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Anjan Chatterjee

University of Pennsylvania, anjan@mail.med.upenn.edu

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Abstract

As our knowledge of the functional and pharmacological architecture of the nervous system increases, we are getting better at treating cognitive and affective disorders. Along with the ability to modify cognitive and affective systems in disease, we are also learning how to modify these systems in health. "Cosmetic neurology," the practice of intervening to improve cognition and affect in healthy individuals, raises several ethical concerns.¹ However, its advent seems inevitable.² In this paper I examine this claim of inevitability by reviewing the evolution of another medical practice, cosmetic surgery. Cosmetic surgery also enhances healthy people and, despite many critics, it is practiced widely. Can we expect the same of cosmetic neurology? The claim of inevitability poses a challenge for both physicians and bioethicists. How will physicians reconsider their professional role? Will bioethicists influence the shape of cosmetic neurology? But first, how did cosmetic surgery become common?

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Cosmetic Neurology and Cosmetic Surgery: Parallels, Predictions, and Challenges

ANJAN CHATTERJEE

As our knowledge of the functional and pharmacological architecture of the nervous system increases, we are getting better at treating cognitive and affective disorders. Along with the ability to modify cognitive and affective systems in disease, we are also learning how to modify these systems in health. "Cosmetic neurology," the practice of intervening to improve cognition and affect in healthy individuals, raises several ethical concerns.¹ However, its advent seems inevitable.² In this paper I examine this claim of inevitability by reviewing the evolution of another medical practice, cosmetic surgery. Cosmetic surgery also enhances healthy people and, despite many critics, it is practiced widely. Can we expect the same of cosmetic neurology? The claim of inevitability poses a challenge for both physicians and bioethicists. How will physicians reconsider their professional role? Will bioethicists influence the shape of cosmetic neurology? But first, how did cosmetic surgery become common?

Clinical and Technical Imperatives

Cosmetic surgery was propelled by a combination of a pivotal need for reconstructive surgery and technical developments. Although reconstructive surgical techniques date back to Indian treatises from 600 BC and were known in Europe during the Renaissance, the introduction of anesthesia and antibiotics made these surgical procedures far more feasible. The First World War served as a major impetus for the development of cosmetic surgery.³ Many soldiers wearing helmets survived trench warfare with significant facial shrapnel injuries. Pilots also had severe facial injuries following crashes. These injuries were recognized as a major social problem. Surgeons wished to both improve function and create an appearance that would make it easier for veterans to return to their families and the civilian workforce after the war.⁴ The wartime innovations in surgical techniques would later be applied to cosmetic surgery.

During the 20th century, technological innovations continued, and the scope of cosmetic surgery expanded to cover almost every part of the body.⁵ Since the 1950s, face-lift techniques have been added to head and neck cosmetic proce-

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dures. "Rejuvenation" procedures include forehead lifts, eyelid surgery, chin implants, dermabrasions, chemical peels, dermaplaning, and laser resurfacing. Solid silicone was introduced to augment noses, cheekbones, chins, and jaws. Various "fillers" are now injected to rejuvenate faces.⁶ The aesthetic armamentarium now includes botulinum toxin to selectively paralyze facial muscles. Procedures to contour the body also developed considerably over the years. In the 1960s, women in search of Barbie bodies could avail themselves of silicone breast implants and later of saline, fat, and peanut oil implants. Since the 1980s liposuction has targeted abdomens, hips, and thighs. This technique applied to chins, cheeks, knees, calves, and ankles is finding new markets among body builders. Prostheses are now inserted into men's penises and men's and women's buttocks, and collagen and fat are injected into hands and lips.

Thus, clinical needs prompted by war injuries and technical developments were preconditions for the development of cosmetic surgery. Analogous clinical needs for cosmetic neurology are now present. By the age of 85 between a quarter and a half of the population may have a dementing illness.⁷ Better acute management of strokes means that more patients survive with chronic cognitive impairment. Cognitive disorders in younger people, such as attention deficit disorder, learning disabilities, and the spectrum of autistic disorders are increasingly recognized. We seem awash in psychiatric disorders. A recent survey suggested that half of adult Americans suffer from addiction or affective illnesses.⁸

The clinical need for treatments for cognitive and affective disorders is accompanied by scientific developments that make neuroenhancement possible. The targets for neuroenhancement include motor, cognitive, and affective systems. Motor abilities can be enhanced by modulating cardiovascular, peripheral motor, and central nervous systems. Human erythropoietin and sildenafil increases oxygen-carrying capacities for better endurance.⁹ Insulin-like growth factor increases muscle mass and prevents decline associated with aging.¹⁰ Dopamine agonists target the central nervous system and improve the acquisition of motor skills, and, when paired with physical therapy, appear to hasten motor learning following stroke.¹¹

Attention, memory, and learning can also be modulated in healthy people. Cholinesterase inhibitors improve normal performance in laboratory vigilance tests.¹² Modafinil improves vigilance and reduces impulsive responding¹³ especially in sleep-deprived states. Nonaddictive stimulant medications, such as atomoxetine, are also likely to improve levels of arousal in normal subjects. New classes of drugs, ampakines and cyclic AMP response element binding protein (CREB) modulators, promote the intracellular cascade of events leading up to structural neural changes associated with the acquisition of long-term memories.¹⁴ Most neuroenhancement drugs are developed to treat disorders. As an afterthought, they may also enhance normal abilities. In contrast, ampakines and CREB modulators are developed to augment normal encoding mechanisms. They might also apply to disease states, as an afterthought.

Finally, we continue to refine ways to modify affective systems. Beta-blockers appear to help with posttraumatic symptoms in individuals who come to emergency departments after car crashes.¹⁵ Serotonin reuptake inhibitors are used widely and seem to promote affiliative behavior in healthy people.¹⁶ Around the corner are a host of potentially new ways of controlling affective states with the modulation of neuropeptides¹⁷ such as substance P, vasopressin, galanin, and

neuropeptide Y. Corticotropin release factor (CRF) seems to mediate the long-term effects of stress, and blocking CRF may blunt these effects.¹⁸

We are in the midst of a period of unprecedented and ongoing development in neuropharmacology. Reconstructive surgery toppled into cosmetic surgery as if pushed by a technological imperative. Will a similar technological imperative tip the clinical neurosciences into cosmetic neurology?

Ethics and Inevitability

The ethical concerns raised by cosmetic neurology have been reviewed in detail elsewhere.¹⁹ There are four major concerns. First is a concern about safety. As new medications are developed, some will have undesirable side effects. In a disease state, we weigh the potential risks against the potential benefits. In a healthy state are any risks worth taking? Second is a subtle concern about the erosion of character. If struggle is important to the development of character, does the use of pharmacological interventions to improve cognition or modify affect undermine this process? Third is a concern about distributive justice. If cosmetic neurology succeeds in making people smarter and happier, will these enhancements be available disproportionately to the affluent? Finally, there is a concern about coercion. Can healthy individuals be forced to take medications either because it would serve a greater good or because of competitive pressures? Despite these considerable ethical concerns, I propose that the advent of cosmetic neurology is inevitable. My point is not to trivialize these concerns, but to argue that they are unlikely to halt the development of cosmetic neurology.

Similar ethical concerns applied to cosmetic surgery, and yet cosmetic surgery is now practiced widely. Concerns about safety for cosmetic surgical procedures have always been present and became especially salient when silicone breast implants were implicated in autoimmune disorders.²⁰ Concerns about character were framed around notions of frivolity and being inappropriately preoccupied by appearance. Coercion was also a concern. But, rather than being an impediment, it became a driving force in the development of cosmetic surgery. Questions of distributive justice were never entertained seriously and were mitigated by financial plans that made these procedures available to those of modest means.²¹ Cosmetic surgery has also been subject to feminist critiques²² as women's bodies are considered raw material to be shaped by male standards.²³ Cosmetic surgery also falls well outside the traditional goals of medicine to save lives, treat disease, and promote health. Surprisingly, medical ethicists have only rarely examined this practice.²⁴

Despite these concerns about cosmetic surgery, in 2004 board-certified surgeons performed 9.2 million cosmetic surgical procedures (compared to 5.6 million reconstructive procedures), a 700% increase since 1992. For women, the top five cosmetic surgical procedures were liposuction, breast augmentation, eyelid surgery, nose reshaping, and face-lifts. For men, the top five cosmetic surgical procedures were nose reshaping, hair transplantation, eyelid surgery, liposuction, and breast reduction. These procedures are not confined to white America. Between 2000 and 2004, 49% more procedures were performed on Hispanics and 24% each on African-Americans and Asian-Americans. These statistics (http://www.plasticsurgery.org/public_education/2004Statistics.cfm)

apply to board-certified physicians and undoubtedly underestimate the actual number of procedures performed.

How did cosmetic surgery become so common? Although technical and scientific developments were a necessary prerequisite for this development, cultural, sociological, and economic forces paved the way. Analogous forces seem poised to pave the way for cosmetic neurology.

Cultural Conditions

The most important impediment to the legitimacy of cosmetic surgery was the view that it was frivolous. Over the years, choosing to undergo cosmetic surgery was reframed as a rational economic and psychological decision. This reframing occurred as the American ideal of self-improvement was changing. Seventeenth and 18th century religious notions of self-improvement gave way in the 19th century to moral but secular constructions, in which developing character became the goal. In the early 20th century, the emphasis on character shifted to a cult of personality. Personality emphasized the presentation of one's self in order to stand out in a crowd and was rooted in a social rather than an individual judgment. It could be augmented by proper speech, dress, and manners.²⁵ The importance of personal appearance was further reinforced by changes in the demographics of the work place. As the population continued to move from insular rural environments to faster paced, transient, and competitive urban environments, the dynamics of the work place also changed. Sales and service became important features of work. Personal encounters with relative strangers became common, and first impressions took on an unprecedented importance. In an increasingly competitive work place, the decision to enhance one's appearance was a rational economic decision. This argument had been used to support reconstructive surgery for wounded veterans to rejoin the civilian work force. If appearance was a critical asset in the market place, then it became increasingly difficult to decide which surgical changes were legitimate and which were not.

Finally, and most importantly, psychology provided a conceptual framework for the practice of cosmetic surgery.²⁶ In the 1920s and 1930s Americans were fascinated by Alfred Adler's notions of the inferiority complex. People could develop inferiority complexes because of physical imperfections, which undermined their confidence and were impediments to work. Thus, cosmetic surgery was mental health intervention with clear economic consequences. This view even led to pilot programs in the 1920s and 1930s of cosmetic surgery to rehabilitate convicted felons.²⁷ Later, in the 1950s beauty became linked more explicitly to youth, and the same psychological and economic rationales for "rejuvenation" were used to legitimize procedures like face-lifts.

Thus, the major criticism of cosmetic surgery as frivolous was countered by the view that it fell within the obligation to improve one's self, and that it was a serious rational decision with clear economic and psychological consequences. Cosmetic neurology, by contrast, does not face the frivolity concern, at least not directly. The obligation to improve one's self extends to a responsibility to be productive and congenial. The economic rationale to maximize abilities is also evident. The workplace has only become more competitive over the years. Many sectors of society have winner-take-all conditions in which

small advantages produce disproportionate rewards.²⁸ The usefulness of being stronger and smarter, require less sleep, learn more quickly, and not be bothered by psychological trauma is abundantly clear. Older workers risk being replaced by younger workers because they are less able to learn and adapt to a rapidly changing technological environment. Finally, psychological problems can be treated directly in the brain rather than distantly at the body.

The Media's Role

The changing cultural values that legitimized the use of cosmetic surgery were promoted most clearly by the media. Womens' magazines advised women on gender roles, methods of self-improvement, and how to deal with new technologies, including surgical innovations. They introduced a vocabulary that made cosmetic surgery familiar. In the 1950s, the postwar emphasis on domesticity extended to comparing cosmetic procedures to sewing, and face-lifts as a way to "neaten" or "tidy up" one's face. Articles on appearance related themes served as instructional guides and updates on new trends or autobiographical accounts. According to Sullivan,²⁹ the magazines tended to be relentlessly positive and light-hearted. Risks, when mentioned, most often focused on unreliable aesthetic results, rather than on health.³⁰ Physician experts often lend authority to these articles. In medicalizing cosmetic surgery, nose, chin, and ear modifications became treatments for genetic misfortunes; tummy tucks, breast lifts, and thigh and buttock shaping became treatments for damage rendered by pregnancy and aging; chemical and laser peels became treatments for damage by sun, cigarettes, and acne. The articles often extol the chance to improve on nature and decry the idea that anatomy is destiny. More recently television extends this media role. The current wave of makeover shows that emphasize appearance also include cosmetic surgical procedures. By highlighting specific procedures as "extreme," these shows normalize other cosmetic procedures. Thus, the media promoted cultural attitudes that shaped the view of cosmetic surgery as normal and even desirable.

It is too early to predict the media's role in the evolution of cosmetic neurology. What is clear is that they will be active participants.³¹ The media has been preoccupied by stories of doping athletes, sleepless students, and steady musicians. The Internet also serves as a vehicle for cultural values in a way not present in the early days of cosmetic surgery. How the Web will affect the development of cosmetic neurology is difficult to predict. How will pharmaceutical advertisers, consumer advocates, and professional groups try to guide the media? Whether a dominant media message about cosmetic neurology will emerge remains to be seen. But it is likely that the media will both reflect and shape cultural attitudes toward this practice.

Medicine's Response

Cosmetic surgery introduced a medical practice without precedent. Despite considerable initial resistance and deep ambivalences among physicians, in 2004 almost twice as many cosmetic as reconstructive procedures were conducted in the United States. How did physicians reconsider their role to make this practice possible, and what can we expect of physicians in the development of cosmetic neurology?

The initial resistance to cosmetic surgery in the early 20th century arose when physicians were establishing their legitimacy as healthcare practitioners.³² Medical practice at the time was largely unregulated. The American Medical Association (AMA) branded “irregulars” such as homeopaths, chiropractors, magnetic healers, and hydrotherapists as quacks and introduced tight professional norms for allopathic physicians by insisting on scientific rigor in medical training and licensing procedures for practice. In this climate, most well-established surgeons considered cosmetic procedures frivolous and even immoral. At the time, “beauty doctors” did most cosmetic surgery. They often had little formal training and did not teach in medical schools or join medical societies or publish in medical journals. Yet, they had a disproportionate impact on how the public viewed cosmetic surgery. For example, Schireson promoted and received intense press coverage for operating on vaudeville star Fanny Brice’s nose, making the public aware that such procedures were even possible. Despite the initial disdain for beauty doctors,³³ by the 1960s, most plastic surgeons had lucrative side practices in cosmetic surgery. Surgeons adopted the idea that cosmetic surgery was a mental health intervention, which placed the practice in familiar therapeutic territory.

Sullivan³⁴ points out that changes in the economics of medicine promoted the practice of cosmetic surgery. The increasing number of practitioners following the 1970s increased competition and coincided with decreasing demands for traditional reconstructive services. The use of seat belts and shatterproof glass in cars reduced the need for trauma surgery. The decline in the number of births in the 1960s reduced the need for congenital craniofacial procedures. Innovations in radiation and chemotherapy reduced the need to treat deformities caused by tumors. The increasing corporatization of medical practice provided incentives for physicians to practice cosmetic surgery. Physicians increasingly function as employees. Their medical decisions are largely constrained by insurance policies and regulatory burdens. Under these conditions, the freedom of a fee for service practice had an obvious appeal. Cosmetic surgery also became more widespread as informal controls on its practice broke down. Through the 1960s there were few opportunities to be trained in aesthetic procedures. Since then, practitioners can learn new procedures at workshops sponsored by professional organizations. In addition, hospital privileges are no longer needed to practice cosmetic surgery. By the late 1980s, 95% of procedures took place in doctor’s offices and in stand-alone surgical centers.

In the 1970s, the Federal Trade Commission, attempting to decrease medical costs, decided that bans on advertising violated antitrust laws. Vigorous medical marketing followed this ruling.³⁵ The American Society for Plastic and Reconstructive Surgery hired consulting firms to tailor their message, revived science writers’ symposia to encourage media exposure, provided radio broadcasts with prerecorded messages, widely distributed patient-education brochures, developed films and slide shows for local seminars and newsletters that could be individualized for practitioners, and established a toll-free national referral service. In 2004, their toll free referral number logged half a million phone calls.

How do the dynamics within medicine over the last 85 years in response to cosmetic surgery compare to what might be expected for cosmetic neurology? The struggles of the AMA in the first half of the 20th century to legitimize medicine by upholding standards and decrying commercialism seem a distant

memory. Physicians as a group seem less motivated to establish or maintain their role as cultural authorities. Consequently, the idea of distinguishing between legitimate and quack practitioners, although still germane, is not likely to gather much force. The competitive pressures in the practice of medicine continue unabated. Physician salaries have decreased in recent years, and the bureaucratic burdens of practicing corporate medicine are substantial. The option to engage in a fee for service practice remains enticing. Many psychiatrists now only see patients in fee for service practices, an example cosmetic neurology is likely to follow. Pharmacological enhancements do not face the technical barriers present with cosmetic surgery. Pharmaceutical companies promote the myriad ways in which medications can be used. The Internet as a source of unregulated information and as a marketplace serves to increase demand and creates availability not conceivable for cosmetic surgery.

Ironically, success in clinical neurosciences may bolster cosmetic neurology practices, analogous to the way that decreased demand for reconstructive surgery strengthened cosmetic surgery. Consider Alzheimer's disease, the most common degenerative dementia. Specialized clinical and research Alzheimer's Disease Centers now dot the landscape, and intensive efforts at understanding the pathophysiology and developing treatments are underway. To date most treatments are symptomatic. Although these interventions can improve patients' quality of life, they do not halt or reverse the disease. However, within our lifetime AD might be diagnosed and treated in its preclinical stages. Then, will this massive infrastructure of cognitive experts and specialized centers be redirected to the practice of cosmetic neurology?

It is hard to know if medicine as a profession will engage in promoting cosmetic neurology in an organized way. As part of the ongoing specialization of medicine, this past year, the United Council for Neurologic Subspecialties approved accreditation and licensing procedures for fellowships in behavioral neurology and neuropsychiatry. Thus, an organizational body that might eventually have an economic interest in the development and promotion of cosmetic neurology is in place. More broadly, fiduciary and commercial interests in medicine are increasingly conflated. Academicians develop patents and start their own companies. Hospitals engage in aggressive marketing campaigns. Relationships with rich donor-patients and families are carefully nurtured. Paradoxically, medicine is returning to a marketplace mentality and morality that the AMA decried a century ago. If there is money to be made, barriers to cosmetic neurology appear flimsy at best.

Challenges

If the history of cosmetic surgery is a guide, then the growth of cosmetic neurology seems inevitable. Factors that impeded the development of cosmetic surgery have dissipated, whereas the relevant factors that promoted cosmetic surgery remain in force. The advent of cosmetic neurology presents challenges to physicians and bioethicists.

Physicians are less engaged in questions of legitimacy. Legal and economic concerns insert themselves into decisions made by physicians at the bedside as their autonomy has declined markedly.³⁶ This decline is likely to be accompanied by an erosion in physicians' traditional sense of ethical responsibilities

as these concerns are abrogated to rules and regulations and fiduciary and economic interests are conflated. For physicians, this question of professional identity (and integrity) remains a fundamental challenge, a challenge that will be magnified by the practice of cosmetic neurology.

Bioethics evolved in an organized form in the late 1960s and early 1970s and has focused on medical and technological advances.³⁷ Cosmetic surgery evolved in an earlier era and with little critical analysis and virtually no input from professional bioethicists. Recently, bioethicists have engaged in vigorous debates about the ethics of genetics.³⁸ The concerns about human genetic modifications are not likely to surface in clinical practice for some time. In contrast, cosmetic neurology is evolving now. Bioethicists were late for cosmetic surgery and early for genetics. Professional ethicists are poised to turn their attention to neuroscience. As a fundamental challenge, will bioethics have any influence on cosmetic neurology?

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