Plastic Surgery & Diving

This article only summarizes these procedures. Besides the risks given for each, other potential complications include bleeding, reaction to the anesthetic and infection. Patients should follow their doctor's instructions to minimize these risks. The wait times come from two DAN referral physicians who are also plastic surgery experts – Edward Golembe, M.D., director of the Hyperbaric and Wound Healing Center at Brookdale University Hospital in Brooklyn, N.Y.; and Dr. Ralph Potkin, medical director for the Beverly Hills Center for Hyperbaric Medicine in Los Angeles, Calif. Clearly there is a demand for plastic surgery. And, at the risk of repeating ourselves, we want to remind readers that though it's cosmetic rather than lifesaving, plastic surgery is still surgery, and it has inherent risks. And most insurers don't cover it. It's important that anyone undergoing any procedure must be realistic about what it involves, what it can accomplish and what can go wrong with it, whether it's a general concern or related to future diving.

BOTOX INJECTIONS

Goal of Procedure: To improve one's facial appearance temporarily. It is most successful when used on wrinkles that result from repeated facial expressions where the muscles contract, generally the upper third of the face – horizontal forehead furrows and wrinkles in the corner of the eyes ("crow's feet"). It is less effective on wrinkles caused by gravity or age. Results often appear within two days.

What It Involves: Botox is a botulinum toxin type A, derived from a naturally occurring bacterium. The bacterium can be harmful in larger doses. For Botox, the botulinum is extremely diluted, purified and sterilized. It is safe in small doses: only about 20 units are used for a typical cosmetic injection. It would take hundreds of thousands of units to harm a human. Botox is injected directly into the muscle; this impedes the muscle's ability to contract by blocking the transmission of nerve impulses to the muscles. If a muscle cannot tighten, a wrinkle cannot occur. The injections usually are done in a doctor's office. The patient contracts the muscle area to be treated to determine injection sites. Targeted injected areas may be numbed with an ice pack or a topical agent – no anesthesia is used. Finally, the doctor administers several tiny injections of Botox directly into the muscle. Botox affects only injected areas.

Length of Procedure, Recovery Time and Possible Complications: The length of time the procedure takes depends on the number of injections. Most procedures end within 10-30 minutes. Pain is generally brief and minor and caused by the needle prick of the injections. Results generally last up to four months. Patients should wait at least three months between further treatments. It is likely that with repeated treatments, the injected muscles will atrophy, allowing patients to go longer and longer between sessions. There is a chance of growing resistance to Botox with repeated injections. A person may develop antibodies that would decrease treatments' effectiveness over time. Using the lowest dose possible and extending intervals between sessions can minimize this resistance. Possible complications are infrequent, minor and temporary. Most common are headaches, respiratory infection, flu syndrome, temporary eyelid droop and nausea. Pain, redness and bruising at the injection site and muscle weakness are less common complications. These symptoms are thought to be associated with the injection and occur within the first week. Injections around the mouth can have more potential inconvenient effects, such as drooling. If there is an adverse effect or a mistake made, it is only temporary, as Botox does not stay in the body. Botox injections should be avoided during pregnancy and nursing*, and in individuals younger than 18 years old.

Waiting Time From Procedure Until Diving: This can range from no time up to one week. Some people have discomfort afterward; this prevents them from diving immediately following the procedure. Dr. Golembe noted those who have lip lines treated need to make sure their mouths can grip a regulator and

they can breathe comfortably from it before diving.

CHEMICAL PEEL

Goal of Procedure: To promote cell growth and produce smoother, clearer skin, and treat melasma (a condition where irregularly shaped patches of brown skin appear, usually on the face and neck) and pre-cancerous skin changes. Chemical peels can be performed on the face, neck, chest, arms, hands and legs. A chemical peel can restore a more youthful appearance to wrinkled or blotchy skin. However, a peel cannot reverse the aging process or completely remove deep scars. Loose and sagging skin may also require a face-lift, laser resurfacing or other procedures for best results.

What It Involves: There are three basic kinds of chemical peels, based on the solution applied to remove the outer layers of skin. In general, the stronger the chemical, the deeper it is, with more impressive the results. However, the deeper the peel, the greater the potential is for discomfort, and the longer the recovery time. Light or "lunch hour" peels include glycolic, lactic and fruit acid or alphahydroxy acids (AHA) or salicylic acid or betahydroxy acids (BHA). They smooth out fine wrinkles and / or rough, dry or sun-damaged skin, balance out pigmentation and diminish some types of acne scars. For AHA and BHA lift peels, a doctor applies the solution, waits up to 15 minutes, and then removes it. After the procedure, no ointments or salves are needed on the treated area. Monthly or weekly repetition is common to achieve the desired results. Medium peels use a trichloroacetic acid (TCA) solution. They generally treat skin with moderate sun damage, surface wrinkles and / or uneven tone or pigment abnormalities. The process is the same as with light peels. Sometimes two or more TCA peel treatments every one to two months are needed to achieve the desired results. Deep peels involve phenol acid. They treat skin with coarse wrinkles, blotches or pre-cancerous growths. They can cause permanent lightening of the skin, so they are not recommended for most patients with very dark skin tones. Phenol peels are used only once and create dramatic results.

Length of Procedure, Recovery Time and Possible Complications: AHA, BHA and TCA peels are generally performed in the doctor's office with no sedation or anesthesia; their solutions alone have a numbing effect on the skin. However, most people feel a brief burning sensation when the solution is applied, then numbness or a stinging sensation follows during the treatment. Oral or liquid anesthesia may be given for high-concentration TCA peels before the solution is applied. For these peels, the doctor may vary the concentration of the solution or length of treatment time beyond the usual 15 minutes. Full-face phenol peels take approximately one to two hours, but small-area phenol peels (such as on the upper lip) may take about 10-15 minutes. Generally outpatient procedures with anesthesia, they are performed in the doctor's office or in a surgical center. While AHA, BHA and TCA peels are dressing may be applied to the treated area and left there for one to two days. The patient then should cover the area with antiseptic powder several times a day. A scab will form first, then within seven to 10 days, new skin will form. While the skin will be red at first, the color will lighten over a few weeks to a few months. The doctor may prescribe a mild pain medication to relieve any discomfort. A doctor may recommend that a patient not smoke at least a week after a peel. Smoking decreases circulation of the blood in the skin; this can slow the recovery.

Waiting Time From Procedure Until Diving: For a light peel, allow for one week, with the caveat "you need to use a sunscreen with an SPF of at least 30," according to Dr. Golembe. For the phenol peel, he suggests a minimum of three months, as well as three months for a medium peel, and the same sunscreen recommendation for both.

COLLAGEN INJECTIONS

Goal of Procedure: To help create a younger facial appearance without surgery. Collagen is a naturally

occurring protein that provides support to the skin, joints, bones and ligaments in a person's body. However, the collagen used in injections is derived from proteins from cows; it offers less chance of complications and gives a more natural look. Injected collagen primarily fills wrinkles, lines and scars on the face and sometimes the neck, back and chest to restore youthful looks. It is produced in various thicknesses to meet individual needs. Collagen treatments cannot correct severe facial surface wrinkles, however. A month prior to any injection, a skin treatment needs to be performed on potential patients to determine if they are allergic to the substance. What It Involves: Collagen is injected using a fine needle at several points along the edge of the treatment site. Since part of the collagen substance is salt water that will be absorbed by the body within a few days, the doctor usually slightly overfills the treated area. The patient may experience some minor stinging or burning as the injections are administered, but there is minimal pain involved otherwise, since the anesthetic agent lidocaine is mixed with collagen. The patient can have a topical cream anesthetic or a freon spray to numb the treated area and further minimize the pain.

Length of Procedure, Recovery Time and Possible Complications: The procedure takes a few minutes to an hour to perform, depending on the number of areas to be treated. Collagen injections are usually administered in a applied to minimize discomfort. During the treatment, patients experience some discomfort, a burning or stinging sensation: the patient feels intense emissions of light on the skin as the laser is absorbed by the hair follicles. Each pulse of the laser lasts a fraction of a second and treats an area of approximately an inch. Many lasers have cooling systems to decrease skin temperature, providing an additional mild anesthetic and preventing burns from the heat generated by the laser.

Length of Procedure, Recovery Time and Possible Complications: Treatment times vary considerably depending on the size of the area treated. A small area such as the upper lip may take only five minutes; a larger area like the back or legs may take up to one hour. The treatment is usually performed in a doctor's office. Following the procedure, the area may be red or swollen. Some doctors prescribe a topical cream to soothe the skin. The skin should be cleaned with mild soap and water, not with products, such as astringents that may irritate the skin. Occasionally, the skin in the treated area becomes slightly crusty; this reaction should fade within a few days. Patients with dark complexions may have a temporary lightening of the skin in the treated area. Within 10 days after treatment, damaged hair may fall out in the area and look mistakenly like hair growing back. Patients can shave these hairs if desired but should not wax, tweeze or bleach them between sessions. Sessions should occur at least a month apart, when patients usually notice the regrowth of hairs that were previously in the telogen phase. Despite usually needing multiple treatments, most patients are satisfied with laser hair removal. In some cases complete hair removal is never achieved. Nonetheless, there should be fewer hairs in the treated area than if it had not been treated.

Waiting Time From Procedure Until Diving: No restrictions on diving or other activities, but applying a sunscreen with an SPF of at least 30 on the treated area is recommended.

LASER SKIN RESURFACING

Goal of Procedure: To help minimize fine lines as they begin to occur, particularly those around the mouth and eyes, and also to address other skin problems, such facial scars. Laser resurfacing often gives the doctor more control over penetrating the skin than other resurfacing treatments. The laser removes layers of damaged and wrinkled skin so that new, smoother skin can form. Depending on the type of laser and amount of surface skin removed, some individuals also see a significant improvement in the skin's tightness and firmness.

What It Involves: The doctor or an assistant cleans the patient's face, then an antibiotic is applied to kill

bacteria. Brief, high-intensity emissions of light from a microphone-shaped instrument vaporize the outer layers of damaged skin. The laser can be programmed to penetrate more deeply in some areas to remove deep scars, stubborn spots and wrinkles. The patient may hear the laser zapping and smell smoke. Most resurfacing requires just local anesthesia, possibly with an oral sedative, although for complete facial resurfacing, physicians often use intravenous sedation or general anesthesia. When the treatment ends, the doctor or assistant may apply a protective ointment or bandage to the treated area. "That's like treating a second-degree burn," noted Dr. Golembe about the process.

Length of Procedure, Recovery Time and Possible Complications: The size and severity of the treatment area can make treatment last from just a few minutes to an hour and a half. It may be performed in a hospital, an outpatient surgical facility or a surgeon's office. Most patients who remain awake during the procedure feel only minimal discomfort. After the surgery, the pain is mild to moderate and can be handled by over-the-counter drugs. Some patients experience swelling; cold packs are usually recommended to reduce it. The amount of recovery time depends on the amount of the resurfacing and the patient's capacity to heal. Redness may persist for several weeks, gradually lighten to pink, and then to a lighter, more natural color. To cover up the redness, patients can apply makeup approximately, but not until two weeks after the procedure. Any bandage after the surgery may be changed in a few days. This bandage must remain dry until it is removed. It is completely removed after approximately one week, at which time an ointment is applied. Patients without a bandage need to wash their faces several times daily, being careful in cleaning around the treated area. After every washing, they should apply an ointment such as petroleum jelly to the treated area. Scabs may form and last for about 10 days:patients must not pick at them. Laser resurfacing generally removes most wrinkles and imperfections in the treated area, but natural facial movements and expressions eventually cause some lines to reappear. Laser treatments may be repeated to maintain results. After laser resurfacing, daily sunscreen is highly recommended to protect the sensitive new skin. For resurfacing done around the eyes, patient should wear sunglasses.

Waiting Time From Procedure Until Diving: About three months.

LIP AUGMENTATION

Goal of Procedure: To increase the size of the lips and make them fuller and more attractive. The upper or lower lip may be treated singly or together at the same time.

What It Involves: The two major methods of lip augmentation are injections and grafting. Injections involve small needles filling the lip with a soft substance, usually but not only collagen or fat, to create a temporary fuller appearance.

Purified collagen found in cows may cause allergic reactions when injected, so a sensitivity test should be performed before the actual procedure. Because the body slowly absorbs the collagen, the results generally last between one and three months. Purified fat used for augmentation is harvested from another area of the body, most often the abdomen or thighs, then prepared and inserted with a needle into the lip at more than one point. Local flaps bring material from inside the mouth outside to enhance the lips. An incision may be made inside the mouth to push the tissue inside the mouth upward, and outward, into the lip, sometimes in conjunction with grafting. Or, an incision may be along the upper lip line. In this case, skin above the lip is removed, and the lip is then stitched along the line of the incision. Fat grafting produces lasting results in approximately half the patients. Although it is possible that the body will reabsorb it, many people choose fat grafting because they are most comfortable with using the fat from their own body to enhance their lips. Unlike collagen, there is no possibility of an allergic reaction.

Length of Procedure, Recovery Time and Possible Complications: Outpatient procedures, most lip

augmentations take a half hour to two hours, depending on the method. Topical anesthesia is generally used before injections. Generally, local anesthesia with light or deep sedation is used in grafting. Immediately following surgery, the lips may swell and hurt, though most people report little discomfort in the days after lip augmentation. Cold compresses should be used for 48 hours to control the swelling. During this time, talking and chewing should be avoided as much as possible. Oral pain medications may be used to control the discomfort. Also, antibiotics may be given to reduce the possibility of infection. To help avoid infection, it is also important to keep the lips clean. After injections, most people return to normal activities within a couple of days. Bruising and swelling may last as long as a week. The procedure is often performed more than once to achieve desired results. Grafts and flaps usually involve more pain during recovery and a longer recovery period than injections. People often wait between one and two weeks after the procedure before returning to their regular routines. During that recovery time, some experience problems with drooling. Grafting also may leave lips feeling unnaturally stiff for two to three months after treatment. Any non-dissolving stitches may be removed about seven to 10 days after the procedure. Scars from incisions, if any, are rarely perceptible. The results vary according to the procedure used and how fast a patient absorbs fat and other temporary fillers.

Waiting Time From Procedure Until Diving: "You have to put your mouth around a mouthpiece," notes Dr. Golembe as a concern about diving after this procedure. For injections, he recommends waiting one week, while for grafts, he recommends three weeks.

MICRODERMABRASION

Goal of Procedure: To reduce fine lines, "crow's feet," age spots and acne scars by stimulating the production of skin cells and collagen and giving the skin a fine, healthy glow. A quick, non-invasive process, it is nicknamed the "lunchtime peel" and also known by such patented techniques as the Power Peel(tm) and the EuroPeel(tm). Usually performed on the face and neck, it actually can be done on any part of the body. What It Involves: A hand-held device blasts tiny crystals onto the surface of the skin and suctions the crystals and loosened skin back into the machine. The doctor can vary the pressure to control the amount of penetration, or pass over an area several times to remove the most damaged skin. This results in exfoliation and a gentle abrasion or "polishing" process. No anesthetic is needed. Some patients report some mild irritation, but most report no pain at all.

Length of Procedure, Recovery Time and Possible Complications: Each treatment takes from 30 minutes to an hour. The skin immediately turns pink, but will fade within a few hours. The number of treatments for best results can range between five and 12, spaced from two to three weeks apart. Maintenance of results requires periodic repeat treatments after the initial regimen is completed. Some combine it with a light chemical peel to increase the effect.

Waiting Time From Procedure Until Diving: "For the vast majority of the procedures, I would say that with the reasonable precaution of a good sunscreen, there needn't be any wait time," said Dr. Golembe. "If one were to be ultra-conservative, a two- to three-week wait would be very adequate. Keep in mind that individual recommendations, according to skin type and sensitivity, will possibly alter the time frame."

MICROPIGMENTATION (permanent cosmetics, cosmetic tattooing)

Goal of Procedure: To enhance facial features, correct skin pigmentation problems or give scar tissue a more natural appearance. People with little time to reapply makeup daily, allergies to makeup products, skin disorders, poor eyesight or poor coordination may find this procedure a great help. Some common permanent makeup procedures are permanent eyeliner, permanent eyebrow definition, lip liner and lip color. The fuller and more defined eyebrows and lips that result can change an individual's appearance completely into a more youthful, put-together look.

What It Involves: Permanent makeup comes from vegetable products that make a pigment. Fine needles attached to a coil machine (the machine used for most tattoos) or a rotary machine dip into the pigment and then inject it into a deep layer of the skin. As the needle penetrates the skin, a small amount of bleeding may occur. A topical numbing agent may be applied or an anesthetic injection may be used to numb the area. Most people experience some discomfort during the procedure, less so if the area treated is not close to underlying bone structure. At the end of the procedure, the doctor washes the skin and may apply an antiseptic cream.

Length of Procedure, Recovery Time and Possible Complications: The time depends on the area being treated and the technique used. Generally, it is about an hour. Most treatments are performed in a doctor's office or an outpatient surgical facility. The treated area is usually sensitive and swollen for the first few days following the procedure. A scab will form and fall off as the skin heals over the next seven to 10 days. During this time, the skin must be kept clean to avoid infection, and the doctor may recommend applying antibiotic cream. During the healing process, patients should avoid sunlight because the sun may have a lightening effect on pigment in the treated area. Around four to six weeks after the initial procedure, a follow-up visit should occur. This will allow the doctor to make any needed changes to the pigmentation and to perfect the results. The color of the makeup may fade and need to be touched up at a later date.

Waiting Time From Procedure Until Diving: Around the first seven to 10 days as indicated in recovery.

SCLEROTHERAPY (spider vein treatment)

Goal of Procedure: To remove the unsightliness of spider veins and the problems they cause with restless legs, aching, burning and / or cramps. (Restless Legs Syndrome is a condition in which the patient suffers extreme itching and creeping sensations in the lower extremities; these symptoms cause an irresistible urge to move the legs.) Spider veins are so named because the red, blue or purple thread-like lines just under the skin often radiate out from a central point, reminiscent of a spider's shape. They may also appear as fine, separate lines, a web-like maze or as branches from a single tree trunk. They can develop on any part of the body, but most often on the thighs, calves or ankles. Spider veins are caused by abnormal blood flow and weakening of the blood vessel wall in the affected veins. Any condition or activity that puts pressure on the veins, such as gaining weight and sitting or standing for long periods of time, can contribute to their development. In some cases, laser treatment is used in combination with sclerotherapy or by itself to treat spider veins. Treatment does not prevent developing new spider veins but can improve dramatically the appearance of the affected area, providing a more youthful, healthy look and an even color pattern to the skin as veins lighten after each treatment.

What It Involves: To minimize bleeding during the procedure, some doctors recommend patients avoid alcohol, herbal treatments and anti-inflammatory medications two weeks prior to treatment. On the day of treatment, patients should not put creams, lotions or oils on the affected area, but should wear shorts or comfortable clothing that exposes the spider veins. The doctor applies antiseptic to the area, then injects a sclerosing solution into an affected vein with a very fine needle. Each injection covers about an inch of the vein. Patients may feel a pinch as the needle is inserted and a burning sensation as the solution is injected. Most patients feel little pain, but the type of solution used can affect the amount of pain felt. No anesthesia is needed. Cotton dressing and compression tape is applied to the area after the injection. The doctor proceeds to the next vein area until finished.

Length of Procedure, Recovery Time and Possible Complications: Sclerotherapy normally takes 15 minutes to one hour, depending on the number and length of the spider veins. The procedure is usually performed in a doctor's office or at an outpatient facility. Some patients experience temporary itching or

cramping at the injection site. They must wear a compression wrap for several days and keep the injected area dry. When the compression wrap is removed, there may be bruising and discoloration that will fade over a period of several weeks. Some doctors also prescribe support hose to be worn for several weeks to help keep the treated vein(s) collapsed and reduce the chance of blood clots. Patients should avoid activities that put pressure on the treated area such as heavy lifting or jogging for a few days. However, most doctors recommend a regular walking program for patients after treatment to increase circulation and promote healing. Most patients are highly satisfied with the procedure. The treated areas are noticeably clearer and in most cases the skin improves with each successive treatment. To complete the collapse of the vein, a second treatment is usually needed. For many veins requiring treatment, multiple sessions may be required.

Waiting Time From Procedure Until Diving: No restrictions, but patients should wear a sunscreen with an SPF of at least 30.

LASER TATTOO REMOVAL

Goal of Procedure: To correct a poorly placed or poorly executed tattoo, handle an infected tattoo site or eliminate the tattoo. Because tattoos are placed fairly deeply under the skin, older removal methods such as dermabrasion caused considerable scarring. Lasers are gentler, more effective, and less likely to lead to scarring.

What It Involves: A laser selectively targets and destroys the tattoo without damaging the surrounding tissue. Lasers have differing wavelengths and pulse durations, and different laser beams are absorbed by specific colors, allowing physicians to choose the precise combination of lasers for the depth and color(s) of a tattoo. The doctor or an assistant cleans the tattoo area to remove oils first. During the procedure, the patient feels intense emissions of light penetrating the tattooed area. It is noisy due to sounds from the laser and from fans that operate to reduce heat in the room and clear the air. There is a burning or stinging sensation during the treatment. A numbing cream applied to the skin or a local anesthetic injected under the skin can be used to minimize pain. After treatment, the skin looks more uniform and natural, although some changes in skin texture and color are unavoidable.

Length of Procedure, Recovery Time and Possible Complications: On average, each laser treatment takes 10-20 minutes. The number of treatments needed to achieve the desired results will vary depending on the tattoo's depth and color. Eight to 12 treatments for one tattoo are typical. Patients must allow at least a month between treatments. Laser treatment is usually performed in a doctor's office; a hospital stay is not necessary. The area may be red, as if mildly sunburned, for several weeks afterward. There may be some bruising, and with deeper tattoos bleeding is not uncommon. The area may be treated with an antibiotic ointment and a bandage applied. Recovery times depend on the extent of the treatment and the individual's capacity to heal. Redness and sensitivity may continue for several weeks, and there may be discoloration and a change in skin texture in the area; this will gradually improve. Patients should avoid exposing the treated area to the sun; that may retard healing. Patients may not see significant results until after several treatments. In the end, most are satisfied with the removal. However, the skin will never look as it did before the tattoo was there. Waiting Time From Procedure Until Diving: "If it's uncomplicated, it can be almost immediately after with some sunscreen covering or wearing a garment," Dr. Golembe says. "Most of the things acquire scabbing, and when there's no more scabbing, about three weeks."

SOME FINAL ADVICE

If you're a diver wondering about a surgical cosmetic procedure not covered here, ask your surgeon to call DAN for advice, Dr. Golembe says.

** A consensus statement on Botox from the National Institutes of Health Development Conference from Nov. 12-14, 1990, stated that "Safety for use during pregnancy or lactation has not been established." This*

remains the most currently accepted belief in the medical community at present.