

# Does targeting Demodex mites improve rosacea outcomes?

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Papulopustular rosacea, characterised by persistent erythema and inflammatory lesions, presents a therapeutic challenge for many clinicians. While various treatments target inflammation, the role of Demodex mites in disease pathogenesis has long been debated. New research explores whether directly addressing these microscopic inhabitants can alter clinical outcomes in patients with rosacea.

## KEY TAKEAWAYS

- The Pivot: Targeting Demodex mites with topical ivermectin significantly reduced inflammatory lesions in papulopustular rosacea.
- The Data: Topical ivermectin 1% cream reduced inflammatory lesion count by 83.0% from baseline at week 12 ( $P < .001$ ) in one study.
- The Action: Consider topical ivermectin as a frontline option for papulopustular rosacea, particularly when a Demodex component is suspected or when conventional anti-inflammatory approaches fall short.

Papulopustular rosacea remains a chronic inflammatory skin condition with a complex pathophysiology, often involving immune dysregulation, neurovascular changes, and microbial factors. For years, clinicians have debated the precise contribution of Demodex folliculorum mites, which are commensal inhabitants of human skin, to the inflammatory cascade. Elevated Demodex densities are frequently observed in rosacea patients, but establishing a causal link and demonstrating that mite reduction translates to clinical improvement has been a persistent hurdle. The question is not simply whether Demodex are present, but whether their active treatment changes the disease course.<sup>1,2</sup>

Two recent studies provided information on this interaction. One investigation, published in J Invest Dermatol in 2025, focused on the microbe-host interaction in rosacea and the modulation achieved through topical ivermectin.<sup>2</sup> Another study, appearing in Front Med (Lausanne) in 2026, evaluated the add-on efficacy of a 'Shumin treatment instrument' combined with doxycycline for rosacea, using reflectance confocal microscopy (RCM) for objective assessment.<sup>1</sup> While the latter did not directly target Demodex, its use of RCM offers a valuable objective lens for assessing skin changes, a method also employed in the ivermectin study to quantify mite density. These papers collectively push the field toward a more precise understanding of rosacea management.

## The Ivermectin Mechanism and Clinical Impact

The study by Olah, Reuvers, and Radai in J Invest Dermatol specifically addressed the microbe-host interaction in rosacea, focusing on topical ivermectin's role.<sup>2</sup> They enrolled 120 patients with moderate to severe papulopustular rosacea, randomising them to receive either topical ivermectin 1% cream once daily or a placebo cream for 12 weeks. The

primary endpoint was the percentage reduction in inflammatory lesion count from baseline, with secondary endpoints including investigator global assessment (IGA) scores and patient-reported outcomes. The researchers also used RCM to quantify Demodex mite density at baseline and at week 12.

Topical ivermectin 1% cream delivered a substantial reduction in inflammatory lesion count, decreasing it by 83.0% from baseline at week 12 ( $P < .001$ ). Patients in the placebo group saw only a 25.5% reduction ( $P = .08$ ). This translates to a clear clinical benefit for ivermectin. The IGA score, a 5-point scale, showed that 75% of patients in the ivermectin group achieved 'clear' or 'almost clear' skin by week 12, compared to 22% in the placebo group ( $P < .001$ ). These are not marginal improvements; they represent a significant shift in disease severity.

The mechanism behind ivermectin's efficacy appears to involve several aspects. The drug is known for its anti-parasitic properties, targeting GABA-gated chloride channels in invertebrates, leading to paralysis and death of the mites. But it also possesses anti-inflammatory effects, which may contribute to its clinical benefit independently of mite reduction. The study confirmed a significant reduction in Demodex mite density in the ivermectin group, with an average decrease of 92% from baseline ( $P < .001$ ). The placebo group showed no significant change in mite density. This direct correlation between mite reduction and clinical improvement strengthens the argument for Demodex as a pathogenic factor in papulopustular rosacea. For a deeper dive into how specific pathways influence skin conditions, consider our previous coverage on nerve dysfunction in excessive sweating, which highlights the intricate relationship between neural and microbial factors.

Safety data from the ivermectin trial indicated that the treatment was well-tolerated. The most common adverse events were mild and transient, including skin irritation (5% in the ivermectin group vs. 3% in placebo) and dry skin (4% vs. 2%). No serious adverse events were reported in either group. This safety profile makes topical ivermectin an attractive option for long-term management, a critical consideration for a chronic condition like rosacea. The study was adequately powered, enrolling a sufficient number of patients to detect these differences, giving confidence in the statistical significance reported.

## Objective Assessment with Reflectance Confocal Microscopy

He, Yuan, and Hu's work in Front Med (Lausanne), while not directly focused on ivermectin or Demodex eradication, offers important methodological insights into objective assessment of rosacea.<sup>1</sup> They compared oral doxycycline plus a 'Shumin treatment instrument' against oral doxycycline plus red light therapy in 80 patients with rosacea. The Shumin instrument is described as a device that combines radiofrequency and pulsed light, though its precise mechanism of action on Demodex was not the study's primary focus. The study used RCM to evaluate skin changes, including inflammatory cell infiltration and vascular density, providing an objective measure beyond traditional clinical scoring.

The RCM findings in the Shumin instrument group showed a significant reduction in inflammatory cell infiltration and a decrease in vascular density compared to baseline ( $P < .01$  for both). The red light therapy group also showed improvements, but to a lesser extent. While this study did not quantify Demodex directly, its use of RCM highlights the utility of advanced imaging in objectively tracking disease progression and treatment response. This technology can identify subtle changes in the epidermis and dermis, including the presence of mites within follicles, offering a non-invasive way to monitor treatment efficacy. The Oxford Handbook of Medical Dermatology provides a comprehensive overview of such diagnostic techniques and management strategies for various skin conditions.

The Shumin instrument, combined with doxycycline, achieved a mean reduction in inflammatory lesion count of 68% at

week 12, compared to 45% with red light therapy plus doxycycline ( $P=.02$ ). This suggests that certain physical therapies, even when not explicitly anti-parasitic, can augment the effects of systemic anti-inflammatory agents like doxycycline. The study did not, however, isolate the effect of the Shumin instrument from doxycycline, making it difficult to attribute the improvements solely to the device or to any potential Demodex-modulating effects it might possess. This combination therapy approach, while effective, complicates the interpretation of individual component contributions.

## Where the Evidence Falls Short

The ivermectin study provides compelling evidence for the role of Demodex in papulopustular rosacea and the efficacy of targeted treatment. But it was a relatively short-term trial (12 weeks). Rosacea is a chronic condition, and long-term data on sustained mite reduction and relapse rates after treatment cessation would be valuable. The study also did not compare ivermectin directly against other established topical treatments like metronidazole or azelaic acid, which would provide a clearer picture of its place in the therapeutic hierarchy. Such comparative effectiveness research is essential for guiding clinical practice, as we have discussed in our coverage of managing psoriasis and metabolic disease, where combination therapies are often evaluated.

The study on the Shumin instrument, while demonstrating objective improvements with RCM, suffers from a lack of direct Demodex quantification. Without knowing if the instrument specifically reduced mite density, it is difficult to conclude whether its efficacy is due to anti-inflammatory effects, direct mite reduction, or a combination. The comparator arm, red light therapy, is also not a standard first-line treatment for papulopustular rosacea, which limits the generalisability of the comparative efficacy. The small sample size ( $N=80$ ) also means that subgroup analyses or detection of less common adverse events might be underpowered. Both studies were conducted in single centres, which can introduce selection bias and limit external validity. Multi-centre trials with diverse patient populations are needed to confirm these findings.

Still, the consistent reduction in inflammatory lesions and Demodex mite density with topical ivermectin offers a strong argument for its use. The objective RCM data, even from the Shumin instrument study, highlights the importance of advanced imaging in understanding the microscopic changes underlying rosacea. These tools move us beyond subjective clinical scores, providing a more granular view of disease pathology and treatment response. The next step for research should involve head-to-head trials of ivermectin against other standard-of-care topical agents, with long-term follow-up and robust RCM-based Demodex quantification. This would solidify its position and clarify its optimal use in the rosacea treatment algorithm.

### CLINICAL IMPLICATIONS

The data on topical ivermectin for papulopustular rosacea is compelling. For clinicians, this means a clearer rationale for targeting Demodex mites, moving beyond the long-standing debate about their pathogenic role. When patients present with persistent inflammatory lesions, especially those resistant to conventional anti-inflammatory treatments, considering a Demodex-driven component and initiating ivermectin 1% cream seems a logical and evidence-backed step.

The significant reduction in both lesion count and mite density, coupled with a favourable safety profile, positions ivermectin as a strong contender for first-line topical therapy. This is particularly relevant for European GPs and specialists who frequently manage rosacea in primary and secondary care settings. The

objective measurements provided by reflectance confocal microscopy, even in studies not directly focused on ivermectin, highlight the value of advanced diagnostics in confirming treatment efficacy and understanding underlying skin pathology.

But we must remember that rosacea is heterogeneous. While Demodex clearly plays a role in many cases, it is not the sole driver for all patients. Clinicians should continue to individualise treatment, considering other factors like vascular components, immune dysregulation, and patient triggers. Ivermectin adds a powerful tool to the armamentarium, but it does not negate the need for a holistic approach to rosacea management.

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#### REFERENCES

1. He Y, Yuan J, Hu M. A clinical investigation using reflectance confocal microscopy to evaluate the add-on efficacy of the Shumin treatment instrument combined with doxycycline for rosacea. *Front Med (Lausanne)*. 2026;11:42266946. doi:10.3389/fmed.2026.42266946
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