

Diagnostic therapeutic flow-charts for low back pain patients: the Italian clinical guidelines

S. NEGRINI ^{1, 2}, S. GIOVANNONI ^{3, 4}, S. MINOZZI ⁵, G. BARNECHI ⁶, D. BONAIUTI ^{2, 7}, A. BUSSOTTI ^{3, 8}
M. D'ARIENZO ⁶, N. DI LORENZO ⁹, A. MANNONI ^{10, 11}, S. MATTIOLI ¹², V. MODENA ^{10, 13}
L. PADUA ¹⁴, F. SERAFINI ¹⁵, F. S. VIOLANTE ¹²

In 2002 the Italian Health Ministry (IHM) financed the Care and Research Institute (IRCCS) Fondazione Don Carlo Gnocchi ONLUS of Milan to carry out a research project entitled: "Percorsi diagnostico-terapeutici evidence-based per le patologie del rachide lombare" (Evidence-based diagnostic therapeutic flow-charts (DTF) for lumbar spine pathologies).¹ The first Operative Unit of this project was assigned the task of creating a National Committee which would include all Scientific Societies representing a medical speciality and/or health profession facing problems of the lumbar spine (Appendix).¹ This Committee prepared Italian DTFs, the purpose of which was to act as a single scientific and cultural benchmark for every local initiative of development of DTF, as advised by the IHM.² The DTF, that were produced in a strictly evidence-based way, have been considered by the IHM a subsequent step, more concrete and operative (almost clinical-care profiles) with respect to the classic Guidelines.

In recent years, the guidelines have become an essential means for synthesizing results proposed in the scientific literature and making them fully available to physicians.³⁻⁷ Presently, there are numerous examples of guidelines in the field of low back pain (LBP)⁴⁻¹¹ and experience gained allows us to affirm, on one

Financed by Ministero della Salute to Istituto di Ricovero e Cura a Carattere Scientifico Centro S. Maria Nascente, Fondazione Don Carlo Gnocchi ONLUS, Milan: Finalized Research Project 2002 – n. 206 entitled "Percorsi Diagnostico-terapeutici evidence-based per le patologie del rachide lombare" – Operative Unit n°1 – Società Italiana di Medicina Generale.

Address reprint requests to: S. Negrini, ISICO, Via Carlo Crivelli 20, 20122 Milano, Italy. E-mail: stefano.negrini@isico.it

¹ ISICO (Italian Scientific Spine Institute), Milan
Don Carlo Gnocchi Foundation, ONLUS, IRCCS, Milan

² Italian Society of Physical Medicine
and Rehabilitation (SIMFER)

³ Italian Society of General Medicine (SIMG)

⁴ General Practitioner, Prato
⁵ Italian Cochrane Center

⁶ Italian Society of Orthopedics and Traumatology (SIOT),
Second Department of Orthopedics,
University of Florence, Florence

⁷ Physical Medicine and Rehabilitation Unit,
S. Gerardo Hospital, Monza

⁸ General Practitioner, Florence
⁹ Italian Society of Neurosurgery (SINCH),
Department of Otolaryngology, Neurology and
Ophthalmology, Neurosurgical Clinic,
University of Florence, Florence

¹⁰ Italian Society of Rheumatology (SIR)

¹¹ Unit of Rheumatology and Network for Quality
Improvement, Azienda Sanitaria, Florence
¹² Italian Society of Occupational Medicine and Industrial
Hygiene (SIMLI), Occupational Medicine Unit,
University of Bologna, Bologna

¹³ Division of Rheumatology,
S. Giovanni Battista Hospital, Turin

¹⁴ Italian Society of Neurology (SIN), Department of
Neurosciences, Catholic University, Rome
¹⁵ Italian Association of Physiotherapists (AIFI),
Physiotherapist OMT, Master in Rehabilitation in
Musculoskeletal Disorders, University of Genoa, Genoa

side, their importance, but, on the other, the difficulties that arise when we decide to make them operative; these difficulties may reflect an essentially "laboratory" reality, often propose indications that are more negative than positive (what to do) and are a group of indications that do not provide an exhaust-

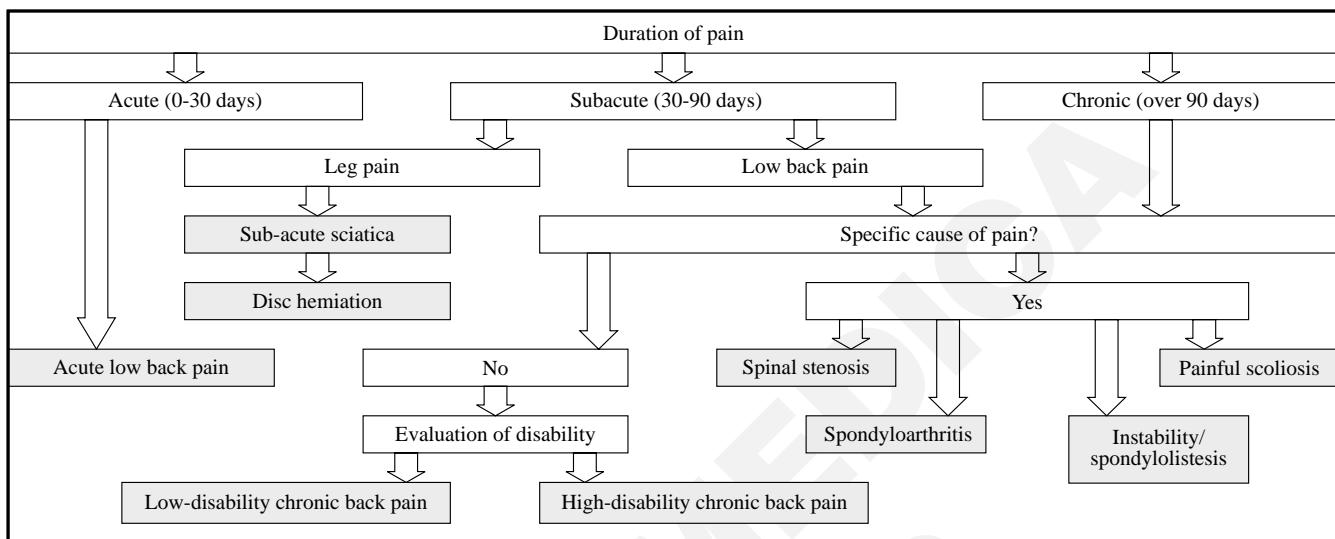


Figure 1.—Synopsis of diagnostic flow-charts proposed in the Italian clinical guidelines for low back pain patients.

tive and coherent picture of what a physician should do.^{1, 12-17}

Flow-charts, already used in some previous examples of clinical guidelines for LBP,^{10, 18} can be seen as an operative resource that enables us to introduce guideline indications into everyday practice: the main difference is that the latter are usually proposed for each single diagnostic and therapeutic instrument, while the former are organic pathways, real profiles of assistance. DTFs are deep flow-charts that synthesize the reported data on LBP while giving an organic picture with respect to "how to behave", thus completing the numerous existing grey areas. DTFs in the field of LBP are almost non-existent at international level, one reason being that "they have to be consistent with local health care reality".^{2, 19} In this respect, these DTFs, shared by all Italian Scientific Societies of national relevance, will be the base on which to develop subsequent local experiences of the National Health Service.

Why do we need diagnostic therapeutic flow-charts for low back pain

LBP is a common osteoarticular disease, representing, after the common cold, the most frequent human disease.^{19, 20} Almost 80% of the population will, at some time in their lives, suffer from LBP.²¹⁻²³

Observational studies report an annual prevalence of symptoms in 50% of adults of working age, 15-20% of whom resort to medical care.^{19, 21-23} After this premise it's evident that LBP can be one of the most frequent reasons for general practitioner (GP) examinations, since the latter is usually the first physician to start the care pathway of LBP patients.^{1, 13, 24} In fact, in Italy LBP represents 3.5% of admissions to General Medicine Services (the third cause after hypertension and preventive care), almost 20% of all osteoarticular causes.²⁵ These data explain why every day a GP gives assistance to an average 2-3 patients with LBP.²⁵⁻²⁷

LBP affects both men and women equally; it occurs most frequently between 30 and 50 years of age; it implies extremely high individual and social costs, in terms of diagnostic tools and treatments, reduction of productivity and decreased ability in everyday life activities; considering only young people under 45 years of age, LBP is the most common cause of disability.^{10, 19, 21, 22, 28, 29} Despite the fact that the post-industrial economy is becoming less demanding for workers thanks to a better automatization of the production cycle and medicine has increased significantly diagnostic and care capability, working disability due to LBP is rising constantly.¹⁹

Diagnostic imaging techniques should follow clinical examination, but frequently this does not happen: their use without the backing of a diagnostic hypothesis can't add any useful data with respect to

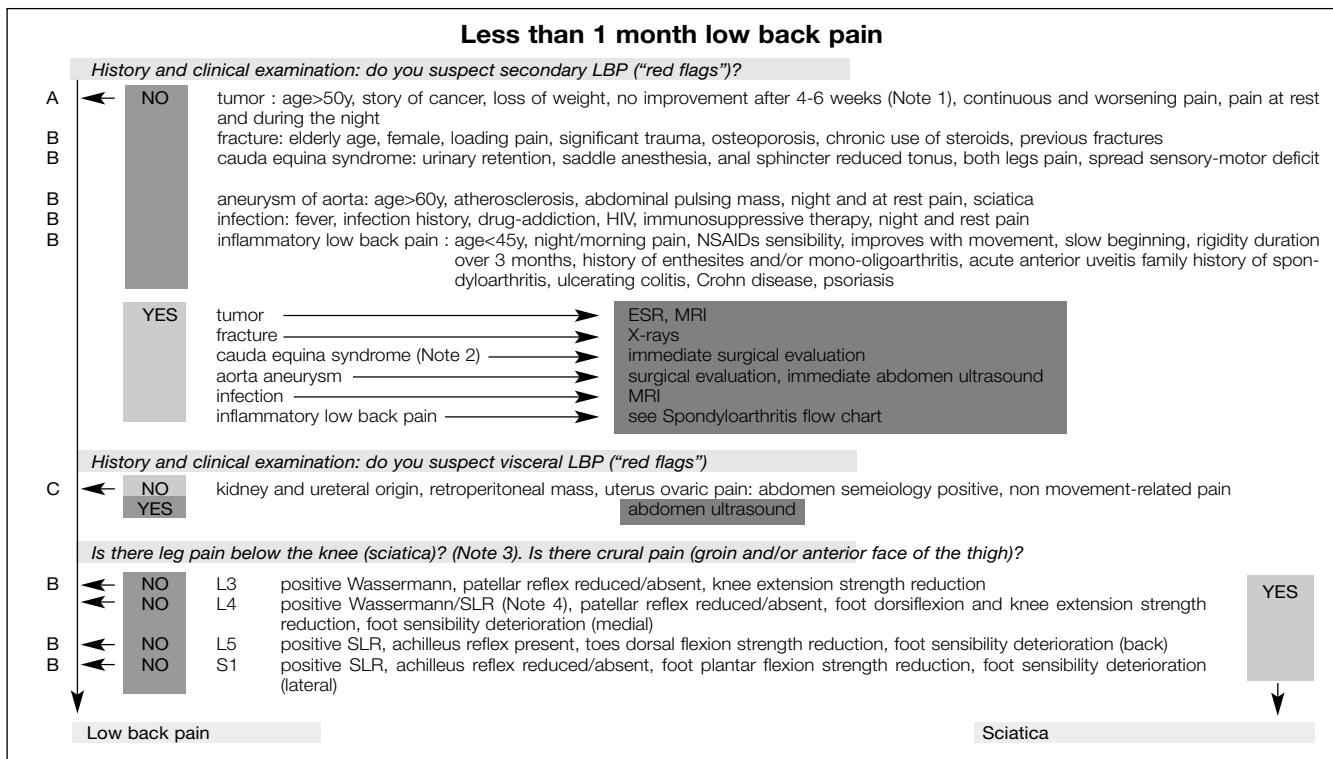


Figure 2.—Diagnostic flow-chart of acute low back pain patients. Notes 1-4 can be found in Appendix II. The letters on the left represent the strength of evidence for each line of the flow-chart.

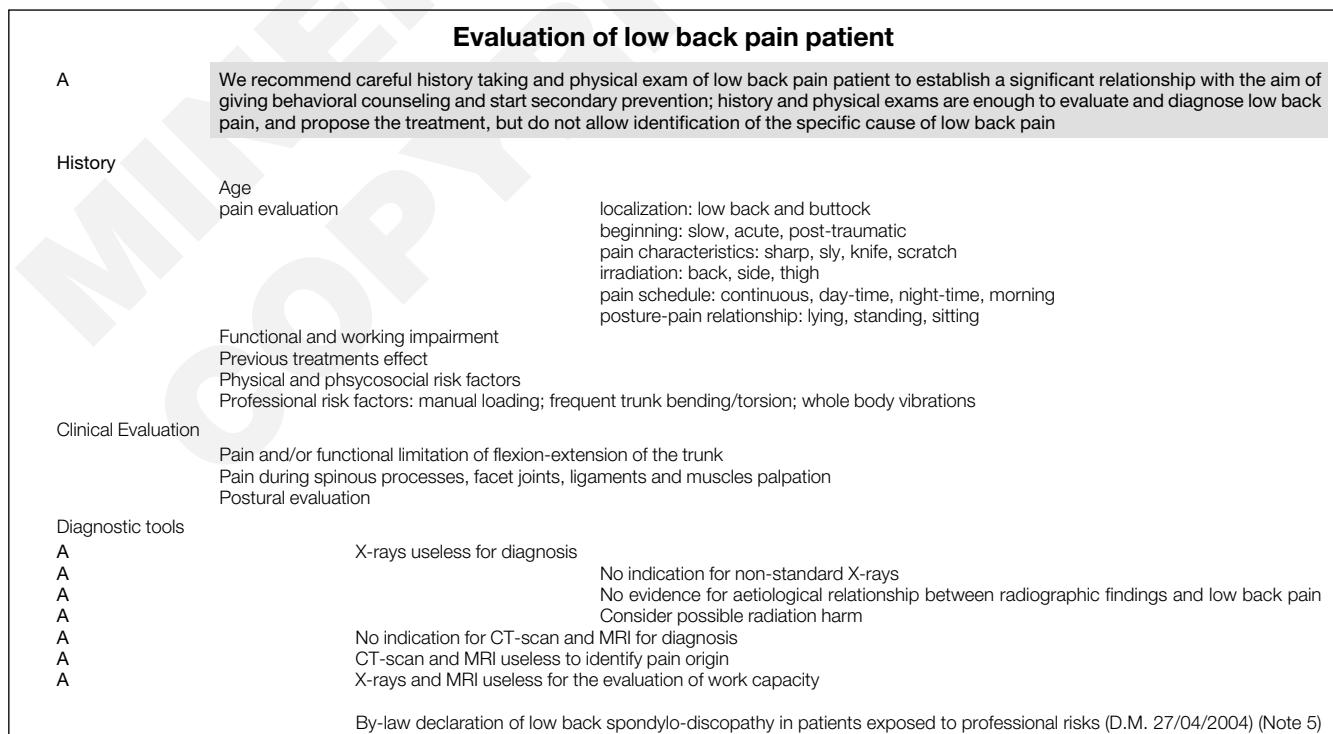


Figure 3.—Evaluation of acute low back pain patients. Note 5 can be found in Appendix II. The letters on the left represent the strength of evidence for each recommendation.

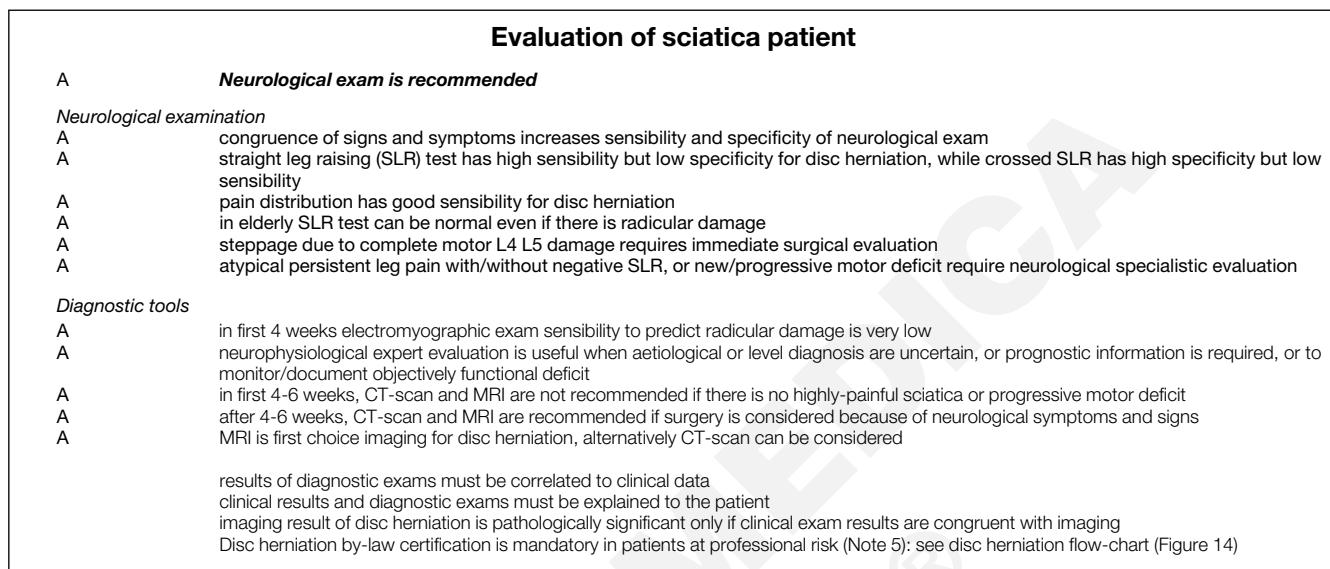


Figure 4.—Evaluation of acute sciatica patients. Note 5 can be found in Appendix 2. The letters on the left represent the strength of evidence for each recommendation.

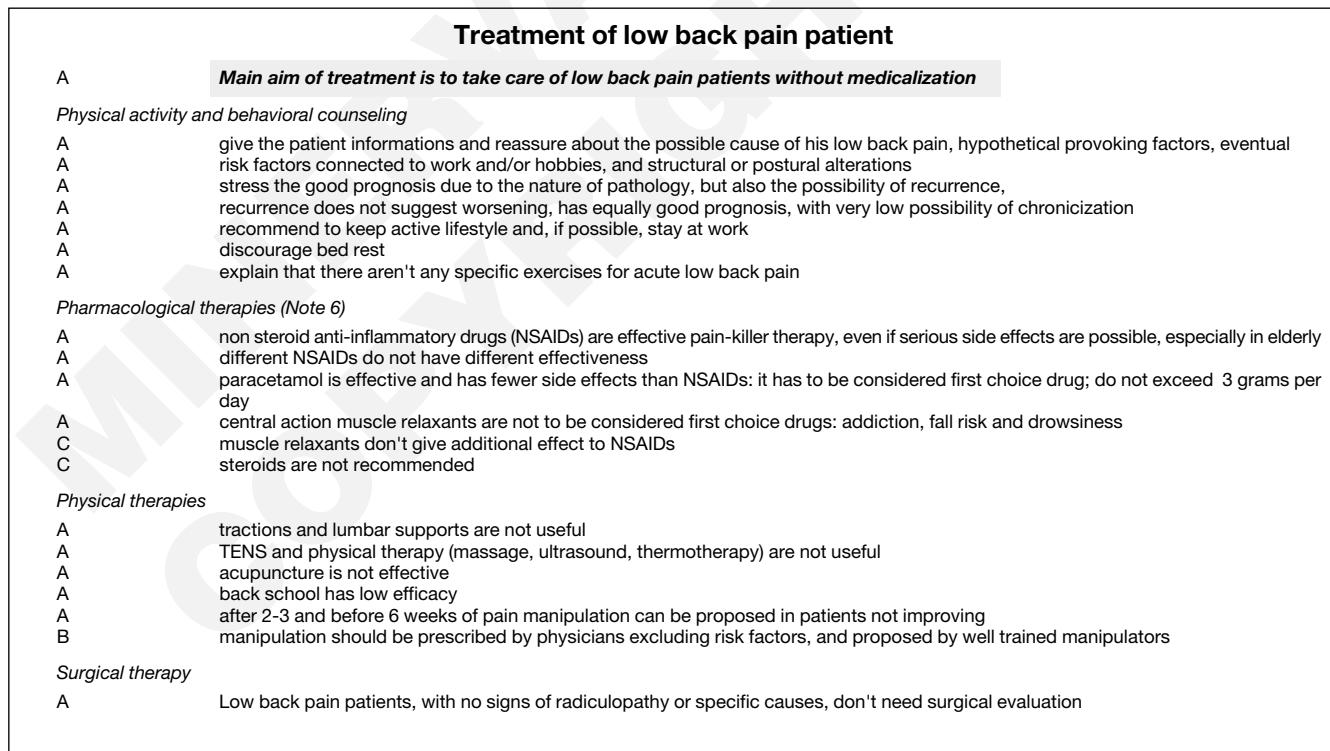


Figure 5.—Treatment of acute low back pain patients. Note 6 can be found in Appendix II. The letters on the left represent the strength of evidence for each recommendation.

Treatment of sciatica patient	
A	<i>Most patients with radicular dysfunction due to a disc herniation fully recover naturally within 1 month, so a surgical evaluation during the first month of therapy isn't recommended</i>
	<i>Physical activity and behavioral counseling</i>
A	it's better not to rest in bed, except 2-4 days in case of major sciatica
A	continue usual everyday life activities, within limits due to pain, and keep on being active
A	recommend to keep on being active and, if possible, to go back to work, even if back pain/sciatica persist, if duties can be modified and/or lightened: this allows fast recovery from symptoms and reduction of relapses
	<i>Pharmacological therapies</i>
C	systemic steroids can be useful for a short period
A	paracetamol, NSAIDs, muscle relaxants, tramadol are useful to reduce pain (see low back pain)
A	paracetamol with light opioid can be an effective alternative when NSAIDs or paracetamol alone do not control pain
B	if there are no results with pharmacological treatment, epidural steroids can reduce radicular pain for a short period
	<i>Physical therapies</i>
A	manipulations are contraindicated
A	TENS and physical therapy (massage, ultrasound, thermotherapy) are not useful
A	acupuncture is not effective
	<i>Surgical therapy</i>
A	after 1 month of conservative treatment surgeon referral is indicated if: sciatica is important and disabling; sciatica continues without improvement or worsening; there is clinical evidence of a radicular compression
A	before 1 month of conservative treatment surgeon referral is recommended (see disc herniation flow-chart) only: in case of neurological worsening; if pain is important and resists any conservative treatment; in case of red flags
A	in patient with disc herniation and radiculopathy, discectomy is effective if there is no improvement with conservative treatment
B	the choice between microdiscectomy and discectomy depends on surgeon's experience and available resources
A	percutaneous discectomy and laser discectomy must still be considered experimental
C	there is no evidence that patients operated on for disc herniation must reduce their everyday activity immediately after surgery
	intensive exercise programs, beginning 4 to 6 weeks after surgery, accelerate functional recovery and return to work currently we don't know if exercises can be started immediately after surgery
B	there's no reason for prolonged reduction of physical activities after surgery
B	always perform a psychological evaluation before surgery

Figure 6.—Treatment of acute sciatica patients. The letters on the left represent the strength of evidence for each recommendation.

history and clinical exam, but increases the risk of treating lesions occasionally found (e.g. asymptomatic disc protrusion, or even herniation, not involved in the present clinical picture).^{1, 13, 30} The call for examination by the patient, who frequently asks the physician to undergo an X-ray, or an even more complex diagnostic imaging examination and, if gratified, shows more satisfaction for the assistance received, should not be underestimated:³¹ one of the gambles of primary care is to increase the patient's satisfaction without prescribing useless exams. As for the therapeutic approach, the wide variability in assistance and the extremely high prescription of physical therapies and exercises,¹ that results in high costs for both individuals and society, despite the lack of reported evidence on their effectiveness for many of them is evident.^{32, 33}

In the clinical pathways of patients with LBP, the first consultation is usually with the GP, who should possess some expertise for a first global evaluation (preventive, diagnostic, therapeutic and prognostic) as

well as the means for an evidence-based critical analysis. This is the basis on which to manage the patient's needs, frequently induced by trends and ideas^{34, 35} and, when necessary, to send the appropriate patients for specialist advice.

Production methodology

The members of the multidisciplinary team that prepared this document were chosen by each single Scientific Society participating in the project (Appendix). The Italian Society of Medical Radiology (Società Italiana di Radiologia Medica, SIRM), the Italian Society of Emergency Medicine and Urgency (Società Italiana di Medicina d'emergenza-Urgenza, SIMEU) and the Italian Society of Medical Psychology (Società Italiana di Psicoterapia Medica, SIPM), although invited to participate in the work, did not send delegates. In a preliminary meeting, in March 2003, work methods were defined as well as the clinical patterns of the different DTFs.

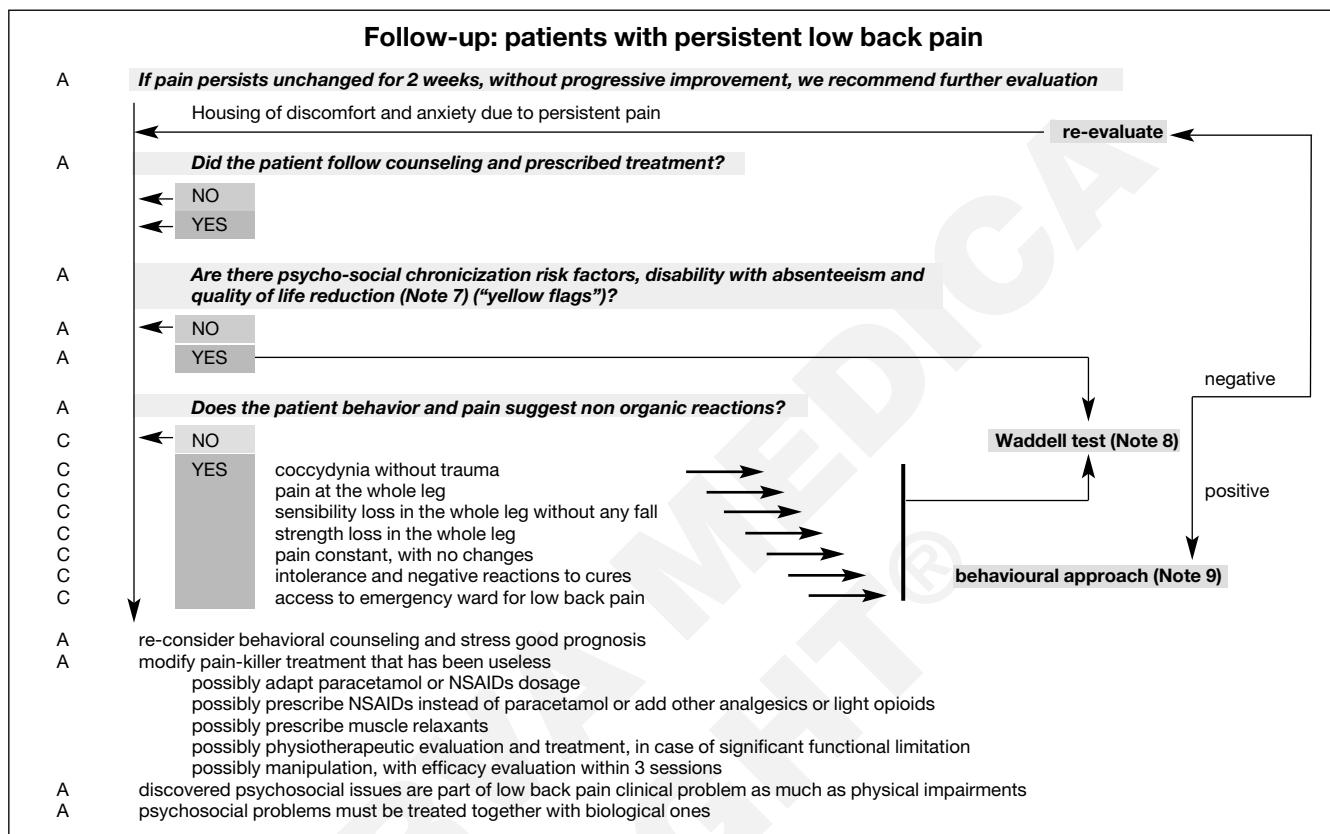


Figure 7.— Diagnostic-therapeutic flow-chart of follow-up of persistent acute low back pain patients. Notes 7-9 can be found in Appendix II. The letters on the left represent the strength of evidence for each line of the flow-chart.

An epidemiologist (S.M.) performed bibliographic research, an evaluation of methodological quality and a synthesis of data on tables that were sent to the members of the team. Each member of the multidisciplinary group proposed for each pattern defined the most appropriate DTF according to the effectiveness of the data collected from the literature and his own competence and clinical experience. These DTFs had to be consistent with the indication of suitability given by the Scientific Committees of the Society represented by the specialist. The project heads (S.N. and S.G.) and the epidemiologist (S.M.) collected all suggestions and proposed a preliminary version of the DTF. In 2 plenary meetings, the raw version of the DTF was discussed by all team members to create the final version of DTF. The final DTF fell in with the indications of the Conference on Guideline standardisation³⁶ to

improve guideline quality and facilitate implementation.

Bibliographic research

Among all existing international Guidelines, the best for methodological quality according to the database of the Italian National Program for Guidelines (Piano Nazionale Linee Guida, PN LG)⁶ were used. Effectiveness of treatments was verified using a synthesis described by van Tulder.^{32, 33} Moreover we considered the systematic reviews (SRs) of diagnosis and treatment published from January 1994 to December 2004 in Medline and in the Cochrane Library databases not included in the above mentioned publications.³⁷⁻⁴⁸ SRs underwent a critical methodological quality evaluation by the epidemiologist of the team (S.M.).⁴⁹⁻⁵¹

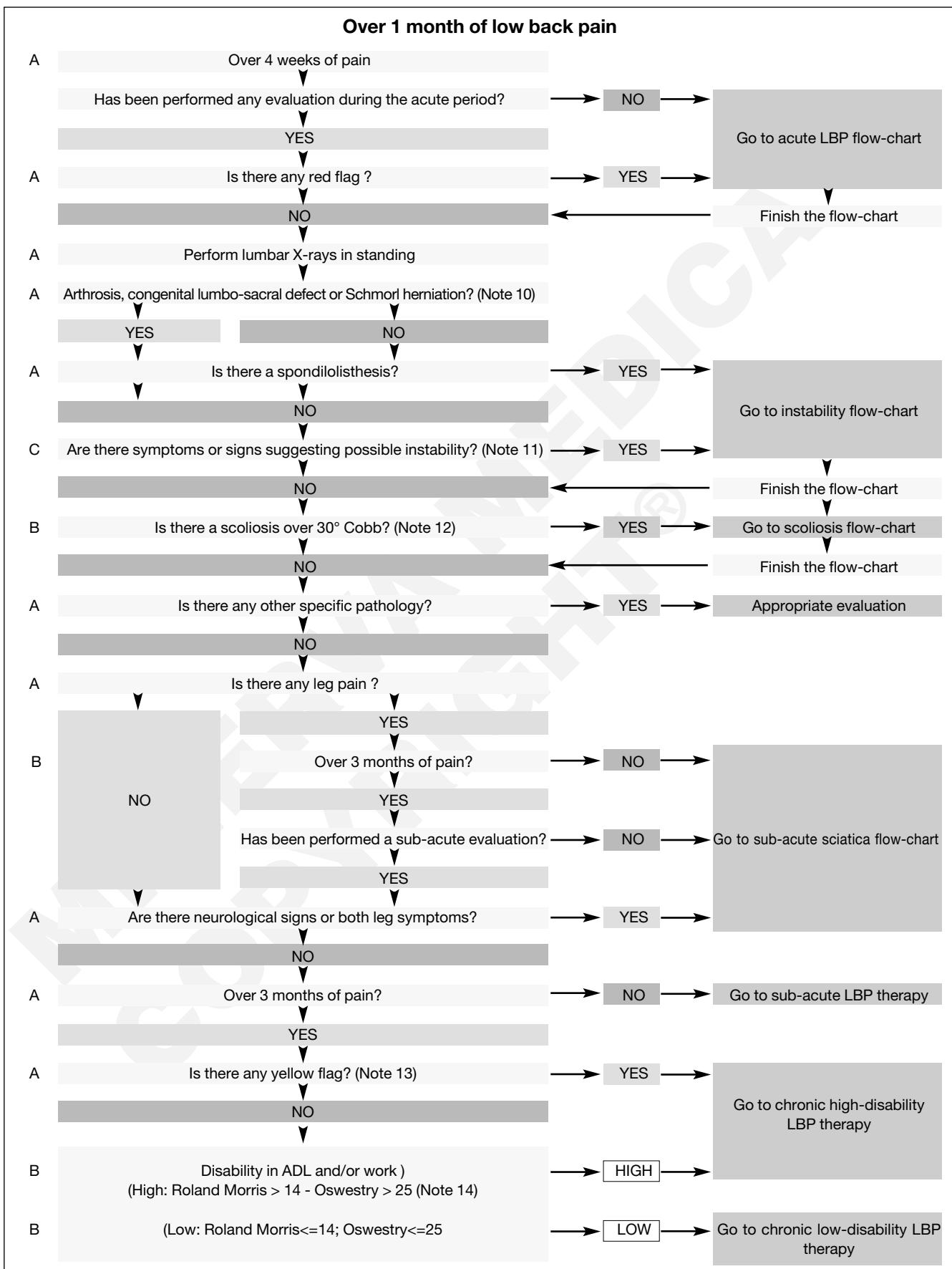


Figure 8.—Diagnostic flow-chart of sub-acute and chronic low back pain patients. Notes 10-14 can be found in Appendix II. The letters on the left represent the strength of evidence for each line of the flow-chart.

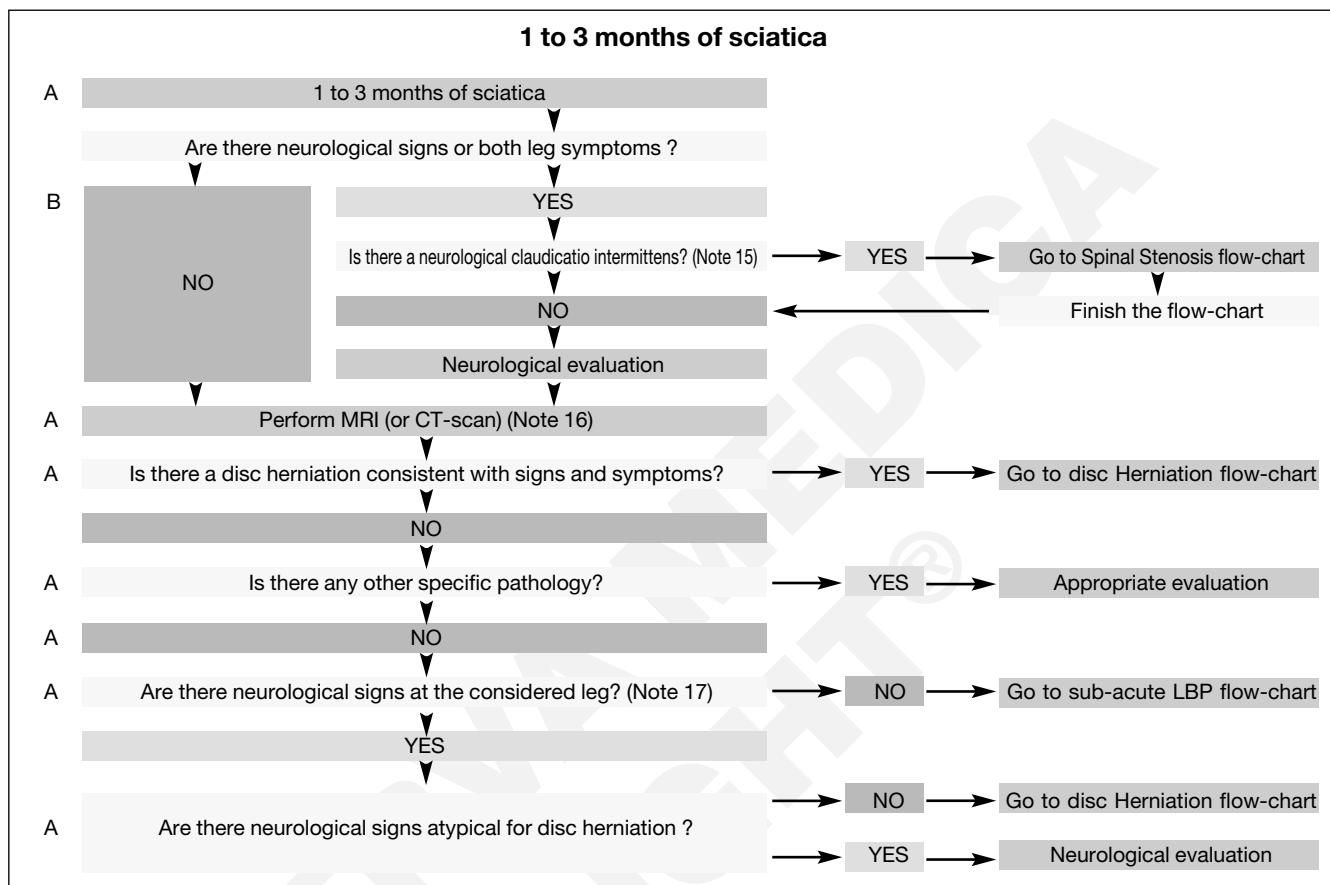


Figure 9.—Diagnostic flow-chart of sub-acute sciatica patients. Notes 15-17 can be found in Appendix II. The letters on the left represent the strength of evidence for each line of the flow-chart.

Addressee of diagnostic therapeutic flow-charts

DTFs address all health operators, working in primary and secondary level care, that can be involved in the assistance and treatment of LBP patients. Particularly, they address the following professionals:

- GPs;
- Radiologists and neuroradiologists;
- Physiatrists;
- Rheumatologists;
- Neurologists;
- Orthopedic surgeons;
- Neurosurgeons;
- Physiotherapists;
- Work medicine physicians.

Evidence grading and strength of recommendations

Evidence grading

- I. Evidence from many randomised controlled trials (RCTs) and/or from SRs of RCT.
- II. Evidence from only one RCT.
- III. Evidence from nonrandomized cohort studies with concurrent or historical controls or their SRs.
- IV. Evidence from retrospective case/control studies or their SRs.
- V. Evidence from case series.
- VI. Evidence based on expert opinions, consensus conference committees or members of this guidelines team.

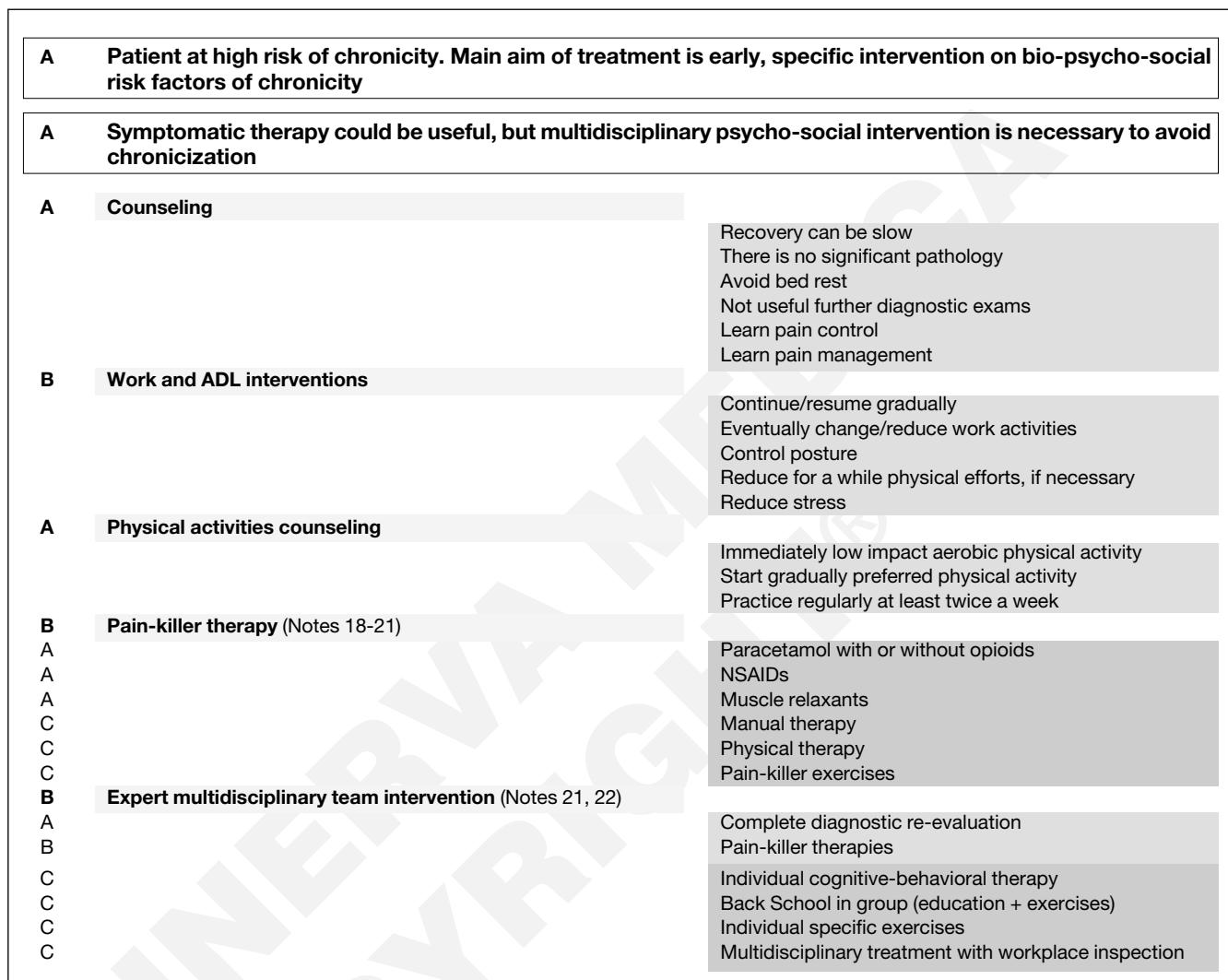


Figure 10.—Treatment of sub-acute low back pain patients. Notes 18-22 can be found in Appendix II. The letters on the left represent the strength of evidence for each recommendation.

Strength of recommendations

— A: strong recommendation for all patients. This is applied to recommendations based on high quality evidence, group I or II (A), or to recommendations on problems or treatments that it is not possible to study with RCTs (*e.g.*: some psychological aspects, patient information, ethics) or data of clinical experience and not disputable (A*).

— B: there are doubts as to whether the execution of the procedure should always be recommend-

ed for all patients, but its execution should be carefully considered.

— C: there is a deep uncertainty pro or versus the recommendation. This refers to procedures where there are no conclusions according to the literature because of the absence of RCTs or contrasting results from existing studies.

The adopted grading system does not conform strictly to the levels of evidence, because it also considers other aspects, with the aim of giving a complete evaluation of diagnostic therapeutic procedures and

A	Chronic pain resolution occurs in less than 5% of patients. In case of low-disability, aim of treatment is reducing actual disability and avoiding its progression through instruments to manage the problem (active approach by the patient) and control pain
A	Counseling
	There is no significant pathology It's difficult to abolish pain completely Pain can be reduced It's possible to improve quality of life and reduce disability Learn pain management Reduce stress Be fit Work is not enemy Physical exercises are important and useful
A	Work and ADL interventions
	Continue/resume gradually Eventually change/reduce work activities Control posture Reduce stress
A	Physical activities counseling
	Start gradually preferred physical activity Practice regularly, at least twice a week
A	Expert physician evaluation
	Complete diagnostic re-evaluation Physical fitness evaluation (biological) (Note 23) Behavioral evaluation (psychological) (Note 24) Disability evaluation (bio-psycho-social) Note 14)
	Expert multidisciplinary team intervention
	See low- or high-disability chronic low back pain flow-charts
	Notes
B	Chronic low back pain therapy changes according to patient disability level (low or high)
C	In case of low-disability a non-expert approach is possible There is no evidence of efficacy in the literature of a non-expert approach, but it could be preferred in terms of cost/benefit ratio
	A multidisciplinary approach is complex, nevertheless it's preferable in case of: — High-disability — Low-disability but early chronicization (it's still possible to solve the problem) — Low-disability, no previous trial of this approach and highly motivated patient
C	Multidisciplinary approach is not recommended in case of low-disability and: — complex treatment difficult because of cognitive, psychological or motivational factors — the patient doesn't believe a solution possible
B	There is no evidence of efficacy for these therapies (both positive and negative) Acupuncture Thermal care Facet joint denervation Lumbar supports and orthosis Gabapentin Trigger point and ligamentous injections Facet joint injections Epidural injections Radiofrequency lesioning of the dorsal root ganglion Ozone therapy Spinal cord stimulation Physical therapies IDET (Intradiscal Electrothermal Therapy) Botulinum toxin injections Tramadol
A	There is evidence of non-efficacy for these therapies Bed rest Intra-discal injections Prolotherapy

Figure 11.—Treatment of chronic low back pain patients. Notes 14, 23 and 24 can be found in Appendix II. The letters on the left represent the strength of evidence for each recommendation.

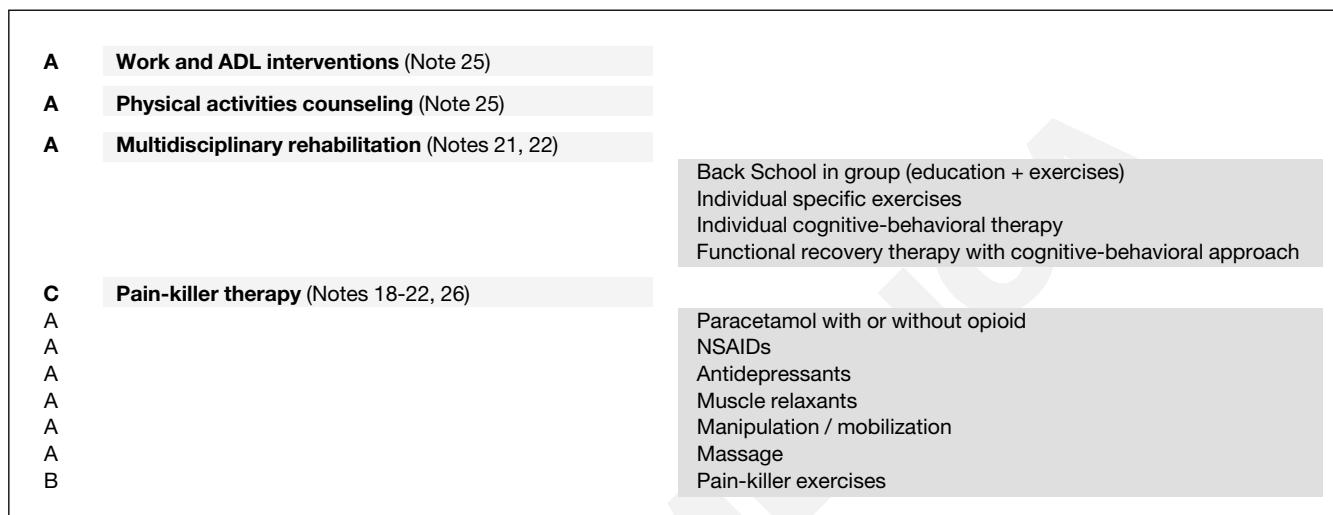


Figure 12.—Treatment of low-disability chronic low back pain patients. Notes 18-22, 25 and 26 can be found in Appendix II. The letters on the left represent the strength of evidence for each recommendation.

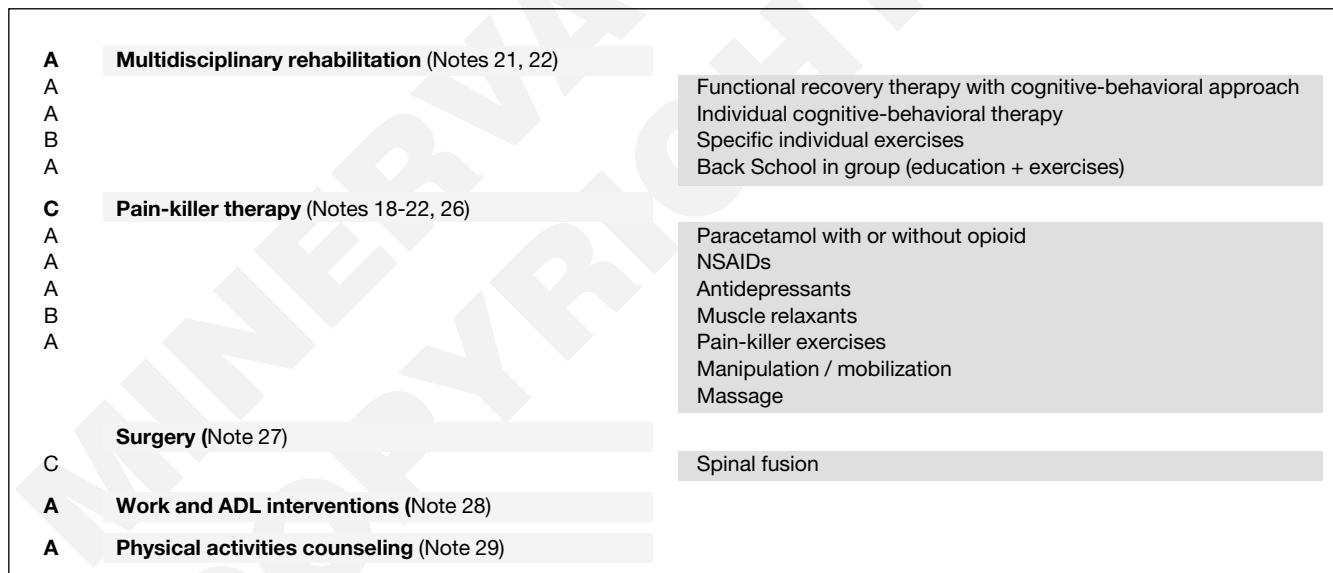


Figure 13.—Treatment of high-disability chronic low back pain patients. Notes 18-22 and 26-29 can be found in Appendix II. The letters on the left represent the strength of evidence for each recommendation.

reaching recommendations suited to a real clinical context. The elements that were considered to graduate the strength of recommendations include the following:

— Level of evidence;

- Practical applicability of the recommendations (local context in which it has to be applied, available structures, cultural barriers etc.);
- Ethical and psychological considerations;
- Costs.

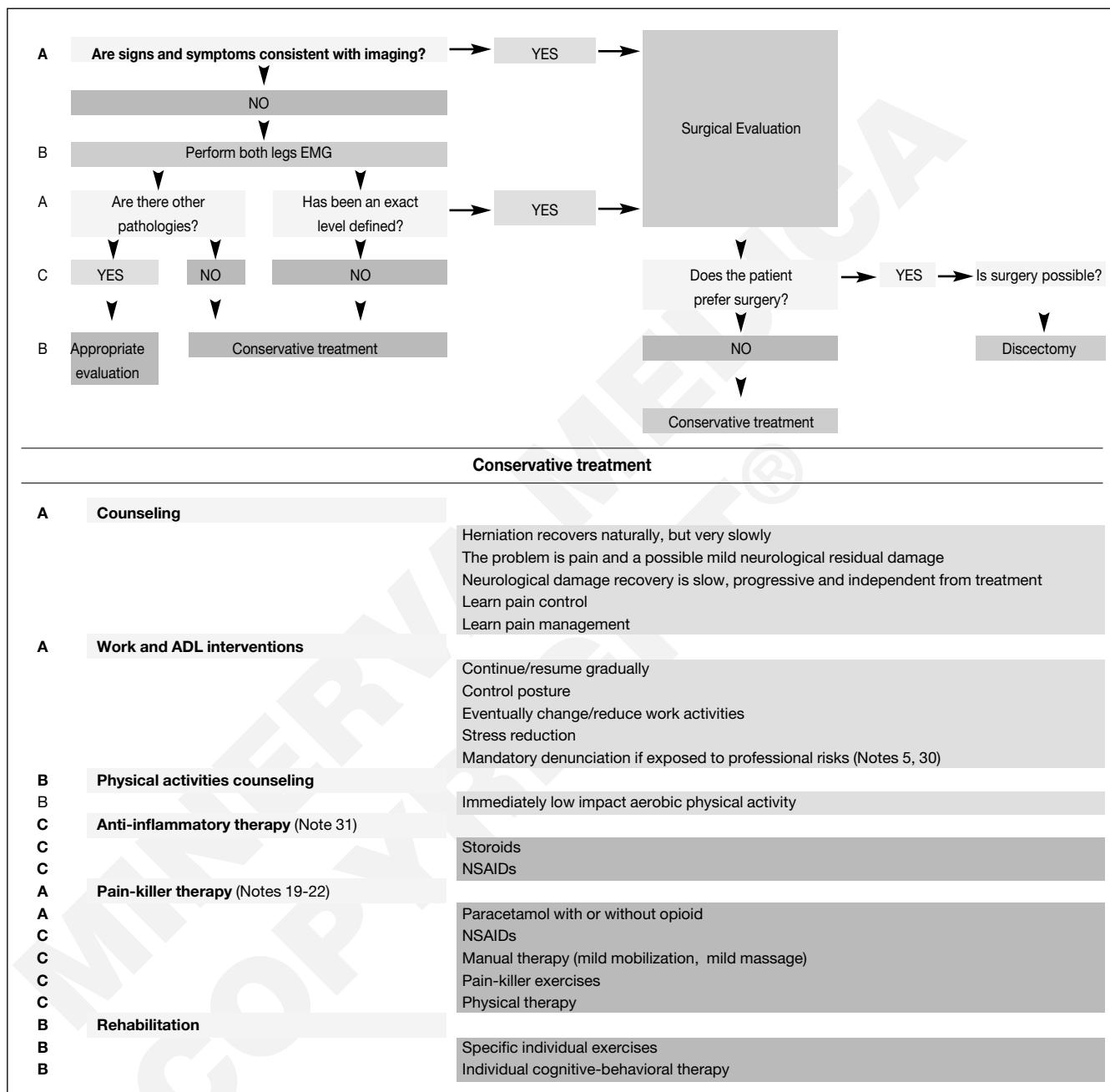


Figure 14.—Diagnostic-therapeutic flow-chart of disc herniation patients. Notes 5, 19-22, 30 and 31 can be found in Appendix II. The letters on the left represent the strength of evidence for each line of the flow-chart and each recommendation.

Document update

The next update of this document is expected by the end of 2008. In any case, this team will monitor sci-

entific writing published by that date and an update of this document will be decided if any important news appears in the literature before that date.

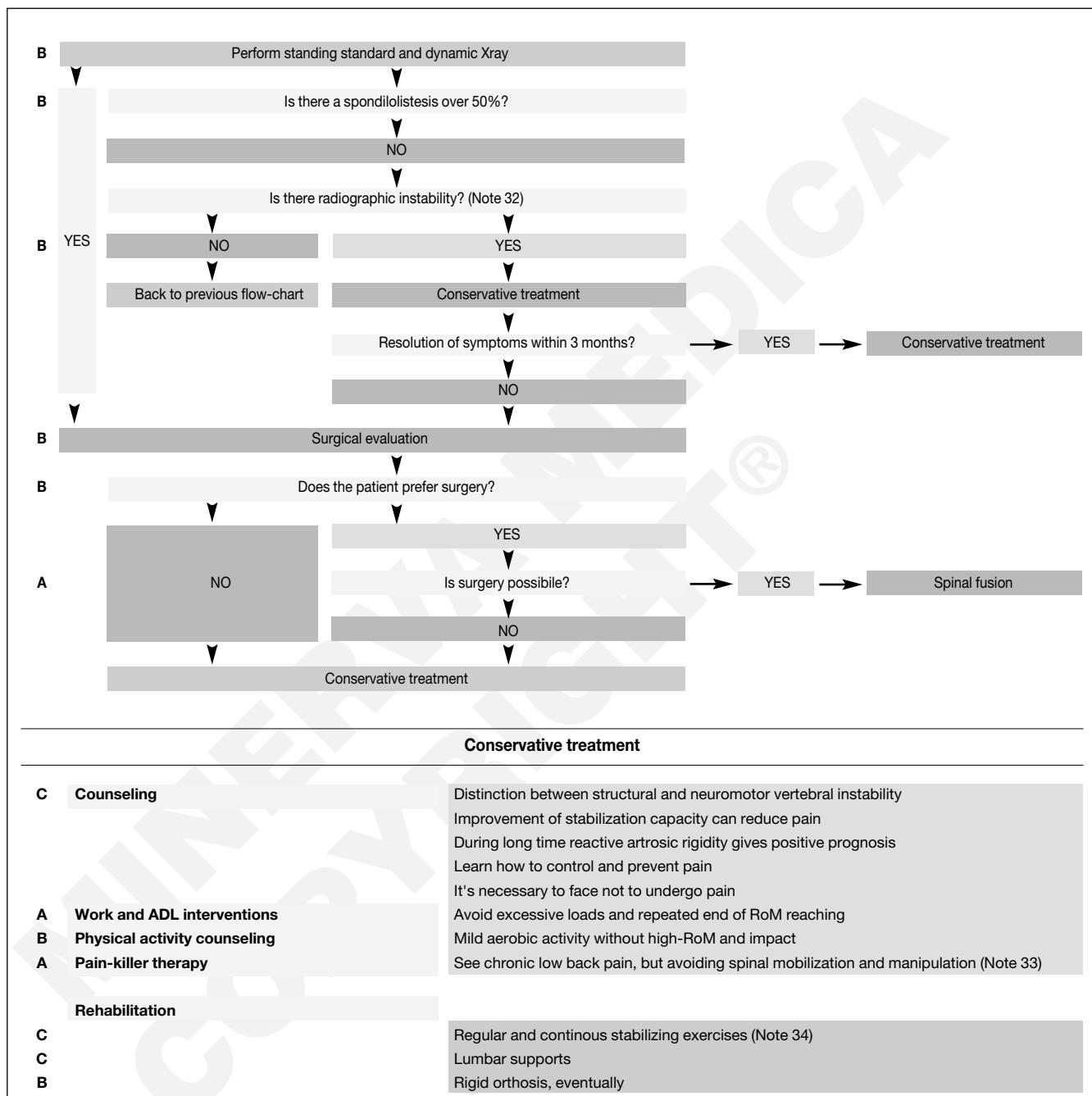


Figure 15.—Diagnostic-therapeutic flow-chart of spinal instability patients. Notes 32-34 can be found in Appendix II. The letters on the left represent the strength of evidence for each line of the flow-chart and each recommendation.

Implementation strategies

Guidelines could hardly translate into effective changes and improvements of assistance levels with-

out active strategies of implementation: their passive circulation, even if it is a preliminary step, is not useful for promoting changes in health workers behav-

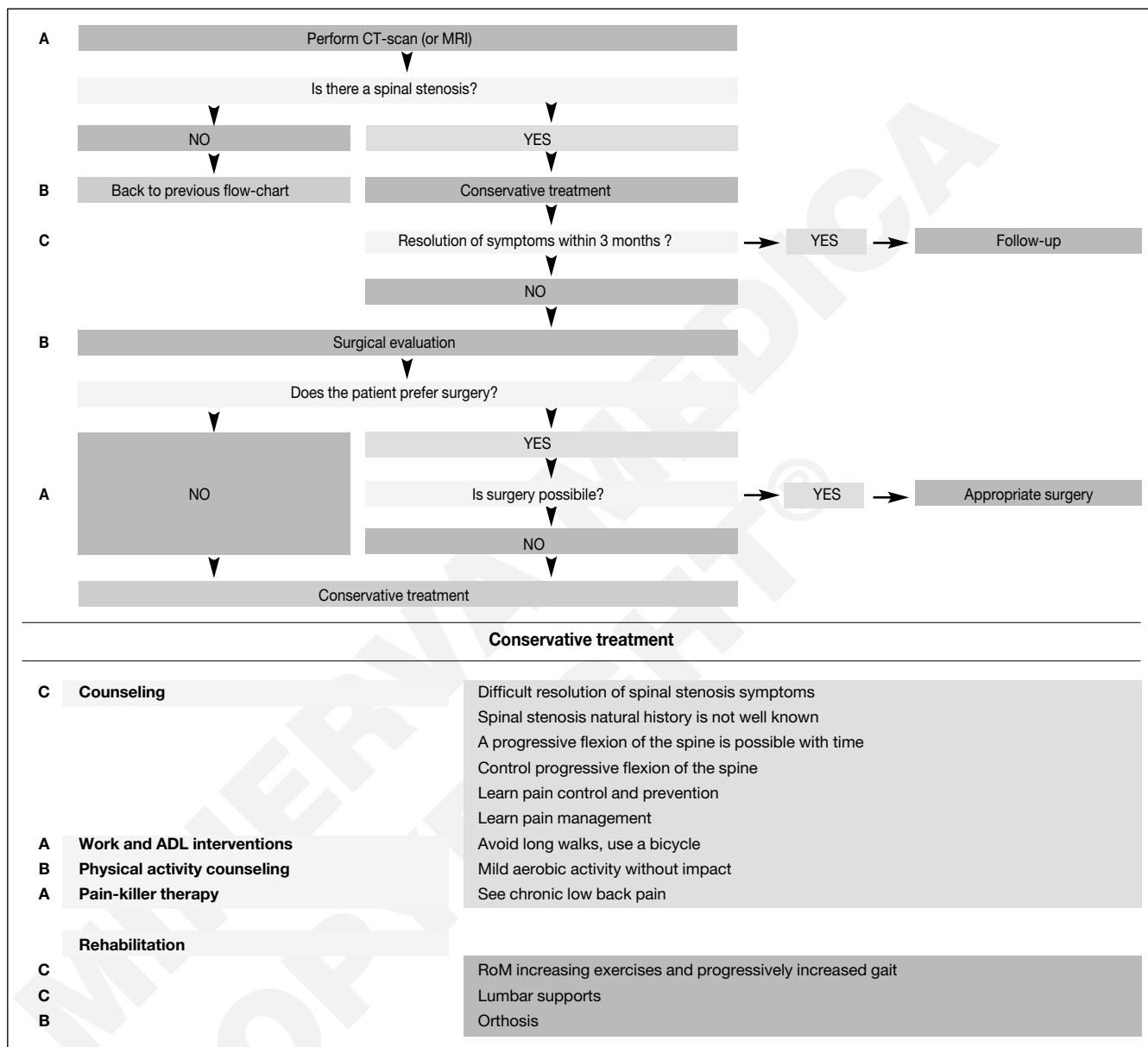


Figure 16.—Diagnostic-therapeutic flow-chart of spinal stenosis patients. The letters on the left represent the strength of evidence for each line of the flow-chart and each recommendation.

ior.^{1, 12-17} The circulation strategies for this document will be:

- publication of a synthetic version of the DTF in the Scientific Societies journal involved;
- publication of a complete version of the DTF on

internet sites of the Scientific Societies involved;

— presentation of the DTF on the occasion of the national meeting of the Scientific Societies involved.

Moreover, it will be the different Scientific Societies job to implement specific strategies at a local (*e.g.*: regional) level, like:

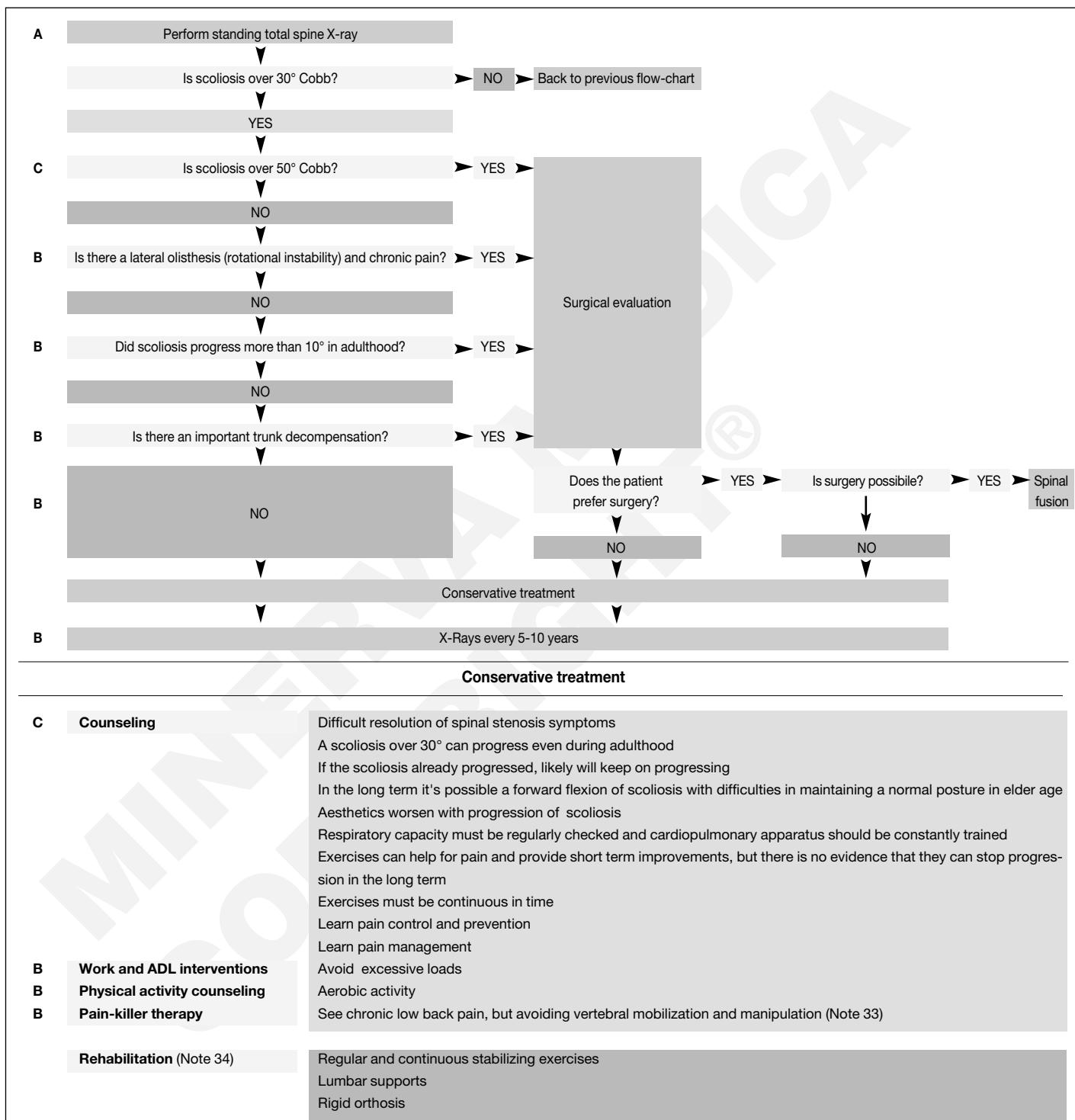


Figure 17.—Diagnostic-therapeutic flow-chart of adult painful scoliosis patients. Notes 33 and 34 can be found in Appendix II. The letters on the left represent the strength of evidence for each line of the flow-chart and each recommendation.

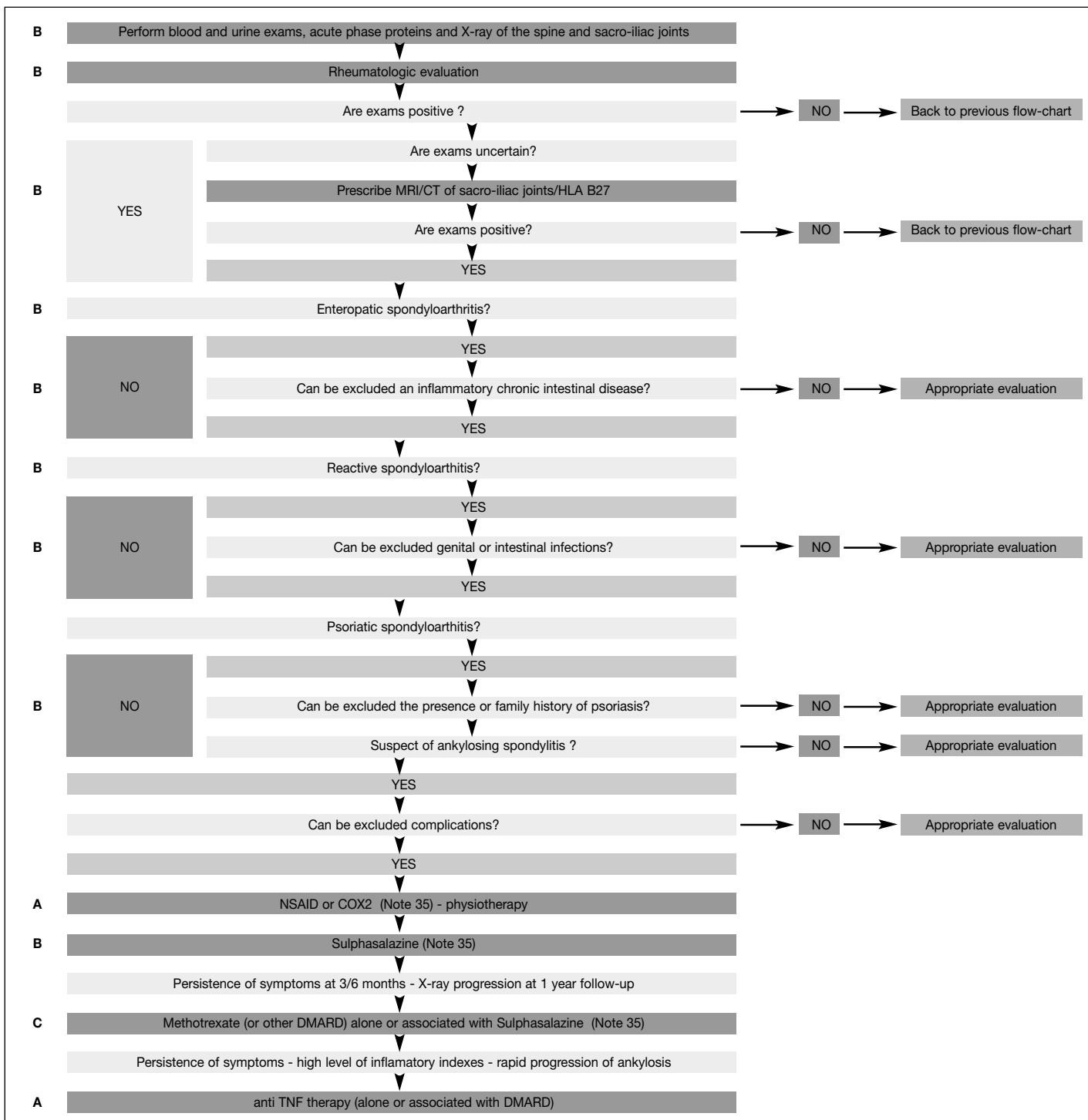


Figure 18.—Diagnostic-therapeutic flow-chart of spondyloarthritis patients. Note 35 can be found in Appendix II. The letters on the left represent the strength of evidence for each line of the flow-chart

— realization of instruments to act as “reminders” such as a pocket plastic version of the DTF, the introduction of DTF recommendations to already existing software etc.

— organization of workshops and specific training days for presentation and discussion of the DTF.

— distribution and diffuse presentation of this document through trained personnel (“educational outreach visit”).

Definitions

LBP is a pain, with/without functional limitation, lasting less than 4 weeks (1 month), in the posterior region included between the inferior limit of the costal arch and the inferior buttock fold, possibly with posterior irradiation to the thigh, but not below the knee. LBP can cause difficulties in normal everyday activities, with possible absence from work.

Subacute LBP presents the same symptoms, duration of which is prolonged over 4 weeks but within 3 months.

Sciatica is LBP irradiated below the knee (involvement of L5 or S1, in more than 90% of cases of radiculopathy) or anteriorly to the thigh (involvement of L2, L3, L4). Leg pain can be present even without lumbar pain.

If symptoms last over 3 months there is chronic LBP or sciatica.

Recurrent LBP is a clinical condition of acute episodes of LBP, lasting < 4 weeks, that return after a period of well-being.

Considered clinical pictures (Figure 1)

— Patient with first or recurrent acute LBP episode (duration ≤1 month): Figures 2, 3, 5, 7.

— Patient with first or recurrent acute sciatica episode (duration ≤1 month): Figures 4 and 6.

— Patient with subacute LBP (duration 1 – 3 months): Figures 8-10.

— Patient with subacute sciatica (duration 1 - 3 months): Figure 9.

— Patient with chronic LBP (duration >3 months): Figures 11-13.

— Patient with disc herniation: Figure 14.

— Patient with vertebral instability: Figure 15.

— Patient with spinal stenosis: Figure 16.

— Patient with scoliosis: Figure 17.

— Patient with spondyloarthritis: Figure 18.

References

- Negrini S, Monticone M, Chirchiglia S, Fabiani L, Gattinoni F, Giorgianni R *et al.* Experience in Italy in the development and application of clinical guidelines for low back pain. *Eura Medicophys* 2004;40:45-53.
- Piano Sanitario Nazionale. Rome: Italian Health Ministry; 2003.
- Arnau JM, Pellise F, Vallano A, Prat N. Editorial Comment: European guidelines for low back pain - A necessary step forward and an opportunity not to be missed. *Eur Spine J* 2006;15 Suppl 2:s131-3.
- Arnau JM, Vallano A, Lopez A, Pellise F, Delgado MJ, Prat N. A critical review of guidelines for low back pain treatment. *Eur Spine J* 2006;15:543-53.
- van Tulder MW, Tuut M, Pennick V, Bombardier C, Assendelft WJ. Quality of primary care guidelines for acute low back pain. *Spine* 2004;29:E357-62.
- Piano Nazionale Linee Guida. Rome: Italian National Guidelines Plan; 2006.
- Koes BW, van Tulder MW, Ostelo R, Kim Burton A, Waddell G. Clinical guidelines for the management of low back pain in primary care: an international comparison. *Spine* 2001;26:2504-13; discussion 2513-4.
- COST B13: European guidelines for the management of low back pain. *Eur Spine J* 2006;15 Suppl 2:s125-7.
- Waddell G, Burton AK. Occupational health guidelines for the management of low back pain at work: evidence review. *Occup Med (Lond)* 2001;51:124-35.
- Bigos S. Acute low back pain problems in adults: Clinical Practice Guidelines n° 14. Rockville, MD: Agency for Health Care Policy and Research, Public Health Service, US Department of Health and Human Services; 1994.
- Guidelines for the Management of Back Injured Employees. Adelaide, South Australia: WorkCover Corporation; 1993.
- Bero LA, Grilli R, Grimshaw JM, Harvey E, Oxman AD, Thomson MA. Closing the gap between research and practice: an overview of systematic reviews of interventions to promote the implementation of research findings. The Cochrane Effective Practice and Organization of Care Review Group. *BMJ* 1998;317:465-8.
- Negrini S, Politano E, Carabalona R, Mambrini A. General practitioners' management of low back pain: impact of clinical guidelines in a non-English-speaking country. *Spine* 2001;26:2727-33; discussion 2734.
- Little P, Smith L, Cantrell T, Chapman J, Langridge J, Pickering R. General practitioners' management of acute back pain: a survey of reported practice compared with clinical guidelines. *BMJ* 1996;312:485-8.
- Grol R. Successes and failures in the implementation of evidence-based guidelines for clinical practice. *Med Care* 2001;39(8 Suppl 2):II46-54.
- Gross PA, Greenfield S, Cretin S, Ferguson J, Grimshaw J, Grol R *et al.* Optimal methods for guideline implementation: conclusions from Leeds Castle meeting. *Med Care* 2001;39(8 Suppl 2):II85-92.
- Grol R, Dalhuijsen J, Thomas S, Veld C, Rutten G, Mokkink H. Attributes of clinical guidelines that influence use of guidelines in general practice: observational study. *BMJ* 1998;317:858-61.
- Adult Low Back pain. May 2001 edition. Bloomington, MN: Institute for Clinical Systems Improvement (ICSI); 2001.
- Dunn KM, Croft PR. Epidemiology and natural history of low back pain. *Eura Medicophys* 2004;40:9-13.
- Elaborazione dati Schede di dimissione ospedaliere (SDO). Relazione ministeriale. Rome: Italian Health Ministry; 1999.
- Scientific approach to the assessment and management of activity-related spinal disorders. A monograph for clinicians. Report of the Quebec Task Force on Spinal Disorders. *Spine* 1987;12 (7 Suppl):S1-59.
- Back Pain. London: HMSO - CSAG, Committee on Back Pain; 1994.
- Walker BF. The prevalence of low back pain: a systematic review of the literature from 1966 to 1998. *J Spinal Disord* 2000;13:205-17.

24. Deyo RA, Phillips WR. Low back pain. A primary care challenge. *Spine* 1996;21:2826-32.
25. Giovannoni S, Stefanacci S. L'attività del medico di famiglia. SIMG 2000;1:10-2.
26. Giovannoni S, Stefanacci S. L'attività del medico di famiglia. SIMG 2000;2:12-4.
27. Giovannoni S, Stefanacci S. L'attività del medico di famiglia. SIMG 2000;3:8-10.
28. Deyo RA, Weinstein JN. Low back pain. *N Engl J Med* 2001;344:363-70.
29. Deyo RA. Low-back pain. *Sci Am* 1998;279:48-53.
30. Anderson RE, Drayer BP, Braffman B, Davis PC, Deck MD, Hasso AN *et al.* Acute low back pain--radiculopathy. American College of Radiology. ACR Appropriateness Criteria. *Radiology* 2000;215 Suppl:479-85.
31. Kendrick D, Fielding K, Bentley E, Kerslake R, Miller P, Pringle M. Radiography of the lumbar spine in primary care patients with low back pain: randomised controlled trial. *BMJ* 2001;322:400-5.
32. van Tulder M, Koes B. Low back pain (chronic). *Clin Evid* 2004;(12):1659-84.
33. van Tulder M, Koes B. Low back pain (acute). *Clin Evid* 2004;(12):1643-58.
34. Negrini S. The low back pain puzzle today. *Eura Medicophys* 2004;40:1-8.
35. Verbeek J, Sengers MJ, Riemens L, Haafkens J. Patient expectations of treatment for back pain: a systematic review of qualitative and quantitative studies. *Spine* 2004;29:2309-18.
36. Schiffman RN, Shekelle P, Overhage JM, Slutsky J, Grimshaw J, Deshpande AM. Standardized reporting of clinical practice guidelines: a proposal from the Conference on Guideline Standardization. *Ann Intern Med* 2003;139:493-8.
37. Urrutia G, Burton AK, Morral A, Bonfill X, Zanoli G. Neuroreflexotherapy for non-specific low-back pain. *Cochrane Database Syst Rev* 2004;(2):CD003009.
38. Assendelft WJ, Morton SC, Yu EI, Suttorp MJ, Shekelle PG. Spinal manipulative therapy for low back pain. *Cochrane Database Syst Rev* 2004;(1):CD000447.
39. Yelland MJ, Del Mar C, Pirozzo S, Schoene ML. Prolotherapy injections for chronic low back pain: a systematic review. *Spine* 2004;29:2126-33.
40. Guzman J, Esmail R, Karjalainen K, Malmivaara A, Irvin E, Bombardier C. Multidisciplinary bio-psycho-social rehabilitation for chronic low back pain. *Cochrane Database Syst Rev* 2002;(1):CD000963.
41. Ostelo RW, de Vet HC, Waddell G, Kerckhoffs MR, Leffers P, van Tulder MW. Rehabilitation after lumbar disc surgery. *Cochrane Database Syst Rev* 2002;(2):CD003007.
42. Jarvik JG, Deyo RA. Diagnostic evaluation of low back pain with emphasis on imaging. *Ann Intern Med* 2002;137:586-97.
43. Vroomen PC, de Krom MC, Knottnerus JA. Diagnostic value of history and physical examination in patients suspected of sciatica due to disc herniation: a systematic review. *J Neurol* 1999;246:899-906.
44. Deville WL, van der Windt DA, Dzaferagic A, Bezemer PD, Bouter LM. The test of Lasegue: systematic review of the accuracy in diagnosing herniated discs. *Spine* 2000;25:1140-7.
45. van Tulder MW, Assendelft WJ, Koes BW, Bouter LM. Spinal radiographic findings and nonspecific low back pain. A systematic review of observational studies. *Spine* 1997;22:427-34.
46. Kardaun JW, Schipper J, Braakman R. CT, myelography, and phlebography in the detection of lumbar disk herniation: an analysis of the literature. *AJR Am J Neuroradiol* 1989;10:1111-22.
47. van den Hoogen HM, Koes BW, van Eijk JT, Bouter LM. On the accuracy of history, physical examination, and erythrocyte sedimentation rate in diagnosing low back pain in general practice. A criteria-based review of the literature. *Spine* 1995;20:318-27.
48. Boos N, Lander PH. Clinical efficacy of imaging modalities in the diagnosis of low-back pain disorders. *Eur Spine J* 1996;5:2-22.
49. Oxman AD, Cook DJ, Guyatt GH. Users' guides to the medical literature. VI. How to use an overview. Evidence-Based Medicine Working Group. *JAMA* 1994;272:1367-71.
50. Oxman AD. Checklists for review articles. *BMJ* 1994;309:648-51.
51. Moher D, Cook DJ, Eastwood S, Olkin I, Rennie D, Stroup DF. Improving the quality of reports of meta-analyses of randomised controlled trials: the QUOROM statement. *QUOROM Group*. *Br J Surg* 2000;87:1448-54.
52. Decreto Ministeriale. Denuncia obbligatoria e certificati di malattia professionale. DM 27 aprile 2004.
53. Greene JM, Winickoff RN. Cost-conscious prescribing of nonsteroidal anti-inflammatory drugs for adults with arthritis. A review and suggestions. *Arch Intern Med* 1992;152:1995-2002.
54. New Zealand Guidelines Group. Guide to assessing psychosocial yellow flags in acute low back pain: risk factors for long-term disability and work loss. In: New Zealand Guidelines Group editor. New Zealand acute low back pain guide. Auckland: Enigma Publishing Ltd; 1998.
55. Waddell G, McCulloch JA, Kummel E, Venner RM. Nonorganic physical signs in low-back pain. *Spine* 1980;5:117-25.
56. Boos N, Semmer N, Elfering A, Schade V, Gal I, Zanetti M *et al.* Natural history of individuals with asymptomatic disc abnormalities in magnetic resonance imaging: predictors of low back pain-related medical consultation and work incapacity. *Spine* 2000;25:1484-92.
57. Padua R, Padua L, Ceccarelli E, Romanini E, Zanoli G, Bondi R *et al.* Italian version of the Roland Disability Questionnaire, specific for low back pain: cross-cultural adaptation and validation. *Eur Spine J* 2002;11:126-9.

Acknowledgements

The authors wish thank Dr. Fabio Zaina from the ISICO (Italian Scientific Spine Institute), Milan and the School of Rehabilitation and Physical Medicine at the University of Verona for his help in translating the text.

APPENDIX I

**Working Group who developed
the diagnostic therapeutic flow-charts
with Scientific Societies represented, their
Presidents at the start and end of the project,
and their delegates**

Coordinators of the project

S. Giovannoni (SIMG) – S. Negrini (SIMFER) – S. Minozzi (Cochrane Centre)

Italian Society of General Medicine - Società Italiana di Medicina Generale (SIMG)

President: C. Cricelli – Delegate: A. Bussotti

Italian Society of Neurology - Società Italiana di Neurologia (SIN)

Presidents: C. Messina, A. Rizzato – Delegate: L. Padua

Italian Society of Neurosurgery - Società Italiana di Neurochirurgia (SINCH)

Presidents: F. Tomasello, G. Brogli – Delegates: N. Di Lorenzo, H. Mouchati

Italian Society of Orthopaedics and Traumatology - Società Italiana di Ortopedia e Traumatologia (SIOT)

Presidents: A. Faldini, V. Monteleone – Delegates: M. D'Arienzo, G. Barneschi

Italian Society of Reumatology - Società Italiana di Reumatologia (SIR)

Presidents: S. Bombardieri, B. Canesi – Delegates: V. Modena, A. Mannoni

Italian Society of Physical and Rehabilitation Medicine - Società Italiana di Medicina Fisica e Riabilitativa (SIMFER)

Presidents: R. Gimigliano, A. Giustini - Delegate: D. Bonaiuti

Italian Society of Work Medicine and Industrial Hygiene - Società Italiana di Medicina del Lavoro ed Igiene Industriale (SIMLI)

President: L. Ambrosi - Delegates: F. Violante, S. Mattioli

Italian Association of Physiotherapists - Associazione Italiana Fisioterapisti (AIFI)

President: V. Manigrasso - Delegate: F. Serafini

APPENDIX II

NOTES TO THE FLOW-CHART

1. It is possible to exclude cancer with 100% specificity if there are no age>50 years, history of cancer, unexplainable loss of weight, no improvement after 4-6 weeks of conservative treatment.
2. Without urinary retention, the probability of a cauda equina syndrome is 1/10.000.
3. Pain below the knee increases the probability of a real radiculopathy.
4. The SLR test should be performed with both legs: it's positive with posterior pain below the knee between 30° and 70° of straight leg raising, with the patient lying on his back.

5. By-law declaration and certificate of professional disease.⁵²

6. Strategies to optimize cost-effectiveness in NSAIDS therapy.⁵³

7. Psychosocial risk factors for persistent low back pain and disability.⁵⁴

8. Waddell test.⁵⁵

9. Behavioral approach in primary care.⁵⁶

10. Arthrosis: discopathy, osteophytosis, reduction of discal space, and/or vertebral endplates thickening. Usually these are radiological diagnoses without any relevance.

11. Neuromuscular spinal instability (different from the osteoligamentous one) has not been defined

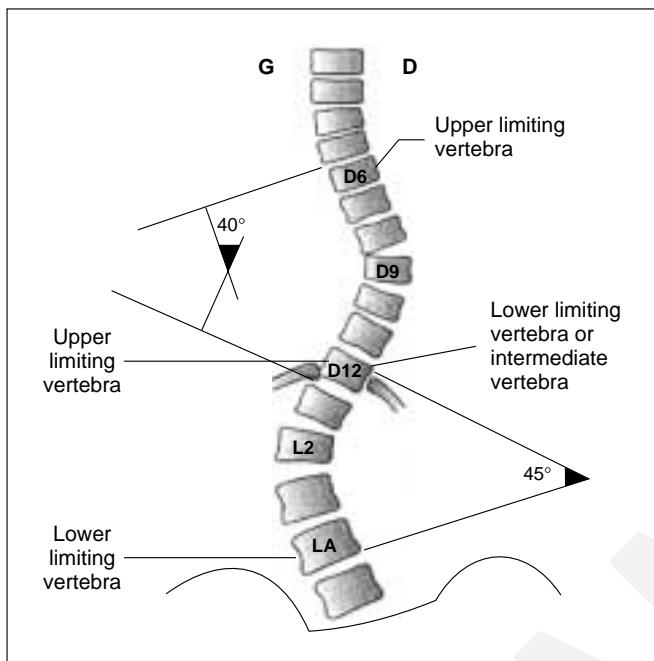


Figure 19.—Cobb degrees measurement.

in the literature. It is possible to consider the following criteria:

— sharp and brief acute pain following sudden position changes and/or efforts.

— pain during stabilization tests: *e.g.* sudden release after isometric contraction of hip muscles (flexion, adduction, abduction), trunk destabilization.

12. Cobb degrees measurements. Scoliosis over 30° can progress in adulthood and needs specialist control (Figure 19).

13. (see acute LBP - Yellow flags).

14. In Italian: Roland-Morris.⁵⁷

15. Leg pain while walking always the same distance that disappears with flexion of the spine.

16. CT-scan is second choice screening exam.

17. Reduced strength, sensibility or reflexes with a metameric distribution and/or crossed SLR.

18. Pain-killer therapy should be proposed only when necessary.

19. Perform a complete treatment.

20. Follow the specific indications of each treatment.

21. Cost-effectiveness priority listing.

22. Choice recommended according to cost-effectiveness, patient preferences, availability and previous results.

23. Necessary in case of high disability.

24. *e.g.* psychological scales of SF36, Fear Avoidance Behavior.

25. Usually during rehabilitation, seldom after.

26. Pain-killer therapy kills only pain, but is not therapeutic.

27. Only after 2 years expert rehabilitation, according to patient choice and without any adverse psychological prognostic factor.

28. Before/after rehabilitation according to clinical indication.

29. After/during rehabilitation: choose individually the right moment.

30. Professional risk: load mobilization, trunk movements, vibrations.

31. Only one short-time treatment, not repeated.

32. Over 3 mm of mobility or over 10° of intervertebral angle.

33. Mobilization means performing repeated manoeuvres till the end of range of motion (RoM) that implies an increase of RoM over time.

34. Stabilizing exercises increase spinal neuromotor control ability and are based on the improvement of: proprioception, kinesthesia, spinal coordination, precise neuromotor control of movement, strengthening of stabilizing muscles (particularly multifidus and transversus).

35. In presence of peripheral arthritis.