Tooth extractions may result in loss of bone and soft tissue and lead to severe compromises in the ability of patients to function, even with current implant and prosthodontic procedures. Most extractions are performed without regard to using bone and ridge regenerative or maintenance procedures. Studies on extraction socket healing have not, heretofore, reported direct measurements of osseous changes from a fixed reference point. This study measured changes in bone morphology when ePTFE membranes are used to maximize the healing potential of the extraction socket.

Ten patients needing two or more anterior teeth extracted underwent impression procedures following atraumatic surgical extractions. Metal pins were placed in the alveolus to serve as fixed reference points for ridge measurement. Each patient had one socket covered with an ePTFE membrane, with the other socket serving as control. Primary closure was obtained over both sockets. Results of the study are presented for three patients at three months (due to membrane exposure) and for seven patients at six months. Model measurements essentially showed the same changes as direct clinical measurements. Measurements in the three-month group did not show any significant changes from the controls. Loss of width in both groups was significantly more than loss of height. The experimental group had significantly more socket fill and less loss of alveolar bone height and width than controls. The results indicate that ePTFE membranes have some value in ridge maintenance procedures. (G. Jividen, Jr.)

The use of single-implant treatment continues to increase. In conjunction with component development, attention is also focusing on surgical procedures that can be used to restore the alveolar crest and manage the soft tissue adjacent to the restoration, especially the papillae. The objective of this study was to develop an objective scale or index to clinically evaluate the degree of recession and regeneration of papillae adjacent to single-implant restorations and to test this proposed index in a pilot study for soft-tissue assessment at the time of crown insertion and during follow-up.

This was a retrospective study of 21 patients treated with single-implant restorations and photographically documented at the time of crown insertion and at time periods ranging from one to three years. Mean follow-up time was 1.5 years. All implants were standard-diameter Branemark origin with cemented crowns. Using this scoring system, a clinically and statistically significant increase in papillae size was observed since initial crown placement. The author speculates that incomplete plaque control contributes to this regeneration and concludes that the proposed index has value in further necessary research evaluating soft-tissue changes adjacent to single-implant restorations. (G. Jividen, Jr.)

The purpose of this study was to examine the soft-tissue attachment around endosseous nonsubmerged one-part titanium implants under unloaded and loaded conditions in the canine mandible over longer periods. A total of 69 TPS and sandblasted acid-etched implants (Straumann) were placed in six foxhounds. Two dogs were sacrificed at three months postinsertion (unload ed implants), two each at three and 12 months postcrown placement (loaded implants). Histology around both unloaded and loaded implants revealed similar structures as found around teeth. These dimensions were 0.16 for sulcus depth, 1.88 for the junctional epithelium, and 1.05 for the connective tissue contact. No difference was found between surface treatments. This study concludes that the dimensions and relationships of the implanto-gingival junction of healthy, nonsubmerged, one-part titanium implants are similar to dento-gingival tissues. (G. Jividen, Jr.)

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fect of drill speed on bone temperature
Many studies have investigated the ef-
placement, the graft recipient site was
treated with mandibular bone grafts
from the symphysis or ramus. Follow-
ing radiographic and clinical evalua-
tion of the graft recipient site, the
choice of donor site was determined by
defect morphology and recipient site
location. Although the harvest of bone
was associated with low morbidity, the
ramus donor site resulted in fewer
complications. Implants were placed
secondarily following a four- to six-
month healing period. Prior to implant
placement, the graft recipient site was
examined for bone resorption, graft in-
corporation, and bone quality. The
onlay grafts exhibited minimal resorption
and maintained their dense quality.
The symphyss grafts were larger in
overall volume, with a corticocancel-
lous morphology. The ramus area pro-
duced essentially a cortical graft that
was well suited for veneering ridge de-
ficiencies; however, the surgical access
in some cases was more difficult than
in the anterior mandible. (E. Demird-
jan)

“Issues Related to Single-tooth Im-
plants,” by Roland M. Meffert. J Am

As more and more practitioners and
patients are turning toward implants
as a method of replacing a missing
tooth, criteria have to be set regarding
indications and contraindications of
such implants. Many studies have been
done to determine the success and fail-
ure of implants placed in various lo-
cations, whether maxillary or mandib-
ular and whether anterior or posterior.
This article summarizes the various in-
clusions and exclusions to the place-
ment of a single-tooth implant.
The inclusions listed by Dr. Meffert
are as follows:

- Patient has a single-tooth space;
- Patient has intact adjacent teeth with
functional and aesthetically good
restorations;
- Patient is reluctant to undergo prep-
paration of adjacent teeth;
- Patient has a maladaptive experience
or has demonstrated a psychological
reluctance to wear a removable par-
tial denture.

The exclusions listed by Dr. Meffert
are as follows:

- Patient is unable to undergo minor
oral surgery procedure;
- Patient has a history of drug abuse;
- Patient has unrealistic expectations
about the aesthetic outcome;
- Patient has vital anatomic structures
close to the proposed implant site;
- Patient has poor bone quality or
compromised oral health at the local
site, for example, a cyst;
- Patient has insufficient vertical inter-
arch space to accommodate the
available prosthetic components,
together with proposed pontic and
gingival analog designs;

LITERATURE REVIEWS

“Effect of Drill Speed on Bone Tem-
perature,” by M. B. Abouzgia and J. M.

Many studies have investigated the ef-
effect of drill speed on bone temperature
increase or the response of bone to sur-
gical trauma during drilling. The con-
sensus has been that drill speeds
should be kept under 2000 rpm, but the
actual correlation between actual drill
speeds and thermal injury has not
been well established because the stud-
ies have relied on the manufacturers’
claims of free-running drill speed and
it was not known whether those
speeds were constant during drilling.
Other studies have shown that, in us-
ing electrically powered drills, speed
depends on force and can vary as
much as 50% between free-running
speeds and speed under load. The pur-
pose of this study was to measure bone
temperature and relate these changes
to operating drill speed in bovine cor-
tical bone specimens. A Stryker-100
surgical drill was fitted with a custom-
designed tachometer that monitored
actual rotational speeds on a drill-
press mounted drill. Drill holes were
made without irrigation in 36 speci-
mens at speeds ranging from 20,000 to
100,000 rpm with constant forces of 1.5
to 9.0 N. Results showed that durations
of bone temperatures greater than 10°C
lasting more than one minute occurred
only at lower speeds (<30,000 rpm)
and lower forces (<2.0 N). At higher
speeds and loads, the duration of bone
temperature elevation did not exceed
30 seconds, which is below the thresh-
old of bone necrosis. In contrast to pre-
vious studies, results suggest that dril-
lng at high speed and large load is
more desirable than previously
thought. The authors believe an argu-
ment can be supported that implant
sites should be prepared with surgical
handpieces that can deliver speeds of
70,000 rpm under load. (J. and S. Wag-
ner)

“Comparison of Intraoral Donor Sites
for Onlay Grafting Prior to Implant
Placement,” by Craig M. Misch. Int J
Oral Maxillofac Implants 12:767–776,
1997.

Fifty patients with inadequate bone
volume for implant placement were
treated with mandibular bone grafts
from the symphysis or ramus. Follow-
ing radiographic and clinical evalua-
tion of the graft recipient site, the
choice of donor site was determined by
defect morphology and recipient site
location. Although the harvest of bone
was associated with low morbidity, the
ramus donor site resulted in fewer
complications. Implants were placed
secondarily following a four- to six-
month healing period. Prior to implant
placement, the graft recipient site was
examined for bone resorption, graft in-
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onlay grafts exhibited minimal resorption
and maintained their dense quality.
The symphyss grafts were larger in
overall volume, with a corticocancel-
lous morphology. The ramus area pro-
duced essentially a cortical graft that

50 Journal of Oral Implantology
Patient's mouth opening is too small to allow for the minimum 4 cm of hardware necessary to place the implant; 
Patient's face and mouth are still growing and teeth have not completed their eruption.

This article provides the practitioner with an overall understanding of whether an intended implant site will or will not be successful. (S. Seu)


The causes of implant failure can be broadly classified into three categories: (1) poor surgical techniques, (2) occlusal overload, and (3) microbiologic factors. This paper examines the effects of controlling microbial levels during the perioperative period through the use of chlorhexidine.

The study group, known collectively as the Dental Implant Clinical Research Group, comprised 32 clinical centers involved in a prospective study utilizing the Spectra-System Implants (Core-Vent Corporation, Las Vegas, NV). The randomized study examined various factors involved in the success and failure of the variety of hydroxyapatite and Ti/Ti alloy implant designs available through the Spectra-System.

Part of the study protocol called for 0.12% chlorhexidine rinses immediately prior to implant surgery/uncovery and BID for two weeks after surgery. Clinical investigators were free to prescribe this regimen or not. Complications were grouped into the following categories: peri-implant infection; peri-implantitis; infection of soft tissue extraorally; systemic infection secondary to implant placement; persistent febrile condition; osteomyelitis, acute; and osteomyelitis, chronic.

A total of 2641 implants were used for analysis in this study. Fifty-two and a half percent of those implants were placed and uncovered using the chlorhexidine rinse protocol (treatment group) and 47.5% did not have any perioperative rinses (control group).

The results indicated a statistically significant difference in the infectious complications present between treatment and control groups (4.1 vs 8.7% of implants and 5.8 vs 9.3% of patients). The results also showed that, of those implants with an infectious complication, 12% went on to fail to integrate at second-stage surgery whereas only 2% of implants failed where no prior infection complication was present. Those patients that experienced an infectious complication had a 38.6% chance of implant failure versus only 7.3% of patients who had a failure with no prior infectious complication.

The results of this study are unequivocal: perioperative chlorhexidine rinses reduce the chance of postoperative infectious complications. The presence of infectious complications is significantly associated with implant failure at uncover.

It should be noted, however, that, with the use of preoperative antibiotics, the rate of infectious complications was the same whether or not chlorhexidine rinses were used.

Peri-implant disease has been seen to be caused by the same organisms as that of periodontal disease. This article demonstrates that chlorhexidine rinses (which have been demonstrated to reduce periodontal pathogens) act beneficially during the perioperative period. Due to the potential of anaphylaxis, the use of perioperative chlorhexidine may be a useful alternative to those currently using a preoperative dose of antibiotics. (J. Ley)


This study (suppl 5) was conducted by the Dental Implant Clinical Research Group (DICRG). The DICRG is composed of 30 Department of Veterans Affairs medical centers and two dental schools and is conducting an eight-year randomized prospective clinical study. All implants utilized in this study are from the Spectra-System produced by the Core Vent Corporation (Las Vegas, NV).

The purpose of this study was to examine the effects of the experience of the surgeon on the success of the implant as noted at second-stage uncover surgery. Two groupings of surgeons were designated. Those who had placed 50 or more implants prior to the study’s inception were classified as “many,” while those who had placed less than 50 implants were classified as “few.” Criteria for implant failure was mobility, peri-implant radiolucency, persistent pain, discomfort, or infection.

Results indicated a significant difference in the failure rate between those surgeons who had placed “many” and those who had placed “few” implants. Those who had placed “few” experienced double the failure rate of those who had placed “many” (3.5 vs 1.8%). Analysis also revealed that a learning curve existed and, as experience increased, the failure rate decreased (in the surgeons in the “few” category only). Those surgeons in the “few” category were noted to have significantly more failures in the first nine cases when compared to surgeons in the “many” category (5.9 vs 2.4%).

It is interesting to note that experienced surgeons did not see as dramatic a decrease in failure when comparing the first nine cases to those of the remaining cases compared to the inexperienced surgeons, that is, 2.4 versus 1.8% overall for experienced and 5.9 versus 3.5% for inexperienced surgeons. This suggests that, for an experienced surgeon, switching to a different implant system should not result in an increased failure rate early on. (J. Ley)

The term osseointegration describes the direct bone–implant contact seen under light microscopy around rigidly fixed, immobile implants. Since this cannot be ascertained clinically, the authors offer to accept a redefinition of osseointegration into clinical terms.

They ask, “What is the best way for determining rigid fixation clinically?”

Methods accepted nowadays are not sufficiently sensitive to measure amount of bone–implant interface and may not always be safe. Clinically detectable mobility, though, is a parameter of low sensitivity and high specificity. Only two evaluations are possible—mobile or not. The Periotest device (Siemens AG, Germany) holds the potential to be safe and effective for evaluating implant mobility. The literature suggests that the Periotest can provide highly sensitive and reliable mobility data. Research suggests that a range of <8 to +09 Periotest value (PTV) units corresponds to a 0 on the Miller index. Because of the high sensitivity of the Periotest, it may be capable of detecting changes in bone–implant complex before pathologic changes are radiographically evident.

For dental implants, a PTV of 10 or higher generally means osseointegration into clinical terms. The average or median PTVs of osseointegrated Spectra-System implants were used in 30 departments of the VA medical centers. Implants included basket, screw, cylinder, and grooved designs. Implants materials used were CP titanium, Ti alloy, and hydroxyapatite-coated Ti alloy. Because it was assumed that implant materials, implant length, and healing collar length were randomly distributed, the influence of these variables was not taken into consideration in this study. The mean PTV for mandibular implants was −4.14 versus −3.24 for maxillary implants. Implants in the densest bone had the lowest mean PTV. The authors suggest that the clinical significance of the PTV numbers could also be applied in monitoring the status of the implant—bone complex when individual implants are functioning under prosthetic load. In the event that a complication occurs and an implant is lost, an accurate PTV series could help identify at what point in the treatment process the pathologic process started. Future data may show a correlation between an optimal PTV value at uncovering and long-term clinical performance of the implant.

(M. Katzap)


The indications for prophylactic antibiotics before placement of dental implants have not been established. The purpose of this article is to report on the effectiveness of prophylactic antibiotics in preventing failure of endosseous implants up to and including uncovering of the implant (stage II surgery).

In implant surgery, streptococci, anaerobic gram-positive cocci, and anaerobic gram-negative rods are the most likely pathogens. Antibiotics selected for prophylaxis should be bactericidal and the least toxic agent available. Penicillin is a good choice. In patients allergic to penicillin, a first generation cephalosporin or clindamycin are alternatives. Prophylactic antibiotics at doses of two to three times the therapeutic dose have been suggested. For optimal effect, a therapeutic level should exist in the tissues when the bacterial contamination occurs. Even in the presence of high drug levels, resistant strains can develop within 48 hours. It was demonstrated that, if antibiotics are delayed for three hours after bacterial contamination, they are no more effective than no antibiotics at all.

Because the appropriate dose of antibiotic is not known, an analysis was done for three separate dosing levels to determine whether different antibiotic doses had an effect on implant survival. For the purpose of this study failure was defined as the removal of any implant that did not osseointegrate.

- Comparison I—Preoperative antibiotics at any dose versus no preoperative antibiotics. Implants had a failure rate of 4.0% without preoperative antibiotics as opposed to 1.5% with antibiotics.
- Comparison II—Adequate levels of antibiotics defined by Peterson (twice the therapeutic level or greater) versus an insufficient dose (dose less than recommended by Peterson) or no preoperative antibiotics. Implants had a 3.6% failure without preoperative antibiotics or doses below Peterson’s criterion and 1.2% with sufficient preoperative antibiotics by Peterson’s criterion.
- Comparison III—Adequate levels of preoperative antibiotics as defined by the AHA verses insufficient (dose less then recommended by the AHA) or no antibiotic coverage. Of the implants, 3.3% failed without preoperative antibiotics with dosage below AHA criterion and 1.4%...
failed with sufficient preoperative antibiotics by the AHA criterion.

Antibiotics administered preoperatively at any of the doses statistically improved implant survival. Postoperative antibiotic usage did not appear to influence the results attributed to preoperative antibiotic usage (ie, not statistically significant). (M. Katzap)

**Implant Prosthodontics**


Adaptation to wearing complete dentures is a complex process that poses difficulty for the denture wearer. Mandibular dentures in particular are difficult to adapt to and pose a problem of stability.

Overdentures are an option for treatment of the edentulous maxilla or mandible. Overdentures may be used in order to better resolve aesthetic and speech problems and give better support to the lips. In maxillary overdentures, it is suggested that four or more impressions are used with a minimum length. With a tendency for an increased failure rate, the maxillary overdenture also exhibits more frequent hyperplasia than the mandibular overdenture.

By and large, treatment outcomes with mandibular overdentures appear to be more successful and have better prognoses than other overdentures. In mandibular overdentures, the U-shaped down bar has proved to provide good stability and optimum retention. It has been proved in many clinical studies that mandibular overdentures have a high success rate with different implant systems and a varying number of implants. The suggestion that overdentures are a favorable treatment option for grinding patients is supported. However, more information is needed regarding the effects of multiple implants splinted with a bar in terms of force distribution. (J. Gulbenkian)

**Basic Science and Research**


The authors of this study evaluated bone formation around hydroxyapatite (HA)-coated implants that were placed in the tibiae of normal rats as compared to streptozotocin-induced diabetic rats (DM). Both groups had HA-coated implants placed in their tibiae and were labeled with fluorescent calcein (CAL), Alizarin complexone (AL), and tetracycline (TC), which were ingested on the seventh, 14th, and 21st days after implantation, respectively.

These animals were sacrificed on the 28th day after implantation, and undecalcified bony sections were obtained from both groups. These sections were prepared for and analyzed by confocal laser scanning microscopy (CLSM).

The results obtained showed that both groups displayed bone formation from the HA surface of the implant to the endosteum and periosteum. The bone of the control group was heavily laminated with distinct patterns of CAL, AL, and TC. The DM group showed patterns of CAL and AL but poor TC-generated patterns. Both groups showed poor bone formation on the lateral portion of the HA surface. This was the surface that was away from the periosteum and endosteum. The DM group showed almost complete bone suppression in this region.

These findings indicate bone formation was initiated from the HA surface of the control group while, in the DM group, bone formation along the lateral portion of the HA surface was suppressed. It is also suggested that, in new bone formation along the HA-coated surface close to the endosteum and periosteum, only calcification on the 21st day was depressed. (R. Baranello)


Mucoperiosteal flaps are used to access the bone and root surfaces in a variety of periodontal and implant procedures. Several reports have shown varying amounts of alveolar crest loss as a result of the regional accelerated phenomenon (RAP) process following wounding of cortical bone that occurs with these procedures. Amino bisphosphonates (AB) are potent inhibitors of bone resorption used in the systemic treatment of bone disorders such as osteoporosis. This study evaluated the effect of local delivery of the amino bisphosphonate on bone resorption associated with mucoperiosteal flaps in rats. Mucoperiosteal flaps were created bilaterally in the mandibles of 25 rats. The experimental quadrant had a pellet of Gelfoam soaked in AB placed on the buccal and lingual alveolar bone with flap readaptation after a total of 20 seconds. The pellets on the control side were soaked in saline. Microradiographical analysis was performed. Resorption was observed in both groups; however, RPA+AB treatment retained 90% of the bone compared to control. A previous study of similar design by the same group reported that gauze soaked in AB and applied for 10 seconds was not effective in inhibiting bone resorption. This latest study now reports a significant reduction in bone resorption following surgery by using an absorbent pellet ap-
plied for a longer duration. (G. Jividen, Jr.)


Many species of bacteria live in the oral cavity. The several known virulent strains are known to have adherence and other abilities allowing surface colonization and subsequent host tissue damage. Bacterial adherence is dependent on (1) the free surface energy and (2) surface roughness. Minimization of surface roughness reduces the amount of bacterial colonization and may, in turn, decrease the chance of implant failure. The purpose of this study was to assess in vivo the optimal polishing level of a titanium finish in order to reduce early plaque colonization.

Forty-eight titanium disks were divided into three polishing groups (A, B, and C) corresponding to different surface finishing procedures. Acrylic stents were constructed that contained a disk from each group. The stents were applied to eight volunteers who suspended oral hygiene for 24 hours. Scanning electron microscopy and microbiological analysis were performed for each subject. Bacterial plaque adherence was directly dependent on surface roughness. The authors conclude that a titanium surface prepared to a high level of smoothness inhibits plaque formation and that it is possible to achieve this with transgingival components. (G. Jividen, Jr.)


Comparative evaluation of hydroxyapatite (HA) and fluorapatite (FA) coatings in the femoral condyles of mature mongrel dogs demonstrated that the two coatings were similar in their in vivo behavior. The results indicated no significant differences in this load-bearing canine model, which is in contrast to several other studies, both in vivo and in vitro, that have shown FA coatings to be more stable than HA coatings. Residual coating surface area, coating thickness, and volume were the physical parameters monitored, while histological sections were used to examine the extent of coating resorption, bone ingrowth, and bone remodeling. Considerable resorption was seen on both coatings, with more bone turnover seen around HA coatings. The study found that there was no statistically significant difference between the two types of ceramic coatings. However, compared to the titanium control, there was a 5–10-fold higher bone ingrowth into the ceramic coatings. (A. Tofe)


Osteogenesis induced by BMP was found to be dependent on the geometry of the hydroxyapatite carrier. The investigators used three different types of hydroxyapatite—synthetically prepared, nonporous, solid particles; synthetically prepared, porous particles; and porous coralline hydroxyapatite—as carriers for BMP extracted from bovine bone. The BMP/carrier composites were implanted into ectopic sites in male Wistar rats. Collagen (without any BMP) was used as the control. The rats were sacrificed after 1, 2, 3, and 4 weeks following implantation. Biochemical, morphological, fluorescent labeling, and nondecalcified histological analyses were performed on the explants. Composites of coral and porous hydroxyapatite showed direct bone formation and vasculature, while the composite formed out of nonporous hydroxyapatite did not show any bone formation. The porous composites demonstrated direct bone formation without any evidence of intermediate cartilage formation, while there was evidence of cartilage formation around the coralline composites. The authors conclude that carriers are important for
the effective functioning of BMPs and that the morphology of carriers plays a deciding role in the type of osteoinductive differentiation. (A. Tofe)


This study tested the hypothesis that some sensory innervation to the lower incisor teeth comes from reentry of the terminal branches of the mental nerve through the labial cortical plate of the anterior mandible. Ten cadaveric heads (20 sides) were dissected and studied to determine whether the mental nerve crossed the midline or reentered the labial plate. Using careful dissection, the most posterior branch of the nerve was exposed from its point of emergence at the mental foramen to its insertions, and any entries into the labial plate were recorded and photographed. Three of 20 (15%) specimens showed unequivocal evidence of nerve reentry into the labial plate. Five specimens showed strong evidence of nerve fibers reentering the plate but these were too fragile to be dissected through the periosteum without breaking. In 12 of 20 (60%) specimens, there were no branches identified that reentered the bone plate. Of the eight specimens showing evidence of reentry, four had substantial midline crossover.

Conclusions. The finding that branches of the mental nerve may reenter the labial plate to supply innervation to the lower incisors explains the phenomenon of crossover innervation from the contralateral mental nerve and the fact that labial infiltration injection will anesthetize the lower incisor teeth. (J. and S. Wagner)

Case Reports


This report represents the second documented case in the English literature of a squamous cell carcinoma (SCC) arising in association with a mandibular staple implant.

Report of case. A 74-year-old woman presented complaining of pain of the left mandible. Thirteen years previously, she had a marginal mandibular resection because of verrucous carcinoma in the alveolar mucosa of her left mandibular molar region. A left omohyoid neck dissection was performed at the same time. The patient had received three courses of methotrexate before surgery. The resection margins and lymph nodes were free of tumor. Three years after the initial surgery, the patient had a titanium mandibular staple implant placed. The patient’s early postoperative period was uneventful, and a mandibular overdenture was fabricated. It was noted on several occasions that the patient had poor oral hygiene, particularly around the implant posts, where she had large amounts of debris surrounding the abutments. The patient was followed for five years, after which she refused further follow-up.

The patient returned two years later complaining of an ill-fitting denture. The mandibular denture was relined and a panoramic radiograph was made. Clinical examination showed moderate debris around both posts and peri-implant inflammation. She returned two years later for reline of her maxillary denture. A panoramic radiograph revealed an ill-defined radiolucency in the symphysis between the implant posts. Clinical examination showed no abnormality except peri-implant inflammation and debris. The patient refused biopsy of the lesion because she had no complaints.

The patient returned one year later, complaining of pain and swelling associated with the left post of her implant. Clinical examination revealed a 2 × 2-cm exophytic, fungating mass around the left post of the staple implant. A panoramic radiograph showed an ill-defined radiolucency extending to the midbody region of the mandible bilaterally. Neither clinical examination nor CT scan revealed enlarged lymph nodes of the neck. Two incisional biopsies showed a moderately well-differentiated SCC. Chronic irritation in the oral cavity is a known contributing factor in the development of SCC. It is the author’s opinion that the profession needs to maintain a high degree of alertness with regard to soft tissue inflammation around implants. (J. and S. Wagner)

Special Report


The objective of this study was to quantitatively measure the effects of caffeine and propranolol, a nonselective B-blocking agent, on surgeon hand tremor during simulated vitreoretinal microsurgery. Seventeen ophthalmic surgeons participated in this study. Hand tremor was measured immediately before and an hour after ingestion of fruit juice containing placebo, caffeine, or propranolol hydrochloride. Tremor was measured using the Microsurgery Advanced Design Laboratory Stability, Activation, and Maneuverability tester (MADSAM). A 15% mean increase from baseline in surgeon hand tremor was observed after placebo ingestion, a 31% increase was observed after caffeine ingestion, and a 22% decrease was observed after propranolol ingestion. The largest increases in hand tremor within the caffeine group were from subjects who indicated no daily caffeine use. The authors concluded that the consumption of a low dose of propranolol one hour before performing a surgical task decreases surgeon hand tremor without noticeable side effects. (J. and S. Wagner)