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Anatomy of the Male Torso in Relation to Body Contouring: Abdomen, Flanks, and Arms

17

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Fig. 17.1 The desired ideal athletic male body from the front view

17.1 Introduction

The shape and size of the human form are determined by the skeletal framework, the amount and distribution of subcutaneous fat, and muscle mass and tone. Other contributing factors include poor posture associated with lack of exercise, diet, bad habits, and weakness. Both the static and dynamic states of the human body should be defined to more clearly elucidate the human external body form. Physical features that are attractive in women include the convexities of the chest, hips, and lumbar lordosis. On the other hand, the features that are attractive in men include well-developed muscle mass, especially in the arms, chest, and abdomen (Fig. 17.1).

In order to achieve a more appealing body image, many people in modern society want to remove excess and/or unwanted fat. Body contouring is a technique used that removes a limited amount of adipose tissue to achieve a more aesthetically pleasing body shape. After determining the best surgical option for the patient wishing to have this technique, a detailed physical examination and careful evaluation of the patient's anatomy are required. It is especially important to note any anomalies in the patient's anatomy, such as deviation from the ideal contour, scars, asymmetry, skin tone, and elasticity, including any taut or excess skin. The surgeon must have a comprehensive knowledge of muscular anatomy in order to shape the human body, and he/she must be able to "look through the eyes of an artist" so that the superficial musculature can be ideally visualized. The majority of people with a normal body mass index can achieve an athletic and toned appearance by emphasizing the main muscle groups with high-definition body contouring. In this section of the review, the anatomy of the abdomen, flanks, chest, and arms will be discussed in detail. It is our hope that this section of the review will help surgeons to identify the muscular structures that create natural bumps in the body, termed "positive areas." Further, surgeons should be able to detect the shadows ("negative areas") created by the natural fat excess in the recesses between these natural bumps. In the following sections, we emphasize the examination techniques and light techniques that can be used to analyze this topographic anatomy.

17.2 Trunk

The trunk muscles include both the muscle groups arranged in the front and back of the abdominal and chest wall muscles (Fig. 17.2). This muscular body wall connects the rib cage to the pelvis. The trunk muscles have various effects on the trunk, including extension, flexion, rotation, and lateral bending. The prominence of the trunk muscles, especially in men, provides an athletic, strong, and healthy appearance. In men, the posterior trunk muscles form a V-shaped or triangular wedge, while the pectoralis major muscle over the chest and the rectus abdominis muscle between the abdomen's tendinous intersections form a convex muscle mass.

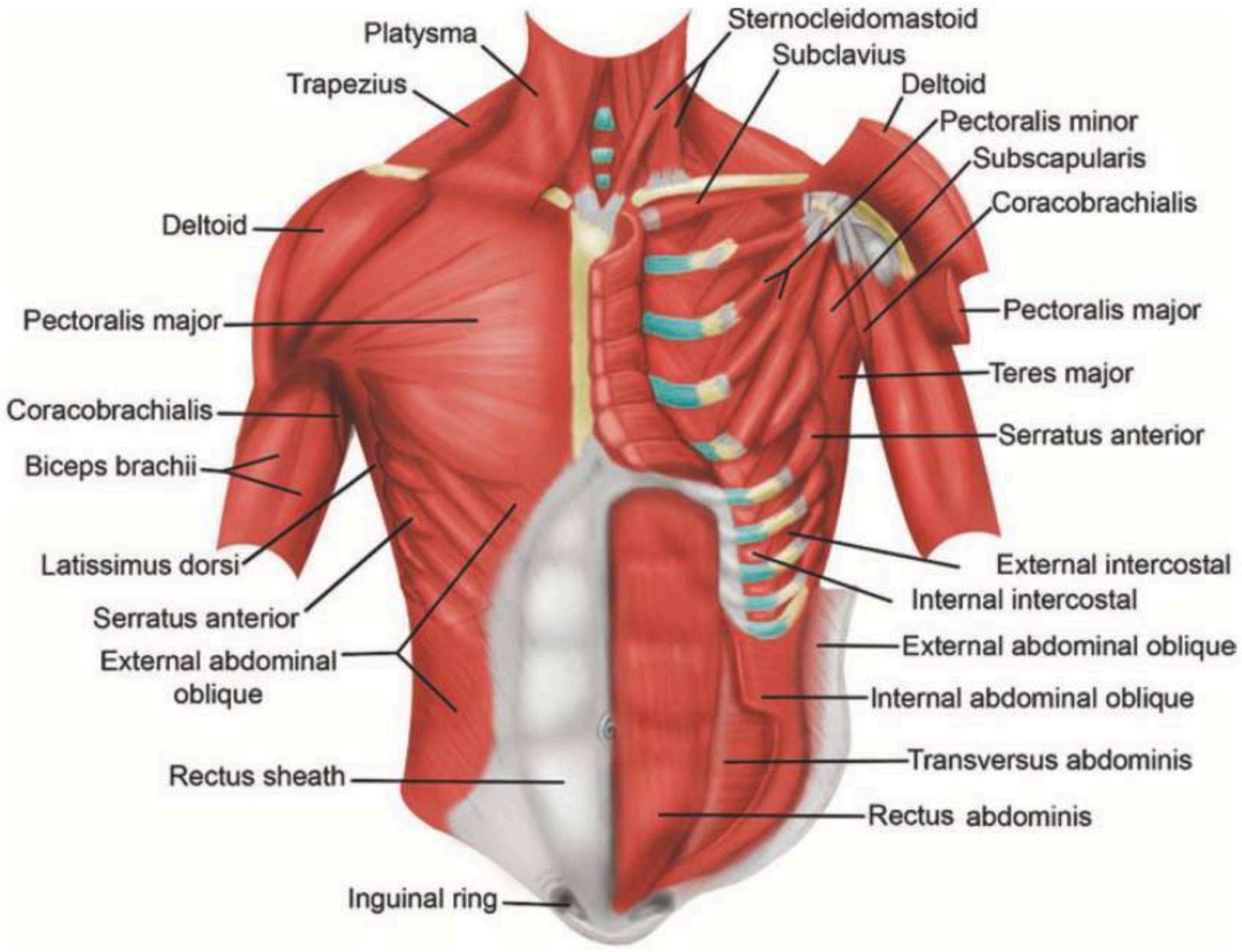

Fig. 17.2 Anterior trunk muscles

17.3 Abdomen

Since aesthetic body contouring surgery requires a general approach to body contour, it is first necessary to evaluate the shaped area and surrounding structures. For example, significant weight loss and obesity can cause abdominal deformation, which affects many parts of the body. In addition, when choosing an appropriate surgical strategy, predisposing factors must be examined, including skin laxity, localized or generalized lipodystrophy, musculoaponeurotic flaccidity, and stretch marks.

While the vast majority of women desire a flat abdomen, the vast majority of men want a well-defined "six-pack" (Fig. 17.3). However, the genes that develop the rectus abdominis produce a very small proportion of male "six packs," which also require a combination of healthy eating habits and exercise. Even athletes, who undergo intense physical exercise, may still have unwanted fat. Because of this unwanted fat, it can be very difficult to achieve a prominent muscle appearance. In the past, liposuction was only used to remove unwanted fat from the body, but now, it is also used for body contouring.

Abdominoplasty ("tummy tuck") is a procedure that is used to reduce excess skin and fat around the abdomen and strengthen the abdominal wall muscles. Due to the change in artistic body shape perception, current approaches to tummy tuck surgery have also changed, and now, it is often performed in combination with an advanced liposuction method.

Fig. 17.3 The anterior abdominal wall. Rectus abdominus and six pack, which are the most important muscles of the anterior abdominal wall in body shaping

However, surgical techniques in this field will not be discussed here, as they are the subject of a separate chapter. Abdominal fat should be removed from the muscles to obtain oblique muscles, anterior serratus, a six-pack abdomen, and taut skin. Fat at the level of the tendinous intersections, ana-

tomical lines, and muscle margins should be removed to emphasize muscle volume. The main purpose of body contouring in the male patient is to create an athletic and muscular appearance (termed a "V shape"), regardless of the patient's body shape. However, the patient's body type and body mass index are very important in body contouring. Therefore, the relevant sportive background, natural muscle structure, and current body morphology are very important. The abdominal body offers a wide range of opportunities for body contouring. All of these procedures should be developed with appropriate diet and exercise.

The abdomen is the part of the trunk that connects the rib cage and pelvis, and an abdominal wall consisting of skin, fascia, and muscle covers the abdominal cavity and internal organs. Unlike the thorax and pelvis, the abdomen lacks skeletal support, except for the spinal column and lower ribs in the back. The anterolateral abdominal wall (from superficial to deep) includes skin, superficial fascia, external oblique muscle, internal oblique muscle, transversalis fascia, and parietal peritoneum.

Men's skin is less prone to overstretching and looseness than women. This is most likely due to its thickness, and that it is not affected by pregnancy or the preponderance of female hormones. In men, excessive excess skin is usually only seen in patients who have experienced significant weight loss or fluctuations. With age, men's abdominal fat increases, and there is a corresponding decrease in subcutaneous fat. In addition, aging leads to the infiltration of fat between the muscles. Taken together, aging causes a decrease in lean body mass and an increase in body mass index, and this redistribution of fat has a major effect on the appearance of the abdomen.

The superficial fascia is located between the dermis and muscles. It is divided into a superficial fatty layer called the Camper fascia and a deep membranous layer called the Scarpa's fascia, which includes another adipose tissue layer deep within.

The camper fascia is the superficial fatty layer of the anterior abdominal wall that is divided by the fibrous septa, which connects the dermis to the deeper membranous layer. The camper fascia extends laterally from the xiphoid process to the seventh and tenth costal margins and lower to the inguinal ligaments. It continues down the groin as the subcutaneous fat of the thigh. In males, it combines with the Scarpa's fascia to form the dartos tunic of the scrotum, and it extends beyond the pubic symphysis.

Scarpa fascia makes up the membranous layer, and consists of connective tissue and elastic fibers. It is located below the Camper fascia and above the external oblique muscle. The oblique fibrous septa loosely connect the underlying external oblique aponeurosis and the rectus sheath. Scarpa's fascia is attached medially to the linea alba and the inguinal symphysis, and extends superficially to the scrotum, where it forms the dartos fascia. Scarpa's fascia plays an important role in the healing process of abdominal incisions. The preservation of Scarpa's fascia reduces seroma formation, which is the most common complication associated with abdominoplasty. In addition, the protection provided by Scarpa's fascia during abdominoplasty also provides good aesthetic results. Liposuction preferably removes the fats in the deep adipose layer (the third layer). The morphology of the adipose tissue and its location directly affects the surgical intervention. The goal of surgical intervention is to smoothly remove this fatty tissue so that a permanent and natural result is obtained, and so that the person's natural infrastructure is revealed. Although some believe that this may occur with the removal of superficial fat tissue, we suggest that deep level liposuction should always be applied, therefore avoiding unwanted complications. It is important to note that the desired athletic body shape in men, especially below the umbilicus, is achieved when the fat is removed under both fascia planes until the skin flap thickness is reduced to 0.5–1 cm.

17.4 Muscles

The muscles of the abdominal wall are divided into two groups as follows: (1) three smooth muscles located laterally and stacked on top of each other, and (2) two vertical muscles near the body's midline. The abdominal wall consists of three smooth muscles, the external oblique, the internal oblique, and the transverse abdominis, which flex and rotate the trunk (Fig. 17.4). Since the fibers of these muscles are cross-linked with each other, these three muscles strengthen the abdominal wall and reduce the risk of herniation.

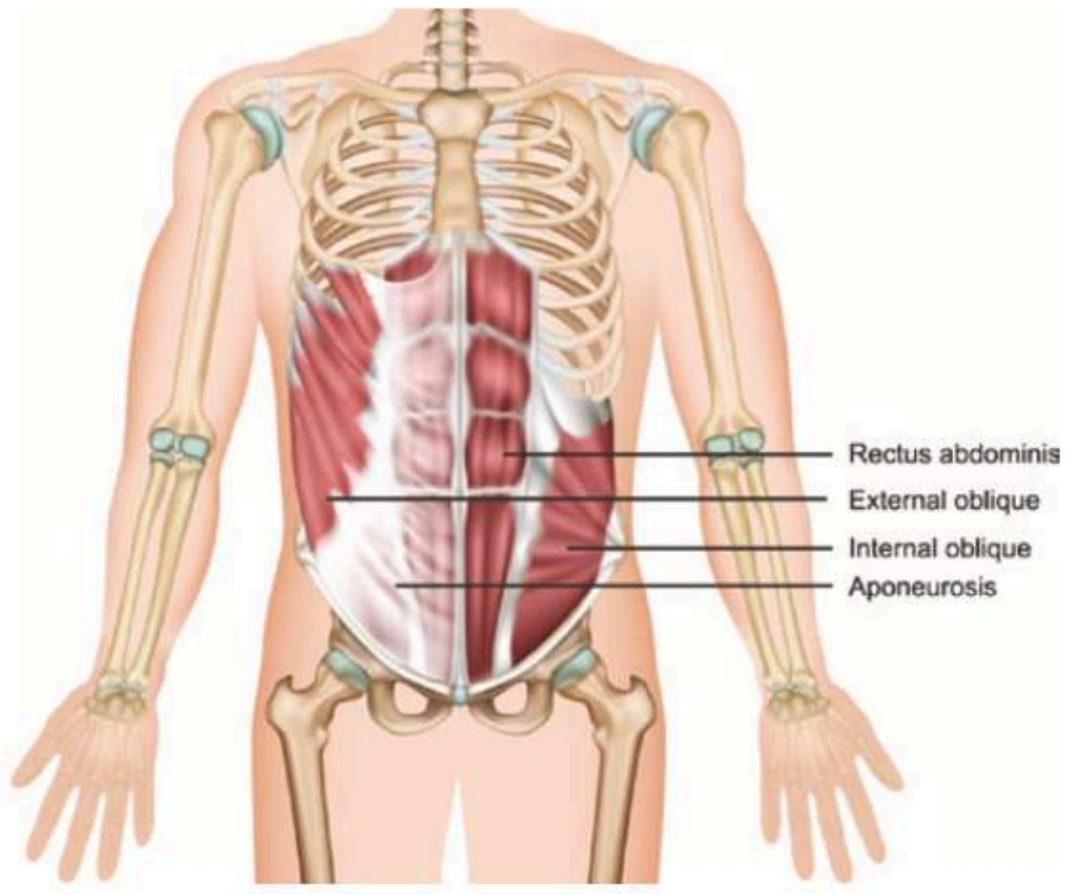

Fig. 17.4 Anterior abdominal wall muscles

17.5 External Oblique

The external oblique is the largest, thickest, and most superficially located anterolateral abdominal wall muscle. The external oblique muscle originates from the outer and lower surfaces of the lower 7 ribs and consists of the upper thoracic part and the lower flank part. The upper attachments of the muscle may be continuous with the serratus anterior, pectoralis major, or latissimus dorsi. The thoracic part of the external oblique consists of parallel and long muscle bundles extending from the outer surfaces of the ribs to their aponeuroses in the semilunar line. In the area where it enters its aponeurosis, the anterior end of the thoracic part of the external oblique is irregular, and its lowest fibers form a transitional zone in the waist region above the flank part. The flank part extends posteriorly from the outer surfaces of the lower ribs to the anterior half of the iliac crest. The flank pad creates a fleshy trapezoid around the waist between the ribs and pelvis. It includes the flank part of the external oblique on the anterior portion, and the flank fat pads on the posterior portion. Even in individuals with very good muscle development, the bilateral oblique muscle fibers are not visible on the convex flank pad. The most posterior fibers that pass vertically through the underlying two ribs to enter the iliac crest form a posterior free border, and do not enter the thoracolumbar fascia. These posterior fibers form the anterior border of Petit's lower lumbar triangle, which is typically covered with a fat pad. The external oblique becomes aponeurotic in the medial midclavicular line and in the inferior spinoumbilical line. The aponeurosis passes in front of the rectus abdominis and decussates with the aponeurotic fibers of the internal oblique, external oblique, and transversus abdominis, which comes from the side opposite the midline. The tip of the tenth rib forms the base of the rib cage and the upper border of the external oblique abdomen. Athletic people often have a small triangular depression along the semilunar line in this area. In subdermal lipoplasty, depression in this area is used as a checkpoint to define the anterolateral abdominal wall. The inguinal ligament is formed from the lower edge of the external oblique aponeurosis, which extends between the anterior superior iliac spine and the pubic tubercle. The external oblique muscle is the most important muscle group to highlight the V-shape in the waist region in males. Therefore, surgery should both emphasize and clarify this region. During the examination, the patient is told to inflate his abdomen outward, and the lower border of the muscle should be able to be felt by hand. Although this is often sufficient, beginners will see a shadowing in the lower border of the muscle due to the bright light source projected onto the muscle from the opposite direction. Due to the natural protrusion of the muscle, this shadowing will be on the lumbar triangle. The lumbar triangle should be marked by the surgeon, and all fat within this triangle should be removed during the surgery in order to define the lower edge of this muscle. Although this negative area is evident in women with an athletic body, a woman's external oblique muscle is not as strong as that in a man. For this reason, the operation should not be performed in this area in female patients if the triangle cannot be detected (Figs. 17.5 and 17.6).

Fig. 17.5 Pronounced external oblique muscle after removing excess adipose tissue from the natural spaces around the muscle

Fig. 17.6 Light techniques are important in advanced body shaping. Bright areas show natural protrusions, while shadows reveal natural dimples between muscles. Here, the external oblique muscle is bright

17.6 Internal Oblique

The internal oblique muscle is the middle layer of the anterolateral abdominal wall muscles. It arises from the lateral iliac crest, iliopsoas fascia, and lumbodorsal fascia. As opposed to the external oblique muscle, the internal oblique muscle's fibers extend from the lower/lateral to the upper/medial to accommodate the lower 5 rib cartilage. Posteriorly, some fibers from the internal oblique are attached to the thoracolumbar fascia. Below, it takes a more diagonal course, and enters the inguinal tubercle. It joins the aponeurosis of the transversus abdominis muscle to form the adherent tendon in the lower part. Like the external oblique muscle, the internal oblique muscle also contributes to the rectus sheath. The fibers adjacent to the inguinal ligament extend downward and medially along the spermatic cord in men. Since the internal oblique muscle is in the deep plane, it does not naturally protrude on the surface, so it does not require special work.

17.7 Transversus Abdominis

The transversus abdominis is the deepest of the anterolateral abdominal muscles. It stems from the lateral one-third of the inguinal ligament deep into the iliopectineal arch, the anterior two-thirds of the inner lip of the iliac crest, the thoracolumbar fascia between the iliac crest and the twelfth rib, and the lower six costal cartilage. Transversus abdominis fibers extend across the lateral abdominal wall anteriorly to the midline and inserts into the linea alba, xiphoid process, and symphysis pubis by the rectus sheet. The lower tendinous fibers originating from the inguinal ligament arise inferomedially over the inguinal canal, and join with the internal abdominal oblique aponeurotic fibers to form the conjoint tendon.

17.8 Rectus Abdominis

The rectus abdominus is a long, double vertical muscle located on either side of the midline. The rectus abdominis is narrow and thick at the bottom and wider and flat in the upper abdomen. It extends from the symphysis of the pubis to the costal cartilage of the fifth to seventh ribs. It has three horizontal lines known as "tendinous intersections" that contribute to well-developed abdominal muscles. These fibrous bands are usually located at the level of the xiphoid process, around the umbilicus, and in between the xiphoid process and umbilicus. The arcuate line is located on a fourth tendinous intersection, which is visible below the umbilicus marks. Tendinous intersections may be in line with the opposite side, or they may be at different levels, giving an asymmetrical appearance to the anterior abdominal muscles. The upper borders of the rectus abdominus may continue along the lower edge of the pectoralis major. The lateral border of the rectus abdominis appears in the abdomen as a vertical groove between the ninth costal cartilage and the inguinal tubercle. This linea semilunaris (Spigelian line) corresponds to a line drawn from the midpoint of the clavicle to the middle of the thigh. The ninth ribs are farther apart than the inguinal tubercles, giving the linea semilunaris its curved shape. In males, the linea semilunaris starts as a depression just below the medial of the nipple, moves downward, and expands into a triangular area above the inguinal ligament. In the linea semilunaris, the tendons of the lateral abdominal muscles meet with the sheath surrounding the rectus abdominis muscle, which is also known as the rectus sheath. The lateral abdominal muscles include the external oblique, internal oblique, and transverse abdominis. The linea semilunaris forms the lateral borders of the rectus abdominis muscles bilaterally, while the linea alba separates the right and left rectus abdominis muscles in the midline. The linea semilunaris, tendinous intersections, and linea alba are structures that make possible the visibly well-developed muscular male abdomen that athletes desire, and the fleshy protruding abdominal segments known as "six-packs." The muscle bulk is emphasized by the removal of fat at the tendinous intersections, the anatomic lines, and the muscular borders. The rectus sheath is an aponeurosis formed by the five muscles of the abdomen. The rectus sheath is divided into anterior and posterior layers for the majority of its length, and covers the rectus abdominis muscle. The anterior layer consists of the outer oblique aponeuroses and half of the inner oblique muscles, while the posterior layer consists of the aponeuroses of the transversus abdominis and the other half of the inner oblique muscles. The arcuate line is the lower part of the posterior rectus sheath, which lies approximately in the middle of the umbilicus and pubic symphysis. Therefore, only the anterior layer of the rectus sheath is located below the arcuate line. Oblique abdominal muscles can be found on

both sides of the rectus abdominis muscle. After a thorough explanation of anatomy, it is important to know how to determine this desired muscle group, which is known and desired by all men as a "six pack." The first and most important point to keep in mind is that if the palpable muscle group cannot be determined, the surgeon should not attempt to clarify these muscles with surgery. Another important point is that these operations require a surgeon with advanced liposuction experience. The main purpose of the surgery is to remove the excess fat and reveal the natural infrastructure. For this reason, it is not recommended to shape the fat while clarifying the abdominal muscles. In such cases, although the result on the operating table seems satisfactory, an unnatural and non-permanent result will occur within a short time. To avoid this problem, in the drawing phase prior to the surgery, the frame of the muscle groups should be determined and drawn. During the surgery, it is recommended that the excess fat be removed *after* applying liposuction, therefore revealing the whole structure. The drawing should be done while the patient is standing up and pulling his abdomen in. Then, if the surgeon or an assistant shines a light source from the opposite direction, the semilunar lines and line alba in the muscle shadows can easily be seen. The patient should then be instructed to perform a breathing maneuver and tighten the abdominal muscles. The lowest horizontal tendinous intersection is often located 0.5–1 cm above the umbilicus level. It should be kept in mind that the mid-level abdominal muscle group follows the serratus anterior, and therefore, determining the lateral border of the semilunar line and drawing it towards the line alba will be useful for the surgeon. Also, the uppermost rectus abdominis may be located under the ribs in some patients, and in such cases, these muscles should not be emphasized. Further, it is known that the uppermost rectus abdominus can also sit on 5–7 ribs in a much smaller structure. In cases such as these, the drawings should be done with light shining on the patient, and/or by asking the patient to tighten his muscles. Surgeons should realize that this type of surgery is dynamic, and there will be a minimum of ±1 cm vertical movement between the contraction and relaxation movements of the muscles. This distance is defined as a "transition zone." The most important transition zones are on the gluteus medius muscle in women and on the pectoral muscle in men. However, while performing the six-pack definition, especially in patients with loss of skin elasticity, the patient can be put in a crunch position, and the surgeon can determine whether the lines were correctly drawn in the standing and lying positions. Although surgical techniques are not the subject of this chapter, it is important to note that there is no need to make permanent incisions on the trunk while clarifying these lines, especially in the abdominal region, and it is necessary to work with surgical equipment designed for hiddden areas (Figs. 17.7, 17.8, 17.9).

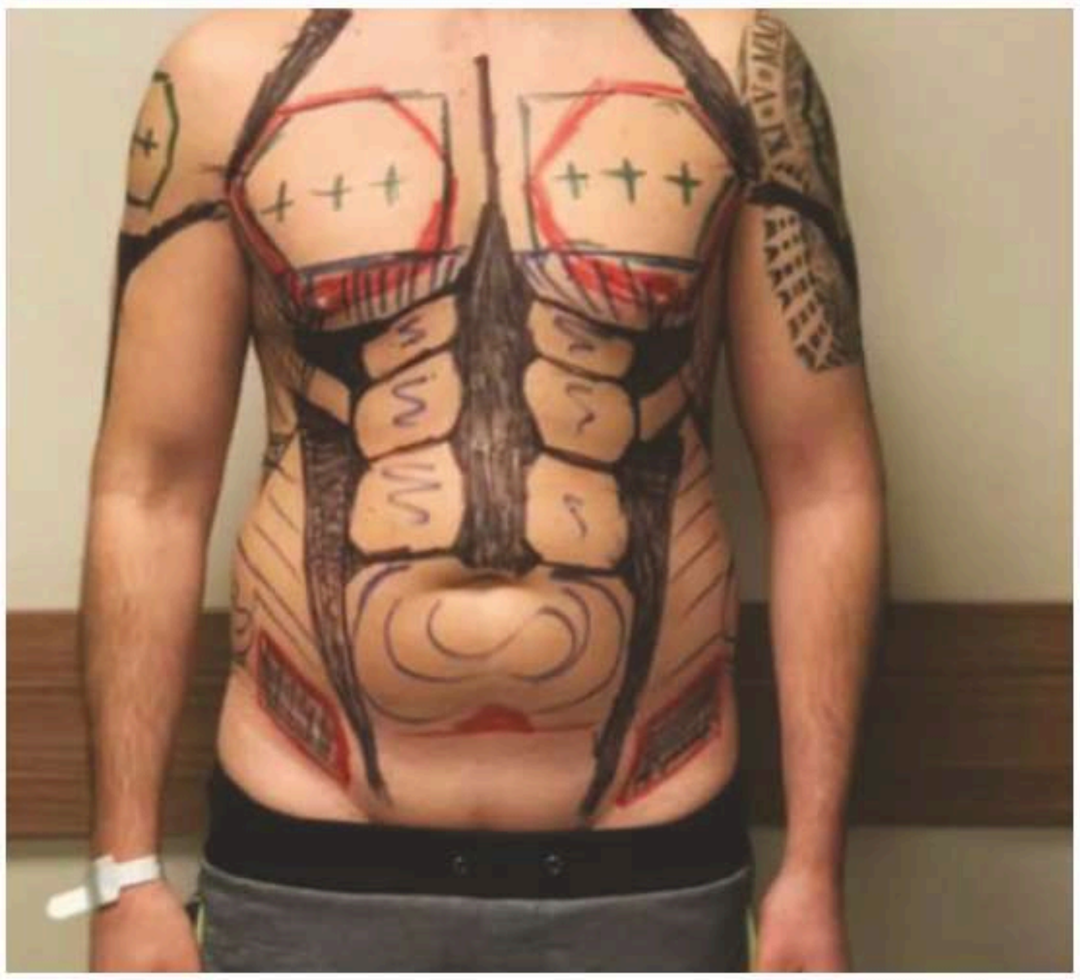

Fig. 17.7 Drawing frames around the muscle groups using different colors

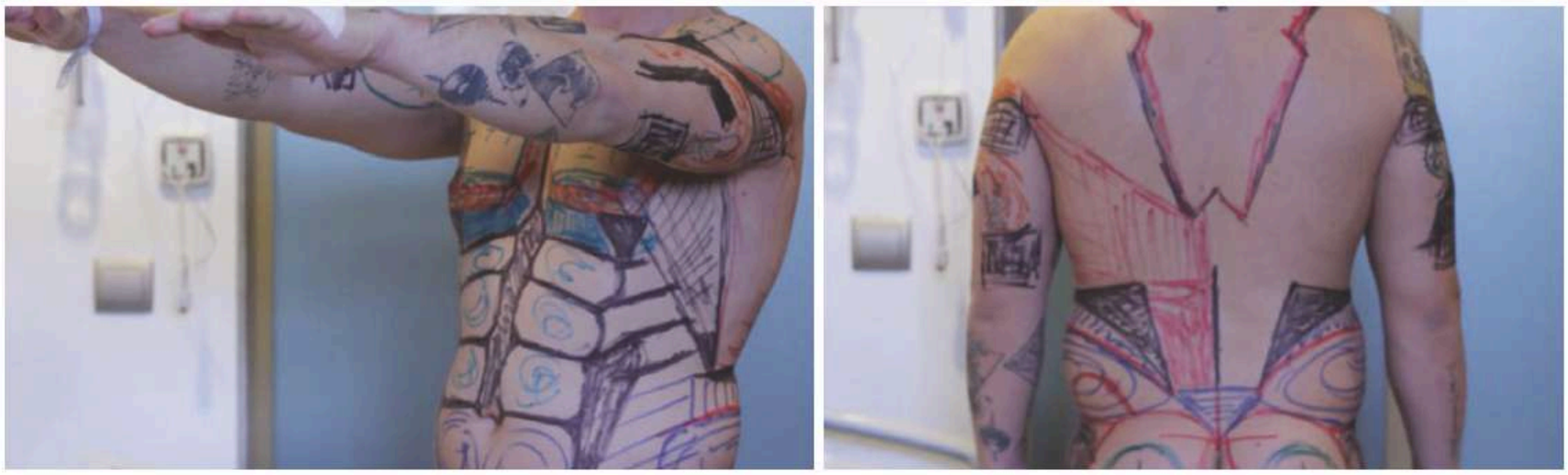

Fig. 17.8 Areas requiring deep liposuction are the black color frames, the red color borders, the green color fat transfer areas, and the dark blue color areas. The light blue color indicates the areas that require superficial liposuction

Fig. 17.9 Pronounced abdominal muscle groups after the fat has been removed from the natural space

17.9 Pyramidalis

The pyramidalis is a triangular muscle located on either side of the linea alba. The pyramidalis stems from the pubic symphysis and the pubic crest, and contracts as it moves upward and settles in the linea alba, located between the umbilicus and groin. The rectus abdominis and pyramidalis muscle, together with the lateral abdominal muscles (external oblique, internal oblique, and transverse abdominis), form the anterolateral abdominal wall. The pyramidalis muscle acts in conjunction with the rest of the abdominal muscles, contributing to various abdominal wall functions, including motions that increase intra-abdominal pressure when necessary (e.g., labor, forced expiration, defecation).

17.10 Blood Supply, Lymphatics, and Nerves of the Abdominal Wall

The arterial supply of the anterior abdominal wall can be divided into three areas. Zone I is the central anterior abdominal wall in the region of the epigastrium and rectus abdominis, and is supplied by the superior and inferior epigastric vessels. Zone II is the lower anterior abdominal wall below zone I, which is mainly supplied by the superficial epigastric, superficial external pudendal, and superficial circumflex iliac arteries. Zone III is the lateral of zone I, and is supplied by the lumbar, musculophrenic, lower intercostal, and subcostal arteries. Venous drainage from the abdominal wall enters the superior vena cava (SVC) via the inner breast, intercostal,

and long thoracic vessels above the umbilicus, and to the inferior vena cava (IVC) via the superficial epigastric, circumflex iliac, and pudendal veins below the umbilicus. Similar to venous drainage, the lymphatic drainage of the abdominal wall above the umbilicus drains into the axillary lymph nodes, and those below the umbilicus drain into the inguinal lymph nodes. The vascularization status of the entire abdominal wall should be well characterized in order to achieve optimal results and to prevent complications. Vascular regions should be well defined for abdominoplasty and liposuction. Lymphatic drainage is equally important as vascular drainage, and care should be taken to protect the inguinal lymph node basins, especially during the dissection and removal of skin flaps.

The muscles and skin of the anterior abdominal wall innervate the ventral rami of the sixth to eleventh intercostal nerves, the subcostal nerve (twelfth thoracic), and the first lumbar nerve (iliohypogastric and ilioinguinal nerves). All of these segmental nerves run within the fascia layer between the transversus abdominis and the internal oblique.

17.11 Serratus Anterior

The quadrangular muscle emerges anteriorly as finger-like bundles from the outer surfaces of the upper 8–9 ribs, and extends to the vertical, medial edge of the scapula (Fig. 17.2). It consists of three parts, including the upper fibers that emerge from the 1–2 ribs and intercostal fascia, the middle fibers from the 3–6 ribs, and the lower fibers that are interdigitated with the upper five fibers of the external oblique. In muscular individuals, the lowest 3–4 finger-like bundles of the serratus anterior can be seen on the lateral chest wall at the lower edge of the pectoralis major. Since the finger-like bundles of the serratus anterior are thicker and more prominent than the external oblique fibers, they are more easily distinguishable. The remaining part of the serratus anterior is hidden at the top of the chest wall by the pectoralis major and posteriorly by the latissimus dorsi. The serratus anterior may be distinguished under the latissimus dorsi muscle, where it bulges out. The prominence of the serratus anterior plays an important role in body shaping in male patients, as it is important in accentuating the middle V in the male body. The most important part of the serratus anterior is the bundle, which extends superficially on the 8–9 ribs, just above the semilunar line. When the topographic drawing of this area is made, the patient should be told to put his hands on his waist and squeeze his waist, while the frame of the muscles can be marked with both manual and light examination.

17.12 Pectoralis Major

In addition to the rectus abdominus muscles in the abdominal region, another attractive feature of an athletic male is the well-defined pectoral region. An attractive male chest is strongly associated with the shape and development of the pectoralis muscles. Common causes that motivate men to have chest shaping surgery include conditions that disrupt normal anatomy, such as gynecomastia in the chest, abnormal fat accumulation, lack of physical activity, underdevelopment of chest muscles, or congenital abnormalities.

The surface anatomy of the pectoralis muscles should be revealed in the ideal male chest. Although the pectoral muscle has its own anatomical reflection, the chest should be considered as a whole, and the surrounding areas should be treated as well. Good results can be obtained for male chest reconstruction with fat grafting and superficial liposuction. In order to obtain a developed and prominent chest structure, the pectoralis should be divided into major, upper, and lower poles.

The pectoralis major, a thick fan-shaped muscle, originates from three parts, including the clavicular part, the sternocostal part, and the abdominal part (Figs. 17.2 and 17.10). The clavicular part originates from the anterior surface of the medial half of the clavicle, the sternocostal part originates from the anterior surface of the sternum (costal cartilage of the 1–6 ribs), and the abdominal part originates from the anterior layer of the rectus sheath, and joins laterally and attaches to the great tubercle of the humerus by a bilaminar tendon. The fibers originating from the clavicular part pass laterally and downward until they are adjacent and parallel to the deltoid fibers. Here, the muscle bundle of the clavicular part passes over other parts coming from the sternocostal and abdominal parts. The sternocostal muscle bundles pass almost horizontally, while the abdominal muscle bundles pass upward and laterally, integrating deeply into other parts. The pectoralis major muscle functions to perform adduction and internal rotation in the shoulder joint. The upper part of the muscle is often straight, while the lower part has more mass and provides a smooth convexity. The lower edge of the muscle is either straight and horizontal, or it can slope slightly downward medially to the side. The pectoral fat pad located near the nipple contributes to the volume and anterior convexity of the chest. The deltopectoral fossa is located between the clavicular part and the deltoid. There is a depression on the sternum between the right and left pectoralis major muscles in the midline, and this depression is more prominent in muscular individuals. In an aesthetically pleasing male chest, the upper pole has a

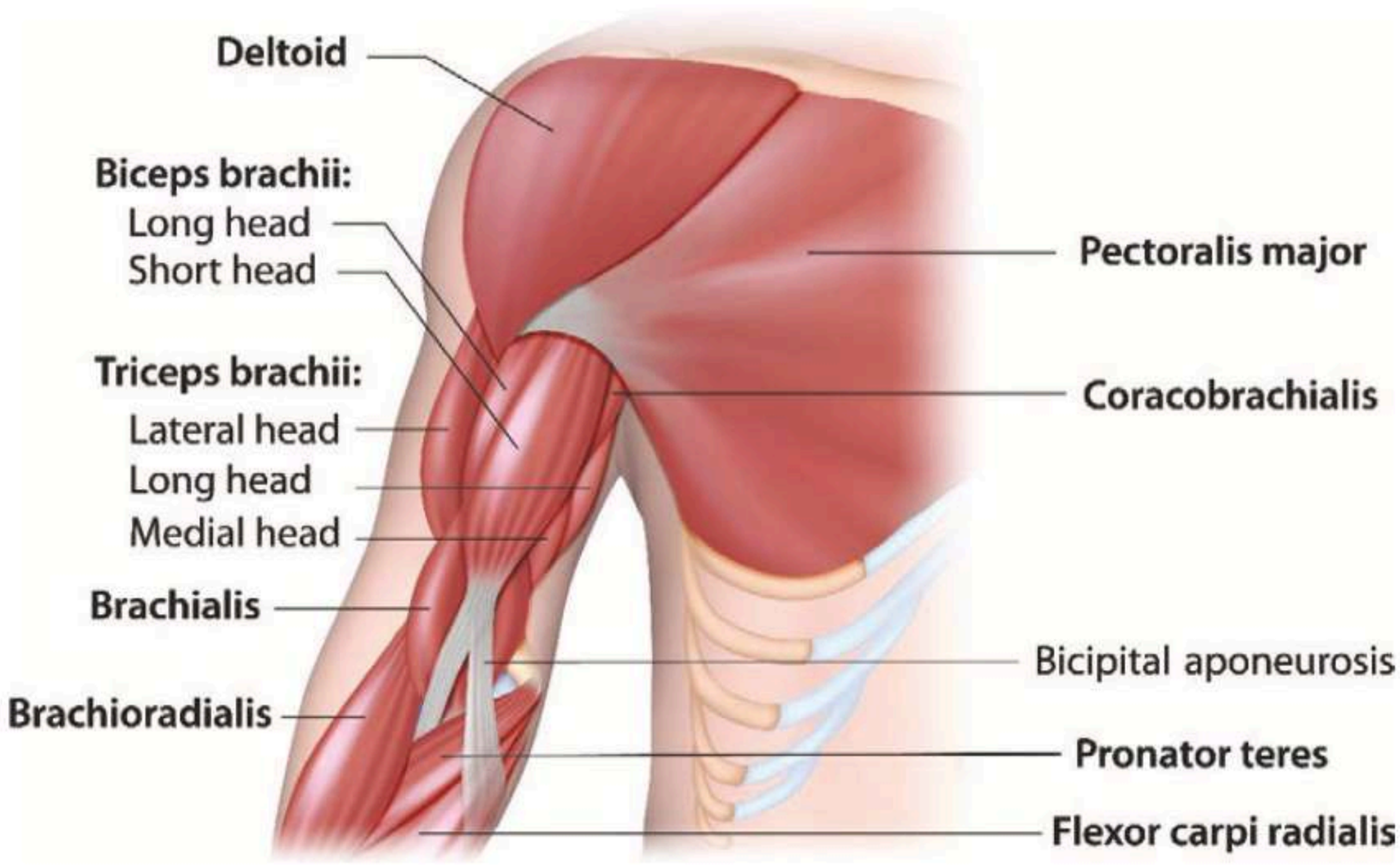

Fig. 17.10 Upper arm and superolateral abdominal wall. The deltoid, triceps, and biceps muscles, which are the most important muscles of the upper arm in body shaping

greater volume than the lower pole, due to its greater muscle mass. In the techniques used for male chest contouring, fats towards the upper abdomen and axilla are removed, volume is increased by fat grafting to the clavicular part, and the borders of the sternocostal part are made more prominent. Around 1 cm below the nipple, there is a horizontal line (pectoral line) along the lower border of the pectoralis muscle. Subdermal and intermediate liposuction should be aggressively used within the triangular area defined by the pectoral line and the lateral border of the rectus abdominis muscle (subpectoral triangle). Further, the surgeon must shape the triangular area between the lateral border of the pectoralis muscle and the lateral border of the latissimus dorsi muscle (pectoral-latissimus triangle), although beyond the pectoral region, in order to extend the concavity to this limit. The two most important muscles in the masculine male body are the pectoralis major and the deltoid muscle. For this reason, it is not recommended to operate on the abdominal area without first intervening in these two regions while creating the masculine "V." Regarding the pectoral muscle, the muscle margins in the relaxed and contracted positions of the muscle should be marked. The area between these two marks is known as the "transition zone." Since the transition zone is a dynamic area, it should undergo careful liposuction, taking into account the skin structure and age of the patient. There is a possibility of sagging breast appearance in cases with excessive fat resection from this area. Of note, the pectoral-latissimus dorsi triangle is located between the outer border of the latissimus muscle, the outer border of the pectoral muscle, and the line joining the lower border of the latissimus from the nipple. The pectoral-latissimus triangle, which is of great importance in the clarification of the upper body triangle, should have so much liposuction to the extent that almost no fat remains. Since the fullness in the male breast should be in the upper 2/3 of the pectoral muscle, fat transfer should be applied to this area under and into the muscle. This intervention ensures that the desired nipple position is achieved, which is often lateral and slightly downward in athletic males (Figs. 17.11 and 17.12).

Fig. 17.11 Change in chest structure after pectoral muscle fat transfer. The deltoid and pectoral muscles should be worked on first in order to achieve the masculine "V"

Fig. 17.12 The insufficient masculine appearance of the patient, who had previously undergone gynecomastia operation, was remedied via pectoral intramuscular fat transfer

17.13 Latissimus Dorsi

The latissimus dorsi is a large, flat, triangular muscle that merges into a narrow tendon that overlies the lumbar region and lower thorax. It originates from the spinous processes of the 7th–12th thoracic vertebrae, all of the lumbar and sacral vertebrae, the posterior third of the iliac, and the spinous processes of the outer surfaces of the lower three ribs (Fig. 17.13). The latissimus dorsi passes from the midline to the arm like a cape. A tendon attaches the muscle bundles converging towards the axilla to the humerus. The muscle bundles come together and wrap around the teres major and form a hanger

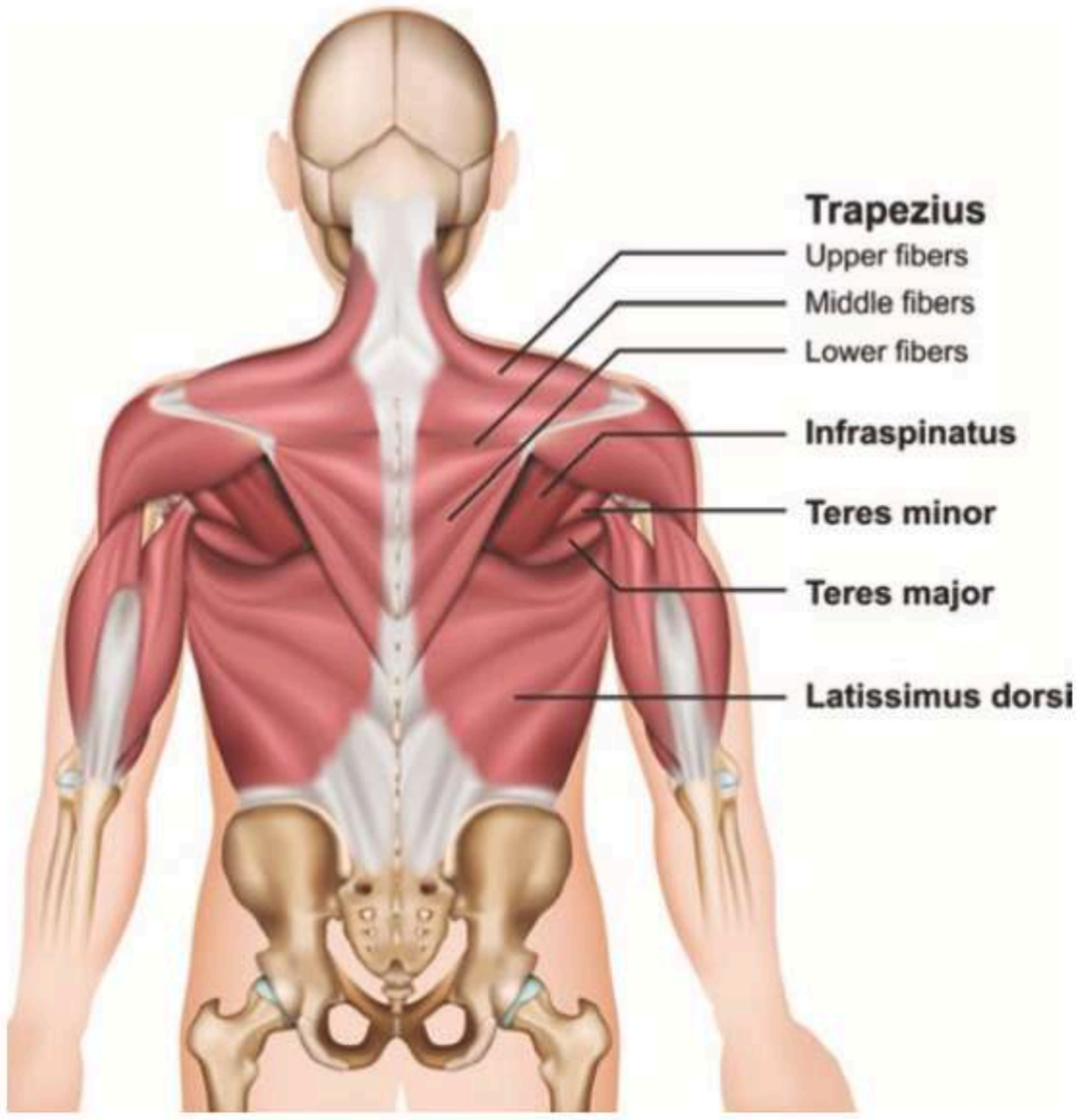

Fig. 17.13 Posterior trunk muscles. The most important muscle of the posterior trunk in body shaping is the latissimus dorsi

that forms the posterior wall of the axilla. Both of these latissimus dorsi muscles form an inverted triangle or "V" shape. The tendon originating from the latissimus dorsi forms a line or curve from the midline to the top of the ilium through the thoracic vertebrae. While the shape of the muscle is normally prominent in the middle and upper part, the part of the muscle below is hidden by the dorsal fat pad, which also hides the lower part of the outer oblique. At the drawing stage, the patient should press his hand down on the surgeon's shoulder to determine the lateral border of the latissimus. In the male patient, a certain amount of fat should remain on the latissimus muscle in order to make the dorsal triangle prominent. Therefore, the patient should lean his body to the right and left while standing in anatomical position in order to evaluate the presence of excess adipose tissue (Fig. 17.14).

Fig. 17.14 The expected masculine V in the posterior view with the latissimus dorsi and lumbar muscle pronounced

17.14 Arm

The arm is one of the most difficult areas in body contouring due to the high risk of contour irregularity of the underlying fat structures (mostly superficial fat), the difficulty of achieving symmetry in bilateral treatment, and the thickness of the arm skin. While arm shape is determined by each patient's muscle structure and mass, there are three main muscles responsible for arm shape, including the deltoid, triceps, and biceps (Fig. 17.10). In both males and females, a well-defined arm is not straight but rather has curves. The deltoid and biceps muscles clearly define the curves in the forearm and lateral arm. However, it is more difficult to define and form the contour of the back of the arm due to its unique fat distribution. More prominent musculature in a man's arm is considered to be athletic and healthy. Fat should be removed in some areas to improve the anatomical structure, but should be grafted in others. As in all other regions, understanding the upper limb anatomy is of utmost importance in a surgical setting. It is necessary for the surgeon to know which plane he/she is in and the neurovascular structures nearby in order to minimize complications and ultimately increase patient satisfaction and survival.

17.15 Skin

The skin of the medial arm is thinner than it is around other body parts, and therefore, it is prone to premature wrinkling. The subcutaneous adipose tissue consists of areolar and lamellar layers separated by superficial fascia. The areolar layer is located under the skin and consists of fat cells separated by connective tissue arches. The lamellar layer consists of horizontally located fat cells and a large amount of connective tissue. The back of the arm consists of a prominent lamellar layer. Patients with increased fat have an increased thickness in the lamellar layer compared to the areolar layer. This increase is predominantly concentrated in the upper and middle third of the arm in the posterior-outer region. The back of the arm is also more prone to skin excess and looseness due to the large fat storage capacity in the area.

17.16 Deltoid

The deltoid is a triangular muscle consisting of an anterior part originating from the lateral third of the clavicle, a middle part coming from the acromion, and a posterior part stemming from the lower surface of the spine of the scapula. All three of these parts settle in the deltoid tuberosity, located in the middle part of the humerus. The anterior part is separated from the pectoralis major by a deltopectoral triangle and groove. A superficial liposuction procedure in this triangle will make both the deltoid and the pectoral muscles more prominent. The middle part is multipennate and contains three septa from the deltoid tubercle and four intramuscular septa from the acromion. When viewed from the front, the middle part gives the shoulder a round appearance, and it inserts from below, in contrast to the front and back parts. The posterior part is a mass that separates the deltoid from the long and lateral heads of the triceps. The tendon of the deltoid's anterior part passes over the tendon of the clavicular part of the pectoralis major, and enters the deltoid tubercle on the anterior surface of the humerus. The other two parts of the deltoid insert into the lateral side of the humerus. The shape of the deltoid slightly changes when the arm is rotated medially or laterally. In slim and muscular individuals, the cross-linking of the muscle bundles creates a segmented appearance on the side of the shoulder. The round deltoid shape is enhanced during high-definition lipoplasty from the incision sites in the anterior and posterior axillary folds. The midline of the deltoid should be marked first with the arm in 90 degrees abduction. At the point where the deltoid muscle ends on the humerus, there is a small natural negative area filled with fat at the midline between the triceps and biceps. Anterior and posterior rotation movements and biceps and triceps boundaries can be easily determined, and the muscle frame should be marked. When the arm is in 90-degree abduction in a posterior view, the angle made by the posterior axillary line and the arm is expected to be 90 degrees in women and 60 degrees in men. All of the fat should be removed from the marked frame in order to clarify the deltoid muscle. In addition, 100–150 cc of fat should be injected into the muscle from the posterior (Fig. 17.15).

Fig. 17.15 The definition of the deltoid and triceps muscles after fat transfer and liposuction

17.17 Triceps

The large triceps muscle, which fills the majority of the extensor compartment of the upper arm, consists of three heads, the long, the lateral, and the medial. The long and lateral heads of the triceps provide the superficial shape of the rear upper arm. The medial head is deeper and contributes to the arm's volume and thickness. The long head of the triceps stems from the infraglenoid tubercle of the scapula, crosses the shoulder joint, and forms the main mass of the posterior upper arm. The lateral head originates from the proximal posterior surface of the humerus, and can easily be seen as a mass near the deltoid on the lateral side of the arm. The medial head has a broad origin and originates from the medial intermuscular septum, the lateral intermuscular septum, and proximally from the humerus, just below the radial nerve's groove. The medial head is covered with lateral and long heads, and can only be seen distally in the humerus. The medial head inserts the tendons of all three triceps' heads into the posterior aspect of the proximal olecranon. A cylindrical form containing part of the triceps' medial head can be seen in the lower half of the medial side of the arm between the biceps brachii and the long head of the triceps. In this region, the surgeon can make prominent the groove between

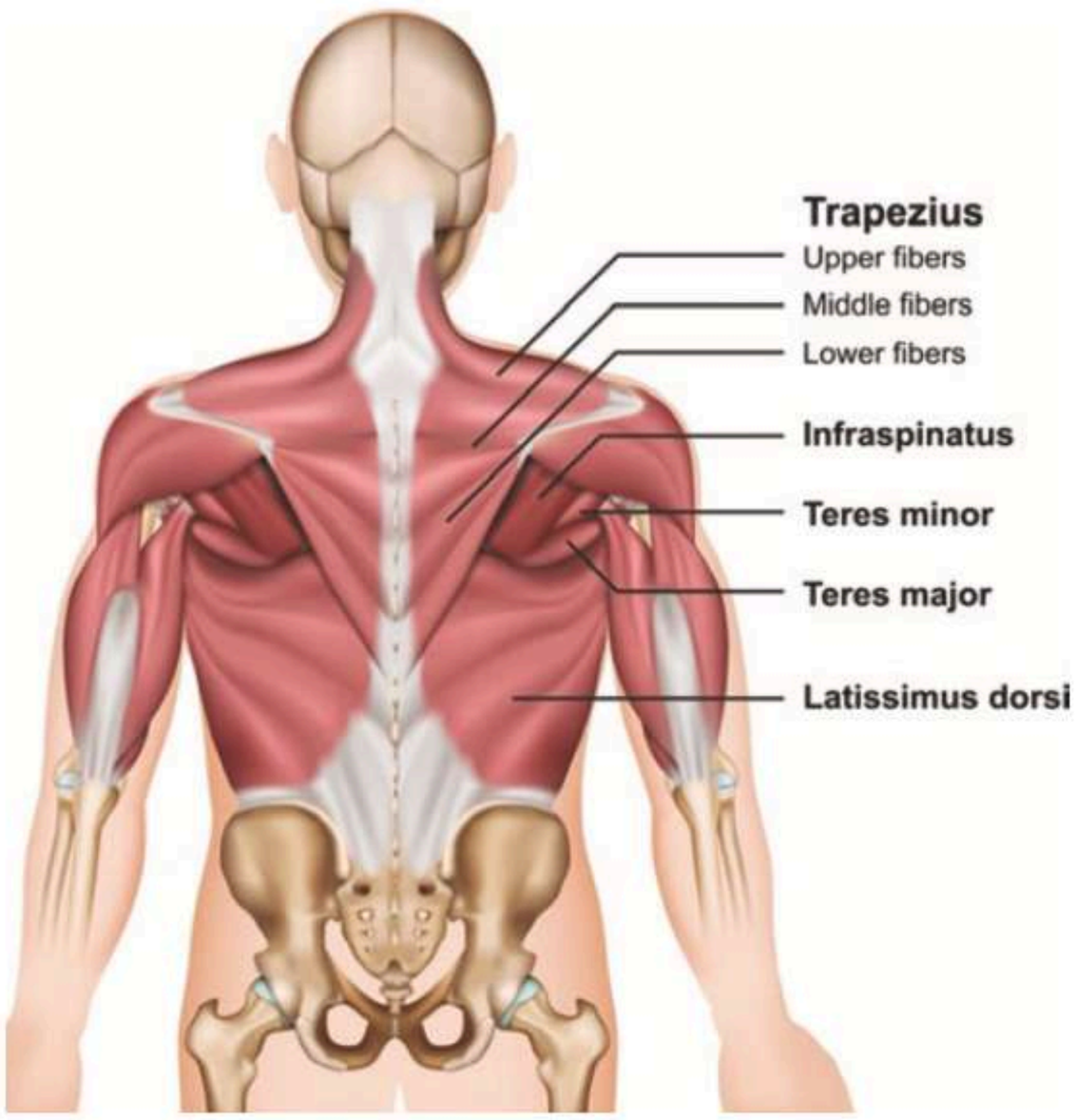

Fig. 17.13 Posterior trunk muscles. The most important muscle of the posterior trunk in body shaping is the latissimus dorsi

that forms the posterior wall of the axilla. Both of these latissimus dorsi muscles form an inverted triangle or "V" shape. The tendon originating from the latissimus dorsi forms a line or curve from the midline to the top of the ilium through the thoracic vertebrae. While the shape of the muscle is normally prominent in the middle and upper part, the part of the muscle below is hidden by the dorsal fat pad, which also hides the lower part of the outer oblique. At the drawing stage, the patient should press his hand down on the surgeon's shoulder to determine the lateral border of the latissimus. In the male patient, a certain amount of fat should remain on the latissimus muscle in order to make the dorsal triangle prominent. Therefore, the patient should lean his body to the right and left while standing in anatomical position in order to evaluate the presence of excess adipose tissue (Fig. 17.14).

Fig. 17.14 The expected masculine V in the posterior view with the latissimus dorsi and lumbar muscle pronounced

17.20 Blood Supply, Lymphatics and Nerves of the Arm

The arterial supply of the upper limb begins with the subclavian artery. The subclavian artery is called the axillary artery once it passes through the lateral edge of the first rib. The axillary artery passes from the axilla towards the humerus and branches off first to the anterior and posterior circumflex humeral arteries, followed by the subscapular artery, its largest branch. As it passes through the teres minor, it becomes the brachial artery. Venous drainage of the upper limb occurs via two large veins. The first is the basilic vessel, which consists of the radial and ulnar vessels, and the second is the cephalic vessel, which stems from around the hand and progresses into the axillary vein.

All of the nerves in the upper limb are supplied by the brachial plexus, which consists of the anterior rami of the spinal nerve levels from C5 to T1. The nerve roots originating from C5 to C7 form the musculocutaneous nerve, and these move down distally in the upper arm, and deeply pierce the coracobrachialis in an upwards manner. The musculocutaneous nerve that travels between the biceps brachii and the brachialis muscle eventually becomes a lateral cutaneous nerve when it passes through the lateral side of the biceps' tendon. The musculocutaneous nerve provides motor innervation to the biceps brachii, brachialis, and coracobrachialis and gives sensory innervation to the radial side of the forearm. The musculocutaneous nerve consists of the nerve roots of the C5 and C6 axillary nerves. The axillary nerve provides motor innervation to the deltoid muscle and teres minor as well as sensory innervation via the upper lateral cutaneous nerve of the arm.

It is not uncommon for the arm's sensory nerves to be damaged during brachioplasty surgery. The most commonly damaged cutaneous sensory nerves during brachioplasty surgery are the medial brachial cutaneous nerves and the medial antebrachial cutaneous nerves. Reliable estimation of the location of the sensory nerves affects incision options and gives limited dissection depth in arm lift surgery.

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the biceps and the triceps' medial head anteriorly, and posteriorly, the groove between the medial and long heads of the triceps. When viewed from the side in a 90° position, there are folds in the proximal and distal regions of the athletic posterior arm. A well-developed triceps creates a convex area in the posterior middle, while the triceps tendon straightens the distal posterior arm, and the triceps proximal insertion creates a curvature to the axilla. This curvature is more pronounced in men. At 90 degrees of abduction, a vertical parallel angle, called the "youth angle," is defined between the shoulder and the lower border of the arm. The narrower the angle, the more pronounced the triceps muscle mass. The arm should be brought into hyperextension for marking the triceps muscle and separating all of its structures. Thus, the contraction of the triceps muscle groups is ensured, and the natural shadows can be easily detected. Liposuction in these areas, called "negative areas," is often sufficient for definition.

17.18 Biceps Brachii

The biceps brachii gets its name from its two proximally attached parts. The long head of the biceps originates from the supraglenoid tubercle of the scapula, while the short head originates from the coracoid apex of the scapula. The long and short heads of the muscle moving on the humerus insert into the radius tuberosity through the biceps' tendon. The two heads of the biceps brachii, which usually appear as one bulging form on the upper arm, can only be seen as two separate structures medial to the cephalic vein. Proximally, the part of the biceps overlapping the pectoralis major and deltoid is distally covered by only fascia and skin. At the medial border, the biceps brachii is associated with the coracobrachialis, brachial vessels, and the median nerve, while at the lateral border, it is associated with the deltoid and brachioradialis. A groove forms between the biceps brachii and pectoralis major with abduction and external rotation. This groove should be emphasized in body contouring in order to clarify the separation between the muscles. Since the convex form on the anterior of the upper arm is mostly formed by the mass of the biceps brachii, a well-developed biceps brachii symbolizes strength, athleticism, and an aesthetically ideal upper arm form. If one desires to clarify the biceps muscle with fat injection, the most practical and useful approach is for the surgeon to reach into the muscle (while protecting the veins and nerves) with a 2 mm incision in the medial, and to inject fat into the medial part (Fig. 17.16).

Fig. 17.16 Fat transfer is the most important part of the male body shaping operation. These images show the change after injections were made into the deltoid, biceps, and trapezius muscles

17.19 Brachialis

The brachialis is a large muscle that is located behind the biceps brachii in the humerus. The brachialis emerges from the lower half of the anterior surface of the humeral shaft, begins on both sides of the deltoid entrance, and passes through the elbow joint into the ulna's coronoid process. The junction of the brachialis and the deltoid can be seen as a depression or groove in the superolateral origin of the brachialis. The medial fibers of the brachialis form the base of a concave cavity bounded near the elbow by the anterior bicipital aponeurosis and posterior by the medial head of the triceps. This is where the brachial vessels are located. When viewed from the front, the brachialis creates a lateral protrusion from the back of the biceps' brachia.

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