The Role of Thread-Embedding Acupuncture in Epilepsy: A Narrative Review

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Abstract: Epilepsy is a chronic neurological disorder characterized by recurrent unprovoked seizures, which substantially impair quality of life through sleep disruption, cognitive deficits, and risk of sudden unexpected death. Pharmacotherapy with antiepileptic drugs remains the mainstay of treatment; however, long-term use may induce adverse effects. Non-pharmacological interventions such as acupuncture have been proposed as adjunctive or alternative therapies. In particular, thread-embedding acupuncture (TEA) has been explored for its potential efficacy in drug-resistant epilepsy (DRE). This review evaluates the evidence for TEA in epilepsy by analyzing recent randomized controlled trials. A patient-assessor blinded clinical trial involving 54 outpatients with DRE found that TEA produced significantly higher rates of satisfactory seizure control (≥50% reduction in seizure frequency) compared to sham TEA (37% vs 3.7%; $p = 0.003$). Moreover, TEA was associated with decreased heart rate and increased heart rate variability, suggesting modulation of autonomic nervous system activity. Current evidence suggests TEA maybe effective adjunct for reducing seizure burden in patients with DRE. Nonetheless, further large-scale, long-term randomized trials are warranted to confirm its effects, elucidate mechanisms (including neural, ionic, immunologic pathways), and define optimal treatment protocols.

1 INTRODUCTION

Epilepsy is a chronic neurological disorder marked by recurrent unprovoked seizures, caused by excessive or synchronized abnormal neuronal activity. It significantly affects patients' quality of life, contributes to high disability-adjusted life-years (DALYs), and ranks among the top neurological disorders in global disease burden. Despite the availability of treatments, epilepsy continues to pose serious economic and social challenges (Adamu et al., 2023).

The International League Against Epilepsy (ILAE) defines epilepsy based on one or more of the following: (1) two or more unprovoked seizures over 24 hours apart; (2) one seizure with a ≥60% risk of recurrence over the next 10 years; or (3) diagnosis of an epilepsy syndrome. Some seizures may be reflexive, such as in photosensitive epilepsy, prompting revisions to earlier definitions (Fisher et al., 2017).

Epilepsy syndromes are identified through characteristic seizure patterns and diagnostic findings, often involving multiple seizure types. Electroencephalogram (EEG) and brain imaging, such as MRI, help assess recurrence risk and guide classification (Sarmast et al., 2020)

Current treatments primarily involve anti-seizure medications (ASMs) such as carbamazepine, valproate, lamotrigine, and others. These drugs work by modulating ion channels and neurotransmitter activity to suppress seizures. However, ASMs often cause adverse effects like drowsiness, liver and kidney dysfunction, and poor treatment adherence. Furthermore, about 30% of patients remain drug-resistant, highlighting the limitations of conventional therapies (Xue et al., 2023).

Drug-Resistant Epilepsy (DRE) refers to the persistence of seizures despite adequate trials of two appropriate and well-tolerated anti-seizure medications (ASMs), used either as monotherapy or in combination. This condition affects a significant subset of patients and is associated with increased risks of cognitive decline, psychosocial dysfunction, and elevated morbidity and mortality. Once two ASMs fail, surgical evaluation should be considered. For non-surgical candidates, alternative ASMs may be used, though their effectiveness is often limited, with about one-third of patients continuing to experience uncontrolled seizures (Perucca et al., 2018).

Alternative treatments, particularly in China, have explored acupuncture as a complementary approach. Among its modalities, Thread Embedding Acupuncture (TEA) has shown

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promise. TEA involves inserting absorbable threads (catgut or polydioxanone/PDO) into acupuncture points, offering prolonged therapeutic stimulation compared to manual acupuncture. PDO threads can last up to 6 months, gradually degrading while maintaining therapeutic tension (D. Van Nguyen et al., 2023).

Studies suggest TEA may enhance immune function, improve local circulation, reduce inflammation, and increase endogenous opioid release—mechanisms that could benefit epilepsy management. Widely practiced in countries like Korea, China, and Taiwan, TEA has been applied for neurological, musculoskeletal, and systemic conditions, including epilepsy (Cho et al., 2018; D. Van Nguyen et al., 2023a). This paper aims to review the literature on TEA's potential as an adjunct therapy for epilepsy.

2 METHOD

Literature search was conducted on several databases including Pubmed, Cochrane, Clinical Key and Google Scholar. The keywords used were 'thread-embedded acupuncture', 'acupoint embedded', 'catgut acupuncture' AND 'epilepsy'. The literature used was fully accessible texts, in English, of any report type found. The duplicates, studies without full text, non-epilepsy journal, non-acupuncture and non-english text were excluded from this review. All studies were identified and then screened based on their titles and abstracts. The flowchart of the search can be seen in Figure 1.

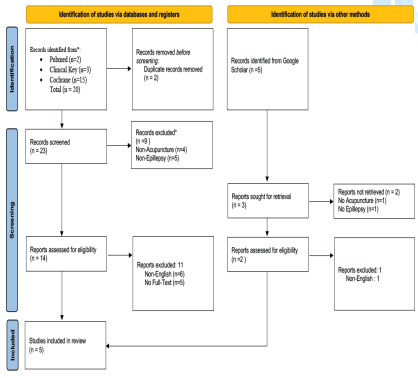

Figure 1. Flowchart of literature search

3 RESULT

The search yielded 15 articles from the Cochrane Library, 2 from PubMed, 3 from Clinical Key, and 5 additional articles from GoogleScholar. After screening the titles, abstracts, and full texts in accordance with the predefined inclusion and exclusion criteria, five studies were deemed eligible for inclusion in the review. These comprised two randomized controlled trials (RCTs), one literature review, and two cases reports all of which examined the potential role of thread-embedded acupuncture in epilepsy. A flow diagram of the study selection process is presented in Figure 1

Out of the five studies reviewed, two were clinical trials that successfully demonstrated the efficacy of thread embedding acupuncture for patients with drug-resistant epilepsy. One study was a literature review covering 10 years of cases where thread embedding acupuncture was used for epilepsy therapy, showing positive results(Xuan Da Ke, 2012). Two studies were case reports that proved the efficacy of thread embedding acupuncture in reducing the intensity of epilepsy recurrence in patients and decreasing the dosage of medication used by patients (Zhang et al., 2019). Two studies were clinical trials that proved the efficacy of thread embedding acupuncture in reducing the intensity of epilepsy recurrence in patients with drug-resistant epilepsy and decreasing the dosage of medication used by patients. D. Van Nguyen et al., 2023a; D. Van Nguyen et al., 2023b).

In the studies mentioned above, it was found that TEA(thread-embedding acupuncture) showed a significantly higher satisfaction rate in seizure control at follow-up compared to the sham TEA group (37% vs. 3.7%, p = 0.003). The TEA intervention was conducted once every 4 weeks, for a total of 4 therapy sessions (D. Van Nguyen et al., 2023a).

One of study shown decrease in monthly epilepsy incidence in drug-resistant epilepsy patients who received thread embedding acupuncture compared to those who received sham TEA (0.963±0.092 → 0.679±0.260). The TEA intervention was conducted once every 4 weeks, for a total of 4 therapy sessions. (D. Van Nguyen et al., 2023b).

4 DISCUSSION

4.1 Thread-Embedding Acupuncture

Thread Embedding Acupuncture (TEA) is an acupuncture technique that involves the insertion of absorbable threads, such as catgut or polydioxanone (PDO), into specific acupuncture points to provide prolonged stimulation. The threads remain in subcutaneous or muscle tissue, gradually degrading over time—PDO threads within 180–210 days and catgut within 2–4 weeks. This continuous stimulation triggers inflammatory and tissue repair responses, offering longer-lasting therapeutic effects compared to manual acupuncture. Studies have shown that the tensile effect of embedded PDO threads persists at 74% two weeks post-treatment, decreasing to 50% at four weeks and 25% at six weeks, with only 1.5% of thread mass absorbed by the second month (Cho et al., 2018; Dart & Dart, 2011; Sung et al., 2020).

TEA is used across various medical fields, including internal medicine (e.g., obesity, abdominal pain), dermatology (e.g., acne, psoriasis), ENT, gynecology (e.g., dysmenorrhea), pediatrics (e.g., cerebral palsy), and neurology, including epilepsy. The technique can be classified into invasive and minimally invasive approaches, using materials such as catgut, polydioxanone (PDS II), PLGA, and chitosan. TEA has gained increasing attention due to its minimally invasive nature, sustained therapeutic benefits, and applicability across a wide range of clinical conditions (Dart & Dart, 2011; Huang et al., 2021).

The five studies analyzed in this review consistently indicate that thread-embedded acupuncture is an effective adjunctive therapy for epilepsy. Overall, the intervention was associated with reductions in symptom severity, improved clinical outcomes, and better functional status. Some studies also reported additional benefits, such as a decrease in the monthly frequency of seizures among patients with drug-resistant epilepsy who underwent thread-embedding acupuncture. Nevertheless, variations in treatment protocols—particularly regarding the selection of acupuncture points and duration of therapy—highlight the need for standardized methods to achieve more definitive conclusions (D. Van Nguyen et al., 2023a, D. Van Nguyen et al., 2023b).

4 CONCLUSION

There is an association between a sedentary lifestyle and stress, but no association between a sedentary lifestyle and anxiety. It is recommended that students reduce sedentary behavior by increasing physical activity as a way to lower stress levels. The faculty can develop health promotion programs such as “get moving” campaigns, provide sports facilities, and integrate light physical activity into academic activities.

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