatment. This can be achieved by actively involving
the patient in devising the treatment plan and in
carrying out treatment.

III. Therapy
This part of the review of the evidence is divided into
two sections: the first contains an evidence-based
assessment of the physical therapy interventions used
in low back pain patients and the second illustrates
the therapeutic process recommended in these
guidelines. These therapeutic recommendations are
based primarily on scientific evidence. Moreover, all
the treatment modalities employed by the physical
therapist must be incorporated into the
recommended active approach.

Evidence-based review
A computer-aided search for published systematic
reviews or meta-analyses dealing with the efficacy of
physical therapy interventions in low back pain
patients was undertaken as follows. The MEDLINE
(1982-september 2000), CINAHL (1982-september
2000), and Cochrane Library (2000, NR 3) databases
and the databases of the Dutch Institute of Allied
Health professions (up to September 2000) were all
searched using the following key-words: back pain,
physical therapy, behavioral therapy, massage,
education, mobilization, electrotherapy, laser,
ultrasound, thermotherapy, systematic review and
meta-analysis. Additional literature was supplied by
members of the working group. The search yielded
188 publications. Inclusion criteria were: (a) that the
publication must be written in English, German,
French or Dutch; (b) that the study design must be a
systematic review or a meta-analysis; (c) that the
article must concern the efficacy of treatment
interventions in patients with non-specific low back
pain; (d) that the article must concern interventions
that are part of the Dutch professional domain of
physical therapy; and (e) that the outcome measures
used must relate to patients' physical functioning.
After applying these criteria, 13 reviews remained. In
addition, five reviews of the efficacy of electrotherapy
techniques in patients with musculoskeletal disorders
were included. For several types of intervention,
reviews by van Tulder et al.48,49 were used. These
reviews refer to four different levels of scientific
No reviews on exercise in water were found. In order to investigate the effectiveness of this particular intervention, therefore, an additional literature search was carried out in the MEDLINE, CINAHL (1990-2000) and Cochrane Library (Rehabilitation and Therapy Field) databases and at the documentation center of the Dutch Institute of Allied Health Professions. The following keywords were used: hydrotherapy, aquafitness, balneotherapy, spa therapy, exercise and water. These keywords were combined with the keywords: back pain and low back. This search yielded 19 articles, eight of which concerned randomized controlled trials.

A description of the outcomes expected for each intervention modality follows, accompanied by recommendations on their use.

**Bed rest**
Hagen et al. performed a systematic review of the effectiveness of bed rest in patients with acute low back pain. The review included nine trials, in five of which the methodological quality was high. Two high-quality studies compared the advice to take bed rest with the advice to stay active. Both studies found no difference in pain intensity after three weeks of follow-up. However, they did show that staying active leads to a slightly better functional status. Another two high-quality studies demonstrated that seven days of bed rest did not have a better effect on pain than two to four days of bed rest. Moreover, sick-leave was shorter when the period of bed rest was

### Table 2. Definitions of different levels of scientific evidence, after van Tulder et al.

<table>
<thead>
<tr>
<th>Level of evidence</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>Consistent findings in several high-quality randomized controlled trials</td>
</tr>
<tr>
<td>Moderate</td>
<td>Consistent findings in one high-quality randomized controlled trial and one or more low-quality randomized controlled trials</td>
</tr>
<tr>
<td>Limited or contradictory</td>
<td>One randomized controlled trial (high or low quality) or inconsistent findings in several randomized controlled trials</td>
</tr>
<tr>
<td>None</td>
<td>no randomized controlled trials</td>
</tr>
</tbody>
</table>

### Table 3. Overview of the different modalities for treating low back pain, arranged according to the strength of evidence of their effectiveness. TENS = transcutaneous electrical nerve stimulation.

<table>
<thead>
<tr>
<th>Strength of evidence</th>
<th>(Sub-)acute low back pain</th>
<th>Chronic low back pain</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strong</td>
<td>Advice to stay active</td>
<td>Exercise therapy</td>
</tr>
<tr>
<td>Limited or moderate</td>
<td></td>
<td>Behavioral therapy, exercise in water</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ultrasound therapy, electrotherapy, laser therapy, TENS, massage therapy</td>
<td>ultrasound therapy, electrotherapy, laser therapy, TENS, massage therapy</td>
</tr>
<tr>
<td>Effectiveness unclear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderate evidence of</td>
<td>Specific exercises, traction</td>
<td>Biofeedback</td>
</tr>
<tr>
<td>ineffectiveness</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Strong evidence of</td>
<td>Advice to rest in bed</td>
<td>Traction</td>
</tr>
<tr>
<td>ineffectiveness</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
shorter. Furthermore, two other high-quality studies failed to find that bed rest had a more positive effect on pain or functional status compared to exercise.

Two further reviews of the effectiveness of bed rest (49,51) included the same trials as the review above, with the exception of three additional studies. Two of these new studies were included in one of the reviews but were not used by Hagen et al. because of criteria restricting (co)interventions. The third study was only published in 1999 and was, therefore, not included by Hagen et al. The findings and conclusions of both these reviews are consistent and confirm that bed rest is not a useful treatment for acute low back pain. It may even cause a delay in recovery.

**Bed rest is not useful in (sub-)acute low back pain patients. When bed rest is unavoidable, the guidelines recommend that it be keep short, to a maximum of two days.**

**Staying active**

Two reviews describe the effect of advising patients with (sub-)acute low back pain to stay active.(49,51) Both reviews included exactly the same eight trials. Two randomized controlled trials compared advice to stay active with advice to take bed rest. Either no difference was found or there was a faster recovery with less pain and a better functional status in patients who were advised to stay active. Five randomized controlled trials compared advice to stay active with the use of traditional treatments, such as analgesics, and found that advice to stay active was either just as effective or led to less sick-leave and less chronic disability. Both reviews conclude that advice to stay active results in a faster return to work, fewer cases of chronic disability, and fewer problems with recurrence. Hence, advising patients to stay active is useful in the management of (sub-)acute low back pain.

**It is useful to advise (sub-)acute low back pain patients to stay active.**

**Exercise therapy**

A systematic review by van Tulder et al.(52) included 39 randomized controlled trials of the effectiveness of exercise therapy for low back pain in the primary healthcare setting. Every study evaluated at least one of the following primary outcome measures: degree of pain, functional status, overall improvement, and return to work. Twelve trials involved patients with acute low back pain and 23 studied patients with chronic low back pain. Three trials included a mixed patient population and one study did not mention complaint duration.

In patients with acute low back pain, there is strong evidence that exercise therapy is equally effective as placebo, as inactive treatment, and as any other active treatment. In patients with chronic low back pain, there is strong evidence that exercise therapy is equally effective as conventional physical therapy using hot-packs, massage, traction, mobilization, short-wave therapy, ultrasound therapy, stretching exercises, mobilization exercises, coordination improvement, and electrotherapy. Moreover, there is strong evidence that exercise therapy is more effective than the standard care provided by the primary care physician.

It remains unclear, however, which types of exercise are best. The review by van Tulder et al.(52) reports conflicting evidence on the efficacy of flexion and extension exercises. There is strong evidence that extension exercises are not effective in the treatment of acute low back pain and moderate evidence that flexion exercises are not effective in the treatment of acute low back pain. There is strong evidence that strengthening exercises are no more effective than any other type of exercise and moderate evidence that strengthening exercises are more effective than inactive treatment.

Hilde and Bø (53) carried out a systematic review on the efficacy of exercise therapy in chronic low back pain patients. In it, they concentrated on the type and quantity of the exercise therapy. Nine randomized controlled trials met their inclusion criteria. Seven of the trials were also included in the above-mentioned review by van Tulder et al., who omitted two because of the patient populations used. Hilde and Bø concluded that it is not clear if either the methodological quality, the quantity, or the type of exercise influences outcome.
In summary, it can be concluded that exercise therapy is effective in chronic low back pain patients. However, insufficient data are available to make specific recommendations about the optimal content of exercise therapy programs.

In patients with (sub-)acute low back pain, exercise therapy is no more valuable than other treatment forms. Exercise therapy should be administered to patients with chronic low back pain because it leads to better results than no treatment. It is not clear which type of exercise is best. Therefore, the guidelines recommend the use of a varied exercise program that meets the patient’s needs.

**Behavioral therapy**

Behavioral therapy is based on the assumption that pain and disability are not solely influenced by somatic pathology but also depend on the patient’s cognition, expectations, psychological distress, and illness behavior. Three main approaches to behavioral therapy can be distinguished: the operant, cognitive and respondent approaches. Each focuses on modifying one of the three response systems that characterize emotional experiences: behavior, cognition, and physiological reactivity. Details of these techniques are given below in the explanation of the recommended therapeutic approach.

Van Tulder et al. carried out a meta-analysis of the efficacy of behavioral treatment for chronic non-specific low back pain compared with that of other treatments for chronic low back pain. They also investigated which type of behavioral treatment was most effective. Their analysis included 21 studies. The results show that there is strong evidence that behavioral treatment, compared with either no treatment, being on a waiting list or receiving placebo, has a moderate positive effect on pain intensity (effect size [ES], 0.62; 95% confidence interval [95% CI], 0.25–0.98), and small positive effects on general functional status (ES, 0.35; 95%CI, -0.04–0.74) and behavioral outcomes (ES, 0.40; 95%CI, 0.10–0.70) in patients with chronic low back pain.

It is not clear how the efficacy of behavioral treatment compares with that of other treatments. Moreover, there is no evidence that any specific behavioral treatment modality is more effective than any other. There is moderate evidence that adding a behavioral component to a normal treatment program for chronic low back pain, such as standard physical therapy, back school, multidisciplinary treatment or medical treatment, has a small short-term effect on functional status (ES, 0.31; 95%CI, -0.01–0.64). No short-term effect was seen on pain intensity (ES, 0.03; 95%CI, -0.30–0.36) or on behavioral outcomes (ES, 0.19; 95%CI, -0.08–0.45). Finally, there is moderate evidence for small long-term effects on functional status (ES, 0.26; 95%CI, -0.06–0.57) and behavioral outcomes (ES, 0.32; 95%CI, -0.06–0.71).

Turner carried out a meta-analysis of the efficacy of cognitive and behavioral interventions in patients with low back pain in the primary healthcare setting. Although 14 publications met the original inclusion criteria, for the present review only 10 could be traced. Of these, eight were included in van Tulder et al.’s review. Also, Turner did not present the results of the individual randomized controlled trials, making interpretation of these studies unclear. However, Turner’s conclusions are broadly the same as those drawn by van Tulder et al. Turner concludes that cognitive and behavioral treatments have a better effect on pain behavior and disability than control treatments, such as being on a waiting list. No differences were found between cognitive or behavioral treatments and other active treatments.

Behavioral treatment seems useful in chronic low back pain patients, being more effective than no treatment. However, it is not clear which type is most effective. For physical therapists, the operant approach seems most suitable because movement behavior is the central concern.

**Traction**

In 1995, van der Heijden et al. performed a systematic review of the effectiveness of traction in neck and back pain. Seventeen randomized controlled trials were included, 14 of which concerned the efficacy of lumbar traction. The authors reported that the methodological quality of the studies was too low to draw conclusions about the efficacy of traction in low back pain. A more
recent systematic review, by van Tulder et al., almost completely overlaps van der Heijden et al.’s review, with the exception of a single randomized controlled trial that was published in 1995. The newly added trial, which has a high methodological quality, compares the efficacy of traction with that of placebo-traction in patients with chronic low back pain. No effect on general improvement, pain or functional status was found. Mainly on the basis of this later trial, van Tulder et al. conclude that there is strong evidence that traction is not an effective treatment for chronic low back pain.

Traction is not useful in chronic low back pain and does not seem to be useful in acute low back pain.

Biofeedback
Van Tulder et al.’s systematic review included five randomized controlled trials of the effectiveness of biofeedback in patients with chronic low back pain. All the trials had a low methodological quality. In three studies, no difference was found in pain or functional status between patients receiving biofeedback and those receiving placebo or remaining on a waiting list. Two studies compared biofeedback with progressive relaxation training and found conflicting results with regard to pain and functional status. Another study looked at the incorporation of biofeedback into a rehabilitation program and found that the inclusion of biofeedback resulted in no difference in pain or in the patients’ range of motion. In conclusion, there is moderate evidence that biofeedback is not effective in patients with chronic low back pain.

The administration of biofeedback does not seem to be effective in chronic low back pain patients.

Massage
Ernst conducted a review of the effectiveness of massage in patients with low back pain. Four randomized trials were included. All the studies used massage as a control treatment rather than an experimental intervention. Moreover, the methodological constructs of all the studies were weak. One study showed that massage is superior to no treatment and two other studies showed that massage is as effective as manipulation or TENS. The fourth study showed that massage is less effective than manipulation. In conclusion, the evidence on the efficacy of massage in low back pain is contradictory.

It is unknown whether massage is useful in low back pain patients.

TENS (transcutaneous electrical nerve stimulation)
The review by van Tulder et al. on the efficacy of TENS contains two trials that studied patients with acute low back pain. One study, which has a low methodological quality, found a larger decrease in pain and a larger increase in mobility in the TENS group. The other study, which has a high methodological quality, did not find any difference in pain or functional status. Four studies, three of which have a high methodological quality, compared TENS with placebo in patients with chronic low back pain. One study found a larger pain reduction with TENS after one week but not after three or six months. In addition, one cross-over study found a slightly larger general improvement with TENS. The remaining two studies did not find any differences in pain, functional status or mobility. In conclusion, the evidence on the efficacy of TENS in low back pain is contradictory.

It is unknown whether TENS is useful in low back pain patients.

Ultrasound therapy, electrotherapy and laser therapy
Van der Windt et al. conducted a systematic review of ultrasound therapy in musculoskeletal disorders. The review covered 38 studies. One study looked at the effectiveness of ultrasound therapy in patients with degenerative rheumatic disorders, including disorders in the low back. The authors concluded that there is little evidence in favor of ultrasound therapy in the management of musculoskeletal disorders. This conclusion is in agreement with that of a previous meta-analysis of the same topic carried out by Gam and Johannsen. The latter meta-analysis included a total of 22 studies, of which two trials concerned patients with low back pain. However, the results of those trials were not presented separately. No clear statement about the efficacy of ultrasound therapy in...
patients with low back pain can be made on the basis of these reviews.

The efficacy of electrotherapy in patients with low back pain was reviewed by van der Heijden et al.\textsuperscript{61} Eleven trials were included. Electrotherapy encompasses direct current therapies (e.g. diadynamic and ultra-reiz therapies) and alternating current therapies (e.g. TENS and interferential therapy). The authors concluded that there is insufficient evidence that electrotherapy is better than either placebo treatment, an active approach, or the combination of different forms of electrotherapy.

A meta-analysis of the effectiveness of low-level laser therapy in patients with musculoskeletal disorders was performed by Gam et al.\textsuperscript{62} Twenty-three randomized controlled trials were included, one of which concerned patients with low back pain. The authors concluded that laser therapy has no effect on the pain resulting from musculoskeletal disorders. De Bie et al.\textsuperscript{63} carried out a systematic review of the efficacy of therapy with 904-nm laser in patients with musculoskeletal disorders. A total of 25 trials were found, of which two studies involved patients with low back pain. The methodological quality of one study was low, while that of the other was high. Neither study was able to show that laser therapy was effective.

It is unknown whether ultrasound therapy, electrotherapy or laser therapy is useful in low back pain. However, because they are passive interventions, they are not recommended.

**Exercise in water**

Two randomized controlled trials describe the effects of exercise in water in patients with chronic low back pain of greater than three months’ duration.\textsuperscript{64,65} One study did not find any difference between exercising in water and exercising on land as both patient groups exhibited improvements in functioning and decreases in pain. The other study found that exercise in water results in an improvement in functional status but no significant improvement was found in mobility, pain intensity, or neurological test results. Overall, there is limited evidence to show that exercise in water is effective in improving the functional status of patients with chronic low back pain. In addition, there is limited evidence showing that exercise in water is as effective as exercise on land.

**Exercise in water may be useful in chronic low back pain patients.**

**Explanation of the recommended therapeutic approach**

1. **Treating low back pain that follows a normal course**
   
   Treatment consists of a single session in which the physical therapist reassures the patient and encourages him to stay active. The physical therapist explains that low back pain is not harmful and that it is better to stay active and to resume gradually normal activities and normal participation in society. In order to reassure and motivate the patient, the physical therapist may ask him to practice movements that are deemed necessary for activities in daily life. If necessary, a second appointment may be made to evaluate the course of the disability and participation problems.

2. **Treating low back pain that follows an abnormal course**

   **Behavioral approach**

   The behavioral approach to therapy focuses on preventing further disability.\textsuperscript{54} Treatment may follow an operant approach, in which the emphasis is on pain behavior, a respondent approach, in which the emphasis is on the recognition of tension, or a cognitive approach, in which the emphasis is on the patient’s expectations and ideas. The operant approach is best suited to the physical therapist’s professional domain. First described by Fordyce et al. in 1973, the operant approach’s main purposes are to increase the patient’s level of activity and to decrease pain behavior in such a way that the patient is able to perform his desired activities despite the pain.\textsuperscript{54}

   The characteristic behavioral principles involved are active participation and time-contingency. Active participation means that the patient co-operates actively in treatment and feels responsible for the results. The objective is to promote the patient’s
control over his own movement behavior. Time-contingency means that time, rather than pain, determines the degree of progress with activities. In other words, the patient stops a certain activity, or exercise, because a certain amount of time has elapsed and not because pain has increased. More details of time-contingent activities are given below in the description of exercise therapy. The idea is to teach the patient to function despite the presence of pain. During treatment, the patient will receive positive feedback on his progress.

**Information and advice**

The physical therapist’s main contribution to treating low back pain is to coach the patient to regain control over his function and activities. Coaching may include activating, reassuring and motivating the patient, assessing progress, and rewarding him through positive feedback. Therefore, patient education plays an important role in the process of physical therapy and special skills are required to ensure that the patient gets the maximum benefit. Research by Knibbe and van Zuilekom showed that it is important to educate the patient in such a way that he becomes aware that his own behavior influences back pain. These authors write: “Through education, patients should learn to feel responsible for the health of their own backs. Patients must get the feeling that they themselves can exercise control over their recovery and prevent recurrence.”

Effective education requires knowledge, educational skills, and the use of some behavioral techniques. Van der Burgt and Verhulst carried out an overview of the educational models used in public counseling, from which they derived a model of patient education that could be applied by allied health professionals. They integrated the Attitude, Social Influence and Personal Efficacy determinant model with the step-by-step educational model proposed by Hoenen et al. In the Attitude, Social Influence and Personal Efficacy model, it is hypothesized that the patient’s readiness to change his behavior is determined by an interplay between attitude (How does the person perceive the change in behavior?), social influence (How do others perceive the change in behavior?) and the patient’s perception of his own efficacy, his self-efficacy (Will it or won’t it work?). The educational model proposed by Hoenen et al. envisages the stages of “being open”, “understanding”, “wanting” and “doing”. For allied health professionals, van der Burgt and Verhulst added two additional steps: “being able” and “keeping on doing”. Van der Burgt and Verhulst view education as being a process in which maintenance of the new behavior is the last step. This final step cannot be achieved if the preceding steps have not been taken. Hence, the six steps must be taken in succession. See table 4.

<table>
<thead>
<tr>
<th>Table 4. The six steps in the process of patient education proposed by van der Burgt and Verhulst.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1. Being open:</strong> the physical therapist tries to respond sensitively to the patient’s experiences, expectations, questions and worries.</td>
</tr>
<tr>
<td><strong>2. Understanding:</strong> information must be offered in such a way that the patient is able to understand and remember it.</td>
</tr>
<tr>
<td><strong>3. Wanting:</strong> the physical therapist evaluates what either drives or prevents the patient from performing a particular behavior; the physical therapist offers support and provides information about possibilities and alternatives; agreements made should be feasible.</td>
</tr>
<tr>
<td><strong>4. Being able:</strong> the patient must be able to perform the desired behavior; functional activities are practiced.</td>
</tr>
<tr>
<td><strong>5. Doing:</strong> the physical therapist makes clear, concrete and feasible agreements with the patient and sets concrete targets.</td>
</tr>
<tr>
<td><strong>6. Keeping on doing:</strong> during each treatment session there must be communication about whether or not the patient thinks he will be able to perform and maintain the new behavior; if there are problems, solutions must be sought.</td>
</tr>
</tbody>
</table>
For more information on this disorder a KNGF-brochure ‘Less bothered by your back’ that can be given to patients is available. For patients with chronic non-specific low back complaints, there has been developed a list with focal points by the NPCF (Dutch Patients and Consumers Federation), to prepare the discussions with care takers.

**Promoting compliance**

Sluijs describes three important factors that promote non-compliance. The first is problems experienced by the patient in attempting to carry out the exercises and instructions given by the physical therapist. The second is a lack of positive feedback. The third is the feeling of helplessness the patient may experience if he thinks the exercise will not help. Other factors, such as a poor prognosis or the patient not feeling significantly hindered by the disorder, lead to only moderate compliance. Sluijs did not find any differences in compliance between men and women. Poorly educated persons were a little more compliant than the highly educated. Sluijs recommends that the physical therapist should explore carefully the extent to which patients are able to comply with the prescribed exercises and advice, and seek solutions to any difficulties together with the patient. The manual on patient education Sluijs wrote for physical therapists contains a checklist of the measures that can be taken to promote compliance. See Table 5.

A distinction is made between short-term compliance up until treatment is over and long-term compliance after the end of the treatment period. To promote short-term compliance, it is important that the positive consequences of the new behavior are made as clear as possible and that the patient is taught to use cues. For example, a physical therapist may teach a telephone operator that he should correct his

<table>
<thead>
<tr>
<th>Table 5. Checklist of measures that promote compliance.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Physical therapist-patient relationship: a good interpersonal relationship between physical therapist and patient forms the foundation for every care process.</td>
</tr>
<tr>
<td>2. Patient perceptions: the physical therapist should be receptive to the patient’s thoughts and perceptions so that he can tailor information to the patient’s ideas and frame of reference.</td>
</tr>
<tr>
<td>3. Discussion of compliance: the physical therapist should talk to the patient about what is easy and what causes problems.</td>
</tr>
<tr>
<td>4. Prevention of problems, and tailoring: the physical therapist should refrain from giving advice that is impossible or extremely difficult for the patient to act on; feasible options should be explored together with the patient.</td>
</tr>
<tr>
<td>5. Solving compliance problems: the physical therapist should ask about problems with compliance, explore the underlying reasons for them, and seek solutions or alternatives.</td>
</tr>
<tr>
<td>6. Positive feedback: the physical therapist should motivate the patient by giving positive feedback.</td>
</tr>
<tr>
<td>7. Use of cues: cues are signs that remind the patient of a certain behavior; by linking behavior to a routine, there is a greater chance that the new behavior will become routine.</td>
</tr>
<tr>
<td>8. Generalization: the patient must learn to transfer what he has learned to new situations; this way the patient learns to react adequately in the future.</td>
</tr>
<tr>
<td>9. Self-efficacy: the patient should have confidence in his own efficacy; the physical therapist can help build confidence by setting realistic goals and by evaluating behavior positively.</td>
</tr>
<tr>
<td>10. Physical therapist-physician co-operation: both practitioners should keep each other informed and support each other’s advice.</td>
</tr>
<tr>
<td>11. Methodical conduct: the physical therapist should make a treatment plan and evaluate the extent to which the objectives have been met; with respect to patient education, he should ask himself: “Does the patient know what he needs to know and does he do what he should do?”</td>
</tr>
</tbody>
</table>
posture whenever the phone rings. The achievement of long-term compliance is comparable with the process of changing behavior, in this case, movement behavior. The patient's confidence in his own ability (his self-efficacy) and a belief that the advantages of the behavioral change will outweigh the disadvantages are essential in bringing about that change. In practice, this means that the physical therapist and patient must together select feasible goals and discuss the advantages and disadvantages of the new behavior. In addition, it is important that the physical therapist provides information in a step-by-step and systematic manner and in a way that corresponds to the patient's knowledge, ideas and experiences. The form and content of the information should be tuned to the specific phase of the behavioral change the patient is going through. See Table 4. By analyzing the various steps in the process and by asking, for example, which behavior the patient is not able to maintain and why, problems with compliance will become clear. Solutions to these problems should be sought together with the patient. The patient should be taught to transfer what he has learned about adequate coping strategies to possible future situations. The physical therapist will need to take into account any social factors that maintain the patient's behavior.

**Exercise therapy**

*Increasing activities using a time-contingent approach*

In a time-contingent program, activities are increased step by step on the basis of previously agreed stages (graded activity) that do not depend on the level of pain. See Table 6. The objective is to increase the patient’s level of activity and to teach him how to operate within his physical capabilities. In order to fit the program to the patient's needs as closely as possible, he will be asked which activities he feels are most limited and which are most important. These activities will provide the points of departure for treatment.

Firstly, a baseline level for the activities to be practiced will be set. This is done by asking the patient to perform the activities as long or as frequently as possible. He must be told that the purpose of this baseline measurement is to make an accurate estimate of his current activity level. The patient must show that he can perform this level of activity without undue stress. It is preferable to perform the measurements repeatedly so that a more reliable estimate of the starting level can be achieved. The mean values of recorded parameters such as time, duration, weight and frequency are calculated to provide baseline measures for each activity. During the baseline assessment, the physical therapist should pay attention to the quality of the patient's movements. Subsequently, a feasible goal is agreed for each activity. The physical therapist will then grade the activities, starting some way below the baseline level and progressing to the projected outcome level, by carefully balancing the load and the patient's load-bearing capacity. The number of steps in the program and their size will depend on the difference between the patient's starting level and the projected outcome level and on the patient's load-bearing capacity. These must be estimated by the physical therapist. Activities may be practiced at home as well as on the physical therapist's premises. It is important that pain is not allowed to obstruct the exercise assignments. In order to observe the patient's progress, these guidelines recommend the use of graphs and training records. The use of painkillers need not stand in the way of building up activities. It may be good advice to increase the level of activities first and subsequently decrease the medication dose at a later stage while keeping the level of activity constant. If the patient’s activity level decreases, for example, due to fear of movement or a passive coping strategy, the patient will be encouraged to move in safe surroundings under the supervision of the physical therapist. The level of supervision should be decreased during the course of the treatment session. In the beginning, control is in hands of the physical therapist. He will tell the patient what, how and how often something should be done. Later, the patient himself will gradually take over.

**Treatment duration**

The duration of treatment in patients with low back pain that follows an abnormal course depends on the course of the complaint, the time available for therapy, and the nature of any limiting personal and
External factors and the extent to which these can be influenced. It is recommended that explicit agreements are made with the patient at the start and finish of treatment. These will have a positive influence on the patient’s control over his functioning.

Conclusion and written report to referring physician
The way in which treatment is concluded, including reporting back to the physician and writing a report, should conform to the respective KNGF guidelines entitled “Communicating with and reporting back to general practitioners” and “Physiotherapeutic documentation and reporting”.

The legal significance towards the guidelines
Guidelines are no statutory regulations, but they give insights and recommendations, based on the results of scientific research, which health care workers must fulfill to attain quality care. Since the recommendations are mainly based on the average patient, the health care workers have to use their professional autonomy to deviate from the guidelines if the patient’s situation requires this. Whenever there is a deviation from the guideline, this has to be augmented and documented. The responsibility for the interventions remain therefore by the individual physical therapist.

Revisions
The KNGF-guidelines are the first development in clinical questions pertaining to diagnostics, treatment and prevention for patients with a non-specific low back pain. Developments that can improve the physical therapeutic care of this group of patients, can change the current insights written in the guidelines. In the method for developing and implementing guidelines is indicated that all guidelines will be revised after three to five years maximum after the original publication. This means that the KNGF, together with the working group, will decide not later than in the year 2006 if these guidelines are is still accurate. If necessary a new working group will be installed to revise the guideline. The validity of the guidelines expire if new developments give reasons to start a reversionary process.

Before the reversionary process, also the Method for Guideline Development and Implementation will be updated based on new insights and cooperation agreements made between the several guidelines developers in The Netherlands. The consensus products of the Evidence Based Guideline Meeting (EBRO platform), which are developed under the auspices of the CBO, will be included in the updated method. The uniform and transparent methods for the determination of the amount of evidence and the derived recommendations for practice are important improvements.

External financing
This guidelines is subsidized by the Ministry of Public Health Care, Welfare and Sports (VWS) in the framework program ‘Quality Support Policy Allied Health Professions (OKPZ)’. The possible interests of

---

**Table 6. Contrasting examples of pain-contingent and time-contingent treatment.**

<table>
<thead>
<tr>
<th>Pain-contingent treatment</th>
<th>Time-contingent treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>The patient walks with the therapist. After 100 meters, the patient says that he is in pain. They sit down for a while. During the rest, they chat until “it’s better” and walking is resumed. In effect the following happens: walking seems to be punished by pain, so walking will be reduced; the pain seems to be rewarded by a rest, so resting will increase; resting seems to be rewarded by social talk, so resting will increase.</td>
<td>The patient walks with the therapist. They agree beforehand to walk to a particular corner with a bench. There they sit down for five minutes before walking back. It may be difficult and painful, or it may be easy and perhaps they could have gone further. But they stick to their agreement and do not walk more nor less. Afterward, the physical therapist gives positive feedback on the progress made.</td>
</tr>
</tbody>
</table>
the subsidizer have not influenced the content and the related recommendations.

Acknowledgements
Special words of gratitude are in order to the multidisciplinary working committee for the production of these guidelines for the Koninklijk Nederlands Genootschap voor Fysiotherapie (KNGF; Royal Dutch Society for Physical Therapy). Many thanks to, in alphabetical order: PF van Akkerveeken PhD (orthopedic surgeon, Rug Advies Centra Nederland), RM Bakker-Rens MSc (occupational physician, Dutch Society for Occupational Practice), AJ Engers PT, MSc (psychologist and human movement scientist, Centre of Care Research, St Radboud Medical Centre, Nijmegen), L Goeken PhD (rehabilitation physician, Dutch Society for Rehabilitation Physicians), JMA Mens PhD (orthopedic surgeon, Spine and Joint Centre, Rotterdam), HHCFM van Maasakkers PT (Rugcentrum Uden), ACM Romeijnders MSc (primary care physician, Dutch Society for General Practice), MA Schmitt PT (School of Physiotherapy, Utrecht), JWS Vlaeyen PhD (psychologist, University of Maastricht), and A de Wijer PT, PhD (School of Physiotherapy, Utrecht). Also, we would like to thank all the physical therapists who have co-operated in the field check. Finally, we would like to thank NE Knibbe MSc (human movement scientist, Locomotion), YF Heerkens PhD and EMHM Vogels MSc (both from the Dutch Institute of Allied Health Professions) for their contributions to these guidelines.
### List of abbreviations and glossary

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>CI</td>
<td>Confidence interval</td>
</tr>
<tr>
<td>ES</td>
<td>Effect size</td>
</tr>
<tr>
<td>ICIDH</td>
<td>International Classification of Functioning, Disability and Health</td>
</tr>
<tr>
<td>KNGF</td>
<td>Royal Dutch Society for Physical Therapy</td>
</tr>
<tr>
<td>NHG</td>
<td>Dutch Society of Primary Care Physicians</td>
</tr>
<tr>
<td>NVAB</td>
<td>Dutch Association of Occupational Physicians</td>
</tr>
<tr>
<td>TENS</td>
<td>Transcutaneous electrical nerve stimulation</td>
</tr>
<tr>
<td>Activity</td>
<td>An individual's actual activity and behavior</td>
</tr>
<tr>
<td>95%CI</td>
<td>A range of values within which there is a 0.95 probability that the real value of a measured parameter is included</td>
</tr>
<tr>
<td>Disability</td>
<td>Inability to perform an activity in the manner or to the extent considered normal for that person</td>
</tr>
<tr>
<td>(Body) functions</td>
<td>Physiological functions of body systems (including psychological functions)</td>
</tr>
<tr>
<td>Impairment</td>
<td>Problem with the function or structure of part of the body</td>
</tr>
<tr>
<td>Meta-analysis</td>
<td>A systematic review of the scientific literature in which the results of all the studies found on a particular topic are combined (quantitatively) to derive a single conclusion</td>
</tr>
<tr>
<td>Participation</td>
<td>Involvement in a life situation</td>
</tr>
<tr>
<td>Participation restriction</td>
<td>Problems an individual may experience with normal involvement in life situations</td>
</tr>
<tr>
<td>(Body) structure</td>
<td>Anatomical part of the body, such as an organ or limb, or its component</td>
</tr>
<tr>
<td>Systematic review</td>
<td>A systematic review of the scientific literature in which the conclusion describes (qualitatively) the results of all the studies found on a particular topic</td>
</tr>
</tbody>
</table>
References


**Diagnosis**

- **Low back pain**
  - Non-specific low back pain
  - Specific low back pain
  - Contact referring physician

**Referral**
The reasons for referral, the patient’s needs, the previous courses of the disability, information on additional diagnostic procedures and prognosis.

**History-taking**
- patient’s needs, expectations and complaints
- identify the onset of the complaints
- evaluate the course of the condition over time
- determine coping strategy
- note additional information

**Examination**
- Identify factors that may either hamper or facilitate treatment
- Assess the patient’s level of physical fitness

The starting points are the disabilities and problems with participation that were identified during history-taking.

**Analysis**
- Main impairments, disabilities and participation problems
- Normal or abnormal course
- Hampering factors that maintain the complaints

Questions:
- Is the health problem a non-specific low back pain?
- Is physical therapy indicated?

Normal course: functions, activities and participation are increasing over time
Abnormal course: functions, activities and participation will not return to normal levels (within three weeks).

**Treatment plan**
Normal course: one treatment session, to coach the patient (to increase awareness and understanding).
Abnormal course: the provision of appropriate information and advice.
The main goals of the treatment plan are to return gradually to a full level of activity and to prevent recurrences and the development of chronic complaints.
**Normal course**

Main goal:
- Increase awareness and understanding (how to cope adequately with the complaints)

One treatment session. The physical therapist will give information and advice.

**Abnormal course**

Main goals:
- increase awareness and understanding
- improve relevant physical functions
- increase the level of activity and participation
- promote an adequate coping style

Main exercises:
- give information and advice
- training relevant functions and activities

Evaluation of the effects of the intervention

Closing off treatment process