

## The Incidence of Vitamin, Mineral, Herbal, and Other Supplement Use in Facial Cosmetic Patients

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**Background:** Dietary supplement use is common in the United States. Some herbal supplements may cause coagulopathy, hypertension, or dry eyes. The goal of this study is to reveal the incidence of herbal supplement use in the cosmetic surgery population.

**Methods:** A retrospective chart review of 200 patients undergoing facial cosmetic surgery performed by a single surgeon was performed. Variables studied included patient age, sex, surgical procedure, herbal medication use, and intraoperative variables. Exclusion criteria were age younger than 15 years, noncosmetic procedures such as trauma, and incomplete preoperative medication form. Patients were subdivided into the supplement user group (herbal) and the supplement nonuser group (nonherbal). Statistical analysis included descriptive statistics, *t* test, and chi-square analysis.

**Results:** The incidence of supplement use was 49 percent in the 200 patients; 24.5 percent of patients used only vitamins or minerals, 2.5 percent of patients used only animal- and plant-based (nonvitamin/mineral) supplements, and 22 percent of patients used both types of supplements. In the herbal group, patients used an average of 2.8 supplements. The herbal and nonherbal groups differed significantly in sex (herbal, 89.8 percent female; nonherbal, 77.5 percent;  $p < 0.04$ ) and age (herbal, 51.4 years; nonherbal, 38.5 years;  $p < 0.001$ ).

**Conclusions:** Herbal supplement use is prevalent in the facial cosmetic surgery population, especially in the older female population. Considering the potential ill effects of these products on surgery and recovery, awareness and careful documentation and prohibiting the patients from the consumption of these products will increase the safety and reduce the recovery following cosmetic procedures. (*Plast. Reconstr. Surg.* 132: 78, 2013.)

General consumption of dietary supplements is common in the United States.<sup>1-4</sup> A survey of the general population found that 33.8 percent of individuals used complementary and alternative medicine in 1990, which rose to 42.1 percent by 1997.<sup>5</sup> It was estimated that Americans spent over \$21 billion dollars on complementary and alternative therapies in 1997.<sup>5</sup> More recently, it was estimated the \$4.8 billion was spent on herbal supplements alone in 2008.<sup>6</sup>

The Dietary Supplement and Health Education Act defines a dietary supplement as “a product (other than tobacco) intended to supplement

the diet that bears or contains one or more of the following dietary ingredients: A) a vitamin, B) a mineral, C) an herb or other botanical, D) an amino acid, E) a dietary substance for use by man to supplement the diet by increasing the total dietary intake, or F) a concentrate, metabolite, constituent, extract, or combination of any ingredient described in clause (A), (B), (C), (D), or (E).”<sup>7</sup> Dietary supplements are not regulated by the U.S. Food and Drug Administration. This has led to a severe lack of safety and efficacy data. The manufacturing of dietary supplements is not scrutinized as closely as that of prescription drugs,

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and many products do not actually contain the purported substance in the same quantity, quality, or purity that is described on the label.<sup>8</sup>

Despite the lack of regulation, herbal medications are potent and can affect blood pressure, heart rate, and the immune system; result in sedation and anesthesia effects; and alter coagulation.<sup>9–12</sup> Some herbal remedies are so efficacious with respect to their antithrombotic and anticoagulation properties that they can be used for these purposes medically.<sup>13</sup> Animal products such as fish oil also express these properties.<sup>14</sup>

The American Society of Anesthesiologists recommends that surgical patients stop taking any herbal medicines 2 to 3 weeks before surgery. It is believed that this is sufficient time for the body to clear out these substances.<sup>15</sup> The objective of this study is to report the incidence of dietary supplement use in facial cosmetic surgery patients, given the importance of identifying these patients before surgery and stopping these medications.

## MATERIALS AND METHODS

This study was approved by the Institutional Review Board for University Hospitals, Case Western Reserve University. A retrospective chart review was performed on 200 facial cosmetic patients from a single surgeon's practice. Inclusion criteria for the study were as follows: patients undergoing rhinoplasty, revision rhinoplasty, rhytidectomy, submental lipectomy, blepharoplasty, forehead rejuvenation, or genioplasty; age 15 years or older; and a complete preoperative medication list.

Preoperative patient variables included age, sex, date of surgery, and type of surgery. The preoperative intake form was reviewed for documented use of dietary supplements. Dietary supplements were defined in accordance with the Dietary Supplement Health And Education Act of 1994 and included vitamins, minerals, herbal and botanical supplements, amino acids, and other substances not typically considered food or part of a meal but still meant to supplement dietary intake.<sup>7</sup> In this study, these supplements are referred to as herbal supplements. If patients disclosed the use of such herbal supplements, the types were recorded. Patients were then subdivided into two cohorts, supplement users (herbal) and supplement nonusers (nonherbal). The herbal group was then further subdivided by the type of medication used: (1) vitamins and minerals only, (2) animal- and plant-based supplements only, and (3) both types of dietary supplements. The animal- and

**Table 1. Demographics of the 200 Facial Cosmetic Surgery Patients**

Overall Patient Characteristics	Value (%)
Total no. of patients	200
Total no. of procedures	318
Average age, yr	44.8
Sex	
Male	33 (16.5)
Female	167 (83.5)

plant-based supplements included medications such as flaxseed oil, fish oil, and glucosamine.

Descriptive statistics, chi-square test, and *t* test were performed. All tests were two-tailed, and a value of  $p < 0.05$  was used to determine statistical significance.

## RESULTS

Two hundred patients met the study criteria; 83.5 percent of subjects were female ( $n = 167$ ), and the average age was 44.8 years. In these 200 patients, 318 procedures were performed during the study, with bilateral procedures counting as a single procedure (Table 1). These included 37 blepharoplasties, 110 rhinoplasties, 67 rhytidectomies, 24 forehead lifts, 22 genioplasties, and 48 submental lipectomies (Table 2). The incidence of herbal supplement use was 49 percent ( $n = 98$ ), with 24.5 percent of patients ( $n = 49$ ) using only vitamins and minerals, 2.5 percent of patients ( $n = 5$ ) using only animal- or plant-based supplements, and 22 percent of patients ( $n = 44$ ) using both types of dietary supplements (Table 3 and Fig. 1). The patient population was subdivided into supplement users (herbal) and nonusers (nonherbal). Ninety-eight patients were in the herbal group and 102 patients were in the nonherbal group. In comparing the two groups, there was a significant difference in sex and age. Patients who reported herbal supplement use were older (herbal, 51.4 years; nonherbal, 38.5 years;  $p < 0.001$ ) and more likely to be female (herbal, 89.8 percent; nonherbal, 77.5 percent;  $p < 0.04$ ) (Table 4 and Fig. 2).

**Table 2. Frequency of Facial Cosmetic Procedures in the 200 Subjects**

Procedures Performed	No. (%)
Blepharoplasty	37 (18.5)
Rhinoplasty	110 (60.0)
Rhytidectomy	67 (33.5)
Forehead lift	24 (12.0)
Genioplasty	22 (11.0)
Submental lipectomy	48 (24.0)

**Table 3. Characteristics of Herbal Use in the 200 Subjects**

Herbal Use Characteristics	No. (%)
Herbal supplement use	98 (49)
Vitamins and minerals	45 (24.5)
Animal, plant supplement	5 (2.5)
Both types of supplement	44 (22)

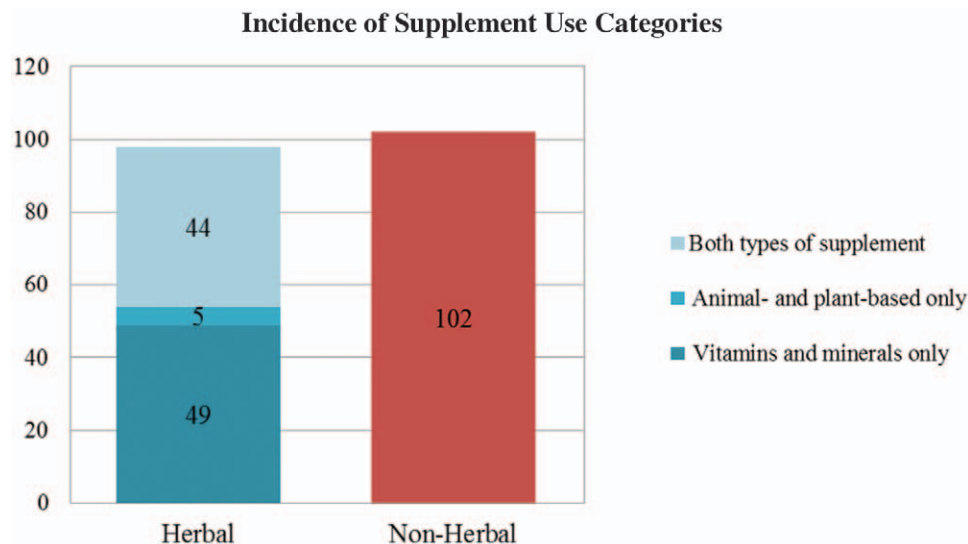
The 200 patients reported using 53 types of supplements 300 times. Among patients in the herbal group, the average number of supplements taken per person was 2.8 and ranged from one to nine supplements. The most common supplements were vitamin D ( $n = 52$ ), multivitamins ( $n = 51$ ), some form of calcium supplement ( $n = 35$ ), fish oil or omega-3 fatty acids ( $n = 28$ ), and some form of vitamin B ( $n = 27$ ). All other supplements were reported by fewer than 10 patients. Interestingly, 28 supplements—more than half those reported—were reported by a single patient. Supplements that increase the risk of bleeding were reported 45 times in 35 patients (bilberry, bromelain, fish oil, flax seed oil, garlic, methylsulfonylmethane, selenium, and vitamin E)<sup>13,14</sup> (Table 5). Therefore, 17.5 percent of all patients and 35.7 percent of patients in the herbal category would have been at risk for bleeding if the senior author's practice did not advise patients to halt these medications 2 to 3 weeks before surgery.

## DISCUSSION

Dietary supplement use is prevalent in the surgical patient population. Tsen et al. have shown that if a thorough medication history is taken, 51

percent of patients report using vitamins and 22 percent report using herbal supplements.<sup>1</sup> Wren et al. demonstrated that 42.7 percent of patients had consumed some sort of complementary or alternative medicine within the 2 weeks before surgery.<sup>12</sup> Despite widespread use of these supplements, patients often do not report this information to their physicians. Studies show that between 60 and 72 percent of patients do not report the use of alternative medicine to their physicians when no special effort is made to elicit this information.<sup>2,8,16</sup> Reasons for underreporting include the following: belief that supplements are not medications and should not be reported as such,<sup>11</sup> perceived irrelevance of supplements to the patient's health care,<sup>17</sup> and fear that using these supplements will be looked down on by physicians.<sup>18,19</sup>

It is extremely important to investigate the use of herbal medicines, as many of these supplements can put the surgical patient at risk. Ang-Lee et al.<sup>11</sup> identified echinacea, ephedra (ma huang), garlic, ginkgo, ginseng, kava, St. John's wort, and valerian as eight popular supplements with adverse effects, and Kaye et al.<sup>14</sup> add feverfew and ginger to this list. Echinacea stimulates the immune system short term, can be immunosuppressive in the long term, and can be hepatotoxic when combined with other medications that inhibit hepatic microsomal enzymes. Ephedra is a sympathomimetic agent that can induce hypertension, cardiomyopathy, arrhythmias and tachycardia, infarction, seizures, and psychosis. Combined use with volatile general anesthetic agents is especially dangerous, and use with monoamine oxidase inhibitors can be fatal. Feverfew and garlic raise the risk of



**Fig. 1.** Incidence of dietary supplement use in 200 facial cosmetic surgery patients.

**Table 4. Significance of Difference in Sex and Age between the Herbal and Nonherbal Groups**

	Herbal Group	Nonherbal Group	<i>p</i>
Female/male, %	89.8/10.2	77.5/22.5	<0.04
Average age , yr	51.4	38.5	<0.001

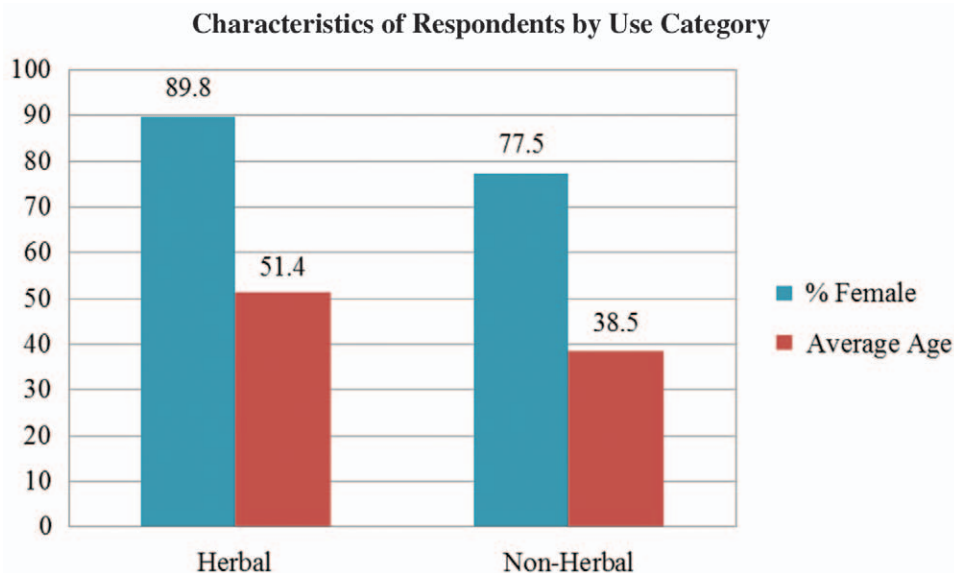
bleeding because of antiplatelet properties, similar to ginkgo and ginger. Ginseng can cause hypertension and can lead to hemodynamic instability when used with anesthesia. It should not be combined with anticoagulants or monoamine oxidase inhibitors because of dangerous potentiation. Kava can augment the effects of barbiturates and benzodiazepines and cause excessive sedation. St. John's wort induces the cytochrome P450 enzyme and can interact with many medications. Valerian potentiates the effects of anesthesia short term, but patients may have higher anesthesia requirements if valerian is used long term.<sup>11,14</sup> Therefore, it is important to ask patients about supplement use, especially the facial cosmetic surgery patient.

Patients undergoing facial cosmetic surgery were found to have a slightly higher incidence of vitamin and mineral use, herbal supplement use, and dietary supplement use than the general surgery population. Results showed that 49 percent of cosmetic patients used some type of supplement, compared with the 42.7 percent<sup>12</sup> in general surgery; 46.5 percent of cosmetic patients used vitamins and minerals, compared with 41 percent of general surgery patients.<sup>3</sup> Animal- and plant-based supplements were used by 24.5 percent of cosmetic patients, compared with 22 percent of general surgery patients.<sup>1</sup> A 2004 study of California cosmetic

plastic surgery patients showed that 55 percent used herbal supplements, in contrast with the general population reporting only 24 percent.<sup>20</sup> The demographics of general surgery patients are age 46.5 years and 60.5 percent female.<sup>12</sup> Therefore, although there is little age difference between general and cosmetic surgery patients (44.8 versus 46.5 years), cosmetic surgery patients are more likely to be female when compared with the general surgery population (83.5 percent versus 60.5 percent). Because women are more likely to use herbal supplements than men, plastic surgeons should be wary of the high incidence of supplement use in their population.

Following patient intake and discussion of medications, patients in the senior author's (B.G.) practice are specifically instructed to stop taking those alternative medicines that increase the risk of bleeding for 2 to 3 weeks before surgery in accordance with American Society of Anesthesiologists guidelines.<sup>15</sup> Therefore, it is expected that in this particular patient population, any effects of dietary supplements are negated by their timely cessation.

The weaknesses of this article include the number of patients studied. Although 200 patients were reviewed, it is possible that results might have been different with a larger study population because some subgroups, such as

**Fig. 2.** Sex and age of herbal and nonherbal groups.

**Table 5. Five Most Commonly Reported Supplements**

Supplement	No. of Patients Reporting
Vitamin D	52
Multivitamin	51
Calcium	35
Fish oil or omega-3 fatty acids	28
Vitamin B	27

patients consuming only herbal supplements ( $n = 5$ ), were small. The study is limited by the nature of a retrospective chart review and relied on patient self-reporting.

## CONCLUSIONS

Nearly half of facial cosmetic surgery patients report herbal supplement use. One must pay particular attention during the preoperative medication review to supplement use, especially in the older female patient, to reduce the potential adverse consequence of consumption of these products and to decrease the recovery time. Patients often do not disclose the use of herbal supplements for various reasons despite the popularity of these medicines. Natural medicines are not necessarily safe, and many herbal supplements put the patient at risk for intraoperative bleeding. These high-risk supplements, not simply supplements in general, are quite commonly used, and the surgeon must elicit a complete history to avoid the known adverse consequences of supplement use on surgical outcome.

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