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Optimizing Oral Health in Women: More than Just Lip Service

By Susan T. Marcolina, MD, FACP, and Pamela A. Fenstemacher, MD, FAAFP

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Dr. Marcolina and Dr. Fenstemacher report no consultant, stockholder, speaker's bureau, research, or other financial relationships with companies having ties to this field of study.

PART 1 OF A SERIES ON ORAL HEALTH

DENTAL CARIES AND PERIODONTITIS ARE INFECTIOUS, COMMUNICAble diseases that cause significant public health problems in the United States. Periodontitis, an infection of the tissues that support the teeth, has been shown in several studies to be a risk factor for poor health beyond the oral cavity. An increased risk of preterm low birth weight infants, aspiration pneumonia, coronary disease, stroke, and poor glycemic control in diabetics are all seen with poor oral health. This burden of disease is disproportionately carried by persons who are poor and uninsured, medically and developmentally disabled, immunocompromised, and elderly, both home-bound and institutionalized. Because women constitute the majority of the elderly population and the entire child-bearing population, it is clear that throughout their lifespan they are vulnerable to periodontal and dental disease.

National Initiatives in Oral Health

Oral Health in America: A Report of the Surgeon General David Sachter in May 2000 alerted the American public to the importance of oral health to their overall general health at every stage of their lives, highlighted the profound and consequential oral health disparities that exist within populations of the United States, and called upon policymakers, community leadership, private industry, health professionals, the media, and the public to implement strategies to mitigate these disparities.[1]

Since the publication of this report, the Centers for Disease Control and Prevention (CDC) has required acute care hospitals "to

develop and implement a comprehensive oral hygiene program" for patients at risk for health care-associated pneumonia, which includes ventilator-associated and aspiration pneumonias.[2]

Access Problems

Medical and dental insurance are strong determinants of dental care access. In the United States, dental coverage is provided either through commercial insurance (employer-based or individual purchase) or Medicaid/State Children's Health Insurance. Only about 50% of the U.S. population is covered by a third party dental plan. For each child without medical insurance, at least 2.6 children are without dental insurance.[1] The latest U.S. Census Bureau data on poverty, income, and health insurance coverage show that economic security for women and their families has eroded over the past six years. The real median income for female-headed households with children has declined from $24,800 in 2000 to $23,100 in 2005 and the percentage of women without health insurance grew from 13.8% in 2000 to 15.6% in 2005, a faster increase than for the overall population. More than one in five (20.8%) elderly women living alone in 2005 was poor.

Dental caries affect 20% of 2-4 year olds, 50% of 5-9 year olds, 67% of 12-17 year olds, and 94% of adults. In 1996, only 28% of people with a yearly income of $32,000 or less reported a dental visit in the preceding year vs. 56% of persons with a yearly income of $64,000 or more. As a result, 33% of poor adults have untreated dental decay as compared to 11% of adults in higher income brackets. Such untreated decay causes pain, compromised nutrition, poor appearance, and diminished productivity, which perpetuates poverty.[3-5]

In 1999, the United States General Accounting Office surveyed Medicaid program officials in all 50 states regarding dentists' participation. Of the 39 states that provided this information, 23 reported that less than 50% of their states' dentists saw at least one Medicaid patient in 1999.[6] Newacheck et al, using the 1994-1995 National Health Interview Survey on Disability, found that approximately one of 12 children with special health care needs was unable to get necessary dental care.[7] Dental providers cite low reimbursement rates, missed appointments, and administrative paperwork burden as obstacles to accepting Medicaid patients. For geriatric patients, Medicare specifically excludes routine dental preventive and restorative services.

The fact that tooth decay and periodontitis are both treatable and preventable through a regular regimen of brushing, flossing, and professional dental care suggests that there is a need to get back to the basics. Primary care physicians, who see patients daily in the office for routine and urgent care, are uniquely positioned to notice these problems, educate their patients about routine preventive oral self-care, and refer them to dental professionals before costly, painful problems arise. Ultimately, collaboration between medical, dental, and public health professionals is necessary for the integration of oral health into general medical health because the oral cavity, as a major portal of entry into the body, both reflects and influences general health and well-being.

Microbiology of Dental Caries and Periodontitis

A diverse bacterial flora inhabits the oral cavity due to the ideal humidity, temperature, and availability of nutrients. Although more than 300 types of bacteria reside here, only a few cause dental caries and the tissue destruction of periodontitis. The oral cavity is sterile prior to birth. Subsequently, *Streptococcus mutans* becomes the predominant cariogenic bacteria in plaque and high counts are associated with increased risk of tooth decay.[8] Bacterial typing of *S. mutans* has shown that mothers are a major source of oral infection in their infants.[9]

Although adult periodontitis is strongly associated with *Bacteroides gingivalis*, several other types of anaerobic bacteria such as *Fusobacterium nucleatum* also cause periodontitis. *Actinobacillus actinomycetamcomi-*

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Please call **Paula Cousins**, Managing Editor, at (816) 237-1833 between 8:30 a.m. and 4:30 p.m. ET, Monday-Friday.

tans is the pathogen primarily responsible for an early-onset, rapidly progressive juvenile periodontitis.[10]

Pathophysiology of Dental and Periodontal Disease

Oral hygiene is the efficient removal of plaque and tartar (calcified plaque) from the surface of the teeth. Plaque is a sticky layer of oral bacteria that combines with food residue and causes tooth decay and periodontal disease. Plaque bacteria metabolize dietary sugars into acids, which penetrate the tooth enamel and damage the internal structure as well as the surrounding gum and ligamentous tissue that anchor the tooth in bone of the jaw. Damage to the ligaments and gum tissue is measured with a calibrated probe and thus the clinical attachment level can be quantified in millimeters of depth.

Plaque accumulates in the subgingival space causing gingivitis, the early manifestation of periodontal disease, which appears as gum puffiness and inflammation. If untreated, deep pockets form between the tooth and gum margin. This process destroys the bony and ligamentous support of the tooth and results in loss of dentition.[10] Moss et al found increased serum levels of tumor necrosis factor-alpha to be associated with the extent of disease progression in periodontitis patients with active attachment loss.

The elaboration of lipopolysaccharides by the predominately gram-positive anaerobic bacteria in the gingival pockets causes inflammatory cell proliferation in large arteries and stimulates hepatic synthesis of clotting factors, which contribute to atherogenesis and thromboembolic events.[11] Several periodontal pathogens such as *Streptococcus sanguis* induce platelet aggregation and thus may be thrombogenic when hematogenously disseminated.[12] The relationship between dental procedures and transient bacteremia has been well documented and must be considered whenever there is a diagnosis of endocarditis or infections of prosthetic implants. Additionally, periodontitis also influences the serum levels of well established cardiovascular risk factors such as lipids, fibrinogen, and C-reactive protein by modifying them toward a more atherogenic profile.[13]

The pro-inflammatory cytokine interleukin-1 (IL-1) is a key regulator of host responses to microbial infection. McDevitt et al report that variations in the IL-1 gene cluster on chromosome 2 are associated with increased susceptibility to severe adult periodontitis.[14,15]

Factors Predisposing to Oral Hygiene Problems

Hyposalivation. Although plaque causes periodontal disease and tooth decay, systemic conditions and health habits exacerbate these problems. Autoimmune illness and drug- or radiation-induced xerostomia, which lead to permanent or temporary reductions in salivary flow, dramatically alter the natural oral bacterial ecosystem, resulting in an increase in oropharyngeal colonization with gram-negative bacteria.

Under normal circumstances, saliva produced by salivary glands is a buffer for acids formed by plaque. Saliva also lubricates the mouth and facilitates clearance of food particulates from the oral cavity. It is supersaturated with calcium and phosphorus and serves as an abundant source of these ions for the remineralization of early tooth surface lesions. Bacteriostatic compounds such as lysozyme, lactoferrin, lactoperoxidase, and secretory immunoglobulins are also contained in saliva.[16] The secretory immunoglobulins, primarily IgA, are important for the prevention of adherence of the *S. mutans* bacteria on the tooth surface.[10] Kapsimalis et al found an inverse correlation in humans between the amount of saliva produced and the number of coronal caries present.[17] Hyposalivation has also been linked to root cavities (cavities below the gum surface), increased gingivitis severity, loss of taste acuity, increased risk of infection, and reduced denture retention.

Many commonly used medications cause hyposalivation as a side effect. A large cross-sectional study by Beck et al showed that 47% of elderly patients receive drugs that decrease salivary flow.[18,19] Common medication classes that diminish salivary flow and put patients at risk for poor oral hygiene are listed in the Table.[20]

Diabetes. Both Type 1 and Type 2 diabetes and periodontal disease have reciprocal effects since uncontrolled

Table

The most common drug classes that cause xerostomia

Anticholinergics/Antispasmodics
Antihypertensives
Anticonvulsives
Chemotherapeutic agents
Antipsychotics
Antibiotics
Antidepressants
Antihistamines
Decongestants
Sedative-hypnotics
Acne medications (Accutane)

Adapted from: Sreebny LM, Schwartz SS. A reference guide to drugs and dry mouth. *Gerodontology* 1986; 5:75-99.

diabetes is a risk factor for periodontal disease and periodontal problems complicate the management of diabetes. The long-term microvascular complications of diabetes have important oral manifestations including increased susceptibility of oral tissues to trauma, xerostomia, delayed wound healing, and opportunistic infections such as candidiasis.

Sreebny et al conducted a prospective trial of 40 ambulatory adult diabetic outpatients (82% female) with an equal number of age- and sex-matched controls to determine the prevalence of dry mouth and to compare salivary and lacrimal fluid flow rates in patients with and without this complaint.[21] Dry mouth was reported by 43% of the diabetic study patients. The oral dryness was not associated with age or the type or duration of diabetes. Although the resting and whole saliva flow rates were abnormally low in the diabetic patients who complained of dry mouth, no significant differences were observed for the stimulated salivary and the lacrimal flow rates. Significant inverse relationships were demonstrated, however, between salivary flow and hemoglobin A1C levels, suggesting that oral dryness in diabetics may be due to disturbances in glycemic control. Persons with Type 1 and Type 2 diabetes appear to be equally susceptible to periodontal disease.[22]

Tobacco Use. The use of tobacco products exacerbates dental and periodontal disease. Tobacco produces potent local inflammatory effects on the oral mucosa that cause tissue damage and xerostomia. Moore et al, in a prospective, epidemiologic cohort study of Type 1 diabetics, found that smoking increases risk of periodontal disease almost 10-fold.[23] Smoking is also a risk for nondiabetic periodontal disease. Haber et al, in a randomly selected cross-sectional population study of young (19-40 years of age) diabetic and nondiabetic patients, found the odds ratio for development of periodontitis for nondiabetic smokers was 8.6 compared to nonsmokers; the odds ratio for the development of periodontitis in diabetic smokers was 6.9 relative to diabetic nonsmokers.[24]

Dietary Sugars. The consumption of sugars in beverages and snacks, especially sucrose, contributes to tooth decay problems as well. *S. mutans* preferentially metabolizes this disaccharide as it accumulates on tooth surfaces. The relationship between sugars in the diet and caries, however, is complex and related to many factors including the frequency of eating and the amount of retained food in critical areas of the tooth surface and the gingival tooth sulcus.[25]

Gastric Acid Exposure. Enamel erosions called perimylolysis can be seen as a result of regular contact with regurgitated stomach acid either from gastroesophageal disease (GERD) or eating disorders such as bulimia. Such abnormalities are primarily seen on the posterior maxillary molars and are one of the initial signs of the eating disorder bulimia and often precede other overt clinical symptoms of GERD. Acid exposure also causes the soft tissues of the mouth to become swollen and dry with resultant halitosis. Once teeth abnormalities are recognized, underlying illness can be treated and dental sealants can be applied to protect the affected teeth from decay.[26]

Substance Abuse. Drug abuse with crystal methamphetamine produces the characteristic stigmata of "meth mouth" with numerous darkened caries located along the gum lines. The etiology of the tooth decay is multifactorial as the methamphetamine causes xerostomia, abuse results in neglect of personal hygiene and health, and the caustic substances used directly damage dental enamel, predisposing the tooth to decay. This has been recognized over the past 10 years and results in severe dental decay which often requires tooth extractions. Alcoholism and other substance abuse problems, which have as sequelae severe dental neglect and poor nutrition, can also be recognized by symptoms that appear in the oral cavity.[27]

Fluoride Use. In contrast to factors that exacerbate dental and periodontal disease, Dean et al observed a strong inverse correlation between the natural fluoride concentration in community water supplies and the number of decayed, missing, and filled teeth in children aged 12-14 years.[28] After these studies were reported, the United States began large-scale community water fluoridation programs in the 1950s, which resulted in a decline in the prevalence and severity of dental caries.

Conclusion

Examination of the above clinical study data in conjunction with the pathophysiological processes that are consequences of periodontal and dental disease provides adequate evidence that careful attention to daily oral hygiene is an essential part of improving and maintaining good general health for women at all stages of their lives. For physicians, examination of the oral cavity may reveal the presence of systemic conditions that require further investigation and treatment. The challenges to achieving optimal oral health in common clinical situations found throughout a woman's lifespan will be discussed in Part 2 as well as strategies which improve oral health in these populations. ❖

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Long-Term Observational Study Demonstrates Safety of Black Cohosh Extract in Postmenopausal Women

By Donald Brown, ND
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Source: Rauš K, et al. First-time proof of endometrial safety of the special black cohosh extract (*Actea* or *Cimicifuga racemosa* extract) CR BNO 1055. *Menopause* 2006;13:678-691.

Abstract: In a prospective, open-label, multicenter, multinational (Czech Republic and Poland) study, the safety of a

standardized black cohosh preparation was studied in postmenopausal women. Four hundred women (mean age 56.38 ± 4.77 years) were given 20 mg of black cohosh (*Cimicifuga racemosa* [L.] Nutt., Ranunculaceae) rhizome extract twice daily. The black cohosh extract used in the trial (BNO 1055, Klimadynon®/Menofem®) was supplied by Bionorica AG (Neumarkt, Germany) and is a dried aqueous/ethanolic (58%, v/v) preparation of the rhizome (standardization specifics are not provided in the paper). The treatment period was 52 weeks.

Data were collected at visit 1 (weeks -4 to -1), visit 2 (day 0 = baseline), visit 3 (four weeks after baseline), visit 4 (week 13), visit 5 (26 weeks), visit 6 (39 weeks), and visit 7 (week 52). The primary outcome of the study was the occurrence of endometrial hyperplasia or more serious adverse endometrial outcome such as carcinoma. Secondary outcome measures included changes in breast density, vaginal bleeding episodes, hormone measures (17β-estradiol, leutinizing hormone [LH], and follicle-stimulating hormone [FSH]), and markers of osteoblast (osteocalcin) and osteoclast (β-CrossLaps). Additionally, serum lipids (total cholesterol [TC], LDL-C, HDL-C, and triglycerides) as well as liver enzymes were measured. The occurrence of adverse events was recorded and the incidence of climacteric complaints was measured using the Menopause Rating Scale II (MRS II).

A total of 375 women completed the entire treatment period of 52 weeks. There were no findings of endometrial hyperplasia or more serious adverse endometrial outcomes reported. In accordance with the result of endometrial biopsies, there was no increase in endometrial thickness found in any subject. Fifty-nine women reported some kind of bleeding episode while taking black cohosh (36, spotting; 8, mild bleeding; 9, moderate bleeding; and 6, strong bleeding). However, in none of these cases were there findings of hyperplasia or development of endometrial thickness more than 5 mm. Serum levels of 17β-estradiol and FSH remained in the postmenopausal range. There were no changes from baseline for breast density with the exception of one woman for whom an invasive breast cancer was diagnosed (this was assessed as not treatment-related). In women with high baseline levels of β-CrossLaps, a significant decrease in the measure was seen over the course of the study (a sign of antiresorptive activity) as opposed to either no change or a slight increase in those with low baseline levels. The reverse was noted for osteocalcin with the high baseline β-CrossLaps group showing a slight increase with black cohosh treatment, whereas while the low β-CrossLaps group showed a significant increase in osteocalcin activity.

Statistically significant, but clinically irrelevant, increases in TC, LDL-C, HDL-C, and triglycerides were found. The LDL:HDL ratio decreased in 64.8% of women and increased in 35.2% at week 52. However, only four women presented a ratio of more than 3.5, the cutoff value for increased risk of coronary heart disease. The upper limits of noncritical values of SGPT, SGOT, and γ-GT were defined as three times above the upper limit of normal ranges. Three women showed SGPT values above this noncritical range with only one continuing to have a high value at week 52. Two women had SGOT levels above the noncritical range with only one remaining elevated at week 52. In seven women, γ-GT values above the noncritical range were found, with only one remaining high at week 52. All changes were reported as nonserious adverse events (AEs) of moderate intensity and were considered unrelated to the study medication. The intensity of climacteric complaints reflected in the total score of the MRS II was significantly reduced by approximately 50% for the entire study group and the four-week weighted score of hot flashes showed a decrease of 80.7% compared to baseline for the entire study group. A total of 752 AEs were recorded. Of these, 414 (55%) were classified as not related to black cohosh and 12 were unclassified. The causal relationship with black cohosh was assessed as possible for 318 (42%) and probable for eight AEs (1%). The intensity of AEs was mild in about 88% of cases.

Comments

Although the safety of black cohosh has been demonstrated in multiple clinical trials, the length of treatment has typically been three months. This is the first long-term study to demonstrate the safety of a standardized black cohosh extract in postmenopausal women. Key is the finding that the Bionorica black cohosh extract BNO 1055 does not stimulate endometrial hyperplasia and does not appear to increase risk of endometrial cancer when used daily for 52 weeks. Also of note is the lack of an effect on breast density. Although there was no placebo group, the long-term effects of black cohosh on hot flashes compared to baseline appear clinically relevant.

I found it interesting that in women with higher levels of osteoclast activity (i.e., bone resorption) at baseline there appeared to be some antiresorptive activity for black cohosh. This differs with an earlier three-month study, which found no effect of the same black cohosh extract on osteoclast activity but clear effects on osteoblast activity.[1] Let's hope this warrants follow-up trials in this subset of women to see if black cohosh does in fact have a significant slowing effect on bone resorption.

The lack of significant hepatotoxicity is also noteworthy. Most European phytopharmaceutical companies have added a warning for women who have a history of liver disease taking black cohosh and a warning is now required in Canada as well. Based primarily on case reports out of Australia,[2,3] the debate about the hepatotoxic potential of black cohosh continues. Independent safety evaluations have concluded that standardized black cohosh extracts are safe;[4] other experts have questioned the reaction (over-reaction?) to the Australian cases, citing problems ranging from lack of analytical verification of products to poor clinical verification of

the cause of hepatotoxicity.[5] It's also interesting to note that a 2004 workshop on the safety of black cohosh in clinical studies sponsored by the National Institutes of Health found no link between black cohosh and hepatotoxicity.[6] Although this long-term safety study appears to suggest lack of hepatotoxicity, it may be prudent for health care professionals recommending black cohosh extracts to choose products that have a track record of safe clinical use (e.g., Klimadynon and Remifemin®) and to regularly monitor patient liver enzymes.

Practice Implications: The use of a standardized black cohosh extract for 52 weeks does not cause endometrial proliferation or negatively effect breast health in postmenopausal women. The results also suggest a longer-term effect on hot flashes and seem to dispel earlier German Commission E guidelines limiting the duration of treatment to six months.[7] Although evidence of hepatotoxicity was lacking in this study, health care practitioners who choose to recommend black cohosh may want to routinely monitor liver enzymes in light of the new warnings that are appearing on black cohosh products in Europe, Australia, Canada, and the United States. ❖

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CME Objectives

After reading *Alternative Therapies in Women's Health*, the health care professional will be able to:

1. evaluate alternative medicine and complementary therapies for women's health concerns;
2. identify risks and interactions associated with alternative therapies;
3. discuss alternative medicine options with patients;
4. offer guidance to patients based on latest science and clinical studies regarding alternative and complementary therapies.

CME Instructions

Physicians participate in this continuing medical education program by reading the article, using the provided references for further research, and studying the questions at the end of the article. Participants should select what they believe to be the correct answers, then refer to the list of correct answers to test their knowledge. To clarify confusion surrounding any questions answered incorrectly, please consult the source material. After completing this activity, you must complete the evaluation form provided and return it in the reply envelope provided at the end of the semester to receive a credit letter. Upon receipt of your evaluation, a credit letter will be mailed.

CME Questions

21. Risk for which of the following is increased with poor oral health?

a. Preterm low birth weight infants
b. Aspiration pneumonia
c. Coronary disease and stroke
d. Poor glycemic control in diabetics
e. All of the above

22. Which of the following is the predominant cariogenic bacteria in plaque?

a. *Actinobacillus actinomycetamcomitans*
b. *Bacteroides gingivalis*
c. *Streptococcus mutans*
d. *Fusobacterium nucleatum*

23. Mothers are a major source of oral infection in their infants.

a. True
b. False

24. The recently published 52-week study of black cohosh extract BNO 1055 did not demonstrate:

a. increased risk of endometrial hyperplasia.
b. increased risk of endometrial cancer.
c. significant hepatotoxicity.
d. All of the above

Answers: 21. e, 22. c, 23. a, 24. d.

News Briefs

Supplements/Prescription Medications Users Seldom Tell Physicians, Study Says

Patients who take nonvitamin dietary supplements with prescription medications seldom tell their conventional medical professionals, says a study in the Oct. 9 issue of the *Archives of Internal Medicine*.

The researchers examined the patterns of the supplement use among adult prescription medication users in the United States. They used the 2002 National Health Interview Survey to analyze factors associated with the supplement and prescription medication use in the prior 12 months with descriptive, ×2, and logistic regression analysis. Overall, the researchers found that one in four prescription medication users took a nonvitamin dietary supplement in the prior 12 months, yet 69% did not share this with their conventional medical professionals.

Here are other results from the study:

- In the United States, 21% of adult prescription medication users reported using the supplements in the prior 12 months.
- Among adults who used prescription medications in the prior 12 months, the most commonly used supplements included echinacea, ginseng, ginkgo, garlic, and glucosamine chondroitin.
- Prescription medication users with menopause and chronic gastrointestinal disorders had the highest rates of the supplement use (33% and 28%, respectively), and prescription medication users with coronary heart disease and history of myocardial infarction had the lowest rates of use (12% each).
- In the adjusted analysis, factors associated with increased use of the supplements by prescription medication users included being female, being Hispanic, having more years of education, living in the West, lacking medical insurance, and having chronic conditions.
- Elderly respondents were less likely to use the supplements.

NCCAM and The Bernard Osher Foundation Announce Career Development Award

The National Center for Complementary and Alternative Medicine (NCCAM) in Bethesda, MD, has announced a career development award designed to diminish barriers that prevent CAM clinicians from exploring a career in research. NCCAM, a part of the National Institutes of Health (NIH), created this award in partnership with The Bernard Osher Foundation through a grant to the foundation for the NIH.

The Bernard Osher Foundation/NCCAM CAM Practitioner Research Career Development Award will promote the science of CAM through research training and mentorship. The award is for individual CAM practitioners with clinical CAM doctorates who have had limited opportunities for research training, but who have a strong desire to pursue a career in CAM research.

Award winners will receive up to five years of intensive, supervised career development research training in the biomedical, behavioral, or clinical sciences related to CAM. Applicants should hold a health professional doctoral degree (e.g., chiropractic, osteopathic, naturopathic, or acupuncture and Oriental medicine).

The Bernard Osher Foundation, based in San Francisco, supports three integrative medicine research centers at the University of California, San Francisco; Harvard University; and the Karolinska Institute in Sweden. Anyone interested in learning more about the award should visit www.nccam.nih.gov/training.

MD Anderson to Study Effects of Tibetan Yoga on Women With Breast Cancer

Researchers at The University of Texas MD Anderson Cancer Center in Houston have received a $2.4 million grant from the National Cancer Institute to study the effects of Tibetan yoga in women with breast cancer who are undergoing chemotherapy.

The award is the largest ever made to study Tibetan yoga in cancer patients, say the researchers, who published a 2004 study in *Cancer* that found the practice led to significant sleep improvements in patients with lymphoma. Another small study of Tibetan yoga also found improvements in cancer-related symptoms and intrusive thoughts in women with breast cancer.

With this grant support, the research team will randomly assign women with breast cancer who are scheduled to undergo chemotherapy to either a Tibetan yoga group, a control group that does simple stretching, or to a group that receives standard care. The participants will practice their assigned techniques for seven weeks during chemotherapy, and then will have five booster sessions over the next six months.

The study will assess the physical and psychological benefits of the yoga program, and will specifically examine such patient lifestyle factors as fatigue and sleep, mental health, and distress. Additionally, the study will evaluate cognitive and emotional processing, social networking and interactions, coping, and other psychosocial factors, the researchers say. ❖

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