Innovations in The Surgical Treatment Of Facial Paralysis

Reanimating the Paralyzed Face

Dr. Maisie L. Shindo

Facial paralysis is a potentially devastating disorder. Few impairments have a more negative effect on the quality of an individual's life. The paralysis, which results from injury to the facial nerve, can lead to a variety of troubling symptoms, including ocular problems, speech difficulties, drooling, and nasal obstruction. Thus, this disorder can be quite debilitating for patients who suffer the emotional impact from the facial disfigurement as well as difficulties with communication, eating, and drinking in a social setting.

At Stony Brook, Maisie L. Shindo, MD, associate professor of surgery (otolaryngology-head and neck surgery) and director of head and neck oncology, is using the latest microsurgical techniques in the treatment of facial paralysis which have the ability to reanimate the face and restore spontaneous facial mimetic function.

A highly respected figure in her subspecialty, Dr. Shindo has gained national recognition for her expertise in the treatment of facial paralysis, as well as the art of microvascular free-flap reconstruction in the head and neck region. In addition, her specialties include the treatment of thyroid and parathyroid disorders, head and neck cancers, voice disorders, and paralyzed vocal cords.

THE FACIAL NERVE

The facial nerve has many functions, of which the most physically obvious are the conveyance of emotion, eye closure, and assistance with speech and chewing. Nerve injury causing facial paralysis may result from tumor growth; trauma; surgical procedures involving the parotid gland, ear, and skull base; infection; and several other causes. The facial nerve is further susceptible to spasm from compression by nearby intracranial vessels or tumors. It has a tortuous bony course longer than any other nerve through the densest bone in the body, making surgery on it quite difficult.

Depending on the type of injury to the nerve, the resulting facial paralysis may be temporary or permanent. When the insult does not sever the facial nerve, functional recovery is generally expected, which may take anywhere from weeks to months. Therefore, if the facial nerve injury is suspected to be due to inflammation or contusion of the nerve, the patient is observed, and protective care is given to the paralytic eye to prevent corneal abrasion.

If the nerve is suspected to be severed, for example, from a temporal bone fracture or following parotidectomy, the suspected site of injury should be explored and the nerve repaired to provide the patient with the best chance for recovery. The decision regarding whether or not to explore can be difficult in situations in which the nature and degree of the injury are unclear. Advances in electrodiagnostic testing and radiographic imaging have provided greater insights into the pathophysiology and diagnosis of facial nerve injury, and aid in the decision process.

Table 1. Procedures for Rehabilitation of Prolonged Facial Paralysis

Dynamic Reanimation

I. Interposition nerve grafts
II. Crossover reinnervation procedures
  - Hypoglossal
  - Ansa hypoglossi
  - Cross-facial

III. Regional muscle transfer
  - Temporalis
  - Massater
  - Digastric

IV. Microneurovascular free-flap
  - Gracilis
  - Latissimus dorsi
  - Rectus abdominis
  - Serratus anterior
  - Pectoralis minor
  - Abductor hallucis
  - Extensor digitorum brevis

Static Reanimation and Cosmetic Procedures

I. Eyelid procedures
  - Goldweight
  - Spring
  - Lower lid tightening

II. Brow and forehead lift
III. Correction of midfacial deformity
  - Slings
  - Fascia lata
  - Alloplastic sheets
  - Malar augmentation

IV. Facelift
V. Lower lip wedge resection
VI. Botulinum toxin

TREATING FACIAL PARALYSIS

Treatment of facial paralysis is aimed at restoring facial symmetry: 1) at rest, 2) during voluntary facial movements, such as smiling, and 3) during involuntary facial movements, such as spontaneous laughter or blinking. Of the three, the last function is extremely important because lack of it would be most noticeable, since human facial expressions are seen mostly as involuntary facial movements during awake hours.

Numerous options are available for rehabilitation of prolonged facial paralysis (see Table 1). The majority of these will restore facial symmetry at rest and during voluntary movements, but rarely involuntary motion. Prolonged, chronic facial paralysis is challenging to treat and rehabilitate, particularly if one wishes to restore spontaneous facial mimetic function.

The rehabilitation procedures can be categorically divided into *dynamic* and *static* reanimation procedures. Static procedures are simple to perform, but they

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Surgery for Facial Paralysis

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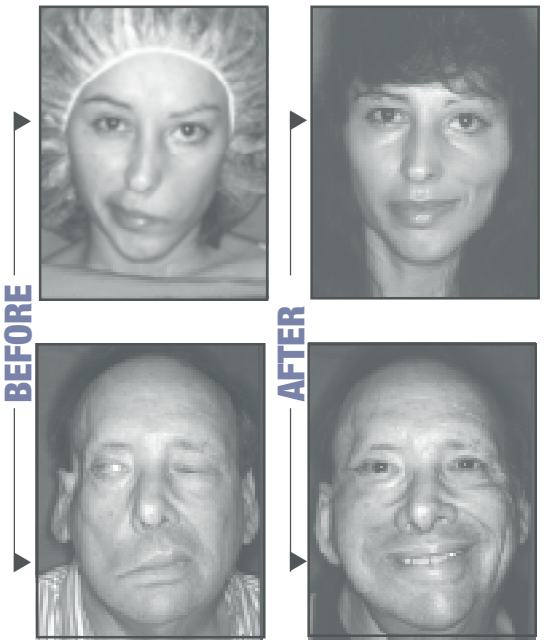
restore facial symmetry only at rest and do not restore movement. These procedures include static slings, ocular protective procedures, and adjunctive cosmetic procedures.

Dynamic procedures are aimed at restoring symmetry at rest as well as during facial expressions. Dynamic reanimation can be accomplished using neurorrhaphy (nerve repair) procedures, or if the facial nerve is not available for neurorrhaphy, by transferring a muscle flap to the face.

Improvements in microsurgical technique and instrumentation have yielded increasing success in restoring symmetric facial movement using microneurovascular muscle transfer from such muscles as the gracilis and latissimus dorsi. These muscles are typically grafted to the upper lip and oral commissure. Such transfers are benefiting patients in terms of both return of function and independent function of the two sides of the face.



Patient with left-sided facial paralysis present since birth, caused by traumatic delivery at birth, before dynamic reanimation surgery (left) performed by Dr. Shindo and one year after surgery (right); note her ability to smile.

Patient with right-sided facial paralysis, due to nerve injury from tumor growth, before dynamic reanimation surgery (left) performed by Dr. Shindo and five months after surgery (right); note his ability to smile.

SURGICAL ADVANCES

Several surgical procedures have been proposed through the years for the treatment of facial paralysis. The multiplicity and diversity of techniques portray the complexity and challenge represented by this disorder. Two basic dynamic reanimation options, as noted above, are currently available: 1) reconstruction of nerve continuity through direct micro suture, with interposition grafts or nerve transpositions; and 2) regional muscular transposition, most often using the temporalis.

Dr. Shindo has been using these advanced microsurgical approaches with considerable success.

Facial reanimation with the temporalis transfer has withstood the test of time and still is a reference technique. In a few weeks, good results can be obtained with a single and rather simple surgical procedure.

In the last two decades, functional free-flaps have been used with increasing frequency, most often combining a cross-facial nerve graft followed by a gracilis free-flap nine months later. With this method there is a potential for restoration of spontaneous facial mimetic function.

At present, the functional results achieved with this technique are good to excellent. Restoration of function, however, is at times limited by lack of axonal regeneration in the nerve(s). Current research is now actively studying and identifying nerve growth factors and pharmacological agents that might have an important and complementary role in the near future.

For consultations/appointments with Dr. Shindo, please call (516) 444-4121.

Recent Publications

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Obesity Surgery Program Re-established

We are pleased to announce the re-establishment of our bariatric surgery program for the treatment of morbid obesity. The new program is directed by Collin E.M. Brathwaite, MD, associate professor of surgery and chief of trauma/surgical critical care. An active general surgeon, Dr. Brathwaite has considerable experience in nutrition and currently chairs University Hospital's nutrition committee.

John S. Brebbia, MD, assistant professor of surgery, is also involved in the program. He has a strong interest in both nutrition and obesity surgery. In addition, Barbara A. Smith, RN, MS, a nurse practitioner in surgery, coordinates the program.

The most effective procedures for weight loss utilize the principle of gastric restriction. If the stomach pouch is made smaller, this reduction will limit the amount an individual can eat and weight loss will result.

Morbid obesity is that state where body weight exceeds ideal body weight by 100 pounds or more. Obesity of this degree is truly morbid since individuals with it face increased complications from their obesity or may be expected to die earlier than predicted on the basis of life-expectancy tables.

Among the serious illnesses associated with obesity are diabetes, heart disease, high blood pressure, stroke, gallbladder disease, and certain cancers. Although they are not caused exclusively by being severely overweight, they may be exacerbated by it, or they may be accelerated in their development.

Recognizing that a multidisciplinary approach to the treatment of obesity is necessary, a special support group will supplement the surgical therapy. This group therapy provides patients with psychological support to help ensure successful outcomes.

To contribute to efforts to further advance obesity surgery, the program is enrolled in the International Bariatric Surgery Registry (formerly known as the National Bariatric Surgery Registry). One of its goals is to enable surgeons to evaluate and improve their expertise in obesity surgery, and benefit from the combined experience of all participants.

Although our new obesity surgery program was just initiated in the summer, increasing numbers of patients are now seeking surgical therapy at University Hospital for critical weight management.

SURGERY FOR OBESITY

Surgery has been a treatment option since the early 1950s. Because surgical intervention is so invasive and, in a sense, radical, it is only indicated in selected patients. Obesity has degrees, and the patients who are candidates for surgery are those who are classified as morbidly obese.

The most effective procedures for weight loss utilize the principle of gastric restriction. If the stomach pouch is made smaller, this reduction will limit the amount an individual can eat and weight loss will result. The operations used include gastric banding, vertical banded gastroplasty, and Roux-en-Y gastric bypass (popularly known just as gastric bypass).

Drs. Brathwaite and Brebbia perform both vertical banded gastroplasty and gastric bypass—the two operations most commonly used today for treating obesity, both of which have been endorsed by medical experts assembled by the National Institutes of Health. These experts concluded that surgery for obesity, with its high rate of success, is an option that should be considered after nonsurgical weight-control measures have failed.

Vertical banded gastroplasty creates a small upper pouch in the stomach and then uses a vertical band of synthetic material to restrict the opening between this upper pouch and the lower stomach. Food then leaves the stomach in the normal fashion after passing out of the upper pouch. Weight losses of 50% to 60% of excess weight can be expected after this surgery.

Gastric bypass also creates a small upper pouch in the stomach (about 1-2 ounces in size), but this pouch is completely separated from the lower stomach by multiple rows of surgical staples. To allow drainage from the stomach, this small pouch is connected to the small intestine, a portion of which is bypassed.

The extra step of draining food from the upper pouch directly into the small intestine gives this operation an extra mechanism for weight loss because not all of the foods are as effectively absorbed (malabsorption). The weight loss with this procedure is considered successful when the mean excess weight lost is between 48% and 74%.

Both of these operations do require that patients change their eating habits. Because of the small size of the stomach pouches which are created surgically, large meals cannot be tolerated. Eating too much may result in regurgitation or vomiting.

In this fashion, behavior modification is enforced upon the patient. Patients are also advised to exercise to

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Research Focus

Improving the Treatment Of Colorectal Cancer Liver Metastases

Colorectal cancer is the fourth most diagnosed malignancy as well as the second leading cause of death from cancer in the United States. This year alone, about 132,000 Americans will be diagnosed with colorectal cancer, and 56,500 will die of the disease. Liver metastases occur in about 60% of patients with colorectal cancer. Patients who undergo surgical removal of diseased liver have only a 30% five-year survival.

Dr. M. Margaret Kemeny

Better therapy is clearly needed. To this end, M. Margaret Kemeny, MD, professor of surgery (interim) and chief of surgical oncology, has made a significant contribution with her current research.

In May, Dr. Kemeny presented the promising early results of her clinical trial of intra-arterial infusion therapy for colorectal cancer liver metastases, at the annual meeting of the American Society of Clinical Oncology (ASCO), in Atlanta, GA. Sponsored by the Eastern Cooperative Oncology Group and the Southwest Oncology Group, this multi-center trial, of which Dr. Kemeny is the principal investigator, is the largest clinical study to date of hepatic arterial infusion therapy following hepatic resection.

A total of 109 patients were randomized before surgery for liver metastases to receive surgery plus continuous hepatic arterial infusion of floxuridine combined with 5-FU by systemic infusion (35 eligible patients) or surgery alone (45 patients). At a median follow-up of four years, three-year recurrence-free survival is 34% in the surgery alone group versus 58% in the combined adjuvant therapy group ($p = .035$).

Of those patients who had recurrences, those in the no chemotherapy group (surgery alone) were more likely to have recurrence in the liver than those in the chemotherapy group (73% versus 50%, respectively).

"Historic" study promises to advance the care of patients with colorectal cancer liver metastases.

Overall survival has not yet reached statistical significance, Dr. Kemeny says, but the trend favors the use of surgery plus chemotherapy. "We still haven't reached median survival for the chemotherapy patients," she notes. "It is 63% at five years for the chemotherapy group versus 32% for the surgery alone group."

Dr. Kemeny and her colleagues conclude that hepatic artery infusion and systemic therapy after resection can be done safely with no increase in operative morbidity or mortality, and results in a significant decrease in liver recurrences, a significant increase in five-year disease-free survival, and a trend toward an improved five-year overall survival rate.

At the ASCO meeting, the results of this study were hailed as "historic" by Nicholas Petrelli, MD, of Roswell Park Cancer Institute in Buffalo, NY, who served as discussant of Dr. Kemeny's presentation. He said the "big news" is that "surgery alone is not adequate therapy," as shown in Dr. Kemeny's "close to ideal" trial.

Dr. Petrelli emphasized that although Dr. Kemeny's study requires longer follow-up, the question now facing physicians treating liver metastases of colorectal cancer is no longer whether to use chemotherapy, but rather "which chemotherapy to choose" for the best possible patient care.

COLORECTAL CANCER SCREENING

Early Detection Is Best Chance for Cure

Colorectal cancer, a major killer, continues to take a high toll of lives. The cause of colorectal cancer is unknown. However, we do know that most colorectal cancers start as a small benign polyp and, if left untreated, progress to cancer.

In its early stage, colorectal cancer is curable in most cases. In its later stages, cure is much more unlikely. Unfortunately, there are often no warning signs or symptoms from colorectal cancer until it has progressed to beyond the curable stage. For this reason, most patients do not seek out treatment until the cancer has reached these later stages.

In an effort to try to detect colorectal cancer early, in its curable stage, the American Cancer Society has made recommendations regarding colorectal cancer screening for individuals. University Hospital and Medical Center offers these screening services to the Long Island community.

By calling Stony Brook's Colorectal Cancer Screening referral line—(516) 444-4393—one can get answers to questions about colorectal cancer and screening.

Our gastrointestinal specialists and gastrointestinal surgeons will provide the proper screening and, if necessary, the proper treatment for colorectal cancer. A grant awarded to Stony Brook from the New York State Department of Health, Bureau of Chronic Disease Services, helps provide these services to uninsured and underinsured individuals.