# A Detailed Analysis of the Reduction Mammaplasty Learning Curve: A Statistical Process Model for Approaching Surgical Performance Improvement

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*Wham, bam, thank you ma'am!*
—David Bowie, "Suffragette City"

The authors apply statistical analysis methods called control charts, borrowed from the business world, to analyze efficiency and quality in breast reduction surgery. As described, control charts plot the mathematical average of a certain variable as a centerline and then set upper and lower boundaries between which individual variation in a specific process occurs. Scores that fall outside these limits are then investigated to identify system problems that can be corrected. Although these tools have traditionally been used for such matters as improving assembly line efficiency and productivity, the authors note that they have been applied in more recent times to evaluate procedure efficiency in general surgery, cardiac surgery, and other subspecialties.

The authors correlate an improvement in efficiency and quality in breast reduction with decreasing operating time, decreasing variability in operating time from case to case, and decreasing complication rates. They acknowledge that the complication rate in breast reduction is low to begin with. Therefore, they essentially define improved efficiency and quality as shorter operating time and less operating time variability for a specific surgeon. The authors mention that the aesthetic result and patient satisfaction are important in the definition of quality but neither one is included in their analysis.

As with cholecystectomy, breast reduction surgery is a commonly performed procedure intended to relieve pain and discomfort. It therefore would appear to qualify for efficiency analysis just like any other procedure. However, unlike modern cholecystectomy surgery that leaves a few relatively inconspicuous laparoscopy scars, a patient undergoing breast reduction lives with a profoundly different aftermath of surgery. Stepping out of the shower every day, she is reminded of the surgical stigmata imprinted on one of the most charged areas of real estate on the female body. Therefore, as the goal of eliminating symptoms is readily achieved by breast reduction, the focus that defines quality should be the aesthetic result, not the amount of time it took to finish the procedure or how consistent was the amount of time it took to do it.

It is challenging to establish aesthetics as the key metric that defines quality, even if it seems intuitively obvious. Aesthetic results are subjective and presently defy measurement even though both excellent and poor results are obvious to physician and layperson alike. Insurance companies, and hospitals for that matter, are certainly not preoccupied with the quality of the aesthetic results we achieve for our patients. Instead, they can be expected to fully embrace a system that defines best quality as the shortest operating time, and who can blame them when looking at the issue from their perspective? Physicians themselves are also part of the problem. At some level, most surgeons admire speed and deftness, and trainees inculcate this as a desirable trait. Furthermore, steadily declining reimbursement rates create cognitive dissonance for the surgeon who prefers to prioritize aesthetics above operating time.

The authors assume that improvements in efficiency and quality go hand in hand. This may be true in the mechanistic world of the factory assembly line. However, pressure to improve efficiency (i.e., decreasing operative time) in the case of breast reduction may actually compromise quality, if not in terms of increased complications then certainly in terms of individual aesthetic results.

Applying instruments designed to measure manufacturing processes to surgeons for the benefit of payors or to qualify surgeons for the public,

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as the authors propose, is highly questionable. We should not feel obligated to pander to outside influences in setting proper standards.

Not all breast reduction methods lend themselves equally to improvement in efficiency and quality, even if we accept these terms as defined by the authors. Inverted-T methods do have an architectural simplicity of design that favors delivery of predictable results with increasing efficiency. Technical advances in equipment such as Quill sutures and absorbable dermal staplers aid this effort by decreasing surgical time independent of individual surgeon characteristics. However, vertical reduction, used in only 1 percent of the patients in this retrospective study but more widely used today, is by nature more intuitive and the technique more variable from patient to patient. It generally requires more of an eye as well as more adjustments during the course of the procedure to achieve consistent high-quality aesthetic results. This technique is even less compatible with analysis using business world tools.

Even if it were possible to establish a set of standards that defines maximum efficiency and quality as defined by the authors, how do we apply this to all practitioners? Surgeons, like artists, differ in their wiring. Van Gogh produced 9000 drawings and paintings within the last few years of his life, an example of being fast and good. There are many important artists that typically produce a dozen paintings per year, an example of being slow and good. Some, like Vermeer, who produced only 37 known paintings over a career, could be categorized as being excruciatingly slow but spectacular. It is improbable that a statistical process control method can change one type of surgeon into another, an unspoken but implied benefit of the methods endorsed in this study.

Even assuming that statistical process control instruments can somehow distinguish quality in different surgeons, it will not necessarily translate into better care for patients. Many in the public today see physicians as interchangeable anyway. They often choose a surgeon solely because that surgeon is in their "network" and therefore the least expensive option. One can also imagine states listing physicians by their statistical process control scores on their official health department websites for the public to decipher. This is already done with mortality statistics for cardiac surgeons and physician malpractice histories in some states. How this information will be helpful to anyone is hard to imagine.

The authors do present an innovative approach and do make some good points regarding the maturation process of surgeons using statistical process control methods. However, as surgeons, we should neither impose nor capitulate to a value system that does not fit a medical application. We should instead maintain our own personal high standards of quality, whether they are measurable or not by today's methodology.

*Surgery is a one-time event for the surgeon and a lifetime event for the patient.*

—William W. Shaw, M.D.

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