Print ISSN: 2321-6379
Online ISSN: 2321-595X

Review Article

Diclofenac Topical Gel for the Management of Osteoarthritis and Joint Pain: Real Therapeutic Effect or Just Psychological Effect

Karthikeyan Chinnaswami[1], Atmananda Hegde[2], Dijoe Davis[3], M. Raffic[4], George M Srampickal[5], S Satheesh Kumar[6], Melvin J George[7]

[1]Consultant, Department of Orthopaedics, Royal Care Hospital, Coimbatore, Tamil Nadu, India, [2]Professor and Head, Department of Orthopaedics, Kasturba Medical College, Mangalore, Karnataka, India, [3]Associate Professor, Department of Orthopaedics, Amala Hospital, Thrissur, Kerala, India, [4]Professor and HOD, Department of Orthopaedics, Sree Gokulam Medical College, Trivandrum, Kerala, India, [5]Orthopaedic and Joint Replacement Surgeon, Department of Orthopaedics, Providence Hospital, Alappuzha, Kerala, India, [6]Associate Professor, Department of Orthopaedics, Sree Gokulam Medical College, Trivandrum, Thiruvananthapuram, Kerala, India, [7]Professor and Unit Chief, Department of Orthopaedics, MOSC Medical College, Kochi, Kerala, India

Abstract

Diclofenac topical gel is an effective treatment for osteoarthritis (OA) and joint pain due to its enhanced skin penetration and therapeutic benefits. The gel formulation provides a higher flux, allowing better penetration and absorption into underlying tissues than other formulations such as solutions or patches. Upon application, diclofenac reaches therapeutic levels in deeper tissues, including synovial fluid, which helps alleviate pain and inflammation while reducing systemic side effects, which are a major concern for OA patients with comorbid conditions. The sustained release mechanism of the gel maintains therapeutic levels over time, contributing to prolonged pain relief. In addition, combination formulations incorporating penetration enhancers or active ingredients can further boost the efficacy of diclofenac gel. Moreover, diclofenac gel demonstrates therapeutic benefits, with measurable pain relief and anti-inflammatory effects, making it a preferred choice of clinicians. However, topical counterirritants provide a paradoxical pain-relieving effect and caution is needed as topical analgesics with counterirritants, such as capsaicin, can cause severe skin injuries, including chemical burns.

Key words: Counterirritants, Diclofenac topical gel, Osteoarthritis, Skin penetration, Therapeutic efficacy

INTRODUCTION

Prevalence of Osteoarthritis (OA)

In India, the overall prevalence of knee OA is 28.7%, with higher rates among women (31.6%) than men (28.1%). The prevalence is also higher among individuals who are obese, older adults, and those with sedentary lifestyles.[1] Knee OA is the most common form of OA, followed by hand OA.[2] At least 62% of the patients are affected by one or more conditions in addition to OA.[3] The occurrence of chronic conditions alongside OA is frequently observed, during the later decades of life.[4]

Access this article online

www.ijss-sn.com

Month of Submission : 10-2024
Month of Peer Review : 11-2024
Month of Acceptance : 12-2024
Month of Publishing : 12-2024

The OA Research Society International and the European League Against Rheumatism guidelines for managing OA recommend non-steroidal anti-inflammatory drugs (NSAIDs) at the lowest effective dose for patients with comorbidities for long-term use.[5] These guidelines consider topical NSAIDs as safe and effective first-line treatments for OA pain with proven efficacy.[5]

Guidelines for Long-term Pain Management for OA

International guidelines advise against prolonged NSAID use, especially in individuals with comorbidities or cardiovascular disease, and recommend short-term use only.[6] The American College of Rheumatology and Arthritis Foundation guideline 2019 recommends topical diclofenac as a first-line treatment for knee and hand OA, particularly for patients with comorbidities.[7,8]

National and international guidelines for the treatment of OA pain advocate the use of NSAIDs to manage OA-

Corresponding Author: Dr. Melvin J George, Department of Orthopaedics, MOSC Medical College, Kochi, Kerala, India.

related pain.[7] Out of 24 such guidelines, 19 recommend topical NSAIDs for OA pain, including diclofenac, as a first-line treatment for OA, especially for patients with limited joint involvement or those at risk for systemic side effects.[7]

Advantages of Topical Drug in OA Pain Management

In a topical drug delivery system, the drug diffuses out of the delivery system, reaches the site of action, and gets absorbed by the skin.[9] Topical application limits systemic absorption, reducing the risk of adverse gastrointestinal, renal, and cardiovascular effects in patients with comorbidities.[10]

Topical diclofenac effectively alleviates OA pain and stiffness within hours of application and is maintained throughout the 12-h dosing interval, improving patient compliance and satisfaction.[7]

Efficacy of Topical Gels

The efficacy of topical preparation depends on skin penetration, which is enhanced if the emulsion used is thixotropic, meaning it becomes less thick or viscous when applied or rubbed onto the skin.[9]

Diclofenac applied topically can reach therapeutic levels in deeper tissues, including the synovial fluid, which is essential for reducing pain and inflammation in OA, and this localized treatment helps in alleviating pain.[11] To further improve both the stability of the emulsion and its ability to penetrate the skin, it is often incorporated into a gel.[9]

Do counterirritants Play a Significant Role in OA Pain Relief?

No, topical counterirritants paradoxically relieve pain by creating milder, less severe pain that masks more intense pain.[12] Counterirritants work by irritating the skin and producing a hot or cold sensation that temporarily interrupts pain signals to the brain.[12] While these counterirritants can offer mild-to-moderate pain relief, they are generally insufficient to address severe OA pain.[12]

Topical capsaicin causes burning sensations or redness, with severe reactions in sensitive skin.[13] The FDA has issued warnings about the risks associated with topical analgesics containing capsaicin, menthol, or methyl salicylate.[14]

However, topical gel is a more suitable option for OA patients with comorbidities due to its targeted pain relief and low systemic side effects.[12]

Not all Gels are the Same: Emulgel Scores Better than Other Gels

Emulgels improve skin penetration due to their thixotropic nature, which means emulgels become less viscous during application, aiding in better absorption.[9] The stability of the emulsion and the type of gelling agent used significantly influence the penetration and overall efficacy of the emulgel.[9]

Emulgel, a combination of both emulsions and gel, acts as a dual control release system. Due to its non-greasy nature, it can be easily applied to the skin.[9] Emulgels have proven as most convenient, best, and effective delivery system.[9]

Clinical Studies on the Efficacy of Diclofenac Topical Gel

In a randomized, double-blind, placebo-controlled study of 72 patients with acute neck pain treated with topical diclofenac diethylamine (DDEA) 1.16% gel showed significant improvement.[15]

The primary outcome, pain-on-movement (POM) at 48 h, was 3 times lower with DDEA gel (19.5 mm) compared to placebo (56.9 mm) ($P < 0.0001$). Change from baseline was a 75% decrease with DDEA gel compared with a 23% decrease with placebo.[15]

POM scores were significantly lower from 1 h onwards, as were pain-at-rest (PAR) and neck disability index (NDI) scores from 24 h onward (all $P < 0.0001$).[15] The response to treatment was 94.4% with DDEA gel versus 8.3% with placebo ($P < 0.0001$).[15]

In another randomized, double-blind, placebo-controlled study with 238 patients, diclofenac gel showed improvement at all 3 weekly visits, with a peak difference of 11 mm at week 2 ($P = 0.0002$).[16] The response rate at the end of the study was 62% for diclofenac gel and 46% for placebo relief in POM ($P = 0.03$).[16]

CONCLUSION

OA poses a significant public health challenge in India. Addressing modifiable risk factors such as obesity, injuries, and occupational stress is essential to mitigating the burden of OA pain. Challenges in OA pain management with traditional NSAIDs underscore the need for alternative strategies.

Topical diclofenac gel emerges as a promising treatment for OA, particularly beneficial for older patients with comorbid conditions where systemic NSAIDs may be contraindicated. The localized action of topical gel provides effective pain relief with a favorable safety profile. The efficacy of topical diclofenac can vary based on formulation, concentration, and active ingredients, with skin penetration as a major parameter of efficacy. However, topical analgesics with counterirritants such as capsaicin pose a risk of skin burns and have the paradoxical effect of masking the pain. In

contrast, diclofenac topical gel provides a pleasant, non-greasy experience and effective pain relief, making it a suitable option for patients with sensitive skin as well.

EXPERT OPINION

1. Dr. Dinesh Veliath, MBBS, DNB Orthopaedics
Daya Hospital, Trichur, Kerala

Diclofenac topical gel is commonly prescribed for patients experiencing localized musculoskeletal pain and is strongly recommended due to its effectiveness and low incidence of systemic side effects. It is a first-line treatment for OA and joint pain, with pain relief being a significant efficacy parameter. The therapeutic efficacy is influenced by skin penetration. In addition, formulations with a cooling sensation without burning are preferred over those with counterirritants such as capsaicin, which can cause a burning sensation. Counterirritants, capsaicin, and methyl salicylates can act as adjuvants in pain relief but are not always preferred. A mild, pleasant smell of diclofenac gel is ideal for office workers. Increased concentration of diclofenac in the gel may improve skin penetration, leading to enhanced efficacy. Typically, patients are advised to apply the gel twice daily, and in patients with OA, depot formulations provide sustained pain relief with fewer applications. Emulgel systems in diclofenac gels further aid in delivering effective pain relief through better skin penetration.

2. Dr. Fakhruddin, MBBS, MS Orthopaedics
Lifecare Ortho Clinic, Chennai, Tamil Nadu

Diclofenac topical gel is prescribed for localized musculoskeletal pain and knee pain associated with arthritis. It is recommended as an adjunct to oral therapy, with pain relief as an efficacy parameter that depends on the penetration through the skin; further massaging can enhance this process. Although gel has a low incidence of systemic side effects, it is moderately recommended. For cooling sensation, formulations without counterirritants are advantageous, as capsaicin can cause a burning sensation despite providing temporary pain relief through a heating effect. In clinical practice, diclofenac gel is advised for once-daily use, as the depot formulations offer sustained pain relief with fewer applications. Increasing the concentration of diclofenac in the gel is not believed to improve its penetration; however, emulgel delivery systems can enhance the penetration.

3. Dr. K C Mohan, MBBS, DNB Orthopaedics
Sree Ortho Clinic, Ashok Nagar, Chennai, Tamil Nadu

Diclofenac topical gel for localized musculoskeletal pain is used as an adjunct to oral therapy for pain relief in OA and joint pain. Due to its low incidence of systemic side effects, it is strongly recommended for twice daily usage without massaging. Capsaicin as a counterirritant may cause a burning sensation in some patients, but it can act as an adjuvant in pain relief. Diclofenac gel with a mild smell is preferred for sprains and strains (ankle and neck). Increasing the concentration of diclofenac in the gel may improve penetration. In OA patients, diclofenac gel with an emulgel delivery system offers better skin penetration.

4. Dr. K Raveendar, MBBS, D Orthopaedics, FAO (Swiss)
Sai Ortho Clinic Saidapet, Chennai, Tamil Nadu

Diclofenac topical gel is prescribed to OA/rheumatoid arthritis (RA) patients with co-morbidities and chronic joint pain as an adjunct to oral therapy for pain relief. It is applied without massaging and is strongly recommended due to its low incidence of systemic side effects. Although capsaicin may cause a burning sensation, it acts as an adjuvant for pain relief. For office workers, a gel with a mild smell is recommended and should be applied twice daily. Increasing diclofenac concentration improves penetration, whereas gels with a depot effect offer sustained pain relief. Emulgel delivery systems provide better skin penetration and pain relief.

5. Dr. Sijad VP, MBBS, DNB Orthopaedic
Indira Gandhi Hospital, Thalassery, Kannur, Kerala

In my clinical practice, diclofenac topical gel is prescribed for all OA patients for sprains and strains, with a focus on pain relief and inflammation. It is strongly recommended owing to less systemic side effects, with skin penetration adding to its efficacy. Capsaicin may cause a burning sensation, but it serves as an adjuvant for pain relief. Diclofenac gel with a cooling sensation and pleasant smell is preferred and applied twice daily. Increasing diclofenac concentration improves penetration and depot effect, providing sustained pain relief, whereas emulgel formulations offer skin penetration and effective pain relief benefits.

6. Dr. Vemu Sudhir, MBBS, MS Orthopaedic
Unittas Hospital, Chennai, Tamil Nadu

Diclofenac topical gel is recommended for all OA patients as an adjunct for pain relief. It is applied without massaging and is strongly recommended because of its low systemic side effects, with skin penetration being crucial for efficacy. Capsaicin may cause a burning sensation, but it provides a heating effect for temporary pain relief. Diclofenac gel is preferred for knee pain associated with arthritis. Increasing diclofenac concentration improves penetration. Gels with a

depot effect provide sustained pain relief, whereas emulgel formulations offer skin penetration, a non-greasy feel, and a cooling sensation.

7. Dr. Vinoth Kumar K, MBBS DNB MNAMS
Sai Clinic, Madurai, Tamil Nadu

I prescribe diclofenac gel for localized musculoskeletal pain and as an adjunct to oral therapy for OA. Key efficacy factors include skin penetration, pain relief, and reduced POM, with minimal systemic side effects. I advise patients to use it only when in pain. Gels with a depot effect offer similar relief as other formulations; however, the emulgel technique is preferred for better penetration, a non-greasy feel, and a cooling sensation. Capsaicin, though an adjuvant, may cause a burning sensation.

8. Dr. Haseeb Mukthar, MBBS, MS Orthopaedic
Travancore Medical College, Kollam, Kerala

I commonly prescribe diclofenac gel for localized musculoskeletal pain and as an adjunct to oral therapy for OA and joint pain, emphasizing pain relief and low systemic side effects. I recommend massaging the gel for better penetration. Capsaicin provides temporary relief but may cause burning, whereas diclofenac is preferred for arthritis, knee pain, and back pain. A mild-smelling gel is ideal for office workers, and increasing diclofenac concentration can improve penetration. Depot gels offer sustained relief, whereas emulgel systems enhance penetration with a non-greasy feel and a cooling sensation.

9. Dr. Sudhakaran Manickam, MBBS, Orthopaedic spine surgeon
Royal Care Super Specialty Hospital, Coimbatore, Tamil Nadu

In my practice, I primarily prescribe diclofenac gel for localized musculoskeletal pain, with a focus on reducing pain during movement. I recommend using it without massaging and consider it for back pain due to its cooling sensation. For office workers, I recommend it due to its mild smell. Capsaicin may cause burning, yet it offers nerve relief. Increasing diclofenac concentration improves penetration, and it is recommended to use it only during pain. Depot effect gels provide sustained relief with fewer applications, whereas emulgel systems offer better penetration, a non-greasy feel, and a cooling sensation.

10. Dr. Rajganesh R, MBBS, D Orthopaedic, MS Orthopaedic
Srichakra Hospital, Chennai, Tamil Nadu

I prescribe diclofenac gel as an adjunct for OA/RA patients with comorbidities. Pain relief is the key to efficacy and I recommend application without massaging. The gel penetration through the skin provides efficacy with low systemic side effects. Capsaicin may cause burning but it also helps with pain relief. Diclofenac gel is preferred for knee arthritis, with patients favoring a cooling sensation. For office workers, I recommend a pleasant-smelling gel. Increasing diclofenac concentration improves penetration and depot gels provide sustained relief with fewer applications.

11. Dr. K Rajeshkumar, MBBS, MS Orthopaedic, MCh Orthopaedic (UK)
Frontline Hospital Trichy, Trichy, Tamil Nadu

I prescribe diclofenac gel for acute injury pain and as an adjunct to oral therapy in OA and joint pain management. I recommend it due to low systemic side effects and reduced POM as key outcomes. Capsaicin aids pain relief but may cause burning. I prefer diclofenac for knee arthritis, as patients favor a cooling sensation. For office workers, I recommend a pleasant-smelling gel and believe higher diclofenac concentration improves penetration. Depot effect gels provide sustained relief, whereas emulgel systems enhance penetration and cooling.

12. Dr. Dhanesh C, MBBS, D Orthopaedic, DNB Orthopaedic
MKH Hospital Tirurangadi, Kozhikode, Kerala

I prescribe diclofenac gel as a first-line treatment for OA joint pain due to its low systemic side effects, and patients favor a cooling sensation. Skin penetration is a crucial factor for its efficacy and I do not recommend massaging the topical gel. I recommend mild-smelling gels for office workers and believe that higher diclofenac concentration improves penetration. Depot effect and emulgel systems enhance relief with better penetration and cooling. Despite the fact that capsaicin may cause burning, I consider it an adjuvant.

13. Dr. Sreevishnu Pavithran, MBBS, MS Orthopaedics
Aswini Hospital, Thrissur, Kerala

I believe that diclofenac gel can be used for all OA patients as an adjunct to oral therapy for joint pain. Key efficacy parameters include pain relief, reduced stiffness, and less POM. I do not advise massaging, but I do recommend it due to low systemic side effects. Effective skin penetration is crucial for efficacy. Capsaicin may cause burning but acts as a counterirritant. I prefer diclofenac for knee arthritis, back pain, and strains, and recommend mild-smelling gels for office workers. Depot effect and emulgel systems enhance penetration, with a non-greasy feel and a cooling sensation.

14. Dr. Melvin J George, MBBS, DNB Orthopaedics
MOSC Medical College, Kolenchery, Kochi, Kerala

In my practice, I prescribe diclofenac gel as a first-line treatment for localized musculoskeletal pain in OA and joint pain, focusing on pain relief and skin penetration. I prefer diclofenac for back pain, ankle sprains, and neck strains, due to its cooling sensation, as patients often avoid burning gels. I do not recommend massaging but I approve the use of the gel due to low systemic side effects. Capsaicin may cause burning but provides temporary relief. I recommend a pleasant-smelling gel. Depot uses fewer applications to relieve pain. Emulgel solutions provide cooling and a non-greasy feel while improving penetration.

15. Dr. Manju G Pillai, MBBS, DNB Orthopaedics
Pushpagiri Medical College Thiruvalla, Thiruvalla, Kerala

I prefer diclofenac gel for localized musculoskeletal pain, such as OA and joint pain, because it provides pain relief, reduces inflammation, and improves movement. Skin penetration is key to its efficacy and it is recommended due to its low systemic side effects. Capsaicin can cause burning, yet it provides temporary relief. I prefer diclofenac for knee arthritis, back pain, and sprains, because of its cooling sensation. For office workers, I recommend a mild-smelling gel. I also believe that higher diclofenac concentration enhances penetration and depot gels provide sustained relief.

16. Dr. R Riju, MBBS, D Orthopaedics, DNB Orthopaedics
Lifeline Hospital Adoor, Adoor, Kerala

Diclofenac gel is prescribed for localized musculoskeletal pain as an adjunct to oral therapy in OA, focusing on pain relief. I do not recommend massaging, because I believe that normal application is sufficient, and I approve its use due to its low systemic side effects. Effective skin penetration is key to efficacy. While capsaicin can cause burning, counterirritants are used as adjuvants. I prefer diclofenac for knee arthritis, as patients favor a cooling effect. For office workers, a mild-smelling gel is recommended. I do not believe that increasing diclofenac concentration improves its penetration, although the depot effect of the gel provides sustained relief and the emulgel system enhances penetration and cooling.

17. Dr. A N Sarath Babu, MBBS, MS Orthopaedics
KS Ortho Clinic, Madipakkam, Chennai, Tamil Nadu

I prescribe diclofenac gel for all patients with OA as an adjunct to oral therapy, for reducing pain during movement. I believe that rubbing the gel on the affected area may increase local drug permeation, and effective skin absorption contributes to low systemic side effects. I also prefer the diclofenac gel for treating sprains and strains. Although capsaicin is used as a counterirritant, it can cause a burning sensation, but I find it helpful for pain relief. When diclofenac gel is applied in higher concentrations, improved drug penetration is observed. I advise using the gel only during pain episodes. I prefer prescribing emulgel formulations as these demonstrate enhanced effectiveness due to better skin penetration and non-greasy feel.

18. Dr. Subraya Bhat K, MBBS MS Orthopaedics
Payyanur Co-Operative Hospital, Payyanur, Kerala

Diclofenac gel is prescribed for localized musculoskeletal pain for reducing pain during movement. I recommend its use due to low systemic side effects. Effective skin penetration is essential for better therapeutic efficacy. For most of the patients who prefer gels with a cooling sensation, I prescribe diclofenac gel for knee arthritis and back pain, while for some patients who report a burning sensation from capsaicin, I prescribe it as an adjuvant for pain relief. For office workers, I recommend a mild-smelling gel. I believe that increasing diclofenac concentration enhances drug penetration in the affected area. I advise using it during pain episodes, as its depot effect offers sustained relief, and the emulgel formulation demonstrates improved effectiveness with better drug permeation and a non-greasy feel.

19. Dr. Navin Kumar M, MBBS, DNB Orthopaedics, MS Orthopaedics
C-Dot Hospital, Chennai, Tamil Nadu

I prescribe diclofenac gel for patients with OA as the first-line treatment for joint pain to reduce pain during movement. I do not recommend massaging the gel. The efficacy of topical gel depends on skin penetration and low systemic side effects. I moderately advise its use and prefer diclofenac gel for knee pain, back pain, and sprains. I recommend a pleasant-smelling formulation and advise using it twice a day. Capsaicin can cause a burning sensation but it also numbs nerves for sensory pain relief. The depot effect provides sustained relief with fewer applications while the emulgel system provides better penetration and a non-greasy feel.

20. Dr. Karthikeyan, MBBS, DNB Orthopaedics, MS Orthopaedics
RTG Hospital, Chennai, Tamil Nadu

Diclofenac topical gel is the first-line treatment for acute pain from injuries and OA, providing joint pain relief with minimal systemic side effects. Higher efficacy is associated

with better skin penetration. Although capsaicin may cause burning sensations, it can offer temporary relief from pain due to a warming sensation. I prefer diclofenac gel for sprains and strains, as many patients favor a cooling sensation. For office workers, I recommend a topical gel with a pleasant smell. I suggest using the gel once daily, as the depot effect provides sustained pain relief and the emulgel system enhances pain relief through better skin penetration.

21. Dr. Karthik Reddy Pammi, MS Orthopaedics, DNB Orthopaedics, FIJR (Germany)
Sunway Medical Centre, Chennai, Tamil Nadu

I prescribe topical diclofenac gel as an adjunctive treatment to oral treatments for localized musculoskeletal pain in OA and joint pain, considering better pain relief and improved inflammation as the key efficacy parameters. I moderately recommend it due to its better skin penetration for higher therapeutic efficacy. I consider counterirritants such as capsaicin and methyl salicylates beneficial for temporary pain relief. I prefer the gel for back pain and sprains and recommend it twice daily. The emulgel system demonstrates higher skin penetration and thus, better pain relief, along with a non-greasy feel and cooling effect.

22. Dr. M. Karthikeyan, MS Orthopaedics
Thulir Multispeciality Clinic, Chennai, Tamil Nadu

In my clinic, I prescribe topical diclofenac gel for localized musculoskeletal pain in OA and joint pain. I recommend the gel due to its low systemic side effects and advise normal application without massaging. Counterirritants such as capsaicin and methyl salicylates provide sensory pain relief due to a burning sensation. I recommend the gel for knee pain and find its cooling sensation beneficial. I recommend this pleasant-smelling formulation for office workers and advise using the gel twice daily. The depot effect of this formulation provides sustained pain relief and the emulgel formulation shows improved pain relief due to better skin penetration, cooling sensation, and non-greasy formulation.

23. Dr. Karthikeyan Chinnaswami, MS Orthopaedics
Royal Care Hospital, Coimbatore, Tamil Nadu

I prescribe topical diclofenac gel for localized musculoskeletal pain due to its pain-relieving efficacy and low systemic side effects. Improved skin penetration is crucial for enhanced effectiveness, and I find cooling sensation beneficial for patients. For office workers, I recommend mild-smelling gels and I believe higher diclofenac concentrations increase skin penetration. Diclofenac gels with depot effects offer sustained relief. The emulgel system is preferred for its superior skin penetration and pain relief.

24. Dr. Venkatraman, DNB Orthopaedics (Surgery)
Dr. Venkats Ortho Clinic, Chennai, Tamil Nadu

The topical diclofenac gel is prescribed for patients with OA and joint pain, due to its low systemic side effects. Massaging the gel on the affected areas enhances its skin penetration. Capsaicin and methyl salicylates are considered adjuvants to conventional treatments, though capsaicin may cause a burning sensation. I recommend a pleasant-smelling gel and believe increasing diclofenac concentration could improve skin penetration. I advise using the gel during pain episodes, as the depot effect provides sustained relief. The emulgel technology shows enhanced efficacy due to better skin penetration, a non-greasy feel, and a cooling sensation.

25. Dr. Atmananda Hegde, MS Orthopaedics
KMC Mangalore, Karnataka

I prescribe topical diclofenac gel for localized musculoskeletal pain due to its improved pain relief and inflammation reduction. I moderately recommend it due to its low systemic side effects, good skin penetration, and cooling sensation. Capsaicin may cause a burning sensation, but capsaicin and methyl salicylates act as pain-relief adjuvants to conventional treatments. I consider recommending gels with a mild smell during pain episodes. The depot effect ensures sustained relief, while emulgel technology shows higher efficacy due to better skin penetration along with a non-greasy feel and cooling sensation.

26. Dr. Manikandan J, MS Orthopaedics
Sruthi Hospital, Sivakasi, Tamil Nadu

I prescribe diclofenac topical gel for all patients with OA as a second-line treatment. I strongly recommend it for its minimal systemic side effects, with its efficacy dependent on skin penetration. While some patients report burning with capsaicin, I consider capsaicin and methyl salicylates as adjuvants and prefer the gel for knee pain due to its cooling sensation and pleasant smell, advising its use once in a day. I believe increasing diclofenac concentration would improve skin penetration. The depot effect offers sustained relief, and emulgel technology enhances skin penetration, non-greasiness, and cooling.

27. Dr. B Sankaravenkatesan, MBBS, D Orthopaedics
Balaji Hospital Vallioor, Vallioor Tirunelveli District, Tamil Nadu

I prescribe topical diclofenac gel primarily for acute pain in injuries, using it as an adjunct to oral therapy for OA and joint pain. The degree of pain relief and skin penetration are crucial for the effectiveness of the

gels. While capsaicin can cause a burning sensation, I consider capsaicin and methyl salicylates as useful adjuvants for pain relief. I recommend a gel with a mild, pleasant smell for office workers, applied twice daily. Higher diclofenac concentrations could enhance skin penetration. The depot effect provides sustained relief with fewer applications. The emulgel system offers better skin penetration, a non-greasy texture, and a cooling effect for effective pain relief.

28. Dr. Muhammed Shafeekh, MBBS, MS Orthopaedics
Sreechand Hospital, Kannur, Kerala

Diclofenac topical gel is mainly prescribed for localized musculoskeletal pain and serves as an adjunct to oral therapy for OA, with reduced stiffness as the key benefit. Although capsaicin can cause a burning sensation, still I consider capsaicin and methyl salicylates as useful adjuvants. I suggest a mild-scented gel only during pain for office workers, and I believe higher diclofenac concentrations do not enhance penetration. The emulgel system aids pain relief along with showing a non-greasy and cooling effect.

29. Dr. Vishwanath Patil, MS Orthopaedics
Chirayu Hospital, Dharwad, Karnataka

I prefer diclofenac topical gel as a first-line treatment for OA, with pain relief as the key efficacy factor. I strongly recommend it, believing effective skin penetration is crucial. Counterirritants numb nerves for pain relief. I prefer the gel for knee arthritis, considering that the cooling sensation of the gels is favored by most of the patients. For office workers, I suggest a mild-scented gel to be used twice daily. Increasing diclofenac concentration can improve penetration, and the depot effect provides long-lasting relief. The emulgel system enhances pain relief with better skin penetration, a non-greasy texture, and a cooling effect.

30. Dr. A Abdulkavi, MBBS, D Orthopaedics
Clinic Kumbakonam, Tamil Nadu

I prescribe diclofenac topical gel mainly for localized musculoskeletal pain, as an adjunct to oral therapy. I moderately recommend it, believing that skin penetration is just one of the factors responsible for better effectiveness. Capsaicin may cause a burning sensation, while counterirritants offer temporary pain relief through a warming sensation. I prefer diclofenac gel for knee arthritis but find the cooling sensation less important for patients. I recommend a mild-scented gel used only during pain for office workers. The emulgel system enhances pain relief with better skin penetration and a non-greasy texture.

31. Dr. Prasoon Anil, MBBS, D Orthopaedics, DNB Orthopaedic
NIMS Medicity, Thiruvananthapuram, Kerala

I prescribe diclofenac topical gel as a second-line treatment for localized musculoskeletal pain relief. I moderately recommend the gel. I have observed that better skin penetration is crucial for the enhanced efficacy of the gels, with massage aiding in better skin absorption. Capsaicin can cause a burning sensation but works as an adjuvant in pain relief. I prefer the gel for sprains and strains and advise using it twice daily. Increasing diclofenac concentration may enhance penetration, while the emulgel system improves pain relief with a sustained depot effect.

32. Dr. Nisanth V S, MBBS, MS Orthopaedics
Paalana Institute of Medical Sciences, Palakkad, Kerala

I primarily prescribe topical diclofenac gel for OA pain relief during movement and physical activity. I strongly recommend it for its low systemic side effects and better effectiveness, which I believe is linked to enhanced skin penetration. I prefer regular application over massaging. Although capsaicin may cause a burning sensation, it helps numb nerves for sensory pain relief. I recommend the gel for knee and back pain, with a mild-scented formulation for office workers, applied twice daily. Increasing diclofenac concentration can enhance penetration, and the emulgel system ensures pain relief.

33. Dr. Dijoe Davis, MS Orthopaedics
Amala Hospital, Thrissur, Kerala

I primarily prescribe topical diclofenac gel as an adjunct to oral therapy for OA, for reduced pain with movement. I recommend its use due to its low systemic side effects and improved kin penetration with massaging the gel. Some patients report capsaicin causing a burning sensation, but it works as a pain-relief adjuvant. I prefer diclofenac gel with a mild smell for knee pain, especially for office workers. Twice-daily use is advised, and I believe higher concentrations ensure better skin penetration. The emulgel system enhances skin absorption, offers a cooling effect, and delivers sustained relief.

34. Dr. Sunil, MBBS, D Orthopaedics
Bannikop Hospital, Hubli, Karnataka

I prescribe diclofenac topical gel to patients with OA/RA along with comorbidities and chronic joint pain as an adjunct to oral therapy, focusing on reduced stiffness. I advise applying the gel without massaging and moderately recommend it. Capsaicin may cause burning sensations, but counterirritants provide temporary relief with a heating

sensation. I prefer diclofenac gel for back pain, recommend a mild-smelling formulation for office workers, and suggest twice-daily use. I do not support using diclofenac in higher concentrations. The emulgel system enhances skin penetration with a cooling and non-greasy feel.

35. Dr. M. Raffic, MBBS, MS Orthopaedics
Sree Gokulam Medical College, Venjaramoodu, Trivandrum, Kerala

I prescribe diclofenac topical gel to all OA patients as an adjunct to oral therapy for pain relief. I advise applying it without massaging and recommend it for its low systemic side effects, with skin penetration being the key to its efficacy. Some patients experience a burning sensation with capsaicin, but such counterirritants also help with pain relief. I prefer the gel for arthritis-related knee pain and find the cooling sensation without counterirritants beneficial. I suggest a mild-smelling formulation, used twice daily, and support higher diclofenac concentrations for better penetration.

36. Dr. Vinoth Kumar, MBBS, D Orthopaedics
Arunpriya Multispeciality Hospital, Mayiladuthurai, Tamil Nadu

I prescribe diclofenac topical gel for all patients with OA as an adjunct to oral therapy, prioritizing, especially inflammation reduction. I do not advise massaging the gel and recommend it due to low systemic side effects and effective skin penetration. Although some patients report a burning sensation from capsaicin, counterirritants such as capsaicin provide pain relief. I prefer diclofenac gel for knee pain, due to its cooling effect without counterirritants, as many patients do not respond well to the burning sensations. For working professionals, I suggest a mild-smelling gel, advising using it once daily. I favor gels with depot effect, especially emulgel, for sustained relief.

37. Dr. George M Srampickal, MS Orthopaedics
Providence Hospital, Alappuzha, Kerala

I commonly prescribe diclofenac gel for localized musculoskeletal pain, especially in knee arthritis, as an adjunct to oral therapy. Pain relief is the key efficacy measure, and I recommend diclofenac gel due to its low systemic side effects and effective skin penetration. Although capsaicin can cause a burning sensation, counterirritants such as capsaicin and methyl salicylates help relieve pain as well. I prefer gels with a mild smell, advising using it twice daily. Increasing diclofenac concentration does not enhance penetration. Depot gels offer sustained relief with fewer applications, particularly in an emulgel system, for better absorption.

38. Dr. Abdul Gafoor, MBBS, DNB, MRCS
IQRAA Hospital, Kozhikode, Kerala

I prescribe diclofenac gel primarily for localized musculoskeletal pain, especially back pain, as an adjunct to oral therapy. I recommend massaging the gel for better penetration. I strongly recommend it for its low systemic side effects and believe better skin penetration is crucial for its enhanced effectiveness. Although capsaicin can cause a burning sensation, I see counterirritants as pain relief adjuvants. I prefer mild-smelling gels and advise its twice-daily use. Increasing diclofenac concentration may enhance penetration and depot effect. Emulgel formulations provide a sustained, non-greasy, and cooling sensation.

39. Dharunraj V, MBBS, MS, DNB Orthopaedics
Chakra Health Care-Bone and Joint Clinic, Tiruchitrambalam, Vanur, Villupuram, Tamil Nadu

I prescribe diclofenac gel primarily for localized musculoskeletal pain, especially knee arthritis and sprains/strains in areas such as the ankle and neck. It is an adjunct to oral therapy, with pain relief as the key efficacy measure. I advise against massaging the gel but recommend it for its low systemic side effects, believing skin penetration is one of several factors influencing efficacy. Capsaicin may cause a burning sensation but provides temporary pain relief through its warming sensation. I recommend mild-smelling gels for working professionals and suggest using diclofenac gel only during pain. Increasing the concentration of the gel may enhance penetration.

40. Dr. Satheesh Kumar S, MBBS, D Orthopaedics, DNB Orthopaedics
Sree Gokulam Medical College, Trivandrum, Thiruvananthapuram, Kerala

I prescribe diclofenac gel for OA, back pain, and sprains/strains as an adjunct to oral therapy, prioritizing improved pain relief and reduced stiffness and inflammation. I recommend it for its low systemic side effects and better skin penetration. Although capsaicin can cause a burning sensation, I see counterirritants as helpful for temporary relief by demonstrating a warming sensation and numbing. The depot effect of gels offers sustained relief. Emulgel systems demonstrate enhanced skin penetration along with a cooling and non-greasy feel.

ACKNOWLEDGMENT

We would like to acknowledge Scientimed Solutions Pvt. Ltd. for assistance in developing the manuscript.

REFERENCES

1. Pal CP, Singh P, Chaturvedi S, Pruthi KK, Vij A. Epidemiology of knee osteoarthritis in India and related factors. Indian J Orthop 2016;50:518-22.
2. Singh A, Das S, Chopra A, Danda D, Paul BJ, March L, *et al*. Although capsaicin can cause a burning sensation, counterirritants like capsaicin and methyl salicylates help relieve pain by creating a distracting sensation that reduces the perception of pain. Burden of osteoarthritis in India and its states, 1990-2019: Findings from the Global Burden of disease study 2019. OARS 2022;30:1070-8.
3. Muckelt PE, Roos EM, Stokes M, McDonough S, Grønne DT, Ewings S, *et al*. Comorbidities and their link with individual health status: A cross-sectional analysis of 23,892 people with knee and hip osteoarthritis from primary care. J Comorb 2020;10:2235042X20920456.
4. Swain S, Sarmanova A, Coupland C, Doherty M, Zhang W. Comorbidities in osteoarthritis: A systematic review and meta-analysis of observational studies. Arthritis Care Res (Hoboken) 2020;72:991-1000.
5. Baraf HS, Gold MS, Petruschke RA, Wieman MS. Tolerability of topical diclofenac sodium 1% gel for osteoarthritis in seniors and patients with comorbidities. Am J Geriatr Pharmacother 2012;10:47-60.
6. Salis Z, Sainsbury A. Association of long-term use of non-steroidal anti-inflammatory drugs with knee osteoarthritis: A prospective multi-cohort study over 4-to-5 years. Sci Rep 2024;14:6593.
7. Bariguian Revel F, Fayet M, Hagen M. Topical diclofenac, an efficacious treatment for osteoarthritis: A narrative review. Rheumatol Ther 2020; 7:217-36.
8. Ling T, Li JJ, Xu RJ, Wang B, Ge WH. Topical diclofenac solution for osteoarthritis of the knee: An updated meta-analysis of randomized controlled trials. Biomed Res Int 2020;2020:1758071.
9. Alexander A, Alexander A, Khichariya A, Gupta S, Patel RJ, Giri TK, *et al*. Recent expansions in an emergent novel drug delivery technology: Emulgel. J Control Release 2013;171:122-32.
10. Wadsworth LT, Kent JD, Holt RJ. Efficacy and safety of diclofenac sodium 2% topical solution for osteoarthritis of the knee: A randomized, double-blind, vehicle-controlled, 4-week study. Curr Med Res Opin 2016;32:241-50.
11. Hagen M, Baker M. Skin penetration and tissue permeation after topical administration of diclofenac. Curr Med Res Opin 2017;33:1623-34.
12. Garg V, Agarwal R, Mendoza K, Lalchandani R, Alcasid Z, Raju G, *et al*. Counterirritants and sensory profiling of pain-relieving patches. Int J Pharm Bio Med Sci 2022;11:466-78.
13. Trin K, Perino J, Allouchery M, Géniaux H, Miremont G, Salvo F. Second-degree burn induced by high-concentration topical capsaicin with mobility sequelae: A case report. Pain Pract 2023;23:216-9.
14. Kuehn BM. Burns from topical pain relievers. J Am Med Assoc 2012;308:2073.
15. Predel HG, Giannetti B, Pabst H, Schaefer A, Hug AM, Burnett I. Efficacy and safety of diclofenac diethylamine 1.16% gel in acute neck pain: A randomized, double-blind, placebo-controlled study. BMC Musculoskelet Disord 2013;14:250.
16. Niethard FU, Gold MS, Solomon GS, Liu JM, Unkauf M, Albrecht HH, *et al*. Efficacy of topical diclofenac diethylamine gel in osteoarthritis of the knee. J Rheumatol 2005;32:2384-92.

How to cite this article: Chinnaswami K, Hegde A, Davis D, Raffic M, Srampickal GM, Kumar SS, George MJ. Diclofenac Topical Gel for the Management of Osteoarthritis and Joint Pain: Real Therapeutic Effect or Just Psychological Effect. Int J Sci Stud 2024;12(9):1-9.

Source of Support: Nil, **Conflicts of Interest:** None declared.