CASE 7.3 Breast Augmentations Using RAFT

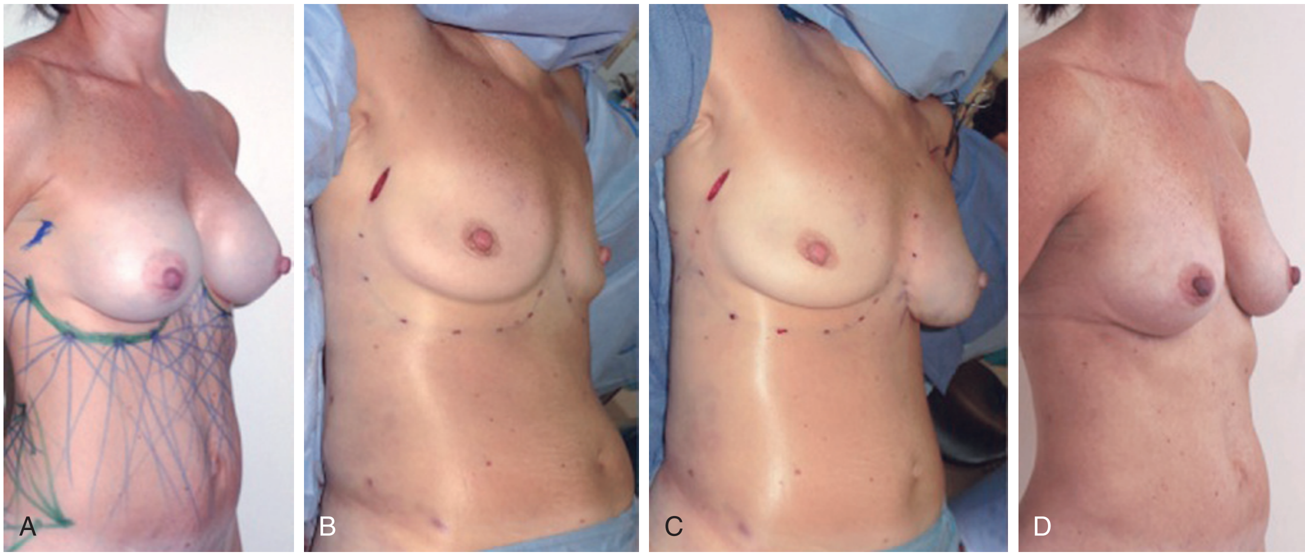

Figure 7.13 (A) A 35-year-old woman with contracted implants for aesthetic augmentation. We removed both right and left implants, while extensively liposuctioning fat from the apron. Once the implants were removed, the breasts were flaccid (B). We grafted fat into the breasts and inserted a RAFT suture to grab the subdermal tissue at the caudal end of the epigastric crescent. Tightening the string and suspending it to the pectoralis creates a new breast mound (C). At 6 months later, without implants, the breasts have about the same volume with a much more natural look and feel (D).

8 Lymphedema: Microsurgical Reconstruction

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INTRODUCTION

Up until recently, lymphedema has largely remained on the sidelines of microsurgery. For many years, most microsurgeons avoided lymphatic reconstruction because of inconsistent results, lack of published data, and concerns regarding safety in a poorly understood disease process. Fortunately, the anecdotal era in lymphatic surgery is giving way to prospective studies and greater integration of our expanding knowledge of pathophysiology, imaging, and patient selection, into clinical practice. Advances in basic science, lymphatic imaging, and more sophisticated surgical techniques have resulted in a swell of interest in lymphatic surgery, which is now common in many academic centers. While there are currently still more questions than answers in lymphedema, we explore here some of the most popular techniques in lymphatic surgery as well as the latest insights into patient selection and operative approach.

LYMPHATIC ANATOMY AND PHYSIOLOGY

Revisiting the anatomy and physiology of the lymphatic system is useful, not only for lymphatic surgery, but also for other cosmetic and reconstructive procedures where increased awareness of this vast organ system may reduce the risk of injury to it. The lymphatic system is present throughout most of the body, although interestingly, it is not found in certain areas such as the central nervous system, or cartilage and bones. The lymphatic system as a whole serves three functions: fluid balance; transporting fats and fat-soluble vitamins from the gut to the circulation; and defending against microorganisms as well as tumor cells. As blood is pumped through the tissues and passes through the capillary network, most of the fluid that enters the interstitium returns through the venous system. The fluid waste that remains is removed by the lymphatics that can accommodate macromolecules that are too large to enter capillary venules, which have limited pore size.[1] This is the basis for such studies as lymphoscintigraphy, that depend on preferential uptake of technetium sulfur colloid into the lymphatics because this agent is too large to fit through the limited pore size of a venule.

Lymphatic vessels also transport antigen and inorganic matter (such as silicone, noted in ruptured implants), via afferent vessels that enter the lymph node on its convex surface. Both B-cell and T-cell populations are located within the lymph node, where a coordinated adaptive immune response occurs following exposure to antigen via antigen presenting cells.[2] Naive lymphocytes become activated and mature lymphocytes subsequently circulate through both the blood and lymph seeking out target antigen, re-entering the lymph node via high endothelial venules.[3] The interconnections between the lymphatic sinuses and venules are the basis for Cheng's proposed mechanism for lymph node transfer.[4] After percolating through the lymph node, lymph exits through the efferent duct at the hilum where the feeding artery and vein perfuse the node.

The transport of lymph through this system of vessels and nodes is interesting, as there is no heart to pump fluid through this one-way street, which parallels the circulation of blood. Lymph is propelled independently by intrinsic smooth muscle contraction within the wall of the lymphatic vessels that is aided by unidirectional valves.[5] Extrinsic skeletal muscle contraction also squeezes the lymphatic vessels, further facilitating lymph transit. This phenomenon is the underlying mechanism of action for short-stretch compression wraps that provide a firm surface against which muscle flexion augments lymph transport.

While intestinal lymph is not typically a focus in plastic surgery, it plays a role in certain types of primary lymphedema and is a significant component of lymphatic physiology. Lymphatics in the small intestine are referred to as lacteals, which absorb fats from the intestinal lumen that accumulate to produce the milky-appearing chyle.[1] This lymphatic efflux of fats empties into the cisterna chyli, which is a dilated lymphatic sac that is situated in front of the L1–L2 vertebral bodies. This structure gives rise to the thoracic duct, which drains the majority of the body with the exception of the right upper limb, chest, and head and neck regions, which are drained by the right lymphatic duct. The thoracic duct and right lymphatic duct both terminate in large lymphovenous connections at the junction of the internal jugular vein and subclavian veins (Fig. 8.1). There is, however, significant variability in this anatomy, and major lymphatic ducts can coalesce more superiorly on the internal jugular vein in the region of the supraclavicular lymph