

Conservative versus operative treatment for hip fractures in adults (Review)

Handoll HHG, Parker MJ



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[Intervention Review]

Conservative versus operative treatment for hip fractures in adults

Helen HG Handoll¹, Martyn J Parker²

¹c/o University Department of Orthopaedic Surgery, Royal Infirmary of Edinburgh, Edinburgh, UK. ²Orthopaedic Department, Peterborough and Stamford Hospitals NHS Foundation Trust, Peterborough, UK

Contact address: Helen HG Handoll, c/o University Department of Orthopaedic Surgery, Royal Infirmary of Edinburgh, Old Dalkeith Road, Little France, Edinburgh, EH16 4SU, UK. h.handoll@tees.ac.uk. H.Handoll@ed.ac.uk.

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ABSTRACT

Background

Until operative treatment involving the use of various implants was introduced in the 1950s, hip fractures were managed using conservative methods based on traction and bed rest.

Objectives

To compare conservative with operative treatment for fractures of the proximal femur (hip) in adults.

Search strategy

We searched the Cochrane Bone, Joint and Muscle Trauma Group Specialised Register (March 2008), the Cochrane Central Register of Controlled Trials (*The Cochrane Library* 2008, Issue 1), MEDLINE (1966 to 2008), EMBASE (1988 to 2008), Current Controlled Trials, orthopaedic journals, conference proceedings and reference lists of articles.

Selection criteria

Randomised and quasi-randomised trials comparing these two treatment methods in adults with hip fracture.

Data collection and analysis

Two review authors independently assessed trial quality and extracted data. Additional information was sought from trialists. After grouping by fracture type, comparable groups of trials were subgrouped by implant type and data were pooled where appropriate using the fixed-effect model.

Main results

The five randomised trials included in the review involved only 428 elderly patients. One small and potentially biased trial of 23 patients with undisplaced intracapsular fracture showed a reduced risk of non-union for those fractures treated operatively. The four trials on extracapsular fractures tested a variety of surgical techniques and implant devices and only one trial involving 106 patients can be considered to test current practice. In this trial, no differences were found in medical complications, mortality and long-term pain. However, operative treatment was more likely to result in the fracture healing without leg shortening, a shorter hospital stay and a statistically non-significant increase in the return of patients back to their original residence.

Authors' conclusions

Although there is a lack of available evidence to inform practice for undisplaced intracapsular fractures, variation in practice has reduced and most fractures are treated surgically. The limited available evidence from randomised trials does not suggest major differences in outcome between conservative and operative management programmes for extracapsular femoral fractures, but operative treatment is associated with a reduced length of hospital stay and improved rehabilitation. Conservative treatment will be acceptable where modern surgical facilities are unavailable, and will result in a reduction in complications associated with surgery, but rehabilitation is likely to be slower and limb deformity more common. Currently, it is difficult to conceive circumstances in which future trials would be practical or viable.

PLAIN LANGUAGE SUMMARY

Conservative versus operative treatment for hip fractures in adults

Roughly half of all hip fractures are within the hip joint capsule (intracapsular) and the rest occur outside the hip joint capsule (extracapsular). Nowadays, most of these fractures will be surgically fixed or stabilised using metal implants. However, some patients have conservative treatment which can involve traction, bed rest or restricted mobilisation.

The five randomised trials included in the review involved only 428 elderly patients. One small and potentially biased trial of 23 patients with undisplaced intracapsular fracture provided limited evidence that surgical fixation increased the chances of the fracture healing. The four trials on extracapsular fractures tested a variety of surgical techniques and implant devices and only one trial involving 106 patients can be considered to test current practice. This trial found no major difference between surgery and traction for people with extracapsular fractures. However, people who had surgery had better anatomical outcomes, tended to leave hospital sooner, and seemed less likely to lose their independence.

The review concluded that overall there was insufficient evidence to determine if surgery is better than bed rest and traction for the two categories of hip fractures tested in randomised trials. However, nowadays most people with hip fracture are treated surgically where it is safe to do so. This reflects advances in surgery and anaesthesia and a clearer understanding of the benefits of early mobilisation and of the risks of prolonged hospital stay.

BACKGROUND

Description of the condition

The majority of hip fractures occur in older people with an average age of around 80 years. The ratio of females to males with this injury is around four to one and the injury is usually the result of a simple fall. People suffering a hip fracture frequently have other medical and physical problems associated with ageing.

Hip fractures, also termed proximal femoral fractures, can be subdivided into intracapsular (also termed subcapital and transcervical) fractures and extracapsular (also termed trochanteric, intertrochanteric, pertrochanteric and subtrochanteric) fractures. Intracapsular fractures are those occurring proximal to the attach-

ment of the hip joint capsule to the femur at the intertrochanteric line. Extracapsular fractures are those which traverse the femur within the area of bone bounded by the intertrochanteric line proximally up to a distance of five centimetres from the distal part of the lesser trochanter. Numerous subdivisions and classification methods exist for these fractures. Intracapsular fractures can be subdivided into those which are displaced and those which are essentially undisplaced. Undisplaced fractures include those which are termed impacted or adduction fractures. Many other subdivisions and classification methods exist for intracapsular fractures but have not been shown to be of reliable clinical usefulness (Parker 1999). Extracapsular fractures may also be subdivided into undisplaced and displaced fractures and the displaced fractures may be further subdivided into different groups dependent on the degree

of fracture comminution (Parker 2002). The distinction between intracapsular and extracapsular fractures is made in this review.

Description of the intervention

The treatment of a hip fracture may be either conservative or operative. Conservative treatment is also termed non-operative treatment and may entail a period of bedrest, restricted mobilisation, traction or even reduction of the fracture and application of plaster. Some of these methods of treatment, such as the use of plaster, would now be considered of historical interest only. Operative treatment may entail either preserving the femoral head by stabilising the fracture using various implants (internal fixation) or replacing the femoral head with an artificial hip prosthesis (arthroplasty).

How the intervention might work

Undisplaced (impacted) intracapsular fractures

Conservative treatment for undisplaced intracapsular fractures has been described in the literature and its use, as primary treatment, advocated by some (Raaymakers 1991). Opinion differs as to whether conservative treatment is appropriate only for those fractures which are impacted or if it may be used for those fractures which are truly non-displaced (not impacted or displaced). Conservative treatment of an undisplaced intracapsular fracture may involve a period of bed rest followed by mobilisation which may be either unrestricted or with limitations on weight bearing or activities, depending on the physician's preference.

Operative treatment for undisplaced intracapsular fractures generally entails preservation of the femoral head by internal fixation. This involves passing single or multiple screws or pins across the fracture site under X-ray guidance. An alternative is to replace the femoral head by an arthroplasty; this method of treatment is generally considered by most surgeons to be inappropriate for this type of fracture.

The main fracture healing complications that occur after an undisplaced intracapsular fracture are failure of the fracture to heal (non-union) and collapse of the femoral head (avascular necrosis or segmental collapse). The latter complication is due to damage to the blood supply to the femoral head. The term non-union customarily refers both to those fractures which fail to heal, and to those fractures which displace.

Displaced intracapsular fractures

Historically these fractures were treated by closed reduction and the application of plaster or traction, with the hope that the fracture would heal. With the advent of surgical techniques, surgery is now almost invariably used to treat this fracture. This is because if left untreated, non-union of the fracture, which may result in a painful and functionless hip, is very common. Surgical treatment may either entail reduction and internal fixation, or re-

placement arthroplasty. Conservative treatment generally involves nursing care only, with the use of appropriate analgesia; there is commonly an underlying acceptance that the fracture will fail to heal.

Extracapsular fractures

Conservative treatment for extracapsular hip fractures entails applying traction to the injured limb either via a pin inserted into the tibia (skeletal traction), or using adhesive tape or bandages applied to the injured leg (skin traction). Between four to nine kilograms of weight is then applied to reduce the fracture. Traction is then maintained whilst the fracture heals, a period of two to four months.

Operative treatment was introduced around the 1950s using a variety of different implants. The advantage was that it allowed earlier mobilisation of the patient and thereby avoided some of the complications of recumbency in the elderly. The most commonly used implant is the sliding hip screw (SHS): this is synonymous with the term compression hip screw and equivalent models such as the Dynamic, Richards or Ambi hip screws. It consists of a screw passed up the femoral neck to the head and then attached to a plate on the side of the femur. These are considered as 'dynamic' implants as they have the capacity for sliding at the plate/screw junction to allow for collapse at the fracture site. Fixed nail plates such as the Jewett, Thornton and McLaughlin nail plates are similar but have no capacity for sliding and hence are termed 'static' or 'fixed' implants. An alternative form of internal fixation uses an intramedullary nail with a side screw passed up into the femoral head. Examples of such a nail include the Gamma nail and Intramedullary Hip Screw. Cochrane reviews comparing different types of implants used for extracapsular hip fractures are available (for example, Parker 2006; Parker 2008).

Why it is important to do this review

The importance of this review has diminished since it was first published (the review evaluating this comparison for extracapsular hip fractures was first published in Issue 1, 1997; the scope was subsequently extended to cover all hip fractures in 2000). This is because the context has changed considerably. Advances in surgery and anaesthesia have lowered the risks associated with surgery. The benefits of early mobilisation and rehabilitation have become clearer and these, together with economic and health imperatives of avoiding prolonged hospital stay, mitigate against conservative treatment. Far more emphasis is now placed on the possible deleterious effects of delayed surgery, rather than questioning whether surgery is required. Nonetheless, it remains important to present what evidence from randomised trials there is to inform practice. Moreover, in some areas of the world, particularly where low incomes or different attitudes to surgery apply, this question remains relevant to current clinical decision making.

OBJECTIVES

To compare the relative effects (fracture fixation complications, post-operative complications, anatomical restoration, and final outcome measures) of conservative treatment versus operative treatment for all types of hip fracture in adults. Results for the treatment of extracapsular and intracapsular hip fractures were analysed separately. Furthermore, an a priori distinction was made between undisplaced and displaced intracapsular hip fractures.

METHODS

Criteria for considering studies for this review

Types of studies

All randomised controlled trials comparing conservative treatment with operative treatment. Quasi-randomised trials (for example, alternation) and trials in which the treatment allocation was inadequately concealed were considered for inclusion.

Types of participants

Skeletally mature patients with a proximal femoral fracture.

Types of interventions

All forms of conservative treatment of the fracture including those involving traction and bed rest. Operative treatment (here the control group) involving either internal fixation of the fracture or arthroplasty.

Types of outcome measures

Data for the following outcomes were sought:

(1) Fracture fixation complications

- non-union of the fracture (the definition of non-union was that used within each individual study and will include early displacement or loss of position of the fracture)
 - avascular necrosis of the femoral head
 - subsequent operation or reoperation (within the follow-up period of the study)

For operative treatment only

- fracture of the femur (around or below the implant)
- 'cut-out' of the implant proximally (penetration of the implant from the proximal femur either into the hip joint or external to the femur).
 - breakage of the implant
 - separation of the two components of the implant

- other major complications of fixation as detailed in each individual study
 - fracture fixation failure rate (a summation of the above five items)
 - wound infection: overall and by severity:
 - superficial wound infection (infection of the wound in which there is no evidence that the infection extends to the site of the implant)
 - deep wound infection (infection around the implant)

For conservative treatment only (omitted in original protocol)

- pin tract infection
 - pin loosening
 - traction pressure sores
- (2) Postoperative, clinical course and complications
- pneumonia
 - pressure sores (sacral and heel)
 - thromboembolic complications (deep vein thrombosis, pulmonary embolism)
 - any medical complication including mental confusion (as detailed in each individual study)
 - transfusion requirements
 - length of hospital stay (in days)
 - number of patients not discharged from hospital at the end of follow-up period
 - cost of treatment
- (3) Anatomical restoration
- shortening of the leg (of more than 2 cm)
 - varus deformity
 - external rotation deformity (of more than 20 degrees)
- (4) Final outcome measures (preferably at least six months from injury)
- mortality (within the follow-up period of the study)
 - pain (persistent pain at the final follow-up assessment)
 - failure to return to place of residence; loss of independence
 - failure to regain mobility
 - failure to regain activities of daily living
 - failure to regain in health related quality of life/functional assessment outcomes

Search methods for identification of studies

Electronic searches

We searched the Cochrane Bone, Joint and Muscle Trauma Group Specialised Register (March 2008), the Cochrane Central Register of Controlled Trials (*The Cochrane Library* 2008, Issue 1), MEDLINE (1966 to March week 4 2008) and EMBASE (1988

to 2008 Week 14). We searched Current Controlled Trials at www.controlled-trials.com (accessed April 2008) for ongoing and recently completed trials. No language restriction was applied. The generic search strategies for hip fracture trials in *The Cochrane Library* (Wiley Interscience) and MEDLINE (2004 onwards) are shown in [Appendix 1](#). This MEDLINE search was combined with all three stages of the optimal trial search strategy ([Higgins 2006](#)). The general search strategy for hip fracture trials in EMBASE (2004 onwards) is shown in [Appendix 2](#).

Searching other resources

We searched reference lists of articles and our own reference databases. We checked the findings from handsearches of the British Volume of the Journal of Bone and Joint Surgery supplements (1996 to 2006) and abstracts of the American Orthopaedic Trauma Association annual meetings (1996 to 2007: <http://www.hwb.org/ota/am/>) and American Academy of Orthopaedic Surgeons annual meeting (2004 to 2007: www.aaos.org/wordhtml/libscip.htm). We also included handsearch results from the final programmes of SICOT (1996 & 1999) and SICOT/SIROT (2003), EFORT (2007) and the British Orthopaedic Association Congress (2000, 2001, 2002, 2003, 2005 and 2006). We scrutinised weekly downloads of “Fracture” articles in new issues of 15 journals (Acta Orthop Scand; Am J Orthop; Arch Orthop Trauma Surg; Clin J Sport Med; Clin Orthop; Foot Ankle Int; Injury; J Am Acad Orthop Surg; J Arthroplasty; J Bone Joint Surg Am; J Bone Joint Surg Br; J Foot Ankle Surg; J Orthop Trauma; J Trauma; Orthopedics) from AMEDEO (www.amedeo.com).

Searches conducted up to June 2004 were mainly those of the Cochrane Bone, Joint and Muscle Trauma Group Specialised Register, locally accessible conference proceedings and orthopaedic journals, reference lists of articles and contacting trialists.

Data collection and analysis

Selection of studies

Two review authors (MP and HH) independently assessed potentially eligible trials for inclusion. Any disagreement was resolved by discussion.

Data extraction and management

Data for the outcomes listed above were independently extracted by at least two review authors and any differences resolved by discussion. Where necessary and practical, we contacted trialists for additional data and clarification.

Assessment of risk of bias in included studies

In this review, risk of bias is implicitly assessed in terms of methodological quality. Each trial was assessed independently, without masking of authors or source, for its quality of methodology by two review authors. All differences were resolved by discussion. In total, 12 aspects of methodology were rated (*see Table 1*). The scores of the individual items were no longer summed from 2008 onwards.

Table 1. Methodological quality assessment scheme

Items	Scores
1. Was there clear concealment of allocation?	Score 3 (and code A) if allocation was concealed (e.g. numbered sealed opaque envelopes drawn consecutively). Score 2 (and code B) if there was a possible chance of disclosure before allocation. Score 1 (and code B) if the method of allocation concealment or randomisation was not stated or was unclear. Score 0 (and code C) if allocation concealment was clearly not concealed such as those trials using quasi-randomisation (e.g. even or odd date of birth).
2. Were the inclusion and exclusion criteria clearly defined?	Score 1 if text states the type of fracture and which patients were included and/or excluded. Otherwise score 0.
3. Were the outcomes of trial participants who withdrew or excluded after allocation described and included in an intention-to-treat analysis?	Score 1 if yes or text states that no withdrawals occurred, or data are presented that, by clearly showing 'participant flow', allow this to be inferred. Otherwise score 0.

Table 1. Methodological quality assessment scheme (Continued)

4. Were the treatment and control groups adequately described at entry and if so were the groups well matched or appropriate co-variate adjustment made?	Score 1 if at least four admission details given (e.g. age, sex, mobility, function score, mental test score, fracture type) with no significant difference between groups or appropriate adjustment made. Otherwise score 0.
5. Were the health care workers/surgeons experienced in both interventions prior to the commencement of the trials?	Score 1 if text states there was an introductory period or that all health care workers including surgeons were experienced in the procedures they provided. Otherwise score 0.
6. Were the care programmes other than trial options identical?	Score 1 if text states they were or if this can be inferred. Otherwise score 0.
7. Were the outcome measures clearly defined in the text with a definition of any ambiguous terms encountered?	Score 1 if yes. Otherwise score 0.
8. Were the outcome assessors blind to assignment status?	Score 1 if assessors of pain, anatomical restoration and function at follow up were blinded to treatment outcome. Otherwise score 0.
9. Was the timing of outcome measures appropriate? A minimum of six-months follow up for all surviving trial participants.	Score 1 if yes. Otherwise score 0.
10. Was follow up active with the trial participants being called back or approached for assessment at set times, or passive (e.g. based on patient referrals)?	Score 1 if active. Otherwise score 0.
11. Was loss to follow up reported and if so were less than five per cent of trial participants lost to follow up?	Score 1 if yes. Otherwise score 0.
12. Were the authors able to provide supplementary details of the trial in addition to published data?	Score 1 if yes. Otherwise score 0.

Measures of treatment effect

For each study, relative risks (RR) and 95% confidence intervals (CI) were calculated for dichotomous outcomes. We planned also to present mean differences and 95% confidence intervals for continuous outcomes.

Assessment of heterogeneity

Heterogeneity between comparable trials was tested using a standard χ^2 test, with additional consideration of the I^2 statistic (Higgins 2003).

Data synthesis

Trials evaluating treatment of intracapsular fractures were kept separate from those evaluating treatment of extracapsular fractures. Comparable groups of trials on extracapsular fractures were subgrouped by implant type (here, fixed nail plate or sliding hip screw). Where appropriate, data were pooled using the fixed-effect model using 95% confidence intervals (CI). Where there was significant heterogeneity ($P < 0.10$; $I^2 > 50\%$) in the pooled results of individual trials, we planned to present these using the random-effects model.

RESULTS

Description of studies

See: [Characteristics of included studies](#); [Characteristics of excluded studies](#).

No new trials were found on extending the search from June 2004 to March 2008.

Six studies were identified and all met the pre-defined inclusion criteria. However one ([Harper 1994](#)), which was originally available only as a conference abstract, was subsequently excluded as it was methodologically compromised (*see* 'Characteristics of excluded studies'). The five included studies involved a total of 428 elderly patients.

Two of the five studies were available as published reports ([Bong 1981](#); [Hornby 1989](#)), two in abstract form ([Hansen 1994](#); [Sher 1985](#)) and one was unpublished ([Hornby 1975](#)), with summary data provided by the principal trialist. A conference abstract for [Hornby 1975](#) showed that 70 rather than 67 patients were originally included in the trial ([Stevens 1980](#)). Three studies were sited in Newcastle-upon-Tyne in UK, one ([Hansen 1994](#)) in Denmark and one ([Bong 1981](#)) in Hong Kong. The four studies on extracapsular fractures were conducted from the mid 1970s ([Hornby 1975](#)) up to the late 1980s ([Hornby 1989](#)), and the one study on intracapsular fractures ([Hansen 1994](#)) was conducted in 1994. Details of the individual studies are given in 'Characteristics of included studies'.

The one study on intracapsular fractures ([Hansen 1994](#)), compared conservative treatment (including early mobilisation on crutches) with operative treatment of internal fixation with a sliding hip screw in 23 people with impacted fractures.

All four studies on extracapsular fractures ([Bong 1981](#); [Hornby 1975](#); [Hornby 1989](#); [Sher 1985](#)) used traction for conservative treatment. Surgical treatment varied. Fixed nail plates were applied in [Hornby 1975](#) and [Bong 1981](#). This was preceded by bone sectioning (osteotomy) in [Bong 1981](#) where there were two surgical groups, one which had medial displacement osteotomy and the other which had valgus osteotomy. Sliding hip screw fixation using the AO dynamic hip screw was used in [Hornby 1989](#). [Sher 1985](#) applied either a sliding hip screw or a Kuntscher Y nail (an intramedullary device). Two studies selected unstable trochanteric fractures ([Bong 1981](#); [Sher 1985](#)). [Hornby 1989](#) included both stable and unstable trochanteric fractures. The type of fracture was only stated to be trochanteric in [Hornby 1975](#).

Risk of bias in included studies

The method of randomisation was not stated for [Bong 1981](#) or [Hansen 1994](#). [Hornby 1989](#) used sealed envelopes. [Hornby 1975](#) and [Sher 1985](#) were quasi-randomised trials using odd and even hospital record numbers and alternation respectively. The imbalance

in the numbers allocated to the two groups (7 versus 16) was not explained in [Hansen 1994](#).

The methodology scores for the five studies as assessed by the scoring system described earlier are given below:

```
1 2 3 4 5 6 7 8 9 10 11 12
1 1 0 0 0 0 0 1 1 1 0 Bong 1981
1 1 0 0 0 0 0 0 0 0 0 Hansen 1994
0 0 0 0 0 0 0 1 0 0 1 Hornby 1975
2 1 1 1 1 0 1 0 1 1 1 0 Hornby 1989
0 0 0 0 1 0 0 0 1 0 0 0 Sher 1985
```

The assessment of methodological quality is likely to reflect more the extent and quality of the trial reports than study design. For instance, [Hornby 1989](#) was a comprehensive report whereas those of [Hansen 1994](#), [Hornby 1975](#) and [Sher 1985](#) were very limited. An enquiry regarding [Sher 1985](#) produced additional details about trial methodology but no information on patient numbers.

Effects of interventions

The outcome measures reported by each study are listed in 'Characteristics of included studies'. These are presented grouped within the four categories listed earlier. The results for intracapsular fractures are presented separately from those for extracapsular fractures. Where pertinent and when data were available, the results subgrouped by implant type (fixed or dynamic) of various outcomes are shown graphically; here only for extracapsular fracture trials. No quantitative results were available for [Sher 1985](#). Data from the two operative groups were combined for [Bong 1981](#).

Treatment of undisplaced intracapsular fractures

(1) Fracture fixation complications

The one study identified ([Hansen 1994](#)) involved only 23 participants. Non-union (termed secondary dislocation in this study) only occurred in conservatively-treated participants, at between 2 to 35 days after entry into the trial, (10/16 versus 0/7; relative risk (RR) 9.88, 95% confidence interval (CI) 0.66 to 148.48). The only case of avascular necrosis occurred in a participant of the operatively-treated group.

Nine of the 10 participants with non-union in the conservative group were operated on for secondary displacement; eight had hemiarthroplasty and one had a secondary internal fixation. The other participant with non-union did not have surgery due to poor health. Only one reoperation was undertaken in the internal fixation group. This was for avascular necrosis, which was treated by insertion of a hemiarthroplasty.

(2) Postoperative/clinical complications

These outcomes were not reported in [Hansen 1994](#). Neither were hospital stay or cost of treatment.

(3) Anatomical restoration

These outcomes were not reported in [Hansen 1994](#).

(4) Final outcome measures

These outcomes were not reported in [Hansen 1994](#).

Treatment of extracapsular fractures

(1) Fracture fixation complications

There was no significant difference in non-union between the two treatments for two studies (Bong 1981; Hornby 1989) (3/86 versus 1/133; RR 3.04, 95% CI 0.48 to 19.03).

No reoperations, or secondary traction, were required for the operative group in Hornby 1989. Data for reoperations following internal fixation or operations following conservative treatment failure were not available for the other three trials. Nonetheless it is likely that some of 25 cases of fixation failure, including five cases of fracture collapse, in Bong 1981 resulted in reoperations. Hornby 1975 reported two cases of foot drop, both in the conservative treatment group.

Complications exclusive to each treatment group were reported by three studies (Bong 1981; Hornby 1975; Hornby 1989). Major complications associated with internal fixation were reported in Bong 1981. These comprised 20 breakages at the nail-plate junction and five cases of 'cut-out'. Hornby 1989 reported only five minor complications consisting of three cases of migration of the lag screw in the femoral head without penetration into the hip joint and two instances of backing out of the screw, both in one person. Wound infection in the fracture fixation group was reported by Bong 1981 (4 cases), Hornby 1975 (2 cases) and Hornby 1989 (no cases). Bong 1981 also reported avascular necrosis in one participant. Only Hornby 1989 mentioned complications specific to traction. These were loosening of the traction pin (20 cases), minor pin tract infection (8 cases), and skin sores from traction (5 cases).

(2) Postoperative/clinical complications

These were reported in all four studies but to varying degrees and only comprehensively in Hornby 1989. Bong 1981 only referred indirectly to these in the listing of causes of death.

There was no significant difference in "chest infection" or pneumonia (2/33 versus 5/34; RR 0.41, 95% CI 0.09 to 1.98) between conservative and operative treatment in Hornby 1975. Sher 1985 implied, without qualification, an increased incidence of fatal pneumonia in the conservative group.

Data presented for "deep" pressure sores (heel and sacral) from the two Hornby studies showed no significant difference between the two treatment groups. Sher 1985 reported that pressure sores were more prevalent in the conservative group. At six months follow up there were equal numbers of "unhealed sores" (5/40 versus 5/41) reported by Hornby 1989.

Thrombotic complications reported in Hornby 1975 and Hornby 1989 were few, with no significant difference between the two groups (Deep vein thrombosis: 1/84 versus 5/89; RR 0.28 95% CI 0.05 to 1.67).

Other complications reported by Hornby 1989 were urinary incontinence (27 versus 34), faecal incontinence (22 versus 25), and mental confusion (19 versus 20), none of which were significantly different between the two groups. Sher 1985 reported an increased incidence of urinary infection in the conservatively-treated group. The length of hospital stay was increased significantly for the con-

servatively-treated participants in Hornby 1989, who reported a difference in mean length of stay of 27 days at six months follow up. Hornby 1989 noted that this was an underestimate given that more in the conservative group remained in hospital at six-months follow up (10/51 versus 6/55; RR 1.80, 95% CI 0.70 to 4.59). As the distribution of the values for hospital stay, shown for the first 12 weeks in the trial report, did not approximate to a normal distribution, the derivation of an exact value for the mean difference is misleading. However, from 14 days onwards there were more people in the conservative group remaining in hospital at any time up to and beyond the six-months follow up (see Analysis 2.9 with the four, eight and 12-week figures). Sher 1985 stated that those in the conservative group remained in hospital on average for seven weeks longer than those treated operatively.

(3) Anatomical restoration

No study reported external rotational deformity. Data for varus deformity presented for Bong 1981 and Hornby 1989 show contrasting directions of effect and were not pooled. In Bong 1981, varus deformity was significantly greater in the operated group, whereas the converse was true in Hornby 1989. Sher 1985 stated that "significant shortening and varus deformity had occurred in over half the fractures treated by traction", with no apparent effect on function. Limb shortening of more than one centimetre was more prevalent in the traction group in Hornby 1989 (29/39 versus 11/37; RR 2.50, 95% CI 1.47 to 4.24). No conclusion could be drawn from Bong 1981 who reported the average degree of shortening in each group. Hornby 1989 also reported more rotation deformity (13/36 versus 24/36; RR 0.54, 95% CI 0.33 to 0.89, analysis not shown), less fixed flexion deformity (14/39 versus 0/35), and a greater incidence of persistent leg swelling (9/31 versus 5/35). Overall, in Hornby 1989, the surgically-treated participants achieved better results in terms of anatomical healing. Sher 1985 also reported anatomical restoration was greater in surgically-treated participants.

(4) Final outcome measures

There was no significant difference in mortality at six months for the two studies (Hornby 1975; Hornby 1989) providing mortality data (19/84 versus 21/89; RR 0.96, 95% CI 0.56 to 1.65). Sher 1985 stated there was a higher mortality with conservative treatment. Bong 1981 reported the death of 10 trial participants at two-year follow up without indicating their treatment groups. The only study to report on residual pain (Hornby 1989) assessed this both by its frequency (none/ occasional/ daily) and intensity (mild/ moderate/ severe). There was no significant difference between the two treatment methods.

The recovery of functional status was depicted by a loss of independence based on residential status in Hornby 1989, and maintenance of mobility in Hornby 1975. At six-months follow up, 16 of the traction group for Hornby 1989 had lost their independence compared to nine of those treated operatively (RR 1.87, 95% CI 0.93 to 3.73). The combined outcome of loss of independence or mortality, still showed a worse outcome for the conservative group

(27/51 versus 22/55; RR 1.32, 95% CI 0.87 to 2.00). [Hornby 1975](#) found that fewer conservatively-treated participants (4/20 versus 8/21) had failed to maintain their pre-fracture mobility.

DISCUSSION

Well conducted and reported randomised trials comparing conservative and operative treatment for hip fractures are disappointingly few. This means that firm and definite conclusions cannot be made from the information available. The relevance of the review to modern day practice in which a high proportion of patients are treated surgically, is diminishing. Some comments on the findings for the two fracture types are given below.

Trials of treatment of undisplaced intracapsular fractures

The one identified study ([Hansen 1994](#)) involved only 23 participants, was inadequately reported and may have been subject to serious bias. The imbalance in the numbers allocated to the two groups was unexplained. There were no details of the interventions used for conservative management and no information on the patient characteristics of the surgically-treated group and only the age range for those in the conservatively-treated group. The limited results presented in the abstract suggest that internal fixation of this fracture could markedly reduce the risk of non-union and the requirement for a subsequent operation, generally the replacement of the femoral head with an arthroplasty. These findings are similar to that of a summary of case series of internal fixation ([Conn 2004](#)). However, the small numbers of patients involved, the potential for serious bias and the failure to report other outcomes (such as operative complications) means that no definite conclusions can be safely drawn from the results of the one trial on intracapsular fractures included in this review.

Trials of treatment of extracapsular fractures

Whilst conservative treatment has remained relatively unchanged, there have been major improvements in the results of operative treatment over the years connected to the refinement of surgical technique and implant design. This accentuates the unsatisfactory nature of the evidence as some of the implants tested in the included trials have been largely superseded. Thus the results of two studies using fixed nail plates for the operative group of extracapsular fractures ([Bong 1981](#); [Hornby 1975](#)), are of restricted value as these implants are less commonly used, have a high failure rate and are almost certainly inferior to the sliding hip screw ([Parker 2006](#)).

Since there are no quantitative data for [Sher 1985](#), the only study which provides evidence for current practice is [Hornby 1989](#). This study included 106 out of 134 people aged 60 years or more with an extracapsular fracture admitted to hospital over a 12-month

period. The 28 patients who were not entered into the study either refused, were unable to give consent or failed to meet the criteria determining fitness to undergo an operation. The results of [Hornby 1989](#) showed no difference in general medical complications nor long-term mortality, pain and unhealed sores between the two methods of treatment. Surgical complications were few and minor perhaps reflecting the strict protocol followed by the surgeon involved. Rates of non-union of the fracture appeared to be similar in either method of treatment, but operative treatment is less likely to result in limb shortening. The prolonged period of bed rest incurred with conservative treatment resulted in a longer hospital stay with more participants of the conservatively-treated group remaining in hospital at six-months follow up. Although not statistically significant, more participants of the conservative group had lost their independence as assessed by their post-fracture residential status at six months.

No attempt was made to quantify cost in any of the trials, although [Hornby 1989](#) gave a useful reminder of the importance of a general approach taking account of opportunity costs and effects of dependence and limited mobility. Indeed, while surgical treatment will involve some additional costs for the operation and implant, these costs will be greatly offset by the prolonged hospital stay incurred by conservative treatment. An economic analysis using the figures from [Hornby 1989](#) ([Parker 1992](#)), reported that conservative treatment would cost about 6000 pounds sterling per patient against 3446 pounds sterling for operative treatment in UK at that time.

AUTHORS' CONCLUSIONS

Implications for practice

The introduction of operative treatment preceded the first evaluation by randomised trial, and the subsequent randomised trials have been few. The limited evidence from one small randomised trial on undisplaced intracapsular fractures suggests conservative treatment is associated with an increased risk of fracture displacement and later replacement of the femoral head with an arthroplasty. For extracapsular fractures, conservative treatment appears to be associated with a prolonged hospital stay and a greater proportion of patients losing their independence.

The review need to be viewed in the context of advances in surgery and anaesthesia, and clearer understanding of the benefits of early mobilisation and rehabilitation. Clinicians should use evidence from other non-randomised studies in conjunction with their personal experience, patient preference and availability of surgical facilities, to influence their choice of treatment.

Implications for research

Although there is little robust data from randomised trials com-

paring non-operative with operative management, it is difficult in contemporary practice to conceive circumstances in which future trials would be possible or considered ethical. However, potential exceptions should not be ruled out. For example, despite access to good surgical facilities centres remain in which patients are treated conservatively. Whatever the underlying rationale, any future studies should employ sound methodology including allocation concealment, complete and long-term follow up, and blinded assessment. They should compare available implants of proven effectiveness with good quality conservative treatment. A full evaluation of clinical and functional outcomes, cost effectiveness and social consequences would also be important. Where the provision of surgical services is limited or where there are strong preferences for non-surgical management, trials evaluating conservative interventions are likely to be more appropriate.

ACKNOWLEDGEMENTS

We are grateful to Mr R Hornby for providing information on his unpublished study. We thank Dr Amit Bhargava for his earlier contribution as a co-author to the review.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies [ordered by study ID]

Bong 1981

Methods	Method of randomisation not stated Assessor blinding: not reported Number lost to follow up: 2	
Participants	Orthopaedic hospital in Hong Kong 150 participants with an unstable intertrochanteric proximal femoral fracture Age: mean ages by treatment group: 73 years (conservative group), 70 years (medial displacement osteotomy), 65 years (valgus osteotomy) % male: 58	
Interventions	(1) Conservative treatment with traction via a tibial pin (2) Operative treatment with internal fixation with a McLaughlin pin and plate and a medial displacement osteotomy (3) Operative treatment with internal fixation with a McLaughlin pin and plate and a valgus osteotomy	
Outcomes	Length of follow up: 2 years Non-union of fracture Fracture fixation failure rate (breakage at nail plate junction, cut-out, collapse of fracture) Wound infection Avascular necrosis Mortality (overall only) Hip rating (overall score) Varus deformity Limb shortening	
Notes		
Risk of bias		
Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Hansen 1994

Methods	Method of randomisation not stated Assessor blinding: not reported Number lost to follow up: not stated, probably none	
Participants	Orthopaedic hospital in Denmark 23 participants with an impacted subcapital femoral neck fracture Age: mean ages not stated (range for those treated conservatively: 59-94 years) % male: 13	

Hansen 1994 (Continued)

Interventions	(1) Conservative treatment (method not stated) (2) Operative treatment with a sliding hip screw	
Outcomes	Length of follow up: not stated, one patient followed up to at least 22 months. Non-union of fracture Avascular necrosis Subsequent operation/reoperation	
Notes	Abstract only. Minimal information provided. Request sent to the author for further information.	
<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Hornby 1975

Methods	Method of randomisation by even or odd admission record number Assessor blinding: not reported Number lost to follow up: not stated; 3 excluded on admission as they were "moribund"	
Participants	Orthopaedic hospital in Newcastle upon Tyne, UK 70 participants with a trochanteric proximal femoral fracture Age: mean ages by treatment group: 80 years (traction), 83 years (surgery) (range 60-96) % male: not stated	
Interventions	(1) Conservative treatment with traction (2) Operative treatment with a McLaughlin pin and plate	
Outcomes	Length of follow up: 6 months Wound infection "Sores over trochanter" Foot drop Pneumonia Pressure sores Deep vein thrombosis Mortality Maintenance of mobility	
Notes	Unpublished study - data from Mr Hornby.	
<i>Risk of bias</i>		
Item	Authors' judgement	Description

Hornby 1975 (Continued)

Allocation concealment?	No	C - Inadequate
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Hornby 1989

Methods	Randomised by sealed envelopes Assessor blinding: no, except for blind assessment of a subgroup at 6 months Number lost to follow up: 1	
Participants	Orthopaedic hospital in Newcastle upon Tyne, UK 106 participants with a trochanteric proximal femoral fracture Age: not stated, inclusion criterion: aged 60 years or over % male: 25	
Interventions	(1) Conservative treatment with Hamilton Russell traction (2) Operative treatment with a sliding hip screw	
Outcomes	Length of follow up: 6 months Non-union of fracture Fracture fixation failure (reoperation, screw migration, cut-out) Wound infection Traction complications (pin tract infection, traction sores, pin loosening) Pressure sores Deep vein thrombosis Pulmonary embolism Urinary incontinence Faecal incontinence Mental confusion Length of hospital stay Mortality Pain at follow up Not discharged from hospital at 6 months Loss of independence Varus deformity Limb shortening Rotational deformity	
Notes		
<i>Risk of bias</i>		
Item	Authors' judgement	Description
Allocation concealment?	Unclear	B - Unclear

Sher 1985

Methods	Method of randomisation: alternation - allocation concealment: C Assessor blinding: not reported Number lost to follow up: not stated
Participants	Orthopaedic hospital in UK 76 participants with an unstable trochanteric proximal femoral fracture Age: not stated % male: not stated
Interventions	(1) Conservative treatment with traction (2) Operative treatment with a sliding hip screw or a Kuntscher Y nail
Outcomes	Length of follow up: 1 year Pressure sores Urinary infection Mortality (including fatal pneumonia) Function (undefined) Varus deformity Limb shortening Anatomical restitution
Notes	Abstract only. Numbers of patients in the two groups were not given. There was no reply to requests for information sent in 1997.

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	C - Inadequate

Characteristics of excluded studies [ordered by study ID]

Harper 1994	In this quasi-randomised trial (allocation based on last digit of patient's Accident & Emergency record number), people aged 80 years and over with a displaced intracapsular fracture and severe dementia (mental test score ≤ 3 out of 10) were allocated to either conservative treatment (9 participants) or treatment with a cemented or uncemented Thompson hemi-arthroplasty (12 participants). Conservative treatment comprised "studied neglect of the fracture", where the patient was allowed to sit out and mobilise as able. The trial was stopped early after nine months because of dissatisfaction and concern with the results of conservative treatment by healthcare professionals associated with care of patients. Three of the conservatively-treated group participants were treated with a cemented Thomson hemiarthroplasty within two weeks because of perceived poor performance and pain. This trial was excluded because it was methodologically compromised, including inadequate reporting of outcomes and the lack of follow up of patients (only 3 were reviewed as planned at 2-3 months).
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DATA AND ANALYSES

Comparison 1. Conservative treatment versus internal fixation for undisplaced intracapsular fractures

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Non-union	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2 Avascular necrosis	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
3 Subsequent operation/reoperation	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected

Comparison 2. Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Non-union	2	219	Risk Ratio (M-H, Fixed, 95% CI)	3.04 [0.48, 19.03]
1.1 Fixed nail plate (+/- osteotomy)	1	138	Risk Ratio (M-H, Fixed, 95% CI)	5.94 [0.25, 142.94]
1.2 Sliding hip screw	1	81	Risk Ratio (M-H, Fixed, 95% CI)	2.05 [0.19, 21.72]
2 Fracture fixation failure rate	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
2.1 Fixed nail plate (+/- osteotomy)	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
2.2 Sliding hip screw	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
3 Wound infection	3	323	Risk Ratio (M-H, Fixed, 95% CI)	0.21 [0.03, 1.73]
3.1 Fixed nail plate (+/- osteotomy)	2	217	Risk Ratio (M-H, Fixed, 95% CI)	0.21 [0.03, 1.73]
3.2 Sliding hip screw	1	106	Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
4 Pin tract infection	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
4.1 Fixed nail plate (+/- osteotomy)	0		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
4.2 Sliding hip screw	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
5 Pneumonia (chest infection)	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
5.1 Fixed nail plate (+/- osteotomy)	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
5.2 Sliding hip screw	0		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
6 Deep pressure sore (heel and sacral)	2	173	Risk Ratio (M-H, Fixed, 95% CI)	0.71 [0.21, 2.42]
6.1 Fixed nail plate (+/- osteotomy)	1	67	Risk Ratio (M-H, Fixed, 95% CI)	1.03 [0.15, 6.89]
6.2 Sliding hip screw	1	106	Risk Ratio (M-H, Fixed, 95% CI)	0.54 [0.10, 2.82]
7 Deep vein thrombosis	2	173	Risk Ratio (M-H, Fixed, 95% CI)	0.28 [0.05, 1.67]

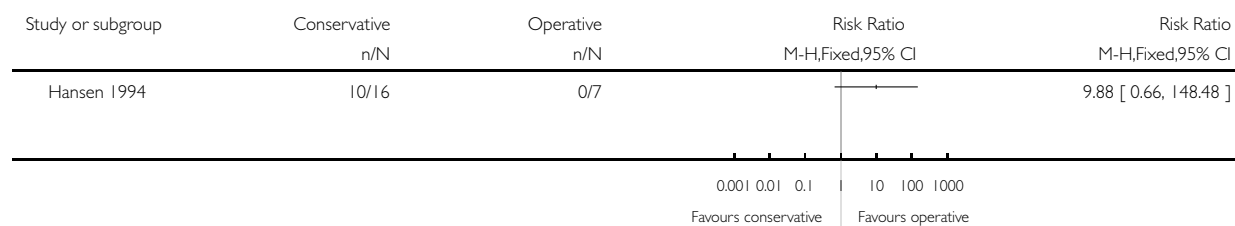
7.1 Fixed nail plate (+/- osteotomy)	1	67	Risk Ratio (M-H, Fixed, 95% CI)	0.26 [0.03, 2.19]
7.2 Sliding hip screw	1	106	Risk Ratio (M-H, Fixed, 95% CI)	0.36 [0.01, 8.62]
8 Pulmonary embolism	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
8.1 Fixed nail plate (+/- osteotomy)	0		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
8.2 Sliding hip screw	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
9 Remaining in hospital at 4, 8 and 12 weeks	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
9.1 4 weeks	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
9.2 8 weeks	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
9.3 12 weeks	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
10 Remaining in hospital at 6 month follow up	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
10.1 Fixed nail plate (+/- osteotomy)	0		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
10.2 Sliding hip screw	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
11 Varus deformity	2		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
11.1 Fixed nail plate (+/- osteotomy)	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
11.2 Sliding hip screw	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
12 Leg shortening	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
12.1 Fixed nail plate (+/- osteotomy)	0		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
12.2 Sliding hip screw	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
13 Mortality	2	173	Risk Ratio (M-H, Fixed, 95% CI)	0.96 [0.56, 1.65]
13.1 Fixed nail plate (+/- osteotomy)	1	67	Risk Ratio (M-H, Fixed, 95% CI)	1.03 [0.44, 2.42]
13.2 Sliding hip screw	1	106	Risk Ratio (M-H, Fixed, 95% CI)	0.91 [0.45, 1.85]
14 Pain	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
14.1 Fixed nail plate (+/- osteotomy)	0		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
14.2 Sliding hip screw	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
15 Loss of independence	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
15.1 Fixed nail plate (+/- osteotomy)	0		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
15.2 Sliding hip screw	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
16 Loss of independence or death	1		Risk Ratio (M-H, Fixed, 95% CI)	Totals not selected
16.1 Fixed nail plate (+/- osteotomy)	0		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable
16.2 Sliding hip screw	1		Risk Ratio (M-H, Fixed, 95% CI)	Not estimable

Analysis 1.1. Comparison 1 Conservative treatment versus internal fixation for undisplaced intracapsular fractures, Outcome 1 Non-union.

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 1 Conservative treatment versus internal fixation for undisplaced intracapsular fractures

Outcome: 1 Non-union

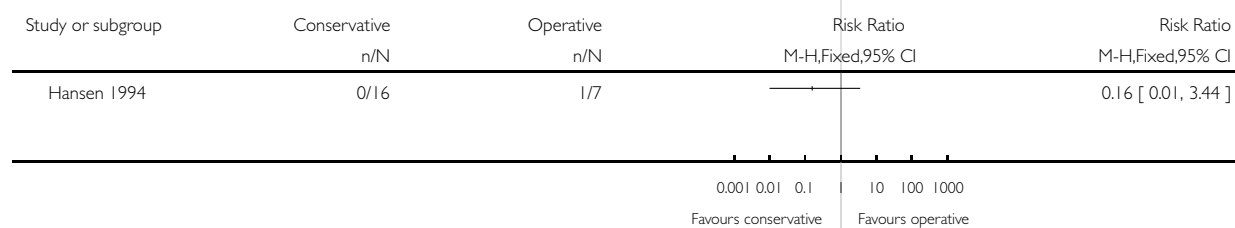


Analysis 1.2. Comparison 1 Conservative treatment versus internal fixation for undisplaced intracapsular fractures, Outcome 2 Avascular necrosis.

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 1 Conservative treatment versus internal fixation for undisplaced intracapsular fractures

Outcome: 2 Avascular necrosis



Analysis 1.3. Comparison 1 Conservative treatment versus internal fixation for undisplaced intracapsular fractures, Outcome 3 Subsequent operation/reoperation.

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 1 Conservative treatment versus internal fixation for undisplaced intracapsular fractures

Outcome: 3 Subsequent operation/reoperation

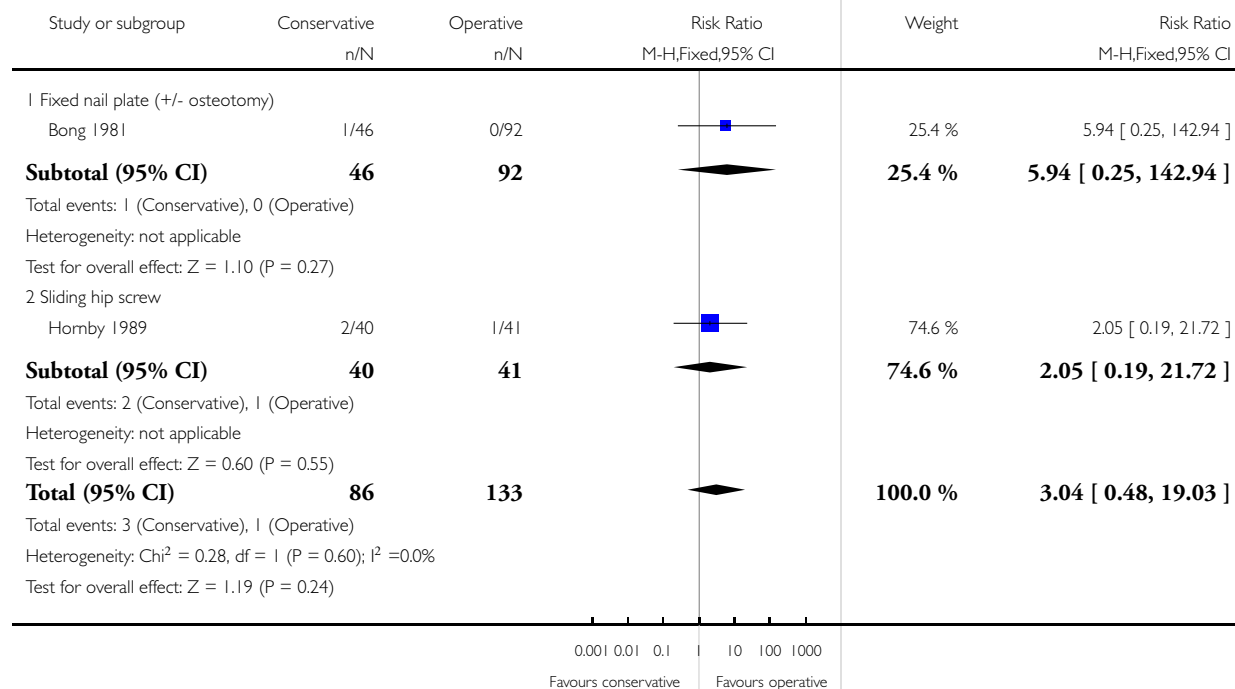


Analysis 2.1. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 1 Non-union.

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 1 Non-union

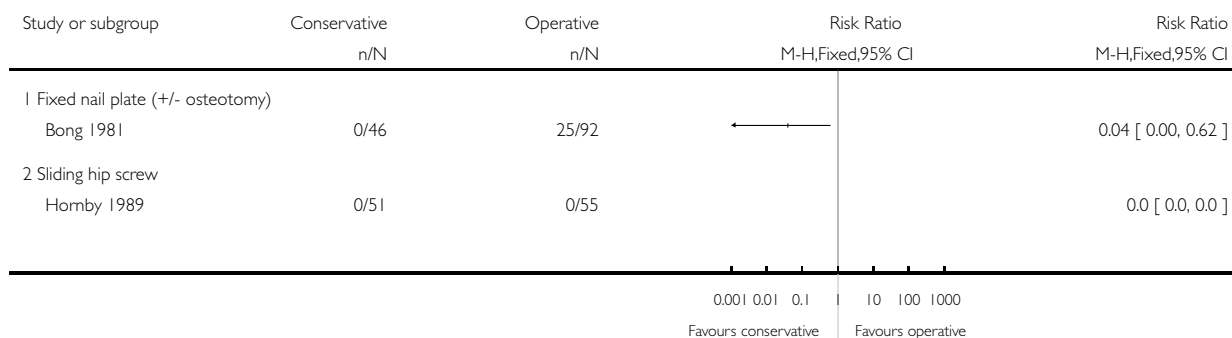


Analysis 2.2. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 2 Fracture fixation failure rate.

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 2 Fracture fixation failure rate

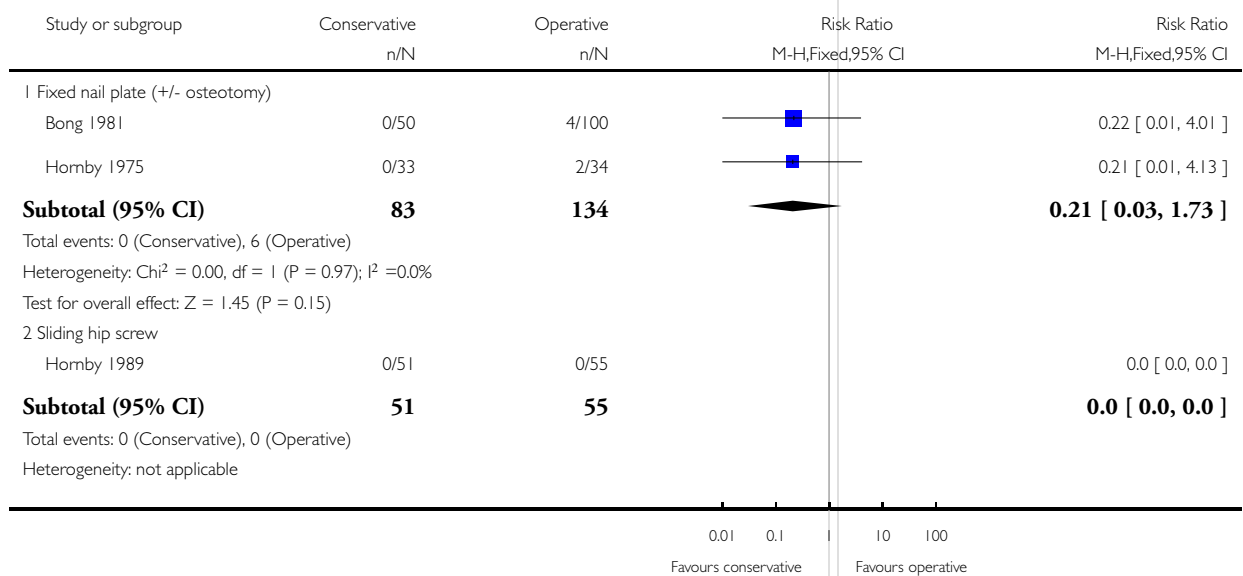


Analysis 2.3. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 3 Wound infection.

Review: Conservative versus operative treatment for hip fractures in adults

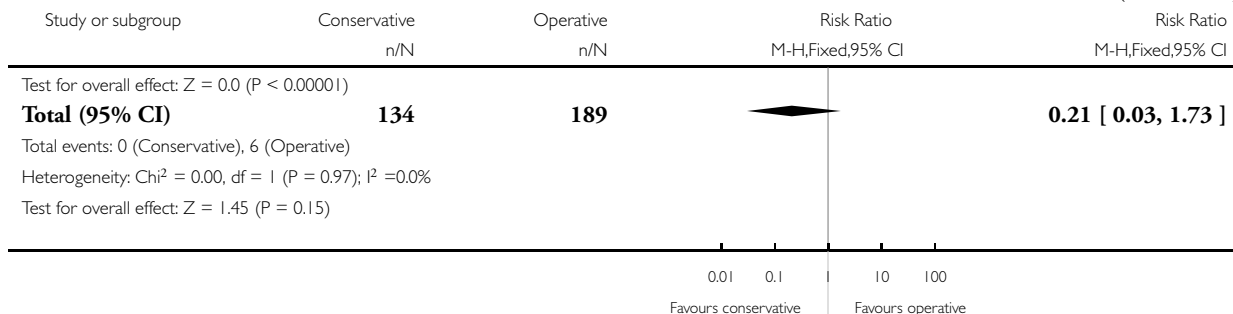
Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 3 Wound infection



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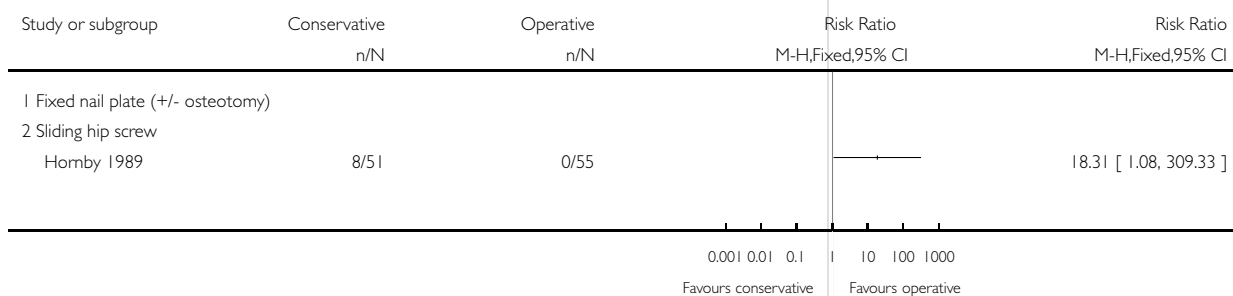


Analysis 2.4. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 4 Pin tract infection.

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 4 Pin tract infection

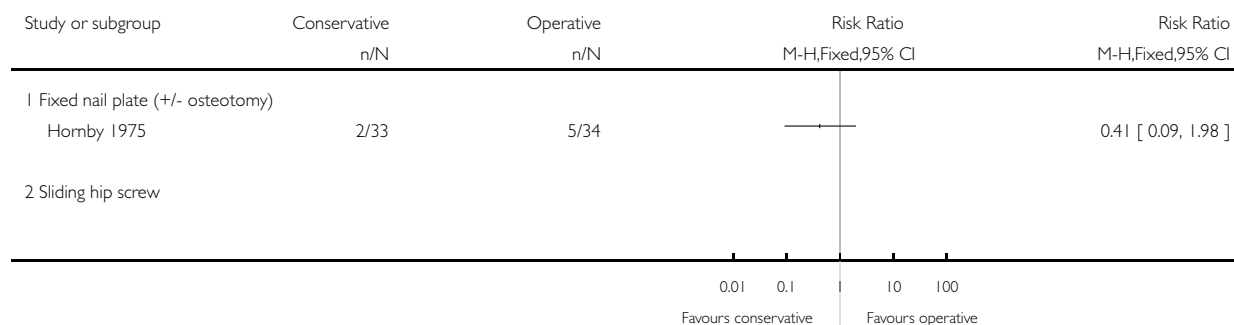


Analysis 2.5. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 5 Pneumonia (chest infection).

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 5 Pneumonia (chest infection)

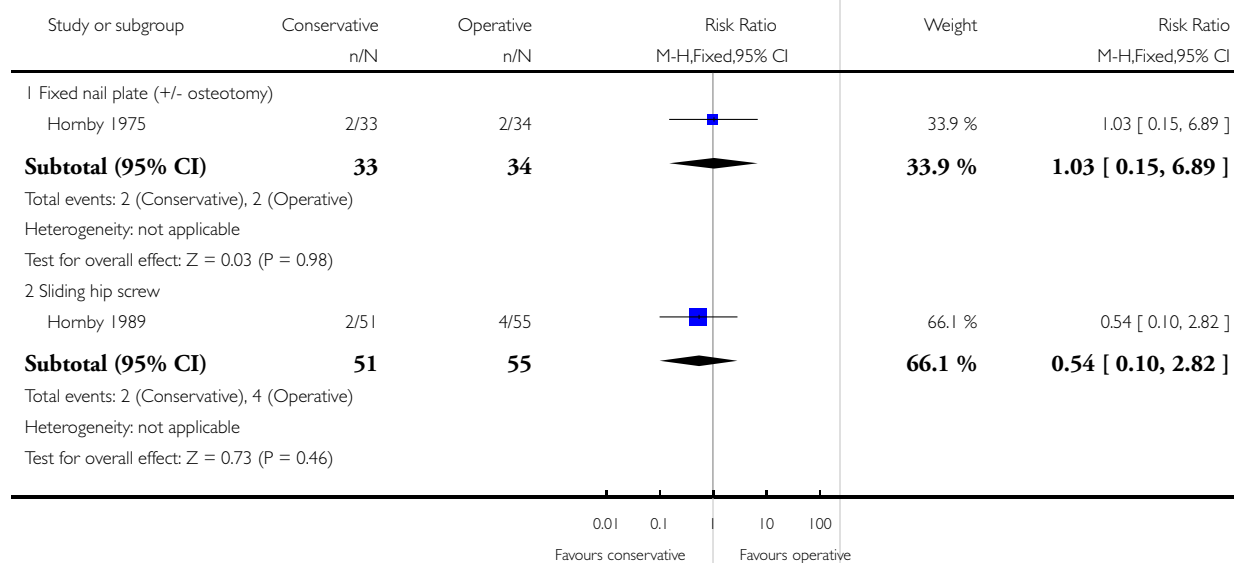


Analysis 2.6. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 6 Deep pressure sore (heel and sacral).

Review: Conservative versus operative treatment for hip fractures in adults

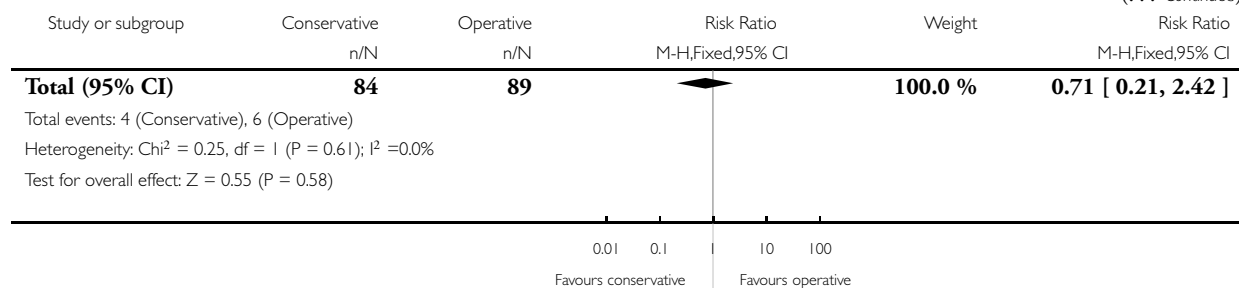
Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 6 Deep pressure sore (heel and sacral)



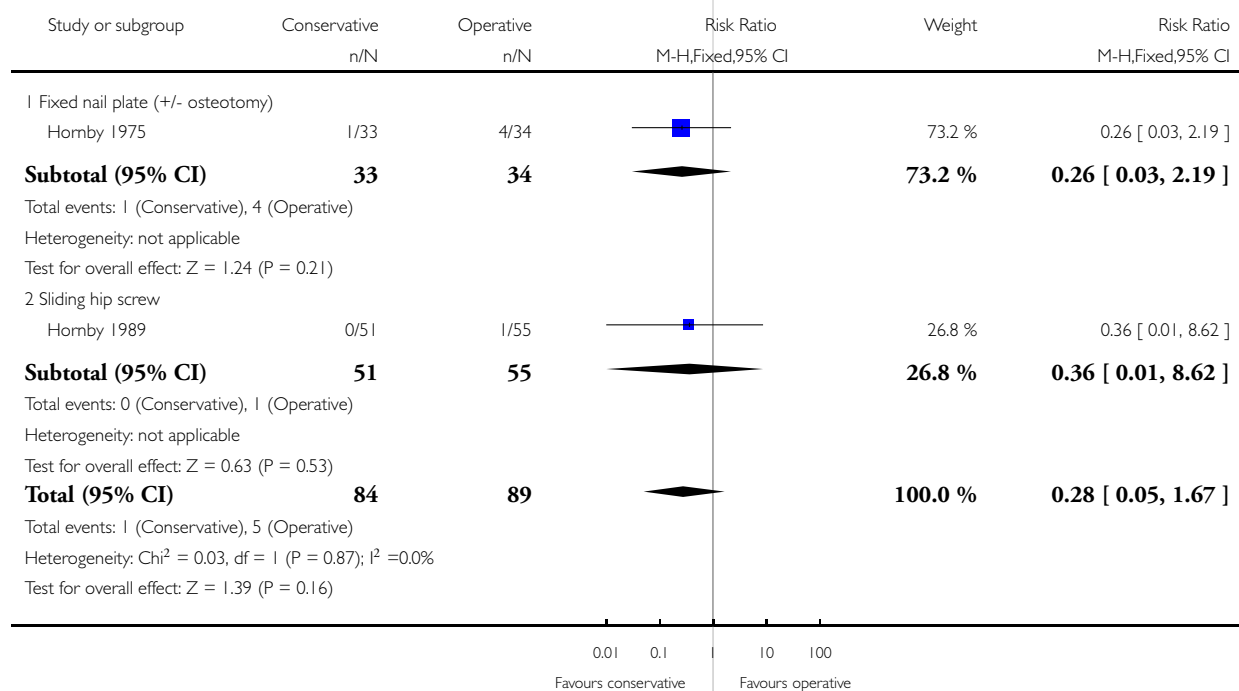
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Analysis 2.7. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 7 Deep vein thrombosis.

Review: Conservative versus operative treatment for hip fractures in adults
Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures
Outcome: 7 Deep vein thrombosis

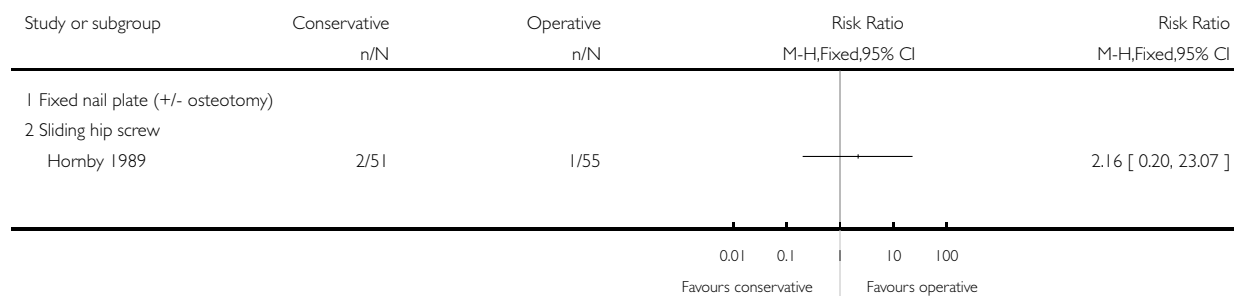


Analysis 2.8. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 8 Pulmonary embolism.

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 8 Pulmonary embolism

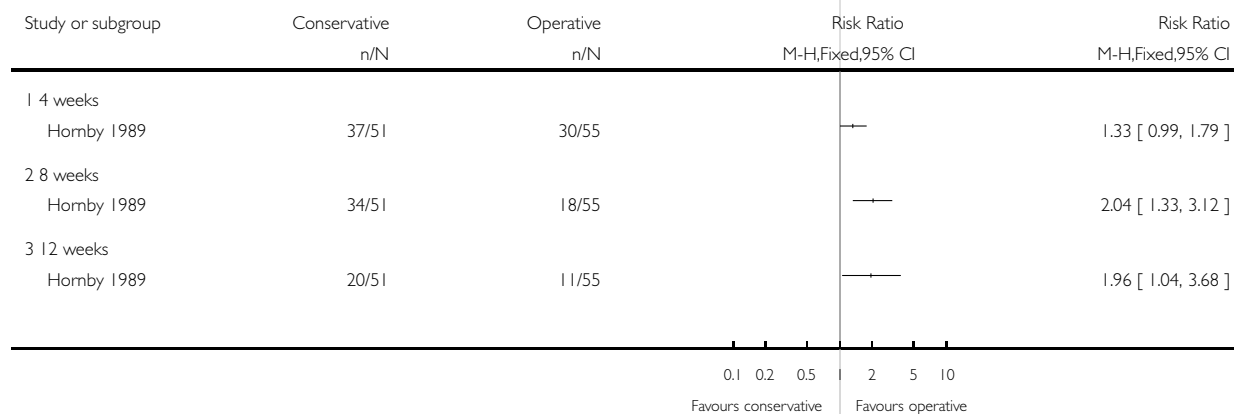


Analysis 2.9. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 9 Remaining in hospital at 4, 8 and 12 weeks.

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 9 Remaining in hospital at 4, 8 and 12 weeks

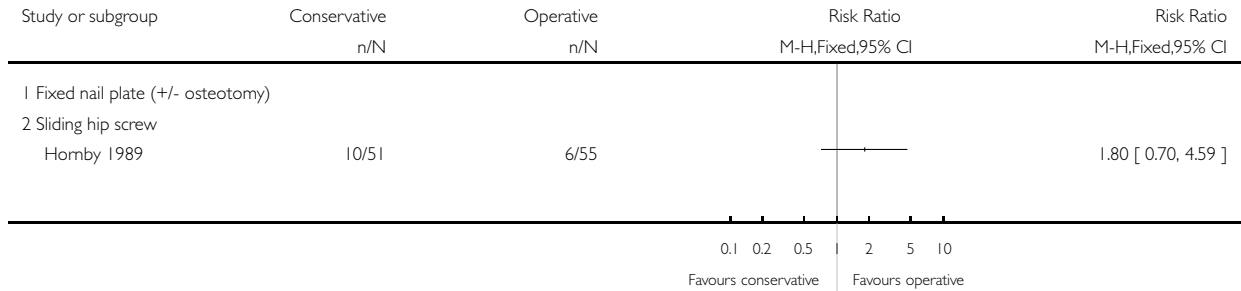


Analysis 2.10. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 10 Remaining in hospital at 6 month follow up.

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 10 Remaining in hospital at 6 month follow up

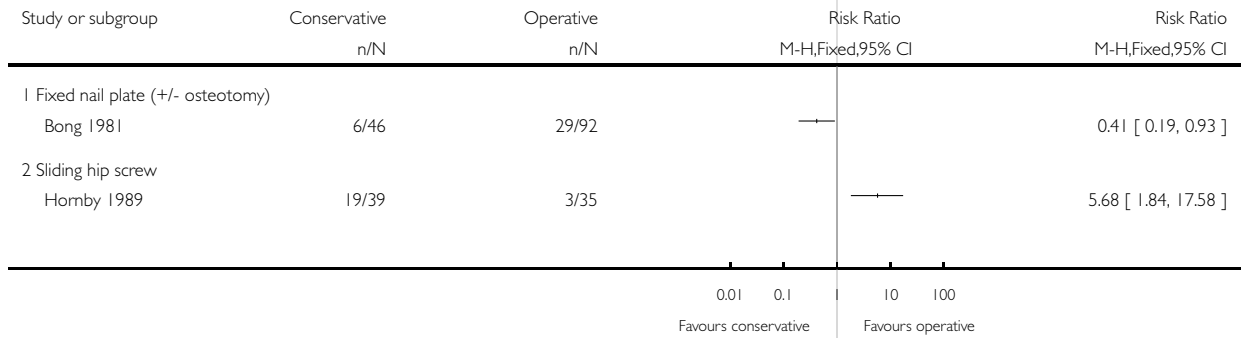


Analysis 2.11. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 11 Varus deformity.

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 11 Varus deformity

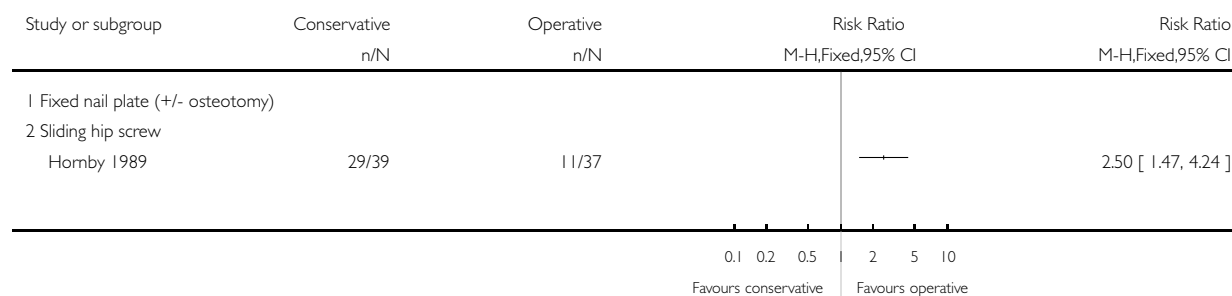


Analysis 2.12. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 12 Leg shortening.

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 12 Leg shortening

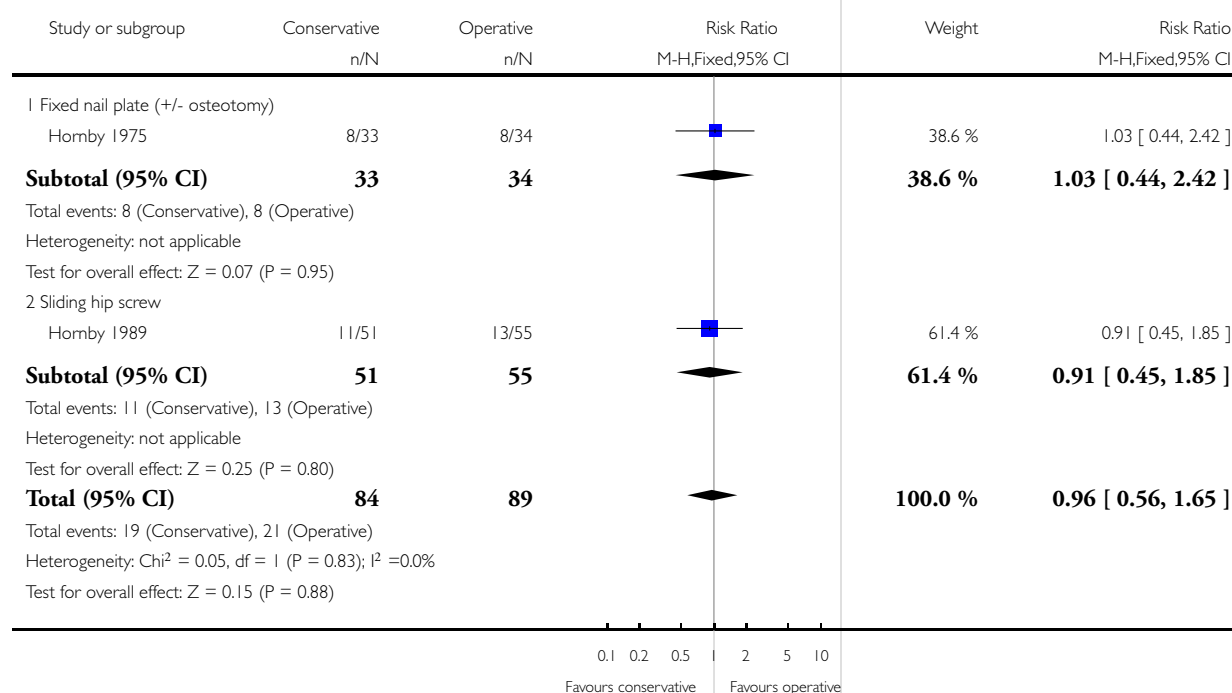


Analysis 2.13. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 13 Mortality.

Review: Conservative versus operative treatment for hip fractures in adults

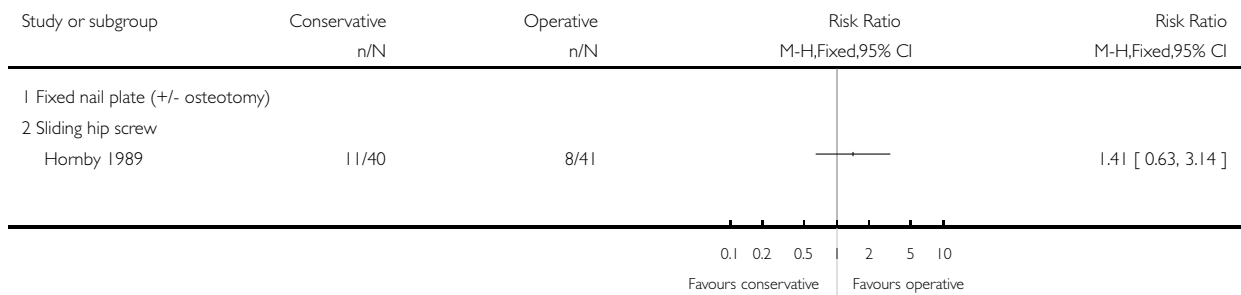
Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 13 Mortality



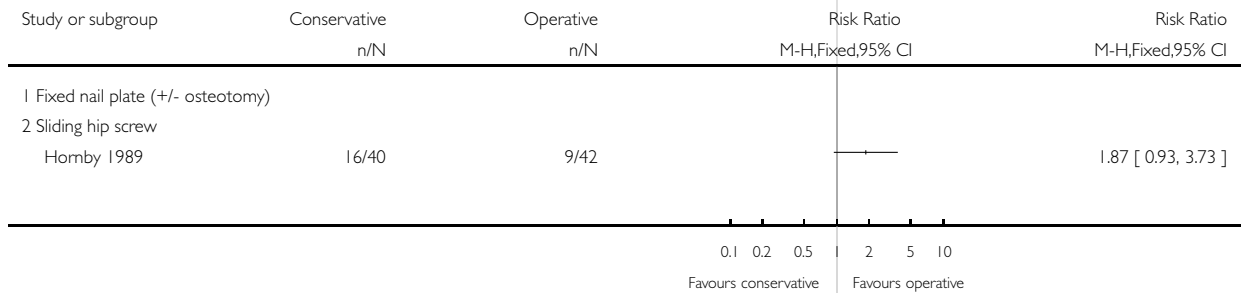
Analysis 2.14. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 14 Pain.

Review: Conservative versus operative treatment for hip fractures in adults
 Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures
 Outcome: 14 Pain



Analysis 2.15. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 15 Loss of independence.

Review: Conservative versus operative treatment for hip fractures in adults
 Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures
 Outcome: 15 Loss of independence

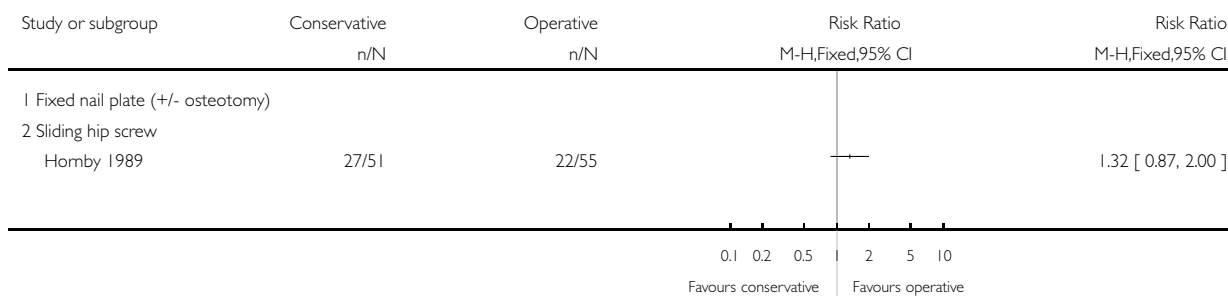


Analysis 2.16. Comparison 2 Conservative treatment versus internal fixation for extracapsular hip fractures, Outcome 16 Loss of independence or death.

Review: Conservative versus operative treatment for hip fractures in adults

Comparison: 2 Conservative treatment versus internal fixation for extracapsular hip fractures

Outcome: 16 Loss of independence or death



APPENDICES

Appendix I. Search strategies for The Cochrane Library and MEDLINE

The Cochrane Library (Wiley)	MEDLINE (OVID-WEB)
#1 MeSH descriptor Hip Fractures explode all trees	1. exp Hip Fractures/
#2 ((hip* or femur* or femoral* or trochant* or pertrochant* or intertrochant* or subtrochant* or intracapsular* or extracapsular*) NEAR fracture*):ti,ab,kw	2. hip\$ or femur\$ or femoral\$ or trochant\$ or pertrochant\$ or intertrochant\$ or subtrochant\$ or intracapsular\$ or extracapsular\$ adj4 fracture\$).tw.
#3 (#1 OR #2)	3. or/1-2
#4 (pin* or nail* or screw* or plate* or arthroplasty* or fix* or prosthes*):ti,ab,kw	4. (pin\$1 or nail\$ or screw\$1 or plate\$1 or arthroplast\$ or fix\$ or prosthes\$).tw.
#5 MeSH descriptor Internal Fixators, this term only	5. Internal Fixators/ or Bone Screws/ or Fracture Fixation, Internal/ or Bone Plates/ or Bone Nails/
#6 MeSH descriptor Bone Screws, this term only	6. Arthroplasty/ or Arthroplasty, Replacement, Hip/
#7 MeSH descriptor Fracture Fixation, Internal explode all trees	7. or/4-6
#8 MeSH descriptor Bone Plates, this term only	8. and/3,7
#9 MeSH descriptor Bone Nails, this term only	
#10 MeSH descriptor Arthroplasty explode all trees	
#11 (#4 OR #5 OR #6 OR #7 OR #8 OR #9 OR #10)	
#12 (#3 AND #11)	

Appendix 2. Search strategy for EMBASE

EMBASE (OVID-WEB)
<ol style="list-style-type: none"> 1. exp Hip Fracture/ 2. ((hip\$ or ((femur\$ or femoral\$) adj3 (neck or proximal))) adj4 fracture\$).tw. 3. or/1-2 4. exp Randomized Controlled trial/ 5. exp Double Blind Procedure/ 6. exp Single Blind Procedure/ 7. exp Crossover Procedure/ 8. Controlled Study/ 9. or/4-8 10. ((clinical or controlled or comparative or placebo or prospective\$ or randomi#ed) adj3 (trial or study)).tw. 11. (random\$ adj7 (allocat\$ or allot\$ or assign\$ or basis\$ or divid\$ or order\$)).tw. 12. ((singl\$ or doubl\$ or trebl\$ or tripl\$) adj7 (blind\$ or mask\$)).tw. 13. (cross?over\$ or (cross adj1 over\$)).tw. 14. ((allocat\$ or allot\$ or assign\$ or divid\$) adj3 (condition\$ or experiment\$ or intervention\$ or treatment\$ or therap\$ or control\$ or group\$)).tw. 15. or/10-14 16. or/9,15 17. limit 16 to human 18. and/3,17

WHAT'S NEW

Last assessed as up-to-date: 3 April 2008.

12 May 2008	Amended	Converted to new review format.
8 May 2008	New citation required and conclusions have changed	For this update, appearing in Issue 3, 2008, the literature search was extended to April 2008 and no new trials were identified. The text and tables were updated to comply with revised style and methods guidelines. These changes mainly comprised replacing the Synopsis with a Plain language summary; reformulating the Objectives; and restructuring the Background, Search strategy and Methods of the review sections. The conclusions of the review were changed in line with current health care practice. The order of the two main authors of the reviews has been changed to reflect their relative contributions.

HISTORY

Protocol first published: Issue 1, 1997

Review first published: Issue 2, 1998

25 June 2004	New search has been performed	For details of this and previous updates, please see 'Notes'.
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CONTRIBUTIONS OF AUTHORS

Martyn Parker initiated and designed the review, and compiled the first draft. Helen Handoll located the review studies and critically rewrote the first draft and subsequent drafts. Helen Handoll initiated and prepared the first drafts of the review updates. All other tasks were shared. On expansion of the review in 2000 to include all hip fractures, Amit Bhargava joined as a co-author. Helen Handoll and Martyn Parker are guarantors of the review.

DECLARATIONS OF INTEREST

None known.

SOURCES OF SUPPORT

Internal sources

- University of Teesside, Middlesbrough, UK.
- Peterborough and Stamford Hospitals NHS Foundation Trust, Peterborough, UK.

External sources

- No sources of support supplied

NOTES

Details of updates prior to Issue 3, 2008.

(A) Non substantive changes made (January 2000) for Issue 2, 2000.

(1) Literature search extended to August 1999.

(B) Minor update Issue 3, 2000.

(1) Synopsis added

(C) Substantive update for Issue 4, 2000.

(1) Scope of the review extended to all hip fractures. Previous review title was 'Conservative versus operative treatment for extracapsular hip fractures'.

(2) Inclusion of one new study on intracapsular hip fractures.

(3) Relative risks instead of Peto odds ratios presented for dichotomous outcomes.

(D) Minor update for Issue 1, 2002.

(1) Literature search extended to July 2001.

(2) Extra references added for one excluded and one included study.

(3) Implications for practice section rephrased.

(E) Minor update for Issue 4, 2004.

(1) Literature search extended to June 2004.

(2) Text and tables modified to conform to style guidelines and revised guidelines in Cochrane Reviewer's Handbook.

INDEX TERMS

Medical Subject Headings (MeSH)

*Bed Rest; *Traction; Hip Fractures [surgery; *therapy]; Randomized Controlled Trials as Topic

MeSH check words

Aged; Humans