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A Brief History of Minimally Invasive Plastic Surgery

Geoffrey G. Hallock, M.D.¹

ABSTRACT

It could be argued that a basic principle establishing plastic surgery as a distinct specialty always has been minimal invasive surgery. Although perhaps lagging behind the other surgical specialties specifically in adopting the surgical endoscope, this merely is a new tool to better achieve just that objective. Outcome enhancements initially predominated in aesthetic applications, but widespread use also in reconstructive endeavors has proved that there is indeed today a broad role for minimally invasive plastic surgery.

KEYWORDS: Minimally invasive plastic surgery, endoscope

The goal of what today would be considered minimally invasive surgery may be to even surpass the outcomes possible with traditional open techniques, with diminished patient morbidity including accelerated recovery times; and, at the same time, preferably by reducing overall health care costs. Initially conceived as a means to allow the direct examination of internal organs while avoiding large incisions, the origins of the clinical application of this concept can be traced back to Hippocrates in ~400 BC who used a rectal speculum to examine hemorrhoids.¹ The centuries to follow fostered slow, incremental improvements in instrumentation and light sources that would eventually allow the requisite access as well as proper illumination of the operative field. However, not until the 1950s did the advent of fiber-optic technology permit the transmission of light from an external light source along long, flexible glass or plastic threads so that a clear image could be obtained, yet now without risk of thermal injury.¹

By the 1970s, gynecologic surgeons routinely used laparoscopy not only for pelvic examination but also for relatively simple operative procedures such as tubal ligation. This author, then a budding “general surgeon,”

recalls borrowing their now crude instrumentation to rule out acute appendicitis in the hopes of potentially avoiding the need for a diagnostic laparotomy. Unfortunately, any insight to realize the great potential to come was sorely lacking. In retrospect, this primarily was because the available equipment was relatively primitive. The typical rigid scope had a single eyepiece that restricted vision, was awkward to manipulate, and limited assistance by others. That all changed with the introduction of the solid-state or chip camera in 1982. Miniaturized video cameras could maintain a sharp, clear image that was magnified, and, when seen on a TV monitor, permitted involvement simultaneously by all operating room personnel to help with the procedure. The laparoscopic revolution truly was “kick started” by the French surgeon Phillipe Mouret in 1987 who performed the first laparoscopic cholecystectomy.²

The impetus to further refine tools and procedures with ever innovative applications rapidly spread to all specialties as virtually all organ systems could now be approached using an endoscopic technique. Plastic surgery as a group may have lagged behind the rest probably because unlike the other specialties that could

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take advantage of an existing or potential space in some body cavity, unique methods had to be devised to develop and/or maintain a satisfactory subcutaneous optical cavity.³ As a footnote in our history, though, Teimourian and Kroll did report the use of subcutaneous endoscopy to evaluate the tissue residue as affected by suction lipectomy in 1984.⁴ Chow soon thereafter presented his two-portal method for carpal tunnel release.⁵ By 1990, ongoing research efforts at the University of Alabama at Birmingham culminated in reports of a broad clinical experience in endoscopy including endoscopic browlift.⁶ Concurrently, the industrious group from Emory swiftly found indications for other facial and breast surgeries.^{7,8} Nowhere were the early demands for minimally invasive surgery so prevalent than in cosmetic surgery.⁹⁻¹¹

The interest in aesthetic endoscopic plastic surgery still predominates today,¹²⁻¹⁷ but even in spite of our tardiness, there was a concomitant explosion of novel applications in reconstructive surgery. An early thrust of the latter included relatively simple maneuvers such as the removal of benign lesions,^{18,19} decompressive fasciotomy for extremity compartment syndrome,²⁰ or retrieval of spare body parts such as tendon,²¹ vein,²² or nerve^{23,24} grafts. Congenital deformities such as torticollis²⁵ or others, especially in the pediatric age group,¹⁹ have been well suited to endoscopic correction, as the cosmetic result often is a major consideration. Acquired defects like facial fractures²⁶ may be directly or indirectly repaired. More complex indications for various tissue manipulations have included the safe placement of tissue expanders^{27,28} or harvest of local²⁹ or free adipofascial, muscle, and visceral flaps³⁰⁻³² using endoscopic assistance. The realm in the future may be endoscopic robotic surgery for even greater precision, including not just the difficult and safe dissection of the vascular pedicles of all flaps but also the performance even of the micro-anastomoses themselves!^{33,34} The capability for all these tissue manipulations could someday then be routinely performed in any distant land or even on another planet, where the immediate availability and skills of a plastic surgeon will no longer be a concern!

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