FACULTY DISCUSSION & STUDY GUIDE

In addition to the review of the ASPS EdNet course modular material, this guide is provided as a tool for faculty use in preparation for a weekly conference. By following and addressing the points below, any plastic surgeon should be able to step in to teach the curriculum in a consistent and complete manner.

IX.D.4 Breast: Reconstruction 1, 2, 3, 4, 5, 6

4-Autogenous Reconstruction

By Edward Luce, MD

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A. Autogenous Reconstruction

Latissimus

1. Describe the favorable candidate for breast reconstruction with latissimus dorsi flap. (Moderately heavy, substantial deficiency of mastectomy skin, prior irradiation, smoker, diabetic, TRAM contraindicated and not desired, moderate ptosis or macromastia of the opposite breast, a slender patient with insufficient abdomen, yet necessity for autogenous reconstruction.)

2. Preoperative testing for an intact neurovascular bundle in the post-mastectomy setting can be done how? (Contraction of the latissimus obtained with the patient placing both hands on her hips with the thumbs pointed posteriorly and pushing inwards; angiography in rare instances.)

3. Describe the accessory blood supply of the latissimus including potential and minor vascular pedicle. (Serratus anterior branch is a potential pedicle if the proximal thoraco-dorsal or subscapular axis is ligated. This vessel creates retrograde flow through the intercostal perforator, a connection which is not consistently present. The minor pedicle is the posterior intercostal perforators.)
    a. What is done with the serratus anterior branch? (Should be preserved. This is almost always possible if the flap is oriented transversely and brought around the chest as a pendulum.)

4. What are the three landmarks or borders that define the extent of the triangular shaped latissimus muscle? (One, the tip of the scapula to the axilla over the posterior axillary line or PAL. Two, the PAL to the iliac crest defines the anterior border. Three, the midline of the back. Actually, from the iliac crest to the midline of the back obliquely is the dorsal fascia.)

5. Describe a skin island design for a latissimus flap breast reconstruction. Use the landmarks or borders as defined in question #4. (Several designs are possible. An advantageous design is a flap set low and inferior and posterior on the latissimus. The skin island is oriented obliquely, posterior tip superior and anterior tip inferior which permits closure of the donor site in a relaxed skin tension line. The considerations are a design based on the perforators from the descending or major branch of the latissimus. The other consideration as stated is a skin island that allows closure in the relaxed skin tension lines. The diagrams in the readings would outline a flap that is obliquely oriented from superior anterior to inferior posterior. Actually, that design will place the most ischemic, the posterior, portion of the flap medially, not a desirable orientation, but does permit an inferior lateral inset of the skin island. The resultant closure is perpendicular to the relaxed skin tension lines.)

6. What is one option in sequence of dissection to expose the lat. dorsi? (Identify the superior border, identify the overlap with the medial-inferior border of the trapezius, use that as a guide to proceed posteriorly and then inferiorly off the paraspinal muscles and then finally anterior and superior along the lateral border.)
    a. What are the principal muscles that relate to the latissimus in this sequence, beginning with the teres major at the axilla and proceeding posteriorly? (Trapezius, the paraspinals, serratus anterior, and the external oblique.)

7. Viewed differently, as the latissimus is transected from inferior to superior off the vertebral origin, what muscle is encountered superiorly, overlapping the superior/posterior border of the latissimus? (Trapezius.)

a. In dissection of the latissimus muscle as one approaches the tip of the scapula from a posterior and inferior direction, with what muscle will the superior/posterior border of the latissimus mingle and intermix? (Teres major.)

8. Describe the arc of rotation and where the muscle and skin components ultimately lie when rotated onto the chest wall. (Tunnel and rotation should be quite high on the chest in order to maintain an inferior chest wall barrier of intact soft tissue between the latissimus dissection posteriorly and the mastectomy site anteriorly. This barrier will help keep a tissue expander in place and avoid a muscle bulge across the lateral chest wall. If the skin island is placed in an oblique and transverse orientation, the flap can simply be swung as a pendulum around the chest wall rather than any rotation or twisting of the muscle.)

9. What is the management of the tendinous insertion and the thoracodorsal nerve? (90% transection of the insertion but retention of a remnant to prevent traction on the vascular pedicle. Some divide the thoracodorsal nerve; others retain the nerve.

10. How is a decision made about tissue expander versus implant? (If the patient has an abundance of soft tissue skin than an implant can be placed primarily. In most cases, a tissue expander is recommended so gradual expansion can be accomplished without tension initially on the flap as well as the ability to balance final volume against the opposite breast.)

11. What are the technical aspects of inset of the flap and placement of the tissue expander? (Subpectoral location of the expander, tacking of the flap to the chest wall superiorly and medially along the sternum, closure laterally of the dead space to prevent migration laterally of the tissue expander, tacking of the latissimus along the inframammary crease or IMF.)

12. The readings describe an autogenous lat. dorsi reconstruction without an implant. What are the principal disadvantages? (The necessity to harvest a great deal of fat and the resultant contour deformity of the back as well as increase in frequency of the complications of wound dehiscence and seroma.)
    a. Balancing against the TRAM flap, other than scar what is the principal disadvantage of the latissimus dorsi? (Early is the complication of seroma and late problems related to capsular contracture about the implant. Probably the most cogent is the volume of the fat and soft tissue as well as the dimensions of the skin island possible with the TRAM flap, all of which allow for more ptosis and no necessity for an implant so a single stage reconstruction.)

13. Anatomy: You perform a latissimus flap for breast reconstruction three months postoperatively. The patient has a lumbar hernia on the operated side. Explain anatomically what has occurred. (Deep to the latissimus inferiorly is the serratus posterior and external oblique which can be difficult to differentiate from the inferior portion of the latissimus. If this muscle or its innervation is damaged than a lumbar hernia would be possible.)

Pedicled TRAM

1. What are the important factors in patient selection for a TRAM flap? (The negative factors include smoking, obesity, prior skin incision and scars on the abdomen, prior abdominoplasty, comorbidities as diabetes, athletic lifestyle. The incidence of complications begin to rise above a BMI of 30.)
    a. Be more specific about obesity, both qualitatively and quantitatively. (Probably a BMI of over 40, namely morbidly obese, or 35-40 borderline morbidly obese is a contraindication. The so-called “pot-belly” habitus with less extra peritoneal and more intraperitoneal fat is qualitatively a contraindication as well as a markedly redundant panniculus.)

2. What are the four contributing sources of vascular supply to the anterior abdominal wall? (Deep superior and inferior epigastric arteries or DSEA and DIEA; intercostal perforators; superficial inferior epigastric artery or SIEA; superficial and deep circumflex iliac.)

3. Outline the zones on the abdomen and give the ranking in terms of vascularity. (Zone I lies over the rectus designed to be the carrier of the flap, Zone III is the next zone lateral on the ipsilateral side, Zone II the first zone across the midline, Zone IV would be most lateral zone on the contralateral side. Zone I, III, II, IV is the ranking in terms of vascularity by the classic system of Hartrampf.)
    a. Discuss the concept of angiosomes with respect to the zones of the TRAM flap. (An angiosome refers to an area of skin and soft tissue vascularized by the primary arterial supply to that area. The angiosomes are linked by choke vessels. Studies of the deep superior epigastric artery and deep inferior epigastric artery indicate that Zone I is the primary angiosome for the latter while connection through choke vessels are necessary to pedicle Zone I on the deep superior epigastric artery. Conversely, Zone II, across the midline, requires flow to even an additional set of choke vessels.)

4. What explains the acute venous congestion frequently seen in superiorly pedicled TRAM flaps? (The necessity to reverse venous flow to the valves of the superior system)
    a. Management? (Can release the ligature on the stump of the DIE vein. Leeches certainly can be utilized but blood loss can be substantial.)

5. What perforators can be incorporated into the flap? (Both the medial and lateral row of perforators. This maneuver requires a much wider harvest of fascia than the incorporation of the medial row of perforators only.)

6. What are some of the methods to modify or increase the volume of tissue and/or reliability with TRAM flap? (A prior delay, bi-pedicle, location of the TRAM flap more superior on the abdomen to incorporate more periumbilical perforators, and a free flap based on the deep inferior epigastric vessels.)

7. Two methods described in the readings to enhance the vascularity of a TRAM flap are bi-pedicled design and supercharge by a microvascular anastomosis. Critique. (A bi-pedicled flap implies sacrifice of both recti muscles and substantial bulk within the tunnel from abdomen to breast for the flap. The inherent increase in weakness of the abdominal wall does not seem justified for the

increase in vascularity. Supercharge may require an orientation of the flap beneficial to optimal formation of the new breast mound. So the indications advocated for a bi-pedicle flap, smoker, large volume flap, obese patient would dictate an alternate approach such as a prior delay for a free flap.)

8. What are the three essential pieces of information in weighing the efficacy of muscle-sparing techniques in pedicled TRAM flaps? (Segmental intercostal innervation enters the deep aspect of the rectus muscle at the junction of the middle and lateral one-third so any lateral muscle segment is by definition denervated; the medial row of perforators is 1-2cm from the linea alba so any medial muscle preservation must be quite small and; a 60% diminished blood flow was demonstrated by simulating muscle sparing with clamping the medial and lateral muscle and measurement of flow.)

9. Within the context of questions 1 and 2 explain the efficacy of delay. (Delay, presumably, does two things. One, opens and enlarges the choke vessels; and two, reverses flow from inferior to superior and renders the venous valves incompetent.)

10. What is the technique or techniques of delay? (Several techniques have been described including simply bilateral ligation of the DIEA, bilateral ligation of the DIEA and SIEA as well, and a more radical delay which consists of incision of the entire inferior limb of the proposed bilateral skin ellipse as well as some additional superior incision and ligation of the perforators on the side not used. The conundrum is the production of a sufficient ischemic delay for efficacy vs. ischemia that will produce tissue necrosis with just the delay procedure.)

11. In the discussion of the delayed reconstruction in the previously irradiated patients, what are the considerations with respect to vascular supply for a planned pedicle flap? (Possible radiation damage to the ipsilateral DSEA and the necessity to use the contralateral flap.)

12. Several of the readings prefer an ipsilateral pedicle over a contralateral pedicle. What is the rationale and the discussion? (Some authors are of the opinion that the muscle bulge is less obtrusive in the central portion of the inframammary crease, and the inframammary crease is better defined. One must consider that the width of the tunnel for the pedicle is about 6cm which would be more than half of the average patient's transverse width of the IMC.
    The argument for contralateral pedicle, as originally described by Hartampf, is the absence of as significant a disruption of the IMC and the ability to conceal the pedicle in the medial portion of the opposite breast)
        a. What are some of the key technical maneuvers to ensure a tension-free rotation of the pedicle TRAM flap? (First, directly visualize the pedicle after rotation of the flap into mastectomy defect. Second, slip a finger between the muscle at the point of rotation and the soft-tissue – abdominal skin to ensure no tension exists on the pedicle.)

13. Describe the estimation of the skin and soft tissue deficit in delayed reconstruction. (Measure the distance from the mid-clavicle to the mastectomy scar and then scar to where the inframammary fold would exist. Compare this measurement to the opposite breast. Determine transverse skin deficiency by measurement from anterior axillary fold to parasternal line at the level of the nipple of the opposite breast and compare to the opposite breast or plan the final appearance of the opposite breast.)

14. What area, according to the readings, can be harvested by a unipedicled TRAM? Or the free TRAM? (Zone I and most of Zone III, perhaps a small, 10-30% of Zone II. The author believes a free TRAM enables harvest of more of Zone II, perhaps 70%.)

15. Describe the orientation and inset of a pedicle TRAM into the chest wall. Designate point A as the periumbical skin, point B as the lateral most skin edge at the midpoint of transected Zone III, and point C as a similar point medially in transected Zone II. (If a contralateral flap is used and a transverse inset is accomplished point A will end medially on the reconstructed breast, point C will be inset in the superior pole, and point B at the inframammary fold.)

a. What part of the flap dictates base width of the reconstructed breast? (Depends on ipsilateral versus contralateral TRAM flap and a transverse inset versus oblique inset.)
b. In summary, what are the three factors in selection of the type of TRAM flap? (Tissue needed, tissue available, and circulatory dynamics of that individual patient.)

16. What are the indications for bipedicled TRAM flap? (Necessity for large volume flap, smoker, obese patient, and possibly prior radiotherapy. This reviewer would prefer a delayed unipedicle flap or free flap in these circumstances.)

17. What is the frequency of hernia in pedicle versus free flap? (As quoted by the readings, despite a wealth of papers the controversy remains. The incidence of abdominal hernia and bulge appears to be equal in both groups.)
    a. In essence, what are the conclusions of the readings' about abdominal integrity and strength in pedicle versus free flaps? (One of the readings presents a comprehensive review of the available literature and concludes that based on available information little difference exists between the two.)

Abdominal Wall Complications

1. Define and characterize the terms true hernia, abdominal wall bulge, abdominal wall weakness and laxity. (A true hernia is loss of continuity of all layers of the abdominal wall with prolapse of the abdominal contents through the defect. The TRAM hernia or bulge is a pseudohernia in the sense that the external fascia may be intact but internal oblique is dehisced. An abdominal wall weakness and laxity is usually due to attenuation and stretching of the donor site defect although all layers are actually present.)

2. What is the important factor with respect to blood flow to the rectus sheath in closure of abdominal wall defects? (Rectus sheath blood flow decreases dramatically when the intra-abdominal pressure is increased. Increase in intra-abdominal pressure is inevitable with closure of TRAM donor site defects.)

3. The authors establish a rational point from review of the literature series of comparison of abdominal wall complications in free and pedicle TRAM flap reconstruction. What is that point? (Difficult to make comparisons because of the heterogeneous nature of the series. The bottom line was that no series has established superiority of a free TRAM over a pedicle TRAM in terms of abdominal wall complications. One of the difficulties is inexact terminology and poor definition for the terms hernia, bulge, laxity and weakness as well as the type of abdominal closure.)

4. What are some of the indications for a mesh onlay? (Significant laxity, diastasis recti, moderately obese patients or excessively tight primary closure. Certainly, bipedicle or bilateral TRAM flap defects will be very commonly reconstructed with mesh.)

Outcomes

1. If reconstruction was done primarily with implant of various types, what was the essential point made in the paper by Clough? (The good results steadily deteriorated in time. At two years percentage of good results was about 86%, which declined to about 54% in five years.)
    a. Effect of capsular contracture? (15% though this doesn't fully explain the above figures.)
    b. What does? (Development of contralateral ptosis with time despite the fact that 92% had some type of contralateral procedure performed in the reconstructive period.)

2. What was the long-term aesthetic outcome in TRAM reconstruction? How does this outcome compare to implant reconstruction long-term when assessed by the same authors? (The long-term aesthetic result for the TRAM flap seemed to be maintained over the five-year study period while the aesthetic results in expander-implant reconstruction deteriorated. As discussed by the authors, 50% of the implant reconstruction became "unacceptable" at five years due to increased ptosis of the opposite breast and the result, asymmetry. In addition, 60% of implant reconstruction require revisions over the five years versus 34% for the TRAM flaps.)

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Video Instructions

1. Go to: https://expertconsult.inkling.com/
2. Login using the following:
   Username: edluce@yahoo.com
   Password: el1007
3. Click on the circle at the top right of the page and then click on "My Library"
4. Click on the second book "Aesthetic and Reconstructive Surgery of the Breast"
5. Go to Video 6.1 "TRAM Flap Variations"

IX.D.5 Breast: Reconstruction 1, 2, 3, 4, 5, 6

5-Perforator and Thigh-based Flaps

By Edward Luce, MD

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A. DIEP Flaps

1. Give the nahabedian classification for the degree of muscle sparring in TRAM flaps. (MS-0 refers to use of the full width of the rectus abdominis muscle; MS-1 refers to the preservation of the lateral segment; MS-2 refers to preservation of the lateral and medial segments; and MS-3 refers to preservation of the entire muscle which is done in DIEP and SIEA flaps.)

2. The patient has had a suction assisted lipoplasty and insists on abdominal based breast reconstruction. How can you ascertain most reliably and consistently if that option is available? (The performance of a TRAM flap, either pedicled or free, would hinge on the preservation of periumbilical perforators. Of the modalities to assess perforator patency the handheld Doppler is the most simple and cheapest but unreliable in terms of detection of a perforator 1mm or larger, namely false-positive. The color duplex Doppler provides images that can be used for guidance but the gold standard would be CT angiography or CTA. The penalty with CTA is the radiation exposure.)

3. What is the underlying concept in DIEP flaps? Discuss the anatomy. (Concept is to preserve all of the rectus muscle and diminish the morbidity of the abdominal wall as a result of the DIEP flap reconstruction. The anatomy hinges on the harvest of a single, or two, perforators from the DIEP inferior epigastric artery and the use of the latter for the free flap anastomosis. As some morbidity does exist with the use of DIEP flap, some damage to the innervation of the muscle as a result of dissection of the perforator must occur.)

4. What is a perforasome and what are the hemodynamics of skin-soft tissue perfusion based on the perforasome theory? (The perforasome is a extension of the angiosome concept of Taylor. A perforasome is a single perforating vessel from the deeper tissues, the deep muscular fascia in the readings, that perfuses a segment of skin and soft tissue. Adjacent perforasomes are perfused either by direct linking vessels, presumably larger caliber, or indirect linking vessels in the subdermal plexus. The readings outline cadaver studies performed by direct injection into a perforating vessel to determine with 3D CT scanning the vascular territory of that particular perforating vessel or perforasome.)

5. What principles are derived from the perforasome theory? (First, as outlined above, a perforasome is linked with adjacent perforasomes by either direct or indirect linking vessels. Second, a flap design or skin paddle orientation should be based on the direction of the linking vessels which are axial in the extremities and perpendicular to the midline in the trunk. Thirdly, preferential filling of perforasomes occur within perforators in the same vascular territory as the main or source artery.)

6. For a reconstruction of a larger volume breast with an inferior epigastric perforator flap, DIEP, is optimally based on a medial or lateral perforator? Why? (The medial perforators perfused a larger volume of abdominal soft tissue than the lateral perforators.)
    a. What is the advantage of a lateral perforator base flap if not volume? (The vessels are straighter in their course through the rectus muscle and easier to dissect and also the dissection is at the lateral border of the rectus muscle.)

7. You plan a DIEP flap on a patient who has a 5 year lower abdominal midline scar. How is that finding incorporated, if at all, into the operative plan? (The DIEP flap would probably best be centered on a lateral perforator rather than the medial. As outlined below, the adjacent territory of a medial perforator is the zone II across the midline via the subdermal plexus or indirect linking vessels. A midline scar will significantly hinder flow through the subdermal plexus. A lateral perforator, in contrast, will enable harvest of not only zone I but also most of, if not all, of zone III.)

8. Assuming the Hartramp classification of the abdominal zones, what is the hierarchy of flow for a medial perforator flap? (The medial perforator will connect with contralateral medial row vessels in zone II by indirect linking to the subdermal plexus. Secondarily, the next level would be zone III. The lowest zone in the hierarchy would be zone IV and the distal portion of zone III.) Lateral perforators? (Conversely, a lateral perforator will harvest of course zone I but also all of zone III with little of zone II and none of zone IV.)

9. If you adopted principles outlined in the readings re: perforator architecture into the design of a *pedicle* TRAM flap based on two medial row perforators, you would incorporate all of zone I and II and some of III into the flap. Correct? (Incorrect. The perforasomes concepts have been derived from direct injection into the perforating vessels of the *inferior* deep epigastric, the predominant blood supply to the lower abdominal wall. A pedicle TRAM flap is based on the deep *superior* epigastric vessels and requires that circulation traverse two sets of choke vessels in order to perfuse territories adjacent to zone I. Therefore, zone II, regardless of the perforators incorporated, is suboptimally perfused from zone I, probably no more than 25%. Perhaps a half of zone III can be incorporated into a undelayed pedicle TRAM flap.)

10. How would you design a flap re: zones of the abdomen for a lateral row DIEP flap? (As outlined above, the flap would incorporate zone I and all of zone III but little of zone II.)

11. Briefly outline the major steps and the use of the DIEP flap for breast reconstruction. (The medial and lateral perforators are identified with a hand-held Doppler. The flap is raised from lateral to medial to identify and ascertain the size of the perforators, 1-3 in number, emerging from the anterior rectus fascia. The perforators are traced back through the rectus muscle by splitting the fibers until the origin from the DIEA artery and accompanying veins are identified. The pedicle is ligated superior to the take off of the perforators and the pedicle is traced further inferiorly by splitting the rectus muscle until a pedicle of sufficient length is obtained. The skin island is harvested. Thirdly, the internal mammary artery and vein are identified in the appropriate intercostal space and the anastomosis completed and the flap inset. Both of the readings or the two references cited provide additional detailed technical information and description of the operative procedure.)

12. Outline the essential anatomy of the superficial inferior epigastric artery, SIEA, flap. (According to Allen, the SIEA artery and vein can be identified in 70% of their cases. Other investigators have determined a considerably lower percentage of suitable SIEA vessels for free-flap transfer. SIEA arises from or as a common trunk with the superficial circumflex iliac artery and vein arising from the common femoral artery and vein and course in a subcutaneous plane superficial to Scarpa's fascia to supply the ipsilateral inferior abdominal skin. The skin island is smaller than the corresponding DIEP flap. The vessels can be found at the inguinal ligament at a point about halfway between the pubis and anterior superior iliac spine.)

13. What are the limitations? (As discussed above the vessels are not consistently present in a sufficient caliber for microvascular anastomosis. In addition, the amount of soft tissue harvested is less than with other methods of breast reconstruction. In most series, the incidence of fat necrosis is considerably higher in flaps based on the SIEA.)

B. SGAP Flaps

1. What are the anatomical landmarks for harvest of the superior gluteal artery perforator, SGAP, flap? (The artery arises at the junction of the posterior and middle 1/3 of a line drawn from the posterior superior iliac spine to the greater trochanter. The perforators from the artery, 2-3 in number, are distributed along the middle 1/3 of the same line. The skin flap ellipse is drawn at right angles to that line once the perforators are identified by Doppler.)
    a. The essence of the flap harvest? (Dissection of the perforators through the gluteus maximus muscle with retraction of the medius muscle until the superior gluteal artery and vein, branches from the internal iliac are identified and harvested with sufficient pedicle length for microvascular anastomosis.)
    b. Limitations? (The necessity for position change from supine to prone and back to supine if performed as an immediate reconstruction; a tedious dissection in the opinion of some; and potentially, barring a deep dissection, a short pedicle length.)

2. What muscle separates the exit from the pelvis of the superior gluteal and the inferior gluteal arteries? (Pyriformis)
    a. What nerve is at risk in the IGAP flap, not at risk with the SGAP flap? (Posterior femoral cutaneous and if the dissection is sufficiently deep the sciatic since both structures, the inferior gluteal artery and the sciatic nerve exit through the sciatic foramen.)
    b. Factors, besides the difficulty of dissection, favor the use of the SGAP over the IGAP flap? (Donor site is more inferior and more readily visible in the IGAP flap.)

3. What is the principal indications for the use of either a superior gluteal artery perforator, SGAP, or inferior gluteal artery perforator, IGAP, flap? (The absence of the abdomen as a donor site either because of prior abdominoplasty, scarring, or insufficient abdominal fat-soft tissue.)

4. What are the advantages and disadvantages? (In necessity to reposition a patient, the proximity of the sciatic nerve, and at times a less than satisfactory contour abnormality of the donor site. The advantage is a hidden scar and in some patients the presence of a large saddle bag that can be harvested for the flap.)

5. From the posterior axillary line, where is the branching point of the thoracodorsal artery? (Approximately 5cm inferior to the posterior axillary line.)

6. If you want to design a thoracodorsal artery perforator flap, TDAP, at what point would you doppler the perforator? (5cm inferior to the posterior axillary line represents the branching of the transverse and descending portions of the thoracodorsal artery and a TDAP flap is based on the first or the largest perforators of the thoracodorsal artery approximately 3cm below the branching point or 8cm from the posterior axillary line.)

7. What are some general guidelines with respect to orientation of the skin island and the initial incision for dissection? (Skin island should probably oriented transversally for both vascular and cosmetic reasons. The initial dissection is performed anterior and inferior to identify the anterior border of the latissimus and then dissect in the superficial plane to detect the principal perforator that will be utilized for the flap.)

C. Other Thigh-based Flaps

1. The transverse upper gracilis musculocutaneous or TUG flap has been utilized for breast reconstruction. Describe the typical patient. (The candidate for a TUG flap reconstruction is small to moderate-sized breast and may not have or desire the abdomen as a donor site.)

2. Outline advantages and disadvantages. (The principal advantage is rapid harvest since not a perforator flap and potential concealment of the scar in the lower extremity. Disadvantages include a relatively short pedicle, limited flap size. Also, potential for donor site morbidity including dehiscence in lymphedema.)

3. Although the technical aspects of flap harvest are the topic for a pre-op conference, what are guidelines for flap design? (The flap is oriented transversally in the upper thigh, the superior border 2 cm inferior to the groin crease, the anterior tip limited to 4-5 cm lateral to the palpated tendon of the adductor magnus, the posterior tip too but not beyond the midline of the posterior thigh. The width should be limited to 6-8 cm in most patients.)
    a. A pinch test can assist in determination of width. In addition to wound dehiscence what other complications can occur because of excessive wound closure tension? (Labial whitening or gapping.)
    b. Vascular supply? (Anterior branch of the medial circumflex femoral artery.)

4. Profunda artery perforator, PAP, flaps have a role in breast reconstruction and differ conceptually from the TUG flap. How? (The flap is a true perforator-based rather than musculocutaneous and posterior-medial skin and soft tissue is harvested rather than antero-medial.)

5. What is the typical patient profile? (Same as the TUG flap. Patients with small and moderately-sized breast and may not have or desire the abdomen as a donor site.)

6. Outline advantages, disadvantages. (Similar to the TUG flap, one principle advantage is the relatively concealed donor site scar. The disadvantages include a relatively short pedicle in some instances, potential for donor site contour deformities, as well as the necessity to dissect perforators, more tedious than the TUG flap. By avoiding the femoral triangle the potential for lymphedema is minimized. Of course, all thigh-based flaps for breast reconstruction have inherent size and volume limitations.)

7. Describe the skin island design. (The skin island isi designed with the patient standing. the superior limb parallels and located about 2 cm inferior to the gluteal crease, the anterior or later tip of the transversely oriented flap is at or slightly beyond the lateral extent of a gluteal crease, the medial tip at the posterior border of the abductor magnus. The width, also determined by the pinch test, probably should be limited to 6 cm in most patients.)

a. Name the vascular supply location. (Posterior perforators are the profunda femoris artery course through the abductor magnus in both instances or septocutaneous between the abductor magnus and the semitendinosus. Perforators are located 6-10 cm inferior to the gluteal crease and, similar to other perforator flaps, are pinpointed with a hand-held Doppler.)

8. What are some caveats re donor site? (Again, similar to the TUG flap, over exuberant design of flap width can result in excessive tension on wound closure and dehiscence, scar widening, and contour irregularities. The revision rate including late fat grafting is substantial.)

Bibliography-IX D.5. - Breast Reconstruction: Perforator Flaps

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