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Facial rejuvenation with aesthetic surgeries

Landy Lin

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Facial Rejuvenation with Aesthetic Surgeries

by

Landy Lin

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Special thanks to my thesis advisors Professor Wabnitz, Dr. Herrera, Dr. Pennino for their generous help. Also thanks to Professor Shepard and Professor Suits for their many valuable advice.

With sincere gratitude to my family: Mom, Dad, Mindy, Wesley and my best friend Chris for their continued support through my academic journey.
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FOREWORD

In the sixteenth century, Leonardo da Vinci was first to explore human anatomy in his paintings. Combining anatomy with art, da Vinci built a bridge between his viewers and medicine. In modern society, medical illustration still carries the same principle that da Vinci expressed through his art, which is to integrate medicine and art for the betterment of human lives.

In evolution, one of man's greatest advances is the increasing knowledge about his physical self which permits advancement in medical technology. Today, medicine has been revolutionized to the point where survival is no longer the only principle duty, but that it should alleviate human suffering in all its forms. Surgery is not limited only to the treatment of organic disease but is performed on an elective basis to improve the quality of life.

Like medical illustrators who unite medicine with art, aesthetic surgeons everywhere are combining their medical knowledge with their artistic talents to create a better self image for their patients. In our youth oriented society, with the constant improvement of medical technology, people are living longer and aging has become a dreadful prospect. While our inner souls remain young, our outer surfaces are aging, causing anxiety about our appearances. Surgery to rejuvenate the most visible part of our anatomy, our face, could close the discrepancy many
of us feel between our youthful inner soul and our aging outer surface. Consequently, happiness may be regained by those who elect to recreate the youthful appearance through aesthetic surgery.
Part One

Why Aesthetic Surgery?

INTRODUCTION

Historically, surgery was usually performed for the remedy of organic diseases. It was considered to be the ultimate procedure for relieving human sufferings when all other forms of treatment had failed.1 With the constant improvement of medical technology, however, our life expectancy is lengthened greatly and we are slowly emerging from an era where survival is the only principal effort. Consequently, we are entering a new age where modern medicine has placed more emphasis on improving the quality of human life, and is not limited only to the treatment of organic diseases anymore.

In our youth oriented culture, aging has become a dreadful prospect which leads many people to develop anxiety over their aging faces. Furthermore, as the lifespan lengthens, most people feel energetic long after their appearance begins to deteriorate. It is therefore, aesthetic surgery is undertaken to rejuvenate the patient’s appearance, with the ultimate goal to assist positive psychological modifications. In reality, many claim that the only rationale for performing aesthetic surgery is to improve the patient’s psychological well-being.2

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1 T. D. Rees, Aesthetic Plastic Surgery, (Phil, W.B. Saunders Company, 1980), pp. 21
Figure 1-1 The old vs. the young appearance
POSITIVE IMPACT with BODY IMAGE CHANGE in AESTHETIC SURGERY

The first step in the process of body-image change is the patient's perception of change in appearance as well as sensory changes. The physical sensation that something feels different than before, in addition to seeing that something has changed are psychologically fundamental and provides a foundation for consequent cognitive, emotional and behavioral changes.3

Cognitive changes are ways which patients change their opinions on his/her appearances. Patients undergoing aesthetic surgery often experience an anxious preoccupation with their physical appearance.4 This self consciousness is the experience of self-focused attention, related with negative emotions concerning one's self. The most important psychological impact of aesthetic surgery is the reduction in this self consciousness. Clinically, it is steadily recorded that aesthetic surgery reduces the amount of time that patients spend thinking about their appearances.5 This would result in greater amounts of time and emotional energy being focused on other areas of their lives.

Aesthetic surgery patients often suffer from poor self esteem and mild to moderate depression.6 This is crucial to forming their motivation for surgery in order to eliminate these adverse

4 T. Pruzinsky, Collaboration of Plastic Surgeon and Medical Psychotherapist: Elective Cosmetic Surgery, Medical Therapy, 1, 1-13, 1988
5 Goin, pp.222
6 Ibid.
experiences. The large majority of patients reveal feeling more positive with their surgically changed appearance and would undergo the procedures again if given the choice. Patients also feel positive about the fact that they had the initiative to seek out the surgical change. It is viewed as a victory over age; they are no longer put in a helpless situation entirely due to circumstances. They feel that they had taken control and made a choice to live the second half of their lives by the same standard as the first. After surgery, most patients reported pleasure in having finally accomplished something for themselves to increase their self-esteem and self-efficacy.

Furthermore, when an individual experiences positive perceptual, cognitive, and emotional changes after surgery, behavioral changes logically would follow. Patients often become more outgoing and less socially inhibited. Marcus summarizes the process by which the intervention aging process by means of surgery can engender a “domino effect”:

it would appear that a surgical operation has long term positive effects and by releasing previously repressed and inaccessible energies allows the patients to develop a significantly different life-style. This sequence of events is analogous to Leichter’s “ripple effect”...(resulting in) increased self-esteem. This in turn may lead to a significant improvement in the life style and the personality of the...
patient. (Marcus, 1984,p.317)

7 Pruzinsky, pp. 1-13
SERIOUS PSYCHOLOGICAL PROBLEMS

The most common but serious psychological complications associated with aesthetic surgery, although rare, are the postoperative psychosis and the loss of identity.\textsuperscript{10} Earlier psychoanalytical observations had implied that aesthetic surgeries could result in the patient's psychological disintegration. However, clinical experiments have invariably proven such suggestions to be false.

Loss of identity has been reported with rejuvenating surgical procedures.\textsuperscript{11} Loss of identity applies to the patient's expressing that he/she does not feel like her self (depersonalization) combined with generalized anxiety.\textsuperscript{12} In most cases, however, the loss of identity is transient, rarely lasting more than a few months.

\textsuperscript{10} Goin, pp.232-240
\textsuperscript{11} Ibid.
\textsuperscript{12} Ibid.
Part Two

Skin Analysis of the Aging Face

WRINKLES AND LINES

Wrinkles on the aging face are often the focus of attention for both the patient seeking aesthetic surgery to restore the youthful appearance and the physician who is to correct the problem. There are many different types of wrinkles and causes for them. The broad division is into lines and wrinkles.

Lines divide into creases, folds, and furrows. A crease is a linear depression whose depth does not extend deeper than the dermis. (Fig. 2-1 A) A fold is an elevation of the skin that includes the dermis and the immediate subcutaneous fat. (Fig. 2-1,B) A furrow, however, is a depression of the skin that includes the dermis and the contiguous subcutaneous fat. (Fig. 2-1,C) Folds and furrows are linear or curvilinear.\(^\text{13}\) Unlike the lines, wrinkles could cross each other to form a checked appearance. (Fig. 2-2) They are multiple, partial thickness, multidirectional elevations or depressions in the skin. (Table 2-1)

\begin{table}[h]
\centering
\caption{Morphology of Wrinkles}
\begin{tabular}{l}
\hline
1. Lines \\
\text{Creases} \\
\text{Folds} \\
\text{Furrows} \\
\hline
2. Wrinkles \\
\hline
\end{tabular}
\end{table}

Figure 2-1 A, B, C, diagrams showing different lines
The primary factors which contribute to the changes in skin include aging, actinic damage and loss of subcutaneous support tissues. (Table 2-2) Like all other systems in our body, the skin also is affected by the biological clock. Several researches have shown that the quality of elastin and collagen fibers deteriorates with age. 

The actinic damage caused by the sun is pervasive to the skin. Averse changes are variable but present in all layers of the skin. Dermal changes could measure from minimal to moderate and to nearly complete substitution with an amorphous mass of degenerated elastic fibers. Furthermore, sun damage also contributes to loss of elasticity and amplifies the movement and sleep-related lines.

Loss of subcutaneous support tissue, including

14 Stegman, pp.6
the subcutaneous fat, bone, and cartilage, is also a primary factor to changes in the skin. The loss of subcutaneous fat from the cheeks and temple is the first typical occurrence of the aging face. Bone loss usually does not occur until the age of sixty years or older and is most prominent around the mouth and chin. Cartilage loss exists in the nose and leads to falling of the tip of the nose.

SECONDARY FACTORS

Secondary factors which contribute to the changes in the skin are gravity, facial movement and sleep position. (Table 2-2) When the skin’s elasticity weakens because of natural aging and sun exposure, secondary factors will emerge.¹⁵

Creases, folds and furrows can be the gradual result of facial movement. (Fig. 2-3) They start to appear when the skin starts to loss resilience from age or other factors. Creases can also result from the position of the head on the pillow when sleeping. (Fig. 2-4) They are ordinarily found on the lateral forehead and begin on top of the eyebrow and stretch diagonally toward the temporal recede of the hairline.

Chemical peel, retin A treatment, dermabrasion and laser surgery are treatments to eliminate lines and wrinkles. They do so by destroying the old epidermis and dermis to encourage a healthier regrow. After these treatments, the healed epidermis will be nearly normal and the papillary dermis is thickened and more collagenous.¹⁶

¹⁵ Stegman, pp. 8-9
¹⁶ Ibid.
When the increasingly less resilient skin is constantly pulled by the gravitational force, ptotic eyebrows and eyelids along with double chins are formed. (Fig. 2-5) Brow lifts, blepharoplasty and rhytidectomy can be performed to remove redundant skin and pull the important features upward.

Aesthetic surgeries can deliver extraordinary results, with patients appearing five to fifteen years younger than they did before surgery. However, these operations do not provide remedy for the cellular mechanisms which are the existent reasons for the aging skin. Even though aesthetic surgeries can turn back the clock and rejuvenate, no surgery will be able to prevent aging permanently.

**TABLE 2-2**

Factors that Change the Skin

<table>
<thead>
<tr>
<th>1. Primary Factors</th>
<th>2. Secondary Factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inherent aging</td>
<td>Gravity</td>
</tr>
<tr>
<td>Actinic damage</td>
<td>Facial movement</td>
</tr>
<tr>
<td>Loss of subcutaneous support</td>
<td></td>
</tr>
</tbody>
</table>

*Fig. 2-3 Movement Lines*
Fig. 2-4 Sleep Creases

Fig. 2-5 Gravity Changes
Rhytidectomy

BACKGROUND

Rhytidectomy is commonly known as face lift. It is frequently performed to remove excess or loose, sagging skin from the face and the neck. (Fig 3-1) The ultimate goal of the operation is to (a) raise sagging cheeks, (b) maintain a smooth contour and tighten the jowl lines, (c) reduce the distinction of buccolabial folds, (d) decrease overabundance bulkiness in the submental and cervical region and (e) provide elevation of facial expression lines from the down ward situation to a more youthful postero-superior orientation.17 (Fig 3-2)

SURGICAL PROCEDURE

Rhytidectomy is done first on one side of the face and then on the other. Patient will need to wash the face and hair with germicidal soaps preoperatively. Following this, surgical incisions are marked and outlined and the hair is secured before the patient is transported to the operating room.

In most cases the incision starts inside the hairline at the temples with the anterior superior pole, extends downward in a natural line around the earlobe and protracts into the back of the scalp or nape of the neck. (Fig. 3-1)

17 W.H. Beeson, Aesthetic Surgery of the Aging Face, (Toronto, 1986), pp. 71
Figure 3-1(a) Preoperative face showing deep cheek folds, jowls and loose skin on the face and neck. (b) Incision is made on both sides of the face beginning inside of the hairline at the temples, surrounding the earlobe to the lower scalp.

Figure 3-2 Postoperative view of face, after facial and neck skin are pulled up.
SUPERFICIAL MUSCULO-APONEUROTIC SYSTEM (SMAS)

The SMAS is a cutaneous fascia layer which occurs and stretch from the superficial surface of the frontalis muscle, joining with the superficial temporal fascia, inferiorly over the zygoma, buccal region, parotid gland, and superficial surface of platysma. (Fig. 3-3) This fascia is associated with the muscle of the face and is connected vertically to the more superficial dermis. It is believed that the facial and cervical cutaneous layers are closely associated with the SMAS. Therefore, during the tissue alterations related to aging, the skin and the SMAS shift as a unit.18

During rhytidectomy, there are two modalities of manipulating the SMAS as part of the procedure to restore youthful appearance. They are (a) opening the SMAS, dissecting under, pulling it up or up and back, and suturing it in place, and then excise the excess, (b) folding the SMAS and suturing it to other facial layers for fixation. (Fig. 3-4)

LIPOSUCTION

In some cases, fat suctioning is performed during rhytidectomy to remove accumulations of fat from beneath the chin and neck. The removal of sagging skin along with the excess fat makes a more effective rejuvenation. This procedure is done with the liposuction cannula which is a blunt-tipped, narrow, long, strong tube that is used to create tunnels just below the skin and to suction the fat away. (Fig. 3-5, A & B)

18 Beeson, pp.73-75
Figure 3-3 The SMAS layer extends into the external part of the facial musculature, involving fibers of the frontalis, the risorius, the peripheral part of the orbicularis oculi, and the platysma.
Figure 3-4 By lifting the SMAS upwards, tension is formed to tighten the structure, therefore improving the results of face lift.
Figure 3-5 Underming with the liposuction cannula.
(A) The mastoid region. (B) The submental region.
1. Start the incision at the temporal hairline and continue down and around the ear, and end the incision in the lateral neck. Use hook to elevate the skin in order to facilitate dissection.
2. Start undermining until reaching the mobile fat near the nasolabial fold. At the completion of undermining, place clamps on the superior temple flap and neck flap.
10. Pull flaps superiorly and allow to overlap the original incision. Excise the excess skin.
11. Close wound by suturing.
Part Four

Blepharoplasty

During the middle years and beyond, distinctive aging deviations appear in the eyelids and brows area. The occurrence of extra skin folds, wrinkles, ptosis of the brows and degenerative changes of the skin and orbicularis oculi muscle may initiate the appearance of baggy eyelids and prominent periorbital fat pads. These conditions can give an individual a constant weary expression and may also affect one's vision. (Fig. 4-1, A,B,C)

Blepharoplasty, also known as the aesthetic eyelid surgery is an operation with procedures for the removal of redundant eyelid skin and protrusion of orbital fat on the upper and lower lids.

Figure 4-1, A. Example of patient with excess eyelid skin, protruding fat tissue on the upper eyelid, pouches of fat under the eye and winkle folds of skin around the eye.

Figure 4-1, B. Figure demonstrating hypertrophy of the orbicularis muscle.

Figure 4-1, C. Figure showing prominent periorbital fat pads
Eyelid surgery begins with the cautious marking of incision lines on the upper and lower eyelid skin. This should be done prior to any medications given to the patient. The upper lid incision is a curved line, 8-10mm from the lash line in midline and extends beyond the lateral canthus while elevating the brow. The lower lid incision is placed beneath the lid margin in a natural crease, extending from under the punctum medially to the lateral extent of the lower lid. (Fig. 4-2) It should stretch laterally into the skin crease 1-1.5 cm beyond the canthus.²¹

Blepharoplasty is usually operated on the upper lid first and then the lower lid. Working through the incisions, the surgeon disconnects the skin form the fat beneath it. Then, the redundant fat and skin are eliminated.

²¹ Fisher, pp.53
Upper Eyelid:
1. Cut the remarked skin
2. Excise the skin.
3. Dissect carefully superior to the orbicularis muscle.
4. Lift muscle and identify fat pads beneath the septum orbital.
5. Remove thin strip of orbicularis muscle along the entire length of the eyelid.
6. Close the wound with subcuticular sutures.
Lower Eyelids:
7. Incise skin lateral to canthus.
8. Open the incision as marked. Attach mosquito clamp to skin flap and pull it down.
9. Incise muscle, divide it along a line parallel to fibers.
10. Remove fat by pulling gently.
11. Trim excess skin from lower eyelid.
12. Close lower eyelid excision
The aesthetics of the periorbital area is vital to the overall facial expression. Some of the most noticeable indications of aging which include drooping eyebrows, hooding over the eyes, forehead furrows and frown lines occur around this area on the upper third of the face. (Fig. 5-1)

Figure 5-1 Aging appearance accentuated with drooping eyebrows, hooding over the eyes and forehead furrows
Generally, the eyebrows should arch smoothly on or partially on top of the supraorbital rim. Ideally, the medial side of the eyebrow should start at a vertical line extended through the lateral alar margin of the nose. The lateral section of the eyebrow should finish at an round line stretched through the nasal ala and the lateral canthus. The medial and lateral extensions of the eyebrow should lie in a horizontal plane. The summit of the eyebrow is at the lateral one-third, generally at a height on a vertical plane with the lateral junction of the iris and conjunctiva. The medial boundary of the brow should have a clubbed-head shape, with the lateral segment gradually tapering.22 (Fig. 5-2)

Figure 5-2 The youthful appearance with ideal brow shape and location

While the usual facial rhytidectomy can rejuvenate the lower two thirds of the face and neck, the upper third is not improved. Forehead lift, also known as a browlift, however, can reduce the aging signs of the upper third of the face. It works by the excision and modification of the problematic skin around the eyes and on the forehead, including the frontalis muscle. The operation will smooth the forehead, lift the upper eyelids and reduce frown lines.\(^{23}\) (Fig. 5-3)

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For most forehead lift patients, the incision will start approximately at the level of the ears and stretch across the top of the forehead. (Fig. 5-4 A, B) Scalp and forehead skin are carefully separated from the tissue underneath and lifted upwards. Then, the excess skin at the point of incision will be excised.24

Figure 5-4 A&B Incision is made across the top of the head behind the hairline

1. Cut the scalp and galea from ear to ear down to the periosteum beneath. Lift the scalp and galea with a skin hook.
2. Separate the loose tissue connecting the galea to the periosteum
3. When tissues are freed, pull entire forehead superiorward to elevate the eyebrows, eyelids and glabellar areas. Excise a portion of the corrugator and procerus muscle
4. A horizontal ellipse of galea and frontalis muscle form the superior forehead are removed. This reduces the chances of recurrence of horizontal lines in the forehead.
5. Excess scalp is trimmed off.
6. Wound is closed with running suture.
INTRODUCTION

Associated with rejuvenating facial aesthetic surgeries such as facelift, brow lift and eye lift are Retin-A treatment, chemical peel, dermabrasion and laser surgery. These techniques are dermatologic surgeries which correct fine wrinkles and hide irregularities of skin surface texture. They do so by inducing wounds that change the epidermis, the papillary dermis and the upper portion of reticular dermis depending on how deep the wound extends. While Retin-A cream and chemical peel burn the skin to eliminate wrinkles, dermabrasion sands the skin and laser surgery cooks the skin. (Herrera, 1996) The regenerated dermis are thicker and without fine wrinkles. (Fig. 6-1 A,B,C &D)

Figure 6-1 A Diagram of skin showing different layers
Figure 6-1 B  Retin-A cream and chemical peel both burn the epidermis of the skin to eliminate wrinkles.
Figure 6-1 C Dermabrasion sands the skin
Figure 6-1  D Laser surgery cooks the skin
Conclusion

This thesis was written with the intention to familiarize the general population with facial rejuvenating surgeries and the different options that are currently available. It was certainly an enjoyable experience for me to work on this project because I found the subject fascinating for it's ability to achieve the seemingly impossible task, which is to turn back the time on many faces.

After having finished this thesis, I believe I would not hesitate to undergo aesthetic surgery to rejuvenate myself in the future when I need it. I think they are worth the effort because they do work to transform the aging appearances into more youthful looks.
Illustration Techniques

Figure 1-1, Carbon dust drawing was scanned into the computer first and color was then filled in using Adobe Photoshop. The final print out was accented with color pencil. Labels made with Claris Works.

Figure 2-1 A,B,C, Pen and ink on satin design paper. Color was filled in on the back of paper with pastel powder.

Figure 2-2, Same as fig.2-1

Figure 2-3, Same as fig.2-1

Figure 2-4, Same as fig.2-1

Figure 2-5, Same as fig.2-1

Figure 3-1, Same as fig.1-1, incision line is made on print out with pen and ink.

Figure 3-2, Same as fig. 1-1

Figure 3-3, Same as fig. 1-1

Figure 3-4, Same as fig.1-1

Figure 3-5, A, B, Pen and ink

Figure 4-1,A,B,C, Same as fig.1-1

Figure 5-1, Same as fig.1-1

Figure 5-2, Same as fig. 1-1
Figure 5-3, Same as fig.1-1

Figure 5-4, Same as fig.3-1

Figure 6-1, A, B, C, D Skin diagrams illustrated with gouach and color pencil. Photocopies made with Cannon color Xerox machine. Surgical tools are illustrated with pen and ink.

All surgical technique illustrations are made with either carbon dust or pen and ink.
BIBLIOGRAPHY


