Why rTMS implementation for depression varies across nations

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Major depressive disorder (MDD) and treatment-resistant depression (TRD) continue to present significant clinical challenges, often necessitating interventions beyond pharmacotherapy. Repetitive transcranial magnetic stimulation (rTMS) offers an evidence-based option, but its real-world integration into healthcare systems is not uniform. A comparative study examined how rTMS is implemented in Sweden and Japan, highlighting differences in regulatory frameworks, organizational structures, and clinical practice.1

KEY TAKEAWAYS

- The Pivot: Real-world rTMS implementation for depression differs significantly between Sweden and Japan, despite international consensus recommendations.
- The Data: The study compared regulatory, organizational, and clinical aspects of rTMS implementation between 2020 and 2024.1
- The Action: Clinicians should be aware that national healthcare systems dictate access and integration of advanced therapies like rTMS, influencing patient pathways.

Persistent apical periodontitis after treatment presents a vexing problem for general practitioners and specialists alike. The decision to retreat, resect, or extract a tooth with refractory periapical pathology is complex, balancing patient prognosis, cost, and potential complications. While the provided research papers do not directly address this specific dental dilemma, they offer insights into the broader challenges of implementing evidence-based interventions in real-world clinical settings, a theme that resonates deeply within endodontics. The lack of direct evidence on persistent apical periodontitis from the provided sources means we must extrapolate from the general principles of clinical implementation.1

The current literature, as represented by the provided abstracts, focuses on the implementation of repetitive transcranial magnetic stimulation (rTMS) for major depressive disorder (MDD) and treatment-resistant depression (TRD). Noda, Lundberg, and Nordenskjold, publishing in the Nordic Journal of Psychiatry in 2026, compared the regulatory, organizational, and clinical implementation of rTMS in Sweden and Japan between 2020 and 2024.1 This study assessed the alignment of these national approaches with international consensus recommendations, a key benchmark for any emerging therapy. The study by Soares, Senna, and Madruga Junior, published in Food Additives & Contaminants Part A in 2026, examined aflatoxin B(1) migration in black beans, a topic entirely unrelated to clinical practice, while Pinilla, Coy, and Baral, writing in JACC Advances in 2026, conducted a meta-analysis on PPV23 vaccination and cardiovascular events. These latter two papers offer no relevant data for the management of apical periodontitis or the implementation of rTMS.1

Understanding the Implementation Gap

The Noda et al. study, despite its focus on rTMS, provides a framework for understanding why certain treatments, even those with established efficacy, struggle with consistent integration across different healthcare systems. The authors specifically looked at regulatory hurdles, organizational structures, and actual clinical practice.1 In the context of persistent apical periodontitis, this translates to questions about national guidelines for retreatment versus surgical intervention, the availability of specialist endodontists or oral surgeons, and the prevailing treatment philosophies within a given region. For instance, a system heavily reliant on general practitioners might see more extractions due to limited access to advanced endodontic procedures, a scenario that mirrors the primary care assessment of oral mucosal lesions. Regulatory differences, as highlighted by Noda et al., can dictate whether a procedure is reimbursed, which specialists are permitted to perform it, and what training is required.1 In Sweden, the integration of rTMS might be streamlined by a more centralized healthcare planning approach, while in Japan, a different set of regulations could create bottlenecks or alternative pathways for patient access. This directly impacts the adoption of complex dental procedures. If a country's regulatory body does not explicitly endorse or fund advanced endodontic surgery, for example, clinicians will naturally gravitate towards more readily available or reimbursed options, even if they are not always the optimal choice for tooth preservation.

Organizational Structures and Clinical Practice

Organizational structures play a significant role in how new or complex treatments are delivered. Noda and colleagues investigated how healthcare organizations in Sweden and Japan structured their rTMS services.1 This includes everything from dedicated clinics to integrated hospital departments. For persistent apical periodontitis, this means considering the referral pathways for complex endodontic cases. Are there sufficient specialist endodontic practices? Are general

dentists comfortable referring, or do they feel pressured to manage cases beyond their expertise? The availability of specialized equipment and trained personnel also falls under this organizational umbrella. A clinic without a dental operating microscope, for instance, will struggle to perform complex retreatment or apical surgery effectively.
Clinical implementation, the third pillar of the Noda et al. study, refers to the actual practice patterns of clinicians.1 This is where the rubber meets the road. Even with supportive regulations and robust organizational structures, individual clinician preferences, training, and perceived success rates influence treatment decisions. For rTMS, this might involve variations in stimulation protocols or patient selection. In endodontics, it translates to the choice between orthograde retreatment (re-doing the root canal), periapical surgery (resection), or extraction. The decision often hinges on the clinician's confidence in achieving a predictable outcome, which is heavily influenced by their training and experience. The causes of dental wear, for example, similarly dictate the treatment plan, highlighting the importance of accurate diagnosis and appropriate intervention.

Alignment with International Recommendations

A key aspect of the Noda et al. study was assessing alignment with international consensus recommendations for rTMS.1 This is a vital benchmark for standardizing care and optimizing patient outcomes for any medical intervention. For persistent apical periodontitis, international endodontic guidelines often provide algorithms for managing failed root canal treatments, outlining criteria for retreatment, surgery, or extraction. These guidelines are typically based on extensive evidence, aiming to standardize care and optimize patient outcomes. But, as the rTMS study implies, national implementation often deviates from these global standards due to local factors.
The discrepancies between international recommendations and real-world practice can stem from several sources. Economic constraints might limit access to advanced technologies or specialist training. Cultural factors might influence patient preferences or clinician attitudes towards tooth preservation versus extraction. Legal frameworks, such as malpractice liability, can also steer clinicians towards more conservative or, conversely, more aggressive treatment options. The Noda et al. paper, by comparing two distinct healthcare systems, implicitly acknowledges these multifactorial influences on clinical practice.1
"Real-world implementation often diverges from consensus recommendations due to a complex relationship between regulatory, organizational, and clinical factors."Noda Y, Nord J Psychiatry 2026The absence of direct research on persistent apical periodontitis in the provided papers is the obvious caveat. We are drawing parallels from a neurological intervention to a dental one, which requires a degree of inference. But the core principles of how evidence-based treatments are adopted, or fail to be adopted, remain consistent across specialties. The challenges of integrating rTMS into routine psychiatric care, as explored by Noda et al., offer a valuable lens through which to view the ongoing debates in endodontics regarding optimal management strategies for failed root canal treatments.1
The decision-making process for persistent apical periodontitis is rarely straightforward. Factors such as the quality of the initial root canal treatment, the presence of a fractured instrument, the extent of periapical bone loss, and the restorability of the tooth all play a role. Each of these variables influences the prognosis of retreatment or surgical intervention. A clinician must weigh these technical considerations against patient-specific factors, including their overall health, financial situation, and desire to retain the tooth. This complex relationship between technical and patient factors highlights the need for clear, evidence-based guidelines that are also adaptable to real-world constraints, a challenge that the rTMS study implicitly addresses in its broader context of implementation science. Clinicians seeking to deepen their

understanding of such complex decision-making might find the Oxford Handbook of General Practice, 5th Edition, a valuable resource for fast, evidence-based decisions.

The Noda et al. study, while not directly applicable to dentistry, highlights the importance of understanding the ecosystem in which clinical decisions are made.1 It is not enough for a treatment to be effective; it must also be implementable. This means addressing the regulatory environment, ensuring adequate resources and infrastructure, and fostering a clinical culture that embraces evidence-based practice. Without these elements, even the most effective interventions for conditions like persistent apical periodontitis will struggle to achieve widespread adoption, leading to suboptimal patient outcomes. The ongoing debate about breastfeeding and early childhood caries similarly touches on the relationship between clinical evidence and public health implementation.

The next trial, or rather, the next set of guidelines for endodontic management, needs to show not just efficacy, but also cost-effectiveness and feasibility within diverse healthcare settings. This is the gap that studies like Noda et al. are attempting to close for other medical fields.1

CLINICAL IMPLICATIONS

The Noda et al. study, while focused on rTMS, makes a critical point for all clinicians: the efficacy of a treatment in a controlled trial does not automatically translate to seamless real-world adoption.1 For persistent apical periodontitis, this means that even if clear evidence favors retreatment over extraction, systemic factors can impede that choice. General practitioners, in particular, face the brunt of these implementation gaps, often having to make pragmatic decisions based on local resources rather than ideal guidelines.

The variations in regulatory approval and organizational support for rTMS between Sweden and Japan serve as a stark reminder that access to advanced dental procedures, such as periapical surgery, will differ significantly across regions. This directly impacts patient care, as a patient in one country might have easy access to a tooth-saving procedure, while another, with the same clinical need, might be offered extraction due to systemic limitations. This disparity is not merely academic; it dictates whether a patient retains their natural dentition or faces the consequences of tooth loss.

For the dental industry, the Noda et al. findings imply that developing new, highly effective endodontic materials or techniques is only half the battle.1 True impact requires navigating complex national regulatory environments and ensuring that organizational structures are in place to support widespread adoption. Without this foresight, even superior products may languish in limited use. The challenge is not just innovation, but integration.

The Noda et al. study highlights that the 'best' treatment for persistent apical periodontitis is often the one that is both clinically sound and practically accessible within a given healthcare system.1 Clinicians must remain vigilant about advocating for evidence-based practices, but also realistic about the systemic barriers that can prevent their widespread implementation. The next step is not just more research on efficacy, but more research on effective implementation strategies.

EDITORIAL & AI STANDARDS

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REFERENCES

1. 1. Noda Y, Lundberg J, Nordenskjold A. Real world implementation of rTMS for depression: a comparative study of Sweden and Japan. Nord J Psychiatry. 2026;80(1):1-8. https://pubmed.ncbi.nlm.nih.gov/42658152/

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