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The Impact of Mindfulness Meditation on the Psychosomatic Spectrum of Oral Diseases: Mapping the Evidence

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The psychological aspect of dis-ease, which is indeed a lack of 'ease' is generally overlooked in the management of myriad maladies that affect the human body. The concept of mindfulness meditation, which is an interesting hybrid born from the meditative discipline of the east and the intellectual discipline of the west is gaining attention in the past two decades for its benefits in the holistic development of individuals. When individuals with ailments are trained under therapists supervised by the clinicians, significant results can be seen in alleviating symptoms like pain, stress, anxiety and an improvement in the quality of life is observed. This review article focuses on the structure and basics of mindful meditation and the mechanisms of mindfulness and its positive effects on various diseases like lichen planus, urticaria, psoriasis, eczema, myofacial pain dysfunction syndrome, to name a few. There are various arenas within the discipline of oral and maxillofacial medicine where mindfulness-based techniques can be explored for its effectiveness in combating psychosomatic conditions. The article highlights the importance of holistic approach in treating diseases in which mindfulness meditation techniques play an important role.

Key Words: Mindfulness, Meditation-based intervention, Psychosomatic, Cognitive therapy, Acceptance therapy

INTRODUCTION

The concept of mindfulness meditation is gaining attention in the past two decades for its benefits in the holistic development of individuals. It is an interesting hybrid born from the meditative discipline of the east and the intellectual discipline of the west. Mindfulness meditation and its related techniques have emerged as an assimilative integration of psychology and philosophy. Mindfulness meditation and mindfulness-based interventions (MBI) have been exponentially explored as a powerful psychotherapeutic tool for treating various conditions of the human body. The concept of meditation is speculated to be as old as mankind itself as even the Neanderthals are believed to have had potential meditative capacity (Table 1). However, the dramatic increase in the use of mindfulness as a complementary treatment approach has occurred only in the past two decades leading to the 'mindfulness therapy movement' [1].

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Table 1. Contemplative sources from the traditions of the east and west on mindfulness and meditation

Country	Source	Time period	Concept
India	Wall art from caves	5000-3500 BC	Figures in meditative postures
India-Hinduism	Philosophies from Vedantism	1500 BCE	Dhyana, Jhana, Hatha yoga
India-Buddhism	Pali canon	3-6 century	Bhavana
China	Daoist	3-6 century	Shou Zhong
	Laozi		Bao Yi
			Shou Jing
			Bao Po
Japan	Dosho	7-8 century	Zen meditation
	Hsuan Tsang		First Zazen constructed
Greece	Christian missionaries	10-14 century	Hesychasm
Europe	Islam	11-12 century	Dhikr

BCE: before the common era.

THE STRUCTURE AND BASICS OF MINDFULNESS MEDITATION

The word meditation originated from the Latin word 'meditatom' meaning 'to ponder'. Mindfulness is defined as the application of non-judgmental present-focused awareness to the totality of experience moment by moment [2]. A study says that our minds wander approximately 47% of the time and this wandering directly causes unhappiness [3]. The ideal state of mindfulness can be achieved with three main principles:

- An attempt to change the state of consciousness and not focus on the contents of the consciousness can alleviate us from suffering
- Interpreting all kinds of experiences with relation to the self-concept is a source of harm
- Only the present moment exists. It is always rewarding to direct oneself towards the present rather than beyond it as the latter can cause distress [4].

When we further explore the concept of mindfulness and its benefits in the field of medicine, we need to understand the basics of psychotherapy as laid by Sigmund Freud in the 19th century. He stated that psychiatric imbalances arise from an unconscious conflict between the ID (Instinctual urges) and the higher morals (superego), along with thoughts subjugated in the ID. Freud further insisted that effective treatment of psychiatric issues should involve an open talk between the patient and the therapist so that the unconscious surfaces as conscious. Till the present date, Freud's theory remains the only well-accepted explanation for the efficacy of psychotherapy [5].

Three types of MBIs have been developed based on the theories put forward by different authors. All of them have been used as effective psychotherapeutic tools in several randomized controlled trials, the numbers of which have expounded in the past ten years (Fig. 1, 2).

The three types of MBIs are:

- Mindfulness-based stress reduction (MBSR) - by Kabat Zinn (1982)
- Mindfulness-based cognitive therapy (MBCT)- by Segal, Williams, Teasdde (2013)
- Acceptance & Commitment Theory (ACT) – by S. Hayes, Strosahl, Wilson (1999)

MECHANISMS OF MINDFULNESS–TARGETING THE CORE CAPACITIES

Mindfulness has been achieved by instructors across the world by carefully maneuvering a set of therapeutically relevant capacities in the mindset of an individual for enhanced self-awareness. A few basic concepts that form the structure of mindfulness meditation (MM) based program are as follows:

1. Meta awareness: Meta awareness also known as "awareness of awareness" is a capacity of an individual to alertly observe and monitor the current mind process and produce a relevant report on it. The mind can suddenly realize as

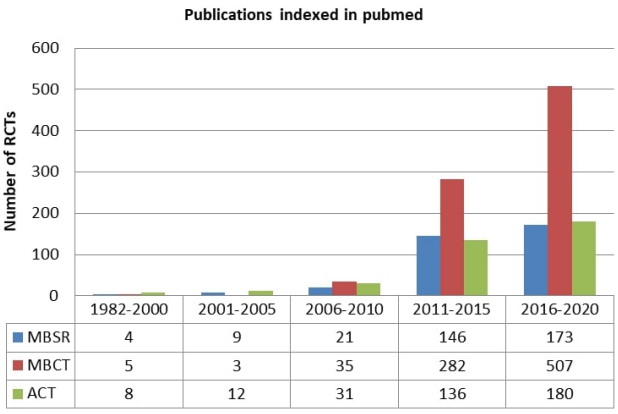
we are reading a newspaper that we have been daydreaming about tomorrow's dinner. Then we consciously strive to bring our attention back to reading the newspaper. This capacity enables one to correct the mental deviation and redirect our attention all without judging any of the context or the self [6].

2. Present-centered awareness: This refers to the capacity to fuel our entire focus on the present moment. Sometimes our thoughts get caught up with old events or incidents and may even undergo time travel and cling to prospective or retrospective memories. Present-centered awareness is facilitated by being aware of every sensation in our body including those of the breath sounds [7].

3. Non-reactivity: This concept refers to the termination of habitual evaluation of events experienced on a momentary basis. It trains us to adopt a non-aversive stance that avoids the evolution of internal stimuli from within us and thus paves way for crisp perception of mental contents [8].

4. Dereification: This is the capacity that enables us to discriminate that thoughts are not real objects in this world. It is a process of decentering or psychological distancing and prevents us from completely getting chocked with our thoughts or anticipations. Dereification helps us taken an opposite stance such that we realize that thoughts are not representations of reality but are mental objects which can be encouraged or ignored [9].

MBSR: Mindfulness-based stress reduction program is a typical 8-week training that employs all of the above capacities to their utmost potential. The participants are asked to pay attention to any focal object of meditation like breathing and provide a "curious", "friendly", or "open" quality of attention. They should have a relaxed mindset with a subtle vigilance for minor distractions around them that are prone to occur. The instructor instructs the participants to recognize the distraction and non-judgmentally return their attention to the object of focus. The instructor takes time to elaborate a series of objects, taking the attention of the participants with him. A typical MM program takes around 2 to 2.5 hours and is held twice a week for optimum training. Apart from the main concepts we discussed above, other capacities like compassion, self-worth, and empathy are also incorporated. The entire MBI aims to be an utmost uncoupling experience for an individual. These capacities work in the posterior cingulate cortex which may



	1982-2000	2001-2005	2006-2010	2011-2015	2016-2020
MBSR	4	9	21	146	173
MBCT	5	3	35	282	507
ACT	8	12	31	136	180

Fig. 1. Total number of randomized controlled trials published on mindfulness based interventions indexed in pubmed (1982-2020).

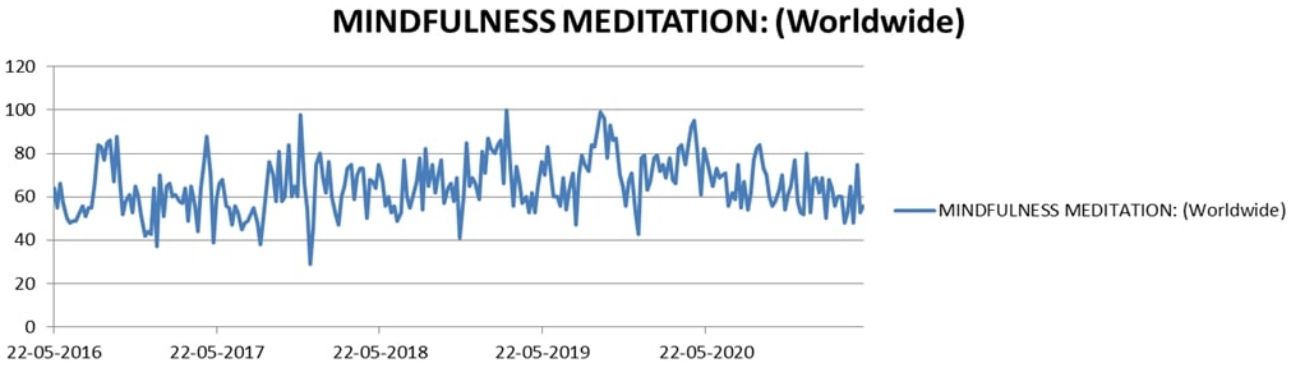


Fig. 2. Google trends search on the term "mindfulness meditation" in the past 5 years.

possibly play a role in self-referential processing.

MMCT: When we look at mindfulness meditation-based cognitive therapy (MMCT), it is based on theories where the primary objective is to prevent depression relapse. Depression involves a particular pattern of thinking called "rumination" which is characterized by repetitive negative thoughts, constantly stuck to the moments that caused distress previously. The mind does not search for a solution. Only purposeless repetition happens [10]. Rumination is achieved during the first episode of depression strongly and relapse occurs when a suitable trigger reactivates it. It creates mental pathways or 'loops' that gain strength with repetitive thoughts. With every relapse, the loop is more strengthened and the probability of relapse rises to create a self-perpetuating loop network. MBCT trains individuals to develop acceptance, enter a "being" mode, and terminate the ruminative loop. Further, the concept of "decentering" is employed to help the participants constantly remind themselves that thoughts are simple transitory events and don't need any undue importance. The National Institute of Clinical Excellence (NICE) recommends MBCT for relapse prevention in depression, for those who are currently well but have a history of at least three episodes of depression [11].

ACT: Acceptance and commitment theory (ACT) is a behavioral approach based on relational frame theory by Hayes, Barner, and Roche in 2001. This theory says that human beings have the ability to gather various stimuli from the environment and develop them into arbitrary contexts using the power of language and rick verbal psychological thought processes. We can create hypothetical scenes about the past or the future. However, this ability of higher cognition limits people by creating various constraints through control that bind associations and behavior. ACT practice can promote flexibility of mind which enables the participant to choose their response and behavior instead of using reflex action blindly. ACT also involves the use of thought suppression, thought observation, reframing thoughts, practicing acceptance, and plan to practice alternate behavior patterns [12].

APPLICATION OF MBI FOR PSYCHOSOMATIC CONDITIONS AND FOR SPECIFIC ORAL DISEASES

Stress-related disorders are on the rise in the past few decades. Stress is simply defined as a general response of the human body to various internal and external factors. It can intensify physiological and psychological actions and reactions in the body. Various studies have proposed possible role of stress and neuroendocrine components in the pathogenesis of dermatological conditions like melanoma, non-melanoma skin cancers, acne, rosacea, vitiligo, lichen planus, eczema, urticaria, atopic dermatitis, etc.

Any behavioral approach is believed to have an interaction between the neuropeptides and other inflammatory mediators and the cells of the dermis, epidermis, and subcutaneous fat cells. Neuron stimulated release of substance p can mediate the occurrence of cutaneous flare, wheel, and itch response. This denervation of the skin can clear psoriasis. Also, it has been proved that psoriatic skin has high levels of nerve growth factor which is complimentary to the underlying mechanism [13].

Another technique that can work for psoriasis is the MBSR. A study was conducted in patients with moderate to severe levels of psoriasis. They were receiving regular treatment options like UVB, PUVA, and psoralens. A few groups were randomly selected to receive MBSR. A five-minute video on mindfulness meditation was being played initially and the instructors began guiding the patients on total attention and focusing concepts. They guided the patients to breathe and be aware of the moment. They were asked to imagine the ultraviolet light penetrating their body cells and relieving them of the skin problem. After 20 cycles, there was significant clearing seen in patients who underwent MBSR. Also, they required 40% less ultraviolet exposure compared to the others [2].

Another study was done among patients older than 50 years diagnosed with post herpetic neuralgia. Despite the varied pharmacologic modalities available, the intense pain related to the condition is not always under control. The study was done among patients who were undergoing an 8-week MBSR course under a trained instructor. They were asked to listen to 1-hour sessions and practice the same with

a gradual increase in the duration of meditation advised over the 8 weeks. The pain was evaluated using Mc gill pain questionnaires; quality of life using Rand 36 item health survey, depression, anxiety scores was noted. In patients who successfully underwent the MBSR program, neuropathic pain improved, emotional well-being improved significantly, anxiety and depression scores decreased significantly leading to a better quality of life [14].

Though several studies have evaluated the use of MBI in various psychosomatic disorders, many of them have analyzed a single component of MBI like mindfulness alone or meditation alone. This is because there is a better possibility to understand the mechanism underlying the intervention when studies individually. In this line, there was a study done among 120 patients belonging to a diverse dermatological population ranging from psoriasis, acne to dermatitis and all of them were under treatment. Patients with higher levels of mindfulness had lower levels of all parameters with an improved quality of life. There was 19% variance in depression, 39% in anxiety. The results showed 41% variance in social anxiety, 13% skin shame, and 6% in dermatological quality of life [15].

In the case of atopic dermatitis, it is proposed that varying levels of stress can cause lesions by impairing the normal function of the skin. In a study done on 158 patients diagnosed with atopic dermatitis, the levels of mindfulness were analyzed using a comprehensive inventory of mindfulness (CHIME) and itch-related queries were also documented using itch cognitions questionnaire. There was more than 27% variance of itch catastrophe in the linear regression analysis. The authors further hypothesized that psychological interventions that train patients to act with awareness can have a buffering action on itch catastrophizing which can cause lower itch intensity in patients with atopic dermatitis [16].

Many authors have given various theories explaining the mechanism of MBI on the human body. Meditation reduces sympathetic activity and lowers the levels of stress hormones in the body. Changes in the electroencephalogram (EEG) have been observed that correspond to a state of relaxation. MBI has been speculated to be particularly helpful in chronic pain, anxiety and emotional conditions and fibromyalgia is one such condition where MBI gave satisfactory results. Myofascial pain dysfunction syndrome (MPDS) is very similar to fibromyalgia as both cause local tenderness, taut bands and has trigger points. Recent literature says that MBSR is useful in improving the sleep quality in fibromyalgia patients and also the positive effects of meditation existed for a long time beyond the recovery period. Such studies suggest the possible role of MBI in MPDS and this could be a new paradigm of research in the head and neck category [17].

Apart from the patient outcome-based trials discussed above, there have been a few studies that have evaluated actual stress-related hormonal changes in the body after subjecting to mindfulness meditation. In a randomized controlled trial conducted in 2020 among 40 healthy participants, the levels of salivary cortisol were estimated before and after the participants received training on PNEIMED. This was a meditation-based intervention that had similarities to Kabat Zinn's mindfulness meditation. The group which took up the training had a significant reduction in cortisol levels compared with the control group. Further studies have to be conducted to assess the effect of MBSR in stress-related disorders and establish its long-term effects after a recovery period [18].

The relationship between the mind and the immune system is phenomenal and has been discussed by various researchers. George Solomon of Stanford University was the first American physician to evaluate the relationship between the mind and the immune system. Later Brown and Fromm in 1987 stated the need for wider psychiatric applications in the management of autoimmune diseases. A paper published by a physician discusses some of his autoimmune patients managed with an integrative approach using tools like mind-body relaxation, hypnosis, ego-strengthening, ego state therapy, etc. He was successful in managing patients with relapsing multiple sclerosis, dermatomyositis, systemic lupus erythematosus, rheumatoid arthritis, and autoimmune pericarditis. The author stated that he finds psychotherapeutic interventions enable a faster resolution of relapse and promote progression into remission [19].

Many well-controlled studies have shown that MBI may reduce markers of pro-inflammation, including circulating blood markers of C-reactive protein, interleukin - 6, and the stress-induced inflammatory skin flare response [20]. Sjogren's syndrome is one such chronic autoimmune disease

characterized by oral and ocular dryness caused by lymphocytic infiltration and subsequent destruction of exocrine glands. A pilot study was carried out among 21 patients diagnosed with primary Sjogren's syndrome and non-Sjogren's sicca syndrome. Patients were guided in an 8-week MBSR program with 2.5 to 3 hours of weekly sessions and one all-day intensive session. They were guided in performing a "body scan" which is an exercise in which the participants are trained to focus on all sensations and parts of the body. Mindfulness meditation using "breathe" as an object of focus, contemplative walking, and mindfulness movements using 'hatha yoga' was taught to the patients. There was a significant improvement in the quality of life, reduction in fatigue and discomfort levels [21]. Also, in pemphigus vulgaris, another debilitating autoimmune condition, various clinical trials have concluded that there was higher mucocutaneous involvement in patients with higher depression levels. These findings emphasize the possible role of the effectiveness of mindfulness meditation in reducing the stress, pain, anxiety, and quality of life in such patients [22].

POSSIBLE ROLE OF MBCT IN OTHER PSYCHOSOMATIC DISEASES-SCOPE OF FUTURE RESEARCH IN THE HEAD AND NECK ARENA

There are many types of cognitive therapies and hypnosis is one of them which have been in practice for a long time. It has been tried in patients with atopic dermatitis, congenital ichthyosiform erythroderma, glossodynia, herpes simplex, hyperhidrosis, lichen planus, neurodermatitis, post herpetic neuralgia, pruritus, psoriasis, verruca vulgaris, and vitiligo. Another concept known as psychosomatic hypnoanalysis has been effective in resistant cases of herpes simplex, neurodermatitis, and urticaria from chocolate and persistent warts resistant to ordinary hypnotic suggestion. The outcomes achieved by the use of hypnosis provide us an insight that a combined approach of MBCT may be more effective in various psychosomatic conditions and accurate tools have to be prepared to evaluate the same [23,24].

When we look into the raging aspect of chronic pain due to various etiologies in our society, we find that we are still at a lack of solutions. Persistent orofacial pain (POP) is fairly common and affects 10% of adults and 50% of the elderly population. POP comprises a spectrum of disorders ranging from temperomandibular disorders, burning mouth syndrome, persistent dentoalveolar pain, neuralgic pain, and atypical facial pain. ACT and MBSR have been proposed for the management of orofacial pain by various authors though there are no major randomized controlled trials in this arena.

The effects of MM have been evaluated using functional magnetic resonance imaging (fMRI) in various studies. Authors say that the pain attenuation achieved with MM differs across varying levels of meditation and the intensities of experience. After a brief MM training of fewer than 10 hours over a particular time period, MM-based pain relief is bound to be associated with the higher-order namely the orbit frontal cortex and rostral anterior cingulated cortex, and the regulation of low levels of nociceptive neural targets in the thalamus and primary somatosensory cortex. This kind of minimal to moderate MM training for pain relief suggests engagement of unique re-appraisal mechanisms. However, with high-intensity MM training of more than 1000 hours, there is the deactivation of pre-frontal regions and greater activation of somatosensory cortical regions that leads to inhibition of appraisals of consecutive sensory events [25].

A STEPPED CARE APPROACH FOR THE CLINICIANS

The NICE has advocated a "stepped care" concept that instructs practitioners to plan effectively before incorporating psychotherapeutic interventions. It suggests guided self-help and also computer-based tools for standard psychological care to people globally. It proposes the widespread use of multi-disciplinary pain management programs in which physical rehabilitation along with psychological training is delivered by experienced staff from various disciplines. MM techniques like MBSR and ACT are proposed to be an integral part of such programs along with optimum physical exercises and medications as per need. A Cochrane review says that PMPS is more effective than regular care and physical therapy for treating pain and disability. Outcomes can be maintained for at least 12

months post-treatment [26].

At present, the knowledge regarding the mechanism of action underlying mindfulness meditation is limited and incompletely studied. The proposed theories are more of theoretical nature and the actual clinical response of the body needs more evaluation using modalities like fMRI (functional Magnetic Resonance Imaging) etc. The absence of such information can lead to few clinical risks as follows:

1. Lack of standard conceptual guidance to cater to different disease severities: Inability of the physician to tailor to every patient based on the background information of the patient, his disease condition, severity, the status of therapeutics, recurrence, and relapse, etc., The physician may not have an idea if the particular patient may develop resistance to MBI at any point of treatment.
2. Patient selection: In some patients due to various reasons, MM may not be effective. This can lead to a weak scientist-practitioner model of clinical psychology.
3. Incomplete adherence: Partial or incomplete use of technique and lack of adherence to training instructions can lead to the eventual loss of fundamentally important principles that form the basis of MM. As a result, the outcomes are largely influenced.
4. Misuse of MM: The use of MM with other techniques like cognitive therapies without the help of trained instructors can lead to confusion and lack of understanding among the participants.
5. Therapy fidelity: In a few cases the patient may not be completely involved in the training and may not follow the instructions due to their mental perceptions regarding the therapy. The clinician may not be aware of the half-mindedness of the patient.

CONCLUSION

Mindfulness meditation is an enormously beneficial psychotherapeutic intervention technique that can be safely practiced in a wide range of diverse populations. The scope of its applications in the psychosomatic oral spectrum of diseases is very large and well-planned clinical trials have to be conducted to evaluate the physical, psychological and holistic outcomes of mindfulness meditation-based interventions. Employing a multi-disciplinary approach, understanding the profound effects of MM on the human mental health and utilizing the help of trained therapists, clinicians can provide better treatment with comparatively early remissions and overall improvement. The effectiveness of MBI in psychosomatic disorders can be a vital research horizon in the years to come.

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