Introduction and Aim of the Work

Body image in particular has been proposed as a crucial factor in the motivation to undergo cosmetic surgery. The construct is considered to comprise of two components: body image orientation, referring to how important body image for a person, and body image evaluation, indicating how satisfied a person with his or her own body. It has been suggested that low body image evaluation combined with high body image orientation increases the likelihood to undergo cosmetic surgery if the outcome of an operation is consistent with the patient's expectations, one would expect that improved body image evaluation follows as a consequence ***(Sarwer et al., 1998)***.

Abdominal plastic surgery has evolved greatly since Callia's original description in 1965 in response to demands for better results, smaller scars, faster postoperative recovery and, above all, fewer postoperative complications ***(Matos, 2006).***

Patients usually seek abdominoplasty for abdominal wall laxity, excess skin, striae, or diastasis of the rectus muscles. The ideal patient is within normal limits for his or her weight and height (i.e. body mass index), has no plans for future pregnancies, has a moderate amount of excess of skin and fat, and has a mild diastasis of the rectus muscles ***(Rees, 1980).***

The type of incision is usually determined by the patient's body habitus or by the patient's choice of clothing, (i.e. bathing apparel or shorts). Most incisions are low on the abdomen, allowing the patient to wear fairly brief apparel. Most abdominoplasty incisions are variations of the Regnault, Grazer, or the bicycle-handlebar techniques described by Baroudi ***(Baroudi and Moraes, 1995).***

Traditional abdominoplasty techniques, which use primarily transverse incisions, seem to be most beneficial for those patients whose abdominal contour is relatively normal with only a minimal to moderate amount of flaccid skin (primarily vertical excess with minimal horizontal excess ***(Matarasso and Belsley, 2005).***

Massive weight loss patients with a large abdominal pannus, however, are usually disappointed with such techniques, as they fail to address the adjacent redundant tissue overlying the upper abdomen, flanks, and hips ***(Taylor and Shermak, 2004).***

The high lateral tension, reverse, and vertical (fleur-de-lis) abdominoplasties (separately or in combination) have done well, then to improve overall anterior truncal contour in this group of patient ***(Lockwood, 1996).***

The use of liposuction combined with abdominoplasty has been controversial. The combination of techniques has been associated with an increased rate of venous thromboembolism and wound-healing complications. Through improvements in venous thromboembolism prophylaxis, refinements in liposuction techniques, and an understanding of anatomy, this cumulative risk has decreased, although the negative stigmata persist ***(Trussler et al., 2010).***

Suction-assisted lipectomy is an integral component of abdominoplasty for many surgeons ***(Brink et al., 2009).***

Liposuction and abdominoplasty provide high levels of patient satisfaction. The combined procedure is similar in discomfort level to abdominoplasty alone and produces the highest level of patient satisfaction ***(Swanson, 2012).***

Scarpa fascia preservation might be a promising approach to reduce seroma and other complications after abdominoplasty ***(Xiangyang and Limin, 2017).***

Aim of the work

The aim of the study is to compare between the results of two different incisions used in abdominoplasty with liposuction, and to detect the morbidities and complications which may occur after the surgical procedures such as *Aesthetic complication* which occurred in the form of asymmetry, dog ears, residual deformity, unsatisfactory umbilicus and unsatisfactory scarring (widened, thickened, hypertrophic or keloid) and *Non-aesthetic complications* which occurred in the form of seroma, wound infection, partial skin necrosis, and wound dehiscence. Then comparing the aesthetic outcome, patient satisfaction.

Chapter 1

ANATOMICAL CONSIDERATIONS

Embryology of the anterior abdominal wall:

The abdominal wall is embryonically derived in a segmental, metameric manner, and this is reflected in blood supply and innervation. These sections-two lateral, one superior, and one inferior–develop and merge to form the embryonic abdominal wall. The transition of the embryo from a trilaminar disk to a three–dimensional structure on the 22nd day of gestation initiates formation of the abdominal wall; however, the abdominal wall does not achieve its definitive structure until birth, when the umbilical cord separates from the fetus ***(Sadler, 1985)***.

The primitive abdominal wall consists of ectoderm and mesoderm without musculature, vasculature, or innervation. This somatopleure is eventually invaded by mesoderm from the myotomes that develop from either side of the vertebral column. Migration of four abdominal wall folds–the cephalic, caudal, and two lateral folds–forms the anterior abdominal wall. Problems with folding will result in such anomalies as omphalocele, gastroschisis, pentalogy of Cantrell, and cloacal exstrophy ***(Kline & Herzler, 1981)***.

With elongation of the midgut during the sixth week of gestation, a physiologic herniation of the abdominal contents occurs through the umbilicus ***(Vásconez & de la Torre, 2006)***.

By the seventh week, the mesodermal mass has migrated ventrally and laterally as a sheet, and the leading edges forming the rectus abdominis muscles and the lateral portion split into three layers, which can be recognized as the external oblique, internal oblique, and transversalis layers. The midgut returns to the abdomen during week 10 to allow closure and development of the abdominal wall to continue. Closure of the midline proceeds from both caudal and cranial directions as the two rectus abdominis muscles meet in the midline. Although this process is complete in the week 12 of gestation, final closure of the umbilical ring does not occur until separation of the cord at birth ***(Vásconez & de la Torre, 2006)***.

Surgical Anatomy

Layers of the Abdominal Wall: (Fig.1)

The anterolateral abdominal wall consists, from the outside in, of the skin, superficial fascia, deep fascia, external and internal abdominal oblique, transverse abdominis and associated aponeuroses, rectus abdominis and pyramidalis, as well as the transversalis fascia ***(Arslan, 2005).***

Superficial structures:

For the purpose of discussing anatomy in the context of abdominal contouring procedures, the abdominal layers can be separated into superficial and deep structures. The superficial structures include the skin, the superficial subcutaneous fat associated with Camper's fascia, Scarpa's fascia or superficial fascial system of the abdomen (SFS), and the deep subcutaneous fat or sub-Scarpa's fat (sub-Scarpal fat) **(Fig.1)**. The proportion of superficial to deep fat layer is variable among patients, depending on their BMI and body habitus. The sub-Scarbal fat is usually less compact, with less fibrous architecture than the fat superficial to Scarpa's fascia ***(Markman and Batron, 1987)***.

Scarpa's fascia, or the superficial fascial system of the abdomen (SFS), is an important anatomic layer in body contouring in general and in abdominoplasty procedures in particular. Scarpa's fascia is the structure that allows surgical closure in abdominoplasty procedures to be performed under remarkably high tension without vascular compromise to the skin. As most of the tension of the closure is placed on the SFS, and the skin closure is subjected to considerably less tension, a good-quality scar can be achieved ***(Lockwood, 1991)***.

Skin:

The skin is of average thickness, and loosely attaches to the underlying tissue. It exhibits certain surface markings such as the umbilicus, linea alba, linea semilunaris, epigastric fossa, and McBurney's point. The umbilicus, a midline fibrous cicatrix covered by a folded area of skin, is an important anatomical landmark in the anterior abdomen that marks the original attachment of the fetal umbilical cord. In young adults, it is usually located at the level of the intervertebral disc between the third and fourth vertebrae. However, lower levels are observed in obese individuals and in conditions that reduce abdominal tone. In the fetus, the umbilicus transmits the vitelline and umbilical vessels and yolk stalk ***(Arslan, 2005).***

The linea alba (white line) is formed by the midline fusion of the aponeuroses of flat abdominal muscles and may be visible through the skin of muscular individuals. The linea semilunaris (Spigelian line) marks the lateral border of the rectus abdominis, extending from the costal arch near the ninth costal cartilage to the pubic tubercle. This line marks the sites of entry of motor nerves to the rectus abdominis, rendering it a surgically undesirable site for incisions. Spigelian hernia, which consists of extraperitoneal fat covered by the skin, superficial fascia and the aponeurosis of the external oblique, may be hidden at the junction of the linea semilunaris and arcuate line of Douglas. The small depression below the infrasternal angle is termed the epigastric fossa. McBurney's point marks the junction of the lateral and middle third of a line that connects the anterior superior iliac spine to the pubic tubercle. This topographic landmark on the anterior abdomen corresponds to the common location of the appendix ***(Arslan, 2005).***

The horizontal directions of the connective tissue fibers beneath the epidermis form the visible Langer's cleavage lines. Due to the elastic quality of the connective tissue, an incision will produce retraction of the connective tissue and eventual gapping of the skin. An incision made perpendicular to the direction of Langer's lines is most likely to gape and result in prominent scarring. Since the course of the nerves and vessels that supply the anterolateral abdomen parallels the cleavage lines of the skin, transverse incisions of the abdomen are surgically more favorable. They are less likely to gape or cause damage to nerves or vasculature and heal faster without visible scarring. The dermis of the skin of the anterolateral abdomen is resilient, permits some degree of stretch, and is able to counteract the prolonged tearing pressure. However, stretch exerted by the pregnant uterus can disrupt the connective tissue fibers of the dermis and produce striae perpendicular to the Langer's lines, commonly known as 'stretch marks' ***(Arslan, 2005).***

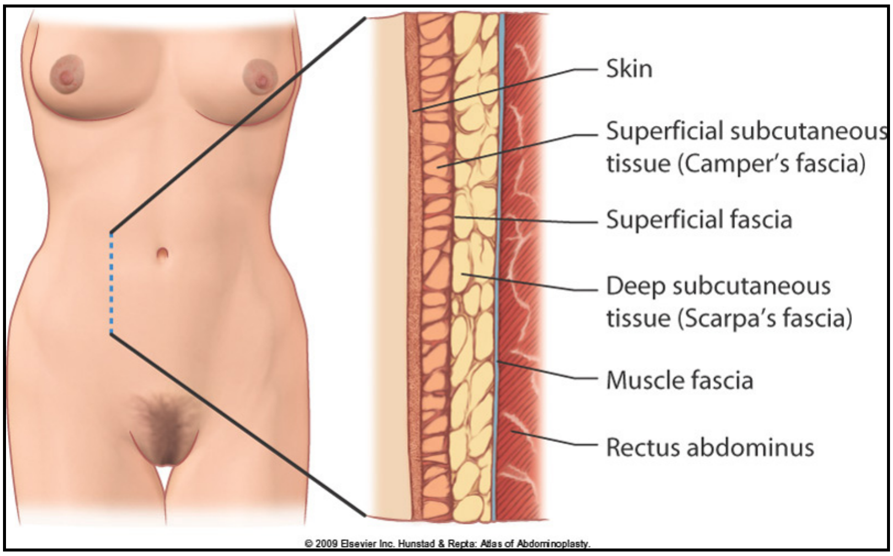

Fig. (1): The superficial structures of the anterolateral abdominal wall ***(Hunstad and Repta, 2009)***.

Deep structures:

The deep structures include the deep muscular fascia overlying the abdominal wall musculature and the abdominal wall muscles themselves, with all the of the corresponding layers of the investing fascia ***(Hunstad and Repta, 2009)***.

When present as a distinct entity, the deep layer of the fascia is more membranous than the superficial, and contains elastic fibres. It is loosely connected by areolar tissue to the aponeurosis of external oblique, but in the midline it is intimately adherent to the linea alba and symphysis pubis. In the male, it extends onto the dorsum of the penis and forms part of the superficial ligament of the penis. Superiorly, it is continuous with the superficial fascia over the remainder of the trunk. Inferiorly, it lies superficial to the inguinal ligament and fuses with the overlying superficial layer and the underlying fascia lata in the inguinal flexure line or skin crease of the thigh. In the male, the deep layer of the fascia continues inferiorly and medially over the penis and spermatic cord to the scrotum, where it becomes continuous with the membranous layer of the superficial fascia of the perineum. In the female, it continues into the labia major a and is continuous with the fascia of the perineum ***(Neil, 2008).***

The lower trunk has fascial attachments between the skin and underlying muscle fascia that act as anchoring points or zones of adherence **(Fig.2)**. These zones of adherence do not allow overlying skin to move during the processes of aging and/or weight fluctuations. Posteriorly the midline has a zone of adherence that overlies the spine. The anterior midline of the abdomen has a less will defined zone of adherence. Three horizontal zones of adherence are located in the inferior aspects of the lower trunk; one is located at the inguinal region bilaterally and extends toward the anterior superior iliac spine (ASIS). Another is located just above the mons pubis and is variable in its adherence properties. The third is located bilaterally between the hip and lateral thigh fat deposits. Truncal tissues become lax due to aging, pregnancy, and/or massive weight loss. They descend the greatest distance laterally, caused by a combination of tissue laxity and central tethering of the midline zones of adherence. As tissues descend around the pelvis they also migrate centrally. The inguinal and mons pubis zones of adherence are responsible for holding the final position of abdominoplasty scars in the lower truncal region. Without their effect, the scars would migrate cephalad, possibly above natural underwear lines ***(Al Aly, 2007).***

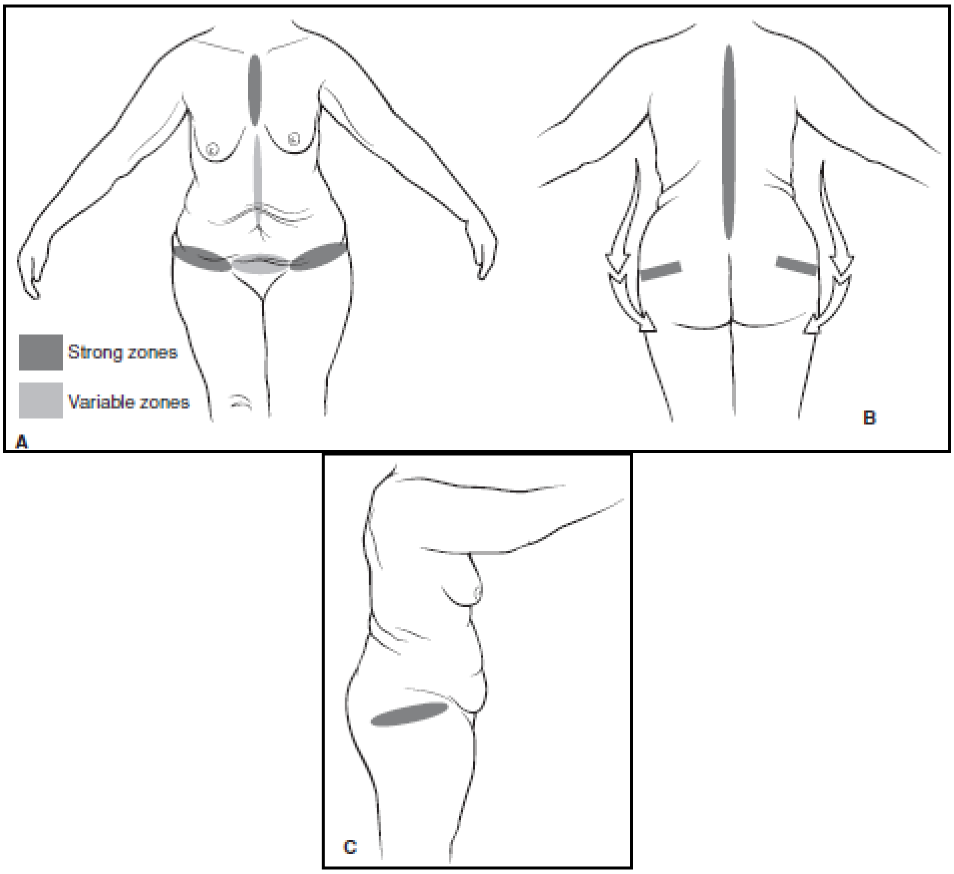

Fig. (2): Fascial zones of adherence. The zones of adherence control the movement of tissue associated with aging and/or massive weight loss, these fascial attachments result in lateral descent of truncal tissues, which rotate toward the midline ***(Al Aly, 2007).***

The anatomy of the rectus sheath is of considerable importance because the majority of myofascial plication methods involve approximating this tissue. The three components of the lateral abdominal wall – the external oblique, internal oblique, and transverses abdominis **(Fig.3)** – come together medially as fascial extensions to form the anterior and posterior rectus sheath ***(Hunstad and Repta, 2009)***.

Superior to the arcuate line, the anterior rectus sheath is composed of fascial extensions of the external oblique and half of the internal oblique **(Fig.4)**. The fascial extension of the internal oblique splits around the rectus abdominis above the arcuate line and reforms at the linea alba. Inferior to the arcuate line the anterior rectus sheath is composed of the fascial extensions of all three muscular layers, with the tissue posterior to the rectus abdominis consisting of only the peritoneum ***(Hunstad and Repta, 2009)***.

The three components of abdominal contouring that are routinely addressed include reduction of excess adiposity by liposuction, elimination of soft-tissue laxity by resection, and correction of abdominal wall laxity by myofascial plication, the latter deals with deeper structures directly ***(Hunstad and Repta, 2009)***.

The external oblique muscle runs inferiorly and medially, arising from the margins of the lowest eight ribs and costal cartilages and the latissimus dorsi, serratus anterior and the iliac crest. Medially it forms a tendinous aponeurosis, which is contiguous with anterior rectus sheath. The inguinal ligament is the inferior-most edge of the external oblique aponeurosis reflected posteriorly in the area between the anterior superior iliac spine and pubic tubercle. The internal oblique muscle lies immediately deep to the external oblique muscle and arises from the lateral aspect of the inguinal ligament, the iliac crest and the thoracolumbar fascia. Its fibers course superiorly and medially and form a tendinous aponeurosis that contributes to both the anterior and posterior rectus sheath. The lower medial and inferiormost fibers of the internal oblique course may fuse with the lower fibers of the transversus abdominis muscle (the conjoined area). The transversus abdominis muscle is the deepest of the three lateral muscles and, as its name implies, runs transversely ***(Bell and Seymour, 2006).***

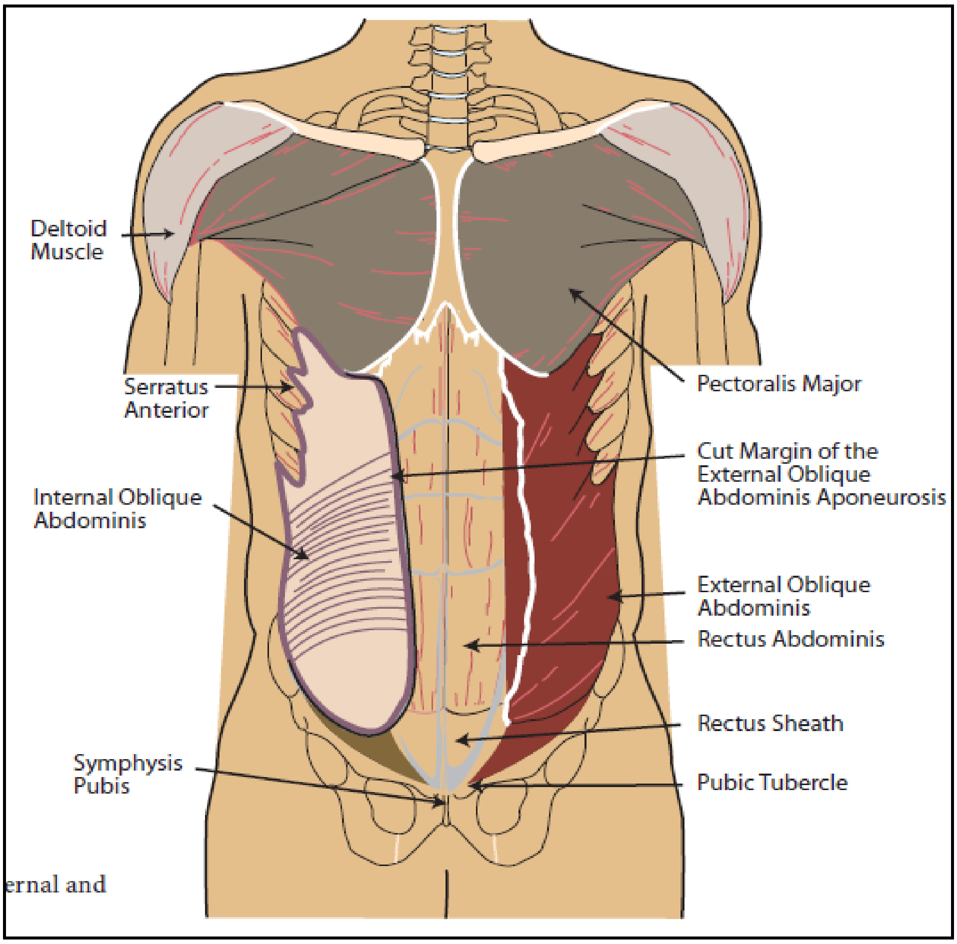

Fig. (3): Direction of the fibers of the external and internal abdominal oblique muscle ***(Arslan, 2005)***.

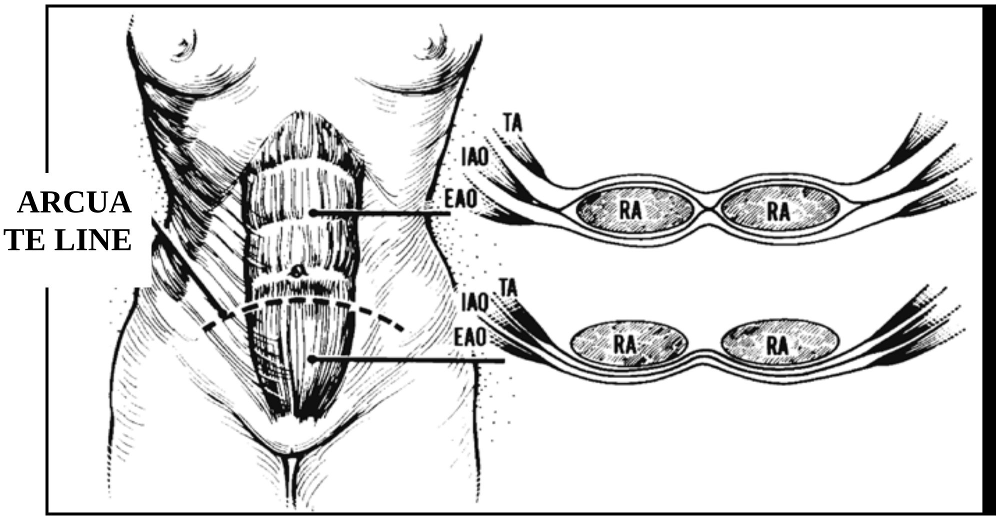

Fig. (4): Surgery anatomy of the anterior abdominal wall (**TA**, transverses abdominis; **RA**, rectus abdominis muscle; **IAO**, internal oblique muscle; **EAO**, external oblique aponeurosis) ***(Wallach and Matarasso, 2005).***

The arterial blood supply of the abdominal wall: (Fig.5)

The blood supply of the abdominal skin and fat is important to understand. The skin overlying the rectus muscles is primarily supplied by arteries that originate from the superior and inferior epigastric vessels that run within the rectus muscles. Branches from these vessels perforate the overlying rectus fascia and traverse through the two layers of abdominal fat, finally reaching the skin. This direct blood supply of abdominal skin is interrupted during the elevation of the abdominal flap in an abdominoplasty. A secondary blood supply is derived from lateral intercostal, subcostal, and lumbar vessels that course anteriorly in the fat superficial to the Scarpa fascia. These vessels are the only remaining blood supply of