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TOPICS IN PLASTIC SURGERY
OF THE BREAST
INTRODUCTION

BACKGROUND
The term plastic surgery derives from the Greek word *plastikos*, meaning “to mould” or “to form.” This modulation and moulding of form is one of the most important aspects of the art of plastic surgery in which we strive to alter the shape of different body parts and, if need be, restore their form and function.

Often the changes in form are achieved by increasing or decreasing the size and volume of the operated body part. This is especially relevant in the case of the breasts in which we may deal with a either a surplus or a shortage of tissue. These situations may be extreme, but at the same time are often seen as mere variations within the norm. This true or perceived deviation from the norm can lead to complaints which may be either functional and physical, or psychological, leading to patient distress. As plastic surgeons we endeavor to manage such situations and strive, if indicated and feasible, to fulfill the patients’ aspirations.

The biological function of the breasts is lactation. Breasts are present in all mammals – a term that derives from the presence of breasts, *mammaria*. Despite all the attention breasts receive in our society, they are in fact simply exocrine glands that serve to nurse and feed the offspring.

The first sign of breast development is the mammary ridge that is seen in 7-week embryos. Most of this then disappears, but a part persists in the thoracic region and penetrates the parenchyma, giving rise to lactiferous ducts and alveoli that form the breasts. These drain into a small epithelial pit shortly after birth. This pit is transformed into the nipple by proliferation of the underlying mesenchyme. Additional breast tissue, usually presenting as axillary breast tissue or supernumerary nipples, may be seen in different locations along this line from the axilla to the groin [1].

At birth the breasts are similar in males and females, and it is not uncommon to observe an enlargement of the nipple and possible milk production, attributed to pre-natal exposure to maternal hormones, which lasts only a short time [2]. Until puberty the breast growth is similar in males and females; the different phases of development have been well described [3].

The appearance and growth of the breasts is an anticipated and welcome phenomenon in females. Lack of sufficient development is often a cause of concern for adolescent girls but, then again, overgrowth of the breasts will also lead to feelings of embarrassment and inadequacy.

Males can also develop excessive growth of the breasts during puberty. This is known as adolescent or pubertal gynecomastia and is a common phenomenon affecting up to two-thirds of adolescents [4].

As stated above, the main function of the breast is breast-feeding – nursing of the newborn. The breasts undergo changes before child birth which prepare them for lactation, and in this period one may observe hypertrophy of the ducts and the alveoli.
Those changes are reversible; in some women permanent growth of the breasts is seen after pregnancies, but more often atrophy and shrinkage are the result.

Like all parts of the body, changes are observed with advancing age. These may be attributed to aging and degradation of the tissues, the effects of gravitation and either the accumulation or loss of fatty tissue. Some of these changes are also due to the changing hormonal balance with menopause.

Such changes are observed not only in women, but also in men in whom the prevalence of gynecomastia increases with aging. This, combined with increased fat deposition and laxity of the skin and connective tissue, may lead to ptosis of the breast tissue [5].

There is a great variation in the shape and size of breasts, as well as in what is perceived as “normal” or aesthetically pleasing. These differences are also dependent on the era, the culture and the prevailing fashion.

Plastic surgery is distinct from many other medical fields due to the fact that one is not only dealing with the diagnosis, prevention and treatment of disease. Plastic surgeons certainly perform medical procedures for purely medical indications. However, they also treat non-medical indications, often performing surgery on healthy tissues, albeit with the aim of improving the psychological wellbeing of the patient, a notion often foreign to physicians and surgeons of other disciplines.

Nevertheless, even if one contemplates treating mainly healthy patients, one should be familiar with the common pathologies and conditions that may be encountered.

Cancer is the most serious pathology that is seen in the female breast and unfortunately it is very common. One in 7 women in the Netherlands will have breast cancer during her lifetime [6, 7]. Despite the progress that has been made in the diagnosis and treatment of breast cancer, it is still a significant cause of mortality for females.

One should remember that there is a range of benign pathologies that may be observed in the breast. These include breast infections in lactating women, as well as in non-lactating women, cystic disease, fat necrosis, fibroadenomas and papillomas [8].

The main treatment of breast cancer remains surgical. In recent years there has been a trend towards less radical operations – lumpectomies in place of mastectomies and the use of the oncoplastic approach [9]. Nevertheless, there often remains a deformity or deficiency that requires complete or partial surgical reconstruction.

In men one may observe pathologies similar to those seen in the female breast. However, the incidence of breast cancer is much lower in men, being about 1% of that in females [6].

The most common abnormal finding in men is gynecomastia [4, 10, 11]. This is a term used to describe breast enlargement in men. It derives from the Greek γυνή (gyné), meaning “woman” and μαστός (mastós), meaning “breast”. GM is
commonly seen during different phases of life. In the neonatal period this is due to intrauterine exposure to maternal estrogen [7] and during puberty it is due to hormonal imbalances with a relative surplus of estrogens [8-10]. It is a common phenomenon in adolescents with an overall reported incidence between the ages of 10 and 16 as high as 48.5% [9,11] and a peak incidence of 64.6% in boys between the ages of 14 and 14½ (11). In most cases pubertal GM resolves within 1 to 2 years following diagnosis [4, 12]. Gynecomastia is also common in the elderly, due to decreased testosterone secretion and increased use of medications [12]. Different pathological etiologies have been reported, including congenital and endocrine disorders, tumors, systemic diseases, medicines and illicit drugs. However, in the majority of cases no clear etiology is found and they are identified as idiopathic. Idiopathic adolescent GM does not require treatment. Reassurance and explanation of the natural course of GM are usually sufficient as most cases regress [13]. However, GM may persist and lead to the development of psychological problems [14]. In such cases the treatment will be operative removal of the surplus breast tissue by different surgical methods. The use of androgens or estrogen-receptor inhibitors is also possible in the early stages in order to inhibit the development of gynecomastia and possibly induce regression [13-15].

As opposed to the situation for other specialists operating on the breasts, the aim of plastic surgeons is not to cure the patient of a disease, but to improve the quality of life by changing the shape and form of the breast or reconstructing the breast in the case of amputation or disfigurement.

Aim

Building a base of knowledge can be a daunting task. It is no longer possible to know everything about one subject or even about one aspect of a subject, but of course a broad knowledge base is required to make further progress in our knowledge. Different pieces of information are needed in order to complete the broad picture. We can compare this to a building in which the different parts lie on top of the foundations or an image that is made up of multiple pixels – the more of those that are available, the better the resolution and the detail of the resulting image.

In research it is important to have positive results, and these will usually get the most attention, but negative results also deserve to be published as they strengthen the positive results. This can be correlated with the noise that has to be removed to get a sharper picture.

In this thesis studies are presented that focused on different aspects of the management of pathologies or abnormalities of the breasts using different methodologies, including reviews, retrospective and prospective studies, and surveys. These can serve to increase our knowledge and shed light on some of the aspects of plastic surgery of the breasts.
GENERAL INTRODUCTION

OUTLINE OF THE THESIS

This thesis has four parts.

PART ONE

The first part of this thesis covers issues of breast reduction in women. Breast reduction is one of the most common procedures performed by plastic surgeons. It is estimated that about 428,000 were performed worldwide in 2011 [16]. There are different reasons why women choose to undergo breast reductions. These include a wish to improve the shape, but mainly the wish for relief from symptoms associated with the breast hypertrophy. Despite the fact that there is a plethora of evidence for the benefit of reduction mammoplasty, plastic surgeons remain in a defensive position in having to prove that the patients should receive coverage by medical insurers.

Chapter 2 presents the results of checking among candidates for reduction mammoplasty to see whether there is an association between back posture and their complaints, and whether back posture may to be used for the screening and selection of patients undergoing such procedures.

It is often argued that the motivation for surgery is mainly psychological and that patients seeking breast reduction surgery may have a psychopathology. Chapter 3 describes a study assessing whether patients undergoing reduction mammoplasty score higher for psychopathology than the general population, using the SCL-90 as a validated tool.

Most studies on plastic surgery of the breast focus on the surgical technique, but the perioperative management is probably just as important in ensuring the safety of the patient. Vascular thromboembolism (VTE) is one of the major complications of surgery, and certainly one that may have the gravest implications. It is therefore important to use measures that may minimize that risk. The American Society of Plastic Surgeons sees the prevention of VTE as a priority [17]. In North America most practitioners apply compression stockings and intermittent compression devices. In the Netherlands the standard of care for the prevention of VTE is chemoprophylaxis using low molecular weight heparin (LMWH). This is known to be effective, but it may increase the risk of hemorrhagic complications. It is important to find a balance between both risks. The recommendations for plastic surgery, including reduction mammoplasty, are extrapolations from other fields of surgery. In Chapter 4 the risk of hemorrhage following breast reduction using perioperative chemoprophylaxis with LMWH is assessed.

PART TWO

The second part of this thesis covers issues concerning breast augmentation.

Breast augmentation was the most popular aesthetic surgical procedure in the US in 2012, with 330,631 reported procedures [18] and more than 1.2 million procedures worldwide [16].
The breast is an organ prone to malignancy; in fact, 1 in 7 women will develop a carcinoma of the breast in her life-time. One may then be concerned about the formation of breast cancer in association with implants and the possible occurrence of malignancy in the capsule, previous studies have demonstrated a reduced incidence of breast cancer in women who have received breast implants. In Chapter 5 a meta-analysis is presented which includes previous studies that assessed the risk of malignancy in patients with breast implants.

Revision of breast augmentation due to capsular contraction is a common procedure. It may also be questioned whether excised capsule material should be submitted for pathological examination. In Chapter 6 a study is presented in which pooled data were used from the nationwide network and registry of histopathology and cytopathology in the Netherlands (PALGA) in order to assess the incidence of malignancy in capsulectomy specimens.

**PART THREE**

The third part of this thesis concerns the male breast.

Males constitute nearly half of the population, but the pathology of the male breast represents only a fraction of the work of a plastic surgeon. Nevertheless, it also merits attention.

Gynecomastia is treated by different disciplines: pediatric surgeons treat children and adolescents younger than 18, general surgeons treat adults, and plastic surgeons treat all age groups. Apart from this difference between the disciplines, one may expect to find differences in patient populations, pathologies encountered and practice. Chapter 7 presents a retrospective analysis of gynecomastia treatment over a 20-year period at the Academic Medical Centre.

In Chapter 8 the same subject is approached in a different fashion. A survey was conducted among Dutch general surgeons, pediatric surgeons and plastic surgeons regarding their practice in the management of GM. Knowledge of the practices of the different disciplines may be important for formulating guidelines and the planning of health care.

Radiological imaging is often used in the assessment of men with breast lesions. It is actually required by Dutch medical insurers for the coverage of the costs of gynecomastia surgery. Due to the scarcity of pathological findings in the male breast, one may ask whether this is in fact necessary and whether imaging is being overused. In Chapter 9 the results of a study evaluating the outcome of imaging of the male breast at a university hospital are presented.

Surgeons will usually consider an operation to manage gynecomastia, but other treatments may be effective. Tamoxifen, an anti-estrogen, has been suggested as a potential pharmaceutical for the treatment of GM. If a pharmacological treatment is efficacious, surgeries may be avoided. Chapter 10 presents a systematic review of the use of tamoxifen for the treatment of pubertal GM.
In the previous chapters the practice of the surgeons was reported. Similar to the situation regarding the submission of capsule material for pathological examination following the revision of breast augmentation, one may question the necessity for submitting excised gynecomastia tissue for such examination. In Chapter 11 a study is presented in which pooled data were used from the nationwide network and registry of histopathology and cytopathology in the Netherlands (PALGA) in order to assess the incidence of malignancy in GM specimens.

**PART FOUR**

The fourth part of this thesis concerns unusual situations that call for original solutions.

In the present era there is pressure on practitioners and institutions to work more according to protocols and standard solutions, using the evidence from studies, and this can lead to increased safety and efficiency. However, there are cases where one should think outside the box and not use a ready-made solution. Reports of this kind can be helpful for practitioners facing the challenge of a similar, perhaps unusual, situation. Chapters 12 to 15 present such situations.

In Chapter 12 a case of lipofilling of the breast is presented in which the fat was harvested from the patient’s brother. This was possible due to the fact that the patient had previously received a bone marrow transplant from her brother.

In Chapter 13 the management and reconstruction of gestational macromastia – excessive breast enlargement during pregnancy – is described. This required a mastectomy followed by delayed staged reconstruction.

In Chapter 14 the use of gentamycin collagen sponges as an aid in salvaging infected breast implants is presented.

Malposition of the nipple in breast reconstruction can be difficult. In Chapter 15 a simple solution is presented for this complex problem.

**REFERENCES**


