Authors' objectives
To study the effectiveness of treatments for glucocorticoid-induced osteoporosis on bone mineral density (BMD) or fractures.

Searching
The authors searched MEDLINE (from 1963 to March 2001), EMBASE (from 1980 to March 2001), the Cochrane Controlled Trial Register (1978 to March 2001), and ISI Web of Science (from 1982 to March 2001); details of the search strategy were provided. An updated search in PubMed (from 2000 to 2001) was conducted 4 months later. In addition, the authors scanned publications cited in previous review articles and meta-analyses. The abstracts of meetings and conferences published in several journals were handsearched (1997 to March 2001). The search was initially limited to English language publications. English, Spanish, Russian, Japanese, Italian, German and French studies were included in the updated search.

Study selection
Study designs of evaluations included in the review
Randomised controlled trials (RCTs) were included in the review.

Specific interventions included in the review
No specific inclusion or exclusion criteria for the interventions were stated. The interventions included bisphosphonates, calcitonin, calcium, vitamin D and vitamin D metabolites, fluoride, hormone replacement therapy, parathyroid hormone, deflazacort and budesonide.

Participants included in the review
Participants with glucocorticoid-induced osteoporosis or who were taking oral glucocorticoids were included in the review.

Outcomes assessed in the review
To be included in the review, the studies had to present replicated BMD measurements or fractures as outcome measures. The outcome measurements included BMD at the lumbar spine, femoral neck, total hip or forearm, and vertebral and non-vertebral fractures.

How were decisions on the relevance of primary studies made?
It was unclear how many reviewers selected the primary studies. The authors stated that three reviewers independently assessed articles with borderline inclusion criteria.

Assessment of study quality
The authors used a quality assessment tool developed by Gillespie et al. (see Other Publications of Related Interest). This tool considers randomisation, blinding, withdrawals, comparability of the groups at baseline, radiological confirmation of hip or other appendicular skeletal fractures, and the method used to diagnose vertebral fracture. Initially, one reviewer quality assessed all of the trials. In addition, four other reviewers independently assessed a random sample of 20 papers. Agreement was determined using kappa statistics. The reviewers were not blind to the author, institution, or journal.

Data extraction
The authors did not state how the data were extracted for the review, or how many reviewers performed the data extraction. The study details reported included entry criteria, diseases, treatment, dose, time, age, initial glucocorticoid...
dose, sample size, BMD (at 12 and 24 months), and vertebral and non-vertebral fractures.

**Methods of synthesis**

How were the studies combined?

A narrative synthesis of the studies was undertaken. The results were reported according to the treatment. Data extraction tables presented studies by treatment and by site of outcome measure.

How were differences between studies investigated?

The authors did not formally address heterogeneity.

**Results of the review**

It appears that 75 RCTs were included in the review (an overall sample size could not be easily calculated).

Overall, the authors reported that the efficacy of agents in the prevention and treatment of glucocorticoid osteoporosis varied, but beneficial effects on BMD in the spine and hip were demonstrated for several interventions (presented in a table). Fracture was not used as a primary end point measure in any of these studies. However, a reduction in vertebral fracture was observed in post hoc analyses of trials of etidronate, alendronate and risedronate.

**Authors’ conclusions**

With regards to treatment, the authors appear to conclude that the efficacy of agents in the treatment of glucocorticoid osteoporosis was variable, but several interventions demonstrated beneficial effects on BMD in the spine and hip.

**CRD commentary**

With the exception of treatments, the inclusion criteria were clearly presented in the appendix of this guideline. The search involved several databases and handsearches. However, the authors did not attempt to identify unpublished studies, thus possibly introducing publication bias into the review. A validity assessment was conducted and validated. While an overall assessment was reported, the results were not presented by individual study, making it difficult to assess the reliability of each study. For some aspects of the review process, it was unclear how many people were involved. While the data were presented in a narrative summary and in data extraction tables, it was difficult to get a general overview of the effectiveness of some of the treatments. There appeared to be much clinical heterogeneity, and the results varied. The authors presented a grade of recommendations on the effect of various interventions, rather than presenting explicit conclusions.

**Implications of the review for practice and research**

Practice: The authors stated that individuals at high risk should be advised to commence bone-protective therapy at the time of starting glucocorticoids, e.g. those aged 65 years or older and those with a prior fragility fracture.

Research: The authors did not state any implications for further research.

**Bibliographic details**


**Original Paper URL**

https://www.rcplondon.ac.uk/publications/glucocorticoid-induced-osteoporosis

**Other publications of related interest**

Oxford: Update Software.

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**Record Status**
This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.