

# Plausible Mechanism in Prevention/Reversal of Oral Psychosomatic Disorders vis-à-vis Endogenous Secretion of N, N-Dimethyltryptamine

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## INTRODUCTION

Due to the imminent lockdown enforced by countries around the world to curtail the spread of COVID-19 infection, we are witnessing profound effects and inevitable consequences geopolitically, socioeconomically as well as on the psychological and mental well being of the society. There has been an upsurge in the anxiety and stress levels due to COVID-19 related lifestyle and a state of chronicity has set in. This long-lasting, chronic stress can be highly detrimental to mental health.

Oral psychosomatic disorders (OPSDs) are a set of disorders which are related to physiological alterations related to emotional upheaval.<sup>1</sup> Consequence of hippocampal atrophy due to constant increase in glucocorticoids and increase in type-2 receptors might lead to aberrations of several biochemical activities which involve the neurotransmitters. These alterations in the higher centers of the brain might lead to OPSDs. The prototypic OPSDs are temporomandibular disorders (TMDs) and sleep bruxism (SB). Other pain-related disorders like atypical facial pain, atypical odontogenic pain, phantom pain, and disorders related to oral sensation like burning mouth syndrome also can be grouped as OPSDs.<sup>2</sup>

To alleviate the symptoms of OPSDs, usually, antidepressants like tricyclic antidepressants, serotonin-norepinephrine reuptake inhibitors (SNRIs), selective serotonin reuptake inhibitors (SSRIs) are prescribed.<sup>1</sup> Majority of the above-said antidepressants (e.g., SSRIs) enhance the serotonin levels in the brain by blocking the reuptake of serotonin into the nerve cells. The freely available serotonin enables the passage of messages between the neurons efficiently. These antidepressants should be strictly prescribed by experienced medical experts and the type, dosage, and duration varies for each OPSD patient. They come with their share of side effects and withdrawal symptoms. Self-medication in these cases is highly contraindicated.

The chances of acquiring OPSDs in this pandemic are very high and worsening of the preexisting OPSDs is also highly possible. Healthcare systems in each country are overwhelmed due to the COVID-19 outbreak and due to lockdown measures taken; the accessibility to oral physicians can be difficult and challenging.<sup>3</sup>

Off lately, there has been an upsurge in alternate medicine practices. Entheogenic plants like peyote, ayahuasca, and psilocybin mushrooms have been traditionally used for their medicinal value, especially, to treat psychological disorders like depression,

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drug addiction, and post-traumatic stress disorder.<sup>4</sup> These are considered to be psychedelics or hallucinogens which serve as serotonin-receptor agonists. The main compound responsible for the therapeutic effects of these plants is N, N-Dimethyltryptamine (DMT) which is believed to have anxiolytic properties. DMTs in these entheogenic plants are primarily responsible for treatment of psychiatric disorders like schizophrenia, depression, and anxiety.<sup>5</sup> In a way, DMTs could also be providing therapeutic relief to OPSDs.

Endogenous secretion of DMTs in the human brain has been matter of greater debate and many researchers are equivocal about its production in humans. Some believe that the concentration of DMTs was too low to have a therapeutic impact pharmacologically. But, recent research on DMTs suggests that trace amine-associated receptors (TAARs) are activated by DMTs and DMTs are present in enough concentration in secretory vesicles in neurotransmitters to produce agonism in serotonin receptors. The extraordinary state of consciousness experienced during birth and at the time of death is believed to be due to the production of DMTs in the brain.<sup>6</sup> Experiences like spiritual calmness, creativity, dreams, and imagination are believed to be due to DMTs secretion in the brain. Data suggest that DMTs can serve as neuroprotectants and neuroregenerative substance.<sup>5</sup>

### Oral Psychosomatic Disorders

The oro-facial musculature is highly influenced by the harmful effects dictated by psychic factors in OPSDs like TMDs and SB. Both, TMDs and SB share a common etiological connection with depression, stress and anxiety. Long-standing and continuous pain in the oro-facial region is one of the key sign of these disorders.<sup>6</sup> TMDs are diverse conditions manifesting pain in the masticatory unit, the clicking of TMJ, and mandibular dysfunction.<sup>7</sup> SB is characterized by grinding and clenching of teeth which eventually lead to TMDs, headache, and regressive alteration of teeth and periodontium. SB is indicative of disturbed sleep. Individuals affected with OPSDs have an overbearing effect on the quality of life and might suffer from secondary, consequential oro-facial symptoms.<sup>8</sup> Treatment for OPSDs is usually multipronged and complex. Rehabilitation of dental tissues, management of pain in the TMJ, and management of muscle fatigue have to be a major focus of the treatment regimen. Another important aspect of the treatment of OPSDs is treating the psychic causes. Conventional psychopharmacological treatment with drugs like antidepressants is common and widely advocated.<sup>9</sup> Usage of traditional plants with psychogenic/hallucinogenic value containing DMTs has been at the forefront in alternative medicinal practice to treat psychiatric disorders. Either conventional psychopharmacological drugs or exogenous plants need to be highly regulated and continuously monitored for the patient response and progress as well as for the potential side effects to these substances.

In the current context of the COVID-19 related healthcare system crisis, timely diagnosis, management, and periodic follow-up of OPSDs remain farfetched. Timely intervention to

OPSDs is very critical as they could lead to irreparable damage to dento-facial structures.

A deep meditative state can be potentially benefitting in treating OPSDs vis-à-vis secretion of DMTs in the brain which can act as serotonin-receptor agonists and serve to be neuroprotective and neuroregenerative.

### Deep Meditation

Meditation, which has stood the test of time for several centuries, is deep-rooted in the Vedic culture of the Indian sub-continent. It has challenged modern medicine and has pioneered itself for its ability to provide a healthy state of mind and body. A connection between mind and soul and state of being in the moment or being aware and mindful is achieved through meditation. Any form of meditation, be it mindful, transcendental or kundalini meditation, awareness is the principal component. Awareness of inhalation and expiration of air, awareness of thoughts, and awareness of emotions that are suppressed and lie dormant in the mind can lead to liberation and emotional well-being.<sup>10</sup>

Mindful awareness and deep relaxation are the two important cogs in the wheel of deep meditation. We believe that practicing and mastering the art of deep meditation techniques can stimulate the brain which could lead to the endogenous secretion of DMTs.

Refocusing the mind on the moment and through the perception of one's external environment and inner stimuli, enabling oneself to move back and reform perceptions is thought to function with mindfulness meditation. The individual remains in relaxed state of mind and seated. Mindful awareness is achieved

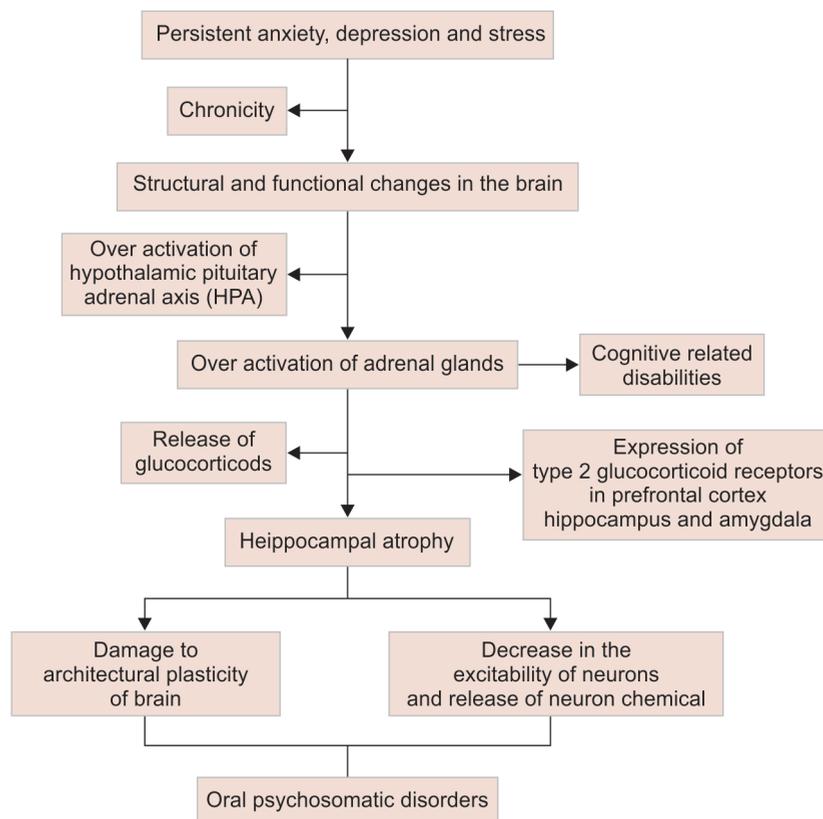
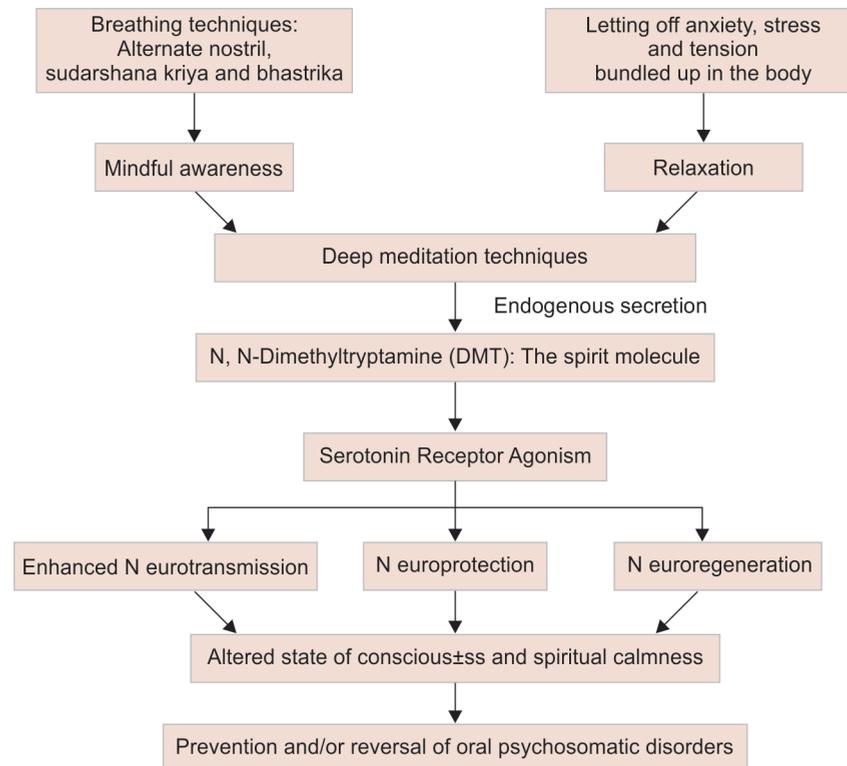


Fig. 1: Cascade of events in development of oral psychosomatic disorders



**Fig. 2:** Plausible mechanism in prevention/reversal of oral psychosomatic disorders Vis-à-vis endogenous secretion of N, N-Dimethyltryptamine

when the individual has developed a relaxed equilibrium between vigilance and letting go of the emotions and thoughts. Mindful awareness can be achieved by mastering breathing techniques like alternate nostril, sudarshana kriya, and bhastrika which will enable the individual to go into deep meditative state.<sup>11</sup>

Another component of deep meditation is relaxation. Letting off anxiety, stress, and tension bundled up in the body and unwinding is achieved through relaxation.<sup>12</sup> Combination of mindfulness awareness and relaxation will lead the individual to deep meditative state which, we believe, will eventually lead to DMTs secretion (Fig. 1).

To practice deep meditation, individual has to choose a calm place without much of bright light. Individual needs to find a right posture which is comfortable. Be it sitting flat on a mat, chair or sofa, or even lying down on their own back. Time of the day is also important for individual to practice deep meditation. As per individual's perception, it's crucial to choose a time when the mind is alert (Fig. 2). Once a right place, posture and time are calibrated by the individual, the ideal way to transcend into deep meditation is to begin with any of the breathing techniques (alternate nostril, sudarshana kriya, and bhastrika) and being attentive to the air entering and exiting your system. Practicing the heightened perception of act of breathing will relax the individual. Once the individual is mindfully aware of the breathing process, the attention can be shifted to the body, especially all the oro-facial musculature and the TMJ. By consciously shifting the focus to the tensed area the individual can notice the sensation of letting go and relaxing by paying benevolent attention. The same act can be progressively applied to the rest of the body. The act of mindfulness breathing and focusing on tensed area of concern and letting it go will anchor the individual to the present. The individual will find contentment in deep breathing meditation. Once the individual trains the mind to deep meditation, they will be able to concentrate/focus better

with least effort. Deep meditation unravels the organic bliss of being in the present moment and not carrying the baggage of past or uncertainty about future. Vigorous and regular practicing of deep meditation daily will play a significant role in production of DMTs in the brain which can act as serotonin receptor agonists and alleviate OPSDs.

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