

One stage rescue procedure after capsular contracture of breast implants with autologous fat grafts collected by water assisted liposuction (“BEAULI Method”)

Einzeitiger Rettungseingriff nach Kapsel­fibrose bei Brustimplantaten mit durch wasserstrahl-assistierter Liposuction gewonnenem autologem Fettgewebe („BEAULI-Methode“)

Abstract

With increasing number of patients with silicone implants for breast augmentation or reconstruction we are confronted with more and more cases of capsular contracture. Not every case is resolved by resection of the capsule and exchange of implants. Many patients rather bear the consequences of severe fibrosis than to have their implants removed. The one stage procedure of implant removal and lipofilling proved to be highly efficient with good to excellent results and high patient satisfaction.

Between January 2008 and October 2012 a total of 64 patients (124 breasts) with capsular fibrosis Baker III to IV were treated with autologous fat grafts collected with the body-jet® by water-assisted liposuction (“BEAULI Method”). Magnetic resonance imaging (MRI) of the breasts was performed in 5 patients preoperatively and 6 month postoperatively, a clinical examination and photo documentation of all patients was done on day 1 and after 4 weeks, 12 weeks and 6 months postoperatively. The procedure included implant removal and lipofilling of the subcutaneous and intramuscular space in a single procedure by means of the BEAULI Method.

The average gross amount of grafted fat was 260 ml. The average drainage time was one day. The shape of the breast changed to a more natural and ptotic form. Negative side effects like oily cysts or infections were not observed. The time of the overall procedure including liposuction was 70±15 min.

Reoccurring capsular contracture is one of the hazards in plastic surgery. Until now the treatment of choice after more than two failed implant changes combined with resection of the capsule is usually the final removal of implants with or without possible additional autologous tissue transfer (microvascular flaps). We could add a relatively simple and efficient procedure to resolve and improve those cases by autologous fat transfer using water-assisted liposuction and the BEAULI Method.

Keywords: breast implants, breast augmentation, capsular fibrosis, autologous fat transfer, water assisted liposuction

Zusammenfassung

Mit steigender Zahl an Patienten, die im Rahmen einer Augmentation oder Rekonstruktion mit Silikonbrustimplantaten versorgt werden, sind wir auch zunehmend mit Kapselkontrakturen konfrontiert. Nicht immer lässt sich das Problem mit Kapselexzision und Implantatwechsel lösen. Viele Patientinnen ertragen lieber die Folgen der Kontraktur als das Implantat entfernen zu lassen. Einzeitige Implantatentfernung und Lipofilling sind hoch effizient und führen zu hoher Patientenzufriedenheit.

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Zwischen Januar 2008 und Oktober 2012 behandelten wir insgesamt 64 Patientinnen (124 Brüste) im Stadium Baker II und IV der Kapsel-fibrose mit autologem Fetttransfer, wobei das Fettgewebe mit dem Body-jet® durch wasserstrahl-assistierte Liposuction („BEAULI-Methode“) ge-wonnen wurde. Kerspintomografisch konnten wir 5 Patientinnen unmit-telbar und fünf Monate nach Operation nachuntersuchen. Klinische und fotografische Dokumentation erfolgte bei allen Patientinnen am 1. postoperativen Tag, nach 4 Wochen, nach 12 Wochen und nach 6 Monaten. Unsere Prozedur schloss Implantatentfernung und Lipofilling im subkutanen und intramuskulären Gewebe als einzeitiges Vorgehen ein, die sog. BEAULI-Methode.

Durchschnittlich wurden je Brust 260 ml reines Fett transferiert. Die durchschnittliche Drainagedauer lag bei einem Tag. Die Brustform veränderte sich mehr zu einer natürlichen ptotischen Projektion. Wir sahen keine negativen Folgen wie Ölzysten oder Infektionen. Die Ge-samtoperationszeit betrug je Patientin 70 ± 15 min.

Wiederkehrende Kapsel-fibrose ist ein bekanntes Risiko in der Plasti-schen Chirurgie. Bisher war das übliche Vorgehen nach zwei fehlgeschla-genen Implantataugmentationen die Kapselexzision und die definitive Implantatentfernung, ggf. gefolgt von autologem Gewebettransfer in Form von mikrovaskulären gestielten oder freien Lappen. Wir konnten nun ein relativ einfaches und effizientes Verfahren etablieren: Der au-tologe Fetttransfer mit wasserstrahl-assistierte Liposuction und der o.g. BEAULI-Methode.

Schlüsselwörter: Brustimplantate, Mammaaugmentation, Kapsel-fibrose, autologer Fettgewebstransfer, wasserstrahl-assistierte Liposuction

Introduction

With increasing number of patients with silicone implants for aesthetic breast augmentation or for reconstruction we are confronted with more and more cases of capsular contracture. There is a wide range of estimated incidence in current literature. Two years after implantation the contracture rate is presumably around 4% [1], [2], [3]. An incidence of at least 10% Baker III and IV contracture within 10 years after primary aesthetic indication seems realistic [4].

Not every case is resolved by resection of the capsule and exchange of implants. The rate of reoccurrence is lower (10%) after total capsulectomy [4], but in some patients this leads to insufficient coverage of the implant. All the incidence rates of reoccurrence cited in literature differ a lot depending on study design and observation interval. The surface of the implants seems to be of minor importance in the long-term.

Many patients rather bear the consequences of capsular contracture for fear of dramatic change in appearance or for lack of financial means.

Autologous fat transfer bears the chance to keep at least some breast volume in patients with capsular contracture who do no longer want to have a silicone implant. In this study we also quantified breast volume and transferred fat after autologous fat grafting in a number of patients with capsular fibrosis using MR imaging.

Material and methods

Between February 2008 and October 2012, a total of 64 patients with capsular contracture were treated with autologous fat grafts collected by water-assisted liposuction (“BEAULI Method”) (Table 1).

All of the patients treated did not wish to receive a new silicone implant but a definite removal. They were in-formed about the estimated change of breast form and appearance postoperatively and the possible loss of volume. All patients were healthy and free of any condi-tions opposed to operation or anaesthesia.

All 64 aesthetic patients underwent MRI examination preoperatively and six months postoperatively. Weight and height measurements were taken. The fat was har-vested from the abdominal wall, hip and thigh area.

The amount of fat to be harvested was calculated roughly according to the existing implants or less in cases of un-reasonably large implants or a lack of sufficient fat to harvest.

The fat was harvested with the BEAULI™ method. It con-sists mainly of to principles:

1. Water-jet assisted liposuction with the body-jet, a device emitting a water beam for infiltration and suc-tion in one step [5].
2. Fat harvesting and separation with the LipoCollector (Figure 1), a device to collect the aspirated fat, and separates the fat from saline (tumescence fluid) and

Table 1: Patients

Aesthetic augmentation	56 patients	
Irradiation (breast cancer)	8 patients	
	<i>min</i>	<i>max</i>
Age	22 years	58 years
BMI	17.5	30
Time interval since first augmentation	1.5 years	12 years
Number of revisions	0	3
Size of removed implant	145 ml	370 ml
Fat grafted (gross amount, including about 28% tumescence fluid)	80 ml	370 ml

rough connective tissue into a sterile container on the instrumentation table. The washed fat is thus ready for reinjection. The harvesting procedure takes between 40 and 70 minutes, the time for reinjection between 15 and 25 minutes.

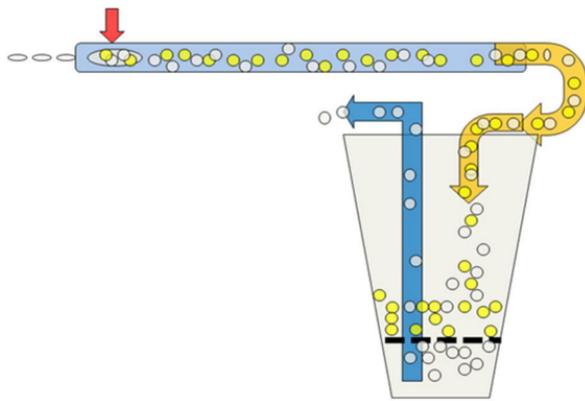


Figure 1: LipoCollector fat collection and separation system

All areas that were selected for harvesting the fat were treated with a basic infiltration according to the wet technique by means of the body-jet using range 2–3, and its infiltration cannula. The solution used was a classical tumescence solution described by Klein [6] which was warmed to 37 to 38 °C (98–100 °F).

After a minimum interval of 10 min after beginning infiltration liposuction is started using a 3.8 mm body-jet WAL cannula with effective suction openings of 0.9 mm. Thus harvesting of very tiny pieces of fatty tissue is possible, ready for immediate refilling with the small BEAULI™ injection cannulas. By adjusting the negative pressure of the body-jet to –0.5 bar (7 PSI), additional destruction of fat cells is avoided. Lower negative pressure is usually ineffective and leads to frequent obstruction of the suction device.

Collection of sufficient volume of fat tissue (average 500–600 ml) takes about 30–45 min. The fluid from the consistently applied flushing with tumescent solution is separated from the fat tissue in the LipoCollector. The fat is removed from the collector by means of BEAULI™ aspiration cannulas into 50 cc syringes (for an easier count of fat cell volume and to avoid contact with air) and from there transferred into 10 cc syringes.

Spinning of the harvested fat is not necessary. The remaining liquid represents the same amount as after decantation and accounts for about 28% of the gross volume. This is a very constant result we found in 2.55 years of experience with the BEAULI™ System after investigational centrifugation of a small portion of 2x10 cc in every performed procedure (over 200 procedures by now). With a calculated a definite take rate of 75% of the grafted fat net volume [7] we achieve a volume gain of about 50–60% of the injected gross volume.

Operation technique

I. Removal of the implant

The old scar of the implantation site is removed and the implant extracted. The capsule is not removed. Swaps are routinely taken. A thorough sponging of the interior side of the capsule is followed by the application of betadine/sodium chloride solution enriched with cephalosporine and gentamicine.

Injection starts by infiltrating the pectoralis major muscle, where about one third of the fat can be deposited. If the implant had been inserted submuscularly, it is helpful to stretch the muscle with the help of a clamp (see Figure 2).

II. Infiltration of the muscle

After the muscle has been filled with fat, the subcutaneous plane is infiltrated. By use of the long BEAULI infiltration cannula no additional incisions are required to reach every part of the breast. Infiltration into the gland is strictly avoided.

The breast is filled up to a condition which you can describe with “firm but not tight”. It is not possible to improve the final volume by overfilling. The additional pressure destroys more cells, and the risk of cysts and calcifications is rising (see Figure 3, Figure 4, Figure 5).

III. Vacuum drainage and closing of the wound

After the procedure, a vacuum drainage is inserted into the empty capsule; the wound is closed in two layers. Usually the drain can be removed within two days (see Figure 6).

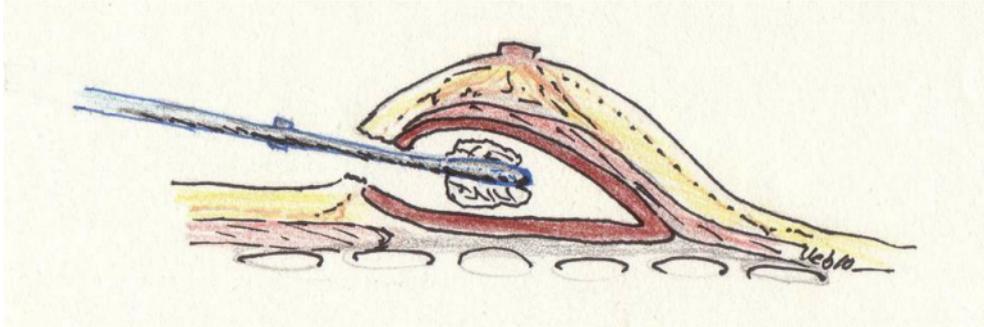


Figure 2: Sponging of the capsule after sub-muscular implant removal

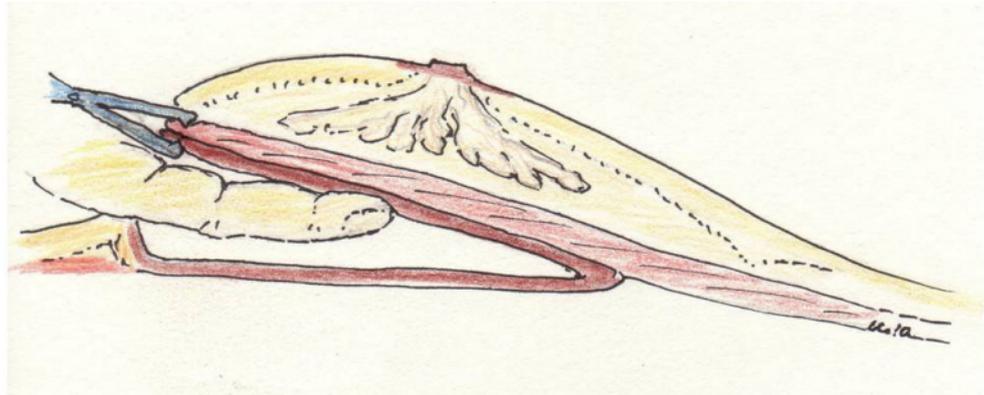


Figure 3: Preparation of fat tissue infiltration after removal of a sub-muscular implant under digital control

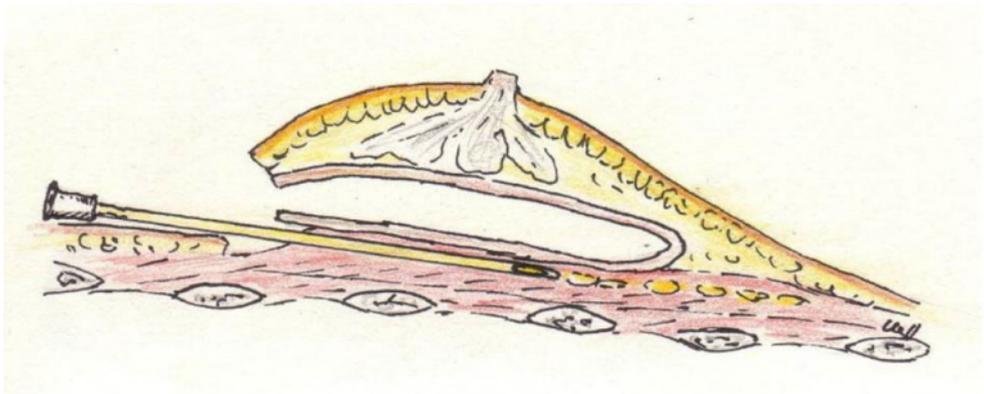


Figure 4: Fat infiltration into the pectoralis major muscle after removal of a sub-glandular implant

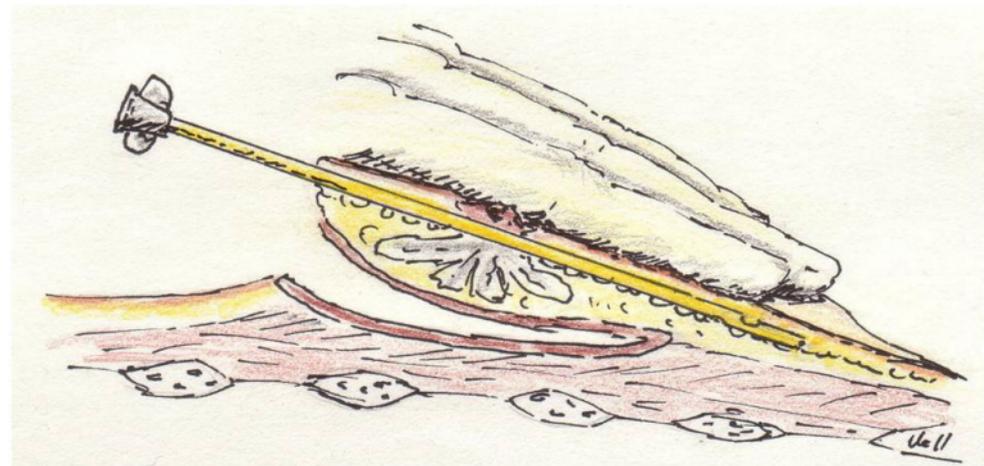


Figure 5: Subcutaneous plane fat infiltration. While pressing against the breast with one hand it is easy to reach the entire subglandular region.

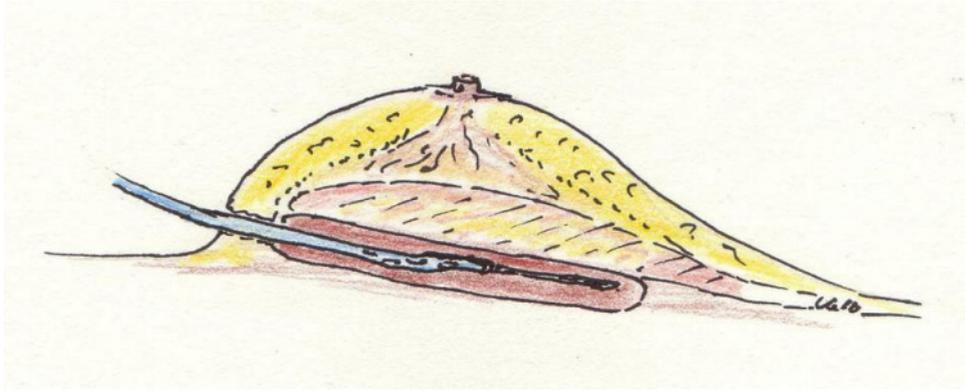


Figure 6: Situation at the end of the operation with drainage of the capsule

Results

From February 2008 to June 2012 68 patients with capsular contracture Baker III and IV were treated. 21 of them had undergone previous procedures of implant exchange and capsular resection or incision. They all wished a definite removal of implants.

- Size of implants removed: 145–370 ml
- Volume of fat tissue (gross volume) injected: 180–320 ml (approximate net volume 140–240 ml)
- Average operation time: 75 min (62–115 min)
- Follow up: 6–56 months
- Patient satisfaction: all patients satisfied
- Change of breast form to a natural ptotic appearance
- Four patients received a second graft

In case of one patient with a BMI of only 17.5 and implant sizes of 265 ml and 305 ml, only 220 ml and 200 ml were grafted due to the lack of more fat to aspirate (see Figure 7).

In a second case implants of 370 ml were removed and 260 ml of fat transferred because the patient disliked the volume of the previously inserted implants. Like all other patients, both of these patients were highly satisfied with the result (see Figure 8, Figure 9).

MRI investigations

Magnetic resonance imaging (MRI) of the breasts was performed in 5 patients preoperatively and 6 months postoperatively. The evaluation by MRI based volumetry gave inconsistent results, presumably due to the fact that volume (the implant) is first removed, and then added by fat grafting in one procedure. Also, the form of the preoperatively often very tight breasts changed dramatically. All MRI showed massive increase in fat tissue. No cysts were observed.

Figure 10 and Figure 11 show the MRIs of a patient pre- and postoperatively.

The next two images show the preoperative and postoperative MRI scans of the patient of Figure 6 with capsular fibrosis after complete subpectoral placement (Figure 12, pre-op), and after implant removal and fat grafting (Figure 13, post-op). Reminders of the capsule are not

to be seen after the procedure. The amount of fat grafted was only 2/3 of the implant volume. The patient was extremely pleased with the result and did not wish further volume increase.

Discussion

Capsular contracture is the most common complication after breast augmentation with silicone implants [1], [2], [3], [4], [8], [9], [10], [11], [12], [13], [14], [15], [16], [17], [18], [19]. For the patient this means disfiguration and pain, and after reoperation procedures frequently the constant fear of reoccurrence.

The standard treatment consists of an implant exchange and a complete or partial capsulectomy. Not a few patients endure the consequences of capsular contracture after several reoperations for lack of financial means or the high incidence of reoccurrence [12]. A new alternative consists in fat grafting around the implant to downgrade a capsular contracture [20]. This is definitely an alternative for patients who want to keep their implants. However, there are a significant number of patients who prefer a definite removal of the implants if this can be done without risking an impairment of breast appearance.

Fat grafting meanwhile is a safe and effective method of volume replacement in breast reconstruction [21], [22] as well as primary augmentation [23], [24], [25], [26], [27]. In now 1,197 years of publication history [28] there are no reports of a higher incidence of cancer after fat grafting to the breast.

The BEAULI™ method using water-jet assisted liposuction with the body-jet and the LipoCollector, produces definitive take rates (volume gain) of the transferred fat of 76+11% [29] while minimizing the risk of negative side effects like oily cysts etc.

MRI based volumetry which works very reliable in primary aesthetic procedures [7] did not show realistic results in these cases of fat grafting after capsular contracture and implant removal. Nevertheless the take rate in the pre-extended breast areas of these patients appears to be even higher than in other cases with more constrictive tissue.



Figure 7: Patient with capsular contracture Baker IV

Four photos on the left: Before removal of implants 265 ml and 305 ml. Two photos on the right: Fat grafting of 220 ml and 180 ml at 1 year post-operatively (BMI of patient = 17.5).

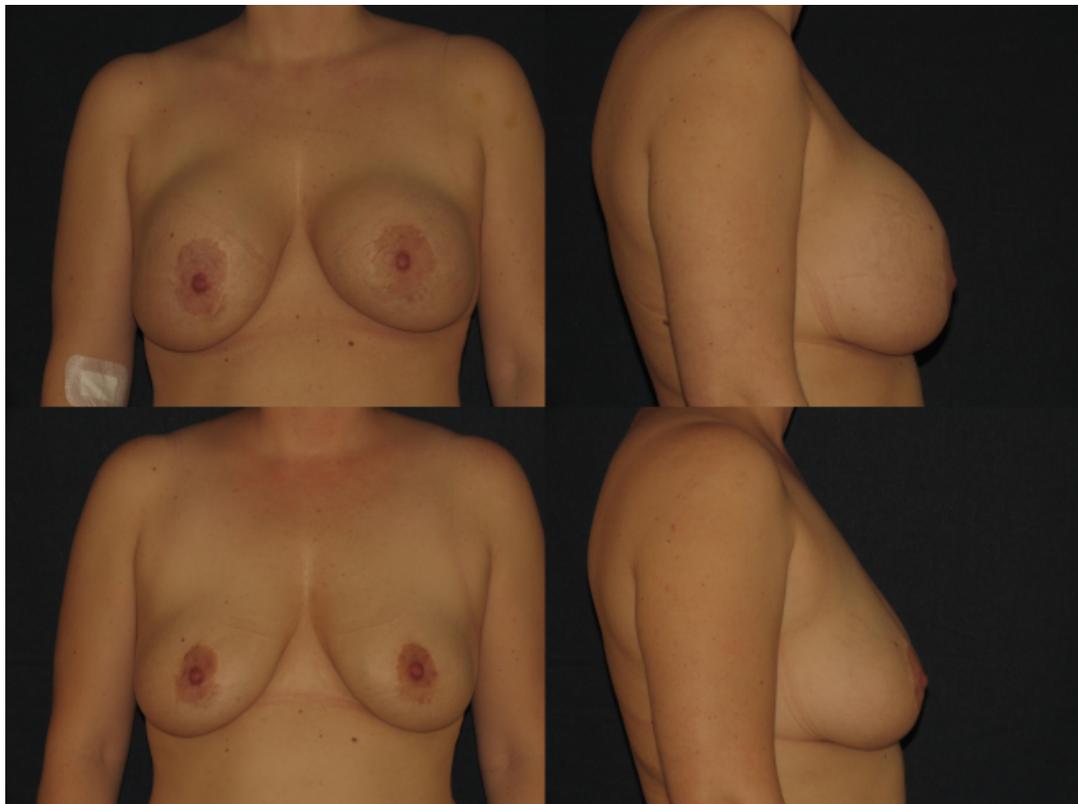


Figure 8: Two photos on the top: Status after breast augmentation by a non-specialized surgeon. Two photos on the bottom: Result 1 year after implant removal, fat grafting and areola tightening.

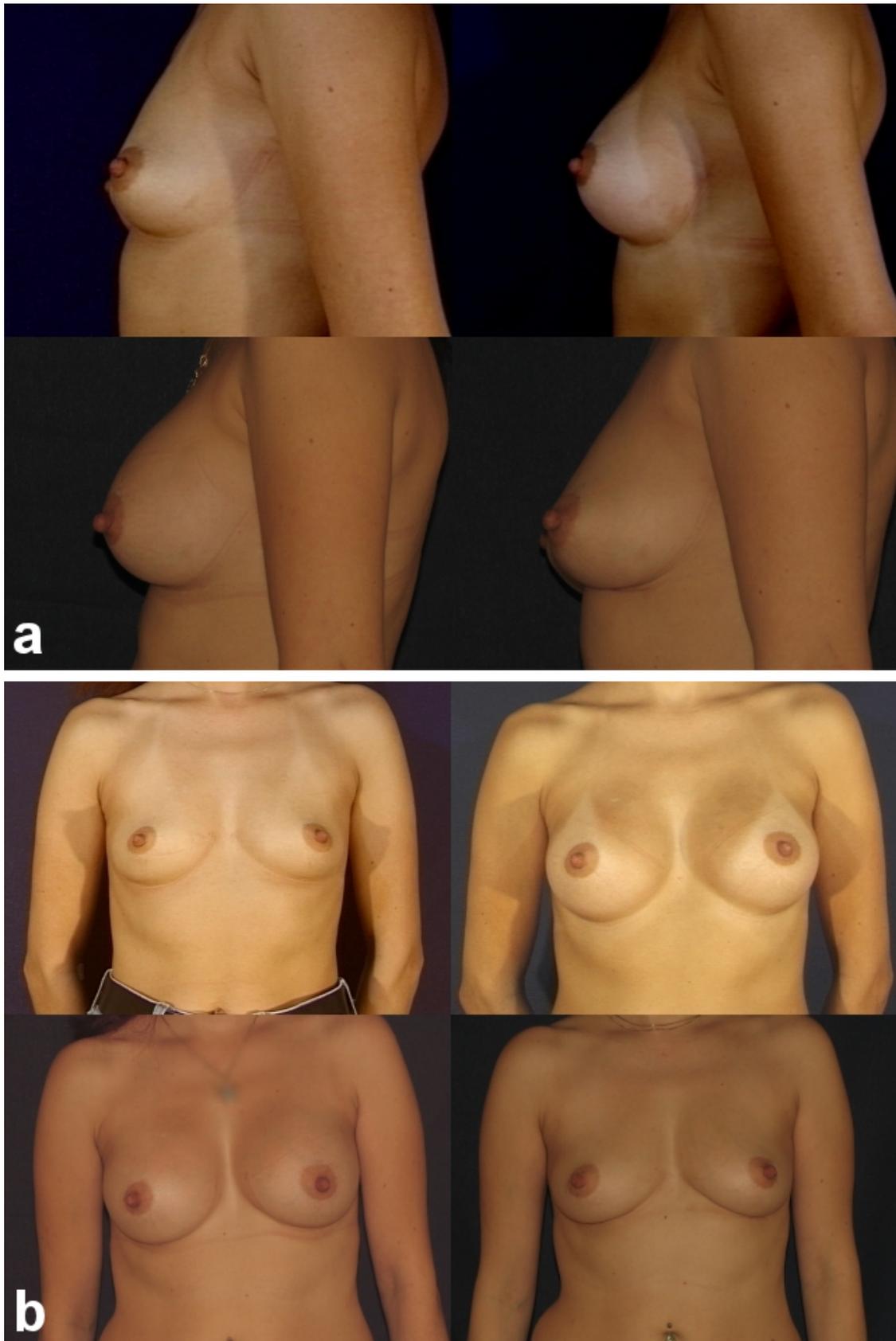


Figure 9: Patient with capsular contracture Baker III-IV after 8 years

a (side): Photo on the top, left side: before breast augmentation; top right: after sub-muscular implantation; bottom left: 8 years after implantation with capsular contracture III-IV; bottom right: 1 year after autologous fat grafting.
b (front): Photo on the top, left side: before breast augmentation; top right: after sub-muscular implantation; bottom left: 8 years after implantation with capsular contracture III-IV; bottom right: 1 year after autologous fat grafting.

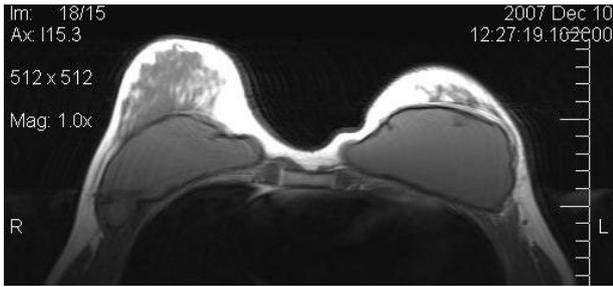


Figure 10: Preoperative MRI of a patient with capsular contracture

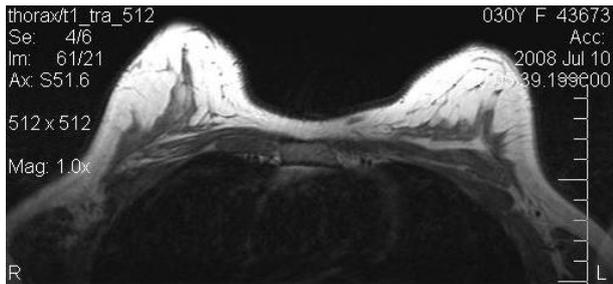


Figure 11: Postoperative MRI of the same patient after implant removal and subsequent fat grafting

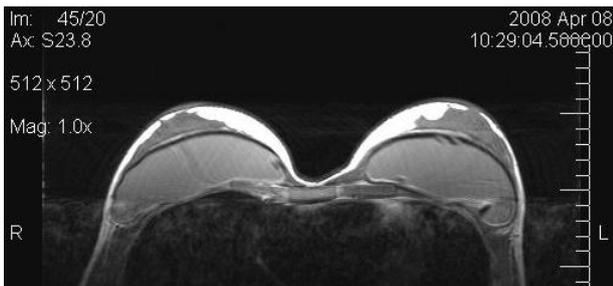


Figure 12: Preoperative MRI of a patient with capsular fibrosis after complete subpectoral placement

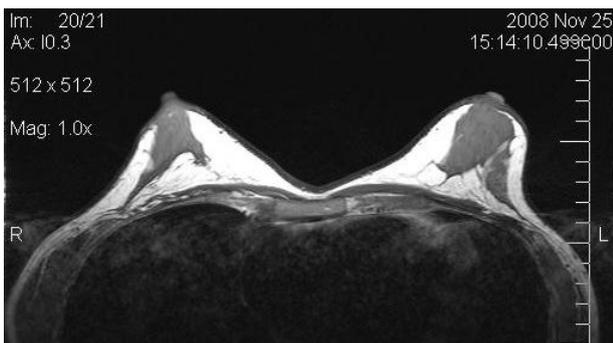


Figure 13: Postoperative MRI of the same patient after implant removal and fat grafting. Reminders of capsule are not to be seen.

In all our cases the remaining volume after implant removal and subsequent fat grafting was larger than before the previous silicone augmentation. The instillation of volumes of up to 320 ml of fat was easily performed without creating much tension of the tissue. That may be due to the pre-extension of the tissue by this method in a similar way like it is supposed to be after external extension [30]. The form of the breasts changed to a more

ptotic and natural appearance and became soft and natural.

In none of the patients the capsule was removed. The removal of the capsular tissue would be contra productive to the infiltration of fat into the muscle due to the creation of an open roof with the risk of fat accumulation in the wound cavity. Although we left the complete capsule we observed no infection and no seroma.

With our method, the patients can be offered a safe and definite alternative to repeated implant changes and capsulectomies. Although we have only a short term follow up in this group, fat grafting in general is meanwhile considered a safe alternative with a long experience. The BEAULI™ collecting and separating system of fatty tissue offers a time sparing and effective procedure for autologous fat transfer.

Notes

Competing interests

The authors declare that they have no competing interests.

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