

REVIEW ARTICLE (META-ANALYSIS)

# Nonsteroidal Anti-Inflammatory Drugs Versus Corticosteroid for Treatment of Shoulder Pain: A Systematic Review and Meta-Analysis



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## Abstract

**Objective:** To compare the treatment efficacy between corticosteroid injection and nonsteroidal anti-inflammatory drugs (NSAIDs) for patients with shoulder pain.

**Data Sources:** PubMed and EMBASE databases were searched from inception to January 2014. Reference lists of the retrieved studies were additionally scrutinized.

**Study Selection:** Randomized controlled trials (RCTs) comparing corticosteroid injection with NSAIDs for treatment of shoulder pain were included. The primary outcome was remission, and the secondary outcomes were pain relief and improvement of range of active abduction. Study selection was conducted by 2 researchers independently. Any disagreements were solved by discussion and confirmed by the third reviewer.

**Data Extraction:** Two reviewers independently conducted data extraction and the quality assessment. Data regarding patients, intervention, control, and outcomes were extracted from the included trials.

**Data Synthesis:** Six high-quality RCTs of 267 patients meeting the inclusion criteria were included. For an outcome of remission, NSAIDs were less effective than corticosteroid in 4 or 6 weeks (relative risk, .64; 95% confidence interval, .45–.92). NSAIDs did not significantly differ with corticosteroid in pain relief and improvement of range of active abduction.

**Conclusions:** Current meta-analysis suggests that NSAIDs are less effective than corticosteroid in achieving remission in patients with shoulder pain at 4 or 6 weeks after treatment. Considering the limited number of studies and small size of each trial, the results should be interpreted with caution, and more high-quality RCTs are encouraged.

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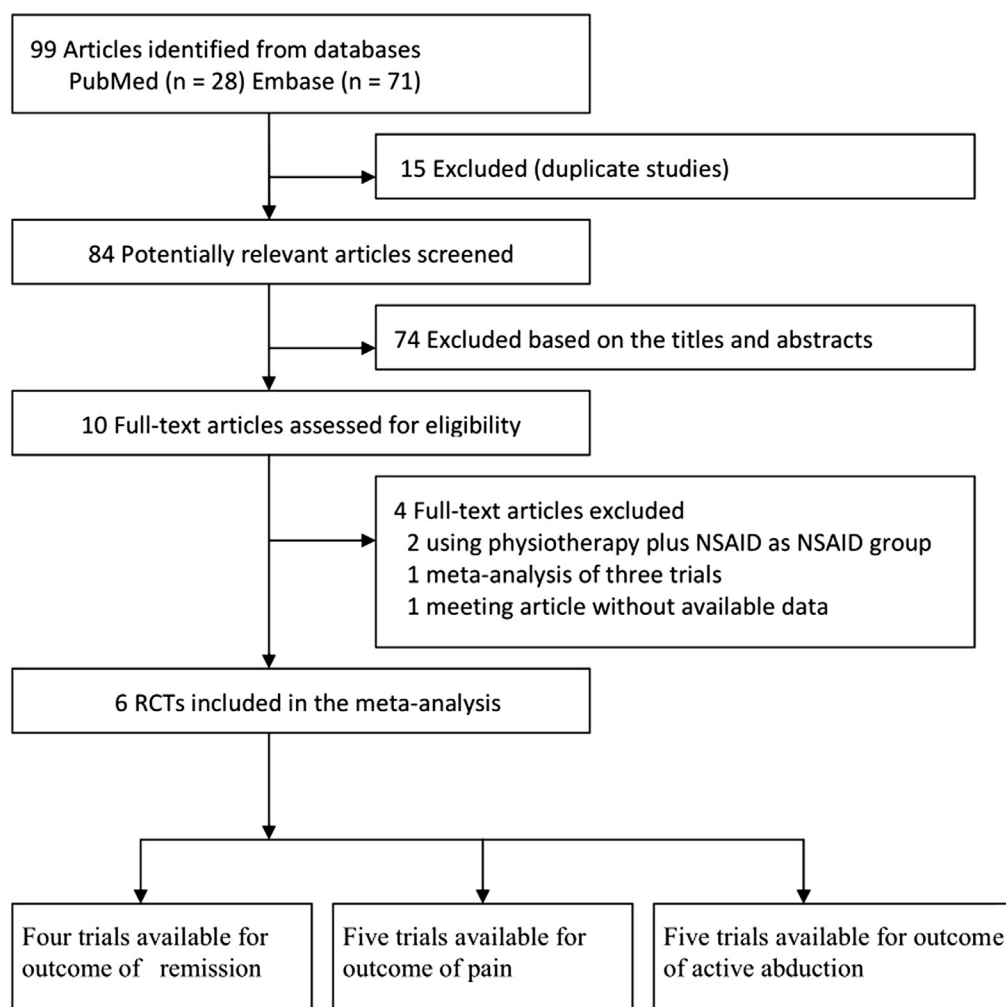
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Shoulder pain is a common musculoskeletal disorder with a prevalence varying from 7.5% to 21%.<sup>1-4</sup> Various clinical disorders, such as rotator cuff tendinitis, adhesive capsulitis, shoulder impingement syndrome, and acromioclavicular joint disease, are diagnosed in patients with a painful shoulder.<sup>3</sup> Patients with shoulder pain usually have active and passive motion restriction and function limitation.<sup>5</sup> Since shoulder mobility affects daily life and pain influences sleeping, some patients also have anxiety and distress. Although shoulder pain is often described as having a self-limited course with

recovery occurring gradually within 1 to 3 years, intervention can help in rehabilitation and improve outcomes.<sup>6</sup>

Many treatments attempt to relieve shoulder pain, including surgical and nonsurgical options (rest, ice, nonsteroidal anti-inflammatory drugs [NSAIDs], corticosteroid injection, physical treatment, electromagnetic radiation, laser).<sup>7-9</sup> NSAIDs and corticosteroid are the most commonly used treatments, but the most effective treatment option remains to be established. A meta-analysis involving only 3 trials was conducted by Arroll et al<sup>10</sup> and published in 2005, and no significant difference between corticosteroid and NSAIDs for treatment of shoulder pain was verified by the results. Moreover, this meta-analysis assessed only the clinical outcome of

Disclosures: none.



**Fig 1** Flow diagram of included and excluded studies.

remission, whereas other outcomes, such as pain and range of motion, were not studied. With accumulating evidence of 3 additionally relevant high-quality randomized controlled trials (RCTs) published,<sup>11-13</sup> we therefore performed a systematic review and meta-analysis of RCTs to investigate the treatment efficacy of corticosteroid and NSAIDs for patients with shoulder pain.

## Methods

### Literature search and inclusion criteria

We conducted this meta-analysis in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses statement.<sup>14</sup> PubMed and EMBASE databases were searched by 2 authors independently (X.-Q.Z., K.L.) to identify the relevant RCTs (from inception to January 2014). The search strategy was set by combining the subject term and free term with the following words: (“shoulder pain” OR “shoulder impingement syndrome”

OR “rotator cuff” OR “bursitis” OR “adhesive capsulitis” OR “frozen shoulder”) OR (“shoulder pain”[MeSH] OR “shoulder impingement syndrome”[MeSH])) AND (steroid\$ OR corticosteroid\$ OR “adrenal cortex hormone”[MeSH]) AND (“anti-inflammatory agents, nonsteroidal” [MeSH] OR “nonsteroid antiinflammatory agent” [MeSH]) OR acetylsalicyl\* OR carbasa-laatcalcium OR diflunisal OR aceclofenac OR alclofenac OR diclofenac OR indometacin OR sulindac OR meloxicam OR piroxicam OR dexibuprofen OR dexketoprofen OR fenoprofen OR flurbiprofen OR ibuprofen OR ketoprofen OR naproxen OR tiapro\* OR metamizol OR phenylbutazone OR phenazone OR propyphenazone OR celecoxib OR etoricoxib OR nabumeton OR parecoxib). The study design was restricted to RCTs, and the detailed limitation for them is presented in [appendix 1](#). Additionally, the reference lists of retrieved studies were also rechecked manually to identify other eligible trials. This process was repeated until no further relevant studies were detected. RCTs included met the following criteria: (1) patients—people with shoulder pain; (2) intervention/control—NSAIDs versus corticosteroid; (3) outcomes—remission, pain relief, and motion improvement; and (4) study design—RCT.

### Data extraction and outcome measures

Two reviewers (X.-Q.Z., K.L.) independently extracted the following information from the included studies: first author,

#### List of abbreviations:

CI	confidence interval
NSAID	nonsteroidal anti-inflammatory drug
RCT	randomized controlled trial
SMD	standardized mean difference

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