

# Integrated yoga therapy for mastalgia

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## Abstract

Mastalgia has neither an organic etiology nor any definitive treatment, which affects women's quality of life during their reproductive lives. Considering mastalgia as one of the psychosomatic disorder, mind-body interventions such as yoga would play an important role. This review is an effort to give a yogic concept in understanding the anatomy and physiology of the subtle aspects of human mind-body system that helps us to understand the imbalances that lead to evolution of chronic lifestyle-related diseases and their pathophysiology in a totally different perspective, which can help modern science to unravel some of the mysteries behind lifestyle problems.

**KEY WORDS:** Yoga therapy, mastalgia, quality of life

## Introduction

Mastalgia or breast pain (BP) is a common breast disorder with highly variable prevalence estimates ranging from 41% to 79%. Mastalgia is generally nonthreatening, but the anxiety of underlying breast cancer is the cause for women to approach evaluation. A thorough clinical evaluation is required to assess the cause.<sup>[1,2]</sup>

Mastalgia in young women is associated with anxiety and depression, thereby brings down the quality of life (QOL). We get the description of mastalgia (BP) in medical history from 1829.

Most of the women experience various breast symptoms, i.e., swelling and tenderness, nodularity, pain, palpable lumps, nipple discharge, or breast infections and inflammation; most of the cases will be benign.

Cyclical mastalgia (CM) or mastodynia typically occurs every month before the start of the menstrual period and is relieved within 7 days of the onset of menses.<sup>[3]</sup> Approximately 40%–70% of BP is cyclic and is related to hormonal cycling

of estrogen, progesterin, and prolactin. Acyclic mastalgia (ACM) is more recurrent or severe, hampers daily activities, and accounts for about 30% of BP.<sup>[4]</sup> Little is known about the cause of ACM. BP with or without a tender palpable swelling and nodularity (fibrocystic disease) seeks greater attention because of the anxiety and fear about the risk of getting breast cancer.<sup>[4]</sup> It is important to study its high prevalence and its potential to become benign to malignant.<sup>[4]</sup>

## Prevalence of Mastalgia and Fibrocystic Disease of the Breast: India and Global

The prevalence of mastalgia happens to differ extensively in various countries. In the United States, two studies on adult people recorded prevalence rates of 68%<sup>[5]</sup> and 11% for CM.<sup>[6]</sup> However, in Canada and United Kingdom, it is recorded as 51.5% and 32%, respectively.<sup>[7]</sup> The prevalence rates in India happen to be identical, with a recorded prevalence of 51%<sup>[8]</sup> to 54%<sup>[9]</sup> in an adult urban population.

## Etiology

Although the etiology of mastalgia is not clearly understood, several contributory factors have been reported. Imbalance in estrogen and progesterone hormones, prolactin,<sup>[10]</sup> thyroid-stimulating hormone,<sup>[11]</sup> abnormalities of lipid metabolism,<sup>[12]</sup> age,<sup>[2]</sup> premenstrual syndrome,<sup>[5]</sup> stress (anxiety, depression, and childhood abuse),<sup>[13]</sup> duct ectasias,<sup>[14]</sup> smoking,<sup>[15]</sup> and caffeine<sup>[16]</sup> have all been implicated [Figure 1].

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## Pathophysiology of Mastalgia

### Mastalgia: a Psychoneuroendocrine Disorder

Increased sensitivity to catecholamines and pituitary hyperprolactinemia owing to inappropriate dopaminergic tone (decreased baseline dopamine levels in blood was found in studies) results in BP [Figure 2].

Mastalgia may be associated with an upward change in the circadian prolactin profile, a probable downward change in menstrual profiles, and loss of seasonal deviations. In addition, patients with mastalgia reveal a intensified prolactin secretion in response to thyrotrophic-releasing hormone anti-dopaminergic drugs and may sequester iodine in an active manner in their breast tissue owing to a change in prolactin control [Figure 1]. In addition, stress can cause a rise in prolactin response.<sup>[17]</sup>

### Stress and Mastalgia

It is well established that psychological stress plays a major role in the cause of mastalgia,<sup>[18,19]</sup> and severe mastalgia is related to increased levels of psychological distress.<sup>[20]</sup> Psychological stress causes mastalgia and, in turn, affects the patients' QOL negatively. Depression and anxiety are the other important psychological disturbances in patients with mastalgia.<sup>[18]</sup>

Studies have shown that acute stressors may have a stimulating effect on the immune system, while in the case of chronic stress (and, in particular, in depression), the immune system may be downregulated.<sup>[21]</sup> It is assumed that the stress-induced neuroendocrine hormones cause immune deregulation.

Recently proposed theories suggested that stressors induce cognitive and affective responses activating the sympathetic nervous system and endocrine variations (corticotrophin-releasing hormone, epinephrine, norepinephrine, adrenaline among others), which could result in troubled physiological functions through the hypothalamic–pituitary (HP)–adrenal, sympathoadrenal–medullary, and HP–gonadal axes.<sup>[22]</sup>

Normal breast function is a balance between estrogen and progesterone, which is a part of the neuroendocrine control exerted by the HP-gonadal axis. Normally, estrogen induces prolactin release by increasing the dopaminergic tone centrally. But, it is postulated that this tone is impaired in patients with mastalgia. Decreased baseline dopamine levels and increased catecholamines have been seen in studies in patients with CM and ACM. Catecholamines may be released owing to dietary factors or stress, resulting in altered abnormal sensitivity of the breast tissue. Recent studies point to a prolactin (PRL) secretary hypersensitivity for estradiol in patients with CM.

Studies suggest that there is a subtle hormonal imbalance in the HP axis. The hypothalamus–pituitary component is the major governing part of the whole endocrine system. Normal breast function is a balance between estrogen and progesterone levels, which is a part of the neuroendocrine control exerted by the HP-gonadal axis.

## Management of Mastalgia

Treatment strategies have varied from hormonal to nonhormonal, from reassurance<sup>[23]</sup> or relaxation therapies to other non-drug therapies such as vitamin E, vitamin B6, evening primrose oil (EPO),<sup>[24]</sup> phytoestrogens, and herbs.

### Drug Therapies

Drugs such as progesterone creams, NSAIDs, tamoxifen,<sup>[25,26]</sup> danazol,<sup>[26]</sup> bromocriptine<sup>[27]</sup> and centchroman,<sup>[18–22]</sup> goserelin, gonadotropin-releasing hormone agonists,<sup>[30]</sup> and centchroman,<sup>[24,26,31]</sup> have all been tried. Usage of all these drugs has been shown to exert minor or major side effects.

### Mind–Body Interventions for Mastalgia

As there is no known organic etiology for mastalgia and the main cause appears to be psychosomatic, it appears that mind–body interventions would play an important role. It is reported that cognitive behavioral therapy remarkably decreases the complaints of majority of the mastalgia patients.<sup>[13]</sup>

## Need for the Study

Yoga has been extensively used as one of the mind–body interventions and has shown beneficial effects in reducing pain,<sup>[32]</sup> anxiety,<sup>[33]</sup> and depression.<sup>[34]</sup> It can be hypothesized that it would lead to a reduction/normalization of sympathetic nervous system/HP axis activation. In a systematic review that looked at the role of yoga in pain management, nine randomized-controlled trials (RCTs) have shown yoga intervention exhibits beneficial effects in reducing pain in any part of the body when compared with the control interventions.<sup>[35]</sup> Yoga is also found to reduce back pain,<sup>[36–38]</sup> headache, abdominal pain during menstruation and other premenstrual symptoms,<sup>[39]</sup> and different gynecological problems.<sup>[35,40,41]</sup> Pointing to the benefits achieved by mind management techniques of yoga, it has been found to be useful in decreasing stress,<sup>[42–45]</sup> stress, and inflammation<sup>[44]</sup> and in increasing self-esteem,<sup>[46]</sup> positive affect, and wellness.<sup>[47]</sup>

## Yoga as a Therapy

Yoga, which is known to be an effective mind–body intervention for stress management,<sup>[33,34,41,42,44,48–50]</sup> has not been tried in women with mastalgia.

## Literature Review of Published Works Related to CAM therapies in Mastalgia

Summary of studies done in the past decade on different complementary and alternative therapies including supplements, herbal, diet, acupuncture, and psychoeducation in treating mastalgia is tabulated in Table 1.

The effects of yoga on psychological aspects (anxiety, depression, stress, and QOL) have been studied from past several years. Summary of a few recent studies has been given in Table 2.

Studies including RCTs over a past decade have shown that yoga practices can result in improving psychological aspects, lowering the anxiety, depression, and stress level, improving QOL, lowering the sympathetic and inflammatory activities, and increasing parasympathetic tone. Hence, we have strong evidence that yoga helps in the management of stress. Studies have revealed that yoga alters the physiological responses to stressors by enhancing autonomic stability with better parasympathetic tone in normal adults.<sup>[51]</sup>

It is proved that CM results owing to a dormant stress-induced hormonal imbalance as specified by hyperprolactinemia.<sup>[52]</sup> It is observed that patients with CM and ACM show increased catecholamines and decreased baseline dopamine level, which suggests that catecholamines may be released owing to stress, resulting in altered abnormal sensitivity of the breast tissue.<sup>[53]</sup> Yoga may improve the QOL by promoting voluntary reduction in violence and aggressiveness.<sup>[54]</sup> Mastery over the emotional responses of anxiety<sup>[21]</sup> or depression<sup>[55]</sup> is attained via relaxing awareness during all the practices in general and meditation in particular.<sup>[56]</sup> Kundalini yoga is found to be beneficial in cases of depression. It stimulates the various autonomic nerve plexus (chakras) and activates pineal organ, which in turn brings homeostasis between sympathetic and parasympathetic activities.<sup>[57]</sup> This mastery over emotional surges leads to controlled and need-based physiological responses that may reduce the overtones of HP–adrenalin axis<sup>[58]</sup> during chronic pain. Yoga has an influence on the HP–adrenalin axis as evidenced by a reduction in cortisol levels in normal<sup>[59]</sup> and sick individuals.<sup>[49,50]</sup>

This article has given a flow chart of how stress is corrected based on yogic concepts. Ancient Indian manuscripts courting back to about 5,000 years (Rig Veda, Patañjali Yoga Sutra, and ayurveda) offer a extremely evolved theoretical basis for the etiopathogenesis of disease and its management.

## Literature Review of Yogic Texts and Yoga Studies

### Integrated Approach of Yoga Therapy (IAYT) for Mastalgia

The IAYT repairs and restores the system into balance at all five levels of one's existence. The Pancakośa concept given in the Taittirya Upaniṣad forms a model of the total structure of a human being [Figure 2]. It brings a deep understanding of the relationship between a human being and all aspects of his or her experience. This theme of relationship is fitting as we glimpse into the fifth layer of the five bodies, Ānandamaya kośa, to gain an understanding of its properties in relation to health. Understanding the mechanisms behind such reversal by yoga requires considering the subject in the terminology specified in the field of study.

Yoga therapy techniques are based on the principle of mind–body medicine that includes: (a) the concept of five aspects of one's personality, called the Pañcakośa viveka (Taitriya Upaniṣad), (b) yogic definition of stress (Bhagavad-Gita) as kleśas (Patañjali Yoga Sutra), and (c) progression of a mind–body illness from mind to the body as vyādhi or disease through intermediation of prāṇa (Yoga Vāsiṣṭha).

The Pañcakośa viveka explains the anatomy and physiology of the subtle aspects of human mind–body system that helps us to understand the imbalances that lead to evolution of chronic lifestyle-related diseases and their pathophysiology in a totally different perspective, which can help modern science to unravel some of the mysteries behind lifestyle problems. These five aspects are: (a) Annamaya Kosha (sheath of physical body that is composed of all the molecules of gross elements); (b) Prānamaya Kosha (the subtle energy that is at the base of all cellular activities); (c) Manomaya Kosha (sheath of mind/emotion), (d) Vigīānamaya Kosha (sheath of intellect); and (e) Ānandamaya Kosha (sheath of bliss).

## The Origin and Scope of Yoga

Yoga is a rich traditional contribution from India to humanity, which starts with introspection/inner mindfulness.<sup>[47]</sup> Yoga includes diverse practices, such as physical postures (asanas), regulated breathing (Prāṇāyāma), meditation, and several concepts for cognitive change.<sup>[47]</sup> The benefits of yoga in improving muscle strength, flexibility, blood circulation and oxygen intake and hormone functions at the gross level are well documented.<sup>[46]</sup> Meditation has been defined as teaching in consciousness that induces definite alterations in perception, attention, and cognition<sup>[59]</sup> and, thus, aid in decreasing stress,<sup>[44]</sup> depression,<sup>[60]</sup> and anxiety.<sup>[33]</sup>

Yoga, which is a way of life, is the need of the hour in all fields of human endeavor. The scope of yoga is extended to bring about changes in the lifestyle, which is at the base of prevention and treatment of noncommunicable diseases. Yoga for promotion of positive health is being nurtured by many who do not want to be the victims of modern ailments.

The term “Yoga” comes from a Sanskrit word “Yuj” meaning “to join.” Yoga is a technique of joining the individual consciousness with universal consciousness,<sup>[61]</sup> which expands the limited view of the world around.

## The Concept of Stress, According to Modern Science and Yogic Scriptures

According to modern science, stress is defined as “a phylogenetic, nonspecific, conventional basic response pattern to any demanding situation.”<sup>[62]</sup> Several physiological changes occur when exposed to life-threatening physically demanding situations that help the system for fight or flight. Although this does cause a temporary imbalance in the metabolic processes that may drain out the useful chemicals and generate

**Table 1:** List of literature review of CAM therapies in treating mastalgia

| Citation details                     | Subjects and design   | Intervention; assessments   | Conclusion and critical analysis  |
|--------------------------------------|---|---|---|
| Studies on supplements for mastalgia |   |   |   |
| 1 Goyal <sup>[27]</sup>              | 24 systematic reviews and RCTs  | Evening primrose oil; low-fat, high-carbohydrate diet, lisuride, or vitamin E                           | Less efficacy; license banned in USA; do not know the efficacy; very few studies  |
| 2 Carmichael <sup>[52]</sup>         | Review RCTs, non-RCTs, cohort, N = 1,992 (total)  | <i>Vitex agnus castus</i> ; Questionnaire: VAS, HAM-D, DSR CGI-SI, and DMS III-R                        | Effective in cyclical mastalgia; safe side effect profile and can be used   |
| 3 Romualdo et al <sup>[71]</sup>     | 91 subjects with cyclic mastalgia   | 900-mg borage oil capsules; assessed by VAS   | Scores of both the mean mastalgia and most severe mastalgia showed significant ( $p < 0.0001$ ) reduction   |
| 4 Saeed et al. <sup>[24]</sup>       | Quasi-experimental, purposive; N = 50: 25 danazol and 25 primrose oil   | Evening primrose oil assessment: Cardiff Breast pain scale at 8, 12, and 24 weeks                       | Danazol was more effective than evening primrose oil  |
| 5 Vaziri et al.; Int J Fam Med 2014  | Three armed RCT; 61, flax seed as bread; 60, omega-3 fatty acids as pearl; and 60, wheat bread for women  | VAS after two menstrual cycles  | Flax seed was more effective than omega 3 fatty acid ( $p < 0.001$ )  |
| 6 Allen and Froberg <sup>[16]</sup>  | Three armed RCT; single blind, N = 56 with mastalgia. Experimental, caffeine-free diet; control, no dietary restriction; placebo, cholesterol-free diet | Caffeine-free diet  | Decreased caffeine consumption did not result in a significant reduction of palpable breast nodules or in a lessening of breast pain/tenderness                   |
| Nonpharmacological studies           |   |   |   |
| 7 Lori <sup>[70]</sup>               | N = 37; a pilot study, acupuncture. Treatment consisted of four acupuncture sessions over 2 weeks, with 3 months of follow-up                           | Reduction in pain intensity and pain interference was demonstrated within one cycle through acupuncture | A randomized-controlled trial may be warranted to evaluate the effect of acupuncture on noncyclic breast pain and the optimal frequency of acupuncture treatments |
| 8 Yarkin; Appl Res Qual Life 2013    | N = 98; mastalgia without organic etiology. 66, psychoeducation PEG; 32, no psychoeducation   | SF36 Health-Related Quality of Life scale; VAS at baseline and 2 months later                           | Psychoeducation was effective in reducing pain and increasing the quality of life   |

many endotoxins, the system has enormous capacity to restore the balance by detoxification, repair, and rejuvenation. The responses are similar when the demanding situations are physical or emotional, and the system can restore to normalcy over a period of time. But, when the situations become chronic and does not give time for restoring normalcy before taking up the next challenge, the system is forced to reset itself at a different level, the imbalance continues, and normalcy is lost; this long-standing imbalance leads to an illness through accumulation of endotoxins (free radicals, etc.). Thus, disease is a habituated disturbed pattern of response.<sup>[63]</sup>

Yoga, a science of introspection/internal awareness/mindfulness, takes us one more step to analyze the mental processes during stress response. All stress responses begin in the mind as intense fear, anger, or depression; all are intense emotional surges; in all these emotional surges, the thoughts in the mind go on rewinding at uncontrollable speed; this gathers enough energy to bring about all the physiological changes. Thus, stress according to yoga is “persistent uncontrolled speeded up repetitive thoughts in the mind.” Yoga teaches

the process of slowing down the flow of thoughts, which is the technique to manage stress.

### Mechanism of Mind–Body Disease (Ādhija Vyādhi) According to Yoga (Vāsiṣṭha Model)

In accordance with the yoga manuscript, Yoga Vāsiṣṭha, “all diseases can be classified as ādhija or Anādhija. Ādhija Vyādhi (stress/mind born disease) is due to ādhi (stress); it begins as an internal by disturbances at the mind level. On the other hand, the Anādhija vyādhi is not due to ādhi (stress); they are caused by external causes such as infections, toxins, injuries etc.”

Although the etiology of mastalgia is unclear, it is clear that this is not owing to any infection, injury, or toxins (not Anādhija Vyādhi) and, hence, can be considered to be Ādhija Vyādhi (noncommunicable lifestyle disease) [Figure 3].

The root cause, the wrong lifestyle, results in stress that begins in the Manomaya kośa (instinctual mental layer of human

**Table 2:** Summary of published articles in yoga and stress

| S. No | Author                                | Design, subjects, and intervention   | Results   | Conclusion   |
|-------|---------------------------------------|--|---|--|
| 1.    | Vedamurthachar et al. 2006            | Subjects: 60 alcoholic subjects—30, Sudarshan Kriya Yoga (SKY); 30, control subjects; 60-min sessions, alternate days; 2 weeks   | SKY group showed reduced depression (BDI), plasma cortisol, and ACTH more than control subjects. Depression correlated with cortisol in SKY group.  | SKY reduces depression and stress-hormone levels (cortisol and ACTH) in alcoholic subjects                         |
| 2.    | Jiang et al. 2009                     | Yoga, 3 times weekly ( $n = 30$ ), Yoga, once weekly ( $n = 30$ ), and control subjects ( $n = 30$ ) female college students; 8-week intervention; IgG level measured                                    | Yoga increased IgG levels more prominent in 3 times/week group  | Yoga influences the immunity (IgG levels)  |
| 3.    | Gopal et al. 2011                     | Yoga ( $n = 30$ ), control subjects ( $n = 30$ ); first-year medical students for 12 weeks. Heart rate, respiratory rate, blood pressure, stress, anxiety, serum cortisol, IL-4, and IFN-g were measured | Physiological measures increased in control group but did not in yoga group. Psychological stress was very high in control group but moderately high in yoga group. Serum cortisol increased and IFN- $\gamma$ decreased less in yoga group than in the control group. Both groups showed increased IL-4. | Yoga resists autonomic changes and impairment of cellular immunity seen during examination stress                  |
| 4.    | Kariya et al. 2010                    | Yoga ( $n = 255$ ) for 16 weeks, symptoms check list, physical self-perception; serum immunoglobulin was measured  | Somatization, personal relationship, and hostility decreased; compulsion, anxiety, depression, fear, and psychosis decreased; serum IgM decreased   | Yoga improves social health and promotes immune changes  |
| 5.    | Kumar and Pandya 2012                 | Yoga ( $n = 80$ ), control subjects ( $n = 30$ ); PG students 30 min/day for 6 months; ESR was measured  | ESR was lower in yoga group for both male and female subjects   | Yoga Nidra: nonspecific inflammation   |
| 6.    | Nidhi et al. <sup>[39]</sup>          | RCT, $N = 90$ , 12 weeks of yoga; physical exercise for control subjects. Anxiety level was measured   | Trait anxiety was significantly lower   | Anxiety reduced in yoga group. $p = 0.002$   |
| 7.    | Kinser et al. <sup>[60]</sup>         | $N = 12$ , 8 weeks of gentle yoga. Interpretive phenomenological study. RCT mixed method study   | Major depressive disorder (MDD) came down. The main reason was stress   | Yoga served as a self-care technique in MDD  |
| 8.    | Rani et al. <sup>[42]</sup>           | $N = 50$ , enumeration sampling technique  | Modified stress assessment scale  |  |
| 9.    | Kiecolt-Glaser et al. <sup>[44]</sup> | $N = 50$ , hatha yoga and treadmill walk, to measure potential stress reduction benefits and inflammatory and endocrine response   | Novices' average serum IL-6 levels were 41% higher than those of experts  | Yoga significantly reduces cortisol and inflammation   |
| 10.   | Kiecolt-Glaser 2014                   | Patients from 0 to III stage BC. Yoga, $n = 53$ ; stretching, $n = 54$   | Improved QOL. Depression, sleep quality, and fatigue measured at 1, 3, and 6 months later   | Yoga improved QOL and physiological changes associated with XRT beyond the benefits of simple stretching exercises |
| 11.   | Vadiraja et al. <sup>[49]</sup>       | $N = 88$ ; 44 = yoga, 44 = supportive therapy. Stages II and III BC patients undergoing radiotherapy   | Reduction in anxiety, depression, and stress level in yoga group  | Yoga helps in reducing stress in BC patients   |



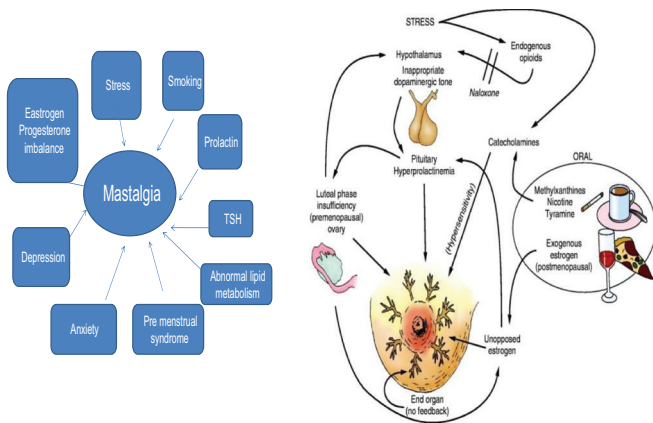


Figure 1: Stress and mastalgia.<sup>[17]</sup>

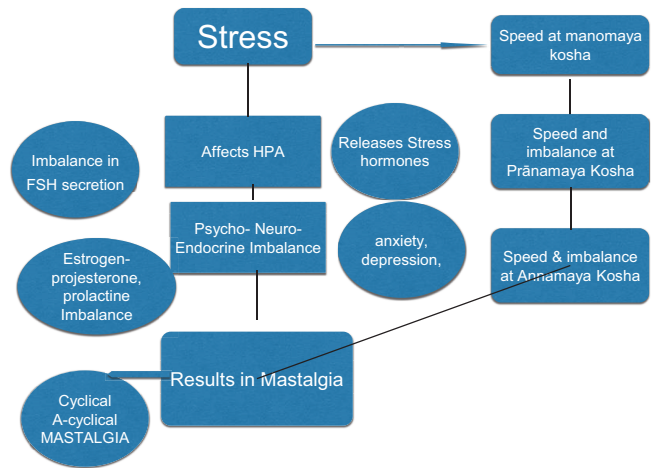


Figure 4: Mechanism of psychosomatic nature of mastalgia—a yogic model.

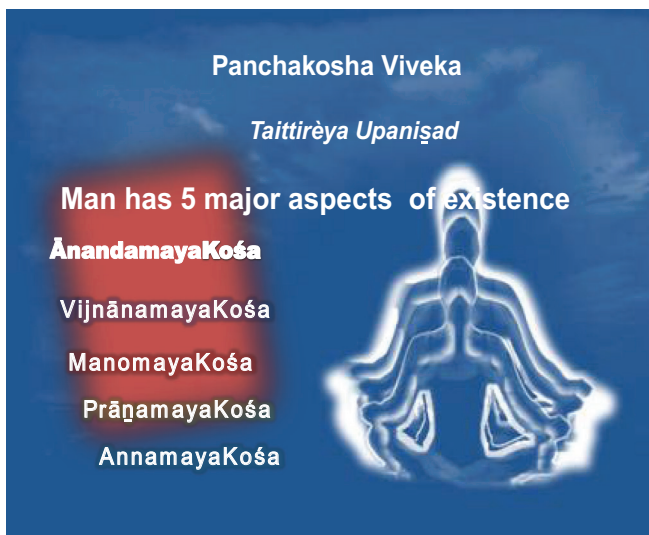


Figure 2: Concept of pañcakoṣa (five-layered existence).

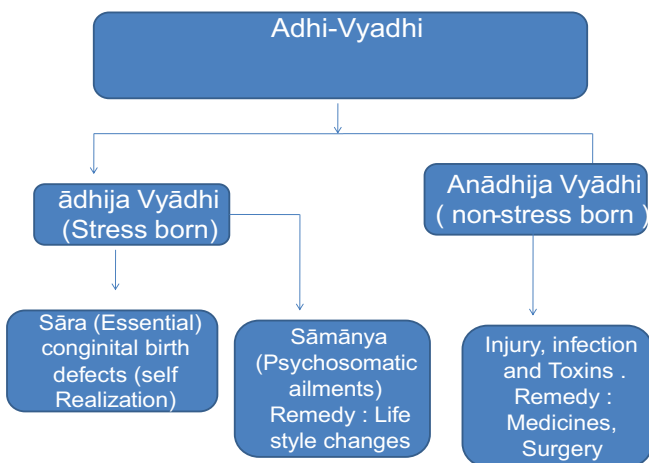


Figure 3: Mechanism of mind body disease (Ādhija Vyādhi) according to yoga (Vāsiṣṭha model).

system). The persistent uncontrolled repetitive thoughts in the mind during these chronic emotional surges of stress activate the physiological responses at the body level. The texts say that prāṇa is the mediator that transfers the imbalances from the mind to the body. Prāṇa is the vital energy (vital force/ bioenergy/subtle energy/life energy/chi) that carries out all activities in the physical body (annamaya kosha). When the mind picks up enormous speed (Vega—udvega—the uncontrolled speed in upward direction), more prāṇa is activated to promote heightened activity in all organs. Persistent excessive prāṇa flow to an organ causes tissue damage, which could be inflammation or early degeneration. Inflammation without any external onslaught by a germ or a toxin is Ādhija Vyādhi. The text goes on to describe two factors that decide where the Ādhija Vyādhi manifests. These are: (a) a genetic predisposition to a particular disease and/or (b) an inherent weakness or vulnerability of the organ in the particular individual.<sup>[47]</sup>

**Let Us Look at Mastalgia as Ādhija Vyādhi—Mind–Body Disease**

The problem begins as responses that are persistent long-standing emotions (recognizable or unrecognizable/ suppressed or expressed), which could be anxiety or depression; this invariably draws too much prāṇa to carry out the stress responses; over a period of time, the habituated excessive prāṇa activity localizes to the breast as pain; pain is uncontrolled excessive activity in the sensory nervous system, which is the result of hormonal (estrogen, progesterone, prolactin, etc.) imbalance. In summary, the yogic model theorizes that the whole complication is owing to repetitive attack by uncontrolled thoughts (suppressed emotions) at the mind level (Manomaya kośa), which results in extreme prāṇa activity and establishes as violence (inflammation) that leads to an imbalance (endocrine/nervous) at Annamaya kośa to show up as BP.

Diagram of pathophysiology of stress and mechanism of psychosomatic nature of mastalgia as a yogic model can be seen in Figure 4.

### Reversal of the Disease (Mastalgia) by the Correction of the Five Layers with Yogic Lifestyle

Yoga is defined as “mastery over the modifications of the mind” by sage Patañjali,<sup>[64]</sup> which is the goal of the integrated yoga program. The modules of IAYT used in this study are techniques that help to repair and restore the system into balance at all five levels of one’s existence.

#### Annamaya Kosha Practices

The practices used at annamaya kosha include yogic diet, kriyas (cleansing techniques) and asanas, and relaxation practices. Annamaya kosha may be regarded as the focus of modern medicine.

IAYT recommends simple wholesome vegetarian (sātvik) diet that helps to keep the mind calm and controlled; it also recommends moderation in eating habits, sleep, and behavior.

Āsanās, which form the major component of IAYT, help in improving lymphatic flow through repetitive stretches of the arms, chest, back, neck, and the thoracic region during different postures.

Kriyās, known as cleansing techniques, may help in clearing the endotoxins, the accumulated free radicals in the breast area.<sup>[65]</sup> Āyurveda, yoga, and naturopathy describe that toxins (āma) are formed within the gut owing to disturbed digestion that results from uncontrolled surge of suppressed emotions. This morbid matter (āma) blocks the subtle energy channels (srotas or nādis) or meridians (Chinese medicine) in different areas and causes local imbalances in prāṇa flow to local organs. Kriyās are recommended to help in detoxifying and achieving voluntary mastery (Rāja Yoga. Kolkata: Ch2 v49; Advaitāshrama).<sup>[66]</sup>

#### Prāṇāmaya Kosha Practices

Prāṇāyāma is a very useful tool to calm down the mind through voluntary slowing down of the breathing rate. Slowing down the rate of inhalation and exhalation is prāṇāyāma. Several types of prāṇāyāma help in channelizing and balancing the prāṇa (chi and vital energy) flow to different organs in general and to the breast region, in particular in cases of mastalgia.

#### Manomaya Kosha Practices

##### Meditation

Pratyāhara (withdrawal of senses from the objects of perception), dhāraṇa (binding the mind to a single thought space), dhyāna (effortless flow of a single thought), and sāmādhi (merging of the knower with the object of meditation) are the components of meditation described by Patañjali. Meditation helps to remove the restlessness wandering uncontrolled surge of negative disturbing thoughts and helps in channelizing them to the desirable positive thought on the background of what remains as inner calmness and bliss. Thus, these practices are the recommended techniques to achieve voluntary mastery over the modifications of the mind, the definition of yoga.<sup>[67]</sup>

#### Vijnānāmaya and Ānadāmaya Kosha Practices

##### Theory Classes and Yogic Counseling Using Jñāna Yoga, Bhakti Yoga, and Karma Yoga

The theory lectures that explain the unique concepts from scriptures on mind body disease (ādhi and vyādhi), happiness analysis, yama (do’s), niyama (don’ts), working without building stresses (karma yoga), and emotion culture through devotional practices (bhakti yoga) help in changing the loop of intrusive stress responses such as anxiety or depression and promote positive feeling by unfolding the divinity within.

Yogic counselling in which the therapist goes into the life problems of the individual and helps the participant to change the perception of the problem itself goes a long way to bring about the required cognitive change. This also prepares the participant to face any stressfully demanding situation that may trigger the unwanted uncontrolled surges of emotions such as anxiety or depression or tension or fear. The improved confidence and will power helps in improving the feeling of wellness and, thus, the QOL. Thus, the lectures from the scriptures and yogic counselling helps in improving interpersonal relationships,<sup>[68,69]</sup> adjusting to environmental changes and ups and downs of life. Thus, there occurs an introspective cognitive change by recognising the psychological freedom “to react, not to react or change the habituated patterns of reaction to situations” as highlighted in yoga texts.<sup>[47]</sup>

#### Conclusion

This is an effort to give a brief synthesis of the rich traditional knowledge of yoga, which has explained a problem and a solution to mastalgia through the Indian scriptures and yogic lifestyle, which has been implemented in our RCT with 6-month follow-up (CTRI/2014/08/004911), an hour of yogic practices for 12 weeks, has given a highly significant result in alleviating mastalgia and depression and anxiety, thereby improving QOL and removing/ruling out the fear of getting breast cancer.

#### References

1. Nasreen N, Sohail S, Memon MA. Utility of breast imaging in mastalgia. *JLUMHS* 2010;9:12–6.
2. Murshid KR. A review of mastalgia in patients with fibrocystic breast changes and the non-surgical treatment options. *J Taibah Univ Med Sci* 2011;6(1):1–18.
3. Zafar A, Rehman A. Topical diclofenac versus oral diclofenac in the treatment of mastalgia—a randomized clinical trial. *Rawal Med J* 2013;38:371–7.
4. American Cancer Society. *Non-Cancerous Breast Conditions*. Atlanta, GA: American Cancer Society, 2012.
5. Ader DN, South-Paul J, Adera T, Deuster PA. Cyclical mastalgia: prevalence and associated health and behavioral factors. *J Psychosom Obstet Gynaecol* 2001;22(2):71–6.
6. Ader DN, Browne MW. Prevalence and impact of cyclic mastalgia in a United States clinic-based sample. *Am J Obstet Gynecol* 1997;177(1):126–32.

7. Brown N, White J, Brasher A, Scurr J. The experience of breast pain (mastalgia) in female runners of the 2012 London Marathon and its effect on exercise behaviour. *Br J Sports Med* 2014; 48(4):320–5.
8. Joshi JV, Pandey SN, Galvankar P, Gogate JA. Prevalence of premenstrual symptoms: preliminary analysis and brief review of management strategies. *J Midlife Health* 2010;1(1):30–4.
9. Uma K. Profile of benign breast diseases in urban India. <https://tspace.library.utoronto.ca/browse?type=author&value=Krishnaswamy%2C+Uma>. 2003. Available at: <http://www.mendeley.com/importer/ios/>. (last accessed on May 21, 2014).
10. Peters F, Pickardt CR, Breckwoldt M. Thyroid hormones in benign breast disease. Normalization of exaggerated prolactin responsiveness to thyrotropin-releasing hormone. *Cancer* 1985;56(5):1082–5.
11. Bhargav PR, Mishra A, Agarwal G, Agarwal A, Verma AK, Mishra SK. Prevalence of hypothyroidism in benign breast disorders and effect of thyroxine replacement on the clinical outcome. *World J Surg* 2009;33(10):2087–93.
12. Rosolowich V, Saettler E, Szuck B, Lea RH, Levesque P, Weisberg F, et al. Mastalgia. *J Obstet Gynaecol Can* 2006; 28(1):49–71; quiz 58–60, 72–4.
13. Colegrave S, Holcombe C, Salmon P. Psychological characteristics of women presenting with breast pain. *J Psychosom Res* 2001;50(6):303–7.
14. Morrow M. The evaluation of common breast problems. *Am Fam Physician* 2000;61(8):2371–8, 2385.
15. Kaiser R, Marcus M, Blanck HM, Naughton M, Zhang RH, Henderson AK, et al. Polybrominated biphenyl exposure and benign breast disease in a cohort of US women. *Ann Epidemiol* 2003;13(1):16–23.
16. Allen SS, Froberg DG. The effect of decreased caffeine consumption on benign proliferative breast disease: a randomized clinical trial. *Surgery* 1987;101(6):720–30.
17. Klimberg VS. Etiology and management of breast pain. In: *The Breast. Comprehensive Management of Benign and Malignant Diseases*, 2nd edn. Philadelphia, PA:WB Saunders, 1998. p. 255.
18. Yilmaz ED, Deveci E, Kadioğlu H, Gençer AG, Ünal O, Koçer E, et al. Anxiety and depression levels and personality traits of mastalgia patients. *J Psychiatry* 2014;17(4):118.
19. Poe RO, Lowell FM, Fox HM. Depression; study of 100 cases in a general hospital. *JAMA* 1966;195(5):345–50.
20. Ramirez AJ, Jarett SR, Hamed H, Smith P, Fentiman IS. Psychological distress associated with severe mastalgia. In: *Recent Developments in the Study of Benign Breast Disease: The Proceedings of the 5th International Symposium on Benign*, Mansel RE (Ed.). Boca Raton, FL: CRC Press, 1993. p. 280.
21. Miller JJ, Fletcher K, Kabat-Zinn J. Three-year follow-up and clinical implications of a mindfulness meditation-based stress reduction intervention in the treatment of anxiety disorders. *Gen Hosp Psychiatry* 1995;17(3):192–200.
22. Chrousos GP. Stress and disorders of the stress system. *Nat Rev Endocrinol* 2009;5:374–81.
23. Rosolowich V. *SOGC Clinical Practice Guidelines, Mastalgia*. Ottawa, Canada: SOGC, 2006.
24. Saeed N, Shaikh BA, Balouch Q. Is oil of evening primrose effective for mastalgia, a comparison with danazol. *ISRA Med J* 2012;4(4):235–8.
25. Jain BK, Bansal A, Choudhary D, Garg PK, Mohanty D. Centchroman vs tamoxifen for regression of mastalgia: a randomized controlled trial. *Int J Surg* 2015;15:11–6.
26. Tejwani PL, Srivastava A, Nerkar H, Dhar A, Hari S, Thulkar S, et al. Centchroman regresses mastalgia: a randomized comparison with danazol. *Indian J Surg* 2010;73(3):199–205.
27. Goyal A. Breast pain. *BMJ Clin Evid* 2011;2011:pii. 812.
28. Fentiman IS, Caleffi M, Brame K, Chaudary MA, Hayward JL. Double-blind controlled trial of tamoxifen therapy for mastalgia. *Lancet* 1986;327(8476):287–8.
29. Kumar S, Rai R, Agarwal GG, Dwivedi V, Kumar S, Das V. A randomized, double-blind, placebo-controlled trial of ormeloxifene in breast pain and nodularity. *Natl Med J India* 2013;26: 69–74.
30. BeLieu RM. Mastodynia. *Obstet Gynecol Clin North Am* 1994; 21(3):461–77.
31. Dhar A, Srivastava A. Role of centchroman in regression of mastalgia and fibroadenoma. *World J Surg* 2007;31:1178–84.
32. Wren AA, Wright MA, Carson JW, Keefe FJ. Yoga for persistent pain: new findings and directions for an ancient practice. *Pain* 2011;152(3):477–80.
33. Nidhi R, Padmalatha V, Nagarathna R, Amritanshu R. Effect of holistic yoga program on anxiety symptoms in adolescent girls with polycystic ovarian syndrome: a randomized control trial. *Int J Yoga* 2012;5(2):112–7.
34. Kinser PA, Bourguignon C, Whaley D, Hauenstein E, Taylor AG. Feasibility, acceptability, and effects of gentle Hatha yoga for women with major depression: findings from a randomized controlled mixed-methods study. *Arch Psychiatr Nurs* 2013; 27(3):137–47.
35. Posadzki P, Ernst E, Terry R, Lee MS. Is yoga effective for pain? A systematic review of randomized clinical trials. *Complement Ther Med* 2011;19(5):281–7.
36. Nambi GS, Inbasekaran D, Khuman R, Devi S, Shanmuganath, Jagannathan K. Changes in pain intensity and health related quality of life with lyengar yoga in nonspecific chronic low back pain: a randomized controlled study. *Int J Yoga* 2014;7(1):48–53.
37. Tekur P, Nagarathna R, Chametcha S, Hankey A, Nagendra HR. A comprehensive yoga programs improves pain, anxiety and depression in chronic low back pain patients more than exercise: an RCT. *Complement Ther Med* 2012;20(3):107–18.
38. Tekur P, Chametcha S, Hongasandra RN, Raghuram N. Effect of yoga on quality of life of CLBP patients: a randomized control study. *Int J Yoga* 2010;3(1):10–7.
39. Rani K, Tiwari SC, Singh U, Agrawal GG, Srivastava N. Six-month trial of Yoga Nidra in menstrual disorder patients: effects on somatoform symptoms. *Ind Psychiatry J* 2011;20(2): 97–102.
40. Kanojia S, Sharma VK, Gandhi A, Kapoor R, Kukreja A, Subramanian SK. Effect of yoga on autonomic functions and psychological status during both phases of menstrual cycle in young healthy females. *J Clin Diagn Res* 2013;7:2133–9.
41. Satyapriya M, Nagendra HR, Nagarathna R, Padmalatha V. Effect of integrated yoga on stress and heart rate variability in pregnant women. *Int J Gynaecol Obstet* 2009;104(3):218–22.
42. Rani R, Kumar A, Sharma P. Effect of Yoga Nidra on stress level among B.Sc Nursing first year students. *Nurs Midwifery Res J* 2013;9:47–55.
43. Rao RM, Nagendra HR, Raghuram N, Vinay C, Chandrashekara S, Gopinath KS, Srinath BS. Influence of yoga on mood states, distress, quality of life and immune outcomes in early stage breast cancer patients undergoing surgery. *Int J Yoga* 2008;1(1):11–20.
44. Kiecolt-Glaser JK, Christian L, Preston H, Houts CR, Malarkey WB, Emery CF, et al. Stress, inflammation, and yoga practice. *Psychosom Med* 2010;72(2):113–21.



45. Rocha KK, Ribeiro AM, Rocha KCF, Sousa MBC, Albuquerque FS, Ribeiro S, et al. Improvement in physiological and psychological parameters after 6 months of yoga practice. *Conscious Cogn* 2012;21(2):843–50.
46. Woodyard C. Exploring the therapeutic effects of yoga and its ability to increase quality of life. *Int J Yoga* 2011;4(2):49–54.
47. Nagarathana R, Nagendra HR. *Yoga for Promotion of Positive Health*. Bangalore: Swami Vivekananda Yoga Prakashana, 2001.
48. Kamei T, Toriumi Y, Kimura H, Ohno S, Kumano H, Kimura K. Decrease in serum cortisol during yoga exercise is correlated with alpha wave activation. *Percept Mot Skills* 2000;90(3 Pt 1): 1027–32.
49. Vadiraja HS, Raghavendra RM, Nagarathna R, Nagendra HR, Rekha M, Vanitha N, et al. Effects of a yoga program on cortisol rhythm and mood states in early breast cancer patients undergoing adjuvant radiotherapy: a randomized controlled trial. *Integr Cancer Ther* 2009;8(1):37–46.
50. Curtis K, Osadchuk A, Katz J. An eight-week yoga intervention is associated with improvements in pain, psychological functioning and mindfulness, and changes in cortisol levels in women with fibromyalgia. *J Pain Res* 2011;4:189–201.
51. Telles S, Nagarathna R, Nagendra HR. Breathing through a particular nostril can alter metabolism and autonomic activities. *Indian J Physiol Pharmacol* 1994;38(2):133–7.
52. Carmichael AR. Can *Vitex agnus castus* be used for the treatment of mastalgia? What is the current evidence? *Evid Based Complement Alternat Med* 2008;5(3):247–50.
53. Bland KI. *The Breast, Expert Consult Online and Print: Comprehensive Management of Benign and Malignant Diseases*, 4th edn. Philadelphia, PA: WB Saunders, 2009. ISBN 9781416052210.
54. Deshpande S, Nagendra HR, Raghuram N. A randomized control trial of the effect of yoga on verbal aggressiveness in normal healthy volunteers. *Int J Yoga* 2008;1(2):76–82.
55. Sharma VK, Das S, Mondal S, Goswami U, Gandhi A. Effect of Sahaj Yoga on depressive disorders. *Indian J Physiol Pharmacol* 2005;49(4):462–8.
56. Telles NH, Nagarathna R, Nagendra HR. Improvement in visual perception following yoga training. *J Indian Psychol* 1995;4:13–9.
57. Devi SK, Chansauria JP, Udupa KN. Mental depression and kundalini yoga. *Anc Sci Life* 1986;6(2):112–8.
58. Leonard BE. HPA and immune axes in stress: involvement of the serotonergic system. *Neuroimmunomodulation* 2006;13(5–6): 268–76.
59. Parshad O. Role of yoga in stress management. *West Indian Med J* 2004;53(3):191–4.
60. Kinser PA, Bourguignon C, Taylor AG, Steeves R. “A feeling of connectedness”: perspectives on a gentle yoga intervention for women with major depression. *Issues Ment Health Nurs* 2013;34(6):402–11.
61. Nagarathna DR. *Yoga as Medicine*. Bangalore: Swami Vivekananda Yoga Prakashana, 2004.
62. Karkow FJ, Spiandorello WP, Godoy RF, Pezzi P, Karkow AG, Faintuch J. Subjective versus objective stress in noncritically ill hospitalized and outpatient adult men. *Rev Hosp Clin Fac Med Sao Paulo* 2004;59(4):161–7.
63. Zajac RN, Whitlatch RB. Responses of estuarine infauna to disturbance. I. Spatial and temporal variation of initial recolonization. *Mar Ecol Prog Ser* 1982;10:1–14.
64. Swami Prabhavanada. *Patanjali Yoga Sutras*, Xi-3M 7C-0. Chennai: The President, Sri Ramakrishna Math, Mylapore, 2002.
65. Reuter S, Gupta SC, Chaturvedi MM, Aggarwal BB. Oxidative stress, inflammation and cancer, how are they linked? *Free Radic Biol Med* 2010;49:1603–16.
66. Vivekananda S, *Raja Yoga*, 1st edn. Kolkata: Advaitashrama, 1999.
67. Taimini IK. *The Science of Yoga*. Chennai: Quest Books, 1999.
68. Deshpande S. Influence of yoga on quality of life: a randomized control study. Department of Yoga and Life Sciences, 2008.
69. Abbas R, Satyapriya M, Raghuram N, Nagendra HR, Venkatram P. Effects of integrated yoga on quality of life and interpersonal relationship of pregnant women. *Qual Life Res* 2010;19(10): 1447–55.
70. Thicke LA, Hazelton JK, Bauer BA, Chan CW, Huntoon EA, Novotny PJ, et al. Acupuncture for Treatment of Noncyclic Breast Pain: A Pilot Study. *Am J Chin Med* 2011;39(6):1117–29.
71. Barboza Gama CR, Lasmar R, Gama GF, et al. Clinical Assessment of Treatment Outcomes Following *Borago officinalis* Extract Therapy in Patients Presenting with Cyclical Mastalgia. *Int J Clin Med* 2015;6:363–37.

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