Methods. The Ultratine forehead fixation device consists of a polymer blend altered to result in a softer material that loses biological strength after 2 to 3 months, 50% of its mass after 4 months, and 70% of its mass after 10 months. The dimensions of this device are identical to the original Endotine. It consists of a 0.5-mm-thick triangular platform containing 5 tines (tine length, 3.0-3.5 mm) and a bone peg (length, 3.75 mm) (Figure 1).

The device attaches to the skull by a peg on the bottom of the triangular platform that is press fitted into a 3.75-mm hole drilled into the outer cortex of the frontal bone. With experience, the device may be deployed in about 2 to 3 minutes per side. Both devices are based on the concept of multipoint fixation, in which the 5 tines act to distribute the forces of fixation and elevation over a diffuse area. Thus, no single point is carrying the entire force. This even distribution of force contrasts with the other commonly used methods of fixation employing sutures, in which the sharp edge of the suture acts almost like a scalpel, cutting through the periosteum and galea as the tissue swells during the postoperative period. As the sharp suture pulls through the tissue, there is a descent of several millimeters from the original elevation. Thus, the Endotine device has demonstrated the ability to elevate and fix the forehead in the original position achieved by the surgery without change or regression and redescend.

The Endotine and Ultratine devices provide mechanical fixation until biological fixation occurs (estimated, based on animal studies, at 6-8 weeks). Once the periosteum is firmly and permanently adhered to the outer table of the skull, the device is no longer necessary and subsequently biodegrades and absorbs at varying intervals. The Ultratine device softens and loses 90% of its strength in 60 days and 50% of its mass by 4 months. This rapid degradation after periosteal attachment means that the patient has less palpability and sensitivity after 60 days. The original Endotine loses only 37% of its strength in 60 days and has an absorption and biodegradability profile of 12 to 18 months.

The Endotine and Ultratine devices may also be used in open and coronal forehead-lift procedures. By fixing the anterior forehead flap solidly with the device, the amount of scalp necessary for resection is markedly decreased, and there is less tension on the closure, resulting in a smaller scar and less alopecia.

The study protocol required multispecialty surgeons to implant the Ultratine device in one side of the forehead and the Endotine in the contralateral side. Seventeen patients were enrolled; 12 patients completed the study at 90 days, and 5 patients were lost to follow-up. The follow-up visits were performed at 30 days and 90 days after surgery. Preoperative and postoperative photography was designed to provide identical clinical landmarks, and computerized digitized measurements were designed to measure heights of elevation from fixed points.

Figure 1. The Ultratine device consists of a triangular platform with 5 tines and a bone peg for attachment to the outer table of the skull.
Results. At each patient’s 90-day follow-up visit, tissue elevation was maintained, and 100% of physicians were satisfied or very satisfied with the results from both devices. In addition, the performance of both devices was rated as good or excellent in 100% of the cases. For both devices, visibility was rated as not visible or slightly visible in 100% of cases. Device palpability was rated as not palpable or slightly palpable in 100% of cases for the Ultratine device and not palpable or slightly palpable in 83.3% of cases for the Endotine device. The 90-day sensitivity ratings for the Ultratine were markedly lower than for the Endotine. Physicians rated the overall perfor-
mance satisfaction for the Ultratine as 100% (excellent/satisfactory/good) at the 90-day interval.

At 90 days, 100% of the patients were satisfied or very satisfied with the Ultratine device, but only 75% were satisfied with the Endotine. There was slight or no visibility in 100% of the patients with the Ultratine device and in only 91.7% of the patients with Endotine. There was slight or no palpability in 100% of the patients with the Ultratine device and in only 58.3% of those with the Endotine. Sensibility was markedly less in those with the Ultratine (Figure 2 and Figure 3).

Comment. In patients with the Ultratine device, by the 90-day follow-up visit, tissue elevation was maintained, the patient's sensitivity had decreased, and the device palpability and visibility had decreased. Overall, physicians rated the product performance satisfaction as 100% (excellent/satisfactory/good). The device exceeded all acceptance criteria set in the study protocol with a high level of patient satisfaction.

The Ultratine forehead fixation device contains a revised polymer concentration of PLA-PGA that results in a softer material at the 3-month interval and 70% bioabsorption in 10 months. Results in a series of 12 patients observed for 90 days indicate that all patients achieved secure and permanent fixation and elevation of their forehead lifts without regression or redescend. Palpability, visibility, and sensitivity of the device were markedly diminished or absent by the 3- to 4-month interval. The Ultratine device represents an improved evolution over the original Endotine device. It is expected that further experience will result in a general acceptance of the Ultratine device in a wide variety of cases as a satisfactory replacement for the Endotine device.

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Safety of Surgeon-Directed Conscious Sedation in Nasal Surgery

Nasal surgery requires numerous, painful local anesthetic injections. Systemic sedation-analgesia is therefore administered concurrently via intravenous conscious sedation (IVCS), deep sedation (DS) with propofol, or general endotracheal anesthesia (GETA). Although DS and GETA are effective, these approaches are substantially more resource intensive than IVCS. The study by Byrd et al\textsuperscript{1} showed that outpatient plastic surgery can be safely performed; however, multiple procedures and anesthesia methods were pooled. Given the difficulty in achieving and maintaining analgesia in nasal surgery, it is not clear whether IVCS is appropriate in these procedures. Furthermore, recent reports of adverse outcomes in outpatient surgery and increased regulations\textsuperscript{2} suggest that more studies to verify safety of surgeon-directed IVCS are necessary. The current study examines the safety of IVCS limited to patients undergoing nasal surgery.

Methods. The medical records of all patients who underwent nasal surgery (rhinoplasty, septoplasty, and septrhinoplasty with or without turbinate reduction) from January 2005 to December 2006 were retrospectively reviewed. The procedures were performed by the otolaryngology department at a single academic health center. Procedures performed using DS or GETA and that had incomplete medical charts were excluded. Patients who returned for a revision procedure on a different day were classified as new patients. Medical charts were reviewed for patient demographics, intraoperative and postoperative vital signs, medication dosage, anesthetic complications, recovery time, and unplanned admissions. Statistical analysis was performed by the biostatistician at the academic health center. An institutional review board approved the study prior to implementation.

Results. A total of 150 procedures were performed using IVCS during the time period studied. In total, 3 cases were excluded: 2 because the medical charts were incomplete and 1 because the operation was canceled (an adequate level of sedation-analgesia was unattainable in a patient with a history of opiate abuse). The procedures in this study were performed largely on young, healthy, active-duty military men (see Table 1 for demographic data and Table 2 for case parameters). Because the study took place at a military institution, most cases were performed for functional or reconstructive rather than aesthetic reasons. No major complications occurred during either the operative or perioperative period, and there were no deaths, intubations, intraoperative ventilation requirements, seizures, or arrhythmias (Table 3).

After analyzing the patient demographics, case parameters, and complications, we found that postoperative nausea prolonged recovery time ($P < .001$) and increased unplanned admission ($P = .03$). Nonadmission recovery time was not associated with age, sex, procedure performed, surgical time, or medication dosage administered.