Panel Discussion

Facial Nerve Injury: Diagnosis and Repair

Editor’s Note: My thanks to the moderator, Julia K. Terzis, MD, PhD (board-certified plastic surgeon and ASAPS member, Norfolk, VA); and to panelists Ralph Manktelow, MD (board-certified plastic surgeon, Toronto, ON); Elliott H. Rose, MD (board-certified plastic surgeon and ASAPS member, New York, NY); and Robert L. Walton, MD (board-certified plastic surgeon, Chicago, IL), for sharing their opinions and clinical experience. In 2006, Aesthetic Surgery Journal will publish a follow-up panel discussion on “Aesthetic Considerations Following Facial Reanimation Procedures.”

Dr. Terzis: Facial nerve injury is something feared by every aesthetic surgeon who performs face lifts. Although most such injuries are transient, some are not. The patients discussed in this panel present with facial nerve injury from a variety of causes, but in each case, the patient’s goal is to achieve a more aesthetic appearance, beginning with the surgeon’s assessment of the potential for nerve repair. In a future panel, we will discuss adjunctive aesthetic procedures to maximize outcomes for such patients.

The first patient is a 50-year-old woman who underwent a face lift procedure elsewhere. Postoperatively she suffered a partial right-sided facial paralysis with complete paralysis of her right depressor complex (Figure 1, A). Dr. Walton, how would you manage this patient if she sought your help after 6 weeks?

Dr. Walton: If it was less than 6 weeks following surgery, I would think that she may experience some improvement in the tone of her lower lip and general facial animation if she waits a little longer. After 8 weeks, however, if she has not exhibited any return of function, I would be inclined to explore the nerve. If results of an EMG indicate fibrillations in the depressor and platysma on the paralyzed side, this would also strengthen my resolve to explore, since fibrillations are a strong indicator of denervation injury. I would also assess for a Tinel’s sign to determine the possible site of nerve injury and to have a clinical landmark by which to follow nerve regeneration. If a Tinel’s sign can be elicited, and there is no advancement of the Tinel’s sign over time, this would be strong justification for surgical exploration.

Dr. Terzis: How would you discuss treatment with the patient preoperatively?

Dr. Walton: I would explain that if the nerve ends are ligated with suture, if they have been cauterized, or actually transected, I would remove the area of injury and attempt repair of the nerve directly or with a nerve graft. The likelihood of recovery would be low, but there are adjunctive procedures that can be performed to improve the symmetry of her smile.

Dr. Terzis: Are you saying that you would try to keep more drastic procedures, such as harvesting of sural nerve grafts, to a minimum in a cosmetic patient such as this one?

Dr. Walton: I would do what I felt was necessary to achieve an optimal aesthetic and functional result. In this case, I believe that the operative access could be limited to the face lift incision. If nerve grafts were required, I would prefer a branch of the great auricular nerve or an antebrachial cutaneous nerve of the forearm.
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Dr. Terzis: If you explored and discovered a lesion in continuity of the cervicofacial branch of the facial nerve that affects the mandibular and cervical areas, what would you do?

Dr. Walton: If I could define the area of injury, I would resect the area in continuity, obtain a frozen section of the proximal and distal nerve branches to assure that there was viable nerve devoid of neuroma, and repair the nerve microsurgically with an interposition nerve graft. I would either take a small branch of the greater auricular nerve or resort to the antebrachial cutaneous nerve in the forearm.

Dr. Terzis: Dr. Manktelow, assume that the patient is very distressed. She sought rejuvenation and now she is deformed. She is newly engaged with an imminent wedding and is deeply upset about her distorted smile. How would you treat her?

Dr. Manktelow: You can provide a lot of important therapy just by listening and being understanding. I would agree with Dr. Walton in every respect except one. I would be inclined to wait a little longer. We would not lose anything in waiting for regeneration through the area of injury into the closest muscle (probably the depressor anguli oris), and next the depressor labii inferioris, and mentalis.

Dr. Terzis: If your electromyographer, with whom you have worked for 10 years, gives you EMG results indicating fibrillations at 6 weeks after an invasive procedure, would you still wait another 6 weeks?

Dr. Manktelow: Yes, because you can expect fibrillations in any muscle that is denervated. The nerve does not need to be divided to get fibrillation, just denervated. We are hoping that this denervation is not due to severing of the nerve but reflects an axonotmesis or Sunderland second- or third-degree injury. If so, nerve regeneration will occur at roughly 1 mm per day. As the injury may be as far as 80 mm away from the muscle, we can afford to wait for 3 months. If the nerve was divided or irreversibly cauterized and needs repair, it can be as effectively repaired at 3 months as at 1-1/2 months.

Dr. Walton: I do not disagree with waiting a while longer. By the time I have the patient on my surgery schedule, it would probably be 3 months later anyway.

Dr. Terzis: If the injury was neuapraxic, it would have resolved by 3

Figure 1. A, This 50-year-old woman suffered a right-sided partial facial palsy after undergoing a full face lift with SMAS. She would like restoration of a symmetrical smile and the ability to depress her right lip. B, Postoperative view 1 year after surgery demonstrates adequate right lower lip depression and a nearly normal smile.
weeks; neurapraxic injuries correspond to a local conduction block in the axon, and complete recovery takes place with segmental remyelination by the accompanying Schwann cells. If the injury is axonotmesis, it makes sense to wait for 6 weeks, since it will take that long for functional recovery. However, if there are fibrillations in the involved muscles, we know that this implies a neurotmetic lesion, which corresponds to complete nerve severance. Would you still wait another 6 weeks if there are fibrillations or explore now? Remember, this patient is angry and threatens litigation.

Dr. Walton: With the information provided, I would be inclined to explore after 8 weeks of observation.

Dr. Terzis: This patient was explored very early, soon after presentation, and the injury was microsurgically repaired (Figure 1, B). Since full function was restored within a year, she dropped all litigation procedures against the treating plastic surgeon.

The next patient is a 52-year-old man who was shot from a distance of 5 feet and was hit with 3 bullets over the left mastoid area (Figure 2). Dr. Walton, if he presented for treatment at 3 months, how would you help him?

Dr. Walton: First, I would like to know the exact trajectory of the bullet and the site of the injury to the facial nerve. Since he is 3 months out and not demonstrating any motion, surgical exploration and repair would be most appropriate. I would do a CT scan to visualize the petrous portion of the temporal bone. If he had an injury within the canal, I would work together with an otolaryngologist to decompress the canal to access the proximal segment of the facial nerve.

Dr. Terzis: Dr. Rose, what would be your approach?

Dr. Rose: After confirming transection of the injured facial nerve intratemporally, I would use a combination of facial rebalancing procedures and attempt to reinnervate the left facial nerve with segmental nerve grafting. I would aim for nerve restoration. Given the timing of the nerve regeneration, I might simultaneously perform a temporising facial rebalancing procedure with insertion of fascia lata slings to the lateral lip commissure and nostril base.

Dr. Terzis: Given that the facial nerve has been injured but not transected, and the preoperative electromyogram (EMG) shows a complete paralysis at 3 months, would...
you want to explore the facial nerve or would you move to secondary rebalancing procedures?

Dr. Rose: I would determine if there is any bony compression of the nerve itself. If there is, I would consult with an otolaryngologist or neurosurgeon to attempt intratemporal facial nerve decompression and grafting procedures.

Dr. Terzis: If the nerve were injured outside of the mastoid, what would be your surgical strategy?

Dr. Rose: I would resect the damaged portion of the nerve and place a series of specific nerve grafts to the individual damaged facial nerve branches.

Dr. Terzis: After performing some microneurolysis and grafting of the branches, what would be your postoperative treatment?

Dr. Rose: Postoperatively, I would treat the patient with low dose alternating current (AC) electrical stimulation to enhance nerve regeneration to the target muscles on the injured side.

Dr. Terzis: Dr. Manktelow, how would you treat this patient?

Dr. Manktelow: First, I would elicit from the patient exactly what he is concerned about. Of course, this man would like to improve his smile, but what we do not know, from looking at his eye, is whether or not he has significant eye symptoms. You could address eye symptoms with either a temporary or a definitive procedure. In total facial nerve injury, either a CT scan or an MRI can establish whether or not this injury is within the facial nerve canal. If it is, I would plan a reinnervation procedure.

Dr. Terzis: Would you use muscle stimulation postoperatively?

Dr. Manktelow: No, I would not.

Dr. Terzis: Dr. Walton, do you use stimulation for denervated musculature?

Dr. Walton: I generally do not. If there is viable nerve proximally and one repairs a segmental gap, the regenerating nerves grow back fairly rapidly. I really have not found any advantage to using percutaneous nerve stimulation and have found patient compliance with this adjunct to be problematic.

Dr. Terzis: Dr. Rose, if this patient sought your help after 9 months, would you use electrical stimulation to salvage the target facial musculature?

Dr. Rose: If there was a complete transection of the nerve, in the interval between the transection and the definitive repair, I would consider direct current (DC) stimulation. After nerve repair, I would consider low-dose subclinical AC stimulation until I began to see some degree of voluntary target muscle activity. I would gradually increase the AC stimulation until I saw full voluntary muscle contraction, and then I would decrease the AC stimulation accordingly as voluntary motion improved.

My physical therapy colleagues recommend DC stimulation for denervated muscle to protect the target from denervation atrophy. They recommend AC stimulation following the regeneration period to increase the receptivity of the target muscle cells.

Dr. Manktelow: I am not convinced that any type of stimulation has made much difference in the clinical setting. However, I was impressed with Bruce Williams’ work using the cardiac pacemaker for 24 hours each day. In terms of duration of application, longer application might be more effective compared with what is presently used.

Dr. Terzis: The wisdom of skeletal muscle stimulation for denervated or reinnervated muscle has often been challenged. Unfortunately, the time restrictions of this panel will not allow an in-depth discussion of this important topic. Having worked with Professor W. Theodore Liberson, a brilliant physiatrist, for 10 years, I can unequivocally state that I have strong proof that slow-pulse stimulation is beneficial to human denervated muscles.1

The patient in Figure 2 was treated with a single microsurgical procedure that involved exploration of the extratemporal portion of the facial nerve, resection of the segments that were injured by the bullets, microneurolysis, end-to-end repair, and interposition nerve grafts.

The third patient also suffered an iatrogenic lesion, but in her case, it was during a parotidectomy procedure for extirpation of a benign parotid tumor (Figure 3, A). During exploration, the surgeon did not use magnification or bipolar coagulation, and when the patient bled profusely, he used regular cautery to control the bleeding. The patient woke up with a complete right facial paralysis. Dr. Rose, suppose that this patient came to you for help at 6 weeks. She is a single mother who has hired a lawyer and wants her face restored. What would you do?

Dr. Rose: I would perform a series of EMG and nerve conduction studies to determine if this was a complete nerve transection, an
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external compression, or a scar-related problem.

**Dr. Terzis:** Let us assume for the purpose of discussion that the EMG demonstrates widespread fibrillations and complete facial paralysis. What would you do?

**Dr. Rose:** I would wait for the inflammation to subside, perform a delayed exploration, resect the appropriate nerve section, and substitute with an immediate interposition nerve graft from the calf or the greater auricular nerve.

**Dr. Terzis:** If you find a gap of about 5 cm at the main trunk of the facial nerve because of the excessive use of cautery, and you do not have a good proximal stump because the bleeding was at the extratemporal portion of the facial nerve as the nerve exited from the stylomastoid foramen, what would be your operative plan?

**Dr. Rose:** I would have prepared the patient to consider either an intratemporal exploration or a series of cross facial nerve grafts.

**Dr. Terzis:** What is an intratemporal exploration?

**Dr. Rose:** In an intratemporal exploration, the nerve is explored proximal to the stylomastoid foramen and a nerve graft is substituted at that point.

**Dr. Terzis:** In other words, you mean an intramastoid nerve exploration. In the operating room, would you call in your ENT colleagues or would you proceed by yourself?

**Dr. Rose:** I would call an otolaryngologist or neurosurgeon to unroof the mastoid.

**Dr. Manktelow:** Can I interject? Since I realized how effectively our ENT colleagues can decompress the mastoid and find the proximal end, I always have them do that. They can expose a nice proximal end for you to work with.

**Dr. Terzis:** Dr. Walton, if this patient had come to you with a history of cautery burn during an extirpation of a benign tumor, would you also consult an ENT colleague before you start?

**Dr. Walton:** This is a really tough case because we are unsure how far proximally in the canal the nerve injury extends. I have had really poor results trying to repair the nerve from inside the canal. In one patient, we worked intracranially and got motion back, but it was very synkinetic.

**Dr. Terzis:** Dr. Rose, what would be your surgical strategy dealing with multiple distal stumps at the level of the angle of the mandible and a single proximal end 1 cm from the middle ear in the vertical canal?

*Figure 3. A,* This 38-year-old woman became totally paralyzed on the right side of her face during removal of a benign parotid tumor. She is requesting reanimation of her right face. *B,* The patient presents postoperatively with an adequate smile, eye closure, and blink.
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**Dr. Rose:** My decision would be based on whether or not I felt comfortable performing a nerve graft from the canal to the distal branches. I probably would opt for a cross-facial nerve graft. I think the cross-facial would provide better control over selective segmental animation of the paralyzed face than attempting a trunkal repair that would result in synkinesis.

**Dr. Terzis:** Are you saying that your greatest concern, if you did repair the nerve, would be an outcome of synkinesis, which would be much more deforming?

**Dr. Rose:** That is correct, and I am also uncertain about the quality of nerve regeneration that would result.

**Dr. Terzis:** Would you completely reject the proximal nerve stump and not use it for ipsilateral reconstruction?

**Dr. Rose:** You could use the nerve stump as one segment of nerve graft to save the buccal branch and then use cross-facial nerve grafts for the lower and upper thirds of the face.

**Dr. Terzis:** Wouldn’t it be a better strategy to use the proximal right facial nerve stump for ipsilateral reconstruction of the eye, which has the least possibility of coming back from a cross-facial nerve graft? And for the buccal, because there is great overlap, wouldn’t you prefer a cross-facial nerve graft?

**Dr. Rose:** Your plan sounds quite reasonable. I am saying that conceptually, you could use the stump to do a segmental innervation. I think that it would make a whole lot of sense to go with segmental innervation using both sides.

**Dr. Terzis:** Dr. Manktelow, what would be your plan?

**Dr. Manktelow:** I would try to get some innervation ipsilaterally, either using the facial nerve stump or a hemi hypoglossal transfer. This should result in mass action, but will achieve some tone, and the tone will hopefully be sufficient so that the eye is no longer symptomatic. The likelihood of getting a good smile is very slim, so I would also insert a cross-facial nerve graft at the same time. Preoperatively, I would inform the patient that the process will require a graft from one of her legs. I would perform the cross-facial nerve graft with the intention of using that for a free muscle transfer. I think she would get reasonable tone and support for her face and good control of her eye with the ipsilateral repair or hemi hypoglossal transfer. Then I would specifically give her a lift and commissure elevation with the cross-facial nerve graft and a microvascular muscle transfer.

**Dr. Terzis:** Do you think that the strategy of bringing a foreign muscle in 2 stages of surgery will lend a better prognosis than trying to salvage the acutely denervated facial musculature in a single microsurgical procedure?

**Dr. Manktelow:** The concept of the multiple interposition grafts is very elegant, but in practice it is not likely to work. There are 3 functional segments, and they actually rotate as the nerve goes through the canal. I do not have much confidence that I could pick up the 3 segments, one of each going to the upper face, constrictors of the mouth, and retractors of the mouth.

**Dr. Terzis:** The patient (in Figure 3, A) was treated in a single-stage procedure by an ENT colleague who unroofed the mastoid and exposed the vertical portion of the facial nerve. Subsequently, a sural nerve graft was harvested. Five ipsilateral interposition nerve grafts were placed, 4 and 5 cm in length, connecting cross-sectioned areas of the right facial nerve stump to corresponding distal branches of the right facial nerve. A postoperative view, 9 months later, is shown in Figure 3, B.

The next patient is an 8-year-old girl who was thrown from a horse and then stepped on by another...
horse. She had no loss of consciousness, but it was noted that she had loss of movement on the left side of her face. A CT scan showed a depressed temporal skull fracture on the left side. She also had a cerebrospinal fluid leak through a laceration behind the left ear and moderate hearing loss. She was referred to the Medical College of Virginia for evaluation and treatment.

Six days later, with a diagnosis of left temporal bone fracture and left facial paralysis, an ENT surgeon performed a left transmastoid decompression of the left facial nerve, and reported that the nerve was in continuity. However, she had no improvement. One year later, she underwent another transmastoid facial nerve exploration, excision of the traumatized nerve, and grafting with a single graft of the greater auricular nerve. Again, she had no improvement.

At 2 years and 3 months she still has a complete left facial paralysis (Figure 4, A). Dr. Rose, what would be your early management?

**Dr. Rose:** I would be reasonably aggressive with this patient. We are at the maximum window before denervation atrophy of the affected muscles. In the photograph, I see a complete left facial palsy, indicating (and probably supported by EMG and nerve conduction studies) that there is no inherent activity of the paralyzed muscles of the left side of the face.

I would approach this with facial rebalancing, including a fascia lata sling to the lateral lip commissure and nostril and intraoperative exploration. I would also stimulate the residual muscles on the left side of the face, specifically the frontalis, orbicularis, nasalis, and depressors to determine if there is any activity.

If there was a suggestion of intraoperative muscle contraction, I would consider multiple cross facial nerve grafts. If there was no indication of muscle activity, I would place a single cross facial nerve graft submentally, followed at a later time with a free gracilis muscle transfer. At the first stage, I would consider a procedure to replace the lower lip depressors—specifically, a platysma transfer with a fascia lata sling.

**Dr. Terzis:** What if the platysma on that side is gone?

**Dr. Rose:** My experience has been that even if we are unable to create voluntary activity, the static depression of the lower lip often counteracts the tendency for invagination and inversion, and frequently, from a functional standpoint, will offer the patient a partial improvement in intraoral fluid retention and phonetics.
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**Dr. Terzis:** How would you treat her eye?

**Dr. Rose:** My initial approach in this 8-year-old would be a lateral canthoplasty. At a later time, particularly if there were signs of exposure keratitis, I would perform a mid lamellar reconstruction.

**Dr. Terzis:** Dr. Walton, how would you approach this patient?

**Dr. Walton:** The injury has probably persisted for too long to realistically anticipate any recovery of her facial muscle function with nerve repair. I would recommend a muscle transplant in combination with a cross facial nerve graft.

**Dr. Terzis:** What if she does have some fibrillations, even at 2 years and 3 months? Remember, she underwent 2 repairs. The first time she underwent a decompression, and the second time she had a greater auricular nerve graft inserted. Suppose that she does have fibrillations and the EMG is not silent. She shows no fibrillations in the frontalis, but she does have fibrillation in the upper and lower eye sphincter, in the levator, buccinator, and depressor. Would that change your approach?

**Dr. Walton:** I would still insert cross facial nerve grafts for an anticipated muscle transplantation procedure later. These would be coapted distally to the corresponding buccal and zygomatic nerve branches on the paralyzed side. I would then wait to assess for return of facial animation.

**Dr. Terzis:** So, you would place cross-facial to the zygomatic and buccal branches and then see how she would respond. What if that did not work? Would you do anything else if you were in the first stage?

**Dr. Walton:** I would not favor a babysitter procedure with a split hypoglossal nerve because the duration interval of facial paralysis seems excessive. While my experience with the split-hypoglossal procedure has been quite favorable in the serial treatment of facial nerve injuries of 9 to 10 months’ duration, I doubt this procedure would be beneficial in this particular patient. Additionally, the patient is a young, growing girl, and hypoglossal-deficient speech issues may be quite significant. I would prefer a more permanent solution for this young girl’s facial paralysis and that would be a free muscle transplant.

**Dr. Terzis:** The use of the mini hypoglossal in the babysitter procedure would be only to resuscitate as much of the target as possible. And there is no residual detectable deficit at 6 months (tested electrically with needle EMGs of the tongue) in any of the patients from a partial split of the hypoglossal nerve for direct neurotization of the ipsilateral seventh nerve.

**Dr. Walton:** I have done end-to-side repair as described in the babysitter procedure, and I just cannot get it to work effectively. So, my plan is still to put in 2 cross-facials: one to the zygomatic and the other to the buccal.

**Dr. Terzis:** How would you approach her paralyzed eye?

**Dr. Walton:** If she does not suffer from exposure keratitis, I would provide conservative management only at this point. I would wait until reanimation of the face was optimized and then perform ancillary procedures. I would also not do anything for the depressor at this point.

**Dr. Terzis:** Dr. Manktelow, what would be your approach considering that it is 2 years and 3 months after the injury?

**Dr. Manktelow:** Very rarely do children have significant eye symptoms, so I do not think I would do anything for her eye except for suggesting that she may, periodically, need to use some lubricant eye drops throughout the day. In terms of her lower face, I have not found that cross facial nerve grafts provide very effective movement. So I would resort to a more reliable and effective reconstruction, using a single cross facial nerve graft and a microneuro vascular muscle transfer.

**Dr. Terzis:** Dr. Manktelow, what if the electromyographer, who is someone you trust and have worked with for 10 years, tells you that there is denervated muscle there? Would you change your management and try to salvage the native facial muscle, or would you let it go and perform a cross-facial to be followed later by a free muscle transfer?

**Dr. Manktelow:** I would not do that. I really have not had success with cross facial nerve grafts, nerve-to-nerve, at all. At best they sometimes provide a little tone and slight movement in children. I have not been impressed with the results in any of the few publications reporting on nerve-to-nerve cross facial nerve grafting.

**Dr. Terzis:** She also had marginal mandibular nerve paralysis as well. What would you do for her depres-
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Dr. Manktelow: I would wait, watch her, and let her grow up a little bit, allowing her to come back to me and ask for more help. I think it would be very helpful if I could do something more for her at that time of particular self-consciousness that all teenagers go through. If I did this for her when she was 8 and had nothing more to offer, I think the end result would not be as satisfying for her.

Dr. Terzis: Assuming she is 14 and unhappy that when she smiles her left lower lip comes into her mouth and she feels deformed, what would you do?

Dr. Manktelow: Last year we published a paper in the British Journal of Plastic Surgery on the effectiveness of the depressor labii resection on the normal side. I have been very impressed with this small operative procedure. I would first try it with some local anesthetic, and probably use Botox and give her a chance to live with it for 3 or 4 months to see how she liked it. And if she was pleased after Botox, I would go ahead and perform a depressor muscle resection introrally. This is one of the few instances in which we can simulate an operation by a simple reversible intervention.

But this procedure is not without difficulty. The mental nerve is sitting right where you want to operate, right under the mucosa. Through a buccal sulcus incision, these branches are identified a little inferior to the orbicularis oris. You next identify the depressor labii inferioris. Its location may be distorted by retractors, and it takes a little time to become familiar with the anatomy.

Dr. Terzis: Do you perform a myectomy or a neurectomy?

Dr. Manktelow: I do a total myectomy of the middle third of the depressor labii inferioris muscle. I try to be very thorough in getting the full width of the muscle.

Dr. Terzis: Would any of the other panelists perform a myectomy for her depressor?

Dr. Walton: If I do a partial myectomy, the patient usually ends up with an irregular but still functioning lower lip depressor. I like the neurectomy. I have had pretty good luck with cross facial nerve-to-nerve repairs. If she has denervation potentials (fibrillations), it is reasonable to place a short cross facial nerve graft since reinnervation occurs fairly quickly, and you still have an adequate cross facial nerve graft for the free muscle transfer.

Dr. Terzis: This patient was treated at age 8 with a two-stage procedure. The injury was on November 4, 1988. On January 24, 1991, she underwent a babysitter procedure, which involved placement of 3 cross facial nerve grafts and direct left split hypoglossal to left facial nerve neurotization by using 40% of the hypoglossal nerve in an end-to-end coaptation. On February 11, 1992 (1 year later), secondary micro coaptations were performed between the distal ends of the cross facial nerve grafts and distal branches of the left facial nerve, aiming for reinnervation of the eye, for smile, and for commissure retraction. Figure 4, B is a postoperative view of the patient several years later.

The last patient is a 21-year-old woman who was undergoing bilateral sagittal split osteotomy of the mandible when she sustained an iatrogenic lesion to the right facial nerve. The injury occurred during a period of bleeding, and it was noted postoperatively that the patient had a complete right facial paralysis together with loss of sensation in the mandibular region of the trigeminal nerve. Over time, some regeneration took place, but she presented a year later with obvious synkinesis. She has weakness in lip elevation, commissure retraction, and a partial paralysis of the ipsilateral depressor (Figure 5, A). Dr. Rose, how would you treat her 1 year after this iatrogenic lesion?

Dr. Rose: Having determined clinically and by EMG and nerve conduction studies that she has reached a plateau, I would approach this the same way I approach all patients with partial facial paralysis, including Bell’s Palsy. I would use a combination of rebalancing and reanimation procedures. I would insert a fascia lata sling for internal support into the right lateral lip, commissure, and nostril base. I would also transfer the temporalis muscle for use as a turnover flap for augmentation of the lip elevators and smile muscles. I would place the insertion of the temporalis turnover both in the lateral third of the upper lip and at the commissure. For correction of the lower lip depressor paralysis, I have used an inferiorly based platysma transfer extended with fascia lata.

For the synkinesis, I would wait until the regional muscle trans-
fers had reached their maximum capacity, and then I would use Botox along the infraorbital rim and the lateral orbital rim to reduce the blepharospasm.

**Dr. Terzis:** Dr. Walton, how would you treat this patient?

**Dr. Walton:** I would try to isolate, by selective blockade, the various portions of the nerve to see what she has specific control of, dividing the face into units to isolate the lower, middle, and upper segments. I would not explore, but try to determine if her overall facial control would be improved with ablation of a specific facial nerve branch. If the zygomatic synkinesis is really problematic, I might consider performing a cross facial nerve graft from the zygomatic nerve branches on the normal side to the zygomatic facial nerve branches on the opposite side so that she would have improved symmetry in facial animation.

**Dr. Terzis:** Would you do anything about her partial weakness in the levators, retractors, and depressors?

**Dr. Walton:** For the lower lip, I would prefer to weaken the depressors on the opposite side. To bring the commissure out a little further and to restore the levator labii superioris, a free micro neuromuscular unit transfer would be appropriate.

**Dr. Terzis:** How would you innervate the free muscle?

**Dr. Walton:** I would determine the specific facial nerve branch over which she had selective control, and I would use it. I think a cross facial would be a reasonable way to approach this. If one seeks to do a selective animation on one side, the motor should preferentially be cross facial.

**Dr. Terzis:** Dr. Manktelow, how would you handle treatment?

**Dr. Manktelow:** When I cover one side of her face, she has a reasonable smile. Any viewer would know she was smiling; she also has a reasonable nasolabial fold. The commissure to midline distance is 30 mm compared with 32 mm on the opposite side. So, we are not far off in terms of lateral commissure movement. If she smiles, she has acceptable right levator function, and on her left, an excessive depressor function. Initially, I would try to weaken the left levator with Botox. That is a very effective and conservative way of rebalancing the smile. I sometimes have seen this situation after a cross-facial nerve and muscle transfer—ie, there is good commissure movement, but not much levator function from the muscle transfer to the upper lip.

**Dr. Terzis:** That might restore symmetry at the nasolabial fold. Would you also use Botox for the nasalis?

**Dr. Manktelow:** I have not done...
that, but if the nasalis is asymmetrical, then I would certainly consider Botox. I would also use Botox for the depressor on her left side.

**Dr. Terzis:** If her main complaint is synkinesis, how would you treat that?

**Dr. Manktelow:** I have not had a lot of success with surgical procedures for synkinesis, so I would stay with Botox.

**Dr. Terzis:** This patient’s microsurgical treatment involved cross facial nerve grafts, right mini temporalis transfer to the right commissure, ipsilateral platysma transfer to the right lower lip for depressor restoration, and a double crush of the facial nerve branches to the right eye sphincter (Figure 5, B).

It is apparent from the multitude of approaches to the injured facial nerve that restoration of normal function following severe trauma, still eludes our skills. The face is the mirror of our souls, and facial expression is the vehicle of communication of inner thoughts, feelings, and both voluntary and involuntary animation. Huge accomplishments have taken place over the past 30 years, but we are dealing with an unforgiving, complex region in which, even after huge efforts, a slight muscle imbalance can result in objectionable asymmetry in the smile or an asynchronous blink.

To overcome the many imperfections that may result from current reanimation procedures, a plethora of ancillary aesthetic procedures are commonly employed. These will be the topic of Part 2, a panel focusing on aesthetic considerations for additional improvement.

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**References**


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