

Allopathic and Ayurvedic  
Approaches to Hypothalamic  
Amenorrhea

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There are two kinds of Hypothalamic Amenorrhea, primary and secondary. Primary refers to females that have not yet had their periods by the age of sixteen. Secondary, is when a woman who previously had normal periods, temporarily or permanently stops menstruating. While many women skip an occasional period, amenorrhea is diagnosed if a woman has missed three or more in a row. This secondary amenorrhea, also known as "Functional" amenorrhea is what will be addressed in this paper. Hence, "Hypothalamic amenorrhea" can technically be defined as the cessation of menstruation due to a dysfunction of hypothalamic signals to the pituitary gland resulting in a failure of ovulation or stimulation of ovulation. Typically, young women who are affected by the condition have no obvious structural abnormalities of the hypothalamus or the rest of the brain, pituitary gland, or ovaries. This common type of functional amenorrhea is a diagnosis of exclusion. Hyperprolactinemia, primary deficiency of gonadotropin-releasing hormone, and other hormonal and electrolyte abnormalities must be ruled out. Affected women are reportedly more likely to be underweight, athletic, engaged in "intellectual" professions, or exposed to social stress than women without the disorder.<sup>1</sup>

In addition, hypothalamic amenorrhea may be preceded by a history of irregular menses and may last several months to years. When it occurs in association with weight loss or intense exercise, hypothalamic amenorrhea is considered to result from energy deficiency. Deficits in nutrients, hormonal perturbations, or both may signal to the brain, leading to the disruption of the pulsatile secretion of gonadotropin-releasing hormone and luteinizing hormone as well as disruption of the menstrual cycle. On the other hand, hypothalamic amenorrhea has also been described in nonathletic women of normal weight -- a variant that may be associated with psychogenic factors such as stressful life events or adverse childhood experiences.<sup>2</sup> An association between menstrual aberrations and stressful situations has long been recognized. For example, women frequently start their menstrual periods on their wedding days or when their husbands return home from military service. Women hospitalized for depression are commonly reported to have amenorrhea. Fifty percent of women in concentration camps developed amenorrhea which persisted throughout their detention. In addition, it has been repeatedly demonstrated that a considerable number of women develop menstrual aberrations, and as high as 20% develop amenorrhea when undergoing the stress of separation.<sup>3</sup> There are examples of it happening at the time of breaking

up with a significant other/life partner, desertion by a parent, and leaving home. Moreover, psychogenic amenorrhea, like exercise-related amenorrhea, has been associated with subtle deficits in calorie and macronutrient intake, as well as with neuroendocrine abnormalities. Thus, a central signal related to energy deficit may be the common factor underlying the two forms of hypothalamic amenorrhea.<sup>4</sup>

## **ETIOLOGY**

Hormonal evaluation in women with functional amenorrhea often reveals a reduction in the mean and pulsatile gonadotropin secretion and a diminished estradiol concentration during the early follicular phase of the menstrual cycle. Other hormonal abnormalities may include a slight increase in the cortisol level and a suppression of thyrotropin and thyroid hormone. Osteopenia may be present, though it is not clear whether it results from hormonal or nutritional deficiency.<sup>5</sup>

It is important to note that although chronic anovulation in anorexia nervosa may resemble an extreme form of functional amenorrhea, there are distinct differences. Functional amenorrhea is not associated with starvation, wasting, distorted attitudes toward food, or altered body image, as is the case with anorexia nervosa. Moreover, anorexia nervosa is also associated with hormonal and metabolic features suggesting more severe hypothalamic dysfunction -- for example, abnormal responses to heat and cold, bradycardia, suppression of triiodothyronine, increased levels of reverse triiodothyronine that are consistent with starvation, and mild diabetes insipidus. The basal cortisol level is typically elevated, although the diurnal secretory rhythm is preserved. Osteopenia is very common in anorexia nervosa.<sup>6</sup>

However, adequate nutrition has long been considered to be a critical determinant of normal reproductive function, given epidemiologic studies showing a close association between greater body weight or body fat and a younger age at menarche as well as increased fertility. These findings are supported by experiments showing close correlations of nutrition with estrous cycles, puberty, and fruitfulness in animals. Frisch proposed that a critical amount of body fat was essential for achieving and maintaining normal reproductive function; however, the nature of the signal or signals linking fat to the hypothalamic-pituitary-gonadal axis remained elusive.<sup>7</sup>

Finally, in key studies, restrictive eating patterns and subclinical eating and exercise disorders, such as very low fat intake, high fiber intake and more calories expended in aerobic activity daily, were found in normal weight, non-athletic women with amenorrhea, even though overall caloric intake was not significantly altered. Thus, even in the absence of blatant dietary restrictions or excessive exercise, nutritional deficiencies still played a role in their development of amenorrhea. From this evidence, which identifies nutritional deficiency as a common underlying cause of estrogen loss leading to amenorrhea in young women, it seems that targeting nutrition may be a more effective route to recovery than trying to replace estrogen without addressing the cause for loss.<sup>8</sup>

Other evidence supporting nutrition as a common denominator for Hypothalamic Amenorrhea has been substantiated by the role of the hormone leptin, which is normally secreted by adipose tissues. Studies have shown that levels of leptin fall rapidly with severe nutritional restriction, regardless of body weight, fat, or body mass index. Low levels of leptin are a signal to the brain to shut down other "unnecessary" hormonal pathways, such as ovulation and reproduction, and to slow down cellular metabolism to protect the body's fat stores. Furthermore, it has been shown that menstruation cannot occur beneath a certain level of leptin in the body. Thus, because lower leptin levels have been found in both normal and underweight women with Hypothalamic Amenorrhea, it can be concluded that nutritional deficiencies, regardless of overall caloric intake or body fat percentage, play a major role in the development of amenorrhea.<sup>9</sup>

After the discovery of leptin, studies suggested that this adipocyte hormone was the long-sought factor linking energy stores to reproduction.<sup>10</sup> The leptin concentration increases with obesity and decreases rapidly during fasting, making it an ideal sensor of energy deficiency. Leptin receptors are present on hypothalamic neurons that control energy balance and reproductive function. Leptin regulates the synthesis and secretion of gonadotropin-releasing hormone, gonadotropins, and sex steroids. As predicted, congenital leptin deficiency results in voracious feeding and morbid obesity -- effects that are consistent with a failure of negative-feedback regulation. Moreover, leptin deficiency results in hypothalamic hypogonadism and central hypothyroidism.<sup>11</sup>

## Diagnosis

Patients with secondary amenorrhea usually can be differentiated from those with other causes of this problem by careful history. However, it is sometimes difficult to uncover the eating problems except by specific questions concerning diet (such as consumption of low calorie food, diet sodas, low calorie salad dressing, etc.) in a woman who is of normal or slightly under weight. There is compelling evidence that the hypothalamic amenorrhea associated with exercise is due to chronic inadequate or restrictive caloric intake in the face of a large exercise load. However, disorders of androgen excess, pituitary tumors, in particular prolactin secreting, and rare tumors of the third ventricle, or other conditions profound enough to cause chronic malnutrition and weight loss should be ruled out.<sup>12</sup>

Laboratory evaluation should include FSH, prolactin (PRL), and TSH. Most of the other pituitary hormones should be in the normal range. The basic defect in women with functional hypothalamic amenorrhea is the failure of the hypothalamus to increase GnRH output in the presence of severe hypoestrogenism. Most investigators believe that there is a slowing of the GnRH pulse generator as reflected by a decrease in peripheral pulsatile LH secretion in these women. The pattern of LH secretion may vary. During the early onset, LH pulse frequency and amplitude may be normal. In more severe cases, regression to a pubertal pattern with sleep- associated increases may be observed.<sup>13</sup>

The pituitary gland is fully capable of synthesizing and release of LH and FSH. However, responses to exogenous GnRH in these individuals may vary depending on the endogenous GnRH priming of the pituitary gland. LH and FSH responses to exogenous GNRH may be absent, normal, or supranormal . In these patients, after a period of priming with intravenous pulsatile GnRH (1-2 mg/90 minutes), normal levels of LH and FSH can be restored and responses to exogenous GnRH become normal. Taken together, these observations suggest that endogenous GnRH secretion is deficient and gonadotropin secretion and ovarian function can be normalized with physiologic replacement of exogenous, pulsatile GnRH.<sup>14</sup>

## Treatment

Once a woman has developed hypothalamic amenorrhea, treatment must be pursued as soon as possible. The overall goal of treatment is to restore menses as soon as possible to minimize the loss of bone mass. Although, bone loss is one of the most pressing issues, perhaps a woman is seeking to get pregnant, and cannot without fertility treatment if menses and/or ovulation do not return. In addition, she may suffer from other hormonal issues such as low libido or hot flashes. According to Locke and Warren, this is most effectively accomplished by treating the cause for hormonal suppression (nutrition) instead of merely replacing the lost estrogen. Treatment options also include behavioral and psychiatric counseling to address individual reasons for excessive stress, exercise and eating disorders. As a last resort, oral contraceptives can be used to minimize the loss of bone density caused by a prolonged lack of estrogen, but unless the causes for hormonal loss are addressed, estrogen replacement has not been shown to be very effective.<sup>15</sup>

By identifying nutritional deficiency as a common, underlying cause for all three types of Hypothalamic Amenorrhea, it is possible to develop preventive measures to minimize bone density loss due to amenorrhea, such as screening for restrictive eating patterns regardless of weight. Patient education efforts must also be increased to ensure that young women realize that the detrimental effects of amenorrhea, such as osteoporosis, extend past the point of the recovery of menses. Peak bone mass can and must be reached through nutrition and exercise into a woman's late 20's and possibly early 30's. After age 40, regardless of what level of density was reached, bone mass begins to decline. Thus, by reaching peak bone mass in the first place a young woman can minimize the amount of bone density decline due to the aging process.<sup>16</sup>

Women need to be made aware of the role that nutrition plays in the loss of estrogen, the development of amenorrhea, and the subsequent increased risk of osteopenia and osteoporosis. By understanding what initiates the cycle that leads to osteoporosis, it is possible that women at risk can minimize or even avoid substantial bone loss.

## **Ayurvedic Interpretation of Amenorrhea: *Nashta Rakta***

The *Caraka Samhita* states:

*“O Lord! That women are the original source of progeny is contradicted by the disorders pertaining to their genital tract. Hence, sir, we want to learn their origin and symptoms of the arisen ones along with treatment for the welfare of the people. Thus queried by the disciple, the son of Atri, best among sages said as follows: Twenty types of genital disorders of women are mentioned in enumeration of diseases. They arise in women due to their faulty practiced, deranged menstrual flow, defect in ovum and fate.”*<sup>17</sup>

Thus, the *Caraka Samhita*, puts great importance on the well being of women's cycles yet, it does not mention *Nashta Rakta* as part of the twenty types of genital disorders. This would lead one to believe that the disorder is one associated with modern day. Even the *Madhava Nidana* states, *“There are twenty forms of these diseases, which are produced by using bad food, or taking improper exercise. They are also caused by diseased menses, or semen. In other cases they are produced without any apparent cause.”*<sup>18</sup> According to more contemporary literature, *Nashta-Rakta* is primarily caused by *vata* vitiation affecting both the *rasa* and *shukra dhatus* Ayurveda sees amenorrhea as a constriction of the *apana vayu* and the *prana vayu*, if there is hormone imbalance. The constriction of *apana* will stop the flow of *pitta* in the *artavavaha* srota. Specifically, imbalanced or high *apana vata* is responsible for amenorrhea. Located in the pelvic region, it controls the flow of menstruation. The decrease in menstrual secretions explains vitiation of the *rasa* while lack of ovulation revealing vitiation in the *shukra dhatu*.<sup>19,20</sup>

### ***Nidana:***

Amenorrhea is caused mostly by a *vata* provoking lifestyle and thus *vata* vitiating regimens of cold, dry and light foods along with a fast paced overwhelming lifestyle. Highly *rajasic* mental states such as excessive, fear, worry, and overwhelm contribute greatly to the disorder.<sup>21</sup> The most common causes of Amenorrhea are:

## **Diet**

Eating excessively cold, light, dry, or airy foods increase *vata dosha* in the body. Eating gas forming vegetables and fruits like cabbage, broccoli, cauliflower, beans, lettuce, mushrooms, parsley, peas, yeast-based products, white flour and white sugar products in excess, also increase the *vata dosha*. Excessive use of fried foods, heavy creams and puddings increases *kapha dosha*. Gradual aggravation of *vata* and *kapha dosha* leads to blockage of *artavavaha srota* and causes Amenorrhea.<sup>22</sup>

## **Lifestyle**

Excess physical exercises, improper ways of intercourse, use of artificial objects for reaching orgasm, sedentary lifestyle, no exercises, excessive cold or warm temperature also leads to an imbalance of dosha. Gradual aggravation of *vata* and *kapha dosha* leads to blockage of *artavavaha srota* and leads to Amenorrhea.<sup>23</sup>

## **Stress**

Negative mental feelings like stress, tension, anger, or sorrow affect menstruation. As previously mentioned, women often do not have periods while changing jobs or schools, travelling, or when under emotional duress. Stress aggravates *prana vata* the subdosha of *vata dosha* that controls our nervous system. Aggravated *prana vata* causes imbalance of the next subdosha that is *apana vata*. Thus, stress and tension create an imbalance of *apana vata*, which leads to Amenorrhea.<sup>24</sup>

## **Weight Loss**

Rapid weight loss often caused by an eating disorder: Eating disorders cause nutritional deficiency and deterioration of *dhatu*s. According to Ayurveda, *kshya* or deterioration increases *vata dosha*. This aggravated *vata dosha* leads to Amenorrhea.<sup>25</sup>

## **Excessive exercise:**

Exercising beyond one's capacity can deteriorate the *dhatu*s. *Kshya* increases *vata dosha* and leads to

Amenorrhea.<sup>26</sup>

### **Contraceptives:**

Some women on the oral contraceptive pill ("The Pill" and "The Mini-Pill"), and many women on Depo Provera injections experience no periods. Regular and prolonged use of these contraceptives can cause aggravation of *vata*, which leads to Amenorrhea.<sup>27</sup>

### **Cold:**

An increase of cold temperatures in the body at the commencement of menstruation or during menstruation also causes aggravation of *vata dosha*, which leads to Amenorrhea. Thus it is very important to keep the body warm at commencement of menstruation or during menstruation to alleviate problems in future cycles.<sup>28</sup>

### **Lethargy:**

Excessive lethargy and sedentary lifestyle aggravates the *kapha dosha*, which blocks menstrual channels, leading to Amenorrhea.<sup>29</sup>

### **Rupa:**

In addition to lack of menstruation with it are usually signs of other *vata* imbalance like dryness, constipation, dry skin, hair, weight loss, worry, and anxiety.

### **Chikitsa:**

The most important component of management of amenorrhea or anovulation is nourishment, as it is a condition of great depletion. The *Caraka Samhita* states, "*In vatika disorders, vata alleviating measures such as unction, fomentation, enema etc. should be prescribed.*"<sup>30</sup> *Rasayana* therapy is indicated to increase the *rasa, medas and shukra dhatus*. Healthy *agni* is essential to proper digestion. Impaired digestion causes accumulation of *ama* or toxins in the body. When digestion is impaired, instead of the

healthy nutrient plasma, *ama* or toxins are produced. This *ama* accumulates in weaker channels of the body. When this *ama* accumulates in *rasavaha srota* or *artavavaha srota* (*part of rasavaha*) and blocks them, stopping the flow of menstruation, it can lead to Amenorrhea.<sup>31</sup>

### **Diet:**

A *vata* pacifying diet of warm nourishing foods that are easy to digest such as: milk, ghee, nuts, grains, and cooked vegetables are all good. Spices like black pepper, cinnamon, coriander, cardamom, fennel, ginger, cumin, black pepper, fenugreek, clove, celery seed, salt, soya seed and mustard seed can be used for garnishing the foods. Herbal teas are recommended but yogurt should be avoided as it causes blockage of the menstrual channels. Eating excessively cold, light, dry, or airy foods that increase *vata dosha* in the body should be avoided. One must also resist from eating gas forming vegetables and fruits like cabbage, broccoli, cauliflower, beans, lettuce, mushrooms, parsley, peas, yeast-based products, white flour and white sugar products in excess, as they increase the *vata dosha*. Vegetables such as sweet potatoes and root vegetables are good.<sup>32,33</sup>

### **Herbs:**

Emmenagogues balanced with reproductive tonics, should be given as a medicated ghee or milk decoction. Dong qui, is both an emmenagogue and tonic and is often used as a chief herb. Other beneficial herbs include, Shatavari, Chaste Tree, Pennyroyal, and Ashwagandha to name a few.<sup>34,35</sup>

### **Lifestyle:**

Follow a lifestyle that will pacify *vata*. Rest and a reduction in activities, especially strenuous exercise is in order. An active lifestyle is recommended, yet the exercises should be according to one's capacity. Negative feelings like stress and tension should be avoided. Yoga, Pranayama, and Meditation will help to calm the mind and body. Excessive intercourse should be avoided as well as the use of contraceptives. Both, excessive fasting and overeating are harmful. Smoking, drinking alcohol and using narcotics aggravates menstrual disorders.<sup>36</sup>

Interestingly enough, the importance of lifestyle and the five sense therapies cannot be overemphasized in the treatment of *Nashta Rakta*. As alluded to earlier, one is led to believe that such “stress induced Hypothalamic Amenorrhea”, is a phenomenon associated with modern day. As we look at women becoming more liberated, it has taken a great toll on the body. In Ayurveda, we treat the body, mind, and spirit. Although diet and herbs can address the physical, when the problem lies in the mind, we are bound to fall short. The *Caraka Samhita* states:

*“In the heart attached are ten vessels, rooted there and of great significance. The words ‘mahat’, ‘artha’ and ‘hrdaya’ are synonymous. The body with six divisions, intellect, sense organs, five sense objects, self together with qualities, **mind along with its objects are located in heart.**”*

*“From the heart as root, ten great vessels carrying **ojas** pulsate all over the body.”*

*“One who wants to protect the heart, the great vessels and the ojas, **should avoid particularly, the causes of the affliction of the mind.** Over and above, he should regularly take the measures which are conducive to heart and ojas and cleansing of srotas and also make efforts for serenity of mind and knowledge.”<sup>37</sup>*

The *Caraka Samhita* expands on this by saying that the best way to take these measures that are conducive to the heart and ojas is not necessarily about food and herbs, but rather; *“Non-violence is the best among the life promoting factors, prowess is the best among the strength promoting ones, learning is the best among the bulk promoting ones, control of sense organs is the best among the happiness promoting ones, knowledge of reality is the best among the pleasure promoting ones and celibacy is the best among the paths—Thus hold the Ayurvedists.”<sup>38</sup>*

In addition The *Caraka Samhita* states:

*“As regards vata, pitta and kapha, they move all over the body with all the srotas serving the purpose of their passage. **Similarly, for mind etc. which are transcending sense organs the entire sentient body serves as passage as well as location.** As long as these srotas are normal, the body is not inflicted with any disorder:”*

*“For **Pranavaha srotas**, the origin is **hrdaya** as well as **maha srotas**’*

*“**Rasavaha srotas** have their root in **hrdaya** and the ten **dhamanis** (vessels).”<sup>39</sup>*

In looking at the above, *ojas*, *pranavaha srota*, and *rasavaha srota* originate in the heart. *Manovaha srota* covers the entire body. It is clear that what afflicts the mind, afflicts the heart. According to Patanjali's Yoga Sutras and the Hatha Yoga Pradipika, the most important way to affect the Mind is through the breath, pranayama. In sutra II.52 in reference to Pranayama, Patanjali states, *“As its result, the veil over the inner light is destroyed.”* The Hatha Yoga Pradipika states in II.2, *“When breathing is disturbed the mind is disturbed. When breath is controlled, the mind is under control. Thus, one should gain control of the breath.”*<sup>40,41</sup> Pranayama practice has been shown to turn on the “Relaxation Response” or parasympathetic nervous activity, which is regulated by the hypothalamus. Roger Jahnke states, *“In the practice of Qigong and Yoga, as has been discussed, the hypothalamus regulates the autonomic nervous system function toward a lessening of the sympathetic activity, which is associated with the stress response. A number of studies have demonstrated that the hypothalamus has an influence over immune function. Meditation, progressive relaxation, deep breathing and slow relaxed movement all tend to move the practitioner out of the sympathetic state and induce the relaxation response. More importantly, Jahnke states, “it is a strong possibility that the intention to circulate the Qi or Prana to the “crown” has the potential to effect the levels of neurotransmitter and endocrine activity, not only in this section of the brain, but throughout the entire body.... when Yoga/Pranayama practitioners bring Prana up along the spinal in the Kundalini channel, the focus of the method is to achieve peace, or in more scientific terms, reduce sympathetic activity and slow brain wave frequency toward the theta range. The anatomical structure which is the target is the anatomical hypothalamus, which is the sympathetic control center.”<sup>42</sup>*

Clearly, the mind affects the ojas in the heart and this ojas is spread through *pranavaha srota*, and *rasavaha srota*. We also know that ojas is closely related to hormones or sexual fluid. For example, it is recommended to keep ejaculation to a minimum to preserve ojas. Thus the channels of the mind are

channels of the body.<sup>43</sup> Amenorrhea is symbolic of great depletion in *Rasa*. In any event, not only is an effective pranayama practice of utmost importance but the use of aromatherapy also has great affect on the *Prana Vayu*. As breathing is controlled so are corresponding neurological and mental functions. Smells have direct path through the nostrils to the mind. In fact, Clary Sage is believed to act on the pituitary hormones and menstrual conditions. It has antispasmodic and emmenagogue properties and promotes estrogen secretion. It can help scanty or missing periods. Oils that calm, uplift, and rejuvenate such as Clary Sage, Lavender, Geranium, Rose help relieve *Vata*.<sup>44,45</sup> Bija mantras such as *Lam and Vam*, will help to increase energy flow to the first two chakras, thus increasing the earth and water elements in the body. Bliss therapies of *Shirodhara* for calming *Vata* as well as *abhyanga, svedana, and nasya* would be of utmost importance in treatment.

## Conclusion

In sum, Ayurveda offers treatment for Amenorrhea that is beyond what allopathic medicine allows. It is clear from allopathy that nutritional deficiency is the greatest cause of Amenorrhea. That nutritional deficiency comes from great stress not only to the body physically but mentally. With great stress the reproductive system gets turned “off.” There are increased levels of cortisol and adrenaline turning on the “Fight or Flight” response. There is no longer a balance of cortisol/adrenaline in opposition to estrogen/progesterone or the sympathetic versus the parasympathetic nervous system. In one study, seven women were given sessions of cognitive behavior therapy and dietary counseling and seven were not. All were observed for 20 weeks. Of the treated women, six fully recovered normal menstrual cycles and one partially recovered. Of those not treated, only one fully recovered.<sup>46</sup> Ayurveda, can not only offer the nutritional counseling for treatment of Amenorrhea but it can offer much greater options for dealing with the root of the problem which lies in the mind. Pranayama, aromatherapy, yoga, meditation, shirodhara, and more can help women to calm the mind, thus leading to strength of ojas and balance of hormones.

*“Hence, sir, we want to learn their origin and symptoms of the arisen ones along with treatment for the welfare of the people.”<sup>47</sup>*

<sup>1</sup> Rexford S. Ahima, "Medical Biology: Body Fat and Hypothalamic Amenorrhea." New England Journal of Medicine. 351:959. 2004.

<sup>2</sup> Ibid.

<sup>3</sup> Howard J. Osofsky and Seymour Fisher, "Psychological Correlates of the Development of Amenorrhea in a Stress Situation." Psychosomatic Medicine. Vol XXIX. No. 1. 1967. P. 15.

<sup>4</sup> Ahima

<sup>5</sup> Ibid.

<sup>6</sup> Ibid.

<sup>7</sup> Frisch RE. "The Right Weight: Body Fat, Menarch, and Ovulation." Baillieres Clinical Obstetrics and Gynecology, 1990; 4: 419-439.

<sup>8</sup> GA Laughlin, CE Dominguez, and SSC Yen, "Nutritional and Endocrine Metabolic Aberrations in Women with Functional Hypothalamic Amenorrhea." The Journal of Clinical Endocrinology & Metabolism. Vol 83. No. 1. P. 25-32.

<sup>9</sup> Ibid.

<sup>10</sup> Corinne K. Wett, Jean Chan. "Recombinant Human Leptin in Women with Hypothalamic Amenorrhea." The New England Journal of Medicine. November 25, 2004. 351:2343.

<sup>11</sup> Ibid.

<sup>12</sup> Ibid.

<sup>13</sup> James H. Lui. "Central Causes of Amenorrhea." Female Reproductive Endocrinology. Endotext.com. May 30. 2003. P. 3.

<sup>14</sup> Ibid.

<sup>15</sup> Rebecca Locke and Michelle Warren. "How to Prevent Bone Loss in Women with Hypothalamic Amenorrhea." Women's Health Orthopedic Edition. 2000; 3: p. 82-88.

<sup>16</sup>Michelle P. Warren, "Health Issues for Women Athletes; Exercise Induced Amenorrhea." Clinical Endocrinology & Metabolism. Vol 84. No. 6. 1999.

<sup>17</sup>P.V. Sharma, Caraka Samhita.Chikitsasthanam: p.505

<sup>18</sup>KRL Gupta, Madhava Nidana, P. 235.

<sup>19</sup>Mark Halpern, Textbook of Clinical Ayurvedic Medicine, September, 2004. \_Ch 5.p. 38.

<sup>20</sup>Atreya, Ayurvedic Healing for Women, p. 112-114.

<sup>21</sup>Halpern. P. 38

<sup>22</sup>[www.jiva.com](http://www.jiva.com); Amenorrhea; Nastartavah

<sup>23</sup>Ibid.

<sup>24</sup>Ibid.

<sup>25</sup>Ibid.

<sup>26</sup>Ibid.

<sup>27</sup>Ibid.

<sup>28</sup>Ibid.

<sup>29</sup>Ibid.

<sup>30</sup>P.V. Sharma, P. 507.

<sup>31</sup>Halpern, P. 39.

<sup>32</sup>Ibid. , p. 40

<sup>33</sup>[www.jiva.com](http://www.jiva.com); Amenorrhea; Nastartavah

<sup>34</sup>Halpern, P. 40

<sup>35</sup> Atreya, p. 115

<sup>36</sup> [www.jiva.com](http://www.jiva.com); Amenorrhea; Nastartavah

<sup>37</sup> P.V. Sharma, The Caraka Samhita: Ch.XXX Sutrasthana, P. 237-8

<sup>38</sup> Ibid.

<sup>39</sup> P.V. Sharma, The Caraka Samhita; Vimanashtanam: Ch. 5. P. 329-30

<sup>40</sup> Sri. Swami Satchidananda, The Yoga Sutras of Patanjali, P. 163

<sup>41</sup> Yogi Hari, Hatha Yoga Pradipika, p. 97.

<sup>42</sup> Roger Jahnke, O.M.D. "Nervous System". 1996.

<sup>43</sup> [www.drclaudiawelch.com](http://www.drclaudiawelch.com)

<sup>44</sup> Light Miller and Bryan Miller, Ayurveda & Aromatherapy. P.96, 162

<sup>45</sup> [www.essentialoils.com/newsletters/2001/Feb2001](http://www.essentialoils.com/newsletters/2001/Feb2001).

<sup>46</sup> Endo: Stress Linked to Functional Hypothalamic Amenorrhea. Doctor's Guide. June 21.2001.

[www.docguide.com](http://www.docguide.com).

<sup>47</sup> P.V. Sharma, Caraka Samhita.Chikitssthanam: p.505