A NARRATIVE REVIEW OF MEDICAL, CHIROPRACTIC, AND ALTERNATIVE HEALTH PRACTICES IN THE TREATMENT OF PRIMARY DYSMENORRHEA

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ABSTRACT

Objective: Primary dysmenorrhea and related issues are discussed as they influence the gynecological and social health of females during adolescence, adulthood, and senior maturity. Health practitioners are exposed to multiple approaches towards the management of menstrual pain. Clinical and social viewpoints target the causation, development, diagnosis, manifestation and management of primary dysmenorrhea. This narrative review includes the topic of the doctor-patient relationship in efforts of cultivating effectively communicative health practitioners. Controversial topics related to primary dysmenorrhea and the quality of life for women are addressed.

Data Sources: A search for literature reviews, case studies, laboratory research, and clinical trials from 1985–2004 was performed using the MEDLINE database. Sources of additional information included textbooks, national organizational literature and contemporary articles.

Discussion: Menstrual pain is a prevalent experience yet it is socially taboo for conversation; as such, it poses a hindrance to its management. The communication between the doctor and patient is a critical barrier point between establishing a diagnosis and determining an appropriate treatment plan. A multi-discipline treatment plan varies as much as patients themselves vary in personal experiences, needs, and preferences.

Conclusions: Medicinal prophylactics, physical therapeutics, non-acidic diets, herbal supplements, eastern therapies and the chiropractic manual adjustments of the spine are effective methods for the management of primary dysmenorrhea. The non-invasive management of primary

dysmenorrhea includes the chiropractic adjustment with complimentary modalities, and other alternative health care practices. Medicinal prophylactics are invasive and pose a higher risk to long-term chemical exposure, side effects or irreversible conditions. (J Chiropr Med 2005;4: 76–88)

Key Indexing Terms: Dysmenorrhea; Chiropractic; Manipulation, Spinal; Complementary Therapies; Eastern Medicine; Women's Health; Physical Therapy

INTRODUCTION

A growing number of healthcare topics address the needs of women. One can currently find volumes of scientific articles and research studies covering risk factors for cancers, systemic diseases, and mental health conditions that predominately affect women. Health issues are increasingly pervasive in mainstream forms of media, which further facilitates social discussions among women on health topics once thought to be taboo. This presentation follows the gynecological health of women spanning from adolescence to senior maturity as it includes topics related to primary dysmenorrhea (PD).

A discussion on PD demystifies the condition to silent sufferers and alerts practitioners of its prevalence. In 1996, PD affected the quality of life for 60–90% of females. Additionally, it contributed to 42% of absenteeism from school or work and a loss of productivity in daily activities.¹ The following discussion serves women by informing them of the health risks and benefits of their choices for treatment. Healthcare practitioners may also benefit from a cross discipline study of the approaches towards treating PD.

Gynecological health is influenced by social standards, cultural practices, personal belief systems,

biological changes, and technology. These multifactorial influences may feed into the development of PD and therefore, require a broad approach towards treatment. In the year 2000, a patient pool of 409 women demonstrated a range of sexual health concerns that included dyspareunia (37%), dysmenorrhea (47%), and premenstrual syndrome (57%).² These statistics increase the awareness that PD may correlate to other illnesses. This awareness provides an opportunity for health practitioners to collaboratively meet the physical and psychological needs of the female patient.

The general population is searching beyond medical care as the first line of defense to combat illnesses. This trend may stem from negative experiences with allopathic methods or out of a desire to pursue a drugless approach towards the prevention and treatment of disease. In a study comparing first and third-year medical students,³ the latter believe that complimentary and alternative therapies to allopathic medicine were less effective forms of health care. In spite of their beliefs, a shift towards alternative care is occurring among women. A focus study conducted at a medical center demonstrated that a growing number of gynecological patients (56%) have already turned towards alternative care.⁴ Health practitioners may follow this trend and extend their services or broaden into multi-disciplined practices to include women who are seeking more options.

This paper aims to guide various health practitioners through the challenges of identifying PD, relating to the female patient, and acquiring information on various treatments. The efficacy of treatment options will include medicinal prophylactics, the chiropractic adjustment and complimentary modalities, as well as, nutritional supplementation and eastern therapies.

METHODS

A search for literature reviews, case studies, laboratory research, and clinical trials from 1985–2004 was performed using the MEDLINE database. Sources of additional information included in this review are: textbooks, national organizational literature, and contemporary articles.

DISCUSSION

Menstruation

Understanding PD begins with a basic comprehension of the female reproductive cycle. The uterine

endometrium goes through the proliferative phase before ovulation followed by the secretory phase. Estrogen and progesterone levels dominate each phase for the purposes of building up or maintaining the uterine lining, respectively. The ovaries, which release both hormones, are controlled by luteinizing and follicle stimulating hormones by way of the hypothalamus and anterior pituitary. This maintains a direct relationship between the reproductive system and the central nervous system. The uterine musculature is also active throughout the cycle. This is observable by transvaginal sonographic tomography. In the proliferative phase, the endometrial wave-like movements proceed along the longitudinal uterine axis from cervix to fundus. In the secretory phase, the wave proceeds from fundus to cervix.

These wave-like movements facilitate sperm motility and excretion of menstrual flow, respectively.^{5,6} Asynchronous reversal of this movement results in retrograde menstruation. The menstrual cycle has increased predictability as events typically occur within 24–35 days. The cycle can be manipulated at many points whereas pregnancy, premenstrual syndrome, and the pain associated with PD may be controlled to affect the gynecological health of women.

Etiology

Hormones are postulated key influencers for triggering menstrual pain. Dysmenorrheics have higher levels of prostaglandins, leukotrienes, vasopressin hormones and platelet-activating factor in menstrual fluid.⁷ Collectively these key elements facilitate pelvic pain associated with arterial vasoconstriction, menorrhagia, blood clot formation, and increased uterine contractility. Progesterone is the principle trigger of the cascade of events leading to menstrual cramps. When progesterone levels fall at the end of the secretory phase, pain ensues as uterine spiral arteries of the endometrium constrict to create ischemia and necrosis. The release of prostaglandin F2 alpha from disintegrating endometrial cells stimulates free nerve endings, which consequently produce pain. Prostaglandin F2 alpha also increases platelet aggregation which causes blood clots to accompany dysmenorrhea.⁸ High levels of E-series prostaglandins correlate to menorrhagia that some women experience during the first three days of menses. The heavy bleeding may be attributed to a greater amount of Prostaglandin E receptors in endometrial tissue.⁹

Excessive amounts of leukotrienes in the endometrium during menses exacerbate the cardinal signs of inflammation. Leukotriene suppression is a targeted method to control pain in the estimated 10–30% of females who do not respond to anti-prostaglandin drugs such as non-steroidal anti-inflammatories.¹⁰ Vasopressin has been identified as a contributor to dysmenorrheic pain.¹¹ Vasopressin originates from the supraoptic and paraventricular nuclei of the brain and uterine endometrium. It is a powerful muscle-contracting hormone and is shown to contract the uterus five times greater in dysmenorrheics.⁸ Females with PD have demonstrated an increase in uterine vasculature throughout the menstrual cycle.¹² A dense vascular endometrium establishes the environment and opportunity for producing greater pain when sloughed from the uterine walls. The increased vasculature suggests a propensity for developing dysmenorrhea due to the inherent structural composition of the uterus.

Genetics relates to the development of PD. New exploration of the human genome, at the 22nd chromosome, purports a genetic link between polymorphisms of enzyme producing proteins cytochrome P450 2D6 and glutathione S-transferase mu with dysmenorrhea. Cytochrome P450 2D6 is involved in the degradation of toxins and synthesis of cholesterol, steroids and other lipids. Glutathione S-transferase mu is a component of a biological pathway that forms anti-oxidants. Variant genotypes of either are jointly associated with an increased risk of recurrent or severe dysmenorrhea and carcinogenesis unrelated to the reproductive system.¹³

Cold environmental temperatures may create conditions for experiencing PD. It is hypothesized that cold temperatures promote vasoconstriction of uterine arteries significantly enough to produce dysmenorrhea. The prevalence of dysmenorrhea, sick leave and cold exposure existed among 73% of 213 poultry industry workers participating in a study.¹⁴ Similar reports of dysmenorrhea (71%) were related to cold exposure and physical workload at another poultry and canning factory.¹⁵ In the same study, 726 women were exposed to a cold working environment, uncomfortable postures, assembly-line work, and irregular work schedules.

Toxic influences can manipulate internal homeostatic balance and alter the gynecological health of women. Dysmenorrhea has been linked to toxic mercury. Mercury exposure may come from con-

ventional sources such as contaminated food sources, the work environment, or dental amalgam fillings. According to the Agency for Toxic Substances and Disease Registry under the Centers for Disease Control and Prevention, mercury vapor can be absorbed at a rate of 70–85% by the lungs. The hazard of mercury exposure is exemplified in a study of Chinese women who subsequently developed dysmenorrhea and menstrual disorders from their work environment.¹⁶ The workplace conditions exposed the women to mercury vapor ranging from 0.001–0.200 mg/m³. The Occupational Safety and Health Administration guidelines in the United States recognize 0.100 mg/m³ as the limit of permissible exposure.

Environmental exposure to insecticides, herbicides and by-products of industrial wastes such as dioxins, polychlorinated biphenyls, lindane, bisphenol A, and atrazine promote menstrual disorders. These toxins act as estrogen receptor agonists therefore, blocking the proper influence of estrogen on the menstrual cycle.¹⁷ Consumers, and females in particular, can be proactive towards limiting the ingestion of herbicides, industrial by-products and environmental estrogens. Fruits and vegetables washed in a mild food detergent reduce surface contaminants. Fat and skin trimmed off meat products where toxins accumulate is another form of combating long-term risks. Food contamination may also occur when heating meals in non-microwaveable plastic containers. Additionally, the lining of metal food cans may leach toxins into meals. More information is available from the Physicians for Social Responsibility's (Washington, DC) 2001 publication entitled *Environmental Endocrine Disruptors: What Health Care Providers Should Know*.

Research on tobacco smoking suggests its contribution to uterine arterial vasoconstriction may lead to dysmenorrhea with menses. Former research hypothesizes that direct cigarette smoking constricts uterine blood vessels and is a contributing factor in cases of spontaneous abortions or low birth weight infants.^{18,19} Direct inhalation or second hand inhalation may threaten a person's long-term health aside from the development of respiratory conditions. Inhalation of second hand smoke was found to increase the occurrence of pelvic pain in non-smoking, newly wed females with no history of dysmenorrhea. In the same study, the incidence of dysmenorrhea increased by 13.3% when a household member smoked up to 10 cigarettes a day in the home.²⁰

The cultural practice of female genital mutilation exacerbates dysmenorrhea. Female circumcision or infibulation is a continued practice in parts of Asia, the Arab World and sub-Saharan African countries. Women experience long-term complications due to scarring, developing adhesions and suturing of the vaginal opening. The urogenital destruction creates an insufficient opening for the menstrual flow and the accumulating intrauterine pressure causes dysmenorrhea. Dysmenorrhea and psychosexual dysfunctions were the most common long-term effect among 80.5% of infibulated African women in Ismailia, Egypt.²¹ Health practitioners placed around the world will reach many women across cultures and impact their care relative to the woman's social experiences, personal choices, and cultural practices. Hormonal cycling, genetics, cold temperatures, chemical exposure to mercury or insecticides, tobacco smoke, and female circumcision serve as examples of the multi-factorial influences for developing primary dysmenorrhea.

Symptoms of Primary Dysmenorrhea

Primary dysmenorrhea occurs during menses and manifests as pelvic pain of a cramping nature. It is not associated with an organic pathology or caused by a psychological infirmity. The female patient may present with complaints of sharp and intermittent spasms localized to the suprapubic region. Others may additionally experience pain radiating into the low back and legs. The pain typically begins hours before the onset of menses and continues to peak during the first three days of menstruation. It is not until further investigation into the patient history that any combination of associated symptoms may be brought to light, eg, nausea, vomiting, diarrhea, fatigue, fever, headache, lightheadedness, menorrhagia, and blood clotting.¹

Perception of Dysmenorrheic Pain

The pathway of transporting neural impulses is critical to the perception of dysmenorrheic pain. Pain reflexes form a neural circuit in which impulses travel from pain receptors in viscera to the cerebral cortex of the brain and return back to the initiating organ. Pain reflexes that develop a continuous loop between the spinal cord and visceral organs may remain at the local spinal level or travel up or down multiple levels of the cord. Either reflex pattern can create a chronic hyper-excited state of stimulation facilitating muscle spasms, ischemia, and inflammation. The lower abdominal and back muscles, along

with the uterus, share sensory and motor pathways in the nervous system. This structural design allows for the development of referred pain patterns, wherein stimulation of one muscle group is perceived at a secondary location. Sympathetic neural innervation of the uterus, iliopsoas, and quadratus lumborum muscles branch out from thoracic and lumbar vertebral levels at T10, T12, L1, and L2. This explains why PD involves local uterine activity, yet sensations are perceived over a broader area.

General pain perception differs in sufferers of dysmenorrhea. A significant reduction in the inhibitory descending control pathway of spinal nociceptive reflexes is apparent during the secretory phase of the menstrual cycle.²² The decreased threshold increases sensitivity to pain and predisposes women to experience severe dysmenorrhea. Bajaj et al conducted a study observing somatosensory differences during menstruation. The researchers observed reduced heat and pressure somatosensory pain thresholds during menstruation at referred pain areas along two abdominal sites (T10-T12) and the midline of the low back (S2-S4). They concluded that the lowered thresholds for pain related to a somatovisceral mechanism of local neural hyperexcitability induced by repetitive menstrual pain.²³ This may provide insight into how chiropractic care may relieve pain by removing the local neurological influence at relevant spinal levels to restore somatosensory balance. Health practitioners can quantify and monitor the progression of dysmenorrhea throughout treatment. The numerical visual analog scale, Moos' menstrual distress questionnaire, and a computer aided menstrual symptometrics device are effective in-office methods of measuring pain.^{24,25}

Differential Diagnosis

A systematic examination through the review of body systems is a necessary approach to distinguish the source of pelvic pain. Common causes of pelvic pain stem from gynecological pathologies or musculoskeletal dysfunctions. Obstetricians and gynecologists traditionally suspect secondary causes of dysmenorrhea when the gynecological history reveals a normal pelvic physical exam and absolutely no relief of menstrual cramps with non-steroidal anti-inflammatory drugs.¹ The diagnosis of secondary dysmenorrhea is clinically observed as an abdominal physical pathology that affects the female reproductive organs and creates cyclical or constant pelvic pain. Endometriosis is a prevalent cause of second-

ary dysmenorrhea. Diagnostic confirmation by laparoscopy identifies that 40–60% of women have endometriosis. In the absence of pelvic pain, the diagnosis is confirmed in 2–22% of women.²⁶ The uterus frequently contracts with greater amplitude and displays greater basal pressure tone in comparison to women without endometriosis.²⁷ Endometriosis mainly develops from endometrial cells relocating outside the uterus by retrograde menstruation. Bulletti et al have shown that mechanical displacement by irregular uterine contractions occurs in 73% of women with endometriosis. Alternative theories of dissemination or pathogenesis include the following: metaplasias of the colon epithelium, metastasis through the lymphatic and vascular systems, iatrogenic dissemination, immunologic dysfunction or genetic predisposition.²⁸

Travell and Simons have identified trigger points (TRPs) in the development of myofascial pain syndrome and their efforts support an association with chronic pelvic pain (CPP). Prudent discernment is required by the practitioner because CPP and dysmenorrhea can occur together although they are distinctively two different diagnoses. CPP is continuous abdominal pain that occurs for more than 6 months. Females with CPP experience symptoms comparable to PD. However, CPP is dissimilar because PD develops as prostaglandin F₂ alpha release increases during menses. The etiology of CPP has its root in myofascial pain syndrome and/or mechanical pelvic joint dysfunction. Therefore, CPP can equally affect males and females.

A female with a history of cyclical abdominal cramping may have reoccurring musculoskeletal trigger points. Physical therapy and TRP injections were found to resolve symptoms of unexplained musculoskeletal pelvic pain in a study of females 9–23 years of age.²⁹ TRPs are focal areas of cellular disruptions existing in the muscle belly and tendon attachment that create pain patterns along sensory neural pathways. It has been found that stimulated TRPs in the lower rectus abdominal muscle reproduce pain comparable to dysmenorrhea. The pain radiates into the abdominal, sacroiliac, and low back region.³⁰ Practitioners should also look for TRPs located in the iliopsoas and quadratus lumborum muscles in the replication of dysmenorrheic pain patterns. TRPs may be evoked by chemical influences, skeletal joint dysfunction, postural malposition, muscular cellular damage, cold temperatures, muscle strain, acute infection, emotional stress or

physical trauma.³¹ Theoretically, the formation of prostaglandins during the secretory phase of the menstrual cycle is the stimulating factor aggravating the muscle fibers and tendons.

Iatrogenic scar tissue adhesions can produce pelvic pain in a remote manner. In one study,³² fifty-one hysterectomies were performed on women 2–15 years after a caesarean section as medical treatment to relieve symptoms of lower abdominal pain, menorrhagia, dyspareunia, and dysmenorrhea. It was discovered that the incision along the uterine wall became a site of inflammatory infiltration and fibrosis, which created pathological distortions of the lower uterine segment and other significant findings. The practitioner is challenged in the diagnosis of PD by common and remote conditions.

Doctor-Patient Relationship

Trust is established within the vulnerable doctor-patient relationship through effective communication and compassion. Little et al³³ constructed a clinical survey to identify the most valued aspects in a patient-centered model approach. Patients want to communicate to their doctors on a personal level and actively participate in the treatment decision. They also want to know how to preserve their health. The time available for a patient-centered consultation is limited. Therefore, five specific points on communication represent the highest expectations patients have during a consultation with their primary care physician. Patients want doctors to do the following: be friendly and approachable, listen to the details of their complaint, ask how the complaint affects activities of daily living; explain to them what is wrong and how it can be treated. Effective communication between a doctor and patient can lead to accurate and quick diagnosing, as well as informed decisions.

Practitioners are responsible for establishing a comfortable atmosphere to interact with patients in order to discuss sensitive health issues. Specifically, 64–78% of adolescents want to feel that the doctor-patient conversation is confidential before they will fully disclose concerns regarding nutrition, drugs or sexuality.³⁴ A discussion with the adolescent about physical, social and emotional changes may influence healthy adulthood development. This is particularly necessary during adolescence when there is an association between menstrual dysfunctions or late menarche to depression, eating disorders, and

obsessive-compulsiveness in the first gynecological year.³⁵ Practitioners who lack the interpersonal skills or clinical preparedness may impede patient communication. A survey reported 87–92% of general practitioners and obstetrician-gynecologists had difficulty asking patients about family violence and sexual abuse.³⁶

The practitioner is challenged to overcome the obstacle of initiating the discussion on physical abuse, and develop the skill of identifying opportunities to further discuss the social history. The patient's social history might reveal risk factors that lead into multiple diagnoses and complicate the management of menstrual disorders. Women with a history of childhood physical and sexual abuse may report dysfunctional symptoms affecting cardiovascular, immune, musculoskeletal, neurological, and reproductive systems.³⁷ A study has shown a higher incidence of dysmenorrhea, menorrhagia and sexual dysfunction in women who have been sexually assaulted. A gynecological complaint of one of these symptoms occurred among 6–26% of women, and a complaint of all three symptoms occurred among 13–40% of sexually assaulted women.³⁸

Complaints of sexual abuse are also associated with respiratory and gastrointestinal dysfunctions.³⁹ The examples aforementioned indicate that a collaborative effort among a team of practitioners may be used to control primary dysmenorrhea along with other physical or psychological treatment plans. Practitioners can provide more than immediate health care. The health profession affords the opportunity to educate and emotionally support others through health pamphlets, in-office health seminars, support group listings, professional referrals, and other creative methods.

Dysmenorrhea and PMS

Research has shown an overlap of PD and premenstrual syndrome (PMS). Both conditions develop as progesterone levels fall during the secretory phase of the menstrual cycle. PMS symptoms generally begin 2 to 12 days before the onset of menses and resolve within the first 24 hours of menstrual flow. In comparison, PD begins one to two days before menses and diminishes within two to four days into the menstrual flow.⁴⁰ PMS and dysmenorrhea is seen in women as early as 15 to 19 years of age. Eighty-eight high school-aged adolescents experienced dysmenorrhea (91%) and PMS (86%) signifi-

cant enough to negatively affect school attendance and academic performance.⁴¹ PMS symptoms are also more prevalent among emotionally distressed adolescents.⁴² However, peak occurrences of PMS is among women in their 30s.^{43,44} PMS is experienced by 40% of women reporting symptoms of mood swings, tension, anger, irritability, headache, bloating, and increased appetite with carbohydrate cravings.⁴⁵ PMS impacts a woman's quality of life by also affecting heart rate and personal level of productivity. A study of 64 undergraduate women showed an increase in resting heart rate in those who experience PMS.⁴⁶

Nutrition, chiropractic adjustments, and medications are methods used to combat the symptoms of PMS. Nutritional supplementation with calcium carbonate (1200 mg/d) reduced the symptoms of PMS for some women.⁴⁷ After three months, women experienced a 48% reduction of negative affect, fluid retention, food cravings and pain. In a chiropractic study, Walsh and Polus⁴⁸ noted cervical, thoracic, and low back tenderness in women with PMS. Positive low back orthopedic tests, low back muscle weakness, and a neck disability index average of 5.4 were also recorded. The researchers continued their study and found that a high velocity low amplitude spinal adjustment with soft tissue therapy given 2 to 3 times the week before the onset of menses reduced PMS symptoms.⁴⁹

Medical science characterizes the cause of PMS as a sensitivity to hormonal cycling rather than an abnormality in hormone levels. Until the resolution of symptoms comes with the onset of menopause, medicinal remedies include diuretics or anti-depressants that act as serotonin uptake inhibitors. Anti-depressants are most effective for 3–5% of women who have severe PMS diagnosed as premenstrual dysphoric disorder.⁵⁰ Medicinal treatment of serotonin inhibitors for PMS and premenstrual dysphoric disorder are not without side effects including anxiety, dizziness, insomnia, sedation, nausea and headaches.⁵¹ Cognitive therapy such as behavior modification is used to relieve associated symptoms of anxiety, triggers of frustrations, and poor impulse control indicating premenstrual dysphoric disorder. Massage therapy for premenstrual dysphoric disorder showed a decrease in anxiety, depressed mood, dysmenorrheic pain, and water retention.⁵²

Adolescent Dysmenorrheics

Cross-cultural studies display the widespread prevalence of dysmenorrhea as young girls around 13 years old enter menarche. Within a sample size of 495 Moroccan girls, the prevalence of pelvic pain, PMS, and menstrual irregularity were 69.6%, 51.2%, and 23.0%, respectively.⁵³ In India, dysmenorrhea was a reported condition in 40.7% of girls.⁵⁴ Similarly, out of 3000 Turkish girls, 38.7% reported pain with menses, 4.5% sought medical treatment for irregular bleeding, 46.6% experienced PMS, and 15.8% believed their performance on school examinations was affected by their irregular menses.⁵⁵ Adolescent knowledge of the menstrual process on a rudimentary level may be lacking, but their physical and emotional experiences are significant.

A link between early menarche and PD does exist. Menses that begin between 11 and 12 years of age correlate to an increase incidence and severity of dysmenorrhea.⁵⁶ Factors influencing early menarche are the potential root of the cause in predisposing females to primary dysmenorrhea. An early gynecological age can be associated with the size of the infant female child. In a study of 997 girls 14 to 15 years of age,⁵⁷ early menarche positively correlated to fast postnatal growth rates and pre-menarcheal body composition. Female adolescents who were relatively long and thin at birth (>49 cm, <3 kg) started to menstruate approximately 6 months earlier than girls who were shorter and lighter in weight. Girls starting menarche early also lived in higher socioeconomic households where eating a low fiber and high fat diet was a part of their lifestyle. The abundance of food potentially affords girls to be heavier in weight and facilitates the production of estrogen under such conditions. Consequently, the increased level of estrogen hastens the onset of puberty.

Childhood emotional stress, triggered by global events or familial setting, can quicken the onset of menarche. Stress alters the axial relationship of the hypothalamic, pituitary, adrenal, and reproductive functions. The effects of physical trauma, low socioeconomic status, and psychological trauma provoked by a hostile environment are shown to correlate with the delayed age of menarche in middle-eastern girls.⁵⁸ Another study⁵⁹ noticed that girls 7 to 11 years old could experience familial stress significant enough to progress the onset of

puberty. Within this critical period, the girls both reported feeling a sense of rejection or closeness to their mothers and were more anxious or harbored depression. The absence of fathers also raises the stress factor. A study to explain the connection between daughters and absent fathers suggests a genetic predisposition towards early menarche.⁶⁰ It is explained that a variant X-linked androgen receptor gene exists that predisposes the father towards aggression and impulsive behaviors correlating to their absence. Once the sex-linked trait is passed to the daughter, she demonstrates a propensity for early menarche, precocious sexuality, and behavioral problems. As evidence, the study offers a finding of 121 absent fathers and 164 daughters showing a significant association of the short alleles of the GGC repeat polymorphism of the androgen receptor gene.

Dysmenorrhea along with related gynecological issues impact the quality of life for adolescents. In a study of 600 girls, a significant number miss time spent playing athletic activities (51%), engaging in social interactions (46%), participating in class (50%), and reported an affect on their concentration (59%) while coping with the discomfort of menstrual cramps.⁶¹ Adults could better serve young girls who opt to control dysmenorrhea with oral contraceptives by emphasizing the distinct purpose for taking the drug as pain control and not birth control. This discussion creates the opportunity to convey the message that a mature gynecological age does not equate to sexual readiness. The example of a positive influence may curb the incidence of teenage pregnancies. Gynecological hygiene also becomes a relevant issue with tampon use because menorrhagia and blood clotting are associated symptoms of dysmenorrhea. Tampon use facilitates the internal build-up of prostaglandins, which promotes the exacerbation of PD. Over time, improper tampon use makes a young girl vulnerable to toxic shock syndrome, vaginal ulcers, mucosal alterations or other gynecological problems in adulthood.

Impact of Dysmenorrhea During Adulthood

PD exclusively is not a predictor of future reproductive health. To date, there are no reported incidences of dysmenorrheics being at greater risk for uterine cancers or infertility. Research has not demonstrated that the uterus is either structurally traumatized or compromised for successful implanta-

tions. The long-term treatment goal is to manage dysmenorrheic pain until the natural resolution occurs with menopause or temporarily with pregnancy. In searching PubMed between 1996–2004 no research was found supporting the claim that the incidence of dysmenorrhea decreases after pregnancy. However, increasing the cervical os opening will decrease intrauterine pressure and relieve dysmenorrhea as performed by allopathic practitioners.²⁸

Perimenopause

The perimenopause transitional phase between adulthood and senior maturity is a defining point for many women. The median age of onset is 47.5 years and lasts an average of 4 years. During perimenopause, a woman traditionally experiences 3–11 months of amenorrhea and has increased menstrual irregularity, including a change in cycle length, menstrual flow amount or duration. Dysmenorrheic pain continues throughout a woman's reproductive years, although the severity fluctuates from one menstrual occurrence to the next. Dysmenorrhea follows a trend of gradual increase in intensity from 4 years after menarche that reaches a peak at the age of 20, and then decreases until the woman reaches menopause around 51 years of age. The gradual loss of reproductive capability during perimenopause may affect social and personal expectations that define what it is to be a complete woman. However, the quality of life heavily depends on the mental attitude of the woman rather than the physical manifestations of hormonal changes. A Harvard study of women ages 35–45 with a psychological history of major depression were twice as likely to enter perimenopause earlier, and those on anti-depressants were three times as likely than non-depressed women. The study concluded that depression was associated with early onset of perimenopause, notably the depression sufferers had higher follicle-stimulating hormone and leuteinizing hormone levels and lower estradiol levels.⁶² A gynecological history of nulliparity, early menarche, tobacco smoking, or unilateral oophorectomy are also predisposing conditions for a woman to enter early perimenopause.

Senior Maturity

Ultimately, the natural remedy for PD comes at the point of menopause. The most dominant symptom of menopause is hot flashes or flushes, which may

begin before the menstrual irregularities during perimenopause. About 50% of postmenopausal women experience hot flashes, and the incidence decreases to 20% four years after menopause.²⁸ The vasomotor symptom of hot flashes and night sweats are reportedly more frequent and bothersome in women who have had a longer perimenopause transition (>4 years). A history of more psychological and physical symptoms prior to menopause increases symptoms along with pre-existing negative attitudes towards menopause, tobacco smoking, or divorced status.⁶³ Female sexuality is less interrupted at menopause when women are emotionally and physically satisfied in their personal relationships, appropriately manage stress, preserve a sense of autonomy and possess a positive self-image.⁶⁴

Combined estrogen-progesterone hormonal replacement therapy (HRT) is the medicinal approach to controlling hot flashes, night sweats, osteoporosis, urinary incontinence, and lack of sexual interest or function. Studies on combined HRT^{65,66} reveal an increase risk of developing coronary heart disease, thromboembolic disease, and breast cancer. Oliver et al recommend using HRT for a limited time to control intolerable symptoms of menopause. This review also notes that HRT achieves its maximum efficacy in 3 or 5 years of use for combating osteoporosis and menopausal symptoms, respectively. Thereafter, the risk of secondary health complications increases over time.⁶¹ Women contemplating combined HRT should be aware that endometrial bleeding may occur within the first 6 months of continuous treatment until amenorrhea, and 80–90% of women have regular monthly menstrual bleeding while on the cyclic regimen.²⁸ Women may not demonstrate high compliance with cyclic HRT because of dysmenorrhea, edema, bloating, premenstrual irritability, or breast tenderness.⁶⁷ HRT controls the physiological symptoms of menopause without inducing undesirable effects when administered with the correct formulation and low dosage.

Dysmenorrheics Self-administered Remedies

Symptomatic relief of primary dysmenorrhea may be achieved without accessing health care practitioners. Women treat themselves for menstrual cramps with over-the-counter pain medicines and applications of topical heat or they may develop a regular exercise routine. Naproxen (200–400 mg), acetaminophen (1000 mg), and ibuprofen (200 mg)

are accessible and effective non-steroidal anti-inflammatories (NSAIDs). They effectively act to disrupt the cyclooxygenase enzyme involved in the production of prostaglandin F2 Alpha during the inflammatory process. Among the NSAIDs, naproxen provides greater pain relief within 30 minutes and sustains lasting relief 6 hours after administration.⁶⁸ For those avoiding NSAIDs, an application of topical heat for 12 consecutive hours is as effective as ibuprofen (400mg) given three times a day.⁶⁹ The benefits of exercise for the treatment of PD are hypothesized to be the result of stress release and mood elevation.⁷⁰ Women can also make daily changes to limit exposure to environmental toxic influences as mentioned previously.

Nutritional Management

Dietary changes are a natural way to regulate the occurrence and severity of dysmenorrhea. Proper nutrition can balance hormone levels and decrease prostaglandin and leukotriene formation associated with the pain and inflammatory process. Some women experience success with herbal therapies including black cohosh, primrose oil, Dong Quai, licorice, ginseng, green tea and phytoestrogens contained in soybeans. Such herbals and supplements enter biological pathways to bring the relief of menstrual cramps, PMS or menopausal symptoms. Relief of menstrual cramps is also associated with a sufficient intake of ginger, tumeric, and bioflavonoids such as vitamins E, C, and, beta-carotene, which inhibit prostaglandin formation.

Dysmenorrheics should avoid an acidic diet created by a high intake of meats and omega-6 fatty acids that contribute to the presence of arachidonic acid in uterine tissues. Arachidonic acid is cleaved to form prostaglandins and leukotrienes that stimulate pain receptors. Consequently, a pro-inflammatory state is created at the cellular level as prostaglandin F2 Alpha and leukotrienes induce dysmenorrhea. A diet high in fish, eggs, fruit, and low wine consumption correlates to a decrease in frequent episodes of dysmenorrhea.⁷¹ Fruits and vegetables counteract an acidic internal environment because they contain magnesium, calcium, potassium, and sodium ions. Additionally, a diet that relies more on the omega-3 fatty acids creates a more anti-inflammatory internal environment. David R. Seaman's textbook *Clinical Nutrition for Pain, Inflammation and Tissue Healing* is a recommended source.

Allopathic Treatment

Prophylactic drugs or surgeries are medicinal methods to control the occurrence of PD. Women have a plethora of choices to pursue relief with NSAIDs, hormonal contraceptives, calcium-channel blockers, COX-2 inhibitors, leukotriene receptor inhibitors, nitroglycerin, cervical dilation, hysterectomy or laparoscopic uterosacral nerve ablation procedures. These methods work because they restrict prostaglandin formation, relax muscle contractions, decrease the inflammatory response, or eliminate obstruction and nerve supply to the uterus. However, there is an inherent risk of causing side effects or death with medical intervention. Women need to be aware of the risks and benefits associated with their choice of treatment.

Hormonal contraceptives are an attractive method for many women who like the dual functions of preventing pregnancy and controlling the symptoms of dysmenorrhea. Estrogen-progestin combination contraceptives come in the form of oral pills, transdermal patch, vaginal ring, and injection. Oral pills, implants, intrauterine devices, and injections are also available with progestin only. However, subdermal contraceptive implants have not been available in the United States since the US Food and Drug Administration prohibited the sale of Norplant in 2000. Hormonal contraceptives inhibit ovulation, thicken cervical mucus, and decrease the thickness of the endometrium. A thinner endometrial lining of the uterus facilitates a decrease in prostaglandin production during menstruation. This is how oral contraceptives work to reduce the dysmenorrheic condition. Oral contraceptives have gained popularity because of their ability to act as a birth control method while protecting against ovarian and endometrial cancers, benign breast disease, pelvic inflammatory disease. The latest estrogen-progestin oral contraceptive (OC), Seasonale, will offer women the same benefits. Unlike the traditional 28-day OC, Seasonale is the first 91-day OC that allows a woman to have four menstrual cycles a year. It extends the menstrual cycle for 84 days followed by 7 days of actual menstrual flow. Studies^{72,73} are showing Seasonale to be an effective OC and safe, relative to dosage, for the treatment of moderate acne.⁷⁴ Other "off label" uses of oral contraceptives include treatment for iron deficiency anemia, acne vulgaris, menstrual disorders, and osteoporosis. Hormonal contraceptives are not without associated risks and side effects. The appropriate contraceptive

choice depends upon the age, health status and sexual habits of the individual. Until further studies are done, a conservative approach when dealing with the health of adolescent female reproductive health is warranted to minimize the side effects of drugs and limit long-term exposure.

The easy access to over-the-counter NSAIDs makes them a more popular treatment for dysmenorrhea than oral contraceptives. However, the latest development of COX-2 inhibitors for the treatment of dysmenorrhea is promising. Valdecoxib and celecoxib, commercially known as Valtrex and Celebrex, are conventionally used for the symptomatic relief of pain associated with osteoarthritis and rheumatoid arthritis. They are now indicated for use in primary dysmenorrhea because their anti-inflammatory properties inhibit cyclooxygenase. Valdecoxib has an advantage over NSAIDs in that it produces less gastrointestinal damage and lacks an effect on platelet function. Clinical trials indicate that 40 mg of valdecoxib is effective for relieving menstrual pain while taking effect within 30 minutes and lasting up to 24 hours per dose.⁷⁵ Only time will tell if COX-2 inhibitors will become available without a prescription, as other drugs have done so in the past.

Laparoscopic presacral neurectomy and hysterectomy surgeries are aggressive approaches for treating PD. Pain relief by cutting the sensory pathways between the uterus and the inferior and superior hypogastric plexus is effective in 75–80% of cases. A study supporting this fact evaluated women after the neural ablation procedure and at 6 months post-operative 87.3% reported relief from dysmenorrhea.⁷⁶ Furthermore, 85.7% reported continued relief of menstrual pain at twelve months post-operative. The decline in the success rate may be explained by the theory of neural plasticity, whereby alternative pathways continue to supply innervation to the uterus. Women who are intensely aggravated by menstrual disorders associated with dysmenorrhea may pursue a surgical remedy such as a hysterectomy that irreversibly prevents future pregnancies. Menorrhagia, also associated with dysmenorrhea, is a common complaint among 66% of women age 31–50 seeking hysterectomies.⁷⁷ A medical gynecological procedure may facilitate dysmenorrhea. A case study identified dysmenorrhea due to retrograde menstruation has occurred after a tubal ligation.⁷⁸

Chiropractic Treatment

The chiropractic manual adjustment of the spine is an alternative to the inherent risks and invasiveness of medicinal prophylactics. High velocity, low amplitude manual adjustment was evaluated for its effectiveness and mechanism of action in the treatment of PD. Research has also investigated the effects of the adjustment on prostaglandin levels. Kokjohn et al⁷⁹ conducted a pilot study measuring the effects of a chiropractic manual adjustment on the prostaglandin F2 alpha metabolite, 15-keto-13, 14-dihydroprostaglandin (KDPGF2a), levels in women with primary dysmenorrhea. The research team recorded data, 15 min before and 60 min after treatment, showing a positive response from a high velocity, short lever, low amplitude thrust. The manual thrust was applied to clinically relevant vertebral levels at T10, L5-S1, and sacroiliac joints on the first day of menses. The results demonstrated a significant reduction in plasma levels of KDPGF2a, as well as, a two-fold decrease in pain perception and level of menstrual distress compared to the sham group. The pilot study by Kokjohn et al also noted, to a lesser degree, a statistically significant decreased prostaglandin level in the group receiving the sham adjustment.

Hondras et al⁸⁰ conducted a follow-up clinical trial study and observed similar findings over three consecutive menstrual cycles. However, the subjective and objective findings were not deemed statistically significant to validate the report. An earlier study⁸¹ demonstrated that a manual adjustment of the spine at related areas to restore joint mobility effectively relieved low-back and menstrual pain. The results were measured as surface electromyography readings decreased post-treatment, thereby indicating muscle relaxation along the lumbar spine. A hypothesis in support of chiropractic care suggests that the removal of mechanical joint fixations correct the aberrant motion and elicits a sympathetic response to inhibit uterine contraction. Another hypothesis suggests that the chiropractic adjustment interferes with pain reflexes that link the mental interpretation in the cerebral cortex to the physical manifestation of pain in the uterus.

Physical Therapy Modalities

The inflammatory process may be restricted and noxious stimulation is overcome during the administration of physical therapy treatment modalities.

Symptomatic relief of PD may be obtained by deep heat penetration, cutaneous nerve stimulation, and ischemic compression. Heat and electrical stimulation may override pain nerve impulses and create a decreased perception of pain in accordance with the gate-control pain theory. In a case study, microwave diathermy (45 W total power) was demonstrated to relieve dysmenorrhea.⁸² Immediate and long lasting effects were reported after 20 minutes of application on the first day of menstruation. This was a significant result for the 31-year-old woman who had experienced PD for 18 years that caused her to formerly seek treatment through several hospital emergency departments. Reportedly, the debilitating dysmenorrhea caused a regular absence of 1 to 3 days from work. Health practitioners may also effectively and safely use a portable unit to create high frequency transcutaneous electrical nerve stimulation.⁸³ Ischemic compression dissipates trigger points that would otherwise produce radiating pain into the legs, low back and abdomen. As previously mentioned, a retrospective review of charts of 15-year-old females experiencing musculoskeletal pelvic pain identified that physical therapy relieved pain in 95.24% of cases.²⁷ Physical therapies also include lengthening and stretching hip muscles and rehabilitation exercises to relieve referred pain patterns complicating dysmenorrhea.

Alternative Therapeutics

Traditional Chinese medicine uses acupressure and acupuncture techniques to stimulate free-nerve endings in the attempt to override neurological pain pathways. Acupuncture is also believed to release natural endorphins. The stimulation of acupressure points of 14 to 18 year olds was found to be as effective as using ibuprofen medication.⁸⁴ Researchers have also tested in clinical trials the effectiveness of an undergarment constructed of cotton, lycra and latex foam accupads. The acupressure garment is intended to stimulate pressure points in the lower abdomen and back muscles associated with relieving dysmenorrhea. After wearing the garment for two consecutive menstrual cycles, the participants required less pain medication and experienced a 25% reduction of pain.⁸⁵ There are also other points associated with menstrual relief located along the body meridians. Studies are limited on the success of acupuncture relieving menstrual cramps. However, clinical trials and cases have shown its effectiveness superior to a sham acupuncture placebo or non-treatment. A case report identified a woman

who received acupuncture treatments and herbal medicine with a resolution of symptoms in six months that required no further care.⁸⁶ Treatments were given one week prior to menses over the course of three menstrual cycles and the relief improved her quality of life.

CONCLUSIONS

The central nervous system is a conduit by which mechanical, neurological, and chemical stimulation affects the sensory and motor responses of primary dysmenorrhea. Chiropractic, allopathic, and alternative health care treatments may be able to restrict or influence menstrual cramps through the manipulation of these stimuli. The chiropractic adjustment may remove the mechanical and neurological insult associated with segmental joint dysfunction. However, more studies are needed to document the occurrence of women experiencing symptomatic relief through the chiropractic adjustment. Nutritional, physical and alternative therapies act through diet modification and by the release of neuromusculoskeletal reflexes.

Allopathic medicine effectively alters chemical and neurological stimulation through drugs and surgery, yet with associated risks. Depending on scope of practice, chiropractors may also use complimentary therapies including physical therapy modalities, acupuncture, acupressure, nutritional guidance, or supplementation. As such, chiropractors have the potential to be effectively used as a naturalistic source for treating PD.

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