Review Article

BIOMEDICAL Journal of Scientific & Technical Research

ISSN: 2574 -1241

DOI: 10.26717/BJSTR.2026.64.010086

Modern Science Meets Ancient Traditions: Bioelectric Neuromodulation and Microcurrent Applications for Health and Wellbeing

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ARTICLE INFO

Received: February 03, 2026

Published: February 11, 2026

Citation: Prof Raman Gokal and Bruce Fashong. Modern Science Meets Ancient Traditions: Bioelectric Neuromodulation and Microcurrent Applications for Health and Wellbeing. Biomed J Sci & Tech Res 64(4)-2026. BJSTR. MS.ID.010086.

ABSTRACT

Chronic inflammatory, neurodegenerative, and trauma related conditions account for a growing proportion of global morbidity and disability, yet pharmacological strategies often provide incomplete and symptom focused relief. In parallel, there is renewed interest in ancient healing traditions-such as Traditional Chinese Medicine (TCM) and Ayurveda-that have long conceptualized health as a state of dynamic balance and unobstructed flow within interconnected networks of channels or meridians, and disease as the consequence of stagnation or blockage in these networks. Modern bioelectric medicine, encompassing approaches such as vagus nerve stimulation, microcurrent point stimulation, and other targeted neuromodulation techniques, provides physiologically grounded tools to interrogate and potentially operationalize these traditional concepts in contemporary clinical practice. In this narrative mini review, we outline how ancient frameworks of "energy," flow, and coherence map onto emerging understandings of autonomic regulation, neuroimmune signaling, and network level brain–body communication. We then highlight microcurrent based neuromodulation, including applications for surgical scars, neurodegenerative disorders such as Parkinson's disease, concussion, and post traumatic symptoms in veterans, as an illustrative example of this convergence. Finally, we propose future research directions aimed at integrating rigorous mechanistic and clinical studies with the nuanced maps of function and dysfunction preserved within ancient traditions.

Abbreviations: TCM: Traditional Chinese Medicine; VNS: Vagus Nerve Stimulation; MPS: Microcurrent Point Stimulation; PTSD: Post Traumatic Stress

Introduction

Chronic diseases-including inflammatory, metabolic, neurodegenerative, and trauma related conditions-represent a dominant and rising burden worldwide, driving disability, healthcare utilization, and economic cost [1,2]. Despite significant advances in pharmacology and interventional medicine, many patients with persistent pain, neurodegenerative syndromes, post concussive symptoms, or complex post traumatic presentations experience only partial benefit and substantial residual impairment. This therapeutic gap has contributed to growing interest in complementary and integrative approaches that address regulation at the level of the whole system, rather than focusing solely on isolated organs or pathways. Ancient healing traditions such as TCM [3] and Ayurveda [4] offer sophisticated, if pre scientific, models of health as dynamic balance and coherent flow through networks of channels-meridians or nadis-linking the viscera, nervous system, and mind. In these paradigms, scars, injuries, and emotional trauma can create enduring "blockages" that perturb systemic function, and local interventions at key points are believed to restore flow and balance. Modern systems biology and neurophysiology increasingly support the idea that autonomic tone, neuroimmune signaling, and fascial and neural network integrity play crucial roles in chronic disease and recovery.

Bioelectric medicine has emerged at this interface, using precisely defined electrical or electromagnetic stimuli to modulate nerves, brain circuits, and peripheral tissues to achieve therapeutic effects. Vagus nerve stimulation (VNS) [5,6], transcutaneous VNS, microcurrent point stimulation [7-18], and other neuromodulatory techniques are now being explored in conditions ranging from epilepsy and de-

pression to inflammatory and neurodegenerative disorders. This mini review aims to situate microcurrent based neuromodulation within the broader context of ancient energy based frameworks and modern bioelectric medicine, using illustrative clinical contexts to highlight convergences and identify future research priorities.

Ancient Frameworks of Energy, Flow, and Coherence

In TCM, health is understood as the harmonious circulation of Qi-vital energy-through a network of meridians that connect the viscera, sense organs, and body surface, with disruptions in this flow producing pain and disease [19]. Similarly, Ayurveda conceptualizes health as the balanced interaction of doshas (Vata, Pitta, Kapha) and the unobstructed movement of Prana (life force) through nadis and chakras that link bodily and mental functions [20]. Although these systems developed without the benefit of modern anatomy or physiology, they encode a consistent emphasis on connectivity, pattern, and regulation across the entire organism rather than on isolated lesions. Scars, trauma, and prior injury occupy a distinctive place in these frameworks: they are often viewed as sites where flow is disrupted, creating local and distal symptoms that may persist long after tissue healing appears complete. Traditional interventions-such as acupuncture, moxibustion, scar needling, massage, or application of herbal preparations-are frequently directed at scars or specific points along meridians to "release" blockages and restore systemic balance. Case series and observational reports from practitioners describe changes not only in local symptoms (pain, dysesthesia, tightness) but also in distant complaints, such as headaches, digestive issues, or mood disturbances, following treatment of old scars.

Modern research has begun to explore physiological correlations of these traditional observations. Fascial planes, cutaneous nerves, and autonomic fibers converge in anatomically distinct regions that often overlap with classical acupuncture points and meridian trajectories [21]. Scars can alter local mechanical properties of tissue, nerve function, and microcirculation, and may modulate autonomic and inflammatory processes through sustained nociceptive or dysregulated afferent input. These insights suggest plausible mechanisms by which targeted interventions at scars or "points" could influence broader network dynamics, offering a bridge between ancient metaphors of flow and contemporary models of neuroimmune regulation and systems coherence.

Modern Bioelectric Medicine and Neuromodulation

Bioelectric medicine refers to the use of controlled electrical stimulation to modulate neural circuits and physiological processes for therapeutic purposes, often as an alternative or complement to pharmacologic agents. One of the most developed examples is VNS [22], which has been used for decades in refractory epilepsy and depression and is increasingly investigated in inflammatory diseases, heart failure, and other systemic conditions. The vagus nerve provides a critical conduit between brain and body, influencing heart rate, gut function, inflammation, and immune responses through efferent and afferent pathways, including the so called "inflammatory reflex." Modulation of vagal activity via implanted or transcutaneous stimulators can shift autonomic balance, alter cytokine profiles, and impact symptom burden in various disorders.Beyond VNS, a broad family of neuromodulation strategies-including transcranial magnetic stimulation, deep brain stimulation, spinal cord stimulation, and diverse forms of peripheral nerve and microcurrent stimulation-has evolved to target specific circuits or regions.

Microcurrent and other low intensity electrical modalities have been applied in pain management, wound healing [23], and rehabilitation, with evidence suggesting effects on local circulation, tissue repair, and nociceptive processing. [7-16] While the precise mechanisms vary by modality and parameter set, common elements include modulation of ion channels, neurotransmitter release, inflammatory mediators, and autonomic outflow. Conceptually, these techniques show striking parallels with ancient energy based practices. Both focus on modulating specific locations or pathways (points, meridians, or nerves) to influence systemic state, rather than simply treating isolated symptoms. Emerging anatomical and physiological studies indicate that many traditional points correspond to areas with high densities of nerve endings (e.g. chakras or energy centers [24] in Vedic philosophy), vascular structures, and connective tissue interfaces, which may be particularly responsive to electrical or mechanical stimulation. Thus, bioelectric medicine can be viewed, in part, as a technologically refined extension of long standing efforts to intervene at key nodes in the body's regulatory networks.

Microcurrent Point Stimulation and Clinical Contexts

Microcurrent point stimulation (MPS) refers to the application of very low intensity DC electrical current in the microampere range (one millionth of an amp <1mA) to specific points on the body, often guided by frameworks derived from acupuncture, trigger point therapy, or other mapping systems. This approach promotes cellular and systemic healing. First pioneered by Thomas Wing in 1989 [25], microcurrent is usually delivered using direct (DC) – a continuous flowing current – versus alternating current (AC) – a rapidly switching current that always changes direction. In literature, DC microcurrent is more closely aligned to endogenous bioelectric currents involved with cellular regeneration and neurochemical modulation. [26] AC microcurrent, while stimulatory, lacks the subtlety required for deeper autonomic effects and is reported in science to have an inhibitory influence on stress [26] and cellular healing [27]. Our device, Dolphin is genuinely DC microcurrent (<1mA) without producing the stronger sensations typically associated with traditional TENS or other higher intensity stimulations.

Dolphin's DC microcurrent (<1mA) has shown impressive results in decreasing pain and stress, improving autonomic balance and enhancing cardiovascular performance (like heart rate variability. When

applied to scars, a, acupuncture or dermatomal points, and vagal stimulation [7-16]. One area of particular interest is the treatment of scars and sutures using microcurrent or related direct microcurrent techniques [7,11,13,15,26]. Case reports and small studies describe improvements in pain, sensitivity, and functional symptoms when old scars are treated with targeted microcurrent, often with reference to underlying meridians or neural pathways. In some reports, patients experience reduction in seemingly unrelated symptoms-such as headaches, musculoskeletal pain, or autonomic complaints-after previously neglected scars are addressed, echoing traditional notions of scars as systemic "interference fields." These observations support the hypothesis that scars can serve as modifiable nodes within broader regulatory networks, and that microcurrent stimulation may help normalize their influence.

Microcurrent based neuromodulation has also been explored, often within multimodal programs, for neurodegenerative conditions such as Parkinson's disease. [28-31]. In these settings, microcurrent applied to specific cranial, cervical, or auricular points-sometimes aligned with traditional acupuncture maps-aims to support autonomic balance, sleep, mood, and motor function as an adjunct to pharmacotherapy and physical rehabilitation. Although high quality randomized controlled data remain limited, preliminary studies and clinical experiences suggest that neuromodulatory approaches targeting the vagus nerve and related pathways may affect neuroinflammatory and neuroplastic mechanisms relevant to Parkinson's disease and other neurodegenerative disorders. Concussion and post concussive syndromes, particularly in military and veteran populations, represent another domain where neuromodulation strategies are actively investigated. We have recently published research illustrating dramatic improvements in pain, dizziness, cognitive disturbances, sleep, and post traumatic stress (PTSD) by military veterans applying Dolphin in the home setting [16]. In this context, non invasive microcurrent-cranial stimulation has shown promise in modulating autonomic and cortical function [14].

Microcurrent point stimulation (MPS) is now accepted as part of this broader landscape of gentle, targeted neuromodulation therapies intended to stabilize neurophysiologic networks in individuals whose regulation has been disrupted by trauma. Across these indications-scars, neurodegenerative disorders, concussion, and trauma-microcurrent devices illustrate how modern engineering enables precise, low intensity engagement of points and pathways that resonate strongly with ancient maps of meridians, nadis, and interference fields. The narrative that emerges is not one of replacement of traditional frameworks, but of potential complementarity: traditional maps can guide site selection and interpretation, while bioelectric technologies provide standardized, quantifiable stimuli that can be studied with contemporary methods. Microcurrent therapy and acupuncture continue to evolve [32].

Conclusion

Ancient healing traditions such as TCM and Ayurveda offer rich, system level maps of health and disease built around concepts of energy, flow, and coherence, in which scars, trauma, and nodal points play pivotal roles. Modern bioelectric medicine, particularly neuromodulation strategies targeting the vagus nerve, peripheral nerves, and specific cutaneous points-provides tools to engage and test these maps using defined electrical parameters and objective physiological measurements. Microcurrent point stimulation represents a particularly evocative example of this convergence, applying gentle, precisely controlled currents to sites long recognized in traditional frameworks, with emerging evidence of benefit in scars, neurodegenerative disorders, concussion, and trauma related syndromes. By integrating ancient insights with contemporary knowledge of autonomic regulation and neuroimmune networks, future research can help develop neuromodulatory interventions that are both technologically sophisticated and deeply rooted in enduring understandings of how the body heals.

Conflict of Interest

The authors declare an educational conflict of interest, as they are instructors involved in teaching the concepts described in this article. No grants, sponsorships, or external financial support were received for this work.

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ISSN: 2574-1241

DOI: 10.26717/BJSTR.2026.64.010086

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