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Buttockectomy

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OVERVIEW

Tumors of the gluteus maximus (buttock) are often extremely large before diagnosis. Traditionally, low- and high-grade soft-tissue sarcomas of the buttock were treated by a posterior cutaneous flap hemipelvectomy. Today, however, most low-grade soft-tissue sarcomas of this muscle can be resected with safe margins. Hemipelvectomy is not required. Resection involves complete removal of the gluteus maximus muscle and ligation of the inferior gluteal vessels. The underlying sciatic nerve is preserved. Most high-grade sarcomas of the gluteus maximus can similarly be treated by surgical resection. Preoperative induction chemotherapy, intra-arterial chemotherapy, or radiation therapy is required. Radiation therapy may also be required depending on final margins.

The gluteus maximus is a “quiet area” for soft-tissue sarcomas. The only significant structure that must be evaluated is the sciatic nerve. Minimal reconstruction is required. During the postoperative period it is important to take measures to prevent the formation of large postoperative seromas. The functional outcome of a resection of the gluteus maximus is a minimal deficit in hip extension only. The gait is normal.

Today a hemipelvectomy is rarely required for most soft-tissue sarcomas unless they are extremely large and/or are accompanied by fungation, infection, or extension into the ischioanal space, pelvis, and hip. Direct sacral or iliac bone involvement, which is rare, necessitates an amputation.

INTRODUCTION

The gluteus maximus is a common site for high- and low-grade soft-tissue sarcomas. Such lesions are often confined to the gluteus maximus and do not extend to the underlying retrogluteal space or involve the sacrum or femur. Therefore, a majority of them have traditionally been treated by a wide local resection. Extremely large tumors of the gluteus maximus were, by contrast, traditionally treated by a posterior fasciocutaneous flap hemipelvectomy. An anterior myocutaneous flap modification has been devised by Sugarbaker *et al.*¹ The development of limb-sparing procedures has reduced the need for hemipelvectomy for tumors in this region. Today approximately 90% of soft-tissue sarcomas arising in the buttocks can be resected and adequately treated by a limb-sparing resection. Low-grade soft-tissue sarcomas of the gluteus maximus require surgery only; high-grade soft-tissue sarcomas in this region, like those in other anatomic areas, are treated by either induction chemotherapy and/or radiation therapy preoperatively followed by postoperative chemotherapy. We favor the use of induction chemotherapy followed by a limb-sparing resection when possible. The field is treated with postoperative radiation if required. The major indications for an amputation are extremely large sarcomas that involve the adjacent bone, sciatic nerve, or the ischiorectal fossa.

UNIQUE ANATOMIC CONSIDERATIONS

The gluteus maximus arises from the sacral lamina and alar iliac crest and obliquely passes to its insertion onto the proximal portion of the iliotibial band. This insertion begins above the greater trochanter, passes 4–5 cm below the greater trochanter, and then attaches to the adjacent femur. The gluteus maximus does not attach to the retrogluteal structures as it passes over them. This permits easier surgical dissection of the retrogluteal plane and preservation of the sciatic nerve in many situations.

As it passes from the sacrum to the femur the gluteus maximus covers the sacroiliac joint and the sacrospinous and sacrotubulous ligaments, as well as a portion of the ischiorectal fossa. The area underneath the gluteus maximus is termed the “retrogluteal space”. This area consists of the posterior hip musculature, including the external rotators and portions of the gluteus medius muscle. Most important, the sciatic nerve exits the pelvis through the sciatic notch and passes inferiorly to the piriformis muscle. This nerve lies in close proximity to the posterior fascia of the gluteus maximus; therefore, large tumors of the gluteus maximus may involve the sciatic nerve. The sciatic nerve is rarely involved by the tumor; most often it is displaced around the capsule or

pseudocapsule. The inferior vessels pass below the piriformis muscle to enter the midportion of the gluteus maximus. The inferior gluteal vessels are routinely ligated.

INDICATIONS

A gluteus maximus resection is indicated for patients with low- and high-grade sarcomas confined to the gluteus maximus.

CONTRAINDICATIONS

Possible contraindications to gluteus maximus resection include the following:

- 1 Large tumors that involve the true pelvis or ischiorectal space.
- 2 Involvement of the sacrum or ilium.
- 3 Sciatic nerve involvement (although, on occasion, the sciatic nerve may be resected).
- 4 Pelvic extension through the sciatic notch.

IMAGING STUDIES

Computer Tomography (CT) and Magnetic Resonance Imaging (MRI)

These studies are most useful in determining the extent of tumor involvement of the gluteus maximus (Figures 12.1–12.3). Close evaluation will determine the involvement of the adjacent sacrum, femur, and sciatic nerve. Attention should be placed on the evaluation of the structures of the retrogluteal space, including the hip joint and sciatic nerve, and ischiorectal fossa. Buttock tumors may extend into the pelvis through the sciatic notch.

Bone Scan

Tumor involvement may extend to the crest of the ilium, the sacrum, and the proximal femur. These areas should be evaluated by bone scintigraphy.

Angiography

Angiography is not routinely performed when evaluating tumors of the gluteus maximus (Figure 12.1D). It may be useful in preoperative embolization or preoperative intra-arterial chemotherapy.

Biopsy

The biopsy site must be in line with the incision for the hemipelvectomy should one be required (Figure

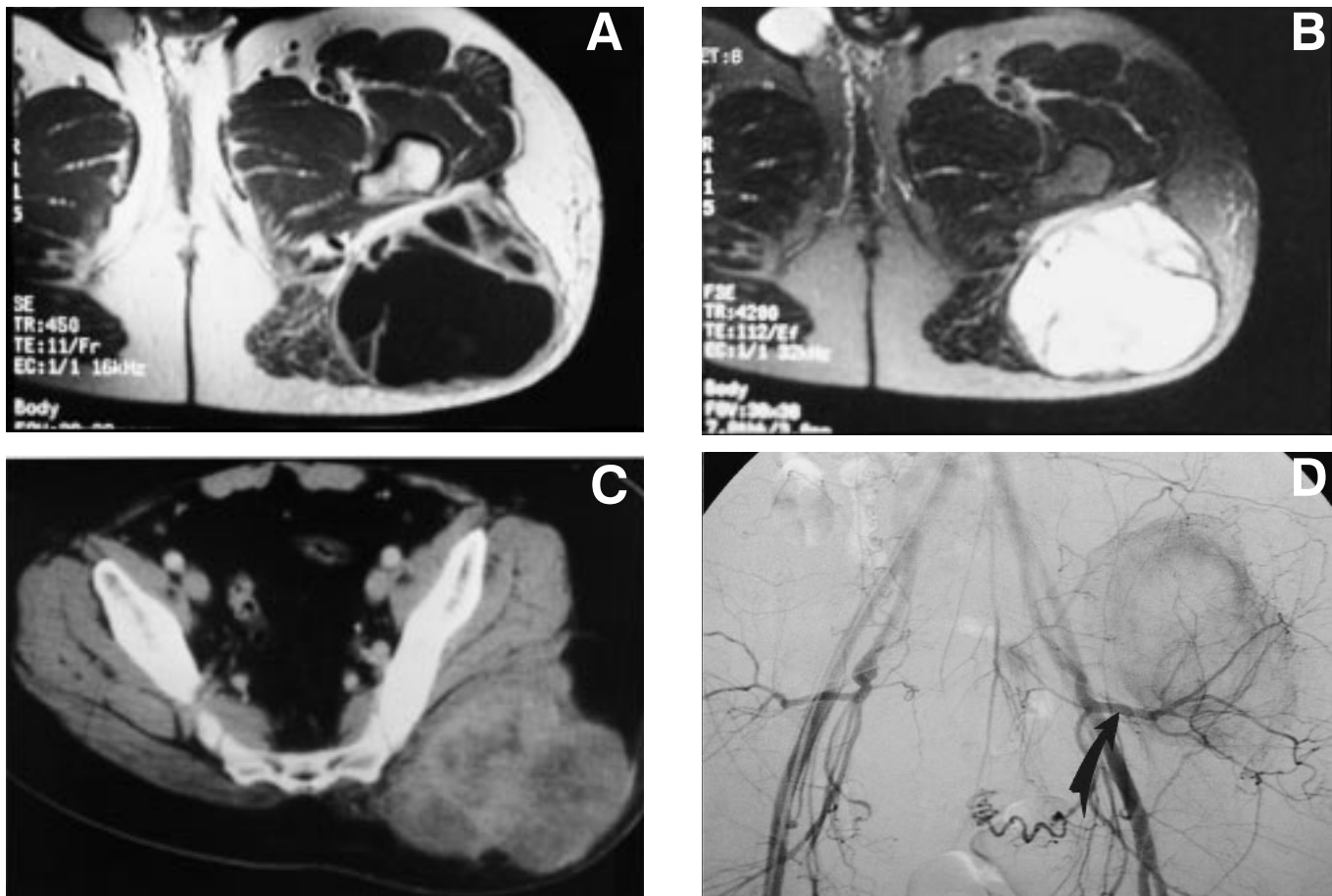


Figure 12.1 Radiographic evaluation of a patient with a large buttock sarcoma. (A,B) T1 and T2 weighted MRI images of a large buttock sarcoma. Note that on the T1 the lesion is extremely large, involving the entire gluteus maximus but without extension into the pelvis or into the anterolateral aspects of the thigh. The T2 weighted image shows a blood-filled cavity that is the result of a spontaneous bleed into the tumor following induction chemotherapy. (C) CT scan of a large buttock sarcoma involving the entire gluteus maximus but not involving the abductor muscles or showing any evidence of intrapelvic extension. (D) Late-phase angiography showing a typical tumor blush of the left buttock tumor. This represents extremely viable tumor despite induction chemotherapy. This patient was still a good candidate for a limb-sparing procedure. Note (arrow) the main vascular supply is from the gluteal vessels that supply the buttock area. These vessels are exposed and ligated early in the operative procedure.

12.4A). Surgeons performing a biopsy of tumors of the buttock must therefore be familiar with the surgical incisions for both posterior flap hemipelvectomy and anterior flap hemipelvectomies. The anterior flap hemipelvectomy, as described by Sugarbaker *et al.*, is preferred for large sarcomas of the buttock area. In this procedure the entire musculature and skin is removed with the amputation and the anterior myocutaneous flap consisting of the quadriceps muscle is utilized to close the defect. If a posterior flap is utilized, care must be taken not to contaminate the posterior skin or fascia. The biopsy site, must therefore be along the lateral aspects of a posterior incision and must avoid the greater trochanter, sciatic nerve, ischioanal fossa, and greater trochanter.

SURGICAL GUIDELINES

1. A large curvilinear incision is made beginning at the posterior aspect of the crest of the ilium, curving distally following the gluteus maximus muscle along the iliotibial band (Figure 12.5), passing over the greater trochanter to about 6 cm distal, and then curving posteriorly back toward the inner aspect of the thigh along the gluteal fold. This incision makes it possible to elevate a large posterior flap.
2. To determine resectability or operability, the sciatic nerve is identified distal to the resection site. This can be identified between the medial and lateral hamstring muscles or just lateral to the ischium before it passes underneath the gluteus maximus muscle.

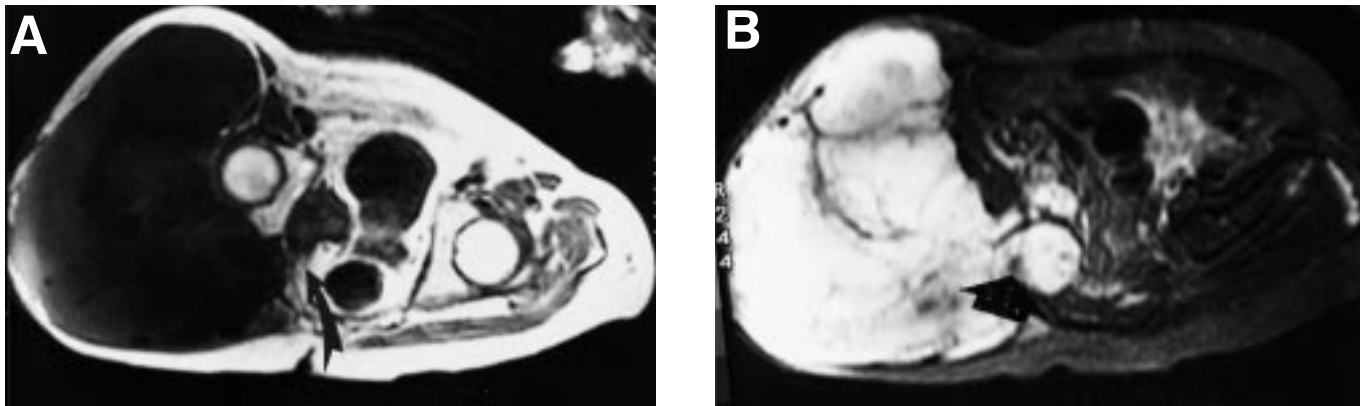


Figure 12.2 MRI scans of a patient with a large buttock sarcoma considered unresectable that required a hemipelvectomy due to intrapelvic extension of the tumor. (A) T1 weighted image of a MRI scan showing a huge right buttock sarcoma involving the entire gluteus maximus and extending into the anterior thigh compartment. In addition there is obvious extension into the pelvis through the sciatic notch (arrow). This is the most important area to evaluate for pelvic extension and is the most common route of intrapelvic disease. (B) T2 weighted MRI image of (A) showing obvious involvement of the acetabulum as well as the intrapelvic extension. This patient underwent an extended anterior flap hemipelvectomy due to extension to the pelvis as well as the sacrum (seen on other views).

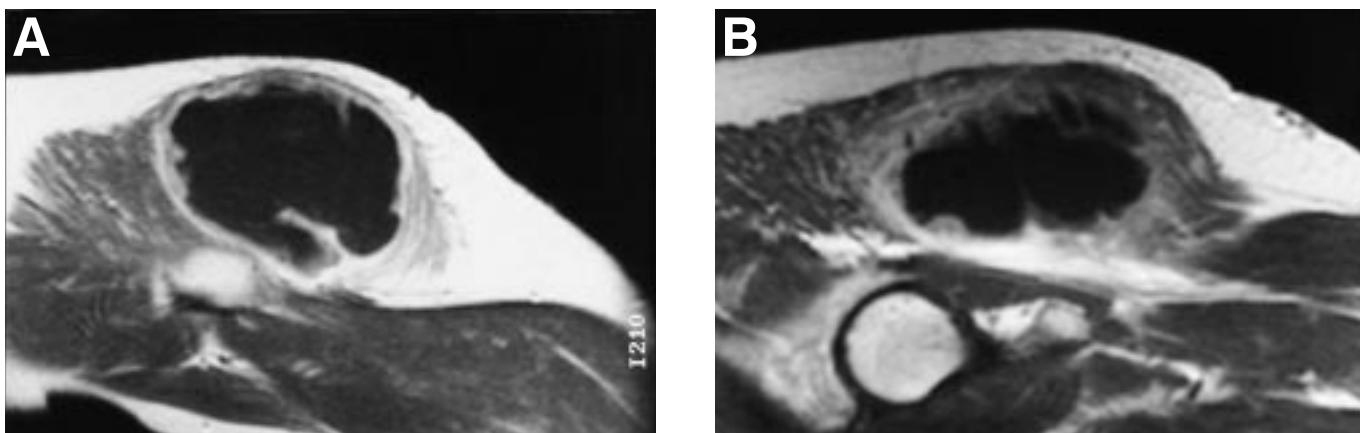


Figure 12.3 Coronal MRI views. T1 weighted image of a large buttock sarcoma. Note there is no extension distally or to the adjacent hip joint.

- The nerve is palpated below the gluteus maximus muscle toward the piriformis muscle.
3. The gluteus maximus is detached from the iliotibial band throughout its length and from the femur distally. This muscle is then flapped medially to expose the superior and inferior gluteal vessels that are then ligated. The sciatic nerve is displaced anteriorly to protect it during the dissection.
 4. Removal of the gluteus maximus involves detaching this muscle from the sacrotuberous and sacrospinous ligaments, as well as the lamina and sacral alar.
 5. To prevent a large postoperative seroma, great care must be taken to tack down the large posterior fasciocutaneous flap to the remaining underlying muscle. Multiple, large drains are utilized.
 6. The patient remains flat for 72 h to prevent the development of a seroma.

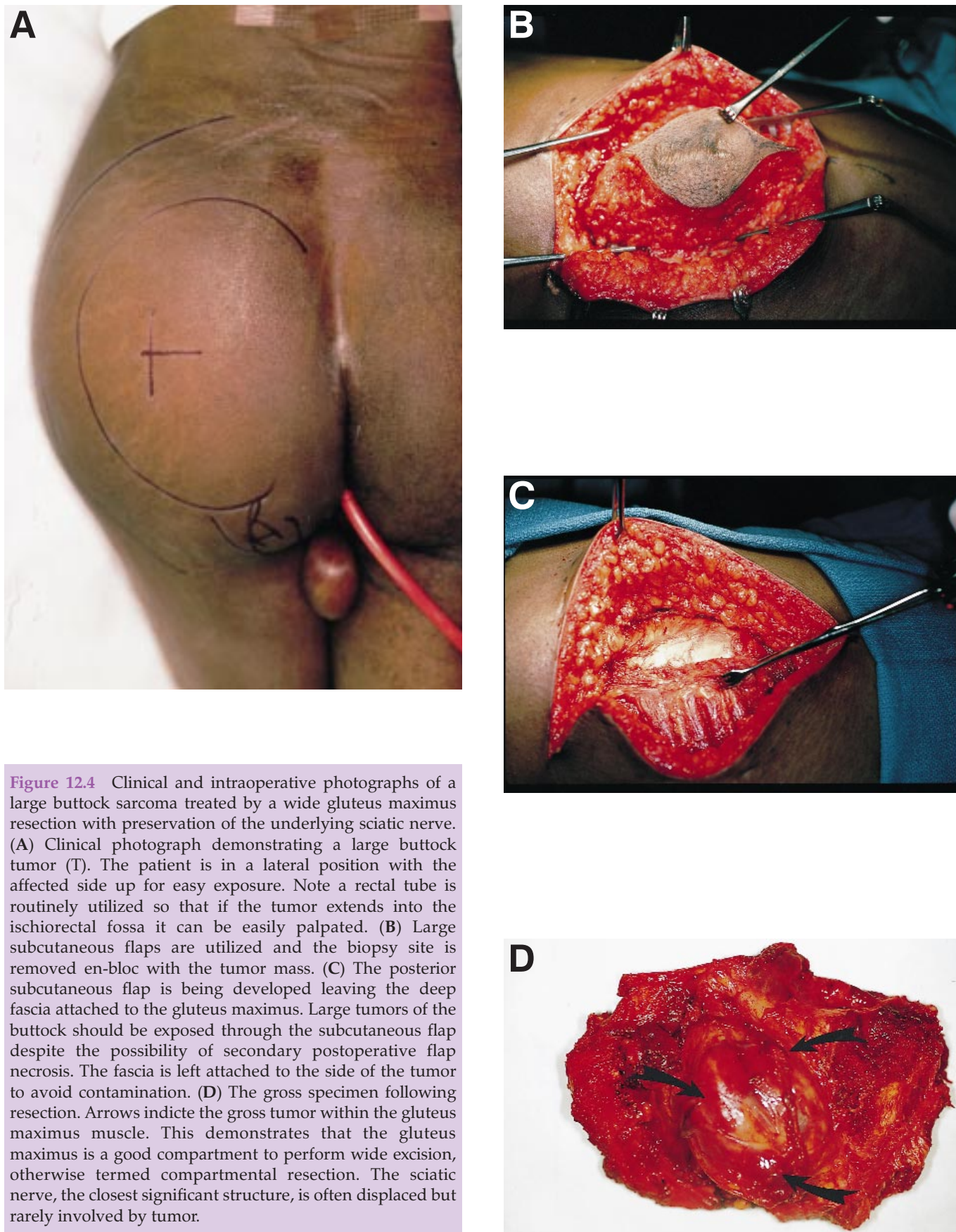


Figure 12.4 Clinical and intraoperative photographs of a large buttock sarcoma treated by a wide gluteus maximus resection with preservation of the underlying sciatic nerve. (A) Clinical photograph demonstrating a large buttock tumor (T). The patient is in a lateral position with the affected side up for easy exposure. Note a rectal tube is routinely utilized so that if the tumor extends into the ischioanal fossa it can be easily palpated. (B) Large subcutaneous flaps are utilized and the biopsy site is removed en-bloc with the tumor mass. (C) The posterior subcutaneous flap is being developed leaving the deep fascia attached to the gluteus maximus. Large tumors of the buttock should be exposed through the subcutaneous flap despite the possibility of secondary postoperative flap necrosis. The fascia is left attached to the side of the tumor to avoid contamination. (D) The gross specimen following resection. Arrows indicate the gross tumor within the gluteus maximus muscle. This demonstrates that the gluteus maximus is a good compartment to perform wide excision, otherwise termed compartmental resection. The sciatic nerve, the closest significant structure, is often displaced but rarely involved by tumor.

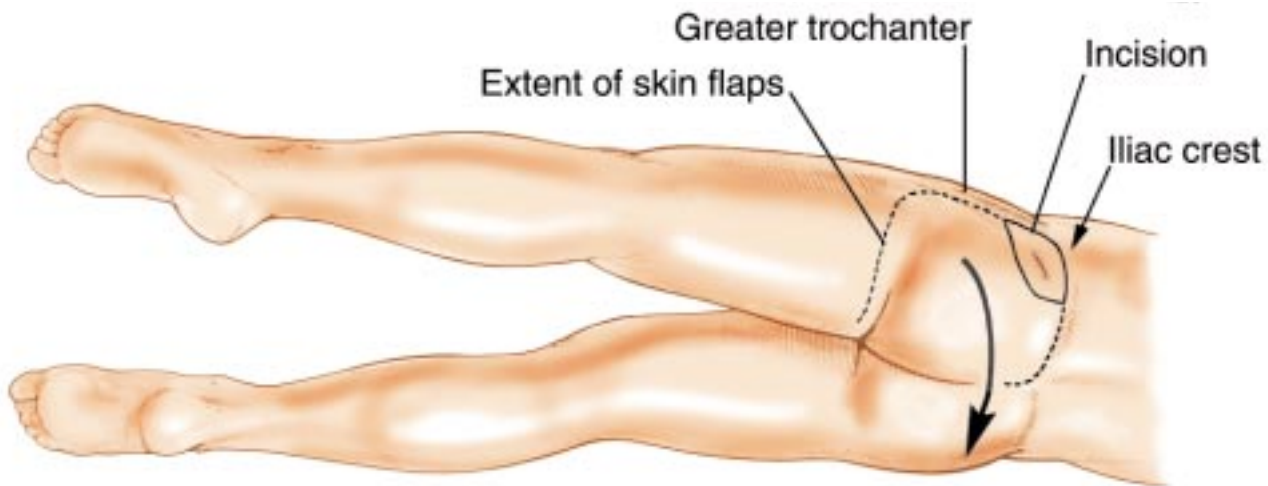


Figure 12.5 Position and incision. A lateral position is utilized. The affected extremity is prepped free from the abdominal wall to the foot. The incision extends along the iliac crest and encompasses the biopsy site by 2–3 cm and then extends along the greater trochanter and along the gluteus maximus skinfold. This incision permits wide excision of the underlying gluteus maximus muscle and early exploration and preservation of the sciatic nerve. If the tumor is unresectable, an anterior flap hemipelvectomy is required.

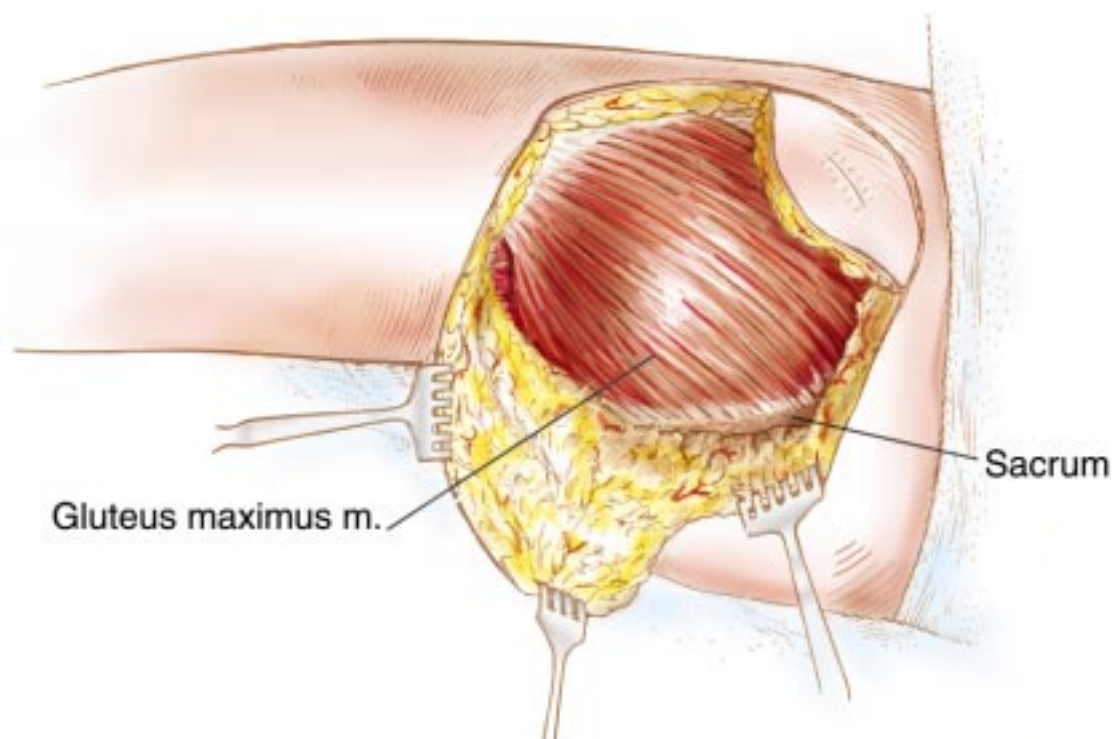


Figure 12.6 Exposure. A fasciocutaneous flap is elevated and dissected with the electrocautery toward the origin of the gluteus maximus muscle (from the sacrum). This permits exposure of the entire gluteus maximus muscle. The biopsy site is left en-bloc with the gluteus maximus muscle. If the tumor is extremely large, then only a subcutaneous flap is utilized with the deep fascia remaining on the tumor side.

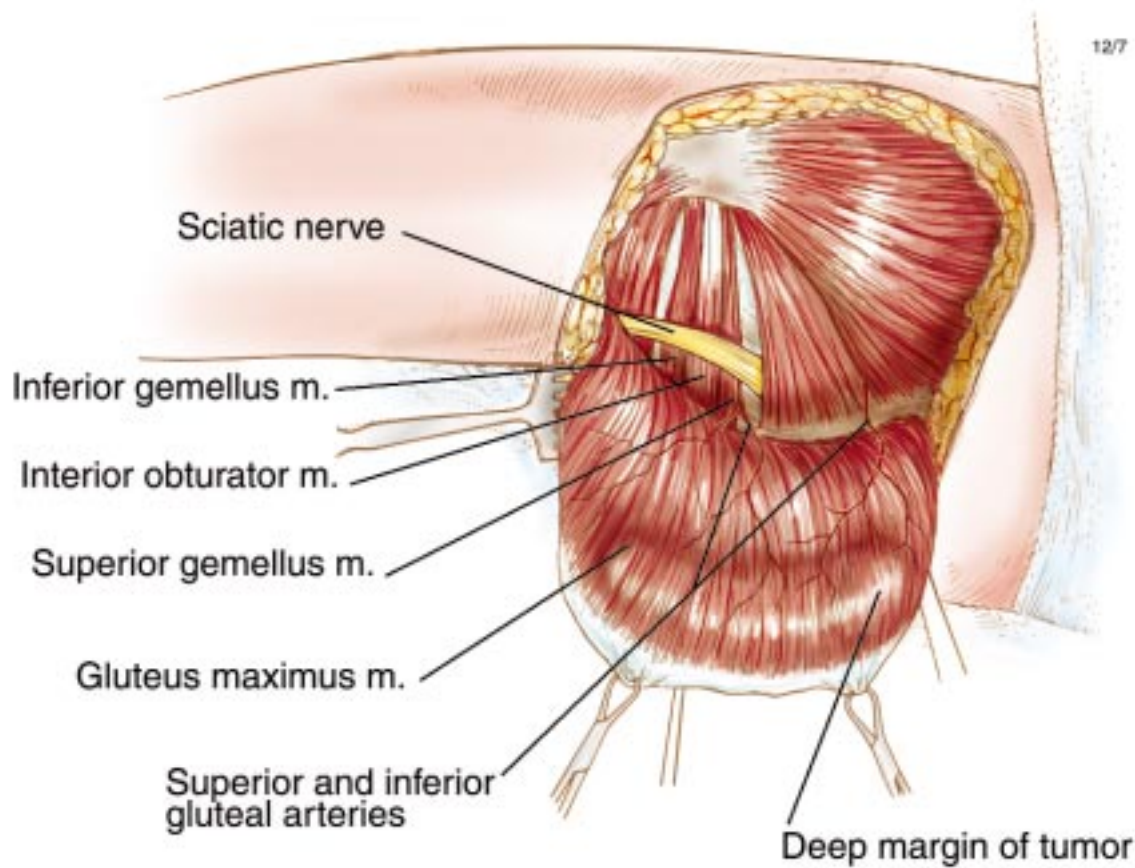


Figure 12.7 Dissection of the gluteus maximus muscle and exploration of the sciatic nerve. The retrogluteal space, consisting of the hip rotators, abductor muscles, and the sciatic nerve, is seen in this illustration. The gluteus maximus is mobilized from inferior along the deep posterior thigh fascia and released from the iliotibial band up to the iliac crest. It is then dissected to its origin along the sacral alar and the sacrospinous and sacrotuberous ligaments. The sciatic nerve is explored initially by the surgeon placing his hand under the gluteus maximus to ensure that the nerve is separate from the tumor. The inferior gluteal artery is ligated at its exit from the sciatic notch.

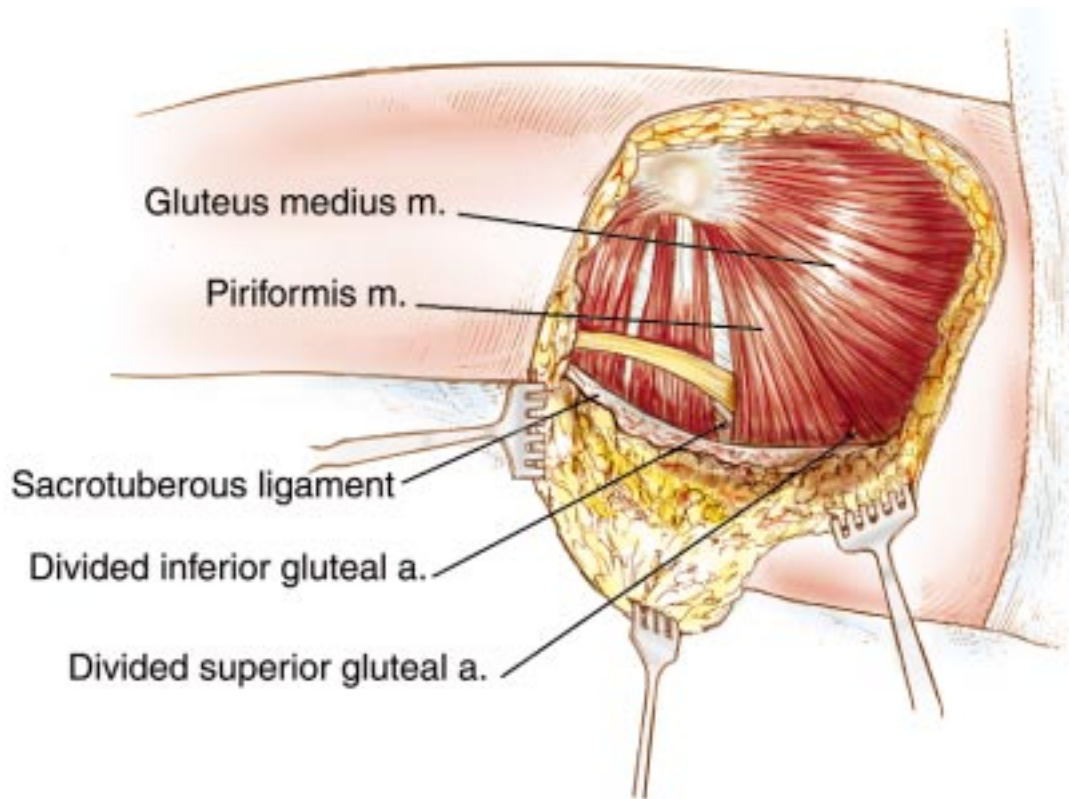


Figure 12.8 Resection. The final surgical maneuver to release the gluteus maximus from the surgical bed is the transection through the origin of its muscle from the sacrospinus and sacrotuberous ligaments. Care should not be taken not to enter the ischiorectal space. The ischium should be palpated, and a hand placed above the ischium and below the gluteus maximus for the release of the tumor specimen.

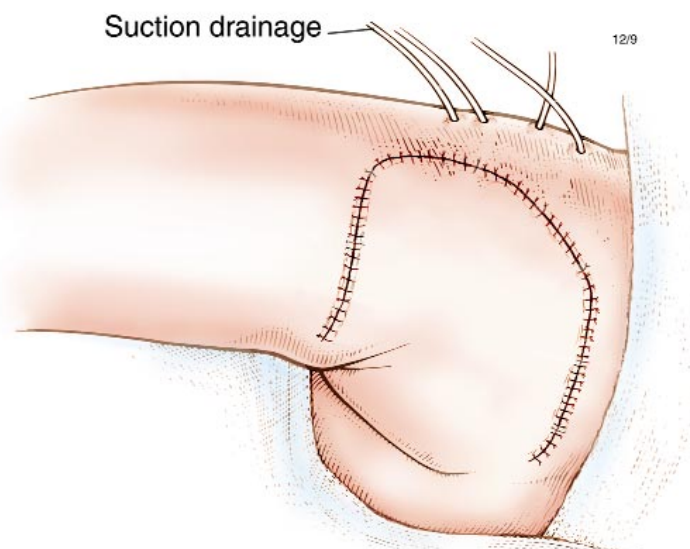


Figure 12.9 Closure. The large posterior fasciocutaneous flap is closed and large suction drainage tubes are utilized. The flap is tacked down to the underlying hip rotator muscles and abductor muscles in order to avoid a postoperative seroma. For 48–72 h a pressure dressing is utilized and the patient lies flat postoperatively.

DISCUSSION

The gluteus maximus is a common area for both low- and high-grade soft-tissue sarcomas. Most often, tumors that arise within the buttocks remain within the substance of the gluteus maximus until they become quite large. Therefore, most low- and high-grade soft-tissue sarcomas of the buttocks can be treated by resection of the gluteus maximus, termed “buttockectomy” or “buttock resection”.

The gluteus maximus is a “silent” area for large tumors. The only significant structure that might pose a problem to resection is usually the adjacent sciatic nerve. Fortunately, the sciatic nerve is often protected by a portion of uninvolved gluteus maximus muscle. More recently, if the sciatic nerve is involved by tumor, resection of the sciatic nerve alone or with the tumor mass can be performed while avoiding a hemipelvectomy. The only functional loss following sciatic nerve resection is ankle and foot control that requires an AFO (ankle-foot orthosis). Depending upon the level of the sciatic nerve resection, the first branch to the biceps femoris may be intact. This will permit good knee flexion. Knee flexion is also retained due to the sartorius muscle (femoral nerve innervated), gracilis muscle (obturator nerve innervated), and the two heads of the gastrocnemius that insert across the knee joint.

Traditionally, sarcomas of the gluteal area have been treated by a posterior flap hemipelvectomy. Today most gluteus maximus sarcomas can be treated by a limb-sparing procedure. In the unusual case of recurrent sarcomas of the buttocks, tumor fungation, massive contamination, or extensive tumor involvement of the adjacent structures, an anterior flap hemipelvectomy, as described by Paul Sugarbaker,¹ is recommended. An anterior flap hemipelvectomy (see Chapter 19) is an amputation removing the extremity and all of the buttock structures and skin. The major indications for anterior flap hemipelvectomy are large, unresectable or recurrent buttock sarcomas. Fortunately these are rare occurrences today.

Evaluation of tumors of the buttock must include the structures around the pelvis that might permit intrapelvic extension. Therefore, the ischiorectal space, sciatic notch, and the hip joint area must be closely evaluated. Involvement of any of these structures may indicate the need for an amputation.

The surgical procedure of gluteus maximus resection entails very little morbidity. A large posterior subcutaneous flap is elevated, utilizing Henry’s approach to the posterior thigh and buttock area. This permits easy identification of the sciatic nerve distal to the gluteus maximus and permits detachment of the gluteus maximus off of its insertion on the iliotibial band and the femur. With the gluteus maximus detached from its insertion and the large posterior flap developed, the only remaining component of the procedure is to remove the gluteus maximus from its origin along the iliac crest and the sacral alar. It is necessary to perform a meticulous closure of this defect. The most common postoperative complication is the development of a large seroma since there is a large dead space with only a subcutaneous flap on top. We have utilized the quadratus femoris muscle rotated over the sciatic nerve for soft-tissue coverage of the nerve.

Similarly, the piriformis is rotated distally. The flap is carefully tacked down throughout its course in its midportion to eliminate “dead” space. One 20-gauge chest tube and two Jackson-Pratt drains are utilized and the remaining portion of the flap is closed. A compressive dressing is utilized for 72 h.

We prefer the use of induction chemotherapy for high-grade sarcomas. We do not utilize preoperative radiation therapy due to the high risk of flap necrosis. Postoperative radiation therapy is required for high-grade tumors once the flaps are well healed (4–6 weeks postoperatively). Postoperative chemotherapy is given following the radiation therapy.

The advances in limb-sparing surgery have been dramatic and are especially seen in the buttock area where muscle group resections routinely replace the standard hemipelvectomy.

References

1. Sugarbaker PH, Chretien PA. Hemipelvectomy for buttock tumors utilizing an anterior myocutaneous flap of quadriceps femoris muscle. *Ann Surg.* 1983;197:106–15.

