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## Cost Effectiveness in Plastic Surgery



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Perceived as an expensive and complex intervention, surgery is often neglected by the global health community that is predominantly concerned with the treatment and prevention of communicable diseases and chronic diseases<sup>1</sup>. Despite accounting for 11% of the global health burden, surgical diseases are often disregarded while the current attention is shifted towards more medical concerns such as AIDS, tuberculosis and cardiac diseases<sup>2</sup>.

What prevents surgery from being a global health concern is related to the complexity of elaborating multiple factors in play altogether. To perform a surgical procedure, an appropriate infrastructure is essential. This includes a well-equipped operating theater, proper surgical equipment, an operational blood bank and a well-trained anesthesia team with the appropriate monitors and equipment<sup>1,3</sup>; all of which are costly. Surgical care does not finish at the end of the surgical procedure; an adequate postoperative care is of paramount importance. Most often this is done through regular monitoring in a postoperative anesthesia care unit run by the anesthesia, nursing and surgical teams. If the surgical procedure is more complicated or the general health status of the patient is more critical, then an intensive care unit will be required where an advanced monitoring system is present a one-to-one nurse-patient

ratio care is provided by well trained and readily available personnel.<sup>1</sup> When the patient status become less critical, he or she is usually transferred to a step-down or intermediate care unit in preparation for transfer to a regular floor. Any surgical procedure is not free of complications; and therefore if they occur, further interventions and lengthier medical care might be required which could negatively affect the health of the patient and significantly increase the cost. All this requires a proper investment to face the expensive cost of this part of healthcare, which creates less interest and enthusiasm by the global community.

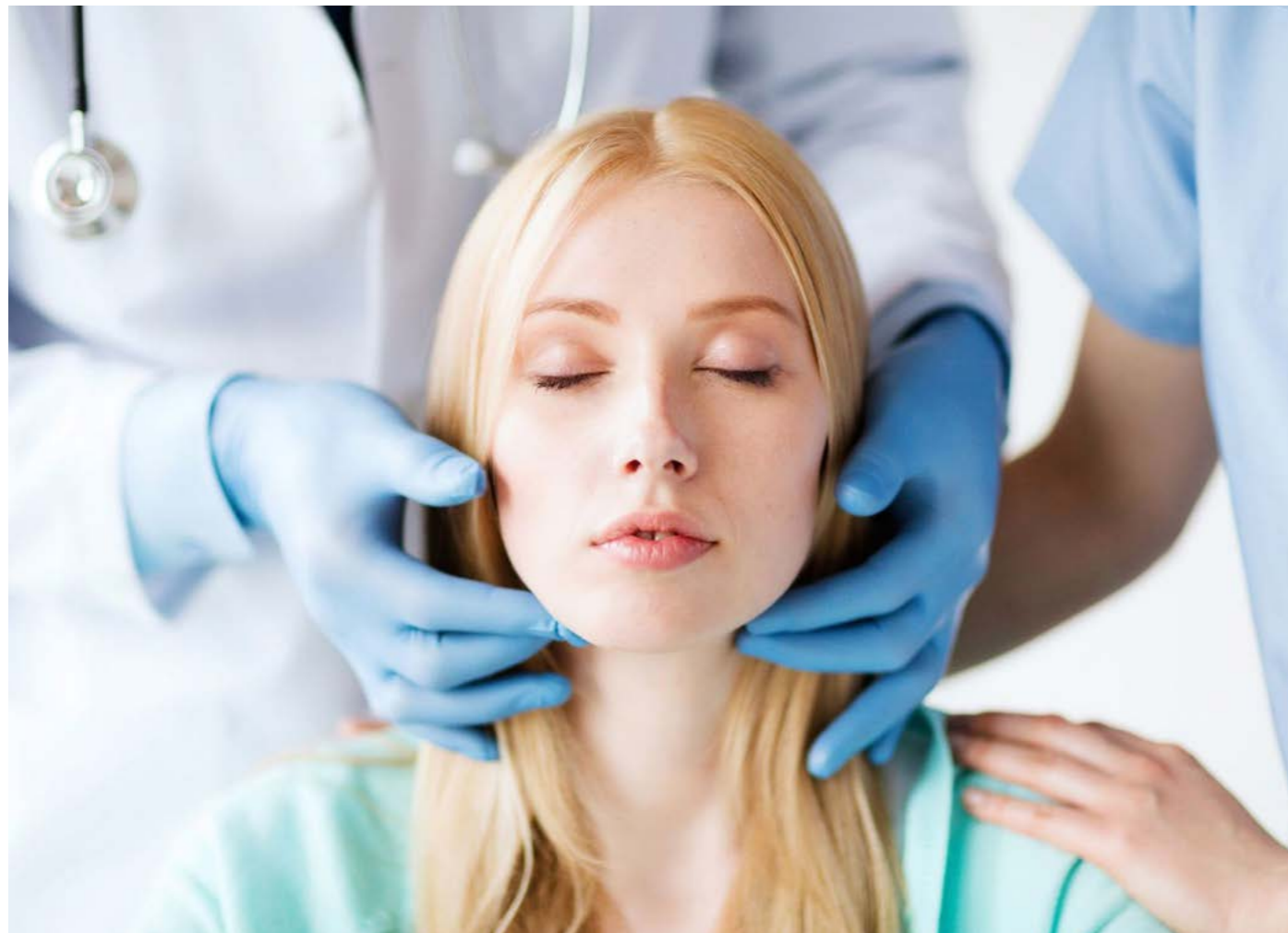
Often labelled as the “luxury” of surgery, plastic surgery is often considered as “less urgent” or “less important” especially when it comes to cosmetic surgery or the aesthetic aspect of reconstructive surgery. These are elective surgeries and rarely life threatening, giving the sense that this surgical specialty is of a lower priority<sup>4</sup>. In reality, plastic surgery is a rapidly growing field of surgery that encompasses its both aesthetic and reconstructive aspects. A variety of plastic surgery subspecialties includes craniofacial surgery, hand surgery, microsurgery and complex reconstruction, breast cosmetic and/or reconstructive surgery, burn surgery, pediatric plastic surgery, general reconstruction, and facial aesthetic surgery<sup>5</sup>. The diversity is not only in the wide array of cases encountered, but also in the substantial diversity that exists in the individual management of each case. For example, a patient in need of a breast augmentation might be offered multiple surgical techniques with different types of incisions and different types and shapes of the implant. This is where the question arises, which option is “superior”? Scientific evidence and more importantly the surgeon’s previous personal experience and training play a major role in the outcome. During surgical decision a major consideration must be focused on the “cost effectiveness” of the procedure, an issue that is often also neglected in the practice of plastic surgery.

Cost effectiveness is a frequently used term to justify

usage of novel interventions and techniques. When health resources are scarce, it is important to use them sensibly, that is when cost effectiveness comes to play. It is important to differentiate cost effectiveness from direct financial cost. Direct cost is the definite sum of money paid per surgical procedure, defined in monetary units such as dollars and pounds. It takes into consideration the cost of the procedure which includes hospital charges, professional fees, laboratory studies, operating time and hospitalization days. What direct cost fails to include is the outcome of the procedure or its “effectiveness” that addresses more with the health of the patient<sup>6</sup>. Outcome can be identified as mortality, morbidity, either expected or unexpected complications, reoperation rates, patient satisfaction and psychological consequences. All these factors can be summed into what is known as quality-adjusted life-years (QALY). QALY is a generic measure of the quality and quantity of life years, with one QALY

equating to one year of perfect health<sup>7</sup>.

In plastic surgery, both cosmetic and reconstructive procedures are included in the economic evaluation which challenges their cost-effectiveness or what we describe in more medical terms as “benefits and risks”. When it comes to reconstructive surgery, the public health care is concerned since it deals with repairing a surgical and functional problem secondary to congenital or acquired diseases such as those related to trauma or cancer surgery. This could not be exemplified better than when dealing with breast defect after cancer surgery. Breast reconstruction has become an integral component in breast cancer surgery and as such many studies are targeted at determining the most “cost-effective” strategy. Despite the option of not performing any procedure to reconstruct the breast post-mastectomy is still a valid one and even though this does not implement any financial cost at first, experimental



data have demonstrated that it is not be the most cost effective way to deal with this major problem. Leaving the patient without a breast mound ensues a body image of disfigurement, disruption of the patient femininity and therefore a far worst quality of life. On the long run, most patients need external prostheses inserted inside the bra to attain a more symmetrical look in clothing and more importantly, many patients will be in need of psychiatric medications and support. These are not cost free, and pose a significant economical burden. Therefore, despite its risks, breast reconstruction post cancer surgery is always recommended, justifying why this procedure is covered by third parties in most countries.

Straight surgically speaking, breast reconstruction entitles three surgical major modalities: reconstruction using breast implant (prosthesis), or using the patient’s own tissues (autologous), or a combined technique of both; all these could be done in one stage or multiple stages<sup>8</sup>.

Multiple researches have been conducted to prove the cost effectiveness of one technique over the rest. But sadly, there is no “one procedure fits all” conclusion. Breast reconstruction is a sensitive issue and the patient must play a principle role in the decision making process. A thorough preoperative assessment and adequate patient counseling should be provided to understand what are the patient’s expectation and how much is her “willingness to pay” threshold. The cumbersome process of reconstruction must be clearly explained in order to set expectations and therefore accordingly individualize treatment methods to each patient, according to guidelines, after extensively detailing the benefits and risks of every procedure on the short and long term. When it comes to cost per surgery, implant based reconstructions tend to be of lower financial cost. But when the quality adjusted life years is factored in, then the scenario changes. Over the first two years implant based reconstruction patients are more satisfied with the result, but that does not hold for long. Cumulative quality adjusted life years is higher in the autologous reconstruction group. So when patients have a longer life expectancy, autologous reconstruction tends to be more cost effective<sup>9</sup>. For better clarification, reconstructing a breast with an implant might cost less and have a shorter recovery on the short run. However, a breast implant needs to be changed once every seven to ten years on average. Therefore, every time the patient will have to undergo the same procedure under anesthesia, creating a cumulative increase in the cost of surgery. On the other

hand, autologous breast reconstruction is a more complex surgery and requires longer recovery period on the short run. However, this autologous modality of reconstruction is free of any implant and its related complications, in addition to the fact that it is a lifelong procedure for which the patient does not require any further surgeries in the future. This shows how autologous breast reconstruction is more cost-effective than an implant-based breast reconstruction on the long term. Finally, the “willingness to pay” threshold is to be addressed. When the patient is the one paying rather than a third party, money becomes an issue. Patients who are not willing to pay large sums of money the “do nothing” approach is the most cost effective option.

Making a “cost effective” decision in plastic surgery does not always have to be as difficult and complex as it is in the example of breast reconstruction. A frequently encountered inquiry in the clinic is an interest in a reliable mean of augmentation for facial volume loss. Commonly used material for augmentation are either autologous fat or alloplastic material; otherwise known as fillers<sup>10</sup>. Again “cost effectiveness” will take the cost and the outcome into consideration. Here, the cost includes the material price, procedure price and the surgeon fee. The outcome is reflected in the longevity of the result.

Per procedure, alloplastic material is of moderate cost. It is done in the outpatient clinic with no need of surgical intervention, the injection is done quickly and the recovery period is fast, making it a tempting choice to patients, especially when compared to the slightly more expensive option of autologous fat. The drawback lies in the frequent need of re-intervention. Fillers last on average six to twenty-four months. Whenever they dissolve re-injection is warranted. Therefore, even if using a persons own fat to restore facial fullness is costlier as it requires surgery under anesthesia, it is done only once in a lifetime, making it more “cost effective”. A similar scenario is faced with the thread lift when compared to surgical face-lifting. A cheaper and faster result is achieved with the thread lift, but again this procedure is susceptible to re intervention and is costlier on the long run.

Due to today’s popular culture, buttocks or gluteal augmentation is a frequently sought operation. It could be performed through a number of different techniques, including implants or autologous fat grafting. Implant

based buttock augmentation may be appealing to many patients as it gives a faster and more definite result, with no donor site morbidity. Fat grafting is also a powerful technique in skilled hands. But fat is prone to reabsorption and the final volume will not remain exactly as what was injected intraoperatively. This makes the patient liable to future surgical intervention for reinjection. In general, gluteal augmentation surgery has frequent complications such as infection, wound dehiscence, seromas and the need of implant revision and replacement. Rates of complication reaches 21% in implant based augmentation versus a 9% in autologous<sup>11</sup>. Knowledge of the significant difference in potential complications may guide the plastic surgeon in selecting the appropriate procedure and path of least resistance toward improved outcomes and consequently cost effectiveness.

A final example on cost effectiveness is on burn patients. Burns are a prevalent and burdensome critical care problem. Their wounds are complex and can present unique difficulties that require late intervention or life-long rehabilitation, which poses an economic burden. Early removal of burnt skin and skin grafting has been the standard of care for decades, not only due to medical reasons but also for its "cost effectiveness." It is a plausible choice to leave the burn wound open and treat it only with local wound care and dressing changes. However, if the wound is not expected to heal within two to three weeks, the high risk of infection, the cost of dressings, topical creams and nursing care will exceed the cost of a single surgery. Not to mention the constant pain, psychological distress and the higher risk of developing cancer in a burn scar on the long term (when no skin graft is applied) that the patient will encounter.

Plastic surgery is a very wide field and to be able to talk about its cost effectiveness as a specialty is very challenging. On a global level, the global health community must be better able to estimate the disease burden that is amendable to surgical intervention. Plastic surgeons must most definitely play a role in that. The burden shifts from congenital craniofacial defects and acute burn care in developing countries to reconstructive breast and cosmetic procedures in developed countries. Both ends of the spectrum of plastic surgery needs to quantify and determine cost effectiveness of procedures as it will help clarify some of the controversies present within this field<sup>12</sup>.

On an end note, an adequate preoperative patient counseling during which all procedures should be explained in details to the patients with emphasis on the risks and benefits of each procedure is highly warranted. Long term cost effectiveness must also be explained as to help guide the patient into making an informed decision.

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