

**MODIFICATION OF CLASSIC RECONSTRUCTIVE TECHNIQUES AND
EVALUATION OF NEW ESTHETIC METHODS IN TERMS OF THE
EXPECTATIONS OF MODERN OTO-RHINO-LARYNGOLOGY AND HEAD-
NECK SURGERY**

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1. INTRODUCTION

1.1. ALTERNATIVE SURGICAL METHODS FOR MALIGNANT TUMORS OF THE HEAD AND NECK

1.1.1. The Modified Facial Degloving technique

Endoscopic surgery has become the cutting-edge therapeutical approach nowadays, as it is minimal-invasive, scarless and can be carried out mostly on one-day-surgery basis. However, the endoscopic approach - especially in case of malignant sino-nasal tumors - has its limitations. In such cases, when microsurgical reconstruction or endoscopic surgery are inadequate or limited, or the personal and financial resources are insufficient, simpler reconstructive methods or classic external approaches may come forth, together with increasingly raised expectations of patients towards the head and neck surgeon to elaborate and apply new surgical methods with concealable or hidden scars.

Maxillo-ethmoidal malignant and aggressively growing benign tumors are removed routinely through the widely-used *Weber-Ferguson's* incision. This surgical approach provides a very good sight of the operative field but may cause postoperative aesthetic deformities. To avoid such complications, the need for a surgical technique with only hidden incisions started to evoke, that gives the same visibility and reach of the tumor.

Conley and Price suggested hidden, sublabial and intercartilaginous incisions; by this so called facial degloving technique the soft tissues of the midface could be elevated. We have modified this approach (Modified Facial Degloving – MFD) and we have been using it since 5 years routinely in cases of benign and malignant sino-nasal tumors.

1.1.2. Alternative application of reconstructive surgical methods in special cases of head-neck cancer

From the surgeon's point of view, the spreading of oncotherapy against his first treatment choice of oncosurgery is another problem, as wound healing disorders may rise after radio-chemotherapy, and additional reconstructive operations could become necessary. Turnover Flaps (TOF) are flaps, that are turned by 180 degrees into the defect over their fulcrum, which provides their blood supply. They can be easily prepared, mean slight operative burden for the patient and have a rather stable blood circulation.

In reconstruction of defects of the skin and underlying soft tissue of the neck it is the surgeon's main objective to achieve proper long-term coverage of the exposed vital

organs with well-vascularised tissue harvested from a distant donor site. The extended lower trapezius musculocutaneous flap (ELTMF) and latissimus dorsi musculocutaneous flaps (LDMF) are the two available muscle compartments that can be transferred on a reliable vascular pedicle to the dorsal, suprascapular, and neck regions.

1.2. COMPLICATIONS OF WOUND HEALING AND REJECTION RELATED TO COCHLEAR IMPLANTS – SURGICAL SOLUTIONS AND PREVENTION

In the past decades, the increasing number of cochlear implantations worldwide, also in Hungary, has led to an elevated number of possible reoperations due to certain complications. One of these complications might be the skin necrosis above the transmitter coil and the concomitant exposure of the receiver-stimulator unit – this is a major complication of the operation. In some of our cases, the skin necrosis occurred repeatedly notwithstanding the various surgical solutions to re-cover the implant. As all implants have been operated by the same team with standard methods, and no infective or histopathological anomaly has been revealed in our patients with implant rejection, and furthermore all of our adopted reconstructive methods, that have been published previously as definitive surgical solutions, failed we started to seek for non-surgical cause. According to literature data the silicone housing of any implanted medical device may play a role in this rejection process via immune system modulation, by inducing foreign-body type and local and systemic nonspecific (nonallergic) inflammatory or true allergic reactions. This drew our attention towards the possibility of individual silicone hypersensitivity against the covering of the CI, because all four patients with skin necrosis had the same silicone-covered device implanted. In the dermatology-allergology practice routinely used, non-invasive Epicutaneous Patch Testing (EPT) seemed to be a proper method to reveal the possibility of individual silicone hypersensitivity.

1.3. SECONDARY CORRECTION OF NASAL DEFORMITIES IN CLEFT LIP AND PALATE PATIENTS: SURGICAL TECHNIQUE AND OUTCOME EVALUATION

Cleft lip and palate (CLP) deformities are among the most common congenital malformations. Surgical correction of CLP should be performed before the first year of age, usually between 3-6 months-of-age, prior to speech development. The aim of the operation is to reunite all tissue layers of the lip, to reposition the nasal septum and to separate the

oral and nasal cavities; and restore the valve function of the soft palate. If this adequate primary surgical correction of CLP fails, the consequentially developing nasal deformity associated with CLP is one of the most challenging reconstructive problems in rhinoplasty. Accompanying nasal deformities are mainly characterized by a shortened columella, a depressed nasal tip, bilateral dislocation of the alar cartilage, eversion of the alar bases and nasal obstruction. Although numerous secondary rhinoplasty methods have been described in the literature for the lengthening of the columella, or for grafting techniques, no standardized technique exists. Statistical analysis or comparison of the surgical methods and their results are hardly comparable this way.

2. AIMS OF THE THESIS

2.1. ALTERNATIVE SURGICAL METHODS FOR MALIGNANT TUMORS OF THE HEAD AND NECK

To work-out and demonstrate a novel surgical method, which gives the opportunity to resect malignant sino-nasal tumors according to the oncosurgical principles without visible skin scars and aesthetic deformities. Furthermore, to present the alternative, modified application of two well-known and previously published flaps (TOF, ELTMF) for the reconstruction of special tissue defects in the head and neck region after malignant tumor resection and oncotherapy.

2.2. COMPLICATIONS OF WOUND HEALING AND REJECTION RELATED TO COCHLEAR IMPLANTS – SURGICAL SOLUTIONS AND PREVENTION OPTION

To establish a diagnostic method, which could shift the focus from reconstruction towards prevention in CI with complications. As three of the four implantees with implant rejection have had a positive skin reaction with the EPT for the silicone sample and the repeated, different reconstructive operations have been unsuccessful, the possibility individual silicone hypersensitivity has arisen. EPT, as a non-invasive method, might be useful in childhood before the planned cochlear implantation to reveal optional silicone allergy.

2.3. SECONDARY CORRECTION OF NASAL DEFORMITIES IN CLEFT LIP AND PALATE PATIENTS: SURGICAL TECHNIQUE AND OUTCOME EVALUATION

To standardize the surgical method according to the experience gained during the secondary rhinoplasty operations of CLP patients at our University, and to evaluate our results by the adaptation of a previously published patient satisfaction questionnaire (ROEQ – Rhinoplasty Outcome Evaluation Questionnaire).

3. METHODS AND SUBJECTS

3.1. ALTERNATIVE SURGICAL METHODS FOR MALIGNANT TUMORS OF THE HEAD AND NECK

3.1.1. The Modified Facial Degloving technique

In case of head and neck tumors, especially in sino-nasal localization, radiological imaging is inevitable for the evaluation of the tumor's extent, the infiltration of bony structures or soft tissues and the presence of metastatic lymph nodes. First line imaging method for the above listed cases is the Computer Tomography (CT), which gives a proper status of the bony structures and the extent of the disease; however, its specificity is rather low: inflammation and tumor can hardly be distinguished. In order to differentiate between a malignant tumor and chronic inflammation, as we have published before, Magnetic Resonance (MR) examination should be performed (neoplastic tissues often have higher proton density and relaxation time than the healthy tissues), i.e. on T2 flares the chronic inflammation is hyperdense, while the tumor remains hypodense.

We have reviewed the data of twenty-three consecutive patients, who have been operated with the MFD technique at our Department between 2012-2016 and we illustrate the main points of our method and its advantages versus the endoscopic approach below in three different tumor localizations and types.

In case of a basal cell adenocarcinoma of the mesostructure and the orbit (37-year-old female) due to the limitations of endoscopic surgery (i.e. orbital involvement) we decided on the MFD approach, during which we carried out medial maxilla resection, removed all turbinates and the entire ethmoid region, the medial orbital wall, the medial segment of *Tenon's* capsule within the orbit and also the inferior wall of the frontal sinus,

which had not been infiltrated yet, but we wanted to gain a better endoscopic visibility of the affected regions and their surroundings during the control examinations.

In case of a basaloid squamous cell carcinoma of the meso- and suprastructure (23-year-old female) the tumor originated from the left nasal cavity, it destroyed the medial wall of the maxillary sinus, the ethmoid cells and infiltrated also the frontal sinus, which latter meant a limitation for ablative endoscopic resection. Because of the age and gender of the patient and the invasion of the whole frontal sinus, we decided on the MFD approach instead of open surgery or endoscopic resection. During the operation in general anesthesia we removed the remaining medial, and partially the anterior wall of the left maxillary sinus, all of the turbinates and partially the left nasal bone. By putting the patient into *Trendelenburg's* position, we were able to reach the frontal sinus as well, because its frontal and lateral recess was also infiltrated, so the tumor mass could be completely and radically removed.

In case of a Stage B olfactory neuroblastoma of the suprastructure (19-year-old female) we decided on the MFD approach, as our endoscopic technique in this field, with this kind of tumor was still in the learning curve. The medial wall of the maxillary sinus, all the turbinates and the whole ethmoid region was resected up to the cribriform plate, which we found intact.

Our results were evaluated by Acoustic Rhinometry without decongestion to prove that the operative technique does not result in narrowing of the nasal cavity and does not cause loss of nasal breathing function.

3.1.2. Alternative application of reconstructive surgical methods in special cases of head-neck cancer

3.1.2.1. Turnover flap

Patient 1: On a 51-year-old woman total laryngectomy with neck dissection has been performed because of residual tumor of the hypopharynx following initial definitive-dose radiotherapy. Due to the poor wound healing caused by the previous irradiation and bacterial infection despite the parenteral application of wide-spectrum antibiotics in the postoperative period have led to the development of a pharyngo-cutaneous fistula. Several skin flaps and musculocutaneous flaps (pectoralis major and latissimus dorsi) have been used to close the fistula, however only size reduction of the fistula has been achieved. A TOF has been used as a last chance solution to close the fistula.

Patient 2: An 83-year-old male patient was diagnosed with a malignant tumor (adenoid cystic carcinoma) of the left submandibular gland, and metastatic lymph nodes on the neck. Radical resection of the tumor mass was carried out together with radical neck dissection. In the postoperative period excessive arterial bleeding occurred and acute exploration was necessary. Despite the parenteral antibiotic treatment oro-cutaneous fistula developed and also the mandible become partially denuded. Due to the patients age and comorbidities (chronic ischemic heart disease, diabetes mellitus) we chose the least stressful surgical solution: the defect was closed with a triangle-shaped TOF.

Patient 3: On a 63-year old male patient amputation of the left side of the nose was performed due to spinocellular carcinoma, surgical resection was complete according to histopathology findings. After 6 months of tumor-free status, a three-staged reconstructive operation was carried out. Firstly, the inner lining of the nose was reconstructed with two TOFs, then the cartilaginous framework has been rebuilt and finally the defect was closed with a forehead flap. TOFs from the facial skin have been used for the reconstruction of the inner lining of the nose in six consecutive patients, after partial or total amputation of the nose because of malignant skin tumors.

3.1.2.2. Extended Lower Trapezius Musculocutaneous Flap (ELTMF)

A 49-year-old patient was admitted to our head and neck surgery department in 2003 with a squamous cell carcinoma of the right tonsillar region and the soft palate (T2N0M0). We did a transoral carbon dioxide laser excision of the tumor, and he was given postoperative radiotherapy (total dose 66 Gy). Four years after the operation a late metastasis was found in the right submandibular region. He was treated by modified radical neck dissection and given four cycles of postoperative chemotherapy.

Despite the complex surgical and oncological treatment in November 2009 another late metastasis appeared below the mastoid region and infiltrated the skin, the subcutaneous tissue, the deep neck muscles, and the carotid artery itself. We resected it as radically as we could by excising even the X cranial nerve and the external branch of the carotid artery. The large and deep tissue defect (5 x 12 x 3 cm) needed extensive coverage, so we decided to use a LDMF from the same side. Our musculocutaneous flap had failed, so we had to recover the same defect. Our second choice was the ELTMF, which is also safe, well-vascularized by the dorsal scapular artery, and voluminous enough to be an alternative flap to cover a dorsocervical defect.

3.2. COMPLICATIONS OF WOUND HEALING AND REJECTION RELATED TO COCHLEAR IMPLANTS – SURGICAL SOLUTIONS AND PREVENTION

EPT according to our method was applied with different silicone samples provided by the implant manufacturer, Cochlear AG, Basel. The test was applied at the Dermatology and Allergology Department of our University.

Patient 1: a three-year-old girl was implanted on the left ear due to bilateral deafness, she received a Nucleus 24M device (silicone coverage). 8 months later skin necrosis of 2 cm - 3 cm in extension developed above the receiver-stimulator unit of the implant. The defect was covered with a parieto-occipitally pedicled skin flap following necrectomy. Four months later repeated skin necrosis evolved in the same location, surprisingly on the intact skin and not in the scar line. An occipitally pedicled skin flap was used to cover the implant and we placed a Liodura sheet onto the receiver-stimulator unit in order to avoid direct contact of the implant and the subcutaneous tissue. Six months later the skin necrosis developed again above the implant body, so we decided to remove the implant. In 2006 we performed a right-sided implantation, the Med-El Pulsar implant (ceramic coverage) showed no signs of rejection. EPT was applied and we observed positive skin reactions with the silicone samples.

Patient 2: a four-year-old boy's right-sided cochlear implantation was performed, he received a Nucleus 24M device. Five months after the operation progressive rejection of the implant was observed, thus the implant was removed 8 months after the implantation. The defect was closed with parietally and temporally pedicled rotation skin flaps, wound healing was undisturbed. EPT showed positive reaction. Cochlear implantation on the opposite side was done with a Med-El Pulsar implant.

Patient 3: a 4-year-old, mentally retarded girl was operated due to bilateral, profound sensorineural hearing loss. The implant was a Nucleus 24R type device. Two years after the surgery a skin necrosis evolved above the rim of the receiver-stimulator coil, which was covered with a perichondrium sheet harvested from the ear and a parietally pedicled rotation skin flap. Six months following surgery granulation and skin necrosis developed, we elevated occipitally pedicled skin flaps to cover the defect paying close attention to place the incision lines and scars as far as possible from the implant while maintaining the blood supply of the flap. Half year after we observed the recurrence of the skin defect with suppuration and granulation, so the implant had to be removed. Re-implantation was planned later on with a Med-El implant. EPT was positive.

Patient 4: a five-year-old boy was implanted on the left ear because of bilateral profound sensorineural hearing loss and disturbed speech development. Nucleus 24M type device was implanted. Six months following the operation we saw suppuration, abscess formation and rejection of the implant and the device was removed. Skin testing with the silicone samples was negative in this case. Re-implantation was cancelled for the parent's explicit request.

3.3. SECONDARY CORRECTION OF NASAL DEFORMITIES IN CLEFT LIP AND PALATE PATIENTS: SURGICAL TECHNIQUE AND OUTCOME EVALUATION

Between 2012 and 2014 twelve consecutive patients with combined CLP deformities underwent nasal reconstructive surgery performed by the same operative team in cooperation with other departments of our University.

Surgery was always carried out under general anesthesia via an open rhinoplasty approach. The columellar skin was in each case lengthened via a V-Y plasty of the philtrum area. During the septal surgery the deviated cartilaginous and bony parts were resected, the remaining septal plates were then positioned back to the midline and, if available, septal cartilage was harvested for grafting. If any severe deviation of the septal dorsum was visible, dorsal grafts were used unilaterally or bilaterally on one hand to straighten it, on the other hand to adjust the height of the dorsum. The anterior septal base was then sutured to the anterior nasal spine, or if this was dislocated, to the midline.

The lower lateral cartilage on the cleft side was positioned into a more medial and prominent position and the two medial crura were sutured together with the columella strut to set the tip projection. If the lateral crus was buckled, strengthening was done with an onlay conchal graft. Occasionally a shield graft was used to define the nasal tip.

To measure the patient satisfaction, we adapted the ROEQ, which was first described by *Alsarraaf et al* to measure facial aesthetic surgery outcome. The questionnaire was modified by *Arima et al* for patients having rhinoplasty. Our adapted ROEQ asks the same four questions before and after surgery, the patient has to score each question with 0-4 points, where 0 represents the least satisfaction and 4 represents the highest one:

1. How much do you like the appearance of your nose?
2. How much can you breathe through your nose?
3. How much do you think your friends and those close to you like your nose?

4. Do you think the appearance of your nose limits your social or professional activities?

Scores for each individual question were compared using a t-test (IBM SPSS Statistics ver20), p was considered significant at 0.005.

4. RESULTS

4.1. ALTERNATIVE SURGICAL METHODS FOR MALIGNANT TUMORS OF THE HEAD AND NECK

4.1.1. The Modified Facial Degloving technique

23 consecutive patients have been operated with our MFD approach between 2012-2016. Postoperative bilateral comparative Acoustic Rhinometry has been carried out. In order to visualize the mimic function of the face, photo documentation was done postoperatively.

4.1.2. ALTERNATIVE APPLICATION OF RECONSTRUCTIVE SURGICAL METHODS IN SPECIAL CASES OF HEAD-NECK CANCER

4.1.2.1. Turnover flap

In the past 10 years (2005-2015) 106 total laryngectomies with partial resection of the pharynx have been performed at our department on patients with T3-T4 stage hypopharyngeal and laryngeal cancer. Among them 23 (21,7%) pharyngo-cutaneous fistula cases were observed. In 12 patients (52,2%) the fistula healed completely for conservative treatment, for 11 patients (47,8%) surgery became. With the eleven revision operations 7 patients (63,6%) were cured completely by multilayer reconstruction of the fistula, or by pectoralis major (PM) flap reconstruction. In 4 cases (36,4%) however, all the above listed methods failed, thus we decided on the application of the simple TOF as the final solution to close the fistula. Three of these patients received initial chemo-radiotherapy, one patient had postoperative oncotherapy. Oro-cutaneous fistula developed in one case, without preliminary oncological treatment.

In the first presented case after the application of the TOF the defect was covered with a split thickness skin graft. Complete healing has been achieved, with normal swallowing function.

In the second presented case after the preparation of the TOF the defect was covered with an occipitally pedicled rotation flap and by mobilizing the surrounding skin of the neck. Wound healing was undisturbed, the anatomical and physiological function of the pharynx has been restored completely.

In the second stage of nasal reconstruction surgery three weeks after the first operation the flap was elevated, tapered and in the last stage the pedicle was transected on the 6th postoperative week. With this three-stage reconstructive method good functional and esthetic results could be achieved in case of large nasal defects.

4.1.2.2. Extended lower trapezius musculocutaneous flap

With the novel application of the ELTMF the umpteen reconstructive operation was successful, the flap remained viable, and the wounds healed primarily.

4.2. COMPLICATIONS OF WOUND HEALING AND REJECTION RELATED TO COCHLEAR IMPLANTS – SURGICAL SOLUTIONS AND PREVENTION OPTION

CI operations have been performed from 1995 at our Department. Until 31 December 2010 we carried out a total number of 223 CI surgeries, in detail 169 child and 54 adult implantations. In case of 4 children (2,37 % of child implantations, 1,79 % of all CI operations) did we face skin necrosis above the receiver-stimulator unit and the concomitant exposure of the implant. The test proved to be positive in 3 cases (75%) and negative in one case (25%). Our experimental study shows that skin necrosis above the CI, which is a rare, major complication of CI surgery, can be caused by individual hypersensitivity to silicone. In such patients, skin replacement or transplantation is not a definitive solution, as the newly placed skin may also die due to the allergic reaction to silicone. In our opinion, if hypersensitivity to silicone emerges, re-implantation with a different CI device is the definitive solution.

4.3. SECONDARY CORRECTION OF NASAL DEFORMITIES IN CLEFT LIP AND PALATE PATIENTS: SURGICAL TECHNIQUE AND OUTCOME EVALUATION

With the above detailed standardized surgical steps adequate aesthetic and functional results were achieved in all patients as shown in the results of the questionnaire and by the follow-up examinations of the patients.

All patients were most satisfied with the postoperative appearance of their nose. The opinion of others about the appearance of the patient's nose after surgery also improved. However, the least difference between the pre- and postoperative scores was with the last question, which could mean that the nasal deformity of these patients does not suppose an important limitation in Hungary for social and professional activities in these CLP patients.

5. DISCUSSION

5.1. ALTERNATIVE SURGICAL METHODS FOR MALIGNANT TUMORS OF THE HEAD AND NECK

5.1.1. The Modified Facial Degloving technique

We have been using the method routinely since 2010 for malignant and benign sino-nasal tumors. Some of our patients complained about dryness of the nasal mucosa, crusting and recurrent nasal bleeding; however, all of these can be easily treated locally.

The proper and adequate use of the endoscopic approach in our opinion requires well trained experts with a lot of surgical experience in this field and special set of expensive instruments, both of which is not available everywhere by all means. Furthermore, the endoscopic approach also has some limitations, which are highlighted by expert authors in cornerstone papers of the literature.

We think our MFD technique represents a simple, relatively easy and ablative alternative in between the two endpoints of surgical therapy for maxillo-ethmoidal lesions, the minimally-invasive endoscopic approach and the open, distorting surgeries. Our method can be easily combined with endoscopic surgery, and can even substitute it when any of the above listed limitations are present; the postoperative results of the two approach are absolutely comparable. Moreover, if necessary, conversion to/combination with open surgeries is also possible, even intraoperatively.

In order to prove that the nasal breathing function is not affected by the method itself and the postoperative scar formation, we carried out acoustic rhinometry minimum one year after the operation on the basis of literature data. The results show that no narrowing of the nasal cavity is observed, neither in the external, nor in the internal nasal valve area in comparison with the contralateral side.

Postoperative photo documentation of the face mimic shows no dysfunction on the operated side; however, in our second patient the left lamina of the nasal bone was also

resected because of tumorous infiltration, so slight rotation of the nasal pyramid to the operated left side is visible. Without any scars in this region secondary correction with rib cartilage graft of this deformity was carried out with acceptable aesthetic result.

5.1.2. Alternative application of reconstructive surgical methods in special cases of head-neck cancer

5.1.2.1. Turnover flap

In head and neck tumor patients, who have disturbed wound healing (oro-cutaneous or pharyngo-cutaneous fistula, skin necrosis, etc.), the affected skin and soft tissue area is usually damaged by irradiation, scary and has deteriorated circulation. In the literature several methods have been described for the surgical treatment of fistulas: from fasciocutaneous island flaps through local and distant skin- and musculocutaneous flaps up to free microvascular flaps. In spite of all these methods, the recurrence of the fistula is rather high, in case of PM musculocutaneous flaps can be 35%. According to our experience and observations detailed above, we tried to find the safest and simplest reconstructive method without much operative burden for these five patients with pharyngo- and oro-cutaneous fistula, which proved to be the TOF.

Surgical reconstruction of the defects of the cartilaginous framework and the perialar region of the nose after radical resection of malignant tumors is a highly challenging issue for the head and neck surgeon. Not only because of the complex spatial structure of the nose, but also the consideration of the aesthetic subunits of it, without which the combined reconstruction of function and appearance could not be fully performed. In order to be able to achieve the latter, reconstruction of all tissue layers of the nose is inevitable. For our patients we have used turnover skin flaps mainly from the nasolabial region to substitute the nasal mucosa, the inner lining of the nose. We have found our method adequate for functional reconstruction, as it replaces the mucosa perfectly, it is thin, incorporates perfectly into the nasal cavity and prevents stenosis and crusting. The rich vascular supply of the flaps provides good nutritive medium for immediate implantation of cartilage grafts.

5.1.2.2. Extended lower trapezius musculocutaneous flap

Tan and Tan incorporated an extension of the flap that runs obliquely from the tip of the scapula towards the mid-axillary line. Their technique was based on the vascular

supply from the dorsal scapular artery, which originates either directly from the subclavian artery as an independent branch, or from the trunk of the transverse cervical artery.

5.2. COMPLICATIONS OF WOUND HEALING AND REJECTION RELATED TO COCHLEAR IMPLANTS – SURGICAL SOLUTIONS AND PREVENTION OPTION

The incidence of skin necrosis following CI surgery, which is one of the possible complications as presented by the authors, varies between 0-5.4% in the international literature after *Cohen and Hoffman*.

The treatment of skin necrosis depends mainly on the extent of the defect. In case of small, superficial lesions, necrectomy, skin regeneration therapy, usage of e.g. Epigard™ or Allevyn™ might be satisfactory. Choosing the appropriate surgical method in case of larger defects is sometimes difficult. One option is to relocate the implant to a “safer” location in the surrounding of the original operation site, however this is technically difficult and results in new scars and areas of alopecia. Local rotation flaps, which also produce scars, are the most reasonable choice, if the skin incision line avoids the implant location. Occipital flaps have the best vascularization and their other advantage is their proximity to the defect and that the scar lines can be easily disguised by a longer hair style.

In all of our four cases Nucleus 24 type, silicone covered implant was used for the first implantation. The surgical intervention was carried out by the same, highly trained and experienced person with the same technique; this excludes the causative role of the surgeon in connection with the skin necrosis.

As we always met the patients after the development of the skin defect, only tissue samples of necrectomy were histologically examined. Fibrosis, granulocytes and reparative signs were mentioned in histopathology data.

Wound cultures were always negative, no bacterial infection was proved. Also perioperative and postoperative parenteral antibiotic treatment is administered routinely in all of our CI patients.

Therefore, we thought that individual silicone hypersensitivity can be in the background of the skin flap necrosis. In general, we can state, that any kind of silicone implant may induce the production of auto-antibodies in genetically susceptible patients causing immune system disorders.

Epicutaneous Patch Testing (EPT) is the gold standard method for the diagnosis of allergic contact dermatitis (ACD). Because in all of our four cases a Nucleus type, silicone-

covered implant was used, the possibility of individual silicone allergy was obvious; our goal was to prove the possibility of silicone allergy with the epicutaneous patch test. The presence of redness, swelling, blisters, or other skin abnormalities at a test site indicates that you may be allergic to the tested substance.

The method is safe, non-invasive, it can be applied even in early years of age. In our cases it does not prove the allergy to silicone, however the positive result of the test, the ACD, may raise the suspicion of immune reaction to silicone, resulting in disturbed wound healing and skin necrosis.

5.3. SECONDARY CORRECTION OF NASAL DEFORMITIES IN CLEFT LIP AND PALATE PATIENTS: SURGICAL TECHNIQUE AND OUTCOME EVALUATION

If the child receives the adequate functional surgery before the first year of age, usually there is no need for secondary rhinoplasty. In every other case secondary septo-rhinoplasty is advised optimally after the adolescence age but not before the age of sixteen.

6. CONCLUSIONS

6.1. ALTERNATIVE SURGICAL METHODS FOR MALIGNANT TUMORS OF THE HEAD AND NECK

In our opinion the MFD technique might be a useful alternative or supplementary of the widely used minimally invasive endoscopic approaches in sino-nasal surgery. Moreover, it might help the less skilled surgeons in the acquisition of the endoscopic techniques for resecting tumors of the maxillo-ethmoidal region. By combining the two methods, the required radicality can be achieved with good cosmetic results. If needed – in certain severe cases, where e.g. orbital surgery (e.g. exenteration) is also necessary – the method could also be combined with the open approach.

According to our experience TOFs might be safe tissue replacement alternatives even in special cases without much operative burden, when e.g. the surrounding tissue is scary and irradiated or tissue harvesting is limited due to the anatomic localization. The demonstrated surgical methods are able to restore anatomical and physiological functions through the reconstruction of head-neck defects, which are result of radical tumor resection or develop as a complication. Another advantage of these flaps is the relatively low

operative burden and that they can be harvested from the surroundings rather easily, however the over-irradiated skin can be the risk factor of failure.

The ELTMF flap has several advantages: the donor site can usually be closed easily, resulting in a tension-free but rather long scar; the flap fills the defect created by the neck dissection and covers the vessels of the neck, preventing damage to the vessels; and the long, thin musculocutaneous pedicle allows for easy transfer of the island flap, which can even be tunneled into a defect if necessary.

6.2. COMPLICATIONS OF WOUND HEALING AND REJECTION RELATED TO COCHLEAR IMPLANTS – SURGICAL SOLUTIONS AND PREVENTION OPTION

Skin necrosis and concomitant implant rejection seems to be one of the most difficult problems to handle from among the possible complications. In our experience the closure of the skin defect over the implant with loco-regional flaps or the numerous plastic surgical operations done in accordance with international recommendations, does not always provide a permanent solution. However, we think, that the method described above could be a safe, non-invasive, fast method to test the possibility of skin necrosis and implant rejection in case of a silicone-covered CI also in children. Final recovery of the surgical site and the skin defect – because of the factors mentioned above – can only be expected after the removal of the implant.

6.3. SECONDARY CORRECTION OF NASAL DEFORMITIES IN CLEFT LIP AND PALATE PATIENTS: SURGICAL TECHNIQUE AND OUTCOME EVALUATION

In our opinion with the above mentioned operative protocol we were able to standardize our surgical technique in the secondary septo-rhinoplasty of patients with CLP. Skin incisions, cartilage harvesting and grafting, endonasal surgery and re-establishment of the nasal framework were successfully unified thus providing a more predictable functional and aesthetic outcome for the already psychosocially affected CLP patients.

Statistical comparative analysis of the pre- and postoperative data from our ROEQ confirmed, that with our standardized surgical protocol improved aesthetic and functional results and good patient satisfaction rates were achieved.

We think our modified ROEQ is an adequate and simple method for the evaluation of the surgical results of secondary septo-rhinoplasty among patients with CLP.