

# Herbal Supplements: Healthcare Implications and Considerations

## Learning Objectives

1. Assess the value of understanding herbal supplements in health-care to make informed decisions about treatment modifications
2. List and describe commonly used herbal supplements
3. Compare and contrast the daily dosage, common uses, mechanism of action, side effects, and interactions of common herbal supplements

## Introduction

The use of herbs or botanicals to treat health ailments has been relied upon since the beginning of recorded human history. One of the oldest surviving medical documents, the Egyptian Ebers Papyrus, is dated around 1550 BC, but many experts believe many of its sections date as far back as 3,500 BC. It contains herbal remedies for over 876 illnesses.<sup>1</sup> It is reported that Hippocrates, the “Father of Medicine”, studied with Egyptian priest-doctors and his writings contain references to over 250 medicinal plants and herbs.<sup>2</sup> Many other ancient Chinese, Arabian and Italian documents also classify herbal medicines.<sup>3-6</sup> Early documents were hand copied and primarily available to royals, clergy and academics. With the invention of the printing press in the 15<sup>th</sup> century, printed herbal texts were more accessible and the commoner was able to self-medicate with herbal medicines.<sup>7</sup>

According to the World Health Organization, herbal medicine is still used as the primary health care system in many developing countries today.<sup>8</sup> Herbal or dietary supplement use has dramatically increased in the United States each year, with a peak during the 1990s. Herbal remedies, supplements, and other natural products have been widely used in America since the 17<sup>th</sup> century.<sup>9</sup> Herbal products were primarily used as analgesics, contraceptives, laxatives, sedatives, and treatment for colds, tuberculosis and cancer. Americans today are choosing to include supplements in their healthcare regimen for many different reasons. According to the National Center for Complementary and Alternative Medicine, Americans use herbal supplements for a variety of reasons from improvement of health and well being, to decreasing arthritis and joint pain, to boosting immune health and energy.<sup>10</sup> Beneficial effects of herbal and dietary supplements are not seen as rapidly as conventional medications and often take 4-6 weeks before any effects will appear.

## Regulation of Herbal and Dietary Supplements

Herbal and dietary supplements (H/DS) are highly regulated in Germany, Canada and China, where H/DS are regulated similarly to

prescription medications. In the United States, H/DS are regulated by the U.S. Food and Drug Administration (FDA) as foods, under the dietary supplement category. This means that they do not have to meet the same standards as drugs and over-the-counter medications for proof of safety, effectiveness, and

what the FDA calls Good Manufacturing Practices.<sup>11</sup> In 2007, the FDA adopted regulations that will require supplement manufacturers to evaluate the purity, strength and composition of their dietary supplements to ensure that they contain what their labels claim and are free of contaminants. The regulations are being phased in over three years, and will not be in full effect until 2010. It is also important to understand that these regulations don't change the fact that herbal and dietary supplements – unlike medications – are not required to obtain FDA approval before going on the market.

The FDA requires certain information on the labels of all herbal supplements:

- The name of the herbal supplement, such as Echinacea. Many manufacturers refer to the herbal supplement by their common name and the part of the plant used to make the herbal supplement, such as Echinacea Root. Some manufacturers use the more formal name, such as *Echinacea Purpurea*, *Echinacea Pallida* or *Echinacea Augustifolia*.
- The net quantity of contents, such as, “60 capsules.”
- In most cases, a disclaimer: “This statement has not been evaluated by the Food and Drug Administration. This product is not intended to diagnose, treat, cure or prevent any disease.”
- A Supplement Facts panel, which includes serving size, amount and active ingredient.
- Other ingredients, such as herbs and amino acids, for which no daily values have been established.
- The name and address of manufacturer and the packer or distributor of the supplement.

## Patient Profile

Common users of H/DS are white females who are over 40 years of age, reside in the western US states and have high levels of income and education. Women reportedly use H/DS more often than men, with



44% of females reporting their use, versus 35% of men.<sup>12</sup> Nearly 16% of U.S. women report having taken an herbal supplement within the last year compared to 13% of their male counterparts.<sup>15</sup> Women in this category often use herbal and dietary supplements to alleviate menstrual and mood difficulties, menopausal symptoms, and bone health. Use of H/DS increases with age and is consistent with data showing the use of Complementary and Alternative Medicine (CAM) increases with age.<sup>13</sup> In a study of women over 65 years of age, 25% reported using an herbal supplement within the last year.<sup>14</sup> Despite the greater use of herbal supplements among women, herbal supplement use for men doubled from 1998 – 2002 in those 65 years or older.<sup>15</sup> Men and women over 65 years of age commonly use herbal and dietary supplements to improve energy, memory and general health. Additionally, although women use H/DS more often than men, studies have shown that men consume more supplements (higher doses) than women.<sup>16-17</sup>

Although consumers of dietary supplements are usually characterized as adult, well-educated females of higher socioeconomic status, H/DS use is expanding to include those of diverse ethnicities. Most H/DS supplement users are non-Hispanic Whites, followed by non-Hispanic Blacks and Mexican-Americans.<sup>18</sup> A multi-vitamin was the most frequently reported H/DS among all ethnic-gender groups and the use of Vitamin A and iron supplements among Latinos and African-Americans was nearly twice that of the other ethnic groups in the cohort. An increasing number of ethnic/racial groups rely on herbal remedies as part of their cultural heritage or folk remedies for common ailments.<sup>19-20</sup>

## Patient's Disclosure of Herbal and Dietary Supplements

Identification of patients taking herbal supplements assists healthcare providers in the prevention of possible adverse effects. A recent study revealed that 54% of dental patients used some form of herbal supplement and of those, 69% were also using prescription drugs.<sup>21</sup> This is consistent with data from the 2002 National Health Interview Survey (NHIS) that revealed among herb users, 72% also used prescription medication and 84% used over-the-counter (OTC) medication within the last 12 month.<sup>22</sup> Kaufman and colleagues reported approximately 16% of US adults use herbal supplements concurrently with prescription drugs.<sup>10</sup> Common reasons that patients do not disclose H/DS use are: “not important for the doctor to know, the doctor never asked, it was none of the doctor’s business, and the doctor would not understand.”<sup>23</sup> The concomitant use of herbal supplements has raised a growing medical concern over possible herb-drug interactions.<sup>23-25</sup>

Further, among patients that use H/DS, over 41% did not report their use to their primary care physicians.<sup>26</sup> In a pre-anesthesia interview at the Texas Tech University Medical Center, nearly 70% of patients taking one or more herbal supplements did not report this information, even when asked.<sup>27</sup> In a multi-center study in California, 56.4% of adults



presenting for elective surgery did not inform their anesthesiologists of use of H/DS prior to surgery.<sup>28</sup> Even more significant, only 17% of operating surgeons inquired about herbal supplement use preoperatively.<sup>29</sup> In young adults, aged 18-30 years old, researchers found that 67% did not disclose their use of H/DS to a health professional.<sup>30</sup> Another researcher reported that 96% of herbal users in a dental practice did not have written documentation of herbal use in their dental chart.<sup>21</sup> Without the knowledge of herbal or dietary supplement use among patients, the health care provider will be unable to associate possible adverse effects and toxicities that may be caused by the herbal supplements.

## Safety of Herbal and Dietary Supplements

Alarming, herbal supplements combined with prescribed conventional medications, over-the-counter medications, or other herbal or dietary supplements have potential to cause many severe adverse reactions.<sup>31-32</sup> Drugs such as blood thinners and NSAIDs (non-steroidal anti-inflammatory drugs, such as ibuprofen) have the same effect as some of the most popular herbal supplements taken today: ginkgo, garlic, ginseng, ginger, and St. John’s wort.<sup>33</sup> According to research, approximately 15 million Americans are at risk for a systemic interaction associated with herbal supplements combined with a medication.<sup>34</sup>

There are many types of adverse reactions caused by interactions of multiple drugs, one being altered bleeding times. Understanding properly regulated bleeding times for a patient is critical for the safety of the patient following procedures such as oral surgery. It is important to understand that, “[b]esides increases in bleeding times, healthcare professionals should observe their patients for physical manifestations of bleeding complications. Signs of altered bleeding may include excessive or diffuse bruising, petechial hemorrhaging, prolonged bleeding following dental procedures, and spontaneous gingival bleeding.”<sup>35</sup>

The majority of healthcare providers and consumers are unaware of possible side effects and adverse reactions of herbal supplements.<sup>36</sup> In order to provide quality dental hygiene care, it is vital that dental hygienists familiarize themselves with commonly used herbal supplements. A thorough medical and dental history is necessary to prevent possible drug interactions. Modification of the dental treatment plan may also be necessary with patients currently taking herbal supplements.

## Commonly Used Herbal Supplements

According to a 2007 nationwide government survey released in December 2008, the most popular herbal supplements being used by American adults included: Echinacea, Ginseng, Ginkgo biloba, Garlic and Green tea. St. John’s wort continues to be a popular herbal supplement as well.<sup>37</sup> Review of these commonly used herbal supplements will provide the dental professional with important information. Unless otherwise cited, information on these herbal supplements,

including dosage, safety and evidence, will be provided by one of the premier databases devoted to providing evidence based information about herbal and dietary supplements, the *Natural Standard*. For each therapy covered by *Natural Standard*, a research team systematically gathers scientific data and expert opinions. Validated rating scales are used to evaluate the quality of available evidence. Information is incorporated into comprehensive monographs which are designed to facilitate clinical decision making. All monographs undergo blinded editorial and peer review prior to inclusion in *Natural Standard* databases.

### Echinacea

#### Latin Name

*Echinacea purpurea*, *Echinacea angustifolia*, *Echinacea pallida*

#### Common Names

Echinacea, Purple coneflower, Coneflower, American coneflower

#### Uses

Echinacea species are perennials that belong to the family Asteraceae, commonly called Coneflower and originate in central and eastern North America. Traditionally used by American plains Indians for a range of infections and malignancies, the roots and herb (above ground parts) of echinacea species have attracted recent scientific interest due to purported “immune stimulant” properties. The Sioux from South Dakota used it as an analgesic; Kiowa and Cheyenne used it for coughs and sore throats; and the Pawnee for headaches.<sup>38</sup> Oral preparations are popular in Europe and the United States for prevention and treatment of upper respiratory tract infections (URI), and *Echinacea purpurea* herb is believed to be the most potent echinacea species for this indication. In the United States, sales of echinacea are believed to represent approximately 10% of the dietary supplement market.

#### Dosage

There is no agreed upon recommended dose for echinacea. The *Natural Standard* indicates that echinacea is commercially available as capsules, expressed juice, extract, tincture and tea. A common dosing range studied in trials for adults is 500mg - 1,000mg of echinacea in capsule form taken by mouth three times daily for five to seven days. As an extract, 300mg - 800mg of echinacea has been taken by mouth 2-3 times daily for up to 6 months.<sup>39</sup>

#### Safety

The *Natural Standard* also indicates that when used orally or topically in recommended doses for a maximum of 8 consecutive weeks, echinacea is considered safe. One small study suggests it is possibly safe when used in pregnant women or children if taken as directed. Based on theory, some experts discourage the use of



echinacea among patients with cancer, tuberculosis, leukocytosis, collagenosis, multiple sclerosis, HIV/AIDS or autoimmune diseases. In addition, echinacea may cause allergic reactions in patients with allergies to members of the Asteraceae/Compositae plant family (ragweed, chrysanthemum, marigold, and daisy).<sup>39</sup>

#### Evidence

According to the *Natural Standard*, “although multiple low quality studies have previously suggested that taking echinacea by mouth by adults when cold symptoms begin may reduce the length and severity of symptoms, a clinical trial reported in July 2005 did not demonstrate any clinical benefit. Recent meta-analyses are conflicting; one suggested that standardized extracts of echinacea were effective in the prevention of symptoms of the common cold after clinical inoculation, compared with placebo, whereas the other reported no such benefit. Further research is needed.”<sup>39</sup>

#### Dental Hygiene Considerations

If the leaves are chewed in some echinacea species, a tingling effect can be seen in the mouth, similar to a topical anesthetic. Swelling of the tongue has been reported as an adverse effect of echinacea use.

### Ginseng

#### Latin Name

*Panax ginseng* (Asian ginseng), *Panax quinquefolius* (American ginseng).

#### Common Names

Asian ginseng, Ginseng, Chinese ginseng, Korean ginseng, Asiatic ginseng, American ginseng. It should not be confused with Siberian ginseng or eleuthero (*Eleutherococcus senticosus*), as this herb is not a true ginseng.

#### Uses

Ginseng is so old that scientists refer to members of its genus as “living fossils” because it has virtually remained unchanged since its first appearance over 65 million years ago.<sup>40</sup> Because ginseng must be grown for five years before it is harvested, it commands a high price, with top-quality roots easily selling for more than \$10,000. The two most commonly used species of ginseng are Asian ginseng (*Panax ginseng*), which is mostly extinct in its natural range, and American ginseng (*Panax quinquefolius* L.), which is still both harvested from the wild and cultivated. Asian ginseng (*Panax ginseng*) has been used in China for more than 2,000 years for various ailments, including asthma, male infertility and erectile dysfunction, memory loss, reduced physical performance, fatigue, and weakened immune system and as an aphrodisiac, and cancer treatment. Today, Asian ginseng is typically used to counter fatigue and



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improve vitality, to boost the immune system and enhance stamina and physical capacity. Asian ginseng is a slow-growing perennial plant with fleshy roots, in the family Araliaceae. It grows in the Northern Hemisphere in eastern Asia (mostly northern China, Korea, and eastern Siberia), typically in cooler climates. In the United States, Asian ginseng is one of the top ten herbs sold.

American ginseng (*Panax quinquefolius*) was a folk remedy used medicinally by many Native American tribes as a mild stimulant and digestive aid, as well as for various other health problems including headaches, female infertility, fever, and earache. Today, American ginseng is typically used for beverages. It grows wild predominantly in the forest of the eastern United States and southeastern Canada. Since the demand by Asian and American markets has increased, the plant is now considered endangered or threatened in several states. American ginseng is difficult to cultivate, but Canadian farms now grow more American ginseng than any others. In the United States, most American ginseng is cultivated in Wisconsin.

### Dosage

A variety of forms of ginseng are typically used from capsules and tablets to teas and decoctions. Like Echinacea, there is no accepted, standardized dosage. According to the *Natural Standard*, one source indicates that the typical adult dose is 100-200mg a day. As a result of controlled studies, the official German pharmacopeia (DAB 10) prescribes daily dosages of 1-2g of dried ginseng root or 20-30mg of ginsenosides. Based on unsubstantiated sources, the typical average dose may be 1-2g of raw herb (root), or 100-200mg daily of a standardized extract containing 4-7% ginsenosides. The *Natural Standard* also reports that practitioners have recommended that after using ginseng continuously for 2-3 weeks, people should take a break for 1-2 weeks.<sup>39</sup>

### Safety

The *Natural Standard* reports that clinical trials have indicated that Asian ginseng and American ginseng are likely safe when used in recommended doses for a short period and do not seem to be associated with serious long-term side effects. Based on limited evidence, long-term use may be associated with skin rash or spots, itching, diarrhea, sore throat, loss of appetite, excitability, anxiety, depression, or insomnia. It also “has the potential to inhibit platelet aggregation, thrombin, thromboplastin, and can cause further bleeding when combined with aspirin, heparin, warfarin, and non-steroidal anti-inflammatory drugs.”<sup>33</sup> Ginseng can also “lower blood glucose, which may contribute to hypoglycemia in surgical patients who are often kept fasting.”<sup>41</sup> Hypertension, nervousness, and insomnia are possible side effects for ginseng use. Animal studies and early human research suggests that ginseng may be safe to use during pregnancy and lactation, but safety has not been clearly established in humans. Therefore, ginseng use is generally not

recommended during pregnancy or lactation.<sup>39</sup> It is also important to note that many tinctures contain high levels of alcohol and should be avoided during pregnancy.

### Evidence

According to the *Natural Standard*, only a few randomized controlled trials using ginseng as a monotherapy have been reported and most are in Chinese. Most studies investigate ginseng in healthy humans to optimize exercise or cognitive performance. Although preliminary research seems promising in the area of cardiovascular health, more studies are needed to make a firm recommendation.<sup>39</sup> American ginseng (*Panax quinquefolius*) studies report a hypoglycemic effect in patients with type 2 diabetes, in both fasting blood glucose and postprandial (after meal) glucose levels. Research is now being conducted to evaluate long-term efficacy of ginseng in managing blood sugar levels.

### Dental Hygiene Considerations

Ginseng has the potential to inhibit platelet aggregation, thrombin, thromboplastin, and can cause further bleeding when combined with other antiplatelets, such as aspirin, heparin, warfarin, and NSAIDs.<sup>33</sup> Ginseng can also “lower blood glucose, which may contribute to hypoglycemia in surgical patients who are often kept fasting.”<sup>41</sup>

## Ginkgo biloba

### Latin Name

*Ginkgo biloba*

### Common Names

Maidenhair tree, Ginkgo tree, Fossil tree, Japanese silver apricot, Baiguo, Bai guo ye, Kew tree, Yinhsing



### Uses

Ginkgo biloba is the oldest living tree, classified in its own division, Ginkgophyta and dating back 200 million years. A large tree, reaching from 65-115 feet in height, the ginkgo is highly resistant to insects and disease. Because of its hearty nature, the ginkgo tree has been planted along city streets in the United States since the 18<sup>th</sup> century. The leaf of the ginkgo biloba has been used in Chinese medicine for thousands of years. Ginkgo is commonly used to improve memory, brain function, circulatory disorders and cardiovascular health.

### Dosage

According to the *Natural Standard*, ginkgo is available in leaf, leaf extract, and seed formulations. Ginkgo leaves are not frequently used in their crude state, but rather, in the form of a concentrated, standardized ginkgo biloba extract (GBE). Ginkgo leaf extract is the most commonly used form. Traditional recommendations for adults include ginkgo products containing 24% flavoglycosides (also

called flavone glycosides or flavones) and 6% terpenes: 80-240mg of a 50:1 standardized leaf extract daily, or 3-6mL of a 40mg/mL liquid extract in 2-3 divided doses, or 30-40mg extract in a teabag, prepared as a tea, for at least 4-6 weeks.<sup>39</sup> There is little evidence to support the benefit of small concentrations of ginkgo biloba found in “fortified” foods.

### Safety

Ginkgo components inhibit the platelet activating factor by displacing it from its receptor binding site, which results in reduced platelet aggregation.<sup>33</sup> Ginkgo’s mechanism of action is to increase blood supply by dilating blood vessels. Abebe (2003) states, “[g]inkgo manifests an increased risk of bleeding, this effect is related to the antiplatelet activity of the constituents of the herbs.”<sup>32</sup> In the same article, it has also been shown that ginkgo causes bleeding when taken alone or in combination with blood thinning medications. A potential oral side effect of ginkgo use includes an increased risk of gingival bleeding during gingival injury because of its antiplatelet activity.<sup>32</sup> Possible cross-sensitivity in people allergic to urusols (mango rind, sumac, poison ivy, poison oak, cashews) has been reported.<sup>39</sup>

### Evidence

Numerous studies support ginkgo for the improvement of claudication, painful legs from clogged arteries. The *Natural Standard* states, “The scientific literature overall does suggest that ginkgo benefits people with early stage Alzheimer’s disease and multi-infarct dementia, and may be as helpful as acetylcholinesterase inhibitor drugs such as donepezil (Aricept®).”<sup>39</sup> There is not enough evidence to support the use of ginkgo for age associated memory impairment. A small amount of poorly designed research reports benefits of ginkgo for the treatment of altitude (mountain) sickness.

### Dental Hygiene Considerations

According to the *Natural Standard*, ginkgo is generally well tolerated, but due to multiple case reports of bleeding, should be used cautiously in patients on anticoagulant therapy, with known blood clotting issues, or prior to some surgical or dental procedures.<sup>39</sup>

## Garlic

### Latin name

*Allium sativum L.*

### Common names

Clove garlic, bear’s garlic, tricolor garlic, stink weed, da suan (Chinese), rashona (Sanskrit), stinking rose, poor man’s treacle

### Uses

Garlic is a member of the lily family, Liliaceae and its close relatives include the onion, shallot, leek, and chive. The bulb of garlic, which



has a white skin encasing a number of cloves of garlic, is the most commonly used parts of this herb. Garlic has been used for thousands of years and continues to be a top herb used among Americans. The Ebers Papyrus mentions garlic as a remedy for a number of ailments, including hypertension, worms, and tumors. King Tutankhamen’s tomb included cloves of garlic. According to the *Natural Standard*, ongoing garlic research in several areas related to cardiovascular health, oncology and infectious disease continues. Its mechanism of action appears to be related to multiple compounds and not only to allicin, as was previously believed.<sup>39</sup> Garlic is originally from China, but cultivated all over the world, with much of the United States production centered in Gilroy, CA. Common uses for garlic include improving cardiovascular conditions, such as hyperlipidemia and hypertension, prevention of cancer and diabetes.

### Dosage

According to the *Natural Standard*, dried garlic powder is considered approximately equal in activity to fresh garlic homogenates. However, steam-distilled oils and oil macerates have shown substantially decreased anti-platelet activity, and aged-garlic in aqueous alcohol has demonstrated no anti-platelet activity. Adult doses of 600-900mg per day of non-enteric coated, dehydrated garlic powder in three divided doses, standardized to 1.3% allicin content, has been used in multiple clinical trials of hyperlipidemia, peripheral vascular disease, and hypertension.<sup>39</sup>

### Safety

Garlic appears to be generally well tolerated when consumed in the diet and at recommended medicinal doses. Garlic is another herbal supplement that can cause blood thinning and bleeding.<sup>31</sup> By reducing thromboxane and increasing prostacyclin, garlic decreases platelet aggregation and increases bleeding.<sup>33</sup> Therefore, garlic is categorized as an herb that inhibits platelet aggregation.<sup>42</sup> Not only is there the risk of bleeding while taking garlic there are other adverse effects that garlic can have on the body. Garlic can contribute to hypoglycemia, but a more concerning effect is its ability to lead to hypotension. Because of garlic’s ability to “inhibit platelet aggregation it can lead to postoperative bleeding and the vasodilatory effect can lead to hypotension.”<sup>41</sup> Garlic is likely safe when consumed in amounts found in foods and possibly safe when used as an H/DS in healthy adults. When used in large amounts orally or when used topically it is considered possibly unsafe. Potential side effects of garlic use include gastrointestinal discomfort, headaches, and lightheadedness. In addition, patients should avoid garlic if they have a known allergy/hypersensitivity to garlic or other members of the Liliaceae (lily) family, including hyacinth, tulip, onion, leek, and chive.

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## Evidence

According to the *Natural Standard*, oral tablets containing dehydrated garlic powder appear to elicit modest reductions in total cholesterol vs. placebo in the short term (4-12 weeks) studies, with unclear effects after 20 weeks. Small reductions in low-density lipoprotein (LDL) and triglycerides may also occur in the short-term, although results have been variable. High-density lipoprotein (HDL) values have not been found to significantly change.

Numerous studies have reported small mean reductions in systolic and diastolic blood pressure associated with the use of oral garlic (<10%) vs. placebo, and combination use with antihypertensives may result in additive effects. These studies have been small and with poor descriptions of methodology and results. Animal studies have shown some protective effects against cancer and in human studies there is limited evidence to suggest antiproliferative effects of garlic on human cancer cells. The available evidence suggests that garlic does not lower blood glucose levels in humans.<sup>39</sup>

## Dental Hygiene Considerations

Avoid oral use in patients prior to some surgical or dental procedures due to an increased risk of bleeding. Garlic is also not recommended for patients on anticoagulants, NSAIDs/anti-platelet agents, herbs/supplements that may increase the risk of bleeding such as Ginkgo biloba, by patients with known bleeding disorders.<sup>39</sup>

## Green tea

### Latin name

*Camellia sinensis*

### Common names

Camellia tea, Chinese tea, Japanese tea, Matsu-cha tea

### Uses

Second to water, green tea is the most consumed beverage in the world. It is made from the dried leaves of the *Camellia sinensis*, a perennial evergreen shrub, originally from China. Green tea, black tea, and oolong tea are all derived from the same plant. The difference is in the processing of the leaves. Black tea leaves are fermented, resulting in the dark brown color. Oolong tea is partially fermented. Green tea does not go through a fermentation process. Instead, the leaves are steamed after drying. Green tea is a source of caffeine, which is a central nervous system stimulant. One cup of tea contains approximately 50mg of caffeine, depending on the strength and size of cup. Green tea is used as an antioxidant for chronic disease prevention and has been studied for weight loss.

### Dosage

Three cups per day (total polyphenol content of 240-320mg per day) of green tea has been traditionally consumed on average. For medicinal purposes, dosages may be as high as 10 cups daily.



## Safety

Green tea is likely safe when used in moderation. Green tea extract has been suggested to be safe to use for up to one year. Because caffeine is a nervous system stimulant, more than 16 cups of green tea per day (500mg caffeine) can cause short-term and long-term adverse effects.<sup>39</sup> Caffeine will cross the placenta, so it is not recommended in pregnancy and has been associated with impaired iron metabolism.

## Evidence

According to the *Natural Standard*, several large population based studies have been undertaken to examine the possible association between green tea consumption and decrease cancer incidence. Cancers of the digestive system (stomach, colon, rectum, pancreas, prostate cancer and esophagus) have been primarily tracked, although risk of breast cancer in women has also been studied. Across these prospective and retrospective studies, relative risks of 0.5 to 1.5 and odds ratios of 0.5 to 0.8 have been reported.<sup>39</sup> Preliminary clinical trials suggest that green tea does not appear to be effective in the treatment of cancer. Additional human research is needed before a recommendation can be made for or against the use of green tea in cancer prevention. There have been several small human studies addressing the use of green tea or green tea extract in weight loss or weight maintenance. More research is needed before a recommendation can be made for or against green tea in weight loss.<sup>39</sup>

There has been some pre-clinical research that demonstrates the antibacterial effect of green tea as it relates to the prevention of dental caries. Preliminary research suggests green tea may be effective in decreasing plaque biofilm and inhibiting *Streptococcus mutans* formation.<sup>43</sup> Additional well-designed controlled research, using appropriate endpoints, is needed before a recommendation can be made for or against green tea in the treatment or prevention of dental caries.

## Dental Hygiene Considerations

Caffeine is listed as an addictive substance. According to the *Natural Standard*, an estimated 9-30% of caffeine consumers could be considered addicted to caffeine.<sup>39</sup> Caffeinism and caffeine withdrawal may be indistinguishable from an anxiety disorder.<sup>44</sup>

## St. John's wort

### Latin name

*Hypericum perforatum L.*

### Common names

Goatweed, Amber, Hypericum, Klamath weed, Rosin Rose, St. John's grass, Tipton weed, Johnswort



### Uses

St. John's wort is a yellow flowering, perennial herb indigenous to Europe and part of the species of *Hypericum*, with approximately 378 known species existing worldwide. The crude medicinal drug is obtained from the species *Hypericum perforatum*. The common name, St. John's wort, is apparently a reference to John the Baptist, as the plant begins to flower on around the 25<sup>th</sup> of June (the feast day of St. John the Baptist). According to folklore, the red residue produced when rubbing the stamens together is representative of the beheading of John the Baptist. It was the first herb used in the treatment of mental disorders. Today it is used for mild to moderate depression, anxiety and fatigue-related depression, insomnia, bruises and wound healing, and inflammation.

### Dosage

Clinical trials have used a range of adult doses, including 0.17-2.7mg of hypericin by mouth, and 900-1,800mg of St. John's wort extract daily by mouth. For treatment of atopic dermatitis, 1.5% hyperforin (verum) has been applied to the skin.<sup>39</sup>

### Safety

In published studies, St. John's wort has generally been well tolerated at recommended doses for up to 1-3 months.<sup>39</sup> The most common adverse effects include gastrointestinal upset, skin reactions, fatigue/sedation, restlessness or anxiety, sexual dysfunction (including impotence), dizziness, headache, and dry mouth. This herb interacts with a number of medications and other herbal supplements. It inhibits serotonin, norepinephrine, dopamine reuptake, and inhibits monoamine (MAO). If taken with warfarin, a decreased INR (blood clotting test) is likely to occur. St. John's wort also decreases estrogen levels and may reduce the effects of lidocaine. St. John's wort may lead to increased risk of sun sensitivity when taken with other drugs such as antibiotics or birth control pills. Side effects for this herbal product include allergic reactions, upset stomach, xerostomia or excessive salivation.

### Evidence

St. John's wort is likely effective in the treatment of mild to moderate depression. It has been extensively studied in Europe over the last two decades, with more recent research in the United States. Short-term studies (1-3 months) suggest that St. John's wort is more effective than placebo (sugar pill), and equally effective as tricyclic antidepressants (TCAs) in the treatment of mild-to-moderate major depression. Comparisons to the more commonly prescribed selective serotonin reuptake inhibitor (SSRI) antidepressants, such as fluoxetine (Prozac<sup>®</sup>) or sertraline (Zoloft<sup>®</sup>), are more limited. However, other data suggest that St. John's wort may be just as effective as SSRIs with fewer side effects.<sup>39</sup>

### Dental Hygiene Considerations

St. John's wort can cause many serious interactions with prescrip-

tion drugs, herbs, or supplements. Therefore, people using any medications should consult their healthcare providers including their pharmacist prior to starting therapy. It is recommended that no epinephrine be used in patients that require local anesthetic for dental procedures.

### Health Care Practitioner Awareness

Health care providers must be aware of their patients who are taking prescribed medications such as warfarin, aspirin, and non-steroidal anti-inflammatory agents, in case the patient is also taking herbal or dietary supplements that have the potential to alter bleeding times. Alarming, some patients may not recognize that herbal supplements are actual medications.<sup>45</sup> Because patients do not commonly reveal their H/DS use, healthcare providers should spend more time gathering this information.

Besides being unaware that a given patient is taking H/DS, physicians and other healthcare professionals may not understand or be aware of the possible adverse reactions to herb-drug interactions. According to Kemper (2003), "Medical school courses in complementary and alternative medicine rarely provide detailed information about herbal or dietary supplements or how to report adverse effects."<sup>46</sup> According to Tariq (2004), "Most of the nation's medical schools only offer elective courses in complementary and alternative medicine, with herbal supplements being a very small portion of the course."<sup>9</sup> Little is known about the education of dentists or dental hygienists regarding H/DS but it can be assumed that it would be similar to medical education.



Dental professionals may not fully document in the patient's chart their herbal product use, unaware of the importance.<sup>21</sup> This can cause serious implications for the safety of the patient. It is critical that a complete and thorough medical history be updated, with specific attention given to the patient's intake of vitamins, minerals, herbal or dietary supplements, proper documentation in the patient's chart, and a thorough conversation with the patient at each visit.

### Patient Education

Patient education on the use of H/DS must also be provided. It is important for patients to realize that because a supplement is labeled "natural", it does not mean that it is safe or without harmful effects. Pregnant or nursing women, elderly people and children should be especially cautious because herbs act like drugs. It is essential for a patient to consult a healthcare provider prior to using an H/DS, especially if the patient is currently taking any other drug and/or have

*Continued on page 14*

any of the following conditions: high blood pressure, diabetes, thyroid problems, heart disease, psychiatric problems, epilepsy, Parkinson's disease, glaucoma, enlarged prostate, blood clotting problems or allergies. Patients should provide a current list of medications including all over-the-counter medications, dietary or herbal supplements as well as current blood test results. Together, all of these tools can help reduce the number of adverse interactions. The dental hygienist is in the perfect position to not only assess H/DS use and possible adverse reactions, but to ensure that the patient has informed her/his medical healthcare provider. This will ensure that the patient is receiving the best possible comprehensive care.

## Treatment Plan Modification

Modification of the dental treatment plan may be necessary with patients currently taking H/DS. Medical history forms should include an area for patients to include their use of herbal and dietary supplements. At each office visit, the patient's medical history should be reviewed and updated to identify any risk factors for herb-drug interactions. It is important to note in the patient's chart any recent blood test results such as INR, blood glucose, and Hb-A1c. A thorough oral examination and assessment must be completed at each visit to identify oral manifestations or side effects of H/DS use. Assess the patient's INR value to determine whether or not follow-up with a medical doctor is necessary. Understanding therapeutic ranges allows for easier prediction of risks for bleeding. The Academy of Anesthesiologists recommends that H/DS be discontinued 2-3 weeks prior to any surgical procedure, which is the estimated time for the compounds to be fully metabolized.<sup>47</sup>

## Conclusion

Dental professionals with enough accurate information can serve as a valuable resource to educate their patients about the possible complications of using herbal and dietary supplements. As healthcare professionals, dental hygienists should be aware of the possible serious adverse reactions that all medications may cause. Herbal supplements discussed earlier can alter bleeding times leading to serious implications for the safety of the patient. In order to avoid future adverse interactions, proper communication and documentation during a medical history review and patient education must be provided.

## About the Authors

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Alison and Laura recently won first place in the dental hygiene category at the California Dental Association convention. This article is based on their research of Herbal Supplements and can be used as a tool for Health Care Practitioners to raise awareness in their community and for their patients.

Michelle Hurlbutt, RDH, BS, is an Herbal Information Specialist from the American Botanical Council and National Training Institute. She is completing her Master of Science in Dental Hygiene and is researching Knowledge, Attitudes and Practices of California Dental Hygienists' Regarding Herbal and Dietary Supplements.



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References available upon request and in the online version of this CE.

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**Home Study Correspondence Course**

**“Herbal Supplements: Healthcare Implications and Considerations”**

*Alison Corwin, RDH, BA  
 Laura Zahorik, RDH, AS  
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Circle the correct answer for questions 1-10

1. Interactions of multiple drugs and herbal supplements can cause adverse reactions such as altered bleeding times.
  - a. True
  - b. False
2. Research indicates that approximately how many Americans are at risk for a systemic interaction associated with herbal supplements combined with a medication?
  - a. 5 million
  - b. 10 million
  - c. 15 million
  - d. 20 million
3. Which of the following are the common users of herbal supplements?
  - a. Hispanic males under 40 years of age
  - b. African American females under 40 years of age
  - c. Asian males over 40 years of age
  - d. White females over 40 years of age
4. Anticoagulant/antiplatelet properties may result from taking ginger, garlic, ginkgo, ginseng, and green tea in combination with conventional physician-prescribed medications or other herbal supplements.
  - a. True
  - b. False
5. Common uses for this herb include improving cardiovascular conditions, prevention of cancer and diabetes, and hyperlipidemia.
  - a. St. John’s wort
  - b. Ginseng
  - c. Ginkgo biloba
  - d. Garlic
6. When St. John’s wort is taken with warfarin, likely outcomes include reduced effects of lidocaine and
  - a. a decreased INR
  - b. an increased INR
7. It is critical that each patient’s medical history be updated on an annual basis with attention to prescription medications, over-the-counter medications, and supplements.
  - a. True
  - b. False
8. Which of the following is a side effect of ginseng?
  - a. Bloating
  - b. Hypoglycemia
  - c. Increased gingival bleeding
  - d. Stomach discomfort
9. Which of the following herb(s) is commonly used to improve memory?
  - a. St. John’s wort
  - b. Ginseng
  - c. Ginkgo biloba
  - d. Garlic
10. Which of the following herb(s) decreases platelet aggregation?
  - a. Ginseng
  - b. Ginger
  - c. Garlic
  - d. All of the above

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