



Diagnostic imaging in acute low back pain

Date: May 2007

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Funder: National Institute of Clinical Studies Emergency Care Community of Practice Program

Abstract

Background: The NHMRC guidelines for the evidence-based management of acute musculoskeletal pain developed by the Australian Acute Musculoskeletal Pain Guidelines Group recommend that diagnostic imaging should not be routinely used for patients presenting with acute low back pain where the cause is non-specific. In this report we review the current state of evidence in relation to the usefulness of imaging tests in these cases.

Clinical Question: What is the current state of evidence regarding the usefulness of imaging tests in the management of non-specific acute low back pain in Emergency Department and general practice settings?

Methods: Searches were undertaken in guideline websites, websites of centres for evidence-based practice and relevant health databases for evidence-based guidelines, health technology assessments, systematic reviews or randomised controlled trials (RCT) published since 2001.

Articles were selected and appraised by one reviewer in consultation with colleagues, using inclusion, exclusion and appraisal criteria established *a priori*.

Results: Three relevant articles were identified – two evidence-based guidelines and a single randomised control trial. Significant quality issues were identified with all three articles.

Both evidence-based guidelines recommend that diagnostic imaging tests should not be routinely used in patients with acute non-specific low back pain.

The RCT found that referral for x-ray on initial presentation of acute low back pain had no effect on physical functioning, pain or disability, further consultations or referrals, but was associated with a modest increase in patient psychological wellbeing.

Conclusions: There is little recent evidence addressing this issue. The limited research evidence available suggests that the benefits of diagnostic imaging tests in cases of non-specific acute low back pain are minor and relate to patient expectations and satisfaction with their clinical care. However, no firm conclusions can be drawn due to the small number of studies conducted and the issues relating to the quality of these studies. The recommendation contained in the NHMRC guidelines that diagnostic imaging should not be routinely used for patients presenting with this condition is consistent with a broad range of current US and European guidelines. However additional research is required in order to provide a clearer evidence base for this recommendation.

Background

Acute low back pain (an episode of 6 weeks or less) is a common presentation in Emergency Departments and in general practice. In the majority of cases of acute low back pain the causes are non-specific.

The NHMRC guidelines for *Evidence-based Management of Acute Musculoskeletal Pain*¹ developed by the Australian Acute Musculoskeletal Pain Guidelines Group recommend that diagnostic imaging of the spine is not routinely used in such cases and should be restricted to the small proportion of cases in which there are indications of specific underlying pathology. Features identifying potentially serious conditions, referred to as 'red flags', include: risk factors for or symptoms and signs of infection; minor trauma or history of trauma indicating a possible fracture; past history of malignancy, failure to improve with treatment, unexplained weight loss or pain at rest or multiple sites indicating a possible tumour; and absence of aggravating features indicating a possible aortic aneurysm¹.

The recommendations contained in the NHMRC guidelines were based on a small number of research studies that indicated that plain x-rays of the lumbar spine are of limited diagnostic value and have no beneficial effects on health outcomes and that computerised tomography (CT) and magnetic resonance imaging (MRI) have no diagnostic value in cases of acute low back pain. Patient and clinician preferences have been identified as factors influencing the use of diagnostic imaging and the findings of a recent study indicate that patients views on the importance of radiology may be a barrier to reducing the inappropriate use of these procedures in such cases².

The NHMRC guidelines were based on a review of the evidence published in the 1990s through to 2002. The purpose of this review is to examine the recent evidence regarding the usefulness of imaging tests in the management of non-specific acute low back pain. The review incorporates systematic methods for searching and appraisal in order to determine whether this recent evidence is consistent with the existing guidelines.

Clinical Question

What is the current state of evidence regarding the usefulness of imaging tests in the management of non-specific acute low back pain in Emergency Department and general practice settings?

Methods

The Centre for Clinical Effectiveness undertook a systematic approach to identify and appraise the evidence related to this question. NICS staff and clinicians from the NICS Emergency Care Community of Practice assisted in development of search terms and inclusion and exclusion criteria.

In most recent publications that address this issue, including European and U.S. guidelines, acute back pain is defined as an episode lasting 6 weeks or less and is differentiated from sub-acute (greater than 6 weeks and less than 3 months) and chronic (longer than 3 months)³⁻⁸. The definitions used in the NHMRC guidelines are ambiguous with an apparent overlap between acute (defined as an episode lasting less than 3 months) and sub-acute low back pain (defined as an episode lasting more than five weeks and less than 3 months). The importance of clarity in this definition is emerging as patients with acute and sub-acute low back pain are treated as separate clinical groups in terms of diagnostic procedures and interventions recommended in recent guidelines³⁻⁴. For the purpose of this review, acute back pain is defined as an episode of six weeks or less.

1. Inclusion and exclusion criteria

Patients	Inclusion: Patients with non-specific acute low back pain, adults (≥ 18 years), duration of episode is six weeks or less Exclusion: Patients presenting with 'Red flag' conditions; loin, gluteal, thoracic or radicular pain or sciatica; children (< 18 years); duration of episode greater than six weeks.
Intervention	Inclusion: X-ray, CT scan, MRI, radionuclide bone scan Exclusion: Other imaging techniques
Comparison	Inclusion: No diagnostic imaging Exclusion: Other intervention
Outcomes	Inclusion: Any health outcomes or measures of patient/clinician satisfaction Exclusion: Economic outcomes
Setting	Inclusion: Emergency Department or General Practice Exclusion: Other settings
Study design	Inclusion: Evidence-based guidelines, HTAs, systematic reviews, RCTs Exclusion: All other study designs, commentaries, editorials, draft documents
Evidence-based Guidelines	Inclusion: Systematic approach to identify, select and critically appraise relevant research and/or explicit links between recommendations and the evidence. Exclusion: Expert opinion only
Publication details	Inclusion: Studies in English and conducted on humans, published from 2002 to April 2007 Exclusion: Studies in languages other than English, published prior to 2002

2. Search strategy

Searches were undertaken in relevant health databases, guideline websites, websites of centres for evidence-based practice, and Australian government health websites. Full details of the sources of evidence searched are outlined in appendices.

2.1 Website identification

The review team were aware of a number of generic guideline clearinghouses and websites of guideline developers. Additional sources of guidelines specific to this research question were identified using the Google search engine. Initial searches for websites of relevant professional associations and peak bodies were undertaken but the huge number of sites identified (>2 million) prevented systematic searching within them. Websites of centres of evidence-based practice in the relevant professional groups were identified and assessed if they contained guidelines. Many of these sites are focused on education about evidence-based practice and do not contain publications or similar resources; these sites were excluded. Details of the search strategy and websites included are outlined in Appendix 1.

2.2 Website searches

Guideline websites were searched using the internal search engine. Centres of evidence-based practice and government websites were searched using an internal search engine where available. In addition, guideline or publication lists within the sites were scanned for items relevant to the research question.

2.3 Internet search

An internet search using the Google search engine was undertaken to identify relevant guidelines.

Google Advanced Search	
With all of the words	acute
With the exact phrase	low back pain
With at least one of the words	guideline evidence

A summary of all guidelines identified, their source/s and reasons for exclusion are detailed in Appendix 2.

2.4 Database searches

Database	Date of Search
All EBM Reviews (Ovid)*	March 27 th 2007
Medline (Ovid) from 1966	April 3 rd 2007
CINAHL (Ovid) from 1982	April 3 rd 2007
The Cochrane Library	April 3 rd 2007

*(including The Cochrane Database of Systematic Reviews, The Cochrane Central Register of Controlled Trials, The Database of Abstracts of Reviews of Effects (DARE), ACP Journal Club)

Search undertaken in Medline*

1. exp low back pain/
2. (pain\$ or ache).mp.
3. exp lumbar vertebrae/
4. exp sacrum/
5. ((spine or spinal) and low\$).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
6. (lumbar or sacral or sacrum or lumbosacral).mp.
7. (low back or lower back or lower-back).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
8. or/3-7
9. acute.mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
- 10.2 and 8 and 9
- 11.1 or 10
- 12.exp diagnostic imaging/
- 13.(x-ray\$ or xray\$ or radiograph\$).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
- 14.(imaging or scan).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
- 15.(computer\$ tomography or CT).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]

16.(Magnetic Resonance Imaging or MRI).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
17.exp Nuclear medicine/ or (bone scan or bone scintigraphy or radionuclide).mp. [mp=ti, ab, tx, kw, ct, ot, sh, hw]
18.or/12-17
19.11 and 18
20.limit 20 to yr="2002 - 2007"

* search terms modified as required for use in other electronic databases

3. Data Collection & Analysis

Studies were selected and appraised by one reviewer in consultation with colleagues in the project team, using inclusion, exclusion and appraisal criteria established *a priori*.

Evidence-based guidelines are appraised using the Appraisal of Guidelines for Research & Evaluation (AGREE) Instrument (www.agreecollaboration.org). The AGREE criteria cover 6 domains: scope and purpose, stakeholder involvement, rigour of development, clarity and presentation, applicability and editorial independence. Reviewers are not blind to author, institution or affiliation as this information is required to address the AGREE criteria related to editorial independence in the guideline process.

All other studies are appraised for quality using standard evaluation criteria outlined in the appraisal tables in Appendix 4.

Results

The database and internet searches returned 646 articles which were reviewed by title and abstract. When the assessment of the relevance of an article could not be made using the abstract alone, the full text was retrieved. A total of 36 full text articles were retrieved for review. Twenty-three of these were guidelines.

Two evidence-based guidelines and a randomised control trial met the inclusion criteria. A critical appraisal of the quality of these articles is presented in Appendix 4. No systematic reviews met the inclusion criteria.

Guidelines

Both of the evidence-based guidelines were published in 2006 and address the management of acute low back pain in primary care. These two guidelines update and complement a number of earlier evidence-based guidelines regarding diagnostic imaging and acute low back pain. Both guidelines were developed with the objective of improving the primary care management of acute (defined as duration of less than six weeks) non-specific low back pain.

The *European guidelines for the management of acute non-specific low back pain in primary care*³ presents a set of recommendations based on evidence reviews and previous guidelines. These guidelines are consistent with the recommendations that diagnostic imaging tests (including x-rays, CT and MRI) should not be routinely used for acute non-specific low back pain. It is difficult to ascertain the scope or quality of the evidence informing this recommendation as the guidelines are based in part upon a comparison of existing guidelines. It is unclear whether this comparison incorporated a critical appraisal of the quality of the existing guidelines.

The *Institute for Clinical Systems Improvement (ICSI) Adult Low back Pain*⁴ guidelines focus on the acute and chronic management of low back pain in primary care. Among the priority aims informing the development of the guidelines is the objective of reducing unnecessary imaging studies in patients with acute low back pain. The recommendations for the management of adult low back pain are presented in the form of an algorithm with 23 components, accompanied by detailed annotations. The recommendations in relation to diagnostic imaging in cases of acute low back pain are that x-rays should not be routinely used but may be warranted in cases in which there are "red flag" indications of serious underlying disease. It is difficult to appraise the quality of the evidence informing this recommendation as there is minimal information provided about the search strategy used to identify relevant research studies.

A further five guidelines were identified for potential inclusion but could not be assessed against the inclusion criteria as we were unable to access information about the methodology used in their development. Details of all guidelines identified are included in Appendix 2.

RCT

The single randomised controlled trial with a research design appropriate for inclusion in this review had been included in the review that informed the development of the NHMRC guidelines⁹⁻¹⁰. This study by Kerry et al was included in the current review because of its importance as the key source of empirical evidence on this issue as it is the only RCT with the appropriate design for addressing this issue that was identified in the recent literature. It is therefore important to appraise the quality of this study.

This study compared short and long-term outcomes for patients with low back pain who were referred or not referred for lumbar spine x-ray at first presentation to 303 general practices in England⁹⁻¹⁰. It was found that the referral for x-ray on initial presentation had no effect on physical functioning, pain or disability, further consultations

or referrals, but was associated with a modest increase in psychological wellbeing at six weeks and one year for patients presenting with low back pain. There are a number of limitations relating to the design and implementation of the study including the recruitment and randomisation procedures and proportion of patients lost to follow-up (see Appendix 4). These limitations suggest that there is potential for selection and attrition bias to influence the results.

The search identified an additional five randomised controlled trials, however these did not meet the inclusion criteria for this review¹¹⁻¹⁵. These studies were excluded because they either used a mix of acute, sub-acute and chronic back pain patients (without any sub-group analysis), were not conducted in an emergency department or general practice setting, or incorporated intervention versus control comparisons that do not provide evidence relating to the usefulness of radiographic imaging in acute low back pain. The design and main findings of these five studies are provided in Appendix 3.

Discussion

The current review identified limited recent evidence regarding the usefulness of diagnostic imaging in the management of non-specific acute low back pain. The recommendation that diagnostic imaging should not be routinely used for patients presenting with acute low back pain where the cause is non-specific is now incorporated into a wide range of back pain guidelines in many countries including the USA, many European countries and Australia. The findings of a single RCT and two evidence-based guidelines published since 2001 are consistent with this recommendation.

However it is important to consider the limited scope of recent evidence and the issues regarding the quality of this evidence. The literature review undertaken during the development of the NHMRC guidelines (1990 to 2002) identified very few relevant studies and this situation has not improved in recent years. It is clear that while there is a broad consensus on this issue among the experts within this field there is little high level evidence relating to the utility of diagnostic imaging for patients presenting with acute non-specific back pain. Additional research is required to provide a clearer body of evidence upon which to base clinical recommendations.

There is some ambiguity evident in the definitions and terminology used in this area. The most recent guidelines published in the USA and Europe define acute back pain as having a duration of 6 weeks or less and this is differentiated from sub-acute and chronic back pain^{3,4,6}. The definition of acute back pain provided in the NHMRC guidelines appears to combine both acute and sub-acute groups which are defined separately in the newer guidelines. This inconsistency may lead to confusion, particularly as some of these recent guidelines recommend that diagnostic imaging is used in cases of persisting back pain including patients categorised in the sub-acute group (6 to 12 weeks duration).

Conclusion

There is little recent evidence addressing this issue. The limited research evidence available suggests that the benefits of diagnostic imaging tests in cases of non-specific acute low back pain are minor and relate to patient expectations and satisfaction with their clinical care. However, no firm conclusions can be drawn due to the small number of studies conducted and the issues relating to the quality of their methodology. The recommendation contained in the NHMRC guidelines that diagnostic imaging should not be routinely used for patients presenting with this condition is consistent with a broad range of current US and European guidelines. However additional research is required in order to provide a clearer evidence base for this recommendation.

References

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Disclaimer

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Appendix 1: Website identification

GOOGLE Advanced Search: (To identify Evidence Based Centres of Professional Practice)

With all of the words	
With the exact phrase	evidence based
With at least one of the words	
Without the words	
Don't return the results of the file format	Adobe Acrobat PDF(.pdf)
Return results where my terms occur	In the title of the page

RESULTS:

Web Results = 462,000

Searched within results for:	Results returned:	Pages Searched:	Websites found:
Emergency	726 (Google cut this down to 58)	All	1
Primary Care	1030	Pages 1-20 (no results found after page 5)	1
Physician	194 (Google cut this down to 42)	All	0
"Family Physician"	103	All	0
"General Practitioner"	5	All	0
"General Practice"	516	Pages 1-15 (no results found after page 1)	1
Nurse	318 (Google cut this down to 94)	All	0
Nursing	21,800	Pages 1-15 (no results found after page 2)	5
Radiology	592	Page 1-25 (no results found after page 10)	1
Radiologist	1	All	0
Chiropractor	5	All	0
Chiropractic	529	Pages 1-15 (no results found after page 1)	2
Physical Therapy	535	Pages 1-15 (no results found after page 2)	1
Physiotherapy	1470	Pages 1-15 (no results found after page 1)	1
Osteopathic	10	All	0
Osteopathy	3	All	0

WEBSITES SEARCHED:

Guideline Services	Centres of Evidence-Based Practice (containing GLs)	Australian Government Health Websites
Joanna Briggs Institute www.joannabriggs.edu.au	Evidence Based Emergency Medicine http://ebem.org/index.php	Australian Government Department of Health and Ageing http://www.health.gov.au
National Health and Medical Research Council (NHMRC) www.nhmrc.gov.au	Centre for Evidence Based Medicine http://www.cebm.utoronto.ca/	Australian Institute of Health and Welfare http://www.aihw.gov.au
New Zealand Guideline Group (NZGG) www.nzgg.org.nz	Centre for Evidence Based Nursing http://www.york.ac.uk/healthsciences/centres/evidence/cebn.htm	Health Insite http://www.healthinsite.gov.au
National Guideline Clearinghouse US (NGC) www.guidelines.gov	Western Australian Centre for Evidence Based Nursing and Midwifery http://wacebnm.curtin.edu.au/	ACT Health http://www.health.act.gov.au
TRIP Database www.tripdatabase.com	Academic Centre for Evidence Based Practice http://www.acestar.uthscsa.edu/	NSW Health http://www.health.nsw.gov.au
Scottish Intercollegiate Guidelines Network (SIGN) www.sign.ac.uk	Centre for Evidence Based Nursing Aotearoa http://www.health.auckland.ac.nz/cebna/	NT Department of Health and Community Services http://www.nt.gov.au/health
National Institute for Health and Clinical Excellence UK (NICE) www.nice.org.uk	Institute of Evidence Based Chiropractics http://www.chiroevidence.com/	Queensland Health http://www.health.qld.gov.au
Guidelines International Network www.g-i-n.net	Evidence Based Chiropractic http://www.evidencebasedchiropractic.co.nz/	SA Department of Health http://www.health.sa.gov.au
	Centre for Evidence Based Physiotherapy http://www.cebp.nl/?NODE=277	Tasmanian Department of Health and Human Services http://www.dhhs.tas.gov.au
	Centre for Evidence-Based Physiotherapy http://www.pedro.fhs.usyd.edu.au/CEBP/index_cebp.html	Victorian Department of Human Services http://www.dhs.vic.gov.au
	Evidence Based Radiology http://www.evidencebasedradiology.net/	WA Department of Health http://www.health.wa.gov.au

Appendix 2: Guidelines Identified

Guidelines:	Inclusion/exclusion:
Evidence-based Management of Acute Musculoskeletal Pain, 2003 NHMRC http://www.nhmrc.gov.au/publications/synopses/ files/cp94.pdf	Current Australian guidelines
Adult low back pain, 2006 Institute for Clinical Systems Improvement. AHRQ (US) - Agency for Healthcare Research and Quality . NGC:005287 http://www.icsi.org/low_back_pain/adult_low_back_pain_8.html	Included
European guidelines for the management of acute non-specific low back pain in primary care, 2006 COSTB13 Working Group http://www.backpaineurope.org/web/files/WG1_Guidelines.pdf	Included
Back Pain, Lower: Counseling, U.S. Preventive Services Task Force 1996 AHRQ (US) - Agency for Healthcare Research and Quality http://www.g-i-n.net/membersarea/dsp_programme_popup.cfm?ProgrammID=702	Excluded – does not address diagnostic imaging
Back pain - lower (PRODIGY Guidance) SCHIN (GB) - Sowerby Centre for Health Informatics at Newcastle http://www.g-i-n.net/membersarea/dsp_programme_popup.cfm?ProgrammID=374	Excluded – does not address diagnostic imaging
Acute low back pain, 2003 Ann Arbor (MI): University of Michigan Health System http://www.guidelines.gov/summary/summary.aspx?ss=15&doc_id=4112&nbr=3157	Excluded – does not address diagnostic imaging
Acute Low Back Pain: Interdisciplinary Clinical Guideline, 2002 The Norwegian Back Pain Network http://www.ifomt.org/pdf/Norway_Acute_Low_Back.pdf	Excluded – insufficient information
Acute low back pain. University of Michigan Health System. 1997 (revised 2003). AHRQ (US) - Agency for Healthcare Research and Quality NGC:003157 http://www.g-i-n.net/membersarea/dsp_programme_popup.cfm?ProgrammID=2059	Excluded – does not address diagnostic imaging
Assessment and management of acute pain, 2006 Bloomington (MN): Institute for Clinical Systems Improvement (ICSI) http://www.guidelines.gov/summary/summary.aspx?ss=15&doc_id=9009&nbr=4884	Excluded – does not address diagnostic imaging
European Guidelines for the Management of Chronic Non-Specific Low Back Pain, 2004 http://www.backpaineurope.org/web/files/WG2_Guidelines.pdf	Excluded – not acute low back pain
Expert Clinical Benchmarks. Low back, 2003 King of Prussia (PA): MedRisk, Inc. http://www.guidelines.gov/summary/summary.aspx?ss=15&doc_id=5988&nbr=3946	Excluded – does not address diagnostic imaging
Guide to Assessing Psychosocial Yellow Flags in Acute Low Back Pain, 1997 National Advisory Committee on Health and Disability, Ministry of Health NZ https://www.cebp.nl/media/m24.pdf	Excluded – does not address diagnostic imaging

<p>Guideline clearing report acute low back pain 2001 AEZQ (DE) - German Agency for Quality in Medicine AEZQ http://www.g-i-n.net/membersarea/dsp_programme_popup.cfm?ProgrammID=5</p>	Excluded – insufficient information
<p>Guideline for hospitalization for low back pain, 2002 Olympia (WA): Washington State Department of Labor and Industries http://www.guidelines.gov/summary/summary.aspx?ss=15&doc_id=4202&nbr=3210</p>	Excluded – does not address diagnostic imaging
<p>Low back complaints, 2004 Elk Grove Village (IL): American College of Occupational and Environmental Medicine (ACOEM) http://www.guidelines.gov/summary/summary.aspx?ss=15&doc_id=8546&nbr=4755</p>	Excluded – insufficient information
<p>Low back - lumbar & thoracic (acute & chronic), 2006 Corpus Christi (TX): Work Loss Data Institute http://www.guidelines.gov/summary/summary.aspx?ss=15&doc_id=9841&nbr=5265</p>	Excluded – insufficient information
<p>Low back pain, 2005 Bradley WG Jr, et al, Expert Panel on Neurologic Imaging Reston (VA): American College of Radiology (ACR) http://www.guidelines.gov/summary/summary.aspx?ss=15&doc_id=8599&nbr=4786</p>	Excluded – insufficient information
<p>Low back pain (Drug Commission of the German Medical Association) AEZQ (DE) - German Agency for Quality in Medicine AEZQ http://www.g-i-n.net/membersarea/dsp_programme_popup.cfm?ProgrammID=138</p>	Excluded – in German (authors contacted but no English translation available)
<p>Low Back Pain Guidance, In Progress Due 2009 http://guidance.nice.org.uk/page.aspx?o=lowbackpain&c=91524&template=catSCG.aspx</p>	Excluded – in progress
<p>Low back pain - National disease management guideline (NVL Kreuzschmerz) AEZQ (DE) - German Agency for Quality in Medicine AEZQ http://www.g-i-n.net/membersarea/dsp_programme_popup.cfm?ProgrammID=3134</p>	Excluded – in German (authors contacted but no English translation available)
<p>New Zealand Acute Low Back Pain Guide, 2004 New Zealand Guideline Group http://www.nzgg.org.nz/guidelines/0072/acc1038_col.pdf</p>	Excluded – does not address diagnostic imaging
<p>Non-rigid stabilisation techniques for the treatment of low back pain (IPG) NICE (GB) - National Institute for Health and Clinical Excellence http://www.g-i-n.net/membersarea/dsp_programme_popup.cfm?ProgrammID=3461</p>	Excluded – does not address diagnostic imaging
<p>Primary care interventions to prevent low back pain in adults (U.S. Preventive Services Task Force) AHRQ (US) - Agency for Healthcare Research and Quality http://www.g-i-n.net/membersarea/dsp_programme_popup.cfm?ProgrammID=3002</p>	Excluded – does not address diagnostic imaging

Appendix 3: Identified RCT studies that do not meet criteria for inclusion in the review

Authors	Subjects	Intervention	Control	Results	Reason for exclusion
Kendrick et al 2001	n= 421 back pain duration of current episode 6 weeks to 6 months	Radiography of lumbar spine	Usual care	No difference between groups for health status, patient functioning or degree of pain. Higher level of patient satisfaction in intervention group.	>6 weeks duration
Gilbert et al 2004	n=782 referred to orthopaedists or neurosurgeons, duration of episode ranged from <3 months to >12 months	Early MRI or CT	Delayed selective MRA or CT where clinical need has been established	No differences in overall clinical treatment. Statistically significant but small difference in improvement in health status (higher in early intervention group)	>6 weeks duration included in study population, no subgroup analysis
Djais et al 2005	n=101 Rheumatology outpatient unit, duration of episode <3 months	Usual care with lumbar spine radiography	Usual care without lumbar spine radiography	Intervention group had lower health status and similar severity of pain scores	>6 weeks duration included in study population, no subgroup analysis
Jarvik et al 2003	n=380 patients referred for radiography, duration of episode not reported	Lumbar spine MRI	Lumbar spine radiography	No differences between groups for functional disability or pain severity measures	Duration not defined
Modic er al 2005	n=246, duration of episode <3 weeks	MRI with early information to patient and clinician	MRI with clinicians & patients blinded to results unless action required	No differences in health status or care, intervention group had lower sense of well being.	Control patients also received MRI

Appendix 4: Critical Appraisal of Identified Research

Appraisal of included Evidence-based Guidelines:

1 European Guidelines for the Management of Acute Nonspecific Low Back Pain

Authors	COST ACTION B13 Working Group on Guidelines for the Management of Acute Low Back Pain in Primary Care
Publisher	European Spine Journal (2006) 15 (Suppl 2): S169-S191
Funding agency	Not clearly indicated – appears to be funded by the European Commission
Scope/ Purpose	The primary objective of the guidelines was to provide a set of recommendations on the clinical management of acute management of acute non-specific low back pain in primary care in Europe.
Contents.	1. Diagnosis of acute low back pain 2. Treatment for acute low back pain

Quality

Agree Domain	Scores			Comments
	GR	MG	%	
Scope and purpose	11/12	10/12	83	Clear and specific objectives and clinical questions are described. There is a clear and specific description of the target patients.
Stakeholder involvement	8/16	7/16	29	Broad range of relevant professionals who have been involved in development of national guidelines. No description of patient input. No documentation of guideline piloting.
Rigour of development	21/28	21/28	67	Guidelines based in part on existing guidelines – the appraisal of these guidelines are not adequately described. Existing systematic reviews also informed the development of the guidelines.
Clarity and presentation	14/16	13/16	79	Very clear presentation.
Applicability	9/12	9/12	67	Applicability issues are addressed
Editorial independence	5/8	5/8	50	Editorial independence was not adequately described.

Relevance

Source	Europe	Setting	Primary care
Developers	COST ACTION B13 Working Group Management of Acute Low Back Pain in Primary Care	Target Audiences	Individuals/groups involved in developing new guidelines or updating existing guidelines.

Summary

The result of a collaboration of experts who have been involved in development of national guidelines for low back pain these guidelines provide a clear set of recommendations for the management of acute low back pain in primary care settings. It is difficult to ascertain the scope and quality of the evidence base for the guidelines as these are based in part on a comparison of existing guidelines. It is not clear whether the methods used in the development of the guidelines incorporated a critical appraisal of the quality of the existing guidelines.

2 Institute for Clinical Systems Improvement (ICSI) Adult Low back pain				
Authors	Institute for Clinical Systems Improvement (ICSI)			
Publisher	Institute for Clinical Systems Improvement (ICSI)- Private non-profit Organisation (USA)			
Funding sources	Minnesota health plans and in-kind support from ICSI members			
Scope/ Purpose	<ol style="list-style-type: none"> 1. To increase the use of the recommended conservative approach as first line treatment for patients with acute or chronic low back pain 2. To reduce unnecessary imaging studies in patients with acute low back pain 3. To increase the appropriate assessment of patients with chronic low back pain 4. To increase the use of appropriate outcome tools 			
Contents.	1 Algorithms and Annotations 2 Supporting evidence 3 Supporting for Implementation			
Quality				
Agree Domain	Scores			Comments
	GR	MG	%	
Scope and purpose	10/12	10/12	78	Clear and specific objectives and clinical questions are described. There is a clear and specific description of the target patients.
Stakeholder involvement	11/16	11/16	58	No description of patient input. Limited information regarding professional groups
Rigour of development	20/28	21/28	64	No information provided regarding search strategy. Internal peer review process.
Clarity and presentation	14/26	15/16	88	Very clear presentation.
Applicability	8/12	6/12	44	Limited description of potential barriers to implementation
Editorial independence	5/8	5/8	50	Editorial independence was not adequately described.
Relevance				
Source	USA		Setting	Primary care
Developers	Institute for Clinical Systems Improvement (ICSI)		Target Audiences	Individuals/groups involved in developing new guidelines or updating existing guidelines.
Summary				
The Guidelines were developed specifically for the purpose of increasing the use of the recommended conservative approach as the first-line treatment for adult patients presenting with low back pain in primary care and to reduce the unnecessary imaging studies for these patients. There is minimal information provided regarding the search strategy used to identify relevant studies.				

Appraisal of included randomised control trial:

Study: Kerry et al 2002

Description of study

Patients	Aged between 16 and 64 years
N	153 in RCT, (506 in observational study)
Setting	General practice
Intervention	Referral for lumbar spine radiography at first presentation
Comparisons	No referral for lumbar spine radiography at first presentation (could be referred at later time)
Outcomes	<ul style="list-style-type: none"> • Roland and Morris back-pain specific disability scale • Hospital Anxiety and Depression Scale (HADS) • The Short Form Health Survey (SF-36)
Inclusion Criteria	Presenting to the general practitioner with low back pain
Exclusion criteria	Patients who had consulted with low back pain in the previous four weeks, who were pregnant, or who were suffering from influenza-like illness.

Study Validity

Specified inclusion/ exclusion criteria	Yes	Inclusion and exclusion criteria were included. No criteria for duration of episode – covered both acute and chronic low pain.
Adequate method of randomisation	No	Participation in RCT versus observational arm of study determined by clinician and patient preferences. Limited information provided regarding randomisation procedures.
Concealment of allocation	Unclear	Limited information provided regarding randomisation procedures.
Groups similar at baseline	Some differences	Differences in gender mix, duration of episode, history of GP consultations and physical functioning.
Blinding - patients/ investigators/ assessors	No	
Sufficient duration of follow-up	Yes	Up to 12 months
Proportion lost to follow up		8% - Initial questionnaire 18% - 6 week questionnaire 29% - 12 months questionnaire Similar proportions for both groups
Objective & independent assessment of outcomes	Yes	

Inclusion of all subjects in analysis	No	Analysis was conducted on results for patients who completed the initial and at least one follow-up questionnaire.
Other comments:	<p>Only 23% of the patients recruited were randomized reducing the power of the study below the initial targets.</p> <p>Results showed that referral for x-ray on initial presentation had no effect on physical functioning, pain or disability but was associated with a modest increase in psychological wellbeing at 6 weeks and 1 year.</p>	
Results		
<p>There were no differences between the intervention and control groups at 6 weeks or one year for measures of physical functioning, pain or disability. At 6 weeks patients who had been referred to x-ray scored higher on the psychological measures. After one year the only difference in the psychological measures was a higher mental health score for patients referred to x-ray.</p>		
Authors' Conclusions		
<p>Referral for lumbar spine radiography for first presentation of low back pain in primary care is not associated with improved physical functioning, pain or disability but is associated with minor psychological improvements.</p>		
Our comments		
<p>The findings are consistent with previous research on this issue. There are concerns for the potential influence of attrition and selection biases on the results due to limitations with the design and implementation of the study.</p>		