Transport Accident Commission & WorkSafe Victoria

Evidence Service

Spinal Injection Therapies: Medial Branch Blocks, Facet Joint Injections and Sacroiliac Joint Injections

Evidence Review

March 2009

Jane Reid, Marie Misso, Claire Harris

CONTENTS

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SPINAL INJECTION THERAPIES: MEDIAL BRANCH BLOCKS, FACET JOINT INJECTIONS AND SACROILIAC JOINT INJECTIONS

PLAIN LANGUAGE SUMMARY

Damage or inflammation of joints in the neck and back can cause pain. Facet joints are small joints between each of the bones in the spine. The sacroiliac joints are where the lower spine joints to the pelvis.

Different kinds of injections have been used to reduce pain coming from joints. Medial branch blocks are an injection that aims to block the nerve to the joints. Facet joint or sacroiliac joint injections can be given straight into or around the joint. A few different medications have been injected, but these are usually steroids and local anaesthetics.

This report looked at the research studies to see whether spinal injections are safe and useful.

Some research studies are specifically designed to test whether a treatment is helpful or not and the results are trustworthy. These studies are called high level evidence. Other studies are not designed to test the treatment, but just observe what happened to patients who received it or those who did not. These studies can provide some information, but it is not as certain as the information from high level evidence. These studies are referred to as low level evidence, sometimes called observational studies.

1. Medial branch blocks

Medial branch blocks are an injection that aims to block the nerve to the spinal joints. No relevant studies were found that assessed the usefulness of medial branch blocks for persistent neck or back pain. This does not mean that they are not helpful; it just means that no research studies have proven that they are.

2. Facet joint injections

Facet joint injections are injections of steroid directly into the facet joint. Facet joints are small joints between each of the bones in the spine. No relevant studies that assessed the helpfulness of facet joint injections (FJIs) for persistent pain in the neck or upper back were found.

Three trials that assessed the usefulness of FJIs for persistent pain in the lower back (lumbar spine) were found. One of these trials provides good quality high level evidence. Although the other two were lower quality, the results were very similar.

These trials found that lumbar FJIs with steroid and local anaesthetic did not help in the first three months. Patients who had this treatment did not have less pain or more ability to function compared with patients who did not have the treatment. One trial found that there may be less pain and more function six months after treatment. Other factors related to the research may have influenced this result.

Patients who had lumbar FJIs with steroid and local anaesthetic had no improvement in return to work at three months compared with patients who did not have this treatment.

The effect of FJIs on quality of life, use of medication or use of health care services has not been studied. The risks of FJIs are not clear from the information available.

There is too little information to decide about the safety and helpfulness of FJIs. This does not mean that they are not helpful; it just means that no research studies have proven that they are.

3. Sacroiliac joint injections

Sacroiliac joint (SIJ) injections are injections of steroid directly into the SIJ. The sacroiliac joints are where the lower spine joins to the pelvis. No studies that assessed the usefulness of SIJ injections for persistent back pain were found. This does not mean that these injections are not helpful, it just means that no research studies have proven that they are.

SPINAL INJECTION THERAPIES: MEDIAL BRANCH BLOCKS, FACET JOINT INJECTIONS AND SACROILIAC JOINT INJECTIONS

EVIDENCE SUMMARY

Spinal injection therapies have been used to treat patients with pain arising from spinal facet joints and sacroiliac joints. Medial branch blocks target the nerves that supply the joints and facet joint and sacroiliac joint injections aim to reduce inflammation within the joint.

Various medications are used, predominately steroids and local anaesthetics, and injections can be undertaken for diagnostic or therapeutic purposes. This review only includes studies of therapeutic interventions.

It is thought that most of the therapeutic benefit is due to the anti-inflammatory effects of steroids, however local anaesthetics are also thought to have a short term beneficial effect. For the purposes of this review, steroids and local anaesthetics, either alone or in combination, are considered to be interventions. Consequently, studies using steroids or local anaesthetics as comparators are excluded.

Radiological guidance is used to verify the correct location of the injection, so that the affected area is directly targeted.

1. Medial branch blocks

No relevant studies were identified that evaluated the effectiveness of cervical, thoracic or lumbar medial branch blocks for persistent neck or back pain. Therefore we conclude that there is no evidence of effectiveness of this intervention.

2. Cervical facet joint injections

No relevant studies were identified that evaluated the effectiveness of cervical facet joint injections for persistent neck pain. Therefore we conclude that there is no evidence of effectiveness of this intervention.

3. Thoracic facet joint injections

No relevant studies were identified that evaluated the effectiveness of thoracic facet joint injections for persistent back pain. Therefore we conclude that there is no evidence of effectiveness of this intervention.

4. Lumbar facet joint injections

General comment

One recent high quality Cochrane systematic review was available. The review identified three studies that evaluated the effectiveness of lumbar facet joint injections for persistent back pain; two randomised controlled trials (RCTs) and one pseudorandomised controlled clinical trial (CCT). One RCT was rated as high quality and provides level II evidence. The other RCT and the pseudorandomised CCT were found to be of low quality and only provide limited evidence. The findings of all three studies are consistent.

In what conditions is this intervention indicated?

No specific indications for use were identified. The studies investigating lumbar facet joint injections were undertaken on patients with persistent low back pain for at least three months. One RCT enrolled patients who had responded positively to a facet joint injection with local anaesthetic. Another included patients with tenderness and local muscle spasm over the facet joints. The pseudorandomised CCT included patients with chronic disabling work-related lumbar spine disorders who had lumbar rigidity between 1 and 3 levels.

What is the effectiveness of this intervention on persistent pain in these conditions?

None of the studies found significant differences in pain relief between the intervention and control groups up to three months after treatment.

Only one RCT (n=101) measured pain after three months and found the steroid injection group had significantly better pain scores at six months than the placebo group (figures not provided). The authors note that when concurrent interventions were taken into account, these differences were reduced; however they provide no information regarding the concurrent interventions or their effect.

The findings of a single RCT suggest that there may be some benefit of lumbar facet joint injections in reducing pain six months after treatment. However the lack of benefit found by all three studies at three month follow-up is inconsistent with this.

The evidence of effectiveness of lumbar facet joint injections on persistent pain is inconclusive.

What is the effect of this intervention on function, quality of life, return to work, medication use and healthcare utilisation?

One study reported on functional status, the other two on disability. All three found no significant difference between intervention and control groups up to three months.

Only one RCT (n=101) measured functional status after three months and found the steroid injection group had significantly better scores in the physical dimension of the Sickness Impact Profile at six months than the placebo group (figures not provided). The authors note that when concurrent interventions were taken into account, these differences were reduced; however they provide no further information regarding this.

One RCT (n=109) reported on return to work and found no significant difference in work attendance between the groups up to three months.

Quality of life, medication use and healthcare utilisation were not assessed by any of the studies.

The findings of a single RCT suggest that there may be some benefit of lumbar facet joint injections in improving functional status six months after treatment. However the lack of benefit found by all three studies at three month follow-up is inconsistent with this.

The evidence of effectiveness of lumbar facet joint injections on function is inconclusive. Lumbar facet joint injections were not found to improve work attendance. There is insufficient information to comment on effectiveness of lumbar facet joint injections in relation to quality of life, medication use or healthcare utilisation.

In what patient groups/conditions is this intervention contraindicated?

The authors did not specify any patient groups/conditions for which this intervention is contraindicated. However the investigators in the high quality RCT (n=101) excluded patients who had back pain of a non-mechanical origin, previous injections in the facet joints or surgery, pregnancy, known allergy to anaesthetic or radiological contrast agents, or presence of a blood coagulation disorder.

What are the risks associated with use of this intervention?

There is insufficient evidence available to provide any information on risks of lumbar facet joint injections.

5. Sacroiliac joint injections

No relevant studies that evaluated the effectiveness of sacroiliac joint injections for persistent back pain were identified. Therefore we conclude that there is no evidence of effectiveness of this intervention.

Spinal Injection Therapies: Medial Branch Blocks, Facet Joint Injections and Sacroiliac Joint Injections

Evidence Review

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BACKGROUND

Spinal injection therapies have been used to treat patients with pain arising from the neck, back and sacroiliac joints. These interventions include epidural injections, medial branch blocks, facet joint injections, injections and sacroiliac joint injections

In order to develop and update policies for the use of spinal injection therapies in patients with persistent pain the Health Services Group of the Transport Accident Commission and WorkSafe Victoria (TAC/WSV) requested a systematic review of the evidence of effectiveness of these interventions.

A preliminary scoping exercise identified numerous evidence resources related to spinal injection therapies. Several high level studies such as evidence-based guidelines (EBGs), systematic reviews and health technology assessments (HTAs) were available for a number of the interventions, randomised and controlled clinical trials (RCT/CCTs) were available for some interventions, and others had no studies identified. In light of the complexity of the research questions and the multiple sources of information available, this review was undertaken in a two-stage process. Due to differences in clinical approach and the patient populations, TAC/WSV requested that epidural injections be reviewed separately to the other interventions. This report has been completed for medial branch blocks, facet joint injections and sacroiliac joint injections.

There are two facet joints at the back of the spine between each of the vertebrae which are essential for spinal stability. Also called zygapophysial, zygapophyseal or zygoapophyseal joints, they are synovial joints with a rich nerve supply and have been implicated as a cause of neck or low back pain if they become damaged or inflamed. Medial branch blocks target the nerves that supply the joints and facet joint injections are given into the joint capsule (intraarticular) or around the joint capsule (periarticular). Both involve injections of various medications, predominately steroids and local anaesthetics, and can be undertaken for diagnostic or therapeutic purposes. This review only includes studies where the aim of the injection was therapeutic.

The sacroiliac joints are located at the junction of the base of the spine (sacrum) and the top section of the pelvis (ilium). They are strong, weight-bearing synovial joints with a rich nerve supply, and can become the source of low back pain. Steroids and local anaesthetics can also be injected into the sacroiliac joint with the aim of reducing pain.

It is thought that most of the therapeutic benefit is due to the anti-inflammatory effects of steroids, however local anaesthetics are also thought to have a short term beneficial effect. For the purposes of this review, steroids and local anaesthetics, either alone or in combination, are considered to be interventions. Consequently, studies using steroids or local anaesthetics as comparators are excluded.

Radiological guidance including fluoroscopy, computed tomography, magnetic resonance imaging and ultrasound is used to verify the correct location of the injection, so that the affected area is directly targeted.

QUESTIONS

This review was undertaken as a two-stage process addressing the following questions. Details of this process are contained in Appendix 1.

Stage 1: Identification of the best available evidence

Is synthesised evidence available (i.e. EBGs, systematic reviews, HTAs)?

Is the available synthesised evidence of good quality?

Is the available good quality synthesised evidence current (within 2 years)?

Does the current, good quality synthesised evidence contain controlled trials?

Are there any controlled trials available for these interventions?

Based on the available evidence, what further action is recommended to address the questions in Stage 2?

Stage 2: Assessment of the interventions based on the best evidence

In what conditions are these interventions indicated?

What is the effectiveness of these interventions on persistent pain in these conditions?

What is the effect of these interventions on function, quality of life, return to work, medication use and healthcare utilisation?

In what patient groups/conditions are these interventions contraindicated?

What are the risks associated with use of these interventions?

METHODS

Methods used for each stage are outlined briefly below with detailed information available in appendices.

Stage 1: Identification of the best available evidence

Systematic approach

Standard systematic review methodology was used to identify existing synthesised research (e.g. EBGs, systematic reviews and HTAs) and any available comparative studies (e.g. RCTs, CCTs or cohort studies). Inclusion and exclusion criteria were established *a priori*. A comprehensive search of the internet, relevant websites and electronic health databases was undertaken. Standard criteria for assessment of validity were applied. Details of the systematic review methods are included in Appendix 2.

A systematic review of epidural injections was conducted concurrently with this review. The database and internet searches were undertaken together and application of inclusion and exclusion criteria was conducted on the combined dataset.

Evidence Map

For each intervention, a list of synthesised research and primary studies that fulfilled the selection criteria was prepared. The most up-to-date source of evidence was selected for each intervention and appraised for quality. Once the most recent source of high quality evidence was identified, it was then compared with the other publications for scope and consistency of findings. Recommendations for Stage 2 were developed. Details of the Evidence Map and Recommendations for Stage 2 are included in Appendix 3.

Decisions by TAC/WSV

Based on the findings of Stage 1, TAC/WSV requested that Stage 2 questions for lumbar facet joint injections were to be addressed using the identified systematic review. Due to the lack of available evidence for medial branch blocks, cervical and thoracic facet joint injections, and sacroiliac joint injections, no further action was required to address these interventions in Stage 2.

Stage 2: Assessment of the interventions based on the best available evidence

Appraisal

The available research was appraised using standard criteria by a single reviewer in consultation with colleagues as required. Details of the appraisals are in Appendix 4.

Data extraction and synthesis

The most recent, comprehensive and high quality synthesised research for lumbar facet joint injections was used to address the questions for Stage 2. Relevant data for outcomes of pain relief, function, return to work, and adverse events were extracted. Findings reported in each of the evidence sources were compared and assessed for consistency.

RESULTS

As detailed above, the searches and application of selection criteria for this review and the epidural review were undertaken together. The combined search in the electronic health databases yielded 13,124 citations. Removal of duplicates reduced this number to 8,758. After reviewing the title, abstract or full text, two systematic reviews,[2, 3] two RCTs[4, 5] and one pseudorandomised controlled trial[6] were identified which met the selection criteria. The internet search identified an EBG.[7] One systematic review[8] was also identified during the scoping exercise; this was a recent article which was yet to be fully indexed in the health databases.

The search of reference lists yielded one EBG[9] and one systematic review.[10] The citation search in the Web of Science database did not identify any additional studies.

In total our searches identified two EBGs,[7, 9] four systematic reviews,[2, 3, 8, 10] two RCTs[4, 5] and one pseudorandomised CT[6] relevant to this review.

A number of primary studies were excluded because an inappropriate comparison, such as local anaesthetic or other active drugs, was used. In addition, systematic reviews and EBGs that included these studies, or did not provide sub-analysis of relevant studies, were also excluded. Journal articles which were summaries of Cochrane reviews or EBGs were also excluded. Reviews which appeared to be systematic reviews but which lack certain key criteria were also excluded.

1. Medial branch blocks

No relevant studies that evaluated the effectiveness of cervical, thoracic or lumbar medial branch blocks for persistent neck or back pain were identified.

2. Cervical facet joint injections

No relevant studies that evaluated the effectiveness of cervical facet joint injections for persistent neck pain were identified.

3. Thoracic facet joint injections

3.1 Identified evidence

A systematic review by Atluri at el[8] was the only research identified which evaluated the effectiveness of thoracic facet joint injections for persistent pain. This was a recent systematic review, published in 2008.

3.2 Quality of evidence

The systematic review by Atluri et al was found to be of good quality with low to moderate risk of bias.

This review did not find any studies that evaluated the effectiveness of thoracic facet joint injections. We were also unable to locate any relevant studies.

4. Lumbar facet joint injections

4.1 Identified evidence

Two EBGs, three systematic reviews, two RCTs and one pseudorandomised CCT were found that evaluated the effectiveness of lumbar facet joint injections for persistent pain. The publication dates ranged from 1989 to 2008. The evidence identified is summarised in Table 1 below.

Table 1. Sources of evidence for lumbar facet joint injections for persistent back pain

Evidence-based guidelines*
Institute for Clinical Systems Improvement. Assessment and Management of Chronic Pain. 2008; Third Edition http://www.icsi.org/pain__chronic__assessment_and_management_of_14399/pain__chronic__assessment_and_management_of__guideline_.html. Accessed February 2009.
Airaksinen O, Brox JI, Cedraschi C, Hildebrandt J, Klaber-Moffat J, Kovacs F. European guidelines for the management of chronic non-specific low back pain. 2005; www.backpaineurope.org/web/files/WG2_Guidelines.pdf. Accessed February 2009.
Systematic reviews/Health Technology Assessments
Staal JB, de Bie R, de Vet HC, Hildebrandt J, Nelemans P. Injection therapy for subacute and chronic low-back pain. Cochrane Database of Systematic Reviews. 2008(3):CD001824.
Zakaria D, Skidmore B. Facet joint injection as a diagnostic and therapeutic tool for spinal pain: a review of clinical and cost effectiveness. Ottawa: Canadian Agency for Drugs and Technologies in Health 2007. Technology Report number 77.
Scheer SJ, Watanabe TK, Radack KL. Randomized controlled trials in industrial low back pain. Part 3. Subacute/chronic pain interventions. Archives of Physical Medicine and Rehabilitation. Apr 1997;78(4):414-423.
Randomised controlled trials
Carette S, Marcoux S, Truchon R, et al. A controlled trial of corticosteroid injections into facet joints for chronic low back pain. New England Journal of Medicine. Oct 3 1991;325(14):1002-1007.
Lilius G, Laasonen EM, Myllynen P, Harilainen A, Gronlund G. Lumbar facet joint syndrome. A □andomized clinical trial. Journal of Bone & Joint Surgery – British Volume. Aug 1989;71(4):681-684.
Controlled trials
Mayer TG, Gatchel RJ, Keeley J, McGeary D, Dersh J, Anagnostis C. A randomized clinical trial of treatment for lumbar segmental rigidity. Spine. Oct 15 2004;29(20):2199-2206.
Cohort studies
None

* Studies are listed in each section in reverse chronological order

The Cochrane systematic review by Staal et al[2] and the EBG by the Institute for Clinical Systems Improvement[7] were the most recent publications, both published in 2008. The search date of the Cochrane review was March 2007 and the Institute for Clinical Systems Improvement guideline was between April 2007 and April 2008. Given that the search dates were similar, both documents were appraised to identify the highest quality up to date synthesised evidence.

4.2 Quality of evidence

The Cochrane systematic review was found to be of high quality with low risk of bias. It was found to be of better methodological quality and more comprehensive than the guideline by the Institute for Clinical Systems Improvement. Therefore the Cochrane review was used to provide key information. Full details of the appraisals can be found in Appendix 4.

4.3 Level of evidence

The Cochrane systematic review included three studies (two RCTs and one pseudorandomised CCT) which were relevant to our question. We also identified these three studies in our search. One RCT was rated as

high quality and provides level II evidence. The other RCT and the pseudorandomised CCT were found to be of low quality and only provide limited evidence.

4.4 Scope

The Cochrane systematic review assessed injection therapy for subacute and chronic low-back pain. Lumbar facet joint injections were one of the interventions assessed. All patients included in the facet joint injection studies had chronic low back pain of at least three months.

Intervention

The high quality RCT (n=101) compared steroids with saline. The lower quality RCT (n=109) used steroids plus local anaesthetic in two intervention groups (intraarticular versus periarticular) and saline in the control group. The pseudorandomised CCT (n=70) was conducted in patients undertaking a home stretching program. The intervention group received facet joint injections of steroids plus local anaesthetic in addition to the home stretching program, the control group had the same stretching program and no injection.

Age of patients

The Cochrane systematic review included studies with participants aged from 18 to 70 years. The age in the individual studies was not detailed.

Outcomes measured

The outcomes measured for facet joint injections included pain, functional status, work attendance and side effects.

4.5 Findings

Findings are reported in the context of the questions posed by TAC/WSV.

In what conditions is this intervention indicated?

A systematic review can only answer this question if the studies identified have addressed it directly or if existing guidelines make specific recommendations. A review of the literature can only provide information about the patient groups and conditions in which the intervention has been applied in the studies available, and not whether this is appropriate or comprehensive. An additional level of expert clinical input is required to adapt this information into recommendations regarding indications for use.

No specific indications for use were identified. The studies included in the Cochrane systematic review used lumbar facet joint injections on patients with persistent low back pain for at least three months.

One RCT, found to be of high quality and the only study with any favourable outcomes from steroid facet joint injections, was undertaken on patients who responded positively to a facet joint injection with lidocaine (more than 50% reduction in pain score).

The other RCT included patients with tenderness and local muscle spasm over the facet joints.

The pseudorandomised CCT included patients with chronic disabling work-related lumbar spine disorders who had lumbar rigidity between 1 and 3 levels.

What is the effectiveness of this intervention on persistent pain in these conditions?

None of the studies found significant differences in pain relief between the intervention and control groups up to three months after treatment.

Only one RCT (n=101) measured pain after three months and found the steroid injection group had significantly better pain scores at six months than the placebo group (figures not provided). However when concurrent interventions were taken into account, these differences were reduced. No further information regarding the concurrent interventions or their effect is available from the review.

What is the effect of this intervention on function, quality of life, return to work, medication use and healthcare utilisation?

Function

One study reported on functional status, the other two on disability. All three found no significant difference between intervention and control groups up to three months.

Only one RCT (n=101) measured functional status after three months and found the steroid injection group had significantly better scores in the physical dimension of the Sickness Impact Profile at six months than the placebo group (figures not provided). However when concurrent interventions were taken into account, these differences were reduced; no further information regarding this is available from the review.

Return to work

One RCT (n=109) reported on this outcome and found no significant difference in work attendance between the groups up to three months.

Quality of life, medication use and healthcare utilisation

These outcomes were not assessed by any of the studies.

In what patient groups/conditions is this intervention contraindicated?

This is similar to the question regarding indications for use. A systematic review can only answer this if the studies identified have addressed it directly or if existing guidelines make specific recommendations. Some information from a review of the literature may be relevant in this context, such as the patient groups and conditions excluded from the available studies or any adverse outcomes that may have occurred in specific patient groups, but cannot be translated directly into contraindications. An additional level of expert clinical input is required to adapt this information into recommendations regarding patient groups or conditions that are contraindicated for use.

The authors did not specify any patient groups/conditions for which this intervention is contraindicated. However the investigators in the high quality RCT (n=101) excluded patients who had back pain of a non-mechanical origin, previous injections in the facet joints or surgery, pregnancy, known allergy to anaesthetic or radiological contrast agents, or presence of a blood coagulation disorder.

What are the risks associated with use of this intervention?

Two studies reported limited information regarding side effects. One RCT (n=101) stated that the only adverse events reported were transient local pain at the site of the injection. The second RCT stated seven of the 109 patients reported side effects, although the nature of these, and if there were any differences between the groups, was not reported.

4.6 Consistency of findings

The findings of the Cochrane review are consistent with the other EBGs, systematic reviews and HTAs. One of the EBGs and one of the systematic reviews state that there is no evidence of effectiveness of facet joint steroid injections for low back pain. In addition, one of the EBGs states that they cannot recommend the use of these interventions for patients with non-specific chronic low back pain. One of the systematic reviews had as its focus return to work. This systematic review stated that most of the studies have methodological limitations and that additional research is needed to more confidently answer the question of what interventions improve work capacity in patients with low back pain.

5. Sacroiliac joint injections

We did not identify any relevant studies that evaluated the effectiveness of sacroiliac joint injections for persistent back pain.

DISCUSSION

Use of EBGs and systematic reviews to address specific clinical questions is limited by the intended purpose of the synthesised evidence and the way the authors report findings from primary evidence. Findings can only be reported for clinical questions that have been addressed by an individual EBG or systematic review and can only be described to the level of detail provided in the synthesised evidence. This approach also means we are unable to conduct our own critical appraisal of primary studies and must rely on the methodology of the review authors to comment on the validity and reliability of results.

There are few comparative studies or reports of synthesised research which evaluate the effectiveness of spinal injection therapies for patients with persistent neck or back pain. The only comparative studies identified were for lumbar facet joint injections with corticosteroids. No relevant studies were identified which assessed the effectiveness of medial branch blocks, cervical or thoracic facet joint injections, or sacroiliac joint injections.

The results of studies investigating lumbar facet joint injections found no difference between the intervention and control groups in the short term (up to three months). One RCT did find that the facet joint injection group had improved in pain relief and functional status at six months. Although these differences were reduced when concurrent interventions were taken into consideration, it is interesting that differences between the two groups only became apparent at six months and not at the earlier follow-up periods.

Only one of the three available studies was of high quality and provides level II evidence; the other two were of low quality which limits the confidence we can have in the results. However the findings of all three studies are consistent.

In this review steroids and local anaesthetics are included as an intervention either alone or in combination, and consequently are excluded as comparators. A number of studies used local anaesthetic as a comparator,[11-13] but were not eligible for our review.

Limitations of this review

Limitations of our review are that only studies in English were included and hand-searching was not undertaken. The implication of this is that some relevant studies may have been missed. In addition, the application of selection criteria, appraisal of studies and extraction of the data was conducted by only one person. This may have lead potentially to errors or bias.

We know from checking reference lists that our search strategy did miss relevant articles. One was a recent article and had yet to be fully indexed.[8] The other article was about return to work strategies and evaluated many interventions.[10] As facet joint injections were just one of the interventions it was not included in the abstract or subject headings and therefore the article was not identified by our search.

CONCLUSION

Information is only available for lumbar facet joint injections.

Steroids, with or without local anaesthetic, appear to have no short term benefit on pain relief or functional improvement. There is level II evidence from one high quality RCT that steroids are not significantly different from placebo up to three months after treatment. This is consistent with the limited evidence from two low quality studies using steroids plus local anaesthetic.

Steroids may be more effective than placebo for pain relief and functional status in the longer term (six months) based on level II evidence from one high quality RCT. The study authors note that concurrent interventions affected this result but provide no further details.

Steroids combined with local anaesthetic appear to have no short term benefit over placebo for work attendance based on limited evidence from one low quality RCT. No studies assessed work attendance beyond three months after treatment.

There is insufficient evidence available to provide any information on risks of lumbar facet joint injections.

No relevant studies were identified which assessed the effectiveness of medial branch blocks, cervical or thoracic facet joint injections, or sacroiliac joint injections for persistent neck and back pain. Therefore we conclude that there is no evidence of effectiveness of these interventions.

DISCLAIMER

CONFLICT OF INTEREST

The TAC/WSV Evidence Service is provided by the Centre for Clinical Effectiveness (CCE) and the Australasian Cochrane Centre (ACC). Neither CCE nor ACC accepts funding from pharmaceutical or biotechnology companies or other commercial entities with potential vested interest in the outcomes of systematic reviews. Both groups abide by the Cochrane Collaboration Policy on Commercial Sponsorship.[14]

The TAC/WSV Health Services Group has engaged CCE and ACC for their objectivity and independence and recognises that any materials developed must be free of influence from parties with vested interests. The Evidence Service has full editorial control.

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APPENDIX 1: TWO-STAGE REVIEW PROCESS

An initial scoping exercise identified a variety of evidence resources. Several high level studies (EBGs, HTAs, systematic reviews) were available for a number of the interventions, RCTs were available for one intervention, and for some interventions no studies were identified. In light of the complexity of the questions and the multiple sources of information available a two-staged approach was undertaken.

Stage 1

Identify evidence available for each intervention

- Write search, limit to EBGs, HTAs, systematic reviews (SRs), RCTs, CCTs and cohort studies
- Run search in health databases, websites and on the internet
- Apply inclusion and exclusion criteria

Critically appraise synthesised research

- Start with most recent review, apply standard appraisal criteria.
  - If found to be of high quality, cross check to ensure references from all other synthesised research are included and check for consistency of findings
  - If not high quality, appraise next most recent, and repeat process
- If there are inconsistent findings across the existing reviews, investigate the possibility of synthesis of this information or whether a new systematic review is required

Identify need for additional systematic reviews

- Map available evidence to each of the interventions (as per Table A1.1)
- Identify action required (based on algorithm in Table A1.2) e.g.
  - Updating good quality but out-of-date systematic review
  - Conducting new systematic review where no good quality systematic review found

Seek direction from TAC/WSV

Stage 2

Update existing high quality reviews and/or undertake new systematic reviews as directed by TAC/WSV

Table A1.1. Map of available evidence

Intervention	EBGs	SRs/HTAs	RCTs	CCTs	Cohort studies
Medial branch blocks					
Cervical facet joint injections					
Thoracic facet joint injections					
Lumbar facet joint injections					
Sacroiliac joint injections					

Table A1.2. Further action required to answer clinical questions

<table>
<tr><td colspan="4">Is there any synthesised research available? (i.e. EBGs, HTAs, systematic reviews)</td></tr>
<tr><td colspan="3">Yes</td><td>No</td></tr>
<tr><td colspan="3">Is this good quality research?</td><td>Are RCTs, CCTs or cohort studies available?</td></tr>
<tr><td colspan="2">Yes</td><td>No</td><td>Yes</td><td>No</td></tr>
<tr><td colspan="2">Is it current (within 2 years)?</td><td rowspan="2"></td><td rowspan="2"></td><td rowspan="2">Consider looking for lower levels of evidence</td></tr>
<tr><td>Yes</td><td>No</td></tr>
<tr><td>No further action</td><td>Update existing SR</td><td>Undertake new SR</td><td>Undertake new SR</td><td></td></tr>
</table>

APPENDIX 2: METHODS

TAC/WSV staff and clinicians assisted in development of search terms and inclusion and exclusion criteria.

Selection criteria

Inclusion and exclusion criteria were established *a priori* (Table A2.1) and were applied by a single reviewer.

Table A2.1. Selection criteria

Patient/ population	**Inclusion:** Patients with persistent neck, back or sacroiliac joint pain following trauma (including occupational injury e.g. prolonged sitting) or arthritis resulting from trauma or degenerative disc disease; or as defined by the trialists or for more than 3 months.
	Exclusion: Non-traumatic pain (e.g. cancer pain, trigeminal neuralgia, spondyloarthropathies); pain associated with childbirth; acute post-operative pain (e.g. abdominal surgery, hip or knee replacement, thoracotomy).
Intervention/ indicator	The review will include interventions administered at any stage of the management of persistent pain (e.g. first-line, second-line, when all else fails, as an adjunct to therapy).
	Inclusion: Radiologically guided (including fluoroscopy, CT, MRI and ultrasound) injection of steroid (particulate or non-particulate) and/or local anaesthetic. Medial branch block (to the cervical, thoracic and lumbar regions of the spine). Also called: • medial nerve branch block • nerve block • dorsal ramus block • posterior primary ramus block Facet joint injection (intraarticular and periarticular) to the cervical, thoracic and lumbar regions of the spine Sacroiliac joint injection
	Exclusion: Non-radiologically guided injection: injection of substances other than steroid and/or local anaesthetic; dorsal root ganglion nerve injections/blocks; greater occipital nerve block; sympathetic ganglion injection; intraarticular regeneration injection therapy (prolotheraphy).
Comparison/ control	**Inclusion:** Placebo procedure (e.g. injection of saline), sham procedure (e.g. injection of saline into an alternative site, where saline is not known to be active therapy for that site), usual care (e.g. medical consultations, analgesics, exercise, physiotherapy, chiropractic, osteopathy).
	Exclusion: Steroid and/or local anaesthetic and all other interventions that are not listed in the inclusion criteria.
Outcomes	**Inclusion:** Pain, function, return to work, quality of life, medication use, harmful effects or adverse events.
	Exclusion: Nil
Setting	**Inclusion**: Any healthcare setting (eg. acute, subacute, rehabilitation, community).
	Exclusion: Nil
Study Design	**Inclusion:** EBGs, systematic reviews, HTAs, RCTs, CCTs, cohort studies.
	Exclusion: Non-evidence-based guidelines, non-systematic reviews, case-control studies, case series, case reports, editorials, letters, commentaries, earlier superseded versions of EBGs or systematic reviews.
Publication details	**Inclusion:** Studies in English and conducted on humans.
	Exclusion: Studies in languages other than English and/or conducted on animals.
Time period	**Inclusion:** Any publication date.
	Exclusion: Nil

Search strategy

A systematic review for epidural injections was conducted concurrently. As there was found to be a substantial overlap between the two reports, the database and internet searches were undertaken together and application of inclusion and exclusion criteria was conducted on the combined dataset by one reviewer in consultation with colleagues as required.

Based on the agreed methodology in the two-stage proposal, searches were limited to EBGs, systematic reviews, HTAs, RCTs, CCTs and cohort studies.

Standard systematic review strategies, as outlined below, were used to identify existing reviews and trials. Additional strategies were included to identify EBGs. Searches were conducted in electronic health databases, relevant websites and the internet.

Electronic health database search

Electronic health database searches were conducted to identify existing reviews and trials.

Databases accessed

Table A2.2. Databases accessed

Evidence Source	Period	Date of Search
Medline (Ovid)	1950 to present	22nd December 2008
All EBM (Ovid) *	**	22nd December 2008
CINAHL (Ovid)	1982 to December Week 2 2008	22nd December 2008
EMBASE	1980 to 2008 Week 51	22nd December 2008

*including The Cochrane Database of Systematic Reviews, DARE, CENTRAL, CMR, ACP Journal Club, HTA and NHSEED

** The Cochrane Database of Systematic Reviews (4th Quarter 2008); ACP Journal Club (1991 to November 2008); DARE, CENTRAL, CMR, HTA and NHSEED (4th Quarter 2008).

Database search

The following search was conducted in Medline and adapted for use in other databases. No terms have been included for comparison or outcomes to enable a broader search.

Table A2.3. Search undertaken in Medline (the English language and humans filter was not used in the All EBM database)

1	exp Pain/	28	26 and 27
2	pain.mp.	29	dorsal.mp.
3	1 or 2	30	posterior.mp.
4	exp Back/	31	29 or 30
5	back.mp.	32	rami.mp.
6	Neck/	33	ramus.mp.
7	neck.mp.	34	32 or 33
8	spinal.mp.	35	31 and 34
9	spine.mp.	36	spinal.mp.
10	or/4-9	37	spine.mp.
11	3 and 10	38	intraarticular.mp.
12	zygoapophyseal.mp.	39	intra-articular.mp.
13	zygapophyseal.mp.	40	25 or 28 or 35 or 36 or 37 or 38 or 39
14	zygapophysial.mp.	41	Injections/
15	facet.mp.	42	inject$.mp.
16	sacro-iliac.mp.	43	block$.mp.
17	sacroiliac.mp.	44	41 or 42 or 43
18	or/12-17	45	40 and 44
19	joint$.mp.	46	Injections, Spinal/
20	18 and 19	47	Injections, Intra-Articular/
21	Zygapophyseal Joint/	48	nerve block/
22	Sacroiliac Joint/	49	nerve block$.mp.
23	SIJ.mp.	50	neural block$.mp.
24	z-joint.mp.	51	or/45-50
25	or/20-24	52	11 and 51
26	medial.mp.	53	limit 52 to (english language and humans)
27	branch.mp.		

A systematic review for epidural injections is being conducted concurrently. As there was found to be a substantial overlap between the two search strategies, the searches were run together and selection criteria applied to the same database.

Website and internet searches

Guideline searches

EBGs are generally published as electronic 'stand alone' documents on the internet rather than papers in peer reviewed journals. The search to identify EBGs is therefore quite different to searches usually undertaken for systematic reviews of primary research in the health literature. Methods to identify EBGs include identification of relevant websites followed by searches within them, direct searches of the internet and searches within the electronic health databases.

Unlike systematic reviews of the primary research literature which usually involve a single clinical question, an EBG is a compilation of systematic reviews arising from numerous clinical questions. These reviews may be grouped within the EBG into sections or chapters based on patient characteristics, health care settings, domains of clinical care or other categories related to the particular condition or patient population. Due to this complexity and comprehensiveness, the information contained in a particular section or chapter may be found in more than one type of EBG. For example, information on use of facet joint injections in patients with persistent pain may be found in a specific section related to facet joint injections within a general pain management EBG. Alternatively this may be found in a specific section on pain management in an EBG for care of patients with specific conditions such as spinal disorders.

Given the likelihood of neck, back and sacroiliac joint pain being included within the same EBGs, the internet and website searches were combined and undertaken together.

As with the database search, the searches for relevant guidelines for this review and for the epidural review were undertaken together.

Searches within relevant websites that are know to contain guidelines

The reviewers were aware of websites of guideline clearinghouses, guideline developers, centres of evidence-based practice, Australian government health services and websites of specific relevance (e.g. accident compensation groups) known to contain evidence-based resources.

The 25 generic websites previously identified by the review team (nine guideline services, two Australian government websites, one centre of evidence-based practice, seven other accident commissions and six pain websites) were searched for relevant EBGs.

Where an internal search engine was available, websites were searched using the following search strings.

- (epidural OR facet joint) AND (injection)
- (med* OR nerve OR branch OR dorsal OR posterior) AND (block) AND (pain)

If no search engine was available, lists of EBGs, publications or other resources identified on the site were scanned for relevant documents.

Details of the searches are outlined in detail in Table A2.4.

Internet search to identify relevant guidelines and systematic reviews

An internet search strategy was conducted using the Google 'Advanced Search' function. The search strings were limited to documents in English and were used to identify relevant guidelines.

spinal OR epidural OR facet OR sacro OR nerve OR intraarticular OR zygapophys OR ramus OR root OR perineural OR branch) AND (injection OR block) AND (evidence OR guideline OR systematic)

The searches are outlined in detail in Table A2.5.

Citation searches

Reference lists of potentially relevant publications were searched to identify any further primary or secondary studies. Any relevant primary studies identified in our search were used in a citation search in the Web of Science database to identify any further studies that met our inclusion criteria.

Table A2.4. Website searches to identify relevant guidelines (searched for epidural injections, medial branch blocks, facet joint injections and sacroiliac joint injections)

Guideline Services		
National Health and Medical Research Council (NHMRC)	www.nhmrc.gov.au	Web page reviewed: Guidelines, health
National Institute for Health and Clinical Excellence UK (NICE)	www.nice.org.uk	Web page reviewed: Our guidance, health topic, injury, accident & wounds Web page reviewed: Our guidance, health topic, musculoskeletal Web page reviewed: Our guidance, health topic, surgical procedures, bones and joint surgery Web page reviewed: Our guidance, health topic, surgical procedures, nervous system surgery
New Zealand Guideline Group (NZGG)	www.nzgg.org.nz	Web page reviewed:: Guidelines and Reports Additional search by terms: evidence for practice, primary care guidelines
Scottish Intercollegiate Guidelines Network (SIGN)	www.sign.ac.uk	Web page reviewed: Guidelines
Joanna Briggs Institute	www.joannabriggs.edu.au	Web page reviewed: Systematic reviews & best practice information (member access only)
Guidelines International Network	www.g-i-n.net	Web page reviewed:: International Guideline Library (members only) Searched by keywords: *spinal, injection, block*
Guidelines Advisory Committee	www.gacguidelines.ca	Web page reviewed: List all topics and summaries
National Guideline Clearinghouse US (NGC) (1) **searched on 09/02/09 – 47 Results total** (2) **searched on 09/02/09 – 92 Results total**	www.guidelines.gov	Searched by: (1) ((epidural OR facet joint) AND injection) (2) (((med* OR nerve OR branch OR dorsal OR posterior) AND block) AND pain)
TRIP Database (1) **searched on 09/02/09 – 159 Results total** (48 – North America, 37 – Europe, 9 – Other) + 65 systematic reviews	www.tripdatabase.com	Searched by: (((epidural OR facet joint) AND injection) OR ((medial OR nerve OR branch OR dorsal OR posterior) AND block) AND pain) – limited by guidelines and systematic reviews
Australian Government Websites containing Guidelines		
Australian Government Department of Health and Ageing	www.health.gov.au	Web page reviewed: Health Professionals – Treatments & Techniques – Guidelines
NSW Health	www.health.nsw.gov.au	Web page reviewed: Publications & Resources – Policy Directives and Guidelines
Centres of Evidence Based Practice Websites		
WA Centre for Evidence Based Nursing and Midwifery	http://wacebnm.curtin.edu.au	Web page reviewed: Resources – 'Reports, Guidelines and Article'

Other Accident Commissions		
Motor Accidents Authority NSW	www.maa.nsw.gov.au/	Web page reviewed: Publications & Reports – MAA Guidelines – Guides for Professionals
Accident Compensation Corporation	www.acc.co.nz/index.htm	Web page reviewed:: For Providers – Guidelines & Best Practice – Published Clinical Guidelines
Pain Treatment Topics	http://pain-topics.org/guidelines_reports/index.php	Web page reviewed: Current Pain Treatment Guidelines
WorkSafe VIC	www.workcover.vic.gov.au	Web page reviewed: Safety & Prevention; Health and Safety Topics
Work Cover NSW	www.workcover.nsw.gov.au	Web page reviewed: Publications
Work Cover WA	www.workcover.wa.gov.au	Web page reviewed: Publications – Publications for health providers
Pain Websites		
British Pain Society	http://www.britishpainsociety.org	Web page reviewed: Publications
Faculty of Pain Medicine – Australian New Zealand College of Anaesthetists	http://www.anzca.edu.au/fpm/	Web page reviewed:: Resources, Professional Documents
American Pain Society	http://www.ampainsoc.org	Web page reviewed: Publications, Clinical Practice Guidelines
The American Academy of Pain Medicine	http://www.painmed.org/	Web page reviewed: Clinical Information, Clinical Guidelines
The Pain Association of Singapore	http://www.pain.org.sg/	Web page reviewed: Pain Guidelines and Management

Table A2.5 Internet search to identify relevant guidelines and systematic reviews (searched for epidural injections, medial branch blocks, facet joint injections and sacroiliac joint injections)

Identification of relevant guidelines and systematic reviews using Google	
Find web pages that have **all these words**	*(spinal OR epidural OR facet OR sacro OR nerve OR intraarticular OR zygapophys OR ramus OR root OR perineural OR branch) AND (injection OR block) AND (evidence OR guideline OR systematic)*
Find web pages that have this **exact wording or phrase**	
Find web pages that have **one or more of these words**	
Don't show pages that have **any of these unwanted words**	
Language	English
Results (12/02/09) completed search:	47,400,000
Google Edits at	545

Appraisal

All quality appraisals were conducted by a single reviewer in consultation with colleagues as required

Quality

Evidence-based guidelines and systematic reviews

The most recent and comprehensive EBG or systematic review was appraised according to standard appraisal criteria.

Other study designs

Where EBGs or systematic reviews were identified, critical appraisal of other study designs was to be limited to trials identified in our search that had not been previously described in the synthesised literature. We did not find any other studies than those identified in the appraised systematic reviews.

Level of evidence

Levels of evidence reflect the methodological rigour of studies. We used the National Health and Medical Research Council[15] (NHMRC) designation of levels of evidence to determine this. A study assigned as level I evidence is considered the most rigorous and least susceptible to bias, while a study deemed to be level IV evidence is considered the least rigorous and is more susceptible to bias. See Table A2.6, for details.

Studies found to be of poor methodological quality cannot be assigned a level of evidence.

Table A2.6. Designation of levels of evidence

Level I	Evidence obtained from a systematic review of all relevant randomised controlled trials
Level II	Evidence obtained from at least one properly designed randomised controlled trial
Level III-1	Evidence obtained from well-designed pseudo-randomised controlled trials (alternate allocation or some other method)
Level III-2	Evidence obtained from comparative studies with concurrent controls and allocation not randomised (cohort studies), case-control studies or interrupted time series with a control group
Level III-3	Evidence obtained from comparative studies with historical control, two or more single-arm studies or interrupted time series without a parallel control group
Level IV	Evidence obtained from case series, either post-test or pre-test and post-test

Scope

Patient groups included and outcomes measured in the studies identified for each intervention were reviewed to consider the scope covered and identify any gaps in the information provided.

Consistency of findings

The findings reported by separate studies were compared and assessed for consistency. In cases where findings appear to be inconsistent with other studies, these were further explored to determine whether differences in study design, scope, or quality can explain disparate findings between studies.

APPENDIX 3. EVIDENCE MAP AND RECOMMENDATIONS

Intervention	EBGs	SRs/HTAs	RCTs	CCTs	Cohort studies
Medial branch blocks	0	0	0	0	0
Cervical facet joint injections	0	0	0	0	0
Thoracic facet joint injections	0	1	0	0	0
Lumbar facet joint injections	2	3	2	1	0
Sacroiliac joint injections	0	0	0	0	0

1. Medial branch blocks

No synthesised research, RCTs, CCTs or cohort studies were found which were relevant to this intervention.

Recommendations for further action

We recommend that no further evidence synthesis is undertaken and that the review reports that there is no evidence of effectiveness.

2. Cervical facet joint injections

No synthesised research, RCTs, CCTs or cohort studies were found which were relevant to this intervention.

Recommendations for further action

We recommend that no further evidence synthesis is undertaken and that the review reports that there is no evidence of effectiveness.

3. Thoracic facet joint injections

A current good quality systematic review with low-moderate risk of bias is available. However, this systematic review did not identify any relevant primary studies. In addition, our search did not identify any relevant studies.

Recommendations for further action

We recommend that no further evidence synthesis is undertaken and that the review reports that there is no evidence of effectiveness.

4. Lumbar facet joint injections

A current high quality systematic review with comprehensive scope and findings consistent with other synthesised research is available.[2] The primary studies included in the review are two RCTs and one CCT.

Recommendations for further action

We recommend that no further evidence synthesis is required and that this review is used to answer the TAC/WSV questions.

5. Sacroiliac joint injections

No synthesised research, RCTs, CCTs or cohort studies were found which were relevant to this intervention.

Recommendations for further action

We recommend that no further evidence synthesis is undertaken and that the review reports that there is no evidence of effectiveness.

APPENDIX 4: APPRAISAL OF STUDY QUALITY

Appraisal tables for EBG and systematic review (in alphabetical order by first author)

Study: Atluri S, Datta S, Falco FJE, Lee M. Systematic review of diagnostic utility and therapeutic effectiveness of thoracic facet joint interventions. Pain Physician. Sep-Oct 2008;11(5):611-629.

Description of study: Systematic review	
Patient/population	Patients with chronic mid-back and upper back pain caused by thoracic facet joints
N	No studies were found that evaluated therapeutic facet joint injections Additional studies were included which evaluated injections other than facet joint injections; we have not included these as they are not relevant to our review.
Setting	Not specified
Intervention/indicator	Intraarticular facet joint injections This review also included medial branch blocks and medial branch radiofrequency neurotomy; we could not include these as they included studies which did not meet our inclusion criteria.
Comparison/control	Not specified
Outcomes	Pain, functional status, psychological status improvement, return to work, and complications.
Inclusion criteria	Studies had to document the existence of thoracic spinal pain of facet joint origin using controlled diagnostic facet joint or nerve block. All studies had to provide "*appropriate management with outcome evaluations*" of at least six months and appropriate statistical analysis.
Exclusion criteria	Reports without appropriate diagnosis and elimination of false-positive responses, abstracts beyond two years, non-systematic reviews, book chapters and case reports were excluded.

Study Validity		
Were there any conflicts of interest in the writing or funding of this review?	No	
Were reviewers blind to authors, institutions and affiliations?	Not reported	
Does the review have a clearly- focused question?	Yes	*"This systematic review is undertaken to determine the accuracy of thoracic facet joint blocks in the diagnosis and effectiveness of thoracic facet joint interventions in the management of chronic mid back and upper back pain."*
Does the review have specified inclusion/exclusion criteria?	Yes	As above in the inclusion criteria and exclusion criteria sections.
Were 2 or more independent reviewers used for: **1. application of inclusion criteria to assess eligibility of studies?**	Not reported	
2. extraction of data from study reports?	Not reported	
3. appraisal of study quality?	Yes	

If there were specified inclusion/ exclusion criteria, were these appropriate?	Yes	
Does the review document a comprehensive search strategy?	Partial	*"A comprehensive literature search was conducted which included search of databases including Medline and EMBASE from 1966 through July 2008, Cochrane database, Clinical Trial Registry, systematic reviews, narrative reviews, cross-references to the reviews, and peer-reviewed abstracts from scientific meetings (during the past 2 years), published in the English language.* *The search strategy emphasized chronic thoracic pain of facet joint origin with a focus on all types of diagnostic and therapeutic interventions. Search terminology included thoracic facet joint, thoracic facet joint pain, thoracic diagnostic facet joint blocks, thoracic facet joint intraarticular injections, medial branch blocks, and radiofrequency neurotomy."* Ideally the search strategy would have been written so that it would be reproducible. This has not happened here.
Was the validity of included trials appraised using appropriate criteria?	Yes	*"The quality of each individual article used in this analysis was assessed by modified Cochrane review criteria with weighted scores for randomized trials and AHRQ (Agency for Healthcare Research and Quality) quality criteria for assessment of observational studies for non-randomized trials with consensus-based weighted scoring developed by the guidelines committee of the American Society of Interventional Pain Physicians."*
Is there a summary of the results of individual studies?	Yes	A summary of results of individual studies was provided for interventions for which studies had been found. For our intervention (facet joint injections) no studies were found.
Were the strengths and limitations of included studies and potential impact on the results discussed?	Partial	Limitations of the studies have been documented for intervention for which studies were found, but how this could impact on the results has not been reported explicitly. For our intervention (facet joint injections) no studies were found.
If meta-analyses were conducted, was it reasonable to do so?	N/A	
If meta-analyses were conducted, was it done appropriately?	N/A	
Other		
What is the overall risk of bias?	Low/moderate	

Results

No studies were found which evaluated thoracic facet joint injections.

Author's Conclusions

N/A

Our comments/summary

This is a moderately well conducted review with a low to moderate risk of bias. The concerns with this review are that the search strategy was not reproducible, it was not reported how the application of selection criteria and data extraction was undertaken; also the limitations of included studies and potential impact on the results were not fully discussed.

Study: Institute for Clinical Systems Improvement. Assessment and Management of Chronic Pain. 2008; Third Edition
http://www.icsi.org/pain__chronic__assessment_and_management_of_14399/pain__chronic__assessment_and_management_of__guideline_.html. Accessed February 2009.

Description of study: EBG

Patient/population	The guideline will address the management of chronic pain for physiologically mature adolescents (between 16-18 years) and adults. It can be applied to paediatric populations where noted. It is not intended for the treatment of migraine headaches, cancer pain, advanced cancer pain, or in the context of palliative care or end-of-life management.
N	Not specified
Setting	Not specified
Intervention/indicator	Facet joint injections This review also included many other interventions; we have not included these as they are not relevant to our review.
Comparison/control	Not specified
Outcomes	Not specified
Inclusion criteria	As above in the patient/population section
Exclusion criteria	As above in the patient/population section

Study Validity

Were there any conflicts of interest in the writing or funding of this review?	Yes	*"Miles Belgrade, MD, received speaker's fees and consultant fees from Pfizer.* *Michael Hooten, MD, participated in research projects through Mayo Clinic funded by Pfizer, Eli Lilly and Sucampo pharmaceuticals.* *Louis Saeger, MD, participated in research projects through Midwest Spine Institute funded by Medtronic and DePuy Spine, Inc., and another for a Centrocor pharmaceutical agent funded by Midwest Spine Research Foundation."*
Were reviewers blind to authors, institutions and affiliations?	Not reported	
Does the review have a clearly- focused question?	Partial	This is a guideline and does not have a clearly focused question. However, some of the elements required for a clearly focused question are present; i.e. the patient group and the intervention are defined. Outcomes to be assessed are not specifically defined.
Does the review have specified inclusion/exclusion criteria?	Partial	As above in the inclusion criteria and exclusion criteria sections.

Were 2 or more independent reviewers used for: **1. application of inclusion criteria to assess eligibility of studies?**	Not reported	
2. extraction of data from study reports?	Not reported	
3. appraisal of study quality?	Not reported	
If there were specified inclusion/ exclusion criteria, were these appropriate?	Partial	The inclusion/exclusion criteria provide insufficient information to be able to determine whether they were appropriate.
Does the review document a comprehensive search strategy?	No	The Institute for Clinical Systems Improvement (ICSI) has a document which provides information on the process for the development, revision and approval of health care guidelines. In this it states: *"ICSI staff working with the work group conducts a literature search to identify any pertinent clinical trials, meta-analysis, systematic reviews, or regulatory statements and other professional guidelines."* This does not provide specific information such as which databases are searched. There is no documentation of search strategy for our question; we therefore can not know how comprehensive this was.
Was the validity of included trials appraised using appropriate criteria?	Partial	The quality of included studies is evaluated according to appropriate criteria. These are detailed in a separate document entitled Evidence Grading System. For primary studies the criteria are: *"1. Were the inclusion and exclusion criteria exceptionally well-defined and adhered to?* *2. Were <u>no</u> serious questions of bias introduced in the study (e.g., through the processes of subject selection, end point selection, and observation or data collection)?* *3. Does the report show a statistically significant and clinically important treatment effect or, for a negative conclusion, have high power?* *4. Are the results widely generalizable to other populations?* *5. Were other characteristics of a well-designed study clearly addressed in the report (e.g., treatment and control groups comparable at baseline, compliance with the intervention, use of intention to treat analysis, all important outcomes measured, statistics appropriate for study design)?"* For systematic reviews the criteria are: *"1. Was the search for primary studies comprehensive (i.e., multiple sources) and current? Were clear criteria given for inclusion and exclusion of primary studies?* *2. Was the quality of the articles included in the analysis assessed and reported?* *3. If a meta-analysis was done, was homogeneity assessed? If no meta-analysis was done, did the authors state why not? Was there at least a narrative synthesis of the primary studies?* *4. Are the primary studies included in the review applicable (i.e., generalizable) to the target population?* *5. Are the conclusions valid (i.e., based on the primary evidence)?"* Although there are criteria, there is no evidence in the guideline that the included studies were appraised.

Is there a summary of the results of individual studies?	No	
Were the strengths and limitations of included studies and potential impact on the results discussed?	No	
If meta-analyses were conducted, was it reasonable to do so?	N/A	
If meta-analyses were conducted, was it done appropriately?	N/A	
Other		
What is the overall risk of bias?	Moderate	

Results

Results were not specifically provided. All the information for facet joint injections is detailed below in the Author's conclusion section.

Author's Conclusions

"Facet joints are an important source of spinal pain in the cervical and lumbar regions. These joints can be reliably anesthetized by way of fluoroscopically guided joint injections. Generally, a depot corticosteroid is concomitantly administered. However, clinical trials have failed to demonstrate any sustained therapeutic benefits following facet joint corticosteroid injections."

Our comments/summary

The concerns with this review include possible conflict of interest, the search strategy not being explicitly documented, and the validity of the trials not being appraised.

This is a general guideline with a small section related to facet joint injections. As no results/findings were reported, it is difficult to know how the authors came to their conclusion.

Study: Staal JB, de Bie R, de Vet HC, Hildebrandt J, Nelemans P. Injection therapy for subacute and chronic low-back pain. Cochrane Database of Systematic Reviews. 2008(3):CD001824.

Description of study: systematic review

Patient/population	Aged from 18 to 70 years, with low back pain with symptoms for one month or more. Subacute low-back pain was defined as lasting at least 4 weeks and chronic was defined as lasting for at least 12 weeks. All studies relevant for this review only included patients with persistent pain (at least 3 months duration).
N	Two RCTs (n=210) compared corticosteroid facet joint injections with placebo injections One CT (n=70) compared facet joint injections and home stretching program with home stretching programme alone. Additional studies were included which evaluated injections other than facet joint injections; we have not included these as they are not relevant to our review.
Setting	Not specified
Intervention/indicator	Facet joint injections This review also included epidural injections and local injections; we have not included these as they are not relevant to our review.
Comparison/control	Not specified
Outcomes	Pain, functional status, work attendance and side effects. This review also included generic health status or well-being and patient satisfaction; we have not included these as they are not relevant to our review. Outcomes were assessed both short-term (less than six weeks) and long-term (longer than six weeks).
Inclusion criteria	Randomised controlled trials Studies needed to include pain as an outcome.
Exclusion criteria	o Non-randomised studies o Studies that compared epidural steroids for radicular pain, intradiscal injections, prolotherapy, or Ozone therapy with other treatments, unless injection therapy with another pharmaceutical agent (no placebo treatment) was part of the treatment arms. o Studies which included injections into the sacroiliac joint or drugs administered via a catheter or not directly by means of an injection

Study validity

Were there any conflicts of interest in the writing or funding of this review?	No	
Were reviewers blind to authors, institutions and affiliations?	Not reported	
Does the review have a clearly- focused question?	Yes	*"The objective of this systematic review was to assess the effectiveness of injection therapy for patients with subacute or chronic low-back pain."*
Does the review have specified inclusion/exclusion criteria?	Yes	As above in the inclusion criteria and exclusion criteria sections.

Were 2 or more independent reviewers used for: **1. application of inclusion criteria to assess eligibility of studies?**	Yes	*"Two reviewers independently selected new studies, assessed the methodological quality, and extracted data (using standardised form)."*
2. extraction of data from study reports?	Yes	As above
3. appraisal of study quality?	Yes	As above
If there were specified inclusion/ exclusion criteria, were these appropriate?	Yes	
Does the review document a comprehensive search strategy?	Yes	**"***MEDLINE and EMBASE searches were based on the search strategies recommended by the Cochrane Back Review Group. The Cochrane CENTRAL database was also screened for relevant RCTs. In addition, citation tracking of the studies retrieved by the search was performed until no new studies were found."* Details of the actual search strategies were provided.
Was the validity of included trials appraised using appropriate criteria?	Yes	Criteria which were used to assess study quality were method of randomisation adequate; concealment of treatment allocation; blinding of patients, care providers and outcome assessors; drop-out rate reported and acceptable; intention to treat analyses; similarity of baseline characteristics; co-interventions avoided or similar between groups; similar timing of outcome assessments between groups. Studies were also assessed for clinical relevance using criteria rated to participant group, interventions and treatment settings, size of effect and benefits worth the potential harms.
Is there a summary of the results of individual studies?	Yes	
Were the strengths and limitations of included studies and potential impact on the results discussed?	Partial	Limitations of the studies have been documented, but how this could impact on the results has not been reported explicitly.
If meta-analyses were conducted, was it reasonable to do so?	N/A	
If meta-analyses were conducted, was it done appropriately?	N/A	
Other	Although the inclusion criteria state that only RCTs are included, one of the studies relevant to our questions has inadequate randomisation methods and is therefore a pseudorandomised controlled trial. Assignment was based on date of the month of their initial visit alternating with patients allocated to the other group.	
What is the overall risk of bias?	Low	

Results

Pain relief

Facet joint injections with corticosteroids versus placebo

Two RCTs (n=210) reported on this outcome. Both RCTs found no significant differences in pain relief between the groups up to three months (the review did not record how pain was measured). Only one RCT (n=101) measured pain after three months and found the corticosteroid injection group had significantly better pain scores (measured on a VAS) at six months than the placebo group (figures not provided). However when concurrent interventions were taken into account, these differences were reduced; no further information is available from the review.

Facet joint injections with corticosteroids combined with a home stretching exercise programme versus a home stretching exercise programme alone

One pseudorandomised CT (n=70) reported on this outcome. This CT found no significant differences in pain relief between the two groups up to seven weeks post intervention (the review did not record how pain was measured).

Functional status

Facet joint injections with corticosteroids versus placebo

Two RCTs (n=210) reported on this outcome. Both RCTs found no significant differences in functional status or disability up to three months (the review did not record how these were measured).. Only one RCT (n=101) measured functional status after three months and found the corticosteroid injection group had significantly better scores in the physical dimension of the Sickness Impact Profile at six months than the placebo group (figures not provided). However when concurrent interventions were taken into account, these differences were reduced; no further information is available from the review.

Facet joint injections with corticosteroids combined with a home exercise programme versus a home stretching exercise programme alone

One CT (n=70) reported on this outcome. This CT found no significant differences in disability between the two groups up to seven weeks post intervention.

Work

Facet joint injections with corticosteroids versus placebo

One RCT (n=109) reported on this outcome. This RCT reported that no significant difference in work attendance was found between the groups up to three months.

Author's conclusions

"There is insufficient evidence to support the use of injection therapy in subacute and chronic low-back pain. However, it cannot be ruled out that specific subgroups of patients may respond to a specific type of therapy."
This was a general conclusion provided for all the interventions of this review.

Our comments/summary

This is a well conducted review. The only concern with this review is that the strengths and limitations of included studies and potential impact on the results were not fully discussed.