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FACIAL RECONSTRUCTIVE AND COSMETIC SURGERY INDIA TRUST

FRCSIT NEWSLETTER 2023

FRCSIT Newsletter Volume 04: Year 2023

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Patience said, "I'm difficult for you."
Hope said, "I'll make it easy for you."
Patience said, "You can't handle me."
Hope said, "I'll help you to handle it."
Patience said, "I'm so hard for you."
Hope said, "I'll make it light for you."
Patience said, "I'm tasteless."
Hope said, "I'll make it tasteful for you."
Patience said, "I'll take sacrifice."
Hope said, "I'll give you more."
Patience said, "I'll make you tired."
Hope said, "I'll give you energy."
Patience said, "I'll give you tears."
Hope said, "I'll wipe your tears."
Patience said, "You need hope to bear me."
Hope said, "I'm here to make you patient."
Patience said, " Me and hope work together."
Hope said, "I can't work without patience."

- MAHNOOR FATIMA

FACIAL PLASTIC SURGERY - An Update

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The definition of an ideal surgeon according to the great surgeon Sushruta is “A person who possesses courage and presence of mind, a hand free from perspiration, tremor- less grip of sharp and good instruments and who carries his operations to the success and advantage of his patient who has entrusted his life to the surgeon. The surgeon should respect this absolute surrender and treat his patient as his own family member.”

Sushruta treated numerous cases of Nasa Sandhan (rhinoplasty), Oshtha Sandhan (lobuloplasty), Karna Sandhan (otoplasty). Even today, rhinoplasty described by Shushruta in 600 BC is referred to as the Indian flap and he is known as the originator of plastic surgery.

Facial plastic surgery is a multidisciplinary specialty driven by otolaryngology, plastic surgery, maxillofacial surgery, oculoplastic surgery, and cosmetic dermatology. Facial plastic surgeons focus on procedures and operations involving anatomy of the head and neck. It includes both reconstructive and cosmetic components. The scope of practice for facial plastic surgeons include rhinoplasty, otoplasty, genioplasty, reconstruction of pinna in

patients with microtia and anotia, browlift, blepharoplasty, facelift, microvascular reconstruction of the head and neck, craniomaxillofacial trauma reconstruction, and correction of defects in the face after skin cancer resection. Facial plastic surgery also encompasses the use of injectable fillers, neural modulators like BOTOX, Cosmetic lasers, and other devices aimed at rejuvenating skin.
Otolaryngologist plays an exclusive and unique role especially in pinna and hearing reconstruction simultaneously in the cases of congenital aural atresia and microtia.

Facial plastic surgery is a constantly evolving field with continuing innovative advances in surgical techniques and cosmetic adjunctive technologies. This article provides an update of the various procedures in the field of facial plastic surgery and to highlight the recent advances and trends in procedures and surgical techniques. trends in procedures and surgical techniques. The practice of modern facial plastic surgery began more than 100 years ago. Otolaryngologists who believed in treating physical defects that caused patients psychological distress, social, and economic disadvantages, pioneered the creation of facial plastic surgery as a subspecialty of otolaryngology. In the beginning, aesthetic surgery was outside mainstream medicine, but Jacques Joseph first promoted cosmetic surgery as a specialized field. Jacques Joseph is considered the founding father of modern facial plastic surgery, and he pioneered many of the earliest surgical aesthetic techniques. Another contributor was Sir Harold Gillies, a New Zealand otolaryngologist by training who first standardized rhinoplasty, skin grafts, and facial reconstruction as described in his 1920 book ‘Plastic Surgery of the Face’.

He is often considered the founding father of plastic surgery. The creation of the American Academy of Facial Plastic and Reconstructive Surgery (AAFPRS) in 1964 officially marked the beginning of modern facial plastic surgery as a subspecialty of otolaryngology. Since then, facial plastic surgery societies have expanded globally and now includes many national and multinational academies, quite a few of which are now recognised as members of the International Federation of Facial Plastic Surgery Societies (IFFPSS).

FRCSIT was founded by like-minded surgeons from India and surgeons of Indian origin living abroad, in the year 2015. These included Mr Ullas Raghavan, Consultant Otolaryngologist and Facial Plastic Surgeon from Doncaster Royal Infirmary, UK, Prof Rakesh Kumar, AIIMS, Delhi and a commonwealth fellow in facial plastic surgery,myself, after working in the United Kingdom for over a decade, and Dr Vishwas Vijayadev, Bangalore. Prof Rakesh and Dr Vishwas returned back to India with lot of enthusiasm in the field of Facial Plastic Surgery after getting trained in the U.K. as a commonwealth fellow, by their mentor Dr Ullas Raghavan. I, myself returned to India in 2003 after training and working in the UK and having gained considerable experience in Rhinoplasty and other facial plastic surgery procedures. Most of us recognise Dr Ullas Raghavan as the ”Founding Father of Facial Plastic Surgery to Indian Facial Plastic Surgeons”, for taking the lead to start this organisation in India though living in Britain and to train the Surgeons in the Indian subcontinent with dedication.

FRCSIT became the associate member of IFFPSS, after a rigours and exhaustive assessment

process by the IFFPSS board. Dr Sandeep Uppal, Senior Consultant Otolaryngologist and Facial Plastic Surgeon from Singapore was instrumental in representing FRCSIT at the IFFPSS board, to put forward our case and achieve this success. I must acknowledge Prof Peter Adamson, world renowned Facial Plastic Surgeon from Canada, for his constant support and guidance to us during this journey.

Facial Plastic Surgery focuses on improving patient facial appearance. Common surgical procedures include rhinoplasty, blepharoplasty (eyelid surgery), rhytidectomy (facelift), browlift, genioplasty (chin augmentation), otoplasty (ear repositioning), liposuction, and fat transfer. Many patients seek surgical treatment to reverse changes that occur with aging, such as loose skin, decreased tissue volume around the face and neck, crow's-feet at the corner of eyes, fine lines on the forehead, loss of jawline contour, sagging jowl, and double chin.

Rhinoplasty is the most commonly performed and most difficult facial plastic surgery is rhinoplasty. It is performed to correct internal and external nasal deformities, to modify unsatisfactory aesthetic appearance, to relieve airway obstruction due to septal deviation, inferior turbinate hypertrophy, deviated/fractured nasal bones, and narrow internal nasal valve area, and to reconstruct congenital nasal anomalies. During the rhinoplasty procedure, the nasal skin, subcutaneous soft tissue, cartilaginous and bony framework, and mucous membrane lining are manipulated. Open rhinoplasty is differentiated from the endonasal rhinoplasty in that the incision is made in the mid-columella in the open approach. The general

principle of a rhinoplasty consists of a separation of the nasal skin and soft tissues from the osseocartilaginous nasal framework so that the framework can be reshaped to produce the desired nasal contours. Rhinoplasty is a technically challenging procedure that has complication rates from 5 to 10%. The most common complication being dissatisfaction of the patient. Sometimes the surgeon is unhappy with his work but patients are happy and the other way round. Postoperative scarring, deformity and undesired results can lead to minor revision surgery called secondary rhinoplasty in about 5-10 % of dissatisfied patients. Rhinoplasty surgery has changed towards using structural techniques that require cartilage to reconstruct shape, bolster anatomic components, expand the airway, and establish appropriate aesthetic contour. Advances in this area include the broader use of septal and conchal cartilage for structural grafting. Traditionally, rib cartilage was used for only major reconstructive nasal operations. Several new technological devices have evolved in recent years including polydioxanone foils to stabilize structural planes, ultrasonic devices to perform precise osteotomies, and the intranasal application of conventional high-speed powered instruments.

Preservation rhinoplasty is a new trend, and gaining some ground amongst surgeons. Digital imaging is an increasingly important element of rhinoplasty planning and an essential component of the preoperative consultation. Three-dimensional (3-D) imaging systems along with 3-D image morphing technologies are now widely used by most surgeons, though there is no universally accepted software platform.

Facelift is another common procedure performed by facial plastic surgeons. When facelifts were first advocated over 100-years ago, the procedure itself involved making multiple incisions and pulling the skin on the face tighter. Now the traditional incision is made in front of the ear, extending up into the hairline and curving around the bottom of the lobule and then behind the ear. The skin is separated from the deeper tissues, and then the deeper tissues are tightened with sutures. In the final step, the skin is redraped and the excess skin removed. Advancements in facelift procedures have been largely driven by the demands and desires of patients. Contemporary patients are looking for minimally invasive procedures with less postoperative recovery time. Treatment of the aging face has been profoundly impacted by the rise of so-called lunch time facelift-type operations.

These complex procedures yield superb outcomes in expert hands; however, often patients operated on by less-experienced surgeons experience prolonged post-operative oedema, sensory or motor nerve injury, and facial asymmetry. Today there are many facelift approaches, such as the deep plane facelift, composite facelift which involves repositioning and fixation of the orbicularis oculi muscle, midface lift, mini facelift, thread lift, periosteal facelift, skin-only facelift, and minimal access cranial suspension lift. Each can achieve good to outstanding outcomes but largely depend upon surgical skill and the anatomic variations from patient to patient. A major trend in recent years is the combination of facelift operations with autologous fat transfer, which also addresses the volume loss that occurs with aging.

Blepharoplasty, or eyelid surgery is another popular procedure. Blepharoplasty involves the excision of excessive eyelid skin and/or removal of orbital fat to treat dermatochalasis (aging-related changes in the periorbital structures) for “droopy eyelids,” “tired eyes,” or “bags under the eyes.” The traditional approach for lower blepharoplasty is through a subciliary incision with a raised skin and muscle flap, followed by identification and correction of herniated medial, middle, and lateral fat.

The skin pinch blepharoplasty is the easiest to perform. In this technique, only excess skin is excised through a sub-ciliary approach. The pinch blepharoplasty of the lower lid also foregoes violation of the orbicularis muscle and the orbital septum to avoid nerve injury and to decrease scarring. This approach allows more wrinkled, thin skin to be safely removed and an aesthetic eyelid posture to be maintained. Both upper and lower lid blepharoplasties are often performed under local anaesthesia with moderate sedation. Of note, blepharoplasty is also performed to correct lid ptosis, the most common cause is levator palpebrae superioris attenuation.

Forehead lift and Browlift- In these procedures, excess skin is resected and the forehead skin is repositioned superiorly. The incisions are placed along a coronal line within the hair-bearing scalp if the frontal hairline is low. A hairline (trichial or trichophytic) incision is used in patients with a high hairline. These two approaches are most commonly used in women. In men, a third option is the mid browlift where an incision is made in a deep forehead furrow, and a fusiform ellipse of skin is resected. In the endoscopic surgery, several small incisions

are placed behind the hairline and an endoscope is used for visualization during elevation of the forehead skin. With the endoscope under the forehead flap, the surgeon releases soft tissue adhesions and ligaments along the arcus marginalis and temporal line of fusion, allowing redraping and fixation of the skin more cephalically. The results are the best approach in the younger patient who seeks more natural changes.

Hair Restoration-Hair loss is a major concern for many, and hair transplantation advancements continue to provide a good option for correction. Physicians from various specialties perform these procedures. In 1984 Headington pioneered the concept of follicular unit transplantation which is now the gold standard of hair restoration. It involves individual hair follicles or small groups of two to four follicles to be extracted and transplanted. It creates the most natural outcomes. Robotic surgery has definitely made advances across multiple surgery specialties and is now being used to automate follicular unit harvest and transplantation. Robotic systems harvest, sort, and process individual single hair grafts or multiple hair grafts. It remains to be seen whether these systems are economically viable related to conventional methods, which required meticulous sectioning of follicular units by teams of technicians.

Non-surgical Cosmetic Procedures- A large evolving part of facial plastic surgery involves using techniques such as chemical peels, lasers, and various injectable substances to produce improved facial aesthetics. In comparison with most cosmetic surgery, these office-based procedures have a much-reduced recovery period.

Chemical Peels-Examples of chemical peel agents include glycol acid, trichloroacetic acid, and phenol. During a chemical peel, the agent penetrates through the epidermis into the first layer of the dermis. Different agents have different depths of penetration and stimulate skin regenerative pathways.

Dermabrasion- Dermabrasion is another technique used to smooth scars and wrinkles. This technique is performed under a local anaesthetic and/or a freezing agent. A high-speed rotating brush, sandpaper, or similar abrasive device is used to remove the top layer of the skin. This technique may be applied to individual blemishes or large areas of the face.

Lasers are used to correct facial rhytids, scarring, photo-damaged skin, and other signs of aging. Laser treatments cause no bleeding and induce minimal trauma to the surrounding skin.

The technology allows for precise control of ablation depth. There are two types of laser therapy, ablative and non-ablative. Ablative lasers vaporize the superficial layers of the skin by heating the dermis to stimulate new collagen production by fibroblasts. Two ablative lasers, pulsed carbon dioxide (CO2) for deep ablations and Erbium:Yttrium-Aluminum-Garnet (Er:YAG) for light to medium ablations. Currently, novel systems are being developed, combined Er:YAG laser and CO2 laser, these aim to achieve a significant degree of clinical improvement with less skin thermal damage. Non-ablative lasers do not cause superficial injury to the epidermis but stimulate collagen growth within the dermis. The Q-switched Neodymium:Yttrium Aluminum Garnet laser is especially useful in the treatment of periocular and perioral rhytids. Others include diode lasers, pulsed-dye lasers and intense pulsed non-laser light

sources

Finally, one of the biggest advances within the past 10 years is the development of spatially selective heating of tissue or fractional photo thermolysis. It causes deep dermal damage that triggers collagen synthesis and remodelling while causing minimal epidermal damage. Fractional ablative lasers combine the principles of classic ablative techniques and fractional photo thermolysis. Re-epithelialization occurs within 48 hours with extrusion of the necrotic tissue with minimal inflammatory reaction. The postoperative erythema usually resolves in 7 days. The main advantage of fractional ablative resurfacing is its low risk for side effects and complications. Fractional laser therapy was a great revolution in the field of laser skin resurfacing, and more laser devices are currently being developed and commercialized.

Fat Grafting- Complementary fat grafting and the efficacy of the manual liposuction of fat and precise injection of small aliquots of this tissue into the regions surrounding the midface, orbit, temporal fossa, neck and other regions. It is an essential adjunctive component of many individuals' facelifts now.

Dermal Fillers -Replacing lost or misplaced fat pads with dermal fillers is one important approach to recontouring the aging face as well as to treating scars and rhytids. The U.S. FDA approved temporary fillers of collagen, hyaluronic acid, calcium hydroxyapatite (CaHA), and poly-L-lactic acid (PLLA). The only FDA-approved permanent filler is polymethyl methacrylate for correcting nasolabial folds.

Hyaluronic Acid - Currently, hyaluronic acids are the dominant facial filler agent. It is also a major component of connective

tissues, especially in the human dermis.

It hydrates, lubricates, and stabilizes connective tissues, and as skin ages, the amount of hyaluronic acid decreases in tissues. The main patient concerns about dermal filler injections are pain and discomfort as well as postprocedural bruising and swelling. Adding 2% lidocaine solution to fillers reduces pain.

Poly-L-Lactic Acid - PLLA is a deep tissue regenerator that provides soft tissue augmentation through stimulation of fibroblast production. It is a synthetic polymer that stimulates collagen synthesis through a foreign-body reaction. PLLA is frequently and successfully used to treat hollowing of the cheek, nasolabial folds, pre jowl folds, the malar area, and the temporal area. Studies have indicated that results last at least 3 years and patient satisfaction is high.

Calcium Hydroxyapatite - In 2006, CaHA was approved by the FDA to treat lipoatrophy via subdermal implantation to correct moderate to severe facial wrinkles and folds. Results last up to 12 to 20 months after injection.

Polymethyl Methacrylate - The only FDA-approved permanent filler is polymethyl methacrylate. The main concerns of permanent fillers are the possibility of late-onset adverse events or displacement of the filler as facial structures change with age.

Botulinum Toxin - Botulinum toxin injection for treatment of facial wrinkles is the most frequently performed cosmetic procedure. The most potent is the botulinum toxin serotype A, which is the one used for cosmetic treatments of glabellar lines and other hyper functional facial rhytids. Botulinum toxins inhibit the release of acetylcholine into

the synaptic cleft and therefore result in temporary muscle paralysis. The clinical effects generally last ~2 to 6 months. There are three botulinum toxin A (BoNTA) serotypes approved by the FDA for cosmetic use: onabotulinumtoxinA (BOTOX), abobotulinumtoxinA (Dysport) and incobotulinumtoxinA (Xeomin). BOTOX is 4 times more potent on a per unit basis than Dysport, and both are used for cosmetic purposes. Xeomin is a highly purified formulation that is free from complexing proteins, reducing its immunogenic potential. In addition to treating already developed wrinkles, BoNTA has been shown to prevent the development of wrinkles.

Reconstructive Surgery-Facial reconstructive surgery aims to correct anatomic defects and may include scar revision, craniomaxillofacial fracture repair, laceration repair, vascular malformation treatment, craniofacial and maxillofacial cleft operations, orthognathic surgery, and cancer reconstruction. Examples of cancer reconstruction include free flaps for head and neck cancer defects and local skin flaps for cutaneous tumours.

Facial Fractures-Facial fractures are often due to trauma and can be divided into various types of injuries: Le Fort fractures, zygomaticomaxillary complex (ZMC) fractures, frontal fractures, mandibular fractures and Panfacial fractures.
Le Fort facial fractures of the midface are complex and classified into three categories. They all involve fracture of the pterygoid plates. Le Fort I fractures (horizontal) often result from a directed force on the maxillary alveolar rim in a downward direction. Le Fort II fractures (pyramidal) result from a blow to the lower or mid maxilla

and are defined in part by separation of the maxilla from the cranial base at the zygomatic arch. Le Fort III fractures (transverse), also termed craniofacial disjunction, are often caused by an impact to the nasal bridge and are the most complex and devastating of the Le Fort fractures. These fractures are accompanied by severe intracranial trauma and result in complete separation of the facial skeleton from the skull base. ZMC fractures are the second most common facial fractures after nasal fractures and are also referred to as malar or cheekbone fractures. The most common causes of ZMC fractures include assault, falls, motor vehicle accidents, and sports injuries. The ZMC provides normal cheek contour and separates the orbital contents from the temporal fossa and maxillary sinus. ZMC fractures are classified into type A1 (zygomatic arch), type A2 (lateral orbital wall), type A3 (inferior orbital rim), type B (involving all four anatomical sites), and type C (complex fractures with comminution of the zygomatic bone). Mandibular fractures are frequent injuries after facial trauma due to the mandible's angularity and relative lack of structural support. Mandibular fracture types can be classified by injury of the anatomic regions: condyle, coronoid process, ramus, angle, body, alveolus, parasymphysis, and symphysis.

Management of Facial Fractures-The ultimate goal in treating facial fractures is to obtain an accurate and stable reduction to restore pre-injury form and occlusion while minimizing external scars and deformity. For ZMC injuries that have fracture instability or comminution, an open reduction and internal fixation is indicated with the coronal approach as the main access for complex zygomatic arch repairs. This approach can lead to alopecia, loss of sensation posterior to the

Incision, risks of traction injury to the frontal branch of the facial nerve with temporal hollowing, and excessive blood loss. More recently, endoscopy has been used to assist in the treatment of ZMC and Le Fort III fractures. Endoscopy can be performed through stab incisions and thus avoids the need for extensive coronal exposure for zygomatic arch repairs. Endoscopy allows for in situ reduction and fixation under magnified visualization while only requiring small, well-concealed incisions.

Mandibular fractures were traditionally treated with closed reduction or open reduction with wire osteosynthesis. In addition, rigid internal fixation was developed and involved placement of interfragmentary titanium plates.

The main advances in facial reconstruction for these traumatic facial fractures are in new instruments and hardware. Individual anatomy is recreated on a computer using computed tomography data. Customized plates are designed, and the operative plan is simulated on a computer workstation. This technology allows surgeons to better plan the operation, showcase expectations to patients, and teach fellow surgeons. Patient-specific implants including titanium and silicone are available.

Additionally, resorbable plates and screws have been used in the treatment of mandibular fractures. These plates are of particular use in children, whose facial bones continue to grow. Rigid fixation techniques commonly utilize smaller fixation plates.

Cleft Lip Repair- The timing of the lip repair is generally between 2 and 3 months of age. Timing of cleft lip repair is a rule of 10s: at least 10 pounds and at least 10 weeks of age. The vast majority of unilateral clefts are treated with Millard's advancement rotation

technique. Bilateral clefts are most often treated in a single stage using either a variation of the rotation advancement technique or the one described by Black and Scheflan. The nasal component of the deformity is often addressed by either adjustment of the ala base or manipulation of the lower lateral cartilages. With regard to the alveolar ridge, if there is good alignment and less than a 1-mm gap, one can proceed with a gingivaperiosteoplasty at the time of lip repair. The literature supports this procedure's improvement in alveolar architecture, dental occlusion, and avoidance of anterior fistulas.

Cleft Palate Repair-There is general agreement that cleft palate repair should occur between 6 and 12 months of age. Timing is dictated by the thought that function of the velum and palate should be optimized prior to the beginning of speech development and pressure formation of the mouth. The majority of cleft palate repairs are done using the two-flap palatoplasty technique using bilateral palatal flaps based on the greater palatine vessels to close at the midline.

Bone Grafting -Bone grafting usually takes place between ages 7 and 9 and serves several purposes. Bone grafting to the alveolar cleft provides a bone scaffold for cleft tooth eruption, it maintains palatal width and completes the alveolar ridge preventing alveolar and hard palatal collapse, it acts as a bone base to the nostril sill and ala, and it is effective in closing oronasal fistulas. In bilateral cases, the bone graft stabilizes the premaxilla. The"gold standard" for alveolar reconstruction is cancellous bone grafting. Oral and nasal flaps are developed restoring mucosal integrity of the nasal cavity and buccal sulcus.

Iliac crest cancellous bone harvesting is still practiced by many.

Facial Reanimation-Facial paralysis can be a consequence of traumatic facial nerve injury, iatrogenic injury, oncologic resection, temporal bone surgery, skull-base surgery, congenital syndromes, and viral infections. Facial reanimation surgery involves using surgical techniques to improve the facial deformity caused by facial paralysis with the goal of improving facial symmetry and restoring function. There are five types of repair: (1) neural techniques; (2) musculofascial transposition techniques; (3) micro neurovascular transfer; (4) facial plastic surgery procedures; and (5) use of prosthetics. Dynamic procedures aim to restore voluntary movement. These include cranial nerve XII–to–cranial nerve VII nerve transfers, Nerve to Masseter, V-VII nerve transfer, inter-positional grafts using great auricular and sural nerve, cross-facial nerve grafts, dynamic musculofascial transpositions, and free flaps with cross-facial nerve grafting for reconstruction. Static procedures to treat facial paralysis include the use of upper eyelid implants, gold/platinum, fascia lata slings, facelifts, browlifts, and eyelid procedures like lateral canthopexy. These techniques can provide marked cosmetic improvement, restore function, particularly in eye protection, mastication, and speech.

Microtia- is a congenital malformation of the external ear with auricular deformity or absence and atresia of the ear canal with hypoplastic ossicles. Reconstruction may be performed through a staged process consisting of the implantation of a rigid framework and the subsequent creation of the ear lobe and crease behind the ear. Reconstruction of the external ear

can be performed with prosthetic ear replacement, prosthetic frameworks, and autologous cartilage. Historically, microtia repair was a four-stage operation with (1) procurement of cartilage of the chest wall; (2) construction and placement of cartilage framework; (3) lobule rotation, conchal excavation, and tragus formation; and (4) elevation of the pinna. With recent advances and refinements in framework carving and techniques, it is a two-stage reconstruction process today: (1) creation of a 3-D costal cartilage framework and hearing reconstruction together (2) ear elevation operation. One study that compared the use of rib cartilage versus porous polyethylene implant for microtia reconstruction showed neither material to be superior; however, the polyethylene implants achieved a better cosmetic outcome in terms of ear definition, shape, and size. The downside was that polyethylene implants had a higher risk for infection and extrusion. Research in tissue engineering is currently being performed, and newer alloplasts are being used with aspirations that the use of engineered tissues and alloplasts may one day replace autologous cartilage.

Otoplasty- Otoplasty is the surgical procedure to treat congenitally prominent ears. Otoplasty can be either cartilage splitting or cartilage sparing. Cartilage-splitting techniques involve incisions through the cartilage and repositioning with sutures. Cartilage-sparing techniques avoid full-thickness incisions but create angles and curls in the cartilage for contouring. Most surgeons now perform cartilage-sparing otoplasty and if needed suture conchal bowl perichondrium to the mastoid periosteum.

Future Direction of Facial Plastic Surgery - Current trends in facial plastic surgery include increased utilization of non-surgical techniques such as fillers and neurotoxins to treat the aging face, development of new laser technologies, utilization of 3-D imaging techniques for individualized plating in maxillofacial surgery in trauma, and minimally invasive techniques such as endoscopic approaches to minimize scaring. Combination of Fillers and BOTOX - BoNTA has now been a popular agent for cosmetic procedures for over 20 years, proved safe, with a high degree of satisfaction. Development of various combination therapies with BoNTA and other modalities including fillers, intense pulsed light, laser modalities and dermabrasion. Aging is a complicated multifactorial process that causes undesirable wrinkles, furrows, sagging, dyspigmentation, and changes in skin textures. Two major causes of the aging processes are volume loss and muscular hyperactivity. There is current research and development in combination treatments with dermal fillers and BoNTA to simultaneously restore volume and relax muscle pull. Combining BoNTA with intradermal fillers such as hyaluronic acid not only gives an immediate resting result but more effectively recontour the face to last twice as long.

Revance Therapeutics, Inc. is developing a new BoNTA product called RT002, a novel injectable formulation of BoNTA that consists of a purified neurotoxin and a patented TransMTS peptide. The RT002 durability is up to 7 months, compared with the average 2 to 6 months of current BoNTA sources.

An increasing number of procedures are performed on the middle and lower face rather

than just on the upper face. The combination of BoNTA and hyaluronic acid filler is now the standard approach for the lower face. Autologous adipose tissue has been used to show extended results. Using blunt cannulas after an initial puncture is made through the skin allowing injection in multiple vectors with reduced needle trauma.

Three-Dimensional Imaging - One of the most exciting trends in facial plastic surgery is the development of computer-guided 3-D reconstruction techniques. For example, computer-guided orbital reconstruction with mirror image overlay navigation improved outcomes in complex orbital reconstructions. Surgical navigation technology has been shown to be effective for improving the treatment results for zygomatic fracture.

Three-Dimensional Printing- 3-D printing technology is an expanding and innovative field in medicine and surgery. 3-D printing-based tactile prototype models are helpful in skull reconstruction, correction of craniosynostosis, simulating Le Fort osteotomies, and creation of ideal orbital wall meshes for orbital wall repairs. Facial reconstruction is a complicated procedure that often requires significant intraoperative time in contouring the titanium plates before surgery. This method allows the creation of a precise fit, resulting in an improved aesthetic form, and reduces the risk for corrective surgery. This is an emerging technology and can create 3-D prostheses and models for individualized patient education, allowing preoperative surgical planning, and fashioning patient-specific implants.

Endoscopy - Popular trend in facial plastic surgery towards minimally invasive endoscopic techniques have been shown to

be safe and effective in the management of orbital floor fractures and zygomatic fractures with good visualization of the anatomy without the need for extensive access incisions. It minimizes scalp scar, decreases forehead numbness, shortens hospital stay, and provides a faster, more comfortable postoperative recovery for the patient.

Advances in Biomaterials and Bioengineered Interfaces- The use of rigid implants is crucial for adequate bone immobilization in skeletal facial reconstruction. The use of non-metallic materials would reduce these postoperative concerns, and research in this area is promising. Resorbable fixation material has been well studied in paediatric craniofacial surgery with good results. Eppley studied the use of plates and screws composed of a specific poly L-lactic acid-polyglycolic acid material, concluding it can be effectively and safely used in the midface.

Tissue Engineering - Repair of craniofacial injuries due to trauma, tumour removal, or congenital abnormalities is a large aspect of facial plastic surgery. Autologous grafts such as those harvested from the cranium, fibula, or iliac crest are the gold standard for head and neck reconstructions. Limited availability, donor site morbidity and lack of precision in contouring of donor graft shape are some of the limitations of these grafts. Engineering of personalized human bone grafts is an exciting field of facial plastic surgery. Cell-seeded scaffolds combine exogenous cells usually harvested from bone marrow with bioactive molecules in scaffolds and platelet-rich plasma were shown to enhance osteogenesis. One famous example of successful tissue engineering is the Vacanti total external ear reconstruction

with a polyglycolic acid polylactic acid construct with seeded chondrocytes.

Advances in Facial Reanimation - In terms of advancements in surgical techniques, there are procedures being developed to drive the native facial muscles with the masseteric branch of the trigeminal nerve with minimal injuries to the donor site, as well as studies on using a cross-facial nerve grafts for the reanimation of the paralyzed face. Cross-facial nerve grafts utilize the contralateral healthy facial nerve to reinnervate the paralyzed muscles.

The “facegram” is a new tool that is being developed to acquire 3-D videographs of patients performing a set of facial expressions and converting the data into graphical information for analysis. Along this line of research is the development of a central database warehouse to allow physicians to upload individual patient facegram data. In the future, the central data set could help physicians better determine the optimal approaches for individual patients because it would offer a reference of available approaches and postoperative results that would augment individual practice experiences.

Facial Reconstruction and Transplantation -Severe trauma to the face after burns or bullet trauma can be disfiguring and difficult to treat because the face is a complex entity in its form and function. There have been advancements from using local soft tissue flaps and rigid fixation in reconstruction to the invention of microsurgical free tissue transfer, which allows clinicians to repair complex facial defects using free flaps and replace significant amounts of missing tissue. Most of the face and neck are composed of fascio-cutaneous

structure and can be more easily repaired via microsurgical procedures; however, injuries involving neuro-musculature of the midface may warrant a facial transplantation.

The midface is a critical component of the face; it is the central region where facial movement is initiated. This central neuromuscular component preserves the individual's identity, and movement in this area must be natural post-reconstruction. Facial transplantations are more technically challenging. The essential concept in facial transplantation is that of angio-neurosome, which is the idea that the design of the flap should be based on blood supply, neuromuscular unit, and muscular origin and insertion, as well as preservation of rigid facial structures and cutaneous ligaments. Facial transplantation allows transferring of skin, soft tissue, and bone that can replace the lost tissue of the patient with an exact anatomic and functional match, but there are risks associated with immunosuppressant use, which increase the risk for infections, malignancies, and end-organ toxicities.

structure and can be more easily

The first near-total face transplantation in the United States was performed at the Cleveland Clinic in 2008. Since then, several partial and total face transplantations have been performed in the United States. After a face transplantation, the patient may look similar to the donor but because of variations in skeletal structure and facial shape of the recipient, the result is a hybrid of the two faces.

Stem Cells -Regenerative medicine plays an important role in many aspects of medicine and surgery. In the field of facial plastic surgery, stem cells are often used for bony and soft

tissue defects, nonhealing wounds, and skin rejuvenation. One example is adipose tissue–derived stem cells that secrete angiogenic growth factors like vascular endothelial growth factor, which have been shown to aid in marked improvements in survival rate of transplanted fat grafts. Stem cells have also been shown to accelerate wound healing, reduce scar appearance, and prevent allotransplant rejection. Adipose tissue–derived stem cells can be isolated from lipoaspirate blood and saline fraction.

Conclusion -Facial plastic surgery is a broad field that involves reconstructive and cosmetic surgery techniques in addition to biomaterials, lasers, and other adjunct materials to improve surgical outcomes. The aim of this article is to provide a good understanding of facial plastic surgery and the upcoming advances in this field. There are exciting research studies in the fields of dermal fillers, 3-D imaging and printing, endoscopy, new biomaterials and tissue engineering, new surgical techniques in facial reanimation and facial transplantation and stem cell research. In conclusion, facial plastic surgery can make life-changing transformations in individual lives and in society. It is a field with innovation in surgical techniques, and minimally invasive nonsurgical and surgical procedures for facial rejuvenation and reconstruction.

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FRCSIT activities in the year 2022

Following activities were held in the year 2022:

1. **8th National Facial Plastic Surgery Course, Bangalore, 4 - 6 May, 2022. Prof. Neil A. Gordon, USA was the honorable Chief guest. During this course, Prof. Peter Adamson Endowment fund for deserving, financially constrained students and doctors was announced.**

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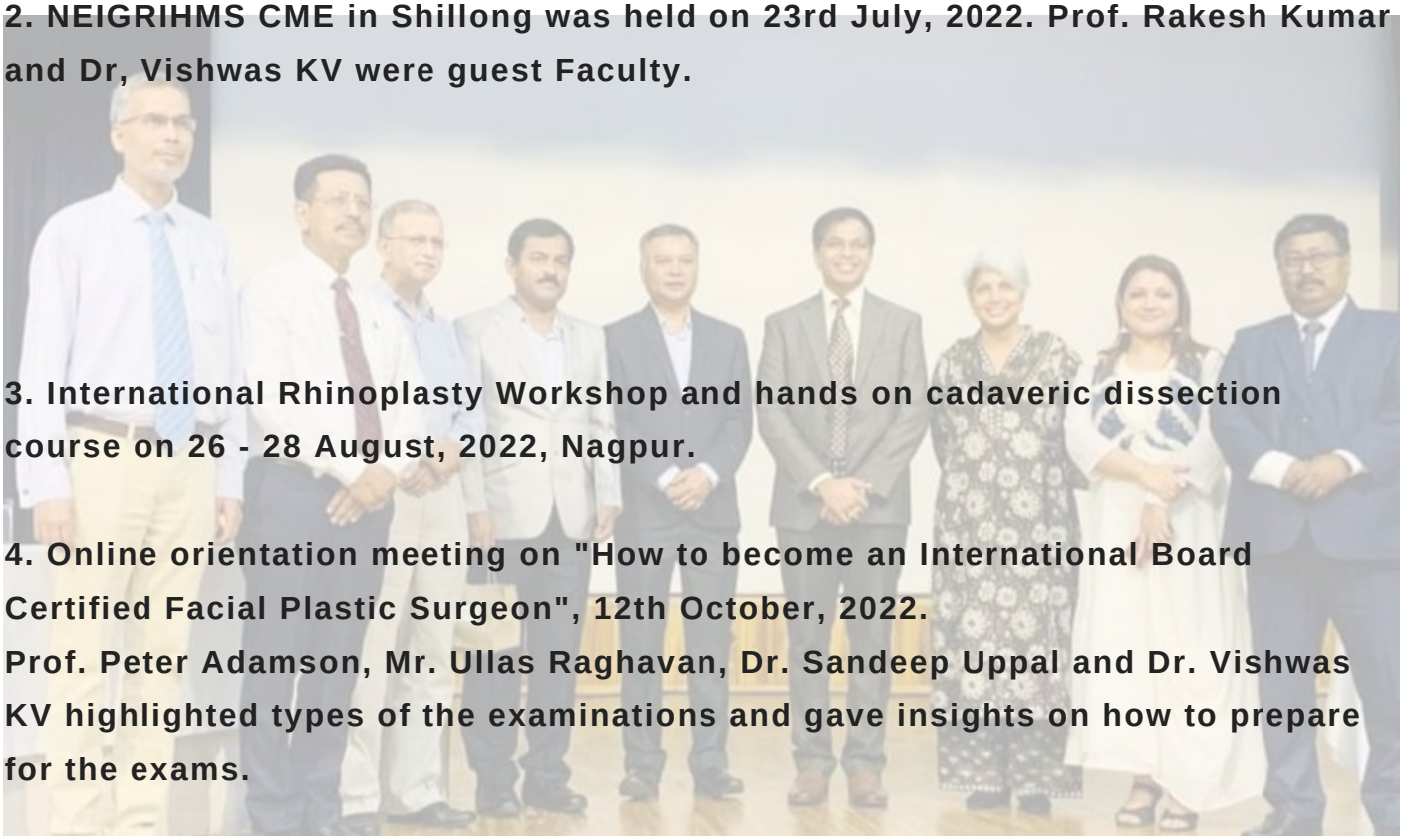
7th General Body Meeting of FRCSIT was held on 6th May, 2022.



2. NEIGRIHMS CME in Shillong was held on 23rd July, 2022. Prof. Rakesh Kumar and Dr, Vishwas KV were guest Faculty.

3. International Rhinoplasty Workshop and hands on cadaveric dissection course on 26 - 28 August, 2022, Nagpur.

4. Online orientation meeting on "How to become an International Board Certified Facial Plastic Surgeon", 12th October, 2022.
Prof. Peter Adamson, Mr. Ullas Raghavan, Dr. Sandeep Uppal and Dr. Vishwas KV highlighted types of the examinations and gave insights on how to prepare for the exams.

FRCSIT activities in the year 2023

1. 11 days of Facial Plastic Surgery :

18 - 21 February : 7th Singapore Advanced Rhinoplasty Fresh Frozen Cadaveric Dissection Course.

22 - 24 February : 6th Singapore Facial Rejuvenation Surgery Fresh Frozen Cadaveric Dissection Course.

2. 5th AIIMS Facial Plastics Workshop, 21-23 April 2023, AIIMS, New Delhi.

3. 9th National Facial Plastic Surgery Courses 26-28 th April, 2023, Bangalore.

4.8th International Rhinoplasty and Facial Plastic Surgery Workshop, 26 - 27th August, 2023, Hyderabad, India.

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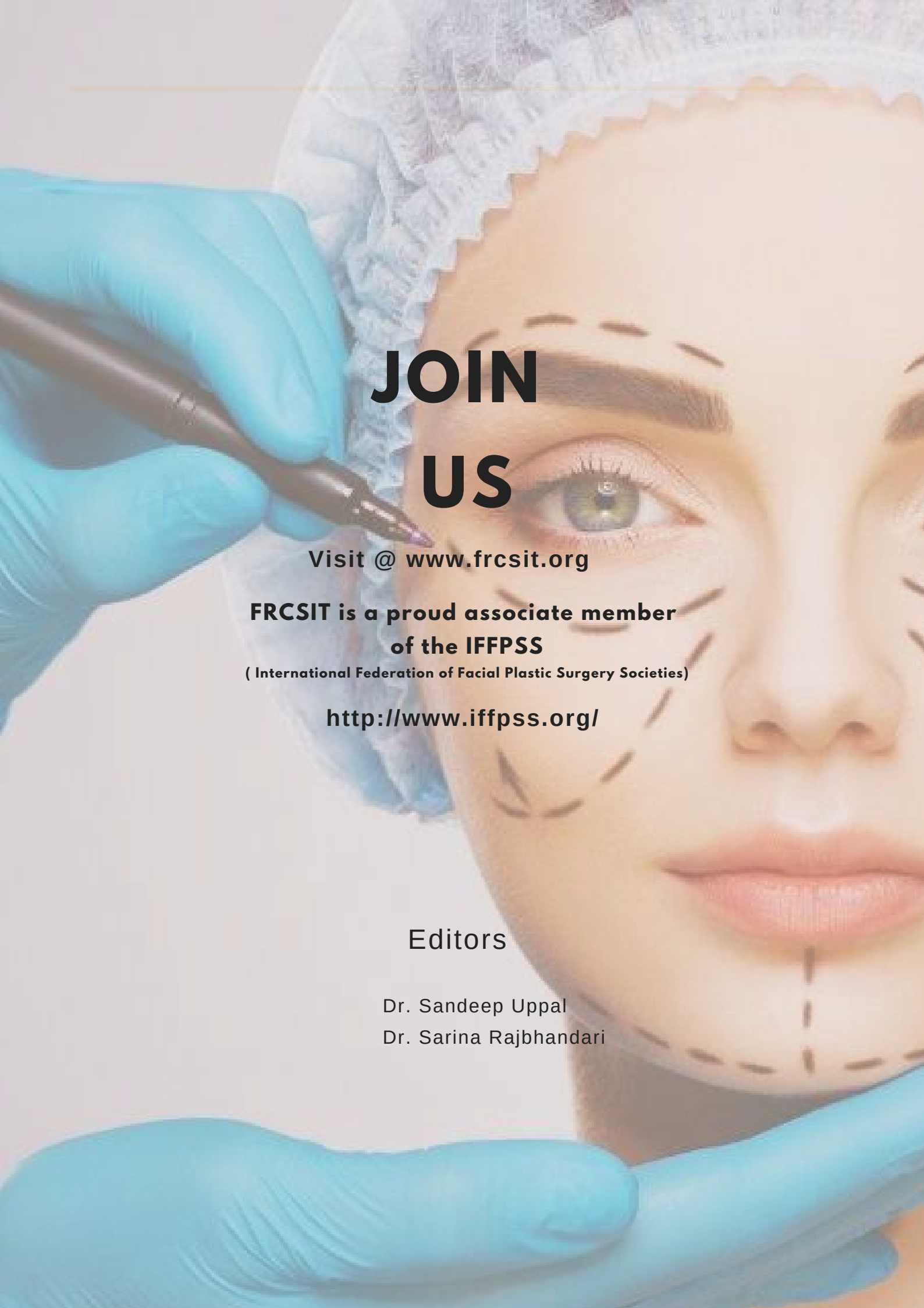

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