**Introduction - What Is Premenstrual Syndrome - PMS?**

Premenstrual syndrome has plagued women since the dawn of time, but has only recently been recognized as a serious disorder. While it is often dismissed by practitioners, it is a cause of enormous and needless suffering by as many as 50% of menstruating women.

Many women experience PMS every month, although the intensity of symptoms can vary from month to month depending on diet, stress levels, or other factors.

Premenstrual syndrome consists of a group of physical, mental and emotional symptoms that occur regularly seven to ten days before the onset on menstruation. The syndrome may first occur when menstruation begins, although many women do not have problems until their 20's or 30's. As a woman matures, in some cases, the symptoms associated with PMS improve, while in other cases, symptoms worsen. We will explore why these variations can occur.

**Diagnosing PMS is fairly easy, based on the timing of the symptoms relative to the menstrual cycle:**

* PMS begins one to ten days before menstruation.
* PMS improves when menstruation begins, or soon after.
* Some women experience symptoms of PMS at ovulation.

There must be a symptomatic phase, followed by a symptom-free phase, lasting at least one week each month, in order to diagnose premenstrual syndrome.

Much of our scientific knowledge regarding PMS and its associated treatment is based on the pioneering work of Dr. Katherine Dalton of Great Britain. Dr. Dalton made headlines in 1979 when her insights into cyclical behavior changes contributed to a successful defense in the murder trial of a barmaid accused of a stabbing death while under the influence of PMS.

This article will review Dr. Dalton's findings and present new knowledge of PMS that has been gained through hair analysis on thousands of PMS sufferers. We will also report on the use of nutritional therapy that has been used to alleviate the symptoms of PMS.

**The Biochemical Causes Of PMS**

The most commonly accepted theory as to the cause of PMS is the one advanced by Dr. Katherine Dalton. Dr. Dalton claims that PMS is triggered by a relative deficiency of the hormone progesterone in relation to estrogen, both of which are female hormones. Dr. Dalton stated in The Menstrual Cycle that:

"Patients with their progesterone levels markedly raised above the estrogen level,...are liable to suffer from spasmodic dysmenorrhea and those whose estrogen levels are markedly raised above the progesterone levels...are liable to suffer from congestive dysmenorrhea or premenstrual syndrome."

However, one must ask why the relative deficiency of progesterone occurs. One purpose of this article is to point out that the imbalance between estrogen and progesterone has a nutritional basis. Hair analysis research indicates that along with an ovarian dysfunction, imbalances in adrenal and liver activity and copper imbalance play an important role in PMS.

Taken together, these imbalances result in a slowing of the metabolic rate, the accumulation of tissue copper or bio-unavailable copper and hypoglycemia. It is these physiological dysfunctions which account for the symptoms of PMS.

Let us now consider each of the above causes separately:

**The Adrenal Glands and PMS**

The adrenal glands produce and secrete mineral and sugar-regulating hormones. Through mineral analysis and other biochemical research we find that:

* Women with diminished adrenal activity are more prone to PMS.
* During the premenstrual period, adrenal activity is reduced, largely due to increased copper and estrogen levels, which have an inhibitory effect on adrenal activity.
* Premenstrual slowing of the adrenal glands in women whose adrenal glands are already weak, results in greater deficiency of both the mineralocorticoid and glucocorticoid hormones.
* These hormonal deficiencies are known to produce symptoms of sugar-craving, salt-craving, hypoglycemia, fatigue and depression. These symptoms are commonly associated with PMS.
* Adrenal gland insufficiency can not only be caused by alterations in copper metabolism, but can be a cause of excessive copper buildup in tissue storage reservoirs, principally the liver and brain. This occurs because copper metabolism is regulated by ceruloplasmin, a specific copper-binding protein that is synthesized in the liver under stimulation by the adrenal glands.

**Copper and PMS**

A specific feature of PMS is that tissue copper levels on a hair analysis test are out of balance. This is indicated on a hair analysis by:

* a copper level greater than 2.50, or less than 1.00, or
* a calcium level greater than 200, or a calcium/potassium ratio greater than 16.00/1, or
* a sodium/potassium ratio less than 2.20/1.

Women with an excessively high copper level, or bio-unavailable copper, are much more prone to PMS. The reason for this is that copper levels in the body generally correlate with estrogen levels. Before the menstrual period, estrogen levels rise and copper levels rise as well.

If a woman already has an elevated copper level, an increase in estrogen activity premenstrually is sufficient to cause many symptoms that are associated with PMS. These include fatigue, mental depression, edema, mood swings, irritability, anxiety, headaches, acne, loss of appetite and joint pain.

Several variants are possible. In some women the copper level simply becomes excessive, causing certain symptoms associated with copper toxicity. In others, copper becomes bio-unavailable. This means there is an actual deficiency of copper, due to a deficiency of adequate copper binding protein. In other words, copper is present (in storage organs), but it is not available. Such a biochemical mineral pattern tends to produce slightly different symptoms, which must be treated differently.

Copper becomes bio-unavailable when adrenal gland activity is reduced to the point where ceruloplasmin synthesis becomes inadequate. Ceruloplasmin is a copper binding protein. As a result, copper is not properly transported to the tissues and the body effectively becomes deficient in copper.

A copper imbalance can explain the value of zinc and vitamin B-6 therapy in the treatment of PMS. Zinc and vitamin B-6 are copper antagonists.

**The Liver and PMS**

The liver plays several important roles in the causation of premenstrual syndrome. We have already noted that ceruloplasmin synthesis occurs in the liver. In addition, the liver also is responsible for the detoxification of estrogen.

In many women with PMS, liver activity is impaired. For this reason, estrogen is not detoxified adequately. Higher-than-normal levels of estrogen remain in the blood, contributing to many of the symptoms associated with PMS.

Liver activity is, in part, regulated by the adrenal gland and the thyroid gland. It is influenced as well by diet and the presence of toxic substances in the body. Emotions which result in internal stress, can also play a determining role in liver dysfunction.

Thus, when adrenal hormone secretion diminishes before the menstrual period, due to increased estrogen secretion, liver activity also decreases. This results in;

* reduced detoxification of estrogen, enhancing estrogen-copper effects,
* reduced bile flow, which contributes to reduced elimination of copper and to constipation and
* reduced liver enzyme production, which affects digestion and potentially affects protein synthesis and many other functions.

**Toxic Metals and Premenstrual Syndrome**

Toxic metal accumulation is common in women with PMS. Presence of these toxic metals contributes to PMS in several ways:

* Toxic metals such as mercury and cadmium adversely affect thyroid and adrenal gland activity.
* Many toxic metals such as copper, iron and manganese accumulate in the liver, impairing normal liver function.
* Toxic metals replace physiological minerals in enzyme binding sites in many organs and glands. This detrimentally affects pituitary, ovarian, pancreatic and other glandular activity.
* Toxic metals increase the body's need for various nutrients such as vitamin C, calcium, zinc and manganese. The end result is a multiplicity of nutritional deficiencies and imbalances.

For this reason, ridding the body of these toxic metals is often essential for permanent alleviation of the agonies associated with premenstrual syndrome.

**Other Biochemical Causes of PMS**

Deficiency of the omega-3 fatty acids or their metabolites apparently is important in PMS. This is the basis for the use of evening primrose oil, a remedy that helps many women suffering with PMS.

The beneficial effects of evening primrose oil may be due to poor absorption of fatty acids, as a result of a deficiency of digestive enzymes. It may also be due to inadequate omega-3 fatty acids in the diet or to inefficient metabolism of fatty acids. Fatty acid metabolism can be impaired by copper toxicity and/or zinc deficiency.

**Symptoms Of PMS**

A wide variety of symptoms may occur, including headaches (often of the migraine type), infections, breast tenderness, joint pains, constipation, fatigue, weight gain, loss of appetite, allergies, asthma, backache, acne, epilepsy and a tendency to retain water.

Cravings for salt, carbohydrates or sweets, particularly chocolate, are common. Sex drive may be increased or decreased, depending on availability or bio-unavailability of copper. Emotional sensitivity is generally enhanced. Along with a general feeling of tension, many women report depression, weepiness, anxiety, irritability, hypersensitivity and mood swings. Violent crime and alcohol abuse by women also occur more frequently before the menstrual period.

Dr. Guy Abraham, M.D. has classified these symptoms into types of PMS - PMS-A, PMS-C, etc. However, in our experience, exact classification is difficult. Instead, we prefer to understand the symptoms biochemically. This understanding can help explain why some women experience certain symptoms, while others do not.

Let's examine some of these symptoms in more detail.

**Headaches and Loss of Appetite**

Headaches are commonly of the migraine type. Copper toxicity is known to cause this type of headache and is probably the cause of migraine type headaches. Copper toxicity also causes a loss of appetite. (anorexia)

**Fatigue, Constipation and Joint Pain**

A lower-than-normal rate of metabolism, commonly associated with copper toxicity, is a frequent cause of joint pain, fatigue and constipation. Joint pain is frequently related to an excessive deposition of copper into the joints, while fatigue and constipation commonly result from a copper-induced sluggish thyroid gland activity.

**Increased or Decreased Sex Drive**

Women susceptible to PMS frequently experience increased tension and may therefore have an increased desire for sexual release during their period. This should come as no surprise, inasmuch as estrogen hormone levels peak at this time.

Estrogen is to female sexuality what testosterone is to male sexuality. A low level of estrogen is frequently associated with a decreased libido in females. Any rise in estrogen levels, up to a certain point, normally results in increased sexual desire. Some women experience an increased sex drive while taking the birth control pill, due to its estrogen content, until their rate of metabolism decreases.

Other women, who have a low rate of metabolism have difficulty utilizing estrogen. This is due to a reduced bio-availability of copper and diminished adrenal activity. These women may experience a severely diminished sex drive as a result of using the birth control pill.

**Depression, Anxiety, Irritability and Mood Swings**

A common characteristic of PMS is the intensity of emotional changes that accompany this syndrome. Some of these, such as mental depression, may be due to a reduced rate of metabolism, resulting in a feeling of lethargy. Many emotional symptoms, however, may be due to copper imbalance. Under acute stress, copper is mobilized from tissue storage. Copper has a stimulating effect on the biogenic amines (neurotransmitters). These are known to enhance emotions and cause the characteristics of anxiety, mood swings and other emotions, commonly associated with premenstrual syndrome.

**Infections and PMS**

The intimate connection between PMS and infections caused by viruses has been well established. Viral infections such as measles and mumps are frequently observed during menstruation. By contrast, bacterial infections such as pneumonia and abscesses are more commonly found at other times of the menstrual cycle.

The onset of acute stages of bacterial and viral infections may coincide with the varying levels of estrogen; progesterone and other hormones noted during the premenstruum and menstruation.

Veterinarians have long recognized the importance of estrogen and progesterone levels in altering the resistance to infections. In the early 1950's, it was demonstrated that womb infections in cows could be triggered and controlled by varying the levels of estrogen and progesterone. Experiments showed that estrogens provide rabbits protection against infection by pneumococci, protect mice against streptococcal infections and protect monkeys and mice against live polio vaccine.

**Flare-ups and PMS**

Women suffering from chronic diseases such as rheumatoid arthritis, asthma and ulcerative colitis frequently note that these conditions worsen before the start of their menstrual flow. Our research indicates that these flare-ups occur due to an increase in one's copper level.

**Crimes of Violence and PMS**

Crimes of violence committed by women under the influence of PMS are a well-documented fact. They are often directed against husbands and children and are due, in part, to an extreme degree of irritability.

A study conducted in New York showed that over 60 percent of crimes of violence committed by women occurred during the premenstrual phase of the cycle. A Paris survey conducted at the turn of the century showed that 84 percent of violent crimes committed by women are traceable to the time immediately before and during menstruation.

**Alcoholism and PMS**

Alcoholism in women is unfortunately rising in the United States. Accumulating evidence indicates that there is an important connection between alcoholism and PMS.

Alcoholic women are frequently arrested for excessive drinking before their period. Possible reasons for this include;

* water retention causes a lowered tolerance to alcohol,
* depression and irritability cause an increased desire to drink away problems,
* low blood sugar levels increase the craving for alcohol, which serves as an alternative fuel and
* magnesium deficiency caused by consumption of alcoholic beverages causes irritability.

**Therapy For PMS**

**Medical Treatments**

Medical therapies recommended for PMS include diuretics, tranquilizers, pain medications such as Motrin, anti-depressants, birth control pills and progesterone.

While any of these medications may provide temporary relief, none of them address fundamental causes. Some of these medications, such as birth control pills and diuretics may cause additional problems later. It is well documented that the birth control pill results in a depletion of zinc, vitamin B-6, folic acid and other essential nutrients. The use of diuretics can deplete potassium, zinc and magnesium, leading to greater sensitivity to stress.

The most effective and least harmful of the medical treatments is the use of natural progesterone, which does provide relief to some women. However, if body chemistry is corrected, the estrogen-progesterone balance will naturally reestablish itself.

**Nutritional Therapy**

Many nutrients are intimately involved in premenstrual syndrome, due to their relationship to copper metabolism, adrenal glandular activity and cellular energy production.

**Magnesium**

Research indicates that women suffering from PMS have lower magnesium levels than women without PMS. A magnesium deficiency may contribute to a number of symptoms associated with PMS, particularly mood swings, abdominal bloating, breast tenderness and nervous tension.

A craving for chocolate is frequently found to be a sign of magnesium deficiency. Though rich in magnesium, chocolate is not recommended, due to its high caffeine and copper content.

**Best Sources of Magnesium**

|  |  |  |
| --- | --- | --- |
|  | almonds | green vegetables |
|  | desiccated liver | soybeans |
|  | eggs | wheat germ |

**Potassium**

Although potassium has many important functions, it plays a vital role in alleviating many of the symptoms of PMS, particularly those relating to water retention.

Many symptoms, including weight gain and bloating, may be due to low potassium levels relative to sodium. Sodium levels are frequently elevated above normal values due to excessive estrogen levels that occur premenstrually.

Women suffering from weight gain and abdominal bloating frequently resort to the use of diuretics. This can only result in a worsening of their symptoms, due to increased excretion of potassium and magnesium.

**Best Sources of Potassium**

|  |  |  |
| --- | --- | --- |
|  | apples | melons |
|  | bananas | oranges |
|  | berries | peaches |
|  | carrots | potatoes |
|  | grapefruit | tangerines |

**Zinc**

The importance of zinc in the treatment of PMS cannot be overestimated. Zinc is of significant value in lowering the usually elevated copper levels associated with increased levels of estrogen during the premenstrual phase. Zinc is a natural antagonist to copper.

Although zinc is vitally important in certain cases, caution must be exercised where copper or ceruloplasmin levels are low. An excessive intake of zinc will cause a decrease in the ceruloplasmin levels in the blood,(1) resulting in a copper deficiency.

According to Van Campen, difficulties do not arise because of too much zinc or too little copper, but rather because of an imbalance between the two. He states, for example, that an animal getting what might be called a normal amount of copper may not be able to bind and utilize it if it has excessive zinc in its diet. The result will be the same as a tissue copper deficiency, while the blood will contain excess levels of unbound copper.

According to Van Campen; mineral imbal ance... "becomes serious when an animal is receiving just barely enough of an essential mineral. Some animals receiving a low copper diet are affected by as little as 50 to 100 parts per million of zinc. Animals getting adequate copper can take 25 to 50 times as much zinc without apparent effects."(2)

Zinc is of special importance if the PMS sufferer is using a copper intra-uterine device for birth control. A zinc deficiency can be caused by the absorption of copper from the copper IUD device. One should take special note that a reduction in zinc frequently results in a rise of sodium (salt) levels. This is a highly undesirable state responsible for many of the symptoms associated with PMS, especially edema.

Another important fact to consider is that diuretics are known to decrease zinc as well as magnesium in the body. By decreasing zinc, diuretics decrease one's ability to combat the effects of stress, further worsening the zinc deficiency.

One of the common manifestations of a zinc deficiency is a loss of appetite. It has been noted that one of the first symptoms associated with PMS is loss of appetite.

**The Importance Of Vitamins**

**The B-Complex Vitamins**

The B-complex vitamins have been known for many years to be effective in reducing many of the symptoms of PMS such as mood swings, anxieties, nervous tension and irritability. Only recently has the mechanism of action been understood.

One of the principal causes of PMS, as we have stated earlier, is an excess of estrogen over progesterone. One of the principal causes of this imbalance is unquestionably a vitamin B-complex deficiency. This may be the result of an excessive dietary intake of sugars. It is a well-known fact that a deficiency of B-complex vitamins may result in a failure to convert estrogens into estriol, which is a less potent form of estrogen. Any diminished ability of the liver to convert estrogen to estriol will result in an increased ratio of estrogen to progesterone, with resulting PMS symptoms.

**Vitamin B6**

Vitamin B6 (pyridoxine) has been found to be extremely helpful in the treatment of PMS, particularly in relieving mental depression. Vitamin B6 is lost from the tissues whenever tissue copper levels rise in the body. This is exactly the case premenstrually. It is principally a copper excess, real or relative, which results in mental depression.

If sufficient or adequate amounts of B6 are present, the depressing effect of excess tissue copper is minimized or negated.

Along with relieving mental depression associated with PMS, vitamin B6 has proved to be effective in reducing water retention, nervous tension and headaches associated with PMS.

It is obvious from the above that vitamin B6 plays a vital role in regulating estrogen levels. Zinc is often combined with vitamin B6, as their effects are synergistic.

**Vitamin B1**

We believe that B1 plays a major role in PMS by increasing the rate of metabolism. The metabolic rate is abnormally low in the great majority of PMS sufferers, due, at least in part, to the effect of copper toxicity.

Copper, in excess, has a depressing effect upon the activity of the thyroid gland which plays a major role in maintaining a normal rate of metabolism.

**Vitamin B3 (Niacin)**

Vitamin B3, or niacin has been found to be effective in reducing mood swings and mental depression. Again, it has been noted that niacin is antagonistic to copper.

Niacin is also essential for energy production in all body cells and tends to enhance energy production.

**Vitamin C**

Vitamin C (ascorbic acid or sodium ascorbate) has also been recognized as being very important in reducing the symptoms associated with premenstrual tension. There is strong evidence that vitamin C plays a vital role in the reduction of copper toxicity. Vitamin C is also necessary for optimal adrenal gland activity.

Many factors contribute to the depletion of vitamin C reserves including stress, environmental pollution, toxic metal poisoning, the use of birth control pills, copper IUD's, water from copper water pipes and even foods relatively high in copper. These include lobster, shrimp, clams, organ meats, soy beans, avocadoes, etc.

**Vitamin E**

Vitamin E deficiency results in increased fluid retention, a problem common to PMS sufferers. In addition, a vitamin E deficiency is commonly associated with muscle cramps and breast tenderness, symptoms common to PMS sufferers.

**Symptomatic Regimens For PMS**

There are two approaches to nutritional therapy. The first and more common is symptomatic nutritional therapy.

The most commonly recommended nutrients for PMS are vitamin B-6, zinc, magnesium, herbs such as dong quai and black cohosh, evening primrose oil and B-complex vitamins.

We have found that PMS can be divided into high and low estrogen types.

**For the high estrogen (high copper) type, a typical nutritional regimen includes:**

|  |  |  |
| --- | --- | --- |
|  | vitamin B6 - 200 mg | 1-1-1(am/noon/pm) |
|  | zinc - 22.5 mg | 2-2-2 (am/noon/pm) |
|  | magnesium - 133 mg | 2-2-2(am/noon/pm) |
|  | potassium - 99 mg | 2-2-2(am/noon/pm) |

**For the low estrogen (bio-unavailable copper) type, we recommend:**

|  |  |  |
| --- | --- | --- |
|  | vitamin C - 1000 mg | 1-1-1(am/noon/pm) |
|  | copper - 3 mg | 1-1-1(am/noon/pm) |
|  | vitamin E - 200 IU | 2-2-2(am/noon/pm) |

Determining if a woman is a high or low estrogen type is not always easy. Symptoms may be used as a rough guide:

**High Estrogen**

|  |  |  |
| --- | --- | --- |
|  | Irritability depression |  |
|  | Water retention |  |
|  | Breast tenderness |  |

**Low Estrogen**

|  |  |  |
| --- | --- | --- |
|  | Depression |  |
|  | Fatigue, extreme |  |
|  | Infections |  |

It is recommended that one regimen be tried for 3 to 4 days. If no improvement takes place, try the other regimen.

Many women are helped by this therapy. However, these few nutrients are oftentimes insufficient to correct the primary causes of PMS, as outlined above.

**Use Of Hair Analysis To Guide Nutritional Therapy**

The second approach to premenstrual syndrome, in which we have specialized, is to correct the underlying causes of the problem through individualized scientific nutrition programs.

Due to the multiplicity of imbalances contributing to PMS, where does one begin? There is an optimal physiological balance which must be attained for each individual. Each and every individual is as biochemically unique as a fingerprint.

Our research indicates that hair mineral analysis is invaluable as a screening tool to determine not only which hormonal imbalances exist, but also provide insight into which nutrients are deficient or excessive.

Using hair analysis as a screening tool, one may specifically select those nutrients which are most likely needed for that individual's specific biochemistry.

On the basis of this test and symptoms, we have learned to design individual nutritional programs that address the biochemical imbalances present. With this method, over a period of several months to a year, often the symptoms associated with PMS can be significantly reduced or eliminated permanently.

**The PMS Diet**

Often, PMS sufferers have poor eating habits, due in part to a copper-induced zinc deficiency. Common manifestations of a zinc deficiency are craving for chocolate, loss of appetite, anorexia and sometimes bulimia. It must be recognized that, to a great extent, the disturbed body chemistry of the PMS sufferer dictates her dietary habits.

Correction of the underlying deviant body chemistry, especially a zinc and vitamin B-6 deficiency, frequently encourages improved eating habits.

The following are some nutritional guidelines which will go a long way towards easing the miseries associated with PMS.

**Should You Increase Your Intake Of Complex Carbohydrates?**

Women with PMS are often advised to increase their intake of complex carbohydrate type foods and to eat six times a day. Our research indicates that this is poor advice for the great majority of PMS sufferers. A large increase in one's carbohydrate intake will serve to limit one's protein intake to perhaps no more than 20 percent (approximately 3 ounces of meat).

Warning: Too great an intake of carbohydrates will result in water retention and depletion of zinc and magnesium reserves.

Research indicates that a high carbohydrate diet is a major cause of both a zinc and magnesium deficiency. The result of both a zinc and magnesium deficiency is a rise in sodium (salt) levels and a decrease in insulin secretion. This results in a decreased ability to effectively metabolize carbohydrates.

**Limitation Of Fat Intake**

Fat intake should be limited to about 20% for the slow oxidizer and to 30% for the fast oxidizer. Fats should consist mainly of polyunsaturated vegetable oils. Dietary fat has a tendency to slow down the rate of metabolism.

Dairy products should be limited to two servings per day; inasmuch as the high calcium content not only blocks absorption of magnesium, it also increases the urinary excretion of magnesium. It is also important to consume twice as much vegetable fat as animal fat, inasmuch as "...animal fats cause hyperestrogenemia and suppress ovarian secretion of progesterone."(3)

**Increased Intake Of Vegetables**

For slow oxidizers, (individuals with a low metabolic rate) it is recommended to increase the intake of whole grains, green leafy vegetables, cereals and legumes. Fast oxidizers, on the other hand, are advised to follow this recommendation, with an emphasis on vegetables.

**Foods To Avoid**

Refined Sugar and Starches:

Sugar intake should be reduced to an absolute minimum. Foods to be avoided include; chocolate, candies, pies, cakes, ice cream and foods and beverages sweetened with sugar.

Refined carbohydrates such as sugar and white bread are mineral-robbers. As noted previously, a deficiency of various minerals such as magnesium, potassium and zinc play a vital role in many discomforting symptoms associated with PMS.

Salt:

A substantial reduction in salt intake is of vital importance to the majority of PMS sufferers. We are not only talking about salt-shaker salt. Foods and beverages with a high salt content include salted soda crackers, pretzels, ham, club sodas, tonics and even diet drinks which contain large amounts of salt in the form of sodium benzoate.

Caffeine-Containing Beverages:

All caffeine-containing beverages should be drastically reduced or eliminated. These include coffee, tea, chocolate and cola drinks. Caffeine is a central nervous system stimulant.

Alcohol:

Alcoholic beverages should be eliminated if best results are to be achieved. Alcohol causes a loss of two very important minerals, magnesium and zinc.

Chocolate:

"...Addiction on the part of some women to certain foods and drugs may, in part, be due to temporary relief of PMS symptoms by these sub-stances..."(4) Chocolate craving is common in PMS sufferers. However, it is best to limit chocolate, if possible, because of its high sugar content.

Cigarettes:

"Because cigarette smoking increases aldosterone levels,"(5) cigarette smoking should be discouraged.

**Lifestyle**

Stress Reduction

Lifestyle can play an important role in modulating PMS symptoms. A healthful lifestyle reduces stress on the adrenal glands and helps avoid the excessive accumulation of copper in various organs (brain and liver). Stress depletes zinc and magnesium, thus increasing the tendency for premenstrual syndrome.

Daily Exercise

Regular daily exercise is of the utmost importance to combat and ease the problems associated with PMS.

It is thought that exercise is beneficial because it may raise levels of progesterone and beta-endorphins (euphoria-producing hormones produced by the brain). However, we feel that exercise is also beneficial by raising the rate of metabolism, which in turn results in a reduction of excessive tissue copper levels.

It is to be remembered that elevated estrogen levels are associated with elevated copper levels. A reduction in copper levels will result in a diminished estrogen level, certainly good news for those who suffer from the PMS.

In this manner, exercise can reduce the symptoms of fatigue, depression, anxiety, irritability and headaches so commonly associated with the PMS. Exercise is particularly effective in mild cases of PMS.

Adequate Rest and Sleep

The adrenal glands require sufficient rest and the regeneration of these glands occurs mainly during sleep. Therefore, eight or more hours of sleep should be obtained daily to correct the primary underlying causes of premenstrual syndrome.

Emotional Control

Lack of control of emotions also places additional stress on the adrenal glands and tends to raise tissue copper levels. Control of emotions and mental disciplines, such as meditation, may therefore also be helpful in reducing PMS.

**Implications And Conclusions**

Quite apart from the serious physical and emotional strain, PMS often causes embarrassment and shame. This has an impact on families and on all of society.

PMS leads girls in school to mischief and pranks and is responsible for a disproportionate amount of avoidable domestic crime. In addition, employee absenteeism, due to PMS, is estimated to cost employers billions of dollars each year.

For all these reasons, we hope that the understanding of premenstrual syndrome, which has come from hair analysis research; will be applied as widely as possible to reduce the devastating effects of this common health condition.

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