



Original Article

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Effectiveness of a Facet Joint Block Versus a Medial Branch Block in Spinal Pain Management: A Systematic Review and Meta-Analysis

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Objective: Facet joint injections (FJIs) and medial branch blocks (MBBs) are commonly used interventions for chronic spinal pain, but their comparative effectiveness remains unclear. This meta-analysis aimed to compare the pain relief, functional improvement, complications, and patient satisfaction associated with FJI and MBB.

Methods: A systematic review and meta-analysis of randomized controlled trials and observational studies were conducted. Primary outcomes included pain relief (numerical rating scale) and functional improvement (Oswestry Disability Index [ODI]/Neck Disability Index). Secondary outcomes assessed adverse effects and patient satisfaction. The differences in characteristics between patients who were readmitted and those who were not were identified and analyzed using the Review Manager software.

Results: FJI resulted in lower pain and ODI scores compared to MBB, but the differences were not statistically significant. However, patient satisfaction was significantly higher in the FJI group (odds ratio, 1.81; 95% confidence interval, 1.02–3.24; $p = 0.04$). Additionally, FJI had fewer adverse effects than MBB.

Conclusion: Both FJI and MBB are effective for chronic spinal pain, but FJI may be preferred for patients seeking immediate pain relief with fewer complications. Further high-quality studies are needed to refine treatment guidelines.

Keywords: Low back pain, Medial branch block, Facet joint block, Chronic pain, Pain management

INTRODUCTION

Chronic low back pain (CLBP) affects approximately 15%–30% of the adult population at any given time, with a lifetime prevalence exceeding 70% in industrialized countries. It is one of the leading causes of disability worldwide, contributing significantly to direct healthcare expenditures, indirect costs such as lost work productivity, and socioeconomic burden.^{1–4} CLBP can be managed through a variety of approaches depending on the underlying pathology and severity. Pharmacological treat-

ments include acetaminophen, nonsteroidal anti-inflammatory drugs, muscle relaxants, opioids, and adjuvant analgesics.² Orthotic devices such as braces and corsets are sometimes employed to provide structural support and pain relief. Rehabilitation strategies including physical therapy, exercise programs, and behavioral interventions aim to restore function and reduce disability.³ In refractory cases, surgical options such as spinal fusion or decompression may be considered.³

Among interventional pain management techniques, various types of injections are utilized, including caudal epidural injec-

tions, transforaminal epidural injections, selective nerve root blocks, and facet joint-related procedures. Facet joint blocks and medial branch blocks (MBBs) specifically target facet-mediated spinal pain and are among the most commonly employed diagnostic and therapeutic interventions in clinical practice.² Diagnosing facet joint pain is challenging, as traditional imaging modalities, such as magnetic resonance imaging and computed tomography, lack specificity.¹ Thus, diagnostic blocks, particularly MBBs and intra-articular facet joint injections (FJIs), are extensively used for diagnostic confirmation and pain management.^{2,4} The MBB targets the medial branch of the dorsal ramus, which innervates the facet joints, providing both diagnostic and therapeutic benefits. In contrast, FJIs deliver corticosteroids and anesthetics directly into the facet joint capsule to reduce inflammation and modulate pain.^{3,7,8} Facet joint-mediated pain typically presents as axial low back pain exacerbated by spinal extension or prolonged standing.² In contrast to radicular pain, facet pain is generally nondermatomal and often lacks associated neurological deficits. In clinical practice, MBBs are often utilized first for diagnostic purposes due to their high specificity in identifying facetogenic pain, while FJIs can be considered for both diagnostic and therapeutic interventions.⁹ Typically, an initial injection is performed, and clinical response is assessed. If adequate but temporary relief is achieved, repeat injections may be considered. In general practice, up to 2 or 3 injections are performed, with intervals ranging from 2 weeks to 3 months, depending on patient response and physician discretion. Repeated blocks are typically limited to avoid masking progressive pathology and to determine candidacy for more definitive treatments, such as radiofrequency ablation.

Despite their widespread use, the relative efficacy of these interventions remains a topic of debate. Some studies suggest that MBBs provide longer-lasting pain relief due to their effect on nociceptive transmission, whereas others argue that FJIs are superior in patients with imaging-confirmed inflammation.¹⁰⁻¹³ Several randomized controlled trials (RCTs) have compared these interventions in patients with chronic spinal pain. Some studies indicate that the MBB may be superior in predicting the response to radiofrequency ablation and providing longer pain relief, whereas others suggest that intra-articular injections offer comparable or superior short-term relief.^{1,2,10,13} Several systematic reviews have assessed the effectiveness of facet joint interventions. Manchikanti et al.¹⁴ performed a comprehensive review and reported moderate evidence supporting MBBs and intra-articular FJIs for pain relief. Similarly, Vekaria et al.¹⁵ focused on FJI alone, suggesting that intra-articular injections can

be effective in selected patients. Cohen et al.¹⁶ further highlighted that patient selection criteria are crucial for optimizing outcomes of facet joint interventions.

However, despite these efforts, there remains a lack of systematic reviews directly comparing the effectiveness of FJI and MBB. Moreover, with the publication of new RCTs in recent years, an updated meta-analysis is warranted to provide clinicians with evidence-based guidance. Therefore, we hypothesized that FJI and MBB would differ in their clinical outcomes and safety profiles when used for the management of spinal pain.

The objective of this systematic review and meta-analysis was to compare FJI and MBB in terms of their effectiveness for pain relief, functional improvement, patient satisfaction, the need for repeat interventions, and the incidence of complications across cervical, thoracic, and lumbar spinal regions.

MATERIALS AND METHODS

1. Study Design

This systematic review and meta-analysis adhered to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) guidelines.¹⁷ It included RCTs, cohort studies, and comparative observational studies that evaluated the effectiveness of FJIs and MBBs for managing chronic spinal pain. This systematic review was prospectively registered in the PROSPERO database (Registration ID: CRD420241040655) prior to the commencement of the study. The review was conducted in accordance with the protocol registered therein.

2. Search Strategy

A comprehensive search was conducted in the PubMed, Embase, Cochrane Library, and Web of Science databases for studies published until January 2025. Keywords used to screen publications included “facet joint block,” “medial branch block,” “facet joint injection,” “low back pain,” “cervical pain,” “thoracic pain,” and “chronic spinal pain.” Boolean operators were also used (e.g., facet joint injection, medial branch block, and chronic pain). The reference lists of the identified articles were further screened for additional studies.

3. Eligibility Criteria

1) Inclusion criteria

- (1) Studies comparing FJIs versus MBBs in patients with chronic spinal pain (cervical, thoracic, or lumbar).
- (2) Studies reporting pain relief (as assessed by the numerical rating scale [NRS]) or functional improvement (as assessed

by the Oswestry Disability Index [ODI] and Neck Disability Index [NDI]).

- (3) Studies with at least 4 weeks of follow-up.
- (4) RCTs, cohort studies, or case-control studies published in peer-reviewed journals.

2) Exclusion criteria

- (1) Studies involving nonspinal interventions (e.g., sacroiliac joint injections).
- (2) Studies evaluating only radiofrequency ablation without prior diagnostic blocks.
- (3) Case reports, letters, and non-English articles.
- (4) Studies with incomplete data those without a specified follow-up period, or those with missing essential demographic or intervention details.

4. Data Extraction and Analysis

Two independent authors extracted the data using a standardized form. Discrepancies were resolved by consensus or by a third reviewer. The following data were collected:

- Study characteristics (author, year, sample size, and study design).
- Patient demographics (age, sex, pain duration, and diagnosis).
- Intervention details (type, dosage, and guidance technique).
- Primary outcomes: pain relief (NRS) and functional improvement (ODI/NDI).¹⁸
- Secondary outcomes: the duration of pain relief, need for repeat injection, and occurrence of complications. Pain relief and functional improvement were assessed at various follow-up intervals depending on the study, typically ranging from 1 month to 12 months after the intervention.
- Patient satisfaction: Likert-type scales or Patient Global Impression of Change scales

5. Quality Assessment

Risk of bias for RCTs was assessed using the Cochrane Risk of Bias tool.^{19,20} For nonrandomized observational studies, the ROBINS-I (Risk Of Bias In Non-randomized Studies of Interventions) tool was applied.^{19,20}

6. Statistical Analyses

We used the Review Manager software (ver. 5.3, Cochrane Collaboration) for the meta-analysis. Meta Essentials (ERASMUS Research Institute) was used to generate the funnel plots. Factors were compared and measured using weighted mean

differences (WMDs) and corresponding 95% confidence intervals (CIs) for continuous data. Their effects were evaluated using 95% CIs and odds ratios. The heterogeneity of the studies was assessed using the I^2 index and chi-square tests. In cases of high heterogeneity between studies, a random-effects model ($p < 0.1$ or $I^2 > 50\%$) was applied; otherwise, a fixed-effects model was applied. Egger test was used to test for publication bias. Statistical significance was set at $p < 0.05$.

RESULTS

1. Included Studies

We identified 72 studies from the PubMed ($n = 60$) and Embase ($n = 12$) databases, from which 63 remained after excluding duplicate studies. Of these, 43 were excluded after reviewing the abstracts and titles because they did not focus on FJIs or MBBs, and 10 were excluded due to insufficient data related to the procedures. Finally, 10 studies were selected for the meta-analysis, 9 of which were RCTs, and 1 was a retrospective study. Two, 2, and 6 studies focused on cervical, thoracic, and lumbar spine pain, respectively. Fig. 1 illustrates the study selection process, and Table 1 summarizes the study characteristics. Table 1 describes the diagnoses, types of medication, dosage, frequency, and methods of administration of the patients included in the study.

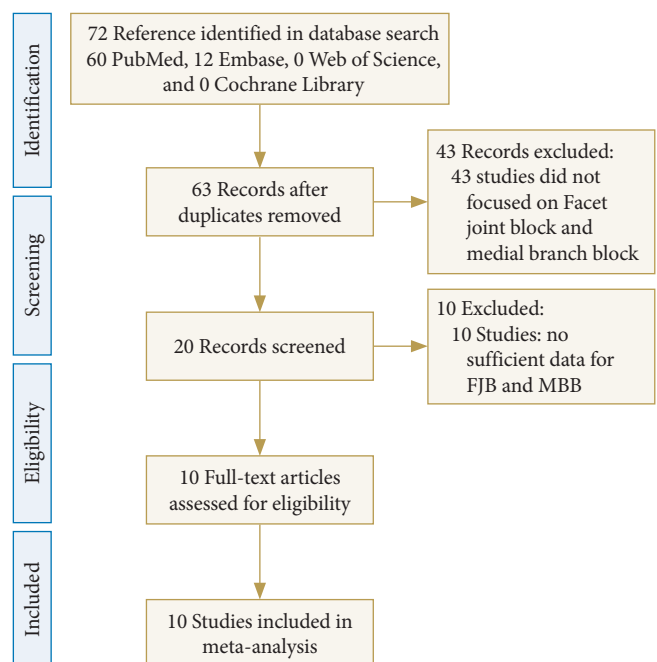


Fig. 1. Flow chart of study selection process.

Table 1. Characteristics of studies included in the meta-analysis

Study	Year	Country	Study type	Location	Diagnosis	Facet joint block	Medial branch block	Drug/dose	Times/method	Outcome measure	Time of measurement (mo)	Mean age (yr)
Ackerman et al. ¹³	2008	USA	RCT	Lumbar	Low back pain	23	23	0.5 mL of 1% lidocaine and 0.2 mL of triamcinolone/0.5 mL	1 Time/fluoroscopy	NRS, ODI, Pain intensity score	1, 2, 3	39.7
Manchikanti et al. ¹²	2008	USA	RCT	Thoracic	Mid back or upper back pain	24	24	0.25% Bupivacaine+ nonparticulate betamethasone (0.15 mg/mL)/0.5–1.0 mL	3–4 Times/fluoroscopy	NRS, ODI	3, 6, 12	44.5
Manchikanti et al. ¹¹	2010	USA	RCT	Lumbar	Low back pain	60	60	0.25% Bupivacaine±sarapin+ nonparticulate betamethasone (0.15 mg/mL)/0.5–1.0 mL	5–6 Times/fluoroscopy	NRS, ODI	3, 6, 12, 18, 24	47.0
Lee et al. ⁹	2018	Korea	RCT	Thoracic	Upper or mid back pain	20	20	0.5-mL bupivacaine+0.25-mL dexamethasone/0.75 mL	1 Time/fluoroscopy	NRS, Likert scale	1, 3, 6	55.6
Cohen et al. ¹⁰	2018	USA	RCT	Lumbar	Low back pain	91	91	0.5% Bupivacaine (0.25 mL)+ depomethylprednisolone 40 mg/mL (0.25 mL)/0.5 mL	1 Time/fluoroscopy	NRS, ODI, Likert scale	1, 3, 6	47.0
Hussain et al. ⁵	2020	India	RCT	Cervical	Chronic neck pain	30	30	Levobupivacaine 0.25% (1 mL)+ Triamcinolone 20 mg/1 mL	1 Time/fluoroscopy	NRS, NDI	1, 1.5, 3	38.7
Seo et al. ³	2021	Korea	Retrospective study	Lumbar	Low back pain	17	33	1% Lidocaine (1.0 mL)+ dexamethasone 2.5 mg/1.5 mL	1 Time/fluoroscopy	NRS, ODI	1.5	62.3
Abdelghaffar et al. ⁸	2022	Egypt	RCT	Cervical	Cervical facet joint arthropathy	35	35	0.5-mL Dexamethasone (4 mg/1 mL)+0.5 mL 1% Lidocaine/1 mL	1 Time/fluoroscopy	NRS, NDI	0.5, 2, 3	39.5
Anshul et al. ²	2023	India	RCT	Lumbar	Low back pain	30	29	0.25% Bupivacaine+ triamcinolone 10 mg/2 mL	1 Time/fluoroscopy	NRS, ODI, RMQ	1, 2, 3, 6	46.8
McCormick et al. ¹	2023	USA	RCT	Lumbar	Low back pain	12	20	Kenalog 0.5 mL+ lidocaine 0.5 mL/1 mL	1 Time/fluoroscopy	NRS, ODI, PGIC	1, 3, 6, 12	62.3

RCT, randomized controlled study; NRS, numerical rating scale; ODI, Oswestry Disability Index; NDI, Neck Pain Disability Index; RMQ, Roland-Morris Questionnaire; PGIC, Patient Global Impression of Change.

Table 2. Quality assessment of included studies in the meta-analysis according to RoB and ROBINS-I

Study	Results	Method
Ackerman et al. ¹³	Low risk bias	RoB
Manchikanti et al. ¹²	Low risk bias	RoB
Manchikanti et al. ¹¹	Low risk bias	RoB
Lee et al. ⁹	Low risk bias	RoB
Cohen et al. ¹⁰	Low risk bias	RoB
Hussain et al. ⁵	Low risk bias	RoB
Seo et al. ³	High risk bias	ROBINS-I
Abdelghaffar et al. ⁸	Low risk bias	RoB
Anshul et al. ²	Low risk bias	RoB
McCormick et al. ¹	Low risk bias	RoB

RoB, risk of bias; ROBINS-I, Risk of Bias In Non-randomized Studies of Interventions.

2. Quality Assessment

Out of the 10 included studies, 9 were assessed as having a low risk of bias, while one study was judged to have a high risk of bias (Table 2).

3. NRSs After 1, 3, and 6 Months

Among the 707 participants, whose data were included in the analysis, 342 received an FJI and 365 received an MBB. One, 3, and 6 months after the procedure (Figs. 2–4, respectively), the NRS scores were higher in the MBB group than in the FJI group; however, these differences were statistically insignificant (1month: WMD, 0.51; 95% CI, -0.56–1.57; $p=0.35$; 3 months: WMD, 1.86; 95% CI, -0.02–3.74; $p=0.05$; 6 months: WMD, -0.68; 95% CI, -2.95 to 1.60; $p=0.56$) (Table 3).

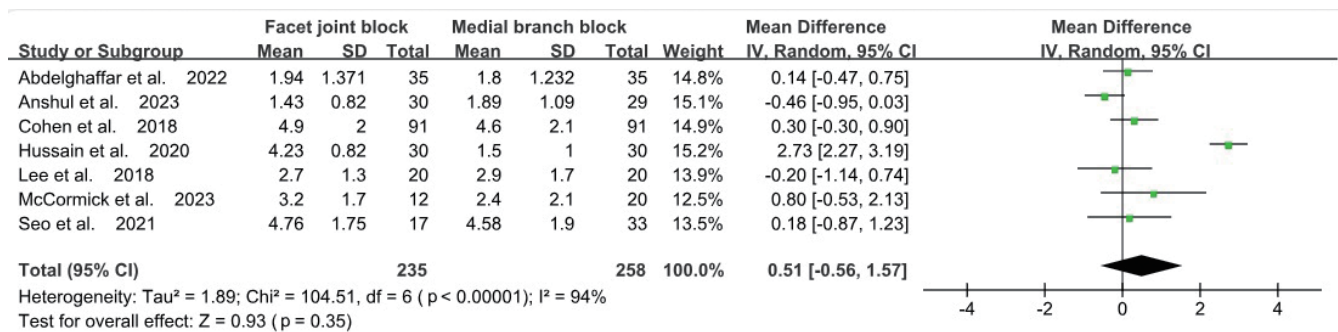
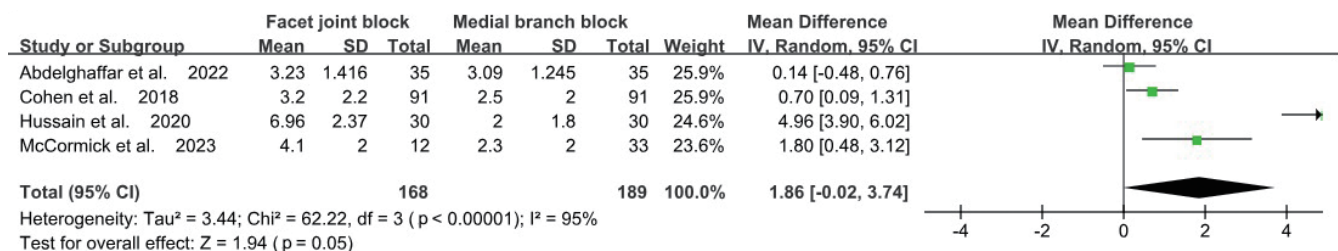
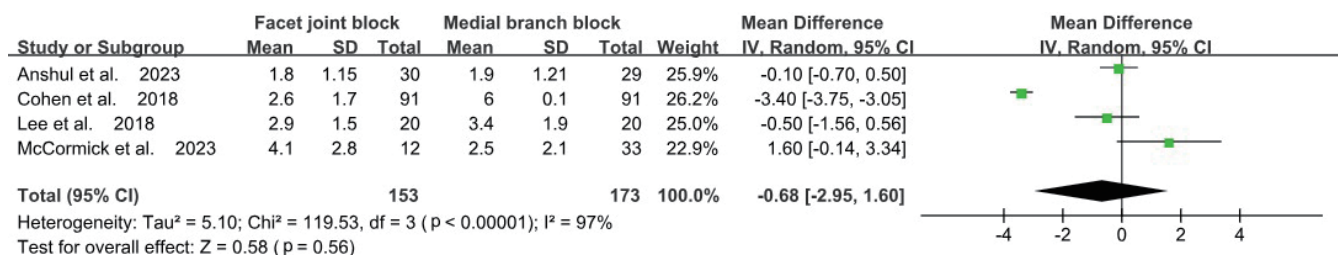
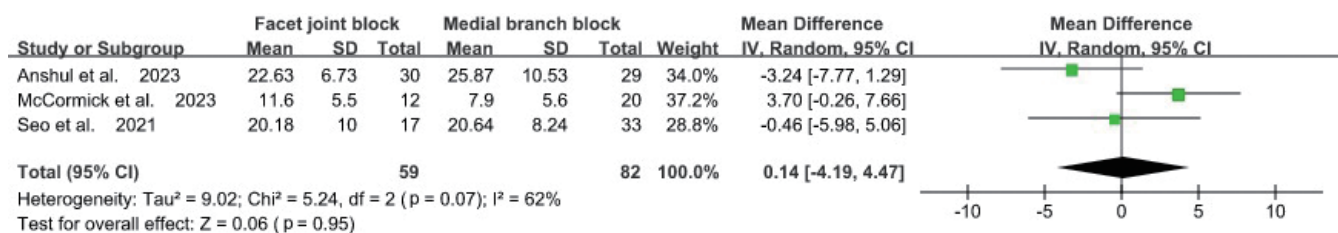
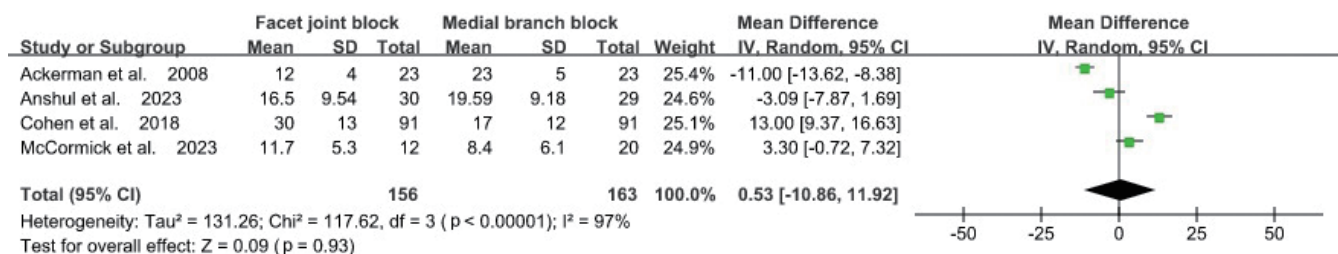
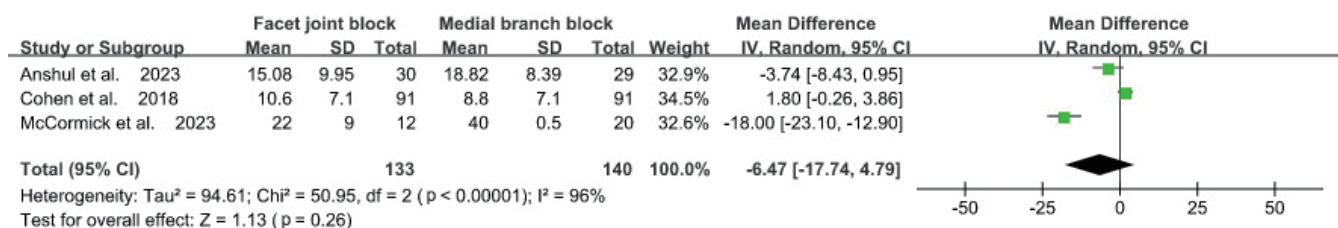
**Fig. 2.** Forest plot showing numerical rating scale in 1 month (random, weighted mean difference). SD, standard deviation; IV, inverse variance; CI, confidence interval; df, degrees of freedom.**Fig. 3.** Forest plot showing numerical rating scale in 3 months (random, weighted mean difference). SD, standard deviation; IV, inverse variance; CI, confidence interval; df, degrees of freedom.**Fig. 4.** Forest plot showing numerical rating scale in 6 months (random, weighted mean difference). SD, standard deviation; IV, inverse variance; CI, confidence interval; df, degrees of freedom.

Table 3. Comparison factors between facet joint block and medial branch block

Factor	No. of studies	Test of differences		Test of heterogeneity		Model
		WMD/OR (95% CI)	p-value	I ² (%)	p-value	
NRS 1 month	7	0.51 [†] (-0.56 to 1.57)	0.35	94	0.01	R
NRS 3 months	4	1.86 [†] (-0.02 to 3.74)	0.05	95	0.01	R
NRS 6 months	4	-0.68 [†] (-2.95 to 1.60)	0.56	97	0.01	R
ODI 1 month	3	0.14 [†] (-4.19 to 4.47)	0.95	62	0.07	R
ODI 3 months	4	0.53 [†] (-10.86 to 11.92)	0.93	97	0.01	R
ODI 6 months	3	-6.47 [†] (-17.74 to 4.79)	0.26	96	0.01	R
Satisfaction score	3	1.81 [‡] (1.02 to 3.24)	0.04*	21	0.28	F
Adverse effect	4	0.64 [‡] (0.32 to 1.28)	0.20	0	0.60	F

NRS, numerical rating scale; ODI, Oswestry Disability Index; WMD, weighted mean difference; OR, odds ratio; CI, confidence Interval.

*p < 0.05, statistically significant differences. [†]Values are WMD. [‡]Values are OR.

**Fig. 5.** Forest plot showing Oswestry Disability Index in 1 month (random, weighted mean difference). SD, standard deviation; IV, inverse variance; CI, confidence interval; df, degrees of freedom.**Fig. 6.** Forest plot showing Oswestry Disability Index in 3 months (random, weighted mean difference). SD, standard deviation; IV, inverse variance; CI, confidence interval; df, degrees of freedom.**Fig. 7.** Forest plot showing Oswestry Disability Index in 6 months (random, weighted mean difference). SD, standard deviation; IV, inverse variance; CI, confidence interval; df, degrees of freedom.

4. ODI Values After 1, 3, and 6 Months

One, 3, and 6 months after the procedure (Figs. 5–7, respectively), the ODI values were higher in the MBB group than in

the FJI group; however, these differences were statistically insignificant (1 month: WMD, 0.14; 95% CI, -4.19 to 4.47; p = 0.95; 3 months: WMD, 0.53; 95% CI, -10.86 to 11.92; p = 0.93; 6 months:

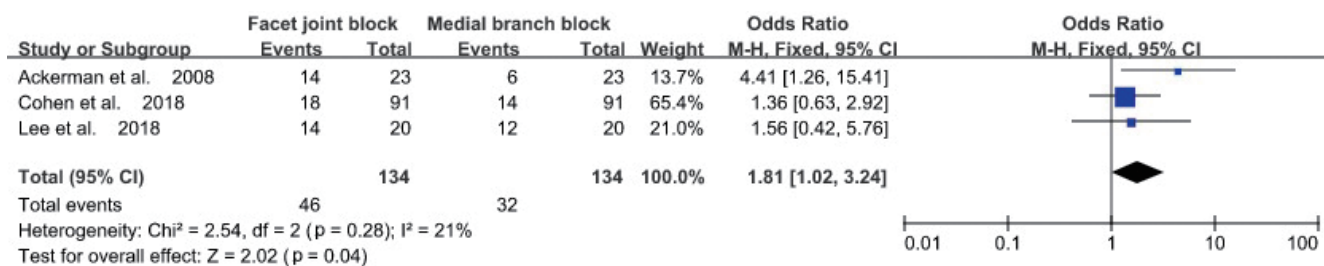


Fig. 8. Forest plot showing satisfaction score (fixed, odds ratio). SD, standard deviation; IV, inverse variance; CI, confidence interval; df, degrees of freedom.

WMD, -6.47; 95% CI, -17.74 to 4.79; $p = 0.26$) (Table 3).

5. Satisfaction Score

When analyzing the percentage of people who said “good” in the satisfaction survey, the satisfaction with the FJI was statistically significantly higher than that with the MBB (OR, 1.81; 95% CI, 1.02–3.24; $p = 0.04$) (Fig. 8, Table 3).

6. Adverse Effects

Procedure-related adverse effects were more common in the MBB group than in the FJI group. However, it was not statistically significant (OR, 0.64; 95% CI, 0.32–1.28; $p = 0.2$).

7. Publication Bias

All funnel plots were symmetrical, and significant publication bias did not exist among the studies. The Egger test results for each risk factor were: NRS at 1 month ($p = 0.505$); NRS at 3 months ($p = 0.864$); NRS at 6 months ($p = 0.568$); ODI at 1 month ($p = 0.724$); ODI at 3 months ($p = 0.762$); ODI at 6 months ($p = 0.642$); Satisfaction score ($p = 0.179$) and adverse effects ($p = 0.287$). Therefore, there was no evidence of publication bias in the dataset.

8. Subgroup Analysis by Spinal Level

Subgroup analyses were performed according to the spinal region treated (cervical, thoracic, or lumbar). In the cervical spine demonstrated that MBB produced significant short-term pain relief, with moderate to high patient satisfaction rates. However, the follow-up periods were relatively short, and no repeated blocks were performed. In the thoracic spine showed effective pain reduction with both FJI and MBB. Lee et al.⁹ observed slightly better outcomes in FJI at 6 months, although the difference was not statistically significant. In the lumbar spine consistently demonstrated that both FJI and MBB provided significant improvements in pain and function. Some studies reported slightly higher satisfaction scores with FJI.

DISCUSSION

Our findings are generally consistent with prior systematic reviews assessing the effectiveness of facet interventions. Manchikanti et al.¹⁴ reported moderate evidence supporting both MBB and FJI for chronic spinal pain, without favoring one over the other. Similarly, the systematic review by Vekaria et al.¹⁵ suggested that intra-articular FJI could be beneficial for carefully selected patients. However, unlike previous reviews, this meta-analysis provides valuable insights into the comparative effectiveness of FJIs and MBBs for managing chronic spinal pain. Our results indicate that both interventions offer significant pain relief and functional improvement, although differences in their duration of efficacy and clinical utility exist.

1. Pain Relief and Functional Improvement

We found that FJIs resulted in lower pain scores than MBBs, although this difference was not statistically significant in most studies. Several trials^{2,3,9} have reported a greater reduction in pain scores following FJIs compared to MBBs. This is potentially attributable to the anti-inflammatory effects of intra-articular corticosteroids, direct targeting of nociceptive receptors within the facet joint, and better pain modulation in patients with confirmed facet joint inflammation on imaging.^{2,4}

Conversely, McCormick et al.,^{1,13,14} Manchikanti et al.,^{1,13,14} and Cohen et al.¹⁰ reported that MBBs better reduced pain, resulting in lower pain scores, compared to FJIs, particularly in patients who subsequently underwent radiofrequency ablation (RFA). The hypothesized reasons for this include a more targeted effect on the medial branch nerves, which directly transmits facet joint pain, and potential long-term benefits in reducing the central sensitization of pain pathways.^{1,10}

The variability in these findings highlights the importance of patient selection, procedural techniques, and the presence or absence of facet joint inflammation, which may influence the relative effectiveness of FJIs and MBBs.

2. ODI and Functional Improvement

Our analysis found lower ODI values for FJIs than for MBBs, although this difference was statistically insignificant. Seo et al.,³ Anshul et al.,² and Lee et al.⁹ reported greater functional improvement following FJIs, which may be attributable to the localized anti-inflammatory effects of corticosteroids and improved joint mobility due to intra-articular drug diffusion. Additionally, FJIs may facilitate a faster recovery in patients with imaging-confirmed facet joint degeneration, reduced mechanical dysfunction, and improved movement.^{2,9}

In contrast, McCormick et al.,^{1,13,14} Manchikanti et al.,^{1,13,14} and Cohen et al.¹⁰ observed that MBBs further reduced ODI values compared to FJIs. The suggested explanations for this include a greater long-term modulation of nociceptive input through medial branch targeting, potential neuroplastic changes following repeated blocks, and a better predictive value for RFA. Additionally, MBBs may have a more sustained impact on disability reduction owing to their direct effect on sensory innervation rather than on joint inflammation alone.^{1,10}

These findings underscore the need to individualize treatment selection based on pain chronicity, facet joint inflammation, and the expected duration of relief, as FJIs and MBBs have distinct advantages depending on patient characteristics.

3. Patient Satisfaction

Our analysis found that FJI was associated with significantly higher patient satisfaction compared to MBB (OR, 1.81; 95% CI, 1.02–3.24; $p=0.04$). The reasons for this may include more immediate pain relief, a perceived smoother procedural experience, and fewer complications associated with FJI.^{2,9} Intra-articular corticosteroids can provide a rapid anti-inflammatory effect, potentially leading to a quicker return to normal activities. In contrast, MBB requires repeated procedures or subsequent radiofrequency ablation for prolonged benefit, which may impact patient-reported satisfaction.¹ Overall, patients who received MBBs required more frequent repeat procedures compared to those who underwent FJIs, likely due to the shorter duration of pain relief associated with MBBs. FJIs directly deliver the therapeutic agents into the facet joint capsule, which may result in more immediate and pronounced pain relief. In contrast, MBB targets the sensory nerves innervating the facet joints and may produce more variable effects depending on individual anatomical variations and technical factors.

4. Adverse Effects and Safety Profile

We found that FJIs were associated with fewer complications

than MBBs. Common adverse effects following FJIs include transient postinjection pain, local skin reactions, and corticosteroid-related side effects, such as fluid retention and hyperglycemia in patients with diabetes.^{2,9} However, these effects are typically mild and self-limiting.

In contrast, MBBs have a slightly higher complication rate, primarily because of their proximity to neural structures. The reported adverse effects include temporary numbness or weakness, vasovagal reactions, and, in rare cases, neuritis or prolonged dysesthesia.^{1,10} Additionally, the risk of vascular injury, hematoma, and inadvertent intravascular injection is slightly higher for MBBs than for FJIs, particularly when performed without fluoroscopic or ultrasound guidance.^{11,12}

Importantly, while vasovagal reactions are known to occur following cervical or thoracic procedures due to higher sympathetic chain sensitivity, they were not commonly reported following lumbar MBBs in the included studies.^{5,9,12} Additionally, region-specific adverse effects were limited. Cervical interventions occasionally carry higher theoretical risks of neurovascular injury due to anatomical proximity to critical structures, while lumbar procedures tend to have lower complication rates overall.^{5,7,10} Despite these differences, both procedures remain relatively safe when performed under proper imaging guidance by experienced clinicians. The choice of procedure should consider patient comorbidities, pain characteristics, and risk tolerance to optimize outcomes while minimizing complications.

5. Limitations

Although this meta-analysis comprehensively compares FJIs and MBBs, several limitations should be acknowledged.

- (1) Heterogeneity in study design: The included studies varied in methodology, patient selection criteria, injection techniques, and follow-up durations, which may have influenced the overall findings and limited direct comparisons. The heterogeneity in patient backgrounds, including factors such as neurological symptoms, spinal deformities, and comorbid conditions, may have contributed to variations in the effectiveness and satisfaction outcomes across studies.
- (2) Variability in outcome measures: Pain relief and functional improvement were assessed using different scales (e.g., NRS and ODI), leading to potential inconsistencies in data interpretation.
- (3) Limited long-term follow-up: Most of the included studies had relatively short follow-up durations, making it difficult to assess the long-term effectiveness and recurrence

rates of pain following these interventions.

- (4) Publication bias: As a systematic review, publication bias exists because studies reporting negative or inconclusive results may be underrepresented in the literature.
- (5) Lack of standardized imaging criteria: Many studies have not uniformly reported imaging findings to confirm facet joint pathology, which may influence treatment efficacy and patient selection.
- (6) Small sample size: Some studies included in the analysis had small patient populations, potentially limiting the statistical power and generalizability of the findings.

Future research should address these limitations through large-scale multicenter RCTs with standardized methodologies, longer follow-up periods, and well-defined imaging criteria for patient selection.

CONCLUSION

Both FJI and MBB are effective for chronic spinal pain, but FJI may be preferred for patients seeking immediate pain relief with fewer complications. Further high-quality studies are needed to refine treatment guidelines.

NOTES

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