# UDPS

UP DATE IN PLASTIC SURGERY



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Ruben Oddenino


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# Editorial

*Caro Socio,*
*in questo ultimo numero del 2016 sono fiero di dare l'annuncio che la nostra rivista, nel 2017, diventerà trimestrale (un numero in più rispetto al passato).*
*Invito tutti voi a inviarci i vostri lavori scientifici e i vostri case report per rendere sempre più attuale e completa la nostra rivista.*

*In questo numero è presente una piccola selezione di lavori pubblicati in passato.*
*La dimostrazione della qualità e la cura professionale che i nostri soci mettono con passione nel loro lavoro quotidiano.*
*Voglio ringraziare tutti i soci per l'impegno profuso in questi anni e rinnovo il mio impegno per darvi sempre una rivista moderna, precisa che rappresenti un punto fermo per l'informazione e la crescita della nostra professione.*

*Dear Member,*
*in this last number of 2016 I am proud to announce that in 2017, our magazine, will become quarterly (one issue more than before).*
*I invite all of you to send us your scientific papers and your case reports to make our magazine more and more current and complete.*
*In this issue there is a brief selection of papers published in the past. It is the demonstration of the quality and professional care that our members put in their daily work.*
*I want to thank all members for their efforts in these years, and I renew my commitment to always give you a modern magazine, that represents a milestone for the information and the growth of our profession.*

*L'Editor*
**Ruben Oddenino**

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2008

# Lipofilling to treat periprosthesic capsular contraction after augmentation mammaplasty.

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Summary

## Lipofilling to treat periprosthesic capsular contraction after augmentation mammaplasty.

**Over the last few years, autologous adipose tissue transfers have been widely used to treat breast defects over the last few years as means of restoring volume after mastectomy or lumpectomy, or correcting breast hypoplasia and asymmetry.**
**Since 2005, we have used purified adipose tissue together with partial capsulectomy to treat capsular contraction in patients experiencing severe capsular contraction (Baker grade III-IV) and rippling after breast augmentation with moderate to severe breast firmness and/or distortion, and/or implant displacement and discomfort (more frequent after revision than after primary augmentation).**
**In this study authors explain the surgical technique with purified adipose tissue, partial capsulectomy and breast implant replacement that was used to treat capsular contraction in 14 patients.**
**Considerable improvement was observed after a follow-up of one year, which shows that this simple, efficient and reproducible technique leads to good results and prevents or diminishes the risk of severe capsular contraction, particularly after reoperation.**

***Key words:*** *Periprosthesic capsular contraction, Breast augmentation, Lipostructure, Capsulectomy, breast implant replacement.*

*UpDate in Plastic Surgery 2008; 1, 1, p. 17.*

## INTRODUCTION

Breast augmentation procedures have a number of delayed complications, of which the five most frequent are capsular contracture, implant rupture, implant malpositioning, infection, and implant rippling. The problems associated with the first and most common complication is directly due to the form and surface of the implant: the first- and second-generation breast implants (particular the smooth types) led to very high rates of capsular contraction, which decreased after the market introduction of texturised implants. The latest-generation implants have improved surface porosity and uniformity, which are critical factors in the development of contracture[1].
The induction of periprosthetic tissue reaction is constant and due to the natural foreign body reaction; however, when the reaction is too aggressive, it leads to increased thickness and firmness.
The best known clinical classification system of capsular contracture in breast augmentation is that of Baker, who divided the anomalies into four grades of firmness and evolution[2]:

**Grade I**: The breast in normally smooth and looks natural. No palpable capsule

**Grade II**: The breast is a little firm but appears natural. The breast is less soft, and the implant may be palpable but not visible

**Grade III**: The breast is firm and beginning to appear distorted in shape; the implant can be palpated easily

**Grade IV**: The breast is hard, painful, tender, cool, and looks abnormal.

Histologically, capsular contracture normally shows hypertrophic circumferential linear fibrosis with myofibroblast involvement.

The precise etiology of capsular contracture remains unknown, but some causes have been suggested[3-4]:

- *Hematoma and/or seroma*. In order to prevent these complication, it is important to control any bleeding that occurs during surgical dissection and wash the pocket with cold irrigation saline to remove blood stains from sub-tissues.
- *Silicon gel bleed*. This is less likely with the latest generation of breast implants because the gel is more cohesive.
- *Infection*. Immediately adjacent to the implant shell, it is possible to observe a chronic subclinical infection within a microscopic biofilm that is inaccessible to cellular and humoral immune function[5]. The risk of bacterial contamination of breast implants can be reduced by correctly handling them, and by using broad-spectrum prophylactic antibiotic treatments during and after surgery.
- *Glove powder on the implant shell*. In order to to avoid this problem, the gloves should be washed with sterile saline solution before touching the implants.
- *Other foreign bodies* such as lint or dust and, particularly, povidone-iodine particles.

One of the hypotheses is to control capsular contracture pharmacologically by means of immunomodulation as recent evidence indicates that the leukotriene receptor antagonists used to treat asthma, such as zafirlukast (*Accolate*) and montelukast (*Singulair*) may prevent and reverse its induction and formation[6].
It is also important to stress that capsular contracture is a risk factor for implant rupture, and the most frequent reason for repeat surgery.

## RATE OF CAPSULAR CONTRACTION

A precise picture of the rate of capsular contracture can be obtained from two important ongoing studies by Inamed and Mentor, the two largest producers of breast implants for both aesthetic and reconstructive breast surgery. The Allergan Core Study (ACS) involved 715 patients (including 455 primary and 147 revision augmentation patients), and the *Mentor Core Study* (MCS) involved 1007 (including 551 primary and 146 revision augmentation patients). Both are 10-year studies designed to assess safety, effectiveness and revision in augmentation mammoplasty, with postoperative follow-up visits scheduled after four weeks, six, 12 and 24 months, and then annually for ten years.
The interim results are very interesting as they indicate that capsular contracture occurs more frequently after revision than after primary augmentation. Among the women receiving breast implants for the first time, the risk of severe capsular contracture (Baker grades III-IV) was 13.2% in ACS after four years, and 8% in MCS after three years, whereas the corresponding figures among the women undergoing a reoperation were respectively 17% and 19%. It is also important to underline the fact that 39/135 patients who underwent repeat surgery in ACS, and 40/109 in MCS, did so because of capsular contracture after their first operation.
We have therefore revised our own informed consent documents in such a way as to highlight the greater risk of capsular contraction in the case of secondary augmentation mammoplasty, which is important for legal purposes.

## MATERIALS AND METHODS

Since 2005, we have used purified adipose tissue together with partial capsulectomy to treat capsular contraction in patients experiencing severe capsular contraction (Baker grade III-IV) after breast augmentation with moderate to severe breast firmness and/or distortion, and/or implant displacement and discomfort[7] (Figs. 1 and 2).
In 2005 and 2006, we performed breast augmentation procedures in 106 women, 12 of whom developed severe capsular contraction (Baker grade III-IV) and were candidates for implant replacement and purified adipose tissue to prevent capsular contraction. The exclusion criteria included the development of capsular contraction during the first eight postoperative months, prosthesis rupture and total capsulectomy, submuscular pocket,

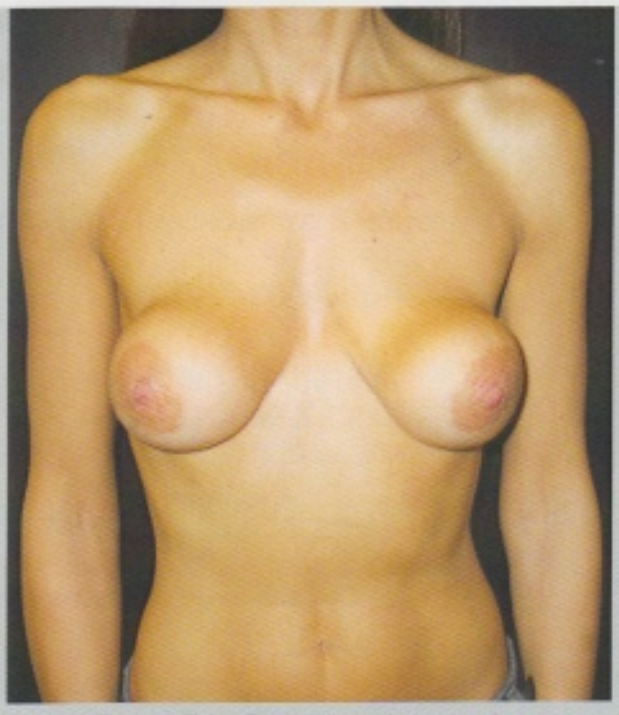



Figure 1. Baker Grade IV capsular contraction.


Figure 2. Periprosthetic capsule.

Figure 3. Partial capsulectomy.

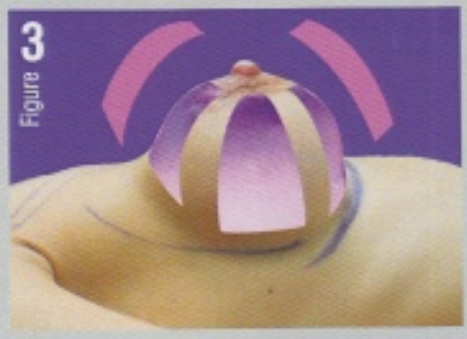
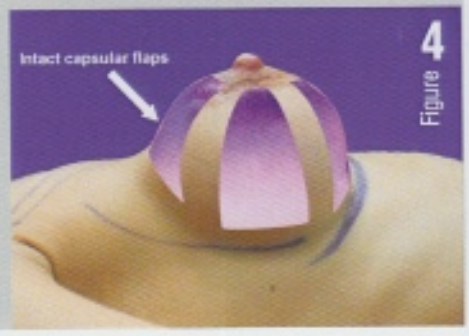



Figure 4.
Intact capsular flaps in which purified autologous adipose tissue is injected (between each capsular layer and the breast parenchyma).



mastopexy, and replacement with a bigger implant. Nine patients were eventually reoperated (five bilaterally and four monolaterally, for a total of 14 augmented breasts) and treated with purified adipose tissue, partial capsulectomy and breast implant replacement. Initially, 11 breasts were classified as Baker grade III and three as Baker grade IV.

## SURGICAL TECHNIQUE

This procedure can be carried out under local anesthesia and sedation, or under general anesthesia. Local anesthesia (epinephrine and lidocaine) is injected round the area in which the adipose tissue will be placed. Before injecting the local anesthetic, it is useful to draw the capsular leaves that will be removed and those which will be kept (Figs. 3 and 4). A blunt dissection of all the retroareolar aspect of the capsule is carried out through a homogeneous periareolar incision made to the retroareolar aspect of the periprosthetic capsule. Once this part of the capsule has been clearly exposed, the (generally eight) capsular leaves are marked (Figure 5), after which the capsule is incised, the prosthesis removed, and four leaves completely dissected from the mammary gland to the deep part of the capsule and removed (Figure 6). In patients with severe capsular contraction (Baker grade IV) and prosthesis dislocation, it is necessary to enlarge the retroglandular pocket by means of a capsulotomy at the inframammary fold (incising the intact capsular leaves at the base).

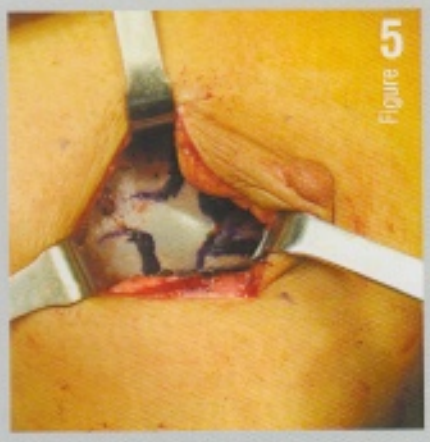



Figure 5. Capsular flaps: intraoperative design.

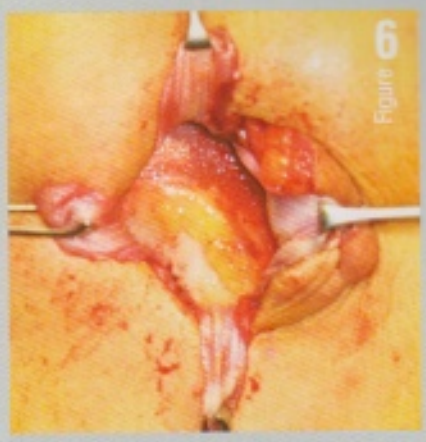
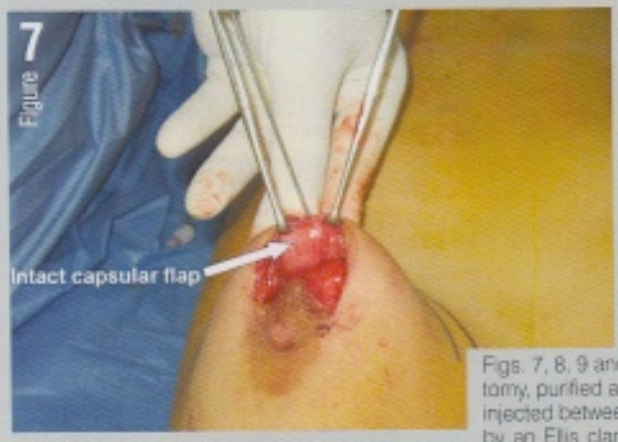
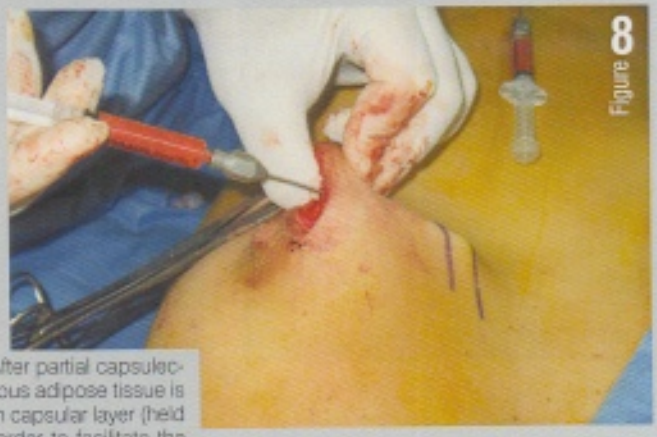


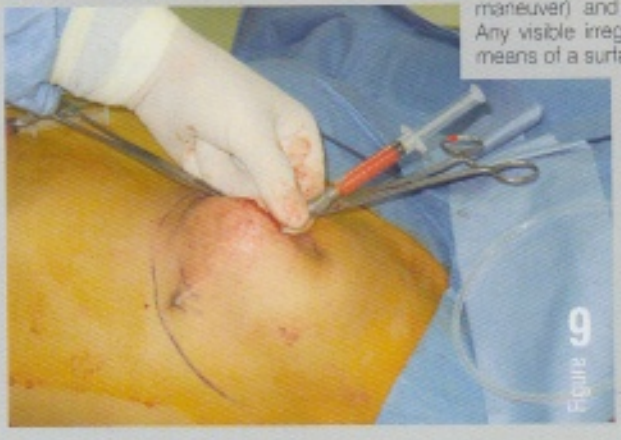

Figure 6. Partial capsulectomy (flower leaf technique); generally, four capsular flaps are removed.

Meanwhile, after locally infiltrating the internal aspect of the knee and/or abdominal region with Ringer's lactate solution and epinephrine/lidocaine (1:400,000), approximately 100-180 cc of adipose tissue is aspirated using a 10 ml luer lock syringe, and then centrifuged and purified according to Coleman (3000 rpm for three minutes and refinement). About 15-20 cc of purified tissue is injected between each intact capsular layer and the breast parenchyma while holding and firmly tensioning the upper part of the capsule by means of an Ellis or Duval clamp in order to facilitate the maneuver (Figs. 7, 8, 9 and 10).




Figs. 7, 8, 9 and 10. After partial capsulectomy, purified autologous adipose tissue is injected between each capsular layer (held by an Ellis clamp in order to facilitate the maneuver) and the breast parenchyma. Any visible irregularities are corrected by means of a surface massage.



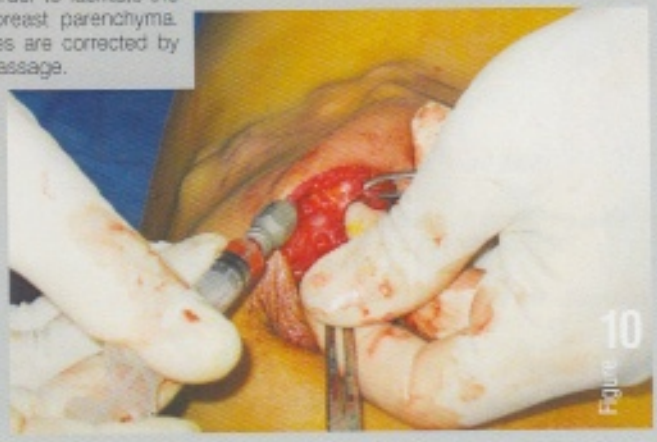




Figure 11.
A modelled dressing is applied using soft foam to recreate the inframammary fold.

Between 70 and 80 cc of purified adipose tissue is generally needed to treat each breast using Coleman cannulas and a 5 cc syringe. The cannula is initially placed at the lower part of the capsule and then retracted while injecting 5 cc of purified tissue. Any visible irregularities after tissue injection are corrected by means of a surface massage. A drain and new implant are systematically positioned, and the incisions are then sutured using absorbable polyglecaprone 25 sutures (3-4/0).

After the procedure, a modelled dressing is applied using soft foam to recreate the inframammary fold, and a specific bra is put in place (Figure 11).

Ceftriaxone 2 g is intravenously administered intraoperatively, and oral antibiotics are continued for five days after the operation.

The drainage tubes are usually removed after 3-4 days, or when their 24-hour output is less than 30 cc of serum.

Fifteen days later, the patients are instructed to massage their breasts using a circular surface movement (2-3 kg weight) as in the case of normal postoperative breast augmentation treatment.

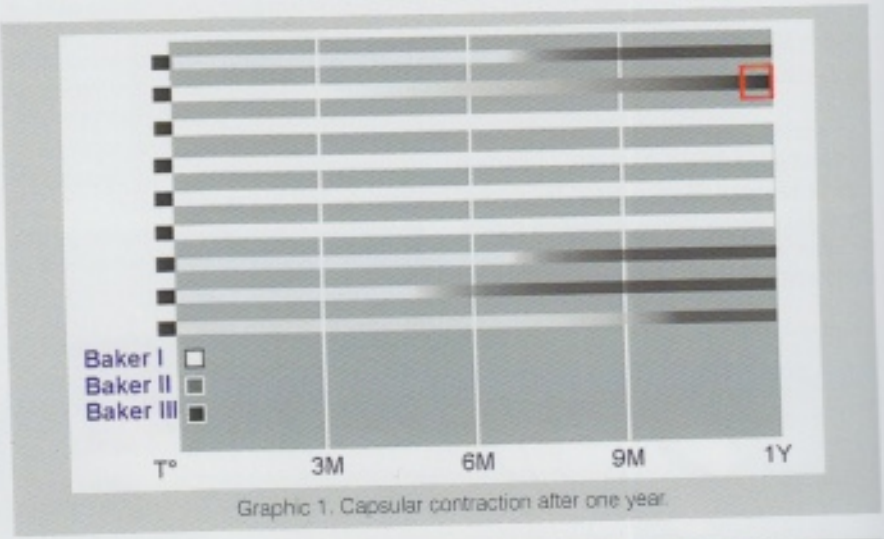
## RESULTS

Considerable improvement was observed after a follow-up of one year: seven breasts were Baker grade I, six Baker grade II and one Baker grade III (Graphic 1) shows that severe capsular contraction can be treated with purified adipose tissue in order to improve and prevent or diminish the risk of severe capsular contraction. Structural fat grafting has the same potential complications as any other surgical procedure[9].

Although there have been reports of rare complications such as hematoma, major edema, seroma, fat necrosis, visible irregularities, calcification, infection and pigmentation, these have never occurred in our experience.

## CONCLUSIONS

No surgeon or patient can predict or control a patient's wound-healing characteristics or a patient's genetic tissue characteristics, factors that can affect outcomes following breast augmentation. Each patient has unique, individual wound-healing and genetic tissue characteristics that influence the interaction between a breast implant and the surrounding tissues. Individual wound-healing characteristics influence the characteristics of the capsule or lining that forms around every breast implant and affect the degree to which that capsule tightens or contracts, which in turn determines whether capsular contracture will cause excessive firmness of the breast or other deformities.



Graphic 1. Capsular contraction after one year.

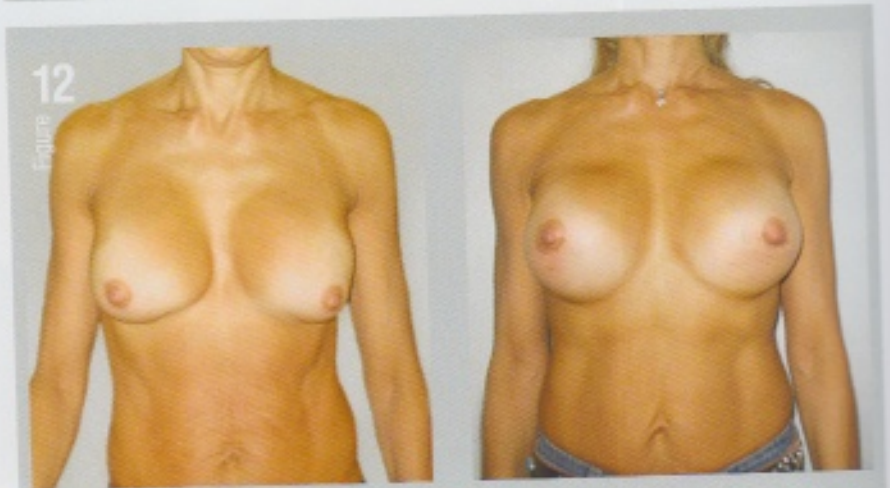
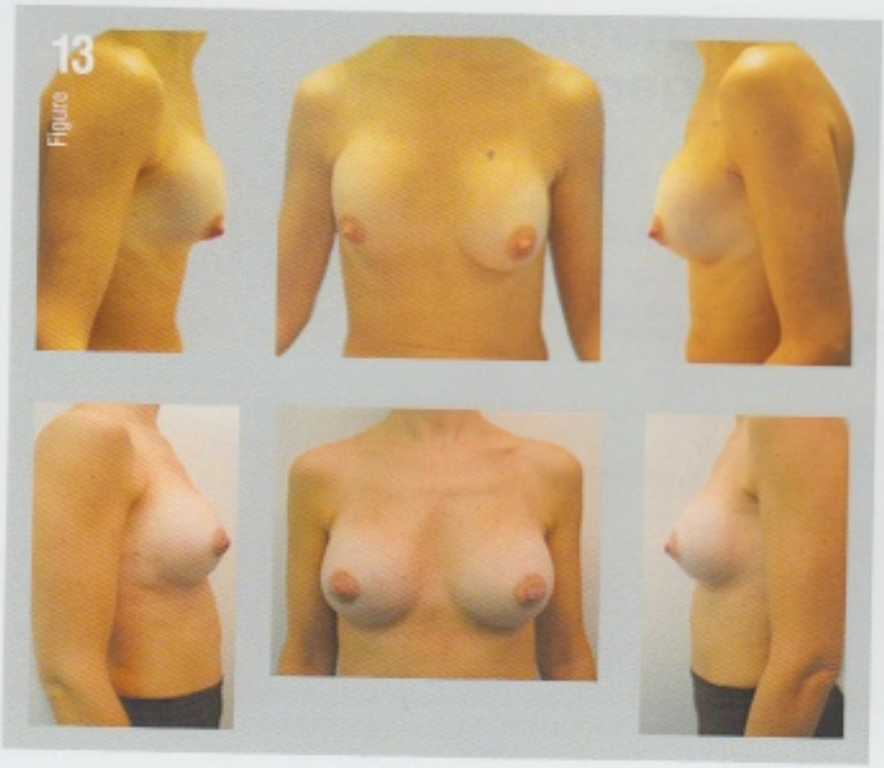


Figure 12. Bilateral capsular contraction (left), and one year after reoperation.

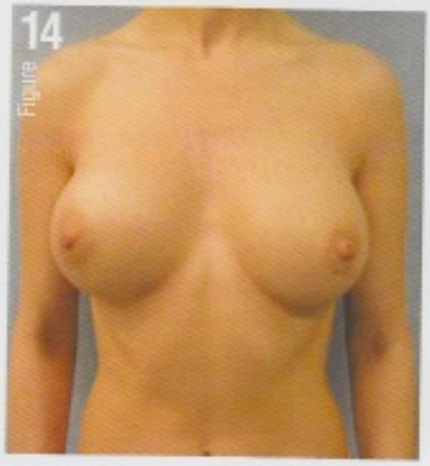


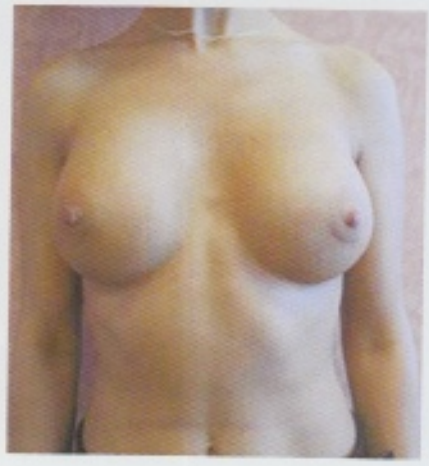

After the reoperation the patients were asked: *"Based on your experience, would you undergo this operation again to correct capsular contraction?"* All of them answered positively, highlighting the important improvement of the cosmetic result, breast natural shape and softness.
Our experience shows that this simple, efficient and reproducible technique leads to good results and prevents or diminishes the risk of severe capsular contraction, particularly after reoperation.
It has now routinely used in our practice.

Figure 13.
*Above*: Baker grade III (left) and grade IV (right) preoperatively.
*Below*: Bilateral Baker grade I 12 months postoperatively.

Figure 14.
*Left*: Right breast Baker grade III preoperatively.
*Right*: Baker grade I 12 months postoperatively.

All our patients were asked before and after the reoperation about satisfaction with cosmetic results and its impact on sexuality and body image.
Overall satisfaction with cosmetic results was high, togheter with an increase of satisfaction in sexual life and body perception, particularly in patients who had Baker grade III-IV with severe prosthesis dislocation who sometimes had more difficulty in looking at themselves naked and being seen naked by their partners.



## REFERENCES


*1) Danino AM, Basmacioglu P, Saito S, et al.* Comparison of the capsular response to the Biocell RTV AND Mentor 1600 Siltex breast implant surface texturing: a scanning electron microscopy study. Plast Reconstr Surg Dec 2001; 108(7):2047-52

*2) Baker JL Jr.* Classification of spherical contractures presented at the Aesthetic Breast Symposium, Scottsdale, Arizona 1975

*3) Barker DE, Retsky MI, Schultz S.* Bleeding of silicone from bag gel breast implants, and its clinical relation to fibrous capsule reaction. Plast Reconstr Surg 1978; 61(6):836-41

*4) Williams C, Aston S, Rees TD.* The effect of hematoma on the thickness of pseudoheat around silicon implant. Plast Reconstr Surg 1975; 56:194

*5) Virden CP, Dobke MK, Stein P, Parsons CL.* Subclinical infection of the silicone breast implant surface as a possible cause of capsular contracture. Aesth Plast Surg 1992; 16:173-79

*6) Schlesinger SL, Ellenbogen R, Desvigne MN, et al.* Zafirlukast (Accolate): a new treatment for capsular contracture. Aesth Surg J 2002, July/August:329-36

*7) Coleman SR, Saboeiro AP.* Fat Grafting to the breast revisited: safety and efficacy. Plast. Reconstr. Surg. 2007; 175-185

*8) Baruffaldi-Preis F.* La correzione delle depressioni esiti cicatriziali e rippling. Presented at the 30° Anniversary Course of the Foundation of G. Sanvenero Rosselli, Milan, Italy, 16 September 2005.

*9) Coleman SR.* Structural fat grafts: the ideal filler? Clinics in Plastic Surgery 2001; 28:111-119

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2009

# Vulvo-perineal reconstruction with V–Y flap after extensive surgery for vulvar cancer.

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Summary

## Vulvo-perineal reconstruction with V–Y flap after extensive surgery for vulvar cancer.

**Background - Soft-tissue reconstruction following vulvar cancer resection is a difficult challenge because of the functional, locational, and cosmetic importance of this region. Although numerous flaps have been designed for vulvar reconstruction, each has its disadvantages.**
**Methods - The Authors present their experience with the antero-medial fasciocutaneous V-Y advancement flap for vulvo-vaginoperineal reconstruction after vulva cancer resection. This flap is supplied by underlying fascial plexus derived from perforators of the superficial and deep femoral artery and indirect branches through musculocutaneous perforators of underlying muscle.**
**Result - All flaps survived completely, with no severe major complications.**
**Conclusions - This flap is reliable, sensate, easy to perform, and has matched local skin quality and concealed donor-site scar on the antero-medial side of thigh. In addition, it can cover large vulvovaginal defects. In our experience, the antero-medial thigh fasciocutaneous V-Y advancement flap has proven very useful for vulvar reconstruction, especially at the point of donor-site scar, flap thickness, and degree of flap advancement.**

***Key words:*** *Vulvo-perineal reconstruction, V-Y flap, Vulvar cancer.*

## INTRODUCTION

Vulvar cancer accounts for 5 percent of all female genital cancers and 1 percent of all malignancies in women. It can be observed more frequently after the fifth or sixth decade of life. Recently, there has been an increase in the incidence of vulvar cancer. Vulvar cancer is a diffusing disease that permeates into regional lymphatics, requiring radical resection with inguinal lymph node dissection for treatment. Characteristically, this area is easily contaminated by secretions from the vaginal exocrine gland and vulnerable to infection after flap surgery. Furthermore, soft-tissue reconstruction following vulvar cancer surgery presents a difficult challenge. In the past, radical vulvectomy defects had been reconstructed using two bilateral longitudinal incisions and repaired by primary closure, skin grafts, and local flaps.
There is no doubt that flaps are superior to skin grafting or direct closure in terms of the aesthetic and functional aspects of reconstruction.
Many flaps have been used in the search for a reliable, single-stage, technically simple flap to repair the majority of surgical defects. This has led to numerous surgical options, ranging from random to axial, fasciocutaneous, and musculocutaneous flaps.
The use of flaps is required not only for covering large defect but also for free tension closure to avoid wound diastase, delayed healing with possibility of infection, stenosis, retraction with perineal disfunction, longer hospitalization and poor cosmetic results.
We think that the "*ideal*" flap should bring to the defect a good vascularized pad of skin and subcutaneous fat the same thickness of the wound, bring a variable amount of tissue able to close both small to wide wounds, reestablish functional needs, minimize negative impacts on both walking and sitting, create a natural aesthetic appearance, possibly be a sensitive flap, and require a single-stage operation.

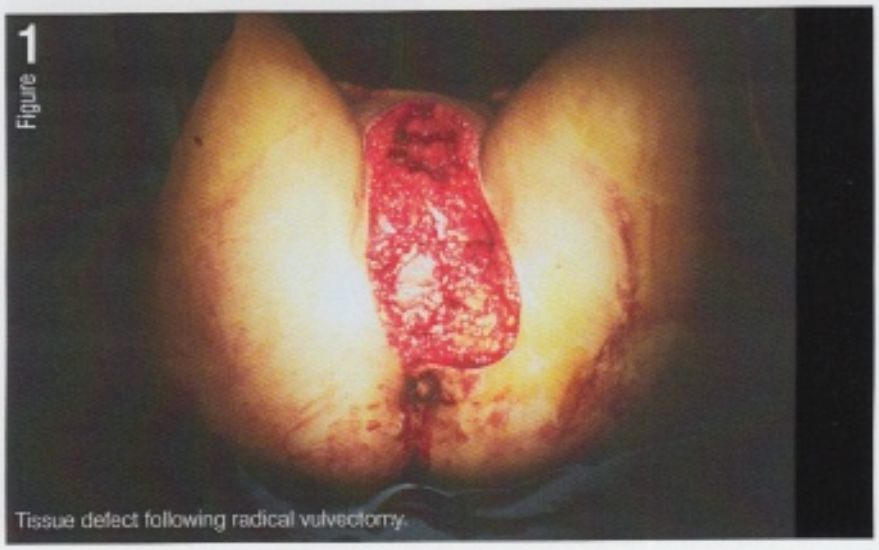

Figure 1
Tissue defect following radical vulvectomy.

*UpDate in Plastic Surgery 2009; 2, 1, p. 20.*

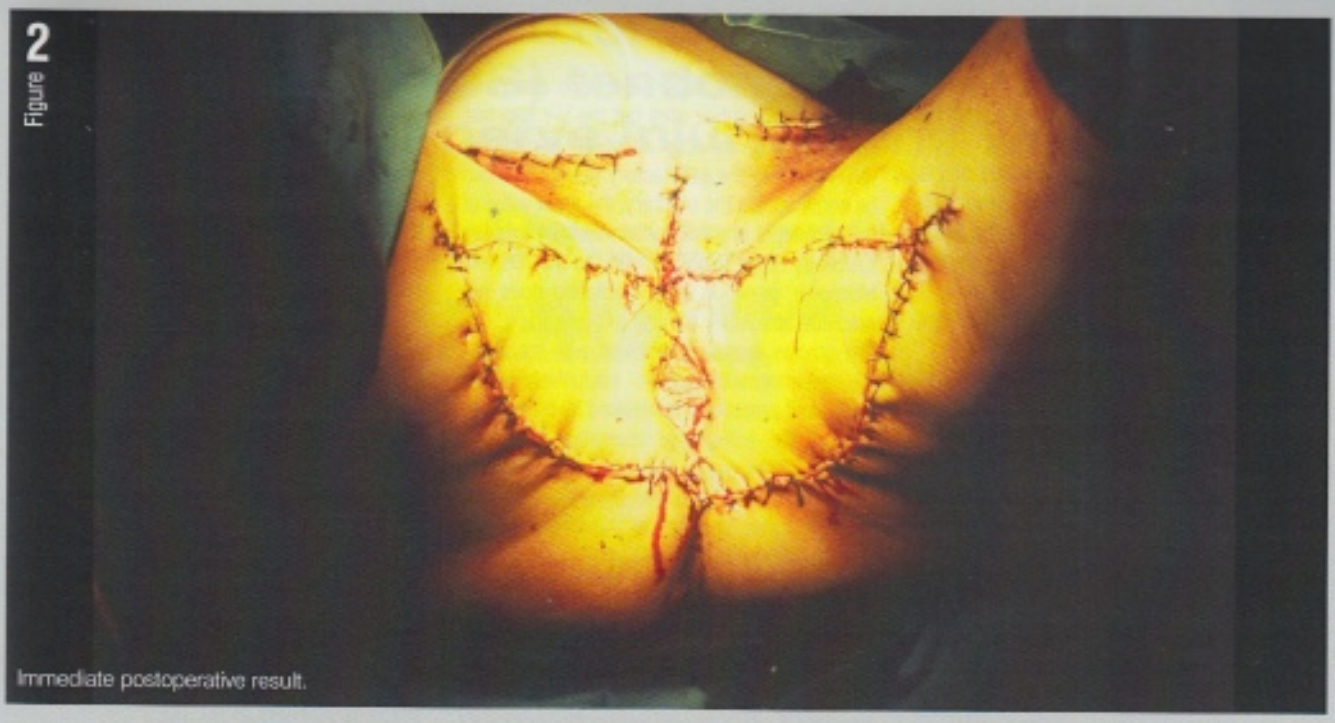

Figure 2
Immediate postoperative result.

## PATIENTS AND METHODS

This study presents a retrospective review of our past 15 years of experience using 23 flaps in 20 vulvar reconstructions following extensive vulvectomies.

All patients who underwent a V-Y flap vulvar and or perineal reconstruction after radical surgery for vulvar neoplasia at *Fondazione San Matteo Hospital* in Pavia from January 1993 to December 2008 were included (figs 1, 2 and 3). Data were collected with regard to age, histology, FIGO 1994 stage, previous surgery, demolitive and reconstructive surgery performed, local morbidity, lenth of hospital stay, stenosis of the vaginal introitus and urethral meatus deviation.

Twenty three patients, who had been presenting with vulvar neoplasia, underwent V-Y flaps surgery to restore the vulvar and/or perineal region. Their ages ranged from 41 to 83 years, with an average age of 70). Eighteen patients presented with primitive carcinoma of the vulva, three with local relapse, and 2 with vulvar *Paget's disease*. Three patients received preoperative vulvar and inguinal radiation, two with concomitant chemotherapy.

FIGO 1994 stage was: IB in 6 cases; stage II, 8; stage III, 2; stage IVA in 2 cases.

Eighteen patients were treated by radical vulvectomy, in two patients a radical emivulvectomy and in three a radical perineal excision for relapse were performed. Reconstruction with bilateral V–Y flaps patients was done and monolaterally in five, in two of them a controlateral different flap was choosed.

We used two different V-Y advancement flaps: a subcutaneous pedicle flap and a musculocutaneous gracilis flap. In larger defects, where further mobility of the flap is required, the gracilis muscle is distally identified and divided in order to obtain a better release and advancement of the flap.

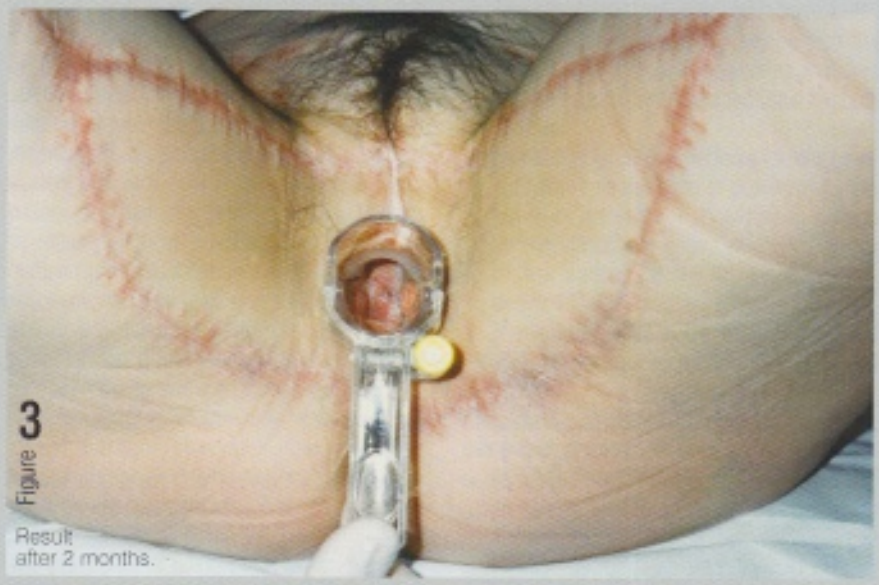

Figure 3
Result after 2 months.

## RESULTS

No patient experienced any complication during surgery. Patients generally reported satisfactory medical conditions at mean 10 days (range 4-15) and than were discharged from the hospital with a mean of 13 days.

Major complications included mono- or bi-lateral lymphocele in two patients, within 6 months after surgery; fever and local infection (inguinal/vulvar swab positive for either *Proteus, Klesbiella* and *Providencia Retgori*) in four

patients, within 6 days after surgery; inguinal hematoma in one patient, three weeks after surgery; bilateral superficial venous thrombosis in one patient, 1 month after surgery; diarrhea in one patient, at day 6 after surgery.
Four patients reported stitch diastasis of the cutaneous margin from the vaginal edge of 1.5 up to 2 cm, detected 4-13 days after the operation. In all but one case, satisfactory healing occurred without further surgery.
Two patients experienced introital stenosis surgey after relapse and two after radiation.
Altough sexual function was not declared, the remaining patients had a satisfactory introitus with accepted a medium size speculum.
One patient underwent Z-plasty 1 year after surgery because of an urethral meatus deviation and another one complained misdirection of the stream.

## DISCUSSION

Several flaps have been described for use in the vulvar area but the V-Y flap has received relatively little attention, particularly with regard to the satisfactory results that can be obtained. On the contrary, the great value of the technique is given by its reliability and the simplicity with which it can be performed. Moreover, previous local irradiation does not preclude absolutely the use of these flaps.
The gracilis muscle is elevated, with the same V-Y advancement pattern, esclusively when larger well vascurised is required by the dimension of the soft tissue resection. The deep defects of the vulva and perineum following extensive radical excisional surgery can be, in fact, effectively covered by this thicker flap in one-stage primary repair.

## CONCLUSION

The V-Y advancement flap technique represents a relatively siple and effective procedure for vulvar defects when performed either with a subcutaneous pedicle or as a myocutaneous unit.
We believe that in most instances the V-Y flaps represent a valid option for vulvar reconstruction thanks to the simplicity and rapidity with which it is performed.
Moreover, these flaps demonstrate good versatility and reliability.
Preoperative radiation therapy does not appear to be an absolute drawback.
Considering the increasing focus of gynaecologic oncologists on preserving normal body image, this technique may have valuable role to play.

## LECTURES


1. **Wee JTK, Joseph VT.** *A new technique of vaginal reconstruction using neurovascular pudendal-thigh flaps: a preliminary report. Plast Reconstr Surg 1989; 83:701-709.*

2. **Monstrey S, Blondeel P, Van Landuyt K, et al.** *The versatility of the pudendal thigh fasciocutaneous flap used as an island flap. Plast Reconstr Surg 2001; 107:719-725.*

3. **Knol ACA, Hage JJ.** *The infragluteal skin flap: a new option for reconstruction in the perineogenital area. Plast Reconstr Surg 1997; 99:1954-1959.*

4. **Moschella F, Cordova A.** *Innervated island flaps in morphofunctional vulvar reconstruction. Plast Reconstr Surg 2000; 105:1649-1657.*

5. **Hashimoto I, Nakanishi H, Nagae H, et al.** *The gluteal-fold flap for vulvar and buttock reconstruction: an anatomical study and adjustment of flap volume. Plast Reconstr Surg 2001; 108:1998-2005.*

6. **Arrkoulakis NS, Angel CL, DuBeshter B, et al.** *Reconstruction of an extensive vulvectomy using the gluteus maximus fasciocutaneous V-Y advancement flap. Ann Plast Surg 2002; 49:50-547.*

7. **Carramaschi F, Ramos MLC, Nisida ACT, et al.** *V-Y flap for perineal reconstruction following modified approach to vulvectomy in vulvar cancer. Int J Gynecol Obstet. 1999;65:157-163.*

8. **Persichetti P, Simone P, Berloco M, et al.** *Vulvo-perineal reconstruction: medial thigh septo-fasciocutaneous island flap. Ann Plast Surg 2003; 50:85-89.*

9. **Loree TR, Hemping RE, Eltabbakh GH, et al.** *The inferior gluteal flap in the difficult vulvar and perineal reconstruction. Gynecol Oncol 1997; 66:429-434.*

10. **Helm WC, Hatch KD, Partridge EE, et al.** *The rhomboid transposition flap for repair of the perineal defect after radical vulvar surgery. Gynecol Oncol 1993; 50:164-167.*

11. **Burke TW, Levenback C, Gershenson DM, et al.** *Closure of complex vulvar defects using local rhomboid flaps. Obstet Gynecol 1994; 84:1043-1047.*

12. **Carlson JW, Carter JR, Saltzman AK, et al.** *Gynecologic reconstruction with a rectus abdominis myocutaneous flap: an update. Gynecol Oncol 1996; 61:364-368.*

13. **Hatoko M, Okazaki T, Tada H, et al.** *Vulvar reconstruction using rectus abdominis musculocutaneous flap transfer with secondary liposuction in extramammary Paget's disease. Ann Plast Surg 1997; 38:179-183.*

14. **Chun JK, Babak Behnam A, Dottino P, et al.** *Use of the umbilicus in reconstruction of the vulva and vagina with a rectus abdominis musculocutaneous flap. Ann Plast Surg 1998; 40:659-663.*

15. **Giraldo F, Gonzalez C.** *The versatility of the pudendal thigh fasciocutaneous flap used as an island flap [letter]. Plast Reconstr Surg 2001; 108:2172-2174.*

16. **Tateo A, Tateo S, Bernasconi C, et al.** *Use of V-Y flap for vulvar reconstruction. Gynecol Oncol 1996; 62:203-207*

17. **Peled IJ.** *Reconstruction of the vulva with V-Y advanced myocutaneous gracilis flap. Plast Reconstr Surg 1990; 86(5):1014-1016*

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2010

# The outcome of Flexor Digitorum Superficialis (FDS) tendon transfer in long standing ulnar nerve injury at the wrist

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Summary

## The outcome of Flexor Digitorum Superficialis (FDS) tendon transfer in long standing ulnar nerve injury at the wrist

**Ulnar clawing is the manifest deformity of long standing ulnar nerve injury at the wrist level with marked weakness of the power hand grip and intrinsic minus position of the affected fingers. To correct ulnar clawing FDS tendon of the middle or the ring fingers transfered to both A1 (first annular pully) and A2 (second annular pully) or its transfer to the radial lateral band of the extensor apparatus of the clowed fingers in 20 patients, classified into two groups, each group contains 10 patients. The first group, FDS tendon had transferred to A1 and A2 pullies. The second group, the transfer was to the radial lateral band of the extensor tendon. Evaluation of postoperative results using standard tests. Goniometry to evaluate the active range of motion of metacarpophalangeal (MP), proximal interphalangeal (PIP) and distal interphalangeal (DIP) joints. Power hand grip assessment using dynamometer, comparing the preoperative measures with the taken postoperative ones at 3 and 6 months postoperatively. All patients have good improvement of the active range of motion of the managed fingers joints, and good improvement of the power hand grip.**

***Key words:*** *ulnar nerve, repair, wrist.*

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## INTRODUCTION

The hand represents one of the most elegant and complex biological motor systems. The coordinated movements of its five digits alternately allows for grasping with the entire fist and pointing with individual fingers[1]. Deficits resulting from trauma to the ulnar nerve are variable. With low lesions, the motor deficits are as a result of loss of intrinsic function; this causes a significant imbalance and deformity. In the hand low lesions affect pinch, grip strength and manipulation. It causes difficulty with the approach of objects due to claw hand deformity. If dysfunction is profound and it is evident that ulnar nerve reinervation is unlikely, patient may decide to undergo tendon transfer to regain function. Unfortunately, an isolated tendon transfer can not restore all of the power requirements of an ulnar nerve palsy[2].

The goal of tendon transfer procedures is to restore balance and function to the hand that has been compromised through the loss of a muscle or group of muscles with irreplaceable loss of nerve innervation. This may occur through prolonged compression, trauma, disease, infectious process, congenital anomalies or spastic paralysis[3, 4].

The principles of tendon transfer surgery are frequently reiterated but often forgotten.

Failure to remember the following principles is a common cause of unsatisfactory results, and all must be considered carefully before embarking on tendon transfer:

1. An elective tendon transfer should never be performed in the presence of unhealed wounds.
2. Full passive joint motion must be restored before tendon transfer.
3. The transfer must not pass through areas of scar tissue or under skin grafts. Furthermore, surgical incisions should not be placed directly over the transfer.
4. Whenever possible, cutaneous sensibility should be restored before tendon transfer.
5. The normal function of the transferred muscle must be expendable.
6. The transferred muscle must be under voluntary control and must have an independent action.
7. The transferred muscle must have sufficient amplitude and power to perform its new function; thus, reinnervated muscles should be used only in exceptional circumstances.
8. If the transfer cannot perform its new function with a straight line of pull from its origin to its insertion, it should pass through no more than one pulley. Acute angulation of the transfer at the pulley should be avoided.
9. Synergism between the muscle's original and new actions facilitates rehabilitation[5].

Claw hand correction is broadly grouped into static and dynamic procedures. Static procedures are performed to maintain the MP joint in some degree of flexion or to limit MP joint hyperextension; in either case the claw posture is reversed by the functioning long extensors. Flexion of the MP joint is unrestricted in static procedures. Dynamic correction involves the transfer of a normally functioning but dispensable motor to a predetermined location in the digit to bring about correction of deformity while introducing additional motor power to carry out specific functions that had been lost[6].

## PATIENTS AND METHODS

Twenty male patients of ulnar claw hand, their age between 25 to 34 years presented to us at least 2 years after the initial trauma and

classified into 2 groups managed by two different reinsertion techniques of FDS tendon transfer.

**Group I**: contains ten male patients of ulnar claw hand managed by FDS tendon transfer to both A1 and A2 pullies. But **group II** also, contains ten male patients managed by FDS transfer to the radial lateral band of the extensor mechanism.

## SURGICAL TECHNIQUES (Figure 1)

The FDS middle finger was identified by palmer incision at the distal palm crease and its cut with slight proximal withdrawal into the palm (Figure 1a).
Two small incisions at the base of the little and ring fingers at the level of their MP joints (Figure 1c). The divided FDS middle finger was splitted longitudinally into 2 halves (Figure 1b). Each half passed through the fibrous flexor sheath under both A1 and A2 pullies of the little and ring fingers and reflected over the sheath and sutured to itself with tension on the transfer to put the MP in 60-70 degrees of flexion (Figure 1c). To the ten patients of group I, while the other ten patients of group II the splitted FDS middle finger was passed through the lumbrical canal to be sutured to the radial band of the extensor apparatus of the ring and little fingers with the same tension on the transfer (Figure 1d & e). Immobilization of the hand with the wrist in 20-30 degrees of flexion MP in 60-70 degrees of flexion and fingers in 0 flexion (Figure 1f). After 2 weeks, immobilization removal and splinting the hand. At week 3 active exercise within the splint, week 4 active exercise outside the splint, discharging the splint at weeks 6 to 8 and active/passive exercises, at week 8 progressive resistive exercise. At the 12th week full non restrictive activities. At the 3rd and 6th months postoperatively; dynamometry was done to measure the hand power grip, evaluation of the active range of motion of the affected joints by goniometry and the tone of transferred muscle by the examiner sense of passive range of motion of the joints.

## RESULTS

Preoperatively, the twenty patients of this work in both groups examined by goniometry to evaluate the active range of motion of long fingers joints and the same range reevaluated postoperatively at 3 and 6 months as shown in (Table 1).There is a manifest difference between the preoperative and postoperative active range of motion of the MP flexion of the little and ring fingers from 0 to 10 degrees preoperatively and..50 to 80 degrees postoperative (Table 1).
Dynamometry was done to all the cases of the study preoperatively and compared with those taken postoperatively at 3 and 6 months to evaluate the power hand grip strength (Table 2).
The power grip is increased strongly in direct proportion with the MP flexion active range of motion improvement and with the cosmotically improved intrinsic minus of the little and ring fingers. The middle finger flexor digitorium superficialis transfer improved the power grip more than that of the ring finger With the use of distal palm crease incision and leaving a small part of FDS tendon at its insertion, there is no extension lag of the PIP joints and no flexion deformity of MP and DIP joints as shown in Figures 2, 3, 4 of the clinical cases. The aesthetic appearance of the hand is improved.
The preoperative hypotonia of MP flexors was reversed postoperatively to nearly normotonia indicating the direct flexor action of the transferred innervated tendons on the MP joints to act as flexors.

## DISCUSSION

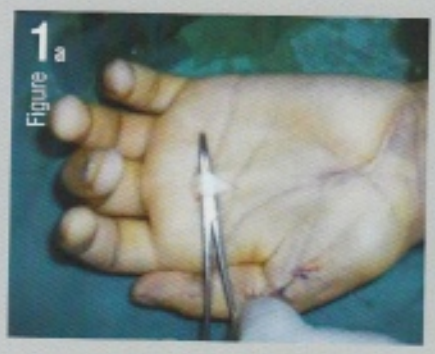
Ulnar claw hand is a crippled one as the patient can not. This put his affected long fingers adequately into the palm to hold the objects due to MP joint hyperextension and interphalangeal joints limited flexion. Fine movements integration of the long fingers are lost. The ulnar fingers "little and ring" are

**Table 1**
**Goniometry to long fingers joints active range of motion.**

| LFinger MP | Preoperative | Postoperative | |
|---|---|---|---|
| | | 3 months | 6 months |
| Little | 0-10 degrees | 50-70 | 60-80 |
| Ring | 0-10 degrees | 50-80 | 60-90 |
| Middle | 60-80 degrees | 60-80 | 60-80 |
| Index | 60-80 degrees | 60-80 | 60-80 |
| PIP | | | |
| Little | 60-90 | 70-100 | 80-100 |
| Ring | 60-90 | 70-100 | 80-100 |
| Middle | 90-100 | 70-100 | 70-100 |
| Index | 90-100 | 90-110 | 90-110 |
| DIP | | | |
| Little | 60-80 | 70-90 | 70-90 |
| Ring | 60-80 | 70-90 | 80-90 |
| Middle | 90 | 90 | 90 |
| Index | 90 | 90 | 90 |

**Table 2**
**Power hand grip in kgs.**

| Reinsertion site | Preoperative | Postoperative | |
|---|---|---|---|
| | | 3 months | 6 months |
| Transferred tendon to A1 and A2 pullies | 35-44 | 45-50 | 56-58 |
| Transferred tendon to the lateral bands of the extensor apparatus | 35-45 | 47-51 | 56-58 |



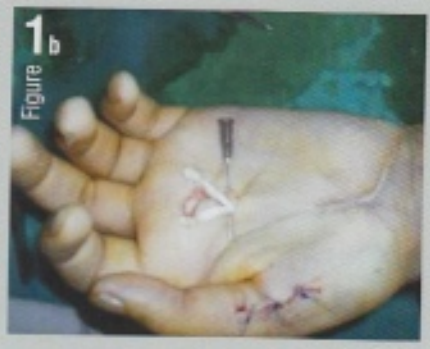
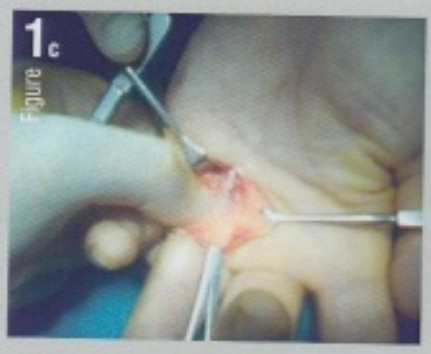




Figure 1.
Ulnar claw hand correction techniques.

Figure 1a
Exposure of FDS tendon through distal palmer crease incision.

Figure 1b
Splitting of FDS tendon into tow halves.



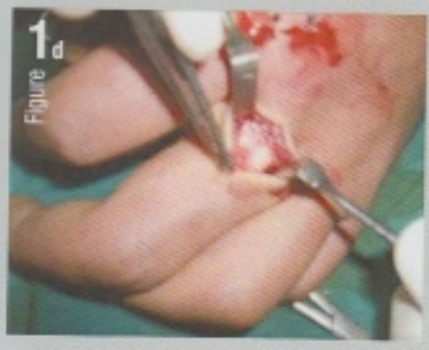
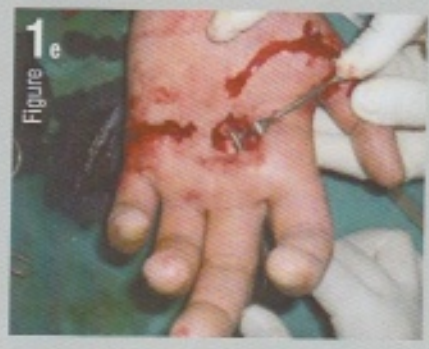



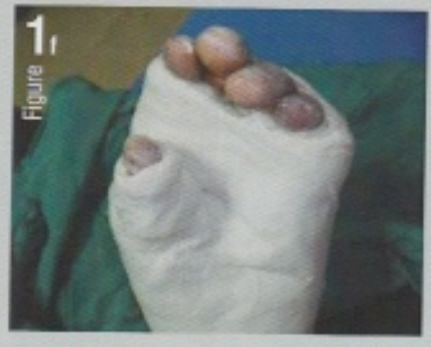

Figure 1c
Retrival of the splitted FDS strip around both A1 and A2 pullies.

Figure 1d
Exposure of the radial band of the extensor apparatus.

Figure 1e
Identification of the lumbrical canal whole length.

Figure 1f
Immobilization of the hand to put MP joints in 60 to 70 degrees of flexion .



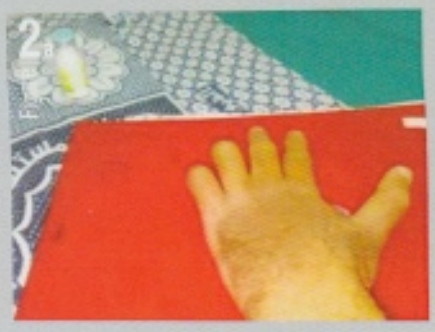

markedly affected than the radial fingers. Our surgical tendon transfer target is to induce balance of the affected fingers by dynamic FDS tendon transfer to both A1 and A2 annular pullies or its transfer to the extensor apparatus to have active flexion of MP joint to overcome the pathological hyperextension deformity of claw fingers. FDS is the primary PIP joint flexor, but in the presence of FDP the PIP joint is flexed even in absence of FDS. So its harvest does not leave residual obvious hand deformity. This concept makes FDS popular muscle for tendon transfer within the hand and wrist.

With the large number of claw hand correction procedures; static and dynamic, there is a great debate about the ideal method to correct the ulnar claw hand. However the static procedures have the drawback of deformity recurrence due to repeated flexion, extension movements on the MP joints and loss of surgically developed tightness on the volar aspect of MP joint capsule [7]. But *Naravankumar* [8] and *Brand* [9], considered the dynamic use of tendon transfer procedures is favourable than the static procedures. Because of its long lasting results and the rare clawing recurrence. It improves the power hand grip markedly and maintains the aesthetic result of the hand appearance as regard the hyperextension deformity of the MP joints.

In our study, we used FDS dynamic transfer to transmit its active contractile force to the prime MP joints flexor "extensor apparatus lateral band" or to the first and second annular pullies on the volar aspects of MP joints to induce active flexion. This dynamic concept is proved by the improving MP joints active range of motion "goniometry" and the power grip advance of the surgically corrected hands measured by dynamometry.

Many insertions have been described for ulnar clawing correction. Transfer reinsertion to both A1 and A2 pullies and transfer to radial lateral bands of the extensor mechanisms of the fingers are widely accepted nowadays. Both retrival sites give good lasting dynamic results with clawing correction [6, 9-11]. In this work the same insertion sites had used. these results are good and coincide with previous anthers results in the form of marked power grip improvement and good active range of motion of MP joints of the managed fingers.

In this work FDS harvest was done through small incision on the distal palmer crease without any incision on the proper finger. Small part of the superficialis tendon was left



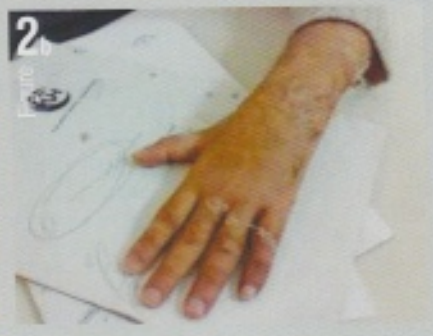
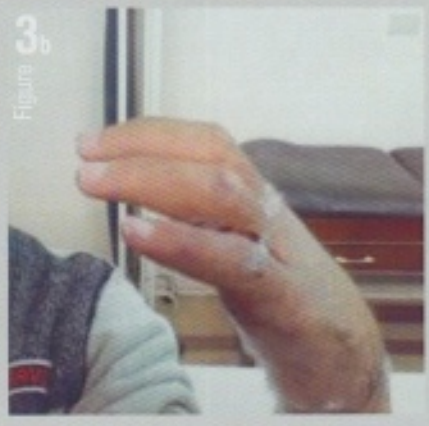



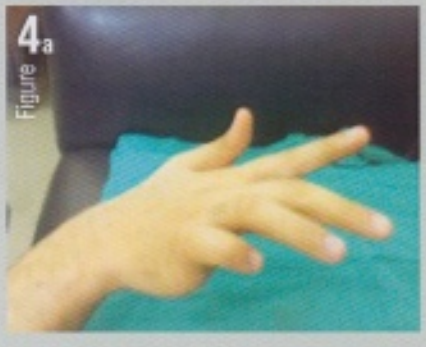

Figure 2a.
Ulnar clawing (preoperative).

Figure 2b.
Postoperative.

Figure 3a.
Ulnar clawing (preoperative).

Figure 3b.
Postoperative.

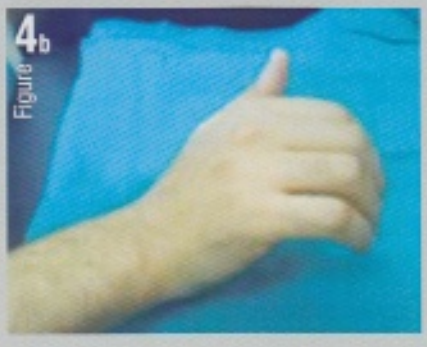




Figure 4a.
Ulnar clawing (preoperative).

Figure 4b.
Postoperative.

near its insertion to prevent PIP joint flexion deformity and to minimize scar tissue and adhesions formation in the donor finger. Extension lag of (PIP) joint occurs in two cases (8%). No flexion deformity occurred .In comparison to the study performed by *Anderson et al.* [7], the ring finger superficialis tendon was harvested through either a mid lateral approach or a Brunner incision on the flexor surface of the ring finger. Extension lag at the DIP joint and fixed flexion deformities at the PIP joint occurred in 44% and 8% of cases, respectively. *Anderson* [7] and his associates believed that, the high complication rate with the lateral approach was due to scar tissue and adhesion formation around the lateral hand of the extensor hood, which are retracted during these exposures.

Postsurgical immobilization advised by the surgeons for at least 3 weeks to prevent stress on the retrival tendon site, so preventing its rupture and operation failure [7, 13]. However *Rath* and his associates [14], used the immediate active motion after tendon transfer for claw deformity comparing their results in two groups; one group of patients managed by conventional immobilization and the other group managed by immediate active motion. They concluded that, the immediate active motion protocol is safe and has similar outcomes compared with those of immobilization, with the added advantage of earlier pain relief and quicker restoration of hand function. Immediate motion after tendon transfer can significantly reduce morbidity and speed up the rehabilitation of paralytic limbs, and it may reduce expense for the patients.

Immobilization is used to all our cases with controlled active motion induction after two to

three week's. Gradual change to full non restrictive motion after the period of three week's up to 12 week's postoperatively. However the immediate postsurgical active motion of *Rath et al.* [14] deserves a future trials to verify its safety as regard retrival site disruption.

## CONCLUSION

Tendon transfer is a good alternative to reconstruct the paralyzed low ulnar nerve injury to reverse the claw hand deformity. FDS muscle of the long finger is a good donor motor to correct ulnar clawing because it has sufficient length, adequate excursion and it does not weaken the power hand grip unlike the FDS of the ring finger.

Ulnar clawing reversal by the FDS of middle finger transfer to loop around both A1 and A2 pullies or to the lateral band of the extensor apparatus has the same result as regard, the active range of motion of IP joints and MP joints and the postoperative improvement of the power hand grip.

The presurgical evaluation of the range of motion, fingers sensibility, soft scars and hand power is important to enhance the postoperative results. Together with the muscle choice of synergistic action. Physiotherapy postoperatively is the cornerstone in the surgical success and good results. For 6 months to enhance tendons gliding and to decease fibrous tissue adhesion between the transferred tendons and its surrounding tissues. So the tunnel of the transfer to the target reinsertion site must be neither wide nor tight to limit the adhesion formation and to fit only the tendon preventing its future migration under the effect of repeated muscular contraction and its propagating force into the tendon.

Tendon transfer is established, the second surgical procedure coming after the successful acute nerve repair as regard the motor hand function, sensory perception and even the cosmotic hand appearance due to minimal scars of acute nerve repair.

## REFERENCES


1. **Michael B, Gerald LS, Amanda H, et al.** *Immediate thumb extension following extensor indicis proprius-to-extensor policis longus tendon transfer using the wide awake approach. Plast Reconstr Surg 2007; 119:1507.*

2. **Omer GE.** *Early tendon transfers as internal splints. In: Hunter JM, Shneider LH, Mackin EJ (ed): Tendon Surgery in the Hand. Mosby, St. Louis, 1987.*

3. **Brand PW.** *Mechanisms of tendon transfers. In Mackeis EJ, Callahan AD, Skirven TM, et al. (eds): Hunter-Mackin-Callahan, Rehabilitation of the Hand and Upper Extremity, 5th ed. Mosby, St. Louis, 2002.*

4. **Brand PW.** *Biomechanics of tendon transfers. In: Hunter JM, Schnieder LH, Mackin EJ (eds): Tendon Surgery in the Hand. Mosby, St. Louis, 1987.*

5. **Davis RC.** *Median never palsy. In: Hotchkiss RN, Pederson WC and Wolf SW (eds). Green's Operative Hand Surgery, 5th edition, Philadelphia, Elsevier (2005).*

6. **Anderson GA.** *Ulnar nerve palsy. In: Green DP, Hotchkiss RN, Pederson WC and Wolf SW (eds). Green's Operative Hand Surgery, 5th edn. Philadelphia, Elsevier; 2005.*

7. **Anderson GA, Lee V, Sundararaj GD.** *Opponensplasty by extensor indicis and flexor digitorium supeficialis tendon transfer. J Hand Surg (Br) 1992; 17:611-614.*

8. **Naravankumar TS.** *Claw-finger correction in leprosy using half of the flexor digitorum superficialis. J Hand Surg Eur Vol 2009 Aug; 33(4): 494-500.*

9. **Littler JW.** *Tendon transfers and arthrodesis in combined median and ulnar nerve paralysis. J Bone Joint Surg 1949; 31A:225.*

10. **Riordan DC.** *Tendon transplantations in median nerve and ulnar nerve paralysis. J Bone Joint Surg Am 1953; 35:312.*

11. **Zancolli EA.** *Claw hand caused by paralysis of the intrinsic muscles. A simple surgical procedure for its correction. J Bone Joint Surg Am 1957; 39A:1076.*

12. **Omer GE Jr.** *Injuries to nerves of the upper extremity. J Bone Joint Surg Am 1974; 56:1615-1624.*

13. **Burkhaler WE.** *Early tendon transfer in upper extremity peripheral nerve injury. Clin Orthop 1974; 104:68.*

14. **Rath S, Selles RW, Schreuders TA, et al.** *A randomized clinical trial comparing immediate active motion with immobilization after tendon transfer for claw deformity. J Hand Surg Am 2009 Mar; 34(3):488-94, 494e1-5.*

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2011

# Autologous fat graft in aging face

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Summary

## Autologous fat graft in aging face

**Autologous fat graft is becoming a widely used procedure in plastic surgery, thanks to its different and remarkable properties. In the 19th century the first techniques of autologous fat graft were described to treat congenital deformities and complex traumatic wounds with soft tissue loss after oncologic demolishing surgery. During the 20th century and the last 10 years, many studies have been published with the purpose to analyse the composition of adipose tissue and to discover its possible benefits. These studies allowed to shift its use from a simple filler to a more important role in regenerative medicine. Thus, autologous fat graft is now used for both reconstructive and aesthetic purposes. It is just in this "*regenerative context*" that the role of autologous fat graft fits in cosmetic medicine. More and more patients ask to treat aging effects on their body, and – especially – the request to obtain face rejuvenation is gradually growing. It is now understood that aging face is not simply a result of gravity, but also a result of volume loss secondary to the atrophy of tissues. Considering our experiences using autologous fat graft procedure in treatment of scar outcomes and burns, we have decided to use this procedure also in the field of aesthetic surgery and, particularly, in aging face treatment. From January 2010 to January 2011, we performed 32 autologous fat graft procedures to obtain facial rejuvenation in patients aged from 38 to 69 years, taking advantage of both filler and regenerative effect. This is a minimally invasive procedure, which allowed us to always observe important improvement in skin trophism, color, softness, plicability and elasticity. The procedure is well tolerated by patients and allows an almost immediate resumption of daily activities. The procedure has showed to be quick, relatively simple, painless and virtually free of complications, becoming increasingly used in aesthetic surgery, particularly in facial rejuvenation.**

***Key words:*** *Autologous fat graft, Aging face.*

## INTRODUCTION

Autologous fat graft is becoming a widely used procedure in plastic surgery, for its different and remarkable properties [1].

The indications of this procedure range from the aesthetic to the reconstructive surgery, considering both filler and regenerative effects of adipose tissue.

Historically, the use of fat to treat congenital deformities and complex traumatic wounds with soft tissue loss after oncologic demolishing surgery, was first proposed in 1893 by *Neuber* [2], by *Hollander* in 1912 [3], by *Neuhof* in 1923 [3] and *Josef* in 1931 [4].

Since 1980, several papers have highlighted different findings on fat transplantation obtained by liposuction [5], but adipose cell vitality has been a controversial subject, with survival rates ranging from 30% to 70% [6].

In 1992, *Coleman* described a new method to improve adipose cell survival and now his technique is one of the most widely used [1, 8].

At the same time, fat has been investigated and multiple microstructural studies have been developed. Adipose tissue showed to contain an extracellular matrix (e.g., collagen, laminin, fibronectin, growth factors) and cellular components (adypocytes and many other factors) [9]. Moreover, recent interest has focused on adipose stem cells, which are capable of differentiating into variable cell lineages, such as cartilage, bone, muscle and nerve [10-15].

The study of the composition and functions of adipose tissue has allowed to shift its use from a simple filler to a more important role in regenerative medicine [5]. Proven properties of tissue regeneration have been exploited for the treatment of dystrophic tissues and scar outcomes – as a result of trauma or surgery – in different areas of the body [7].

It is just in the "*regenerative context*" that the role of autologous fat graft fits also in cosmetic medicine.

More and more patients ask to treat aging effects on their body, and – particularly – the request to obtain face rejuvenation is frequently asked [16].

For years, face lifting has been the most used procedure to obtain facial rejuvenation, but patients have an increasing desire to undergo minimally invasive procedures with a short recovery time [5, 16].

It is now understood that aging face is not simply a result of gravity, but also a result of volume loss secondary to the atrophy of tissues [17].

Adipose tissue is an ideal substance for tissue augmentation: it is abundant in many people, it is easy and quick to be harvested and to be transplanted; it is an autologous component and – in this way – it is unable to elicit rejection reactions [18].

Our experiences using autologous fat graft procedure fits in the field of reconstructive surgery: correction of scar outcomes and burns [19-21]. Considering obtained results (improvement in skin trophism, elasticity, color, plicability), we have decided to use autologous fat graft also in the field of aesthetic surgery and, particularly, in aging face treatment.

In these cases, patients' main request is always to obtain facial rejuvenation through a minimally invasive procedure with short recovery time and, for these reasons, autologous fat graft is an optimal surgical technique. In our experience, we used this technique both alone and in association with other surgical procedures for the treatment of aging face, such as blepharoplasty and face lifting.

*UpDate in Plastic Surgery 2011; 4. 1, p. 5.*

## MATERIALS AND METHODS

From January 2010 to January 2011, we performed 32 autologous fat graft procedures to obtain facial rejuvenation in patients aged from 38 to 69 years.

We are used to perform the surgical procedure under local anesthesia and sedation assisted with sterile technique.

Abdomen and/or trochanteric areas are the donor sites selected for the abundant reserves of adipose tissue and the absence of postoperative outcomes.

After the preliminary incision of the skin, we proceed to the infiltration of the donor areas using a blunt cannula (infiltration of 100 mL saline solution, 10 mL of levobupivacaine 7,5 mg/mL, 20 mL of mepivacaine 10 mg/mL and 0.5 mL epinephrine 1 mg/mL).

Adipose tissue is harvested through the same incision with blunt cannulae connected with a Luer-lock syringe of 10 cc.

The syringes obtained are then placed in a centrifuge with re-sterilized containers and adipose tissue is processed following *Coleman's technique* (i.e. centrifugated at 3,000 rpm for 3 minutes). After this procedure, adipose tissue is separated into three distinct layers, and we eliminate the top layer (made of oil derived from the breakdown of fat cells) and the lower level (with damaged blood cells, water and anesthetic mixture), in this way preserving only adipocytes and stromal-vascular tissue. *"Purified"* adipose tissue is then transferred in a syringe 1 mL Luer-lock that allows precise control of the amount of injected fat and better handling.

The adipocyte fraction is injected using an 18-gauge angiographic needle with a snap-on wing (*by Cordis®, a Johnson & Johnson Company, N.V. 9301 LJ, Roden, Netherlands*).

The adipose tissue fraction is always inserted into the dermo-hypodermic junction in all cases, with the use of small syringesdescribed above. Through the same incision many radiating passages are made, in order to distribute fat in different directions according to an ideal form of a web to support superficial tissues.

This technique seems to allow better fat graft survival, to increases rooting and to minimize the possibility of forming cysts filled with triglycerides. The amount of tissue grafted depends on the extension of the area that has to be treated. The amount of injected fat at each passage is minimized to avoid irregularities and clusters, which are eventually deleted with digital manipulation after procedure.

Injection is performed with retrograde tech-

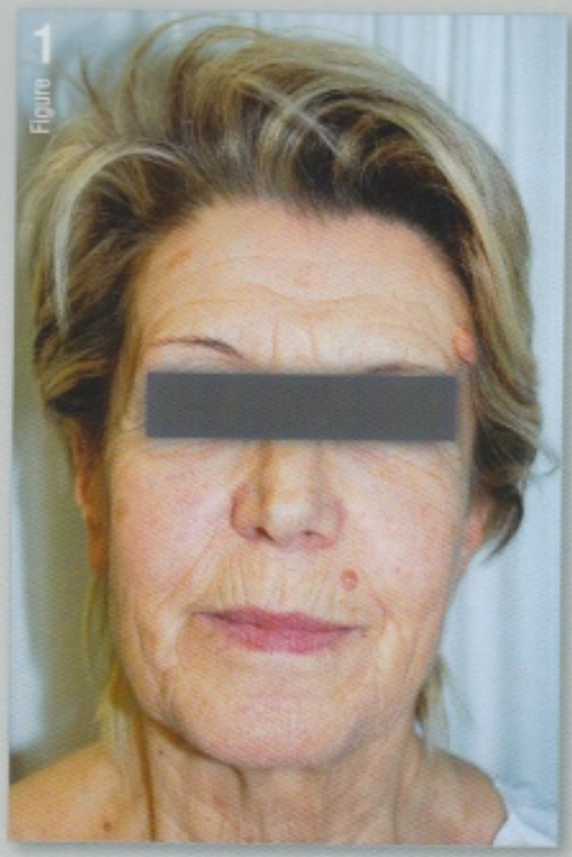


**Figure 1.**

The patient underwent to surgical procedure of autologous fat graft at nasolabial folds, chin and cheekbones. Preoperative view.

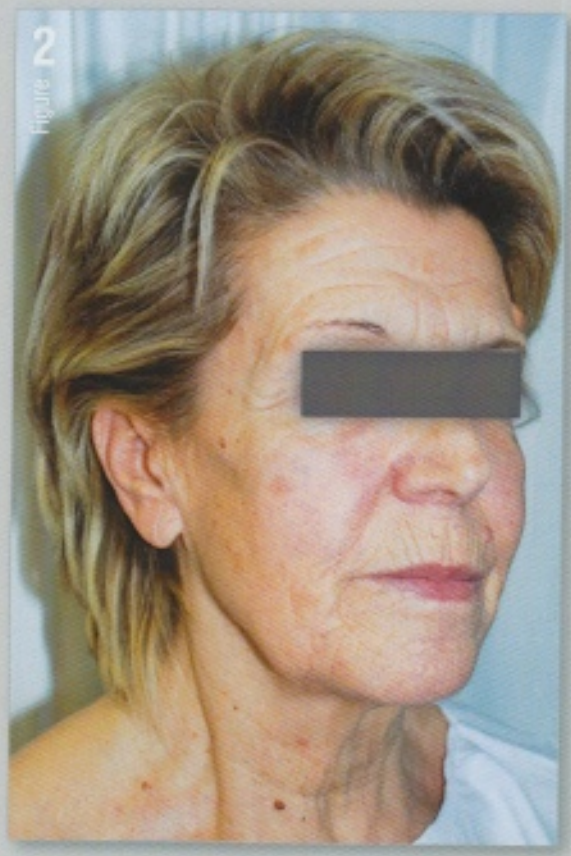


**Figure 2.**

Preoperative view.

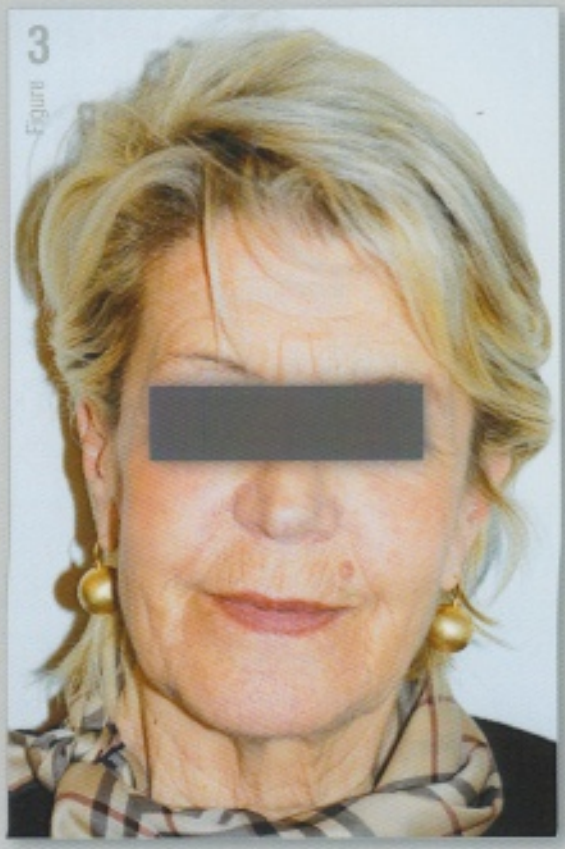


**Figure 3.**

Postoperative view at *2 months follow-up.*

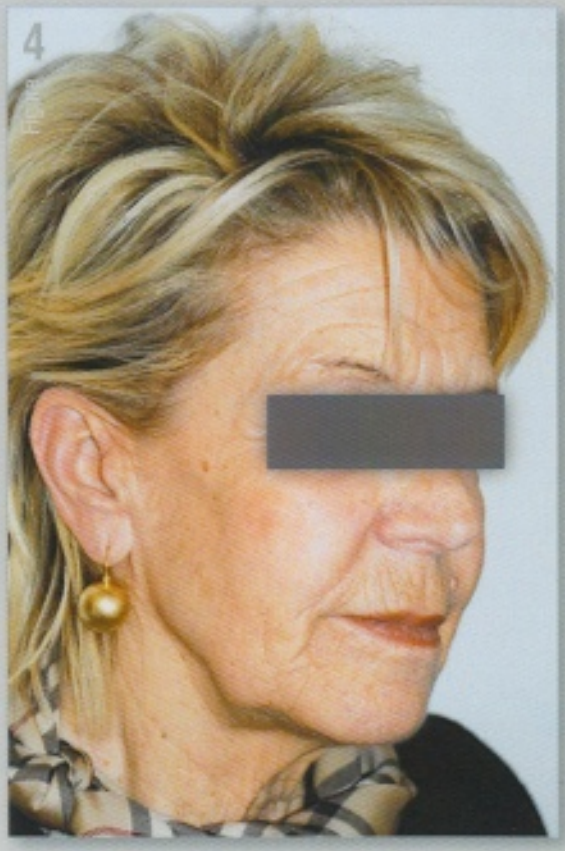


**Figure 4.**

Postoperative view at 2 months follow-up.

nique leaving a very small space between the injected tissue lines. We treat most frequently those areas which are classically subjected to aging effects: nasolabial folds, chin, lips and cheekbones.

The access incisions in the donor areas are sutured with nylon 4/0. Abdomen and/or trochanteric areas are medicated with an elastic-compressive dressing that must be kept in place for 5 days. In all cases, patients are discharged the same day of surgery.

## RESULTS

In all patients we obtained a successful cosmetic result. While the filler effect is evident immediately after procedure, the regenerative effect seems to start about 1 week after surgery and to give a continuous improvement for at least 1 month. We always noted important improvement in skin trophism, color, softness, plicability and elasticity, thus obtaining a significant rejuvenation effect. At fifth post-operative day follow-up, patients never reported pain both in donor and recipient sites.

We have never had any complication, neither *major (such as damage to facial structures or* infection of surgical site) nor minor. The only reported side effect is, in almost all patients, the presence of minimal ecchymosis which disappear in 5-6 days.

## DISCUSSION

In our experience in aesthetic surgery, we decided to use autologous fat graft not only as a mere filler, but also as a stimulus for tissue regeneration, particularly in treating aging face.

Autologous fat graft procedure showed to respond excellently to request from patients who want to obtain face rejuvenation with minimally invasive procedure.

This technique, used both alone and in association with other surgical procedures for the treatment of aging face – such as blepharoplasty and face lifting – has showed to be quick, relatively simple, painless and virtually free of complications. Patients are discharged in the same day of procedure and are able to resume normal daily activities already the day after surgery, thus minimizing discomfort related to the procedure.

Patients are generally satisfied considering aesthetic results both in a early and late follow-up

## CONCLUSIONS

We think that autologous fat graft is the ideal procedure for patients who want to undergo minimally invasive surgery for facial rejuvenation also if associated with blepharoplasty or face lifting.
Considering aging face, autologous fat graft is becoming widely performed to achieve long-glasting regeneration effects without undergoing invasive surgery.

## REFERENCES


1. **Coleman SR.** *Facial augmentation with structural fat grafting. Clin Plast Surg 2006; 33:567.*

2. **Neuber F.** *Fettransplantation. Chir Kongr Verhandl Dsch Gesellch Chir 1893; 22:66.*

3. **Neuhof H.** *The transplantation of tissues. New York Appleton et Comp 1923.*

4. **Josef J.** *Nasenplastic und sonstige Gesichtplstik nebst einem anhang ueber mammaplstik und einige weitere Operationem aus dem Gebiete der ausserem K-rperplastik, ein atlas und ein lehrbuch Berlin 1931.*

5. **Billings E Jr, May JW Jr.** *Historical review and present status of free fat graft autotransplantation in plastic and reconstructive surgery. Plast Reconstr Surg 1989; 83:368.*

6. **Von Heimburg D, Hemmrich K, Haydarlioglu S, et al.** *Comparison of viable cell yield from excised versus aspired adipose tissue. Cells Tissues Organs 2004; 178:87.*

7. **Klinger M, Caviggioli F, Forcellini D, et al.** *Scars: a review of emerging and currently available therapies. Plast Reconstr Surg 2009; 124:330.*

8. **Coleman SR.** *Long-term survival of fat transplants: controlled demonstrations. Aesthetic Plast Surg 1995; 19:421.*

9. **Zuk PA, Zhu M, De Ugarte DA, et al.** *Human adipose tissue is a source of multipotent stem cells. Mol Biol Cell 2002; 13:4279.*

10. **Erickson GR, Gimble JM, Franklin DM, et al.** *Chondrogenic potential of adipose tissue-derived stromal cells in vitro and in vivo. Biochem Biophys Res Commun 2002; 290:763.*

11. **Huang CY, Reuben PM, D'Ippolito G, et al.** *Chondrogenesis of human bone marrow-derived mesenchymal stem cells in agarose culture. Anat Rec A Discov Mol Cell Evol Biol 2004; 278:428.*

12. **Seo MJ, Suh SY, Bae YC, et al.** *Differentiation of human adipose stromal cells into hepatic lineage in vitro and in vivo. Biochem Biophys Res Commun 2005; 328:258.*

13. **Safford KM, Hicok KC, Safford SD, et al.** *Neurogenic differentiation of murine and human adipose-derived stromal cells. Biochem Biophys Res Commun 2002; 294:371.*

14. **Ashjian PH, Elbarbary AS, Edmonds B, et al.** *In vitro differentiation of human processed lipoaspirate cells into early neural progenitors. Plast Reconstr Surg 2003; 111:1922.*

15. **Mizuno H, Zuk PA, Zhu M, et al.** *Myogenic differentiation by human processed lipoaspirate cells. Plast Reconstr Surg 2002; 109:199.*

16. **Glashofer M, Lawrence N.** *Fat transplantation for treatment of the senescent face. Dermatol Ther 2006; 19:169.*

17. **Coleman SR.** *Facial recontouring with lipostructure. Clin Plastic Surg 1997; 24:347.*

18. **Van RL, Bayliss CE, Roncari DA.** *Cytological and enzymological characterization of adult human adipocyte precursors in culture. J Clin Invest 1976; 58:699.*

19. **Caviggioli F, Maione L, Forcellini D, et al.** *Autologous fat graft in post mastectomy pain syndrome. Plast Reconstr Surg 2011. In press.*

20. **Caviggioli F, Klinger F, Forcellini D, et al.** *Scar treatment by lipostructure. Update in Plastic Surgery 2009; 2:51.*

21. **Klinger M, Marazzi M, Vigo D, et al.** *Fat injection for cases of severe burn outcomes: a new perspective of scar remodeling and reduction. Aesthetic Plast Surg 2008; 32:465.*


*Devices used in this study: Coleman's original kit for lipostructure and 18G needle, Cordis®, a Johnson & Johnson Company, N.V. 9301 LJ, Roden, Netherlands.*
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# Sentinel lymph node biopsy in clinically node-negative patients with T1 and T2 squamous cell carcinoma of the oral cavity

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Summary

## Sentinel lymph node biopsy in clinically node-negative patients with T1 and T2 squamous cell carcinoma of the oral cavity

**BACKGROUND: The status of the cervical lymph nodes is the most important prognostic factor in patients with head and neck squamous cell carcinoma (SCC). SLNB has been proposed as a technique to increase the identification of occult metastatic disease in treatment of N0 patients.**
**AIM: Determine the reliability of sentinel lymph node biopsy as a staging system for guiding decisions about neck treatment in patients with squamous cell carcinoma of oral cavity.**
**MATERIAL AND METHODS: A prospective study of 40 consecutive patients with N0 squamous cell carcinoma of the oral cavity that underwent lymphoscintigraphy and SLN biopsy.**
**RESULTS: Lymphoscintigraphy and gamma probe radiolocalization accurately identified 1 or more SLNs in all 40 patients. In 2 (5%) of the 40 patients, the SLN correctly identified metastatic disease. In no instance was the SLN negative when the lymphadenectomy specimen was positive.**
**CONCLUSION: SLN biopsy in SCC of the oral cavity is a feasible and minimally invasive diagnostic tool. SLNB is more reliable at detecting occult metastases and predicting survival than physical examination and conventional imaging.**

*Key words: Neck dissection; Sentinel lymph node; Cervical metastases; Oral neoplasm*

## Introduction

Oral cavity squamous cell carcinoma is the sixth leading cause of cancer worldwide [1]. It accounts for 0.6% to 5% of all cancers in most western reports and up to 17% of cancers in Egypt [2].
Since the most common route of spread for metastatic squamous cell carcinoma is lymphatic, it has been widely accepted that the histopathologic status of cervical lymph nodes represent the most important prognostic factor for patients with squamous cell carcinoma of the head and neck. Thus, accurate staging of cervical lymph nodes is a crucial step in the surgical planning of these cancers [3].
Therefore, if metastases in the regional lymph nodes are discovered, neck dissection (± radiotherapy) should be performed [4]. This is based on the relatively high incidence of occult metastasis in N0 patients, and on the better survival rate for them than for those with clinically evident disease [5]. However, elective neck dissection may expose a large percentage of patients to unnecessary functional and aesthetic complications as the incidence of occult lymph nodes metastases ranges only between 10% and 30% [6,7].
Traditionally, clinical palpation has been the mainstay of determining the presence of nodal metastasis [8].
Magnetic resonance imaging, computed tomography and ultra sound guided needle biopsy have a sensitivity of only about 70% in detecting non-palpable regional disease [9].
The sentinel lymph node biopsy is emerging as an alternative tool for staging the neck following its successful application in melanoma [10] and breast cancer [11]. The concept behind this is that the histological analysis of sentinel lymph node, which is defined as the first lymph node that receives metastases from a tumor of a specific site, is able to predict the presence or absence of occult metastatic disease and therefore can be used to select patients who will benefit from elective neck treatment [12].
The aim of this study is to determine the reliability of sentinel lymph node biopsy as a staging system for guiding decisions about neck treatment in patients with squamous cell carcinoma of oral cavity with clinically negative cervical lymph nodes.

## PATIENTS AND METHODS

### Patients' Criteria

Forty patients with pathologically confirmed primary squamous cell carcinoma of the oral cavity with no evidence of cervical lymph node metastases (clinical and radiologic evaluation) were included.
Recurrent cases and patients with any clinical or radiological evidence of distant metastases were excluded. In addition, any patient who had previous treatment of the neck (irradiation or surgery) or any procedure that could have disrupted lymphatic drainage to the regional nodal basin was also excluded.

### Methods

Preoperative lymphoscintigraphy was done on the day before surgery, to identify all lymph nodes at risk for disease and to localize the sentinel lymph node. 1 mCi (20 MBq) $^{99m}$Tc human serum albumin nanocolloid [*NANOCOLL®; Amersham Cygne, Eindhoven, the Netherlands, labeled with $^{99m}$Tc*] was injected peri-tumor at two different points. Immediately After tracer injection, dynamic imaging in the antero-posterior plane was done using a standard large-field-of-view gamma camera (*GE Starcam; GE Medical*

*Systems, France*) is performed to follow the course of the lymphatic collecting vessels until they reach the draining sentinel nodes (the first and with highest radioactive uptake after the site of the tracer injection) and continued for 30 minutes at a frame rate of 60 sec/image. Multiple static scintigrams of the radioactive nodes in the antero-posterior and lateral planes were taken after 30 minutes.

The general locations of sentinel lymph node(s) were detected using a radioactive ($^{99m}$Tc) source in all patients where the source was moved on the neck of the patients until its position overlaid that of a radioactive node. Finally, marking of the detected node(s) using a permanent ink pen is done directly on the skin of the patient (Figure 1).

Patients were scheduled for surgery on the next day. A careful palpation of the neck was routinely performed under general anesthesia. All patients underwent intra-lesional injection of 1 ml 2.5% patent blue and the handheld gamma probe (*semiconductor cadmium telluride (cd-te) crystal 2002, Gamma Sonics, Australia*) was used transcutaneously to assess the sentinel lymph node.

The sentinel lymph node was explored through a 2-3 cm incision and identification was confirmed by methylene blue dye visualization and radio-localization using the handheld gamma probe. Avoidance of overlapping and scattering of the radioactivity from the primary site was achieved by placing a lead shield on the primary tumor, changing the angulations of the handheld gamma probe directing it away from the primary tumor and shielding the hand piece from the scattering radioactivity by adding a collimator (Figure 2ab).

The primary tumor was then excised with safety margin according to its stage and then elective neck dissection of level I, II and III was performed.

The SLN(s) was measured, bisected, or serially sectioned at 2- to 3-mm intervals along its long axis (depending on size) and submitted in toto in 1 or more cassettes. Each layer was stained with hematoxylin-eosin and cytokeratin and then evaluated by the same pathologist for the presence of metastatic disease. The remaining lymphadenectomy specimens (when neck dissection was performed) were oriented using sutures and labeled as to the lymph node groups they represented (according to the standard numerical designation of lymph node groups in the neck).

The lymph nodes from these specimens were measured, submitted *in toto* (whole, bisected, or serially sectioned, depending on size) in 1 or more cassettes, and stratified as to which level they represented. The reference pathologist then reported on the lymphadenectomy specimen in a standard fashion. The report included the number of lymph nodes from each group, the number of involved nodes and the level at which they were located, the size of the largest metastatic focus, and the presence or absence of extracapsular spread. The findings of pathologic analysis of the SLN were then compared with those of the rest of the lymphadenectomy specimen.

Follow-up was scheduled every 6 months for 1 year. Follow-up included clinical evaluation and computed tomography scanning.

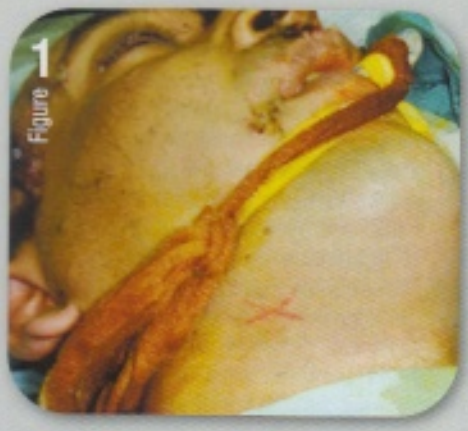


**Figure 1**
Marking of SLN by permanent ink.

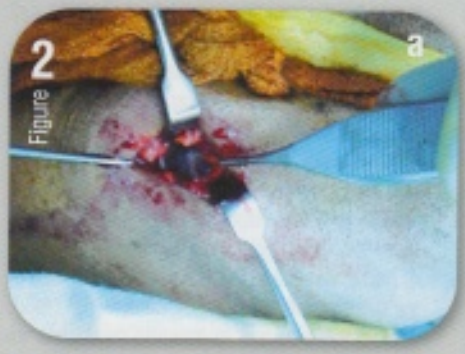


**Figure 2.**
Cervical blue stained SLN
(a) before and (b) after excision.

## RESULTS

Our study included 40 patients (24 males and 16 females) with histopathologically proven squamous cell carcinoma of the oral cavity and perioral region and no clinical or radiologic evidence of cervical lymph node metastases. The study was performed in the period between 2008 and 2010. Sentinel lymph node mapping was done in the nuclear medicine section of radiology department at Ain-Shams Specialized Hospital.

Surgical operations were done in *Plastic and*

**Table 1. Patients fulfilling the inclusion criteria.**

| | Number of cases | Number of SLNs | Levels | | | | Number and Level of +ve nodes |
|---|---|---|---|---|---|---|---|
| | | | Ia | Ib | II | Others | |
| Buccal mucosa | 8 | 8 | - | 8 | - | - | 1 (Ib) |
| Lower lip | 16 | 20 | 2 | 18 | - | - | - |
| Alveolar ridge | 1 | 1 | - | 1 | - | - | - |
| Tongue | 12 | 14 | 2 | 4 | 8 | - | 1 (II) |
| Floor of mouth | 3 | 3 | - | 2 | 1 | - | - |
| TOTAL | 40 | 46 | 4 | 33 | 9 | 0 | 2 |

*Reconstructive Surgery Department, Ain Shams University.*

Patients' ages ranged from 5 to 80 years, with a mean age of 45.6 ±17.4 years.

The anatomical sites of the primary tumors were as follows; lower lip in 16 patients (40%), tongue in 12 patients (30%), floor of mouth in 3 patients (7.5%), alveolar ridge in 1 patient (2.5%) and buccal mucosa in 8 patients (20%). The T stage at presentation was as follows: T1 in 26 patients, T2 in 24 patients (Table 1).

Lymphoscintigraphy showed at least one hot spot in all cases (identification rate = 100%) with a total number of 46 hot spots; one spot in 37 patients and 3 hot spots in 3 patients. It was likely that the radioactive tracer spread distal to the SLN; however, the hot spots were considered as possible SLNs for the purposes of this study, and all were removed separately. A total of 46 sentinel lymph nodes were removed and sent for histological analysis. All sentinel nodes were found in ipsilateral neck to primary tumors with bilateral drainage in 2 patients with central lip tumor (cases 2 and 10). Thus, all cases (100%) showed concordance between both preoperative lymphoscintigraphy and intraoperative methylene blue localization of sentinel lymph nodes.

Frozen-section histological analysis was done in all patients as regard safety margin of the tumor and presence of metastatic disease in SLNs. For the primary tumors all surgical margins were free for all cases and this was confirmed later with paraffin section.

For the SLNs, in 2 cases (cases 5 and 11), occult metastases were discovered in their sentinel lymph nodes located in level II and level Ib respectively. In these 2 patients, metastatic disease was confirmed in SLNs by paraffin section using hematoxylin and eosin staining (H&E).

For the rest of the lymphadenectomy specimen in case number 11 (+ve SLN at level Ib) nodal metastases were restricted to the SLN alone. While in case number 5 (+ve SLN at level II), 2 other positive nodes at the same level were detected. And thus the rate of occult metastasis in the study is 5%.

All patients were re-evaluated every 6 months for year using both clinical palpation and CT scan to detect recurrence or nodal metastases. The mean follow-up ranged between 6-17 months (mean 6.25) after the sentinel node biopsy.

At the end of the follow-up period, 39 patients were free; showed no evidence of nodal recurrence and did not develop subsequent disease. Only 1 patient developed both local and nodal recurrence.

## DISCUSSION

Despite many advances in diagnosis and treatment of SCC, survival rates have not improved significantly in decades.

Therefore, approaching a case of SCC will require a thorough understanding of the cause, pathogenesis and proper identification of high-risk patients [13]. The primary tumor site, depth of invasion, histological grade of the tumor, and TNM classification are well-recognized prognostic factors for SCC [14].

Apart from the many prognostic factors reported, the status of the regional lymph node is considered the most important prognostic factor in the management of squamous cell carcinoma of oral cavity and perioral region [15].

The presence of neck disease should be identified and addressed during the initial evaluation and treatment of the patient to identify patients who are at risk of regional recurrence and thus are candidates for neck dissection [16].

Traditionally for staging, clinical palpation has been the mainstay of determining the presence of nodal metastasis. More recently, because of the relative unreliability of clinical palpation, centers have turned to imaging modalities as U/S, CT, MRI and PET scan to locate the presence of nodal disease [17]. However they cannot replace histopathological staging of the neck as they cannot achieve good sensitivity for the detection of metastatic lymph nodes without losing high specificity [18, 19].

In a preliminary study on sentinel lymph node biopsy done by *Chikamatsu and coworkers* [4], 5 out of 11 patients were considered to have positive lymph nodes as a result of physical examination; only 4 of them proved to have pathologically positive nodes.

CT scan revealed 1 false negative patient and 3 false positive patients. The authors concluded that physical examination and CT scan are not helpful in detecting occult cervical lymph node metastases.

In the context of the controversy over a uniform diagnostic and therapeutic concept for the management of N0 necks; the need for less invasive and more effective means of detection of metastases is needed to avoid a surgical procedure that is often useless and sometimes leads to undesirable sequels [20].

*Cabanas* [21] stated that a limited number of first echelon nodes are the first recipients of micrometastasis. These nodes are considered to be SLNs. If lymphatic spread occurs, the SLN should be the first involved. All other nodes are reached subsequently.

Accordingly, the histological status of the SLN should then predict the presence or absence of micro-metastatic disease in the remainder of the lymphatic basin.

In the present study we tested the reliabilty of the pathological status of the sentinel lymph node in comparison to that of the neck. The results of our study indicate that SLN radiolocalization is technically feasible for oral cavity and perioral SCC. They indicate a strong predictive ability of neck status based on SLN biopsy. The results of the histological examination of the SLNs compared with those of the neck dissection specimens demonstrated an excellent negative predictive value (100%). Importantly, there were no false-negative SLNs in our study; i.e., there was no presence of a negative SLN in the presence of positive neck dissection results.

In our study, occult metastatic disease was found in the sentinel lymph node in 2 of 40 patients (5%) which is consistent with the reported rates of micrometastatic disease in N0 SCC of the oral cavity [22-25]. Selective neck dissection *"levels I, II and III"* showed no other lymph node involvement throughout the lymphatic basin in except in one patient.

This supports the theory of the SLN as the first encountered in the sequential drainage of the primary tumor site.

*Rigual et al.* [25] studied 20 patients with oral cavity SCC. The neck staging in these patients consisted of palpation and CT imaging. Sentinel nodes were identified in all patients. Ten patients were up-staged by SLNB, indicating that conventional imaging failed in 50% of the patients. This study found the sensitivity of SNB to be 83% and the specificity to be 100%.

*Amézaga, et al.* [27] reported that SNB was effective in 24 of 25 cases (96%). SNB revealed hidden metastasis in 4 (16%) of the cases considered clinically to be free of disease.

Of the 40 cases included in our series, sentinel lymph node biopsy resulted in a correct diagnosis of 40 of 40 patients. 38 turned out to be true negative and 2 true positive cases. Thus, the sensitivity of SLN biopsy was 100% (2/2), specificity of 100% (38/38) positive and negative predictive values 100%.

The overall accuracy of the technique is therefore 100 % (40/40), with no false positive and negative results.

In our study all patients were disease free all over the follow-up period and we had no false negative result in which nodal recurrence occurred in previously tumor-negative SLN. Nodal recurrence which developed after 8 months in case number 8 (tumor-negative SNB) may have resulted from spread from the local recurrence. In the present study, lymphoscintigraphy after peritumor submucosal injection of the radioactive tracer yielded excellent results. All 40 patients had 1 or

more hot spots identified and marked on the skin. All SLNs identified preoperatively were successfully located intraoperatively. No SLNs were identified intraoperatively that had not been detected by preoperative lymphoscintigraphy. The skin marking increased the speed of acquisition of the SLNs.

In our study; we used $^{99m}$Tc human serum albumin which has a small molecular size (50 nm). It demonstrated fast washout rates from injection sites and good definition of lymph channels with reliable identification of sentinel lymph nodes in early images. Our study supports the theory of *Taylor, et al.* [28], that the use of small volumes of radioactive tracer increases the likelihood of capturing those lymphatics that drain the primary tumor. Larger injected volumes associated with higher tissue pressures would be expected to diffuse more widely, potentially involving other lymphatic channels unrelated to the primary tumor. Many Authors have found "*skip metastases*", in which the disease will bypass levels I and/or II and go directly to level III or IV ranging from 10-16% [29-31]. We did not identify any cases draining only to the contralateral side or with drainage to unpredictable sites. The findings of our study are in keeping with those of previous reports of SLN radiolocalization and SLN biopsy in oral cavity and oropharyngeal SCC [32-34].

## CONCLUSION

In this study, the technique of lymphoscintigraphy with SLN biopsy in N0 SCC of the oral cavity and oropharynx accurately identified the presence or absence of occult metastasis in all 20 patients. Sentinel lymph node biopsy is feasible and appears to accurately predict the presence of occult metastatic disease. Therefore, SLN biopsy could potentially guide head and neck oncologists to the patients with N0 disease who would benefit most from selective neck dissection and prevent the morbidity of unnecessary surgery in truly N0 patients.

## REFERENCES


1. **Landis SH, Murray T, Bolden S, et al.** *Cancer statistics, 1999. CA Cancer J Clin 1999; 49:8-31*

2. **Bolkainy M.** *Head and neck cancer. Topographic pathology of cancer. NCI Cairo University 2000; 7-22.*

3. **Vartanian JG, Pontes E, Agra IM, et al.** *Distribution of metastatic lymph nodes in oropharyngeal carcinoma and its implications for elective treatment of the neck. Arch Otolaryngol Head Neck Surg 2003; 129: 729-32.*

4. **Chikamatsu K, Kamada H, Ninomiya H, et al.** *A preliminary study on sentinel lymph node biopsy: feasibility and predictive ability in oral cavity cancer. Ann Nucl Med 2004; 18(3):257-262.*

5. **Take Y, Umeda M, Teranobu O, et al.** *Lymph node metastases in hamster tongue cancer induced with 9, 10-dimethyl-1, 2-benzanthracene (DMBA): association between histological findings and the incidence of neck metastases, and the clinical implications for patients with tongue cancer. Br J Oral Maxillofac Surg 1999; 37:29-36.*

6. **Robbins KT.** *Neck metastasis. In: Gates GA, ed. Current Therapy in Otolaryngology-Head and Neck Surgery. 5th ed. St Louis, Mo: Mosby-Year Book Inc; 1994:309-315.*

7. **Woolgar JA, Beirne JC, Vaughn ED, et al.** *Correlation of histopathologic findings with clinical and radiologic assessments of cervical lymph-node metastases in oral cancer. Int J Oral Maxillofac Surg 1995; 24:30-37.*

8. **O'Brien CJ, Traynor SJ, McNeil E, et al.** *The use of clinical criteria alone in the management of the clinically negative neck among patients with squamous cell carcinoma of the oral cavity and oropharynx. Arch Otolaryngol Head Neck Surg 2000; 126:360-65.*

9. **Hao SP, Ng SH.** *Magnetic resonance imaging versus clinical palpation in evaluating cervical metastasis from head and neck cancer. Otolaryngol Head Neck Surg 2000; 123:324-27.*

10. **Morton DL, Wen DR, Wong JH, et al.** *Technical details of intraoperative lymphatic mapping for early stage melanoma. Arch Surg 1992; 127:392-99.*

11. **Giuliano AE, Dale PS, Turner RR, Morton DL, et al.** *Improved axillary staging of breast cancer with sentinel lymphadenectomy. Ann Surg 1995; 225:394-99.*

12. **Stoeckli SJ, Steinert H, Pfaltz M, Schmid S.** *Sentinel lymph node evaluation in squamous cell carcinoma of the head and neck. Otolaryngol Head Neck Surg 2001; 125:221-26.*

13. **Silverman S Jr.** *Oral cancer. 5th edition. Hamilton. (Ontario, Canada): B.C. Decker; 2003. p. 1-128.*

14. **Okada Y, Mataga I, Katagiri M, Ishii K.** *An analysis of cervical lymph nodes metastasis in oral squamous cell carcinoma: relationship between grade of histopathological malignancy and lymph nodes metastasis. Int J Oral Maxillofac Surg. 2003; 32:284-88.*

15. **Layland MK, Sessions DG, Lenox J.** *The influence of lymph node metastasis in the treatment of squamous cell carcinoma of the oral cavity, oropharynx, larynx and hypopharynx: N0 versus N+. Laryngoscope 2005; 115: 629-39.*

16. **Sobin LH, Wittekind CH, eds.** *International Union against Cancer: TNM Classification of Malignant Tumors. 6th ed. New York: Wiley, 2002.*

17. **Stuckensen T, Kovacs AF, Adams S, et al.** *Staging of the neck in patients with oral cavity squamous cell carcinomas: a prospective comparison of PET, ultrasound, CT and MRI. J Craniomaxillofac Surg 2000; 28:319-24.*

18. **Curtin HD, Ishwaran H, Mancuso AA, et al.** *Comparison of CT and MR imaging in staging of neck metastases. Radiology 1998; 207:123-30*

19. **Casteljns JA, van den Brekel MW.** *Imaging of lymphadenopathy in the neck. Eur Radiol 2002; 12:727-38.*

20. **Laverick S, Lowe D, Brown JS, et al.** *The impact of neck dissection on health-related quality of life. Arch Otolaryngol Head Neck Surg 2004; 130:149.*

21. **Cabanas RM.** *An approach for the treatment of penile carcinoma. Cancer. 1977; 39:456-466.*

22. **Shingaki S, Kobayashi T, Suzuki I, et al.** *Surgical treatment of stage I and II oral squamous cell carcinomas: analysis of causes of failure. Br J Oral Maxillofac Surg 1995;33:304-308.*

23. **Shah JP, Anderson PE.** *Evolving role of modifications in neck dissection for oral squamous carcinoma. Br J Oral Maxillofac Surg 1995; 33:3-8.*

24. **McGuirt WF, Johnson JT, Myers EN, Rothfield R, Wagner R.** *Floor of mouth carcinoma: the management of the clinically negative neck. Arch Otolaryngol Head Neck Surg. 1995; 121:278-282.*

25. **Hart RD, Nasser JG, Trites JR, et al.** *Sentinel Lymph Node Biopsy in N0 Squamous Cell Carcinoma of the Oral Cavity and Oropharynx. Arch Otolaryngol Head Neck Surg 2005; 131:34-8.*

26. **Rigual N, Douglas W, Lamonica D, et al.** *Sentinel lymph node biopsy: a rational approach for staging T2N0 oral cancer. Laryngoscope 2005; 115:2217-20.*

27. **Amézaga JA, Herrero LB, Zubizarreta JP, et al.** *Diagnostic efficacy of sentinel node biopsy in oral squamous cell carcinoma. Cohort study and meta-analysis. Med Oral Patol Oral Cir Bucal 2007; 12:E235-43.*

28. **Taylor RJ, Wahl RL, Sharma PK, et al.** *Sentinel node localization in oral cavity and oropharynx squamous cell cancer. Arch Otolaryngol Head Neck Surg. 2001; 127:970-974.*

29. **Alex JC, Sasaki CT, Krag DN, et al.** *Sentinel lymph node radiolocalization in head and neck squamous cell carcinoma. Laryngoscope 2000; 110:198-203.*

30. **Byers RM, Weber RS, Andrews T, et al.** *Frequency and therapeutic implications of "skip metastases" in the neck from squamous cell carcinoma of the oral tongue. Head Neck 1997; 19:14-9.*

31. **Woolgar JA.** *Pathology of the N0 neck. Br J Oral Maxillofac Surg 1999; 37:205-9.*

32. **Kontio R, Leivo I, Lepparen E, Atula T.** *Sentinel lymph node biopsy in oral cavity squamous cell carcinoma without clinically evident metastasis. Head Neck. 2004; 26:16-21.*

33. **Alex JC.** *The application of sentinel node radiolocalization to solid tumors of the head and neck: a 10-year experience. Laryngoscope. 2004; 114:2-19.*

34. **Civantos FJ, GomezC, Duque C, et al.** *Sentinel node biopsy in oral cavity cancer: correlation with PET scan and immunohistochemistry. Head Neck 2003; 25:1-9.*

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# Breast asymmetry: Is it a difficult task?

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Summary

## Breast asymmetry: Is it a difficult task?

**BACKGROUND: Breasts are an integral part of feminine beauty and breast symmetry is a key to beautiful form. Severe breast asymmetry can be psychologically disturbing, especially for teenagers. Correction of breast asymmetry may present a challenge for plastic surgeons.**
**PATIENTS AND METHODS: 72 cases of breast asymmetry complaining of varying degree and etiology of breast asymmetry, treated between December 2009 and December 2012. Their age ranged from 18 to 65 years, with the mean age was 34 years. Every patient conducted doctor interview for good psychological analysis. Preoperative clinical assessment of the specific anatomical deformity, a good surgical plan, subsequent surgical treatment modalities, esthetic outcome, and patient's satisfaction were evaluated. Surgical modalities used in this series included augmentation mammaplasty, reduction mammaplasty, mastopexy, T.R.A.M flap, multiple z plasties, Thoracodorsal flap, and nipple and areola reconstruction. All patients were done under general anesthesia.**
**RESULT: 25% patients (18/72) had breast asymmetry after mastectomy, 20.8 % patients (15/72) had virginal hypertrophy asymmetry, 16.7 % patients (12/72 ) presented by breast asymmetry after burn, 12.5% patients (9/72) presented by bilateral developmental hypoplasia with small-volume asymmetry, 12.5% patients (9/72) had Poland's syndrome, 8.3% patients (6/72) had a iatrogenic breast asymmetry following breast surgery and 4.2% patients (3/72) presented by breast asymmetry following hemitrunk atrophy. 9 of 72 patients were found to have a minor complication, whereas 2 of 72 were found to have a major complication.**
**CONCLUSION: The common cause of breast asymmetry that ultimately undergo surgery in Upper Egypt was post mastectomy and the least type was breast asymmetry following hemitrunk atrophy. Patients' satisfaction were 83.3%, while 73% was the physician' satisfaction. The keys to successful treatment are to define the nature of the asymmetry, respect the aesthetic goals of the patient, and perform a well thought out surgical plan.**

*Key words: Breast asymmetry, patients' and physicians' satisfaction, Poland's syndrome, augmentation mammoplasty.*

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## INTRODUCTION

The female breast is an important symbol of femininity. Socio-cultural influences motivate individuals to seek surgical intervention for breast asymmetry [1, 2]. Breast asymmetry is defined as a difference in contour, position and/or volume of the breast [3-5]. It may be primary or secondary to thoracic deformity [6-8]. Breast asymmetry represents one of the most difficult challenges in the field of cosmetic breast surgery, and it is present in over two-thirds of females [9-13]. Minimal degree of breast asymmetry is very frequent, while marked degree of difference between the breasts that leads to surgical correction is rare [14,15]. Most women 50-88%, depending on the studies, have some degree of unnoticeable asymmetry. The etiology of mild breast asymmetries is unknown, and they are called 'idiopathic breast asymmetry [9,16]. The left breast is usually wider and more ptotic than the right breast, although there is no difference in the areola or nipple [11]. Several Authors have proposed various surgical procedures for the management of breast asymmetry, even by using a different technique on each breast [9,17-21].
There is no definitive solution has yet been found, particularly in cases in which there is an associated skeletal deformities in which it is difficult to achieve a satisfactory results, although a wide range of classifications and related surgical strategies are available [10, 20-22].

## THE AIMS OF THIS STUDY ARE:

1. To analyze the clinical patterns of breast asymmetry,
2. To determine the common causes of breast asymmetry in Upper Egypt,
3. To compare degree of patients' and physicians' satisfaction after surgical correction.

## PATIENTS AND METHODS

### Inclusion criteria:

1. The age of patients was from 18 years to 65years old
2. Patients came from December 2009 to December 2012.

### Exclusion criteria:

1. Patients under 18 years, or over 65 years old,
2. Cancer breast with visceral or skeletal metastasis,
3. Patients with any thrombo-embolic disorders,
4. Immune compromised patients as autoimmune disease,
5. Patients who were unable to complete the second stage due to a complication.

72 patients presented to the plastic surgery department, Assiut university hospital by breast asymmetry of different etiologies (Figure 1) in a period from December 2009 to December 2012.
Their age ranged from 18years to 65 years; with the mean age was 34 years.
All patients were properly assessed through a history taking, include history of trauma or change in bra size and also proper psychological assessment to exclude depression or aberrant behavior.

### Physical examination include the following:

1. Examine the entire thorax for signs of chest hypoplasia, skeletal deformities or muscular abnormalities,
2. Measure and record the distance from sternal notch to nipple and the base width of each breast,
3. Determine if there is a discrepancy of inframammary fold levels.

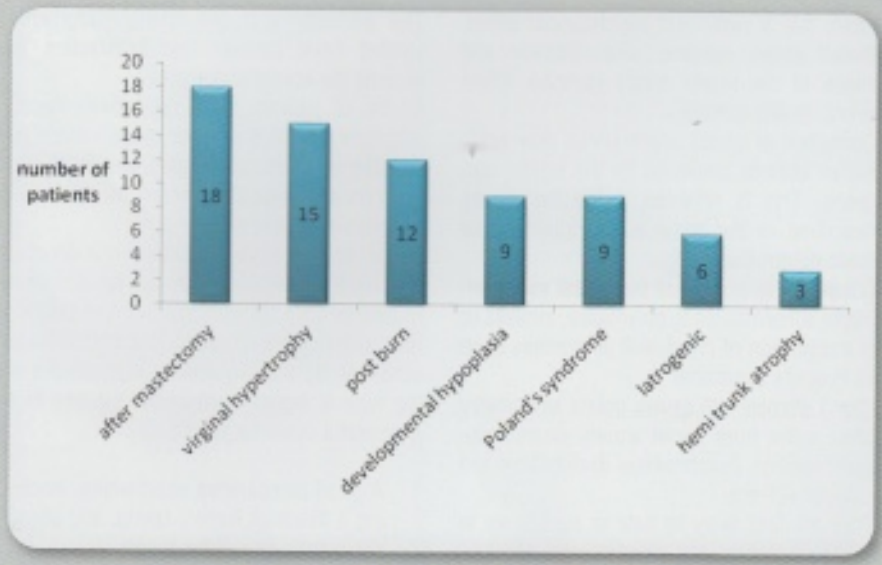



**Figure 1**
Different etiologies of breast asymmetry.

The postoperative parameters, size, shape, symmetry, nipple areola complex (NAC), and overall, were assessed.

A plastic surgeon evaluator assessed the patient's esthetic outcome. The operating surgeons were excluded from performing the postoperative evaluation.

Satisfaction questionnaires were completed by patients in the outpatient setting. Operative procedures were performed by the same surgeon.

Several types of surgical modalities were performed, augmentation with subglandular or sub-pectoral implants according to measurement, reconstruction by TRAM followed by augmentation with implants, reduction mammaplasty and mastopexy. In selected cases nipple areolar complex reconstruction was performed by quadrapod flap and skin graft. Glanduloplasty was performed by Wise pattern skin incision.

All the patients were informed about the indications for surgical correction and possible complications. In augmentation mammoplasty, a textured, round, cohesive, and high profile silicone implant with different volume according to every case presentation were used, the size of breast implant ranged from 250cc. to 400cc.

All the surgical procedures were performed under general anesthesia.

Patients received broad spectrum bactericidal antibiotics for 7 days.

The results were evaluated by a physician based on a subjective impression by comparing preoperative and postoperative pictures and by patients' satisfaction. The follow up period was from 3 months to 24 months.

## RESULTS

The results were evaluated according to these parameters:

1. Quality of coverage,
2. Aesthetic appearance (physicians' satisfaction),
3. Minor complications (seroma, hematoma, infection),
4. Major complications (implant extrusion, capsular contracture, or flap loss),
5. Patients satisfaction.

18 patients (25%) presented by breast asymmetry after mastectomy, pedicle Transverse rectus abdominis musculocutaneous flap (TRAM) was performed to cover the defect, 6 months later, quadrapod flap and skin graft were performed to reconstruct nipple and areola respectively. Virginal hypertrophy breast asymmetry was present in 15 patients (20.8%), hyperplastic breasts were corrected with Wise pattern inferior pedicle reduction mammaplasty.

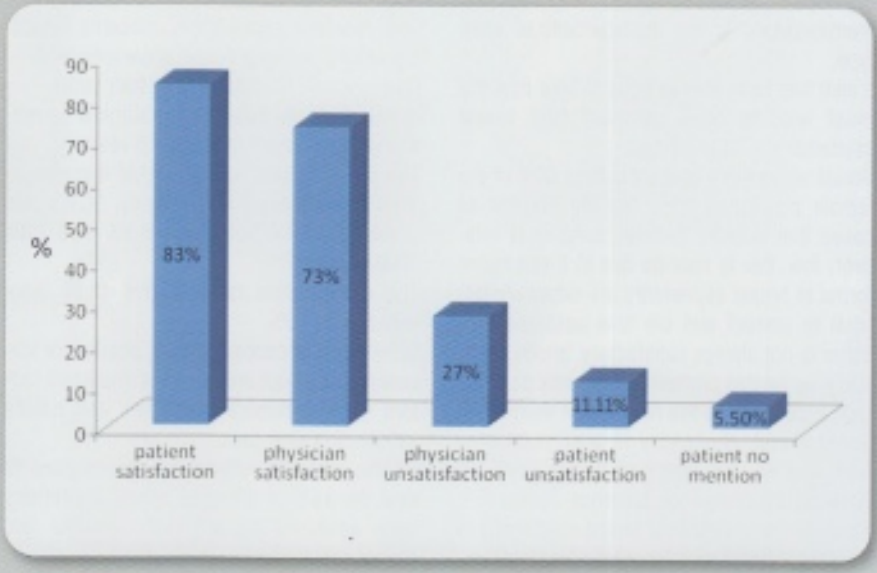
Thoracodorsal artery flap, multiple Z plasties, and inframmary fold release and skin graft were performed in 12 patients (16.7%) presented by post burn breast asymmetry.

9 patients (12.5%) of breast asymmetry were found in this series due to bilateral developmental hypoplasia, augmentation mammoplasty with subglandular or sub-pectoral implants according to measurement was performed.

9 patient (12.5%) complained from mild form of Poland's syndrome, augmentation with implant in the affected side and breast mastopexy in the other breast if needed were performed. Iatrogenic asymmetry as a result of previous surgical interventions, following drainage of prepubertal abscess or removal of large benign cyst, was present in 6 patients (8.3%), augmentation with a proper implant was performed. 3 patients (4.2%) presented by breast asymmetry following hemi-trunk atrophy, augmentation with different sizes of implants were performed.

9 of 72 patients were found to have a minor complication, whereas 2 of 72 were found to have a major complication.

**Figure 2**
Incidence of patients and physicians satisfaction.



The minor complications were 3 cases of necrosis in distal part of pedicle TRAM flap, debridement and secondary suture were performed with an acceptable result, 2 cases of cellulites that were treated with oral antibiotics and quickly resolved.
Venous congestion occurred in distal 2 cm in one of thoracodorsal flaps, debridement and secondary closure was performed with a good result. seroma occurred in two cases which responded to the anti-inflammatory drugs.
None of the above complications had a negative effect on the achievement of breast symmetry. One major complication resulted in removal of the tissue expander after 5 weeks due to an implant infection.
The second major complication involved a case of total TRAM loss, which necessitated another surgery to achieve symmetry.
There were no other major late complications during the follow-up period.
5 of 72 patients had no follow-up after completion of her surgery, 60 of 72 were subjectively documented as pleased with the result, 4 records made no mention of patient satisfaction, and 8 patients had concerns regarding her results, resulting in a patient satisfaction rate of 83.3% (60 of 72 patients), whereas objective physician satisfaction rate was 73% (53 of 72) (Figure 2).

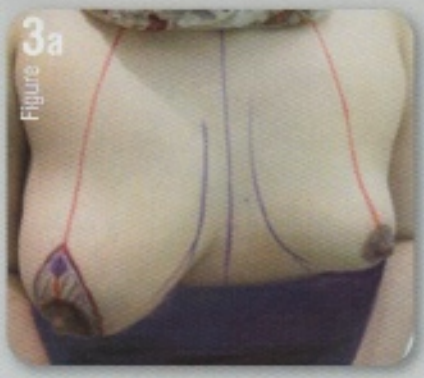
## DISCUSSION

This study examined 72 patients undergoing surgery for different pathologies of breast asymmetry, congenital, developmental or acquired, and dwelling into the outcomes of different options, augmentation, mastopexy, reconstruction, or reduction mammoplasty in the management of each type.
It also has been able to bring to lime light the most and the least common type breast asymmetry in Upper Egypt.
Breast asymmetry present in over 80% of the female population [21, 23] but the number of cases that actually undergo surgery is relatively low, this is may be due to these minor forms of breast asymmetry are extremely difficult to correct and the final aesthetic outcome is not always satisfactory, another reason may be this problem is of minor psychological concern to the majority of women [19].
Some breast asymmetry is also associated with specific but rare pathologies such as Poland's syndrome or tuberous breast [9,16].
Although some degree of breast asymmetry is almost universal, developmental breast asymmetry has a significant psychosocial effect. Breast shape, volume, size, location and shape of the nipple areola complex affect overall breast esthetics.
Correction of breast asymmetries may present an esthetic challenge for the plastic surgeons. This is reflected in the techniques described in the literature for treatment of these deformities [24-28].
Congenital anomalies of the breast vary from nipple abnormalities to polymastia, amastia or in association of chest wall deformities such as Poland's syndrome [14].
Young women with severe breast asymmetry often suffer from social anxiety, depression, peer rejection, psychosexual dysfunction, and low self-esteem.
They are less likely to date or participate in school activities, and psychosocial development can be significantly retarded [29].
The variations in the clinical presentation of the breast asymmetry account for the different options in approach and technique, as reduction mammoplasty, mastopexy, augmentation, reconstruction, or in combination for management.
A good knowledge of breast development and anatomy is required for optimization of results and avoidance of complications during management of breast asymmetry.
Volume-asymmetry correction was achieved in some patients by means of implant in the affected side only and in other patients by implant in affected side and modification in other breast by reduction mammoplasty, mastopexy or augmentation.
In younger patients with breast asymmetry, treatment in the form of surgical correction has been deferred secondary to concerns regarding the disruption of breast development and the possibility of an unfavorable final cosmetic appearance, concerns regarding weight changes during adolescence [30].
Others would treat patients in their teens [31].
In this study we deferred any surgical correction of breast asymmetry to 18 years.
The rate of partial loss in TRAM flap ranged from 5 % to 30%,[3] in this study, 16.6% had a partial TRAM loss and 5.5% had total TRAM loss.
The complication rates in this study were noted to be 15%.
Differences of contour, shape, position or volume of the breast are the most important factors which influence cosmeses and patient satisfaction after breast surgery [20, 22].
So the different surgical modalities used to treat the various group of breast asymmetry were assessed by aesthetic outcome and patient satisfaction.
The patients' and physicians' judgments yielded most patients had satisfaction as regards the aesthetic outcomes.
83.3% of patients were subjectively happy with their results, 4 patients' records made no mention of patient satisfaction, and 8 patients had concerns regarding her results, when satisfaction was assessed.
All mentions of patient satisfaction in the clinical record are subjective, as no objective measures were employed and 73% of patients had a good result, when satisfaction was assessed by the physicians. Independent of the type of breast asymmetry, the key to a successful outcome lies in;

1. A good preoperative assessment, involving a thorough history taking, and physical examination of the breast,
2. A good surgical plan, based on the preoperative assessment, as well as the aesthetic goals of the patients,
3. The meticulous implementation of the surgical plan.

## CONCLUSION

Correction of breast asymmetry represents one of the most difficult challenges in the field of cosmetic breast surgery.
The best options for management of the cases were carefully chosen, based on the case presentation, and the surgeon's experience, thus optimizing the good outcome, and minimizing or avoiding the complications.
The common causes of breast asymmetry that ultimately undergo surgery in Upper Egypt were post mastectomy, representing 25%, followed by virginal hypertrophy asymmetry representing 20.8%, 16.7 % presented by breast asymmetry after burn and the least type was breast asymmetry following hemi-trunk atrophy representing 4.2%.
The incidence of patients' satisfaction after surgical correction of breast asymmetry was 83.3%, while 73% was the incidence of physician' satisfaction.



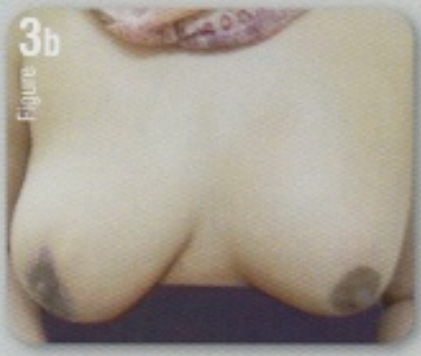



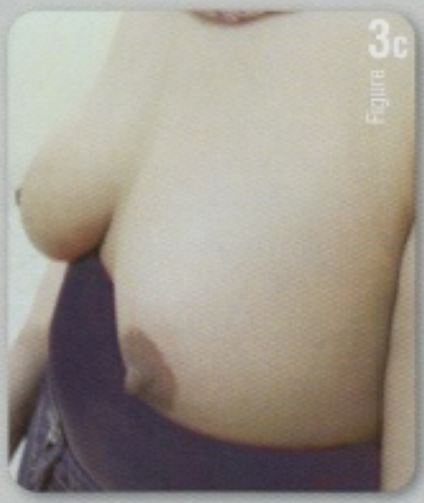

**Figure 3**

**a** - A preoperative frontal view of a 23 years old patient with Poland's syndrome of the left breas.

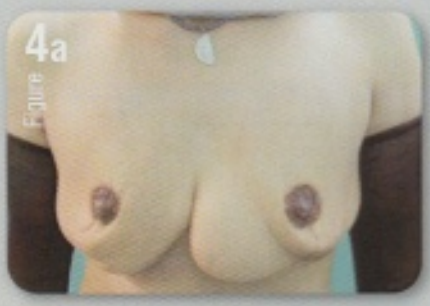
**b** - 6 months postoperative frontal view; 400cc implant in the left breast, and mastopexy for the right breast.

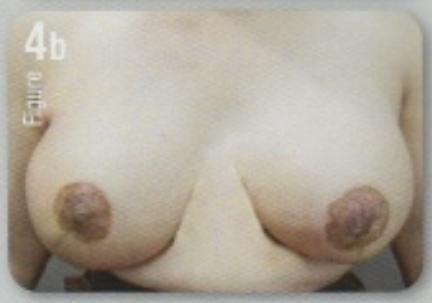
**c** - A preoperative oblique view of a 23 years old patient with Poland's syndrome of the left breast.

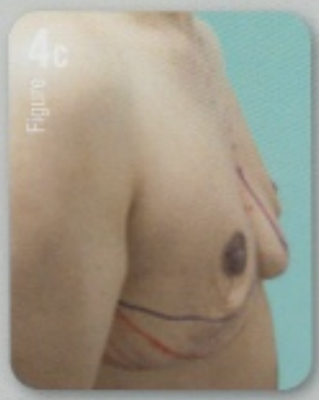
**d** - 6 months postoperative oblique view; 400cc implant in the left breast, and mastopexy for the right breast.

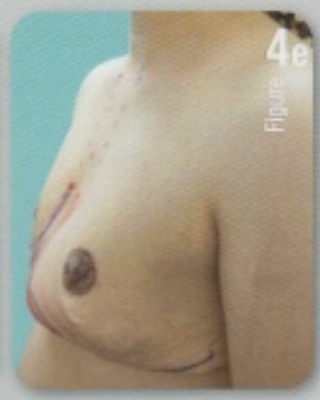


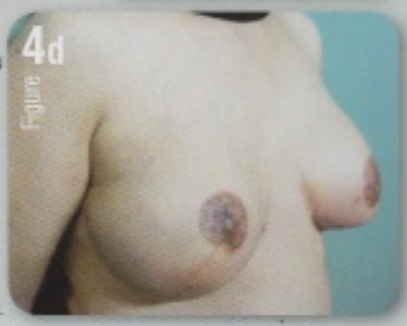




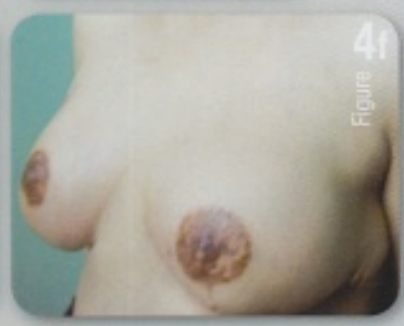




**Figure 4**

**a** - A preoperative frontal view of a 30 years old patient, with iatrogenic breast asymmetry.

**b** - 6 months postoperative frontal view; bilateral 350cc implant and mastopexy,

**c** - A preoperative right oblique view,

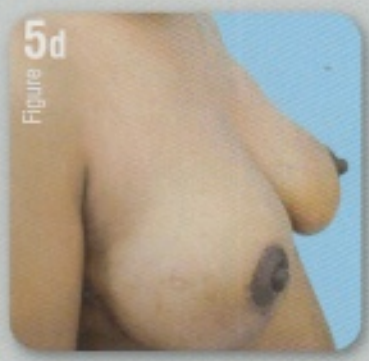
**d** - 6 months postoperative right oblique view,

**e** - A preoperative left oblique view,

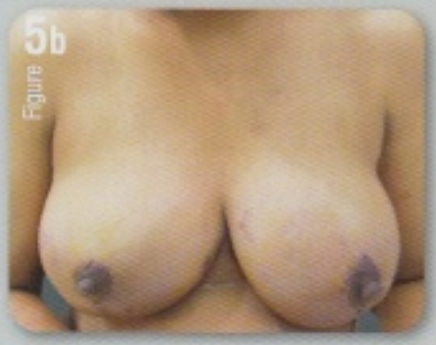
**f** - 6 months postoperative left oblique view.



c - A preoperative right oblique view.

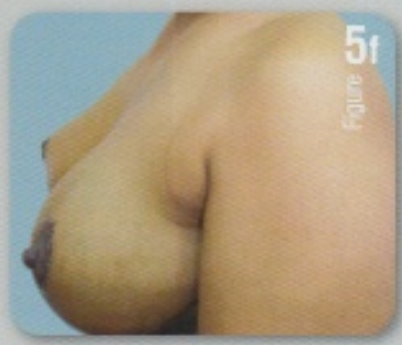



d - 6 months postoperative right oblique view.





e - A preoperative left lateral view.

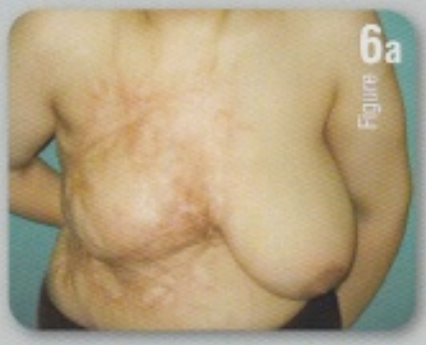



f - 6 months postoperative left lateral view.

**Figure 5**

**a** - A preoperative frontal view of a 35 years old patient with bilateral virginal hypertrophy and breast asymmetry.

**b** - 6 months postoperative frontal view, of bilateral reduction mammoplasty, using inferior pedicle.



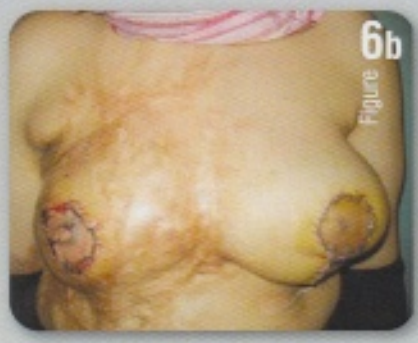
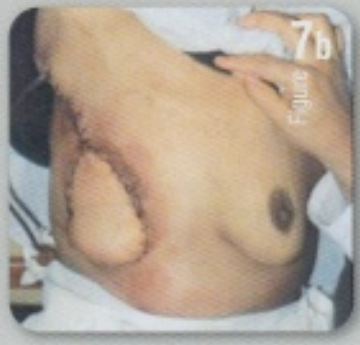




**Figure 6**

**a** - A preoperative frontal view of an 18 years old patient with post burn right breast deformity and a sever breast asymmetry.

**b** - Immediate postoperative frontal view, showing release of IMF, split thickness skin graft, NAC reconstruction, on the right breast, and mastopexy on the left breast.

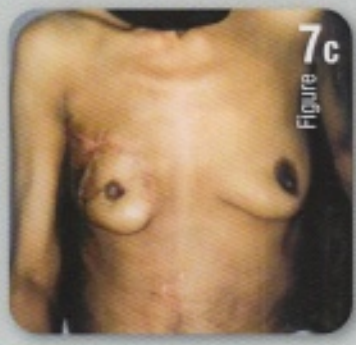




**Figure 7**

**a** - A preoperative frontal view of a 55 years old patient, with right breast cancer

**b** - Immediate post operative frontal view, using pedicled TRAM flap

**c** - 6 months post operative frontal view, with nipple and areola reconstruction.

## REFERENCES


1. Jones DP. Cultural views of the female breast. ABNF Journal 2004; 15:15-21.

2. Thompson JK, Tantleff S. Female and male ratings of upper torso: actual, ideal and stereotypical conceptions J Soc Behav Pers 1992; 7:345-54.

3. Isogai N, Sai K, Kamishi H, Watatani M, Inui H, Shiozaki H. Quantitative analysis of the Reconstructed breast using a 3-dimensional laser light scanner. Ann Plast Surg 2006; 56:237-42.

4. Kovacs L, Zimmermann A, Papadopulos NA, Biemer E. Factors determining shape and symmetry in immediate breast reconstruction. Ann Plast Surg 2004; 53:192-4.

5. Catanuto G, Spano A, Pennati A, Riggio E, Farinella GM, Impoco G, et al. Experimental methodology for digital breast shape analysis and objective surgical outcome evaluation. J Plast Reconstr Aesthet Surg 2006; 61:314-8.

6. Normelli H, Sevastik J, Ljung G, et al. The symmetry of the breasts in normal and scoliotic girls. Spine 1986; 11:749-52.

7. Hodgkinson DJ. The management of anterior chest wall deformity in patients presenting for breast augmentation. Plast Reconstr Surg 2002; 109:1714-23.

8. Sanders SR. Frequently unrecognized causes of breast asymmetry. Plast Reconstr Surg 2004;113:448- 449.

9. Grolleau JL, Lanfrey E, Lavigne B, Chavoin JP, Costagliola M. Breast base anomalies: treatment strategy for tuberous breasts, minor deformities, and asymmetry. Plast Reconstr Surg 1999; 104:2040-8.

10. Godfrey PM. Breast asymmetry: varied problems, varied solutions. The clinic in operative plastic surgery. New York: Plastic Surgery Associates 1996.

11. Rees TD, Dupuis CC. Unilateral mammary hypoplasia. Plast Reconstr Surg 1968; 41:307-10.

12. Nassab RS, Hamnett N, Dhital S, Juma A. The relationship between hand dominance and breast size difference in congenital breast asymmetry. Plast Reconstr Surg 2010; 125:211.

13. Denoel C, Aguirre MF, Bianco G, et al. Idiopathic scoliosis and breast asymmetry. J Plast Reconstr Aesthet Surg 2009; 62:1303-8.

14. WoanYi Chan, Bhagwat Mathur, Diana Slade-Sharman, Venkat Ramakrishnan. Developmental Breast Asymmetry: The Breast Journal 2011; 17:391-398.

15. Vandenbussche F. Asymmetries of the breast: a classification system. Aesth Plast Surg 1984; 8:27-36.

16. Denoël C, Soubirac L, Lopez R, et al. The tuberous breast: a review. Rev Med Liege 2002; 57:655-60. Review. French.

17. Novakovic M, Lukac M, Kozarski J, et al. Principles of surgical treatment of congenital, developmental and acquired female breast asymmetries. Vojnosanit Pregl 2010; 67:313-20.

18. Cervelli V, Araco F, Araco A, Grimaldi M, Cervelli G. New view in the mammary asymmetry treatments. Minerva Chir 2005; 60:91-8.

19. Médard de Chardon V, Balaguer T, Chignon-Sicard B, Ihrai T, Lebreton E. Constitutional asymmetries in aesthetic breast augmentation: incidence, postoperative satisfaction and surgical options. Ann Chir Plast Esthet 2009; 54:340-7.

20. Onesti MG, Mezzana P, Martano A, Scuderi N. Breast asymmetry: a new vision of this malformation. Acta Chir Plast 2004; 46:8-11.

21. Malata CM, Boot JC, Bradbury ET, Ramli AR, Sharpe DT. Congenital breast asymmetry: subjective and objective assessment. Br J Plast Surg 1994; 47:95-102

22. Gliosci A, Presutti F. Asymmetry of the breast: some uncommon cases. Aesth Plast Surg 1994; 18:399-403.

23. Smith Jr DJ, Palin Jr WE, Katch VL, Bennett JE. Breast volume and anthropomorphic measurements: normal values. Plast Reconstr Surg 1986; 78:331-5.

24. Williams G, Hoffman S. Mammoplasty for tubular breasts. Aesth Plast Surg 1981; 5:51-6.

25. Versaci AD, Rozzelle AA. Treatment of tuberous breasts utilizing tissue expansion. Aesth Plast Surg 1991; 15:307-12.

26. Puckett CL, Concannon MJ. Augmenting the narrow-based breast: the unfurling technique to prevent the double-bubble deformity. Aesth Plast Surg 1990; 14:15-19.

27. Atiyeh BS, Hashim HA, El-Douaihy Y, Kayle DI. Perinipple round-block technique for correction of tuberous / tubular breast deformity. Aesth Plast Surg 1998; 22:284-8.

28. Muti E. Personal approach to surgical correction of the extremely hypoplastic tuberous breast. Aesth Plast Surg 1996; 20:385-90.

29. Latham K, Fernandez S, Iteld L, et al. Pediatric breast deformity.J Craniofac Surg 2006; 17:454.

30. Oakes MB, Quint EH, Smith YR, Cederna PS. Early, staged reconstruction in young women with severe breast asymmetry. J Pediatr Adolesc Gynecol 2009; 22:223-228.

31. Piza-Katzer H. Reduction mammaplasty in teenagers. Aesth Plast Surg 2005; 29:385-90.



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