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History of Mammaplasty

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There is no better beginning to the saga of mammaplasties than "Once Upon a Time," as the history is truly a tale of wonder that it is our pleasure to unfold.

At its source lies woman's eternal dream—beautiful, firm, and harmoniously proportioned breasts—a dream that has inspired painting, sculpture, and literature since the dawn of mankind.

The first attempts at breast surgery were purely functional and aimed primarily at relieving women of the excessive weight of their breasts, but it was not long before aesthetic considerations came to guide the hand of the surgeon.

Our story goes back no further than the close of the nineteenth century, for neither Durston in 1669 (66) nor Velpeau in 1857 (67), the first names in the literature, had plastic considerations in mind when reducing mammary volume.

In evoking the history of plastic surgery, there is a strong temptation to enumerate names and dates and to delve into the past in an attempt to discover a pioneer because originators of new ideas are often cast in the role of heroes. But it is by no means easy to determine who was responsible for a discovery and who, by cleverly exploiting it, managed to cover himself in undeserved glory. Thus in trying to separate the wheat from the chaff, the enduring from the ephemeral, we shall cite few names and focus our attention on the development of surgical principles and techniques.

The history of reduction mammaplasty

The history of reduction mammaplasty may be conveniently broken down into three phases: pre-1930, 1930–1960, and post-1960.

Pre-1930

Glandular reduction

The first step was to use the submammary surgical route described by Gaillard-Thomas in 1882 (66) for the resection of a glandular disc from the posterior part of the mammary gland.

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This technique was used by Morestin and Guinard (46) and refined by the Swiss surgeon De Quervain (58) who in 1925, well in advance of his time, carried out a subtotal mammectomy, leaving only a small retroareolar glandular stump.

Other resection sites were suggested by a number of surgeons, including Pousson (57), Dehner, Kuster, and Verchere (66).

Glandular reduction with nipple transposition

The need soon arose to combine glandular reduction with a transposition of the areola and nipple in order to impart a pleasing form to the reduced breast.

Reduction with transplantation. An excellent solution was found by combining reduction with free transplantation of the nipple, a technique reported by Thorek in 1922 (66) and Lexer in 1925 (34). With only minor modifications and improvements, it is the only technique of this period to have survived to our day, and it still remains the solution to some extreme cases.

Reduction with transposition. But soon surgeons were attempting to combine reduction with nipple transposition. The first reduction mammaplasty worthy of the name was performed by Aubert (3) in Marseille and described by him in 1923. It was a milestone in the history of mammaplasty.

The site and the volume of the glandular resection could be varied, but nipple transposition called for more or less extensive undermining between skin and gland.

Failures of glandular reductions in the region of the nipple were soon to draw attention to the importance of taking due account of vascularization.

Both in extent and in form, glandular exereses had to maintain one or two glandular arterial pedicles for vascularization: the stump of the remaining gland had to be vascularized by either the external pedicle or the internal pedicle or both. The number and variety of the techniques suggested may well be imagined; in every case the overriding concern was to ensure a sufficient blood supply to the residual glandular stump and hence to preserve the integrity and vitality of the nipple.

Glandular reduction, nipple transposition, and glandular remodeling

Although these glandular exereses reduced the volume of the gland, its form suffered. The vascular conditions outlined above were met, but the need was to reconstruct a harmoniously proportioned glandular stump in the form of a smaller mammary gland. Hence the necessity for *glandular remodeling* after most of these resections. This represented a major step forward allowing surgery for ptosis with associated hypertrophy and paving the way for surgical treatment of ptosis as such.

Two names are linked with this advance—Biesenberger (8–10) and Schwarzmann (63). These men may be said to have achieved the real breakthrough in mammary reduction surgery.

Biesenberger resected the outer glandular segment of the breast by a long S-shaped incision going from the upper to the lower pole of the gland: he performed a glandular modeling in such a way that the lower convex and upper concave parts of the glandular section were brought together.

Schwarzmann, 3 years later, performed a similar glandular resection incorporating a periareolar desepithelialization which has since borne his name. This began a new phase in mammary plastic surgery, perhaps the most significant to date, as the vascular security of the nipple afforded by this technique in resections of the Biesenberger type with undermining between skin and gland would enable many practitioners to increase the volume of glandular resections.

1930–1960

Mammaplasty with skin-gland undermining

The outstanding names of Gillies and McIndoe (20, 37) who, just before the outbreak of World War II, perfected Biesenberger's technique, adapting it to both hypertrophy and mammary ptosis.

It is impossible to cite all the modifications proposed. They are legion. Like those of Ragnell (59) and Aufricht (4), they were all designed to allow larger exereses or a more effective remodeling of the gland (periwinkle shell, plicature etc.).

It gradually became apparent that the royal road of progress had come up against a brick wall, as this type of operation failed to take into account the basic fact of cutaneoglandular unity and more especially vascular unity, since the breast is a cutaneous gland. Leaving the nipple on a well-vascularized glandular segment offered less opportunity for exeresis: there was a limit to glandular resection beyond which it was impossible to go without risk of necrosis. To go further a new approach was called for.

After 1960

The great merit of Arie (1) was to realize as early as 1957 that it was preferable to avoid any undermining between skin and gland. The surgery of reduction mammaplasty received a new impetus as a result of operations which offered both remarkable glandular security and extensive vascular exereses.

In 1961 Pitanguy (56) performed a "keel"-shaped resection followed by suturing of the glandular surfaces. Strombeck (65) had in 1960 performed an "hourglass"-shaped resection consisting of a cylindrical anteroposterior resection of the upper part of the gland. This technique exploits the possibilities of gland exeresis to the maximum, leaving merely a sort of glandular "basket handle" which maintains the double external and internal vascularization.

Skoog (64) in 1963 carried out a very extensive inferoposterior resection with no undermining between skin and gland, creating a "nipple-bearing" dermal flap. This technique forms the basis of present developments in mammaplasties.

As early as 1943 May's (43) maneuver had foreshadowed this technique. May had already become aware of the part played by the dermal vessels in the vascularization of the nipple and had suggested retaining a cutaneous flap for vascularization which was folded back on itself for the transposition of the nipple. Believing, however, that the primary blood supply links were between nipple and gland and that the subdermal vascularization was secondary, he resected the flap, which was temporarily clamped, once the nipple's vitality seemed assured.

Many were to follow in Skoog's footsteps—Weiner et al. (69) among others.

In 1972 McKissock (37) described a technique using a vertical bipedicular dermoglandular flap, the vascularization of the nipple being provided by the perforating arteries reaching the flap via its lower part. This part is not separated from the pectoral muscle, while its upper part, essentially dermal, is folded back on itself allowing the nipple to be raised without difficulty.

Thus, by the early 1970s, particularly after the work of Skoog and Beare (6), proof had been given of the importance of subdermal vascularization allowing subtotal mammectomies and cutaneous remodeling by desepithelialization (31). A number of techniques appeared combining differing degrees of periareolar desepithelialization and subtotal mammectomy [Garcia-Padron (50), Hinderer (28), Lalardrie (31), Schrudde (62), etc.].

Some of the techniques developed in the 1960s were subsequently modified along these lines.

Thus the limit to what could be resected was no longer what was technically feasible but rather what was necessary to obtain, the ideal residual volume.

Surgical problems

We now turn to two problems which have exercised the ingenuity of surgeons throughout the history of reduction mammaplasty: breast suspension and scars.

Breast suspension

Since the earliest days surgeons have strived to find a "trick" to stabilize reduction.

Thus Pousson (57) in 1897 and Dehner in 1908 (66) attached the upper pole of the gland to the pectoralis major or to the periosteum of the third rib.

In 1927 Göbell (24) fixed the gland to the third rib by a strip of fascia lata.

The work of Biesenberger (8), Gillies, Marino (42), and McIndoe (37) on the suspension effect of glandular remodeling seemed to hold promise and was developed by Dufourmentel and Mouly (17).

Finally came the era of *dermopexies* which could be:
dermoglandular as proposed by Tessier (54),
dermomuscular as demonstrated by Hinderer (29),
dermohypodermal following Gillies and Marino (21),
dermodermal, now the most commonly employed of modern techniques and advocated by Goulian (27) in 1971 as the sole surgical means for correcting ptosis.

Scars

Once mammary plastic surgery had come of age, surgeons sought to find means of reducing the length of scars and of making them less visible.

We may single out:
Scars resulting from a single cutaneous pleat:
Horizontal—submammary in the case of Passot (52) or higher
External horizontal [Gläsmer (23)]
Vertical [Arie (1) and Mir y Mir (44)]

Scars resulting from a double pleat:

Lower

Anchor-shaped, by far the most frequent, following Gillies, McIndoe (20), Pitanguy (56), Strombeck (65), Skoog (64), etc.

Inverted T [Biesenberger; (8)] or inverted T with short internal arm [Lalardrie (32)]

Lateral

Following Holländer (30) and Marc (40), Dufourmentel and Mouly (16) have stressed the importance of a lateralized scar.

Elements of the two types have been combined, giving an L- or J-shaped scar in techniques proposed by Elbaz and Verheecke (19), Dufourmentel and Mouly (18), and Regnault (61).

Despite the efforts of all these surgeons, the price paid in terms of scarring remains a real problem and may be considered as the ultimate stumbling block in reduction mammaplasty.

The history of augmentation mammaplasty

The operative technique of augmentation mammaplasty is more straightforward since the problem is a simpler one: it involves no more than creating a greater mammary volume as we exclude from our discussion the whole area of mammary reconstruction.

Discounting Neuber in 1893 (68), it is Czerny (15) from Heidelberg in 1895 who performed the first augmentation mammaplasty. To replace the loss of substance caused by ablation of a breast adenoma, Czerny successfully transplanted a lipoma from the patient's back.

After the work of Lexer (68) in 1925 and Passot (52) in 1930, fat transplantation became commonplace, the fatty tissue being taken from the abdomen or buttocks.

In view of the high degree of resorption noted, Berson (7) in 1944 proposed using dermal-fat transplants which Peer (55) recommended to be of the largest possible volume.

The latter proved experimentally that dermal-fat transplants accompanied by fascia revascularized more rapidly. This was the heyday of dermal-fat fascia grafts used by May (43), Watson (68), Bames (5), Conway and Dietz (12), Luque (36), Winkler (70), and others.

Enthusiasm gradually waned and the epiploic free transplants proposed by Passot (53) did not succeed in making good this deficiency.

To remedy the shortcomings of these techniques, investigators proposed *local flaps*. These were either fat in the manner of Glasner (22) or Morel-Fatio and Lalardrie (45), or dermal fat derived from Maliniac's technique (39) and advocated by Marino (41) and Longacre (35) *inter alia*.

Many attempts met with failure; others were *inclusion* of preserved human skin and *injection* of paraffin practiced as early as 1899 by Gersony (66). Vegetable oils, lanolin and beeswax, and especially liquid silicones were injected following Uchida

in 1961 and Conway in 1963 (13). *Prosthetic inclusions* have since earliest times constituted the easiest solution.

The first attempts appear to have been made with balls of ivory.

In 1930 Schwarzmann (66) suggested the use of glass balls, and this solution seems to have prevailed for some years for in 1942 Thorek (66) was still advocating it "in certain cases."

Plastic inclusions

Plastics made their appearance toward the end of World War II and surgeons soon came to envisage them as a solution to their problems. Levine and Hurst seem to have been the first to use them in mammary surgery.

After this time a large number of products appeared on the market, but their use in medicine was not always without problems.

We shall mention only the five products whose names have gone down in the history of mammary inclusions.

Ivalon

Ivalon (a derivative of polyvinylic alcohol) was discovered in 1949 and is spongy in texture. This product will always be associated with the name of Pangman and Wallace (51), who in 1954 performed 400 mammary implants.

Polistan

Polistan (a derivative of polyethylene) was discovered in 1950 and is also spongy with the consistency of straw (49).

We cannot mention every name associated with this product as this would amount to a rollcall of all the plastic surgeons working in the 1950s. Gonzalez-Ulloa (26) does, however, deserve special mention as he had the idea of using heat to render the surface of the inclusion smooth, so preventing a penetration of fibrous tissue: he thus attempted to transform an open-cell inclusion into one having closed-cell properties.

Etheron

Etheron (a derivative of polymethane), discovered in 1960, takes the form of a fine-textured sponge. This may explain why this type of inclusion leads to a less marked reaction of the periprosthetic tissue. Regnault (60) made an intensive study of this product.

Hydron

Hydron (a derivative of polyglycomethacrylate) was discovered in 1961. Also of spongy texture, this product seems to have enjoyed little success.

Silicones

Silicon rubbers were used for industrial purposes as early as 1945 (11) but were not used in medicine until the early fifties.

In 1953 Brown suggested using this product as a subcutaneous inclusion.

Between 1960 and 1962 Cronin and Gerow developed a mammary silastic prosthesis, and this was first used by Gerow in March 1962 (11).

At the Third International Congress for Plastic and Reconstructive Surgery in Washington in 1963 (14), they proved that the so-called closed silastic prostheses (as against the open prostheses referred to above) brought about only a slight fibrous reaction in the surrounding area. In order to give the breast a "natural feel to the touch," Cronin and Gerow, comparing the breast to a plastic bag filled with liquid, conceived a prosthesis formed by a silastic envelope containing a gel of the same product.

From 1964 on, this type of prosthesis was used by most surgeons, and a host of publications testified to the excellent results it afforded.

At the same time Akiyama, working in Japan as early as 1949 (48), produced prostheses with an organosilicone base, having identical properties.

In 1965 Arion (2) in France created a "silicone elastomer" prosthesis which could be inflated.

The satisfactory tolerance of medical silicones over 15 years has led to the appearance of various types of prostheses. It would be impossible to list all of them, particularly as new ones are appearing all the time.

It is possible, for example, to vary the shape, contents, outer covering, and other features to meet what are often contradictory needs.

We should also mention the site of the inclusion and the route by which it is introduced. But perhaps it is well to stop here for the story is by no means over and the time has not yet come to write a complete history.

Conclusion

This, then, is the history of mammaplasty; no doubt more remains to be said and our presentation is necessarily subjective. The tale is nonetheless a fascinating one as it testifies to the work of plastic surgeons for more than a century. The best way of bringing it to life is to perform a mammaplasty. Let us be aware that each of our acts, in its ease and simplicty, bears witness to this history and to the endeavours of the men who made it.

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