

# A Trauma-Induced Fatty Mass: The Facts About Posttraumatic Pseudolipomas

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## PRACTICE POINTS

- Physicians should include pseudolipoma in the differential diagnosis when evaluating masses that develop in patients at sites of blunt or prolonged trauma.
- A pseudolipoma is an unencapsulated, round, or fusiform fatty mass that differs from a traditional lipoma by the absence of a capsule.
- Further research may elucidate the pathogenesis of these adiposities.

To the Editor:

The posttraumatic pseudolipoma (PTL) is a painless localized mass comprised of unencapsulated adipose tissue that develops at the site of acute or prolonged blunt soft tissue trauma. It may be round or fusiform in shape and has areas of saponification leading to fat necrosis.<sup>1</sup> Posttraumatic pseudolipomas are 12 times more likely to occur in females, which may be attributed to sex-determined adipose tissue distribution or cosmetic concerns.<sup>2</sup> Most PTLs are found in areas of the body with high adiposity, including the hip, thigh, and gluteal regions.<sup>3</sup> A patient history of a traumatic event resulting in a hematoma and a subsequent latent period of several months to years before the pseudolipoma formation occurs is common.<sup>1,2,4-6</sup>

A 27-year-old woman presented to the family medicine clinic for examination of a deformity on the right buttock. She noticed a soft protruding mass months after landing on the buttocks and on top of a stick during routine physical training. Prior ultrasonography of the deformity proved unhelpful in determining the etiology. Physical examination revealed a protruding, 2-cm, flesh-colored mass on the right buttock intergluteal fold that was soft, compressible, and nontender (Figure 1). There was no capsule, nodule, loculation, or sinus tract. The patient underwent excisional resection with findings of benign-appearing unencapsulated adipose tissue (Figure 2). The wound was closed without difficulty. After several weeks, she had a well-healing scar without contour deficits of the buttocks. Two to 3 months after the initial repair, the patient presented to the family medicine clinic with recurrence of the fatty protrusion. She was referred for consultation and definitive management to a plastic surgeon but was lost to follow up.

In a systematic review of the literature to research pathogenesis theories, a PubMed search of articles indexed for MEDLINE using the terms *trauma* and *pseudolipoma*, *lipoma*, *fat*, or *adipose* yielded 45 citations, with only 10 publications addressing the pathology specific to pseudolipomas. Two leading theories of the pathogenesis of PTLs include the adipose herniation pathway and the inflammatory proliferation pathway.<sup>4,5</sup>

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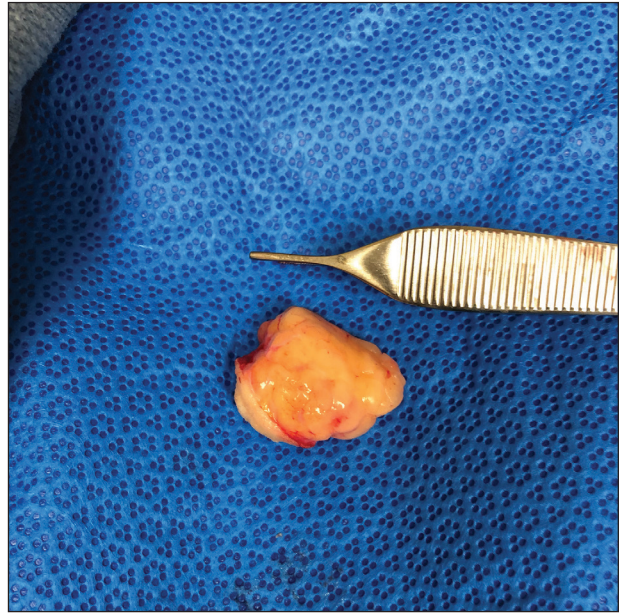
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**FIGURE 1.** Pseudolipoma on the right buttock intergluteal fold.



**FIGURE 2.** Excision of the mass revealed unencapsulated fatty tissue.

Adipose tissue comprises fat lobules that are organized underneath the supportive elastic fascial layers. Injury from forces exceeding the fascial strength is the basis for the oldest pathogenesis theory. The adipose herniation theory suggests that fat lobules are displaced through the damaged septae, allowing for the development of an epidermal pseudolipoma at the site of blunt trauma.<sup>7</sup> This theory has been supported by many case reports; however, more recent reports have identified a larger number of PTL cases that showed no identifiable disruptions in the fascia.<sup>1,4,8</sup>

In 1997, the inflammatory proliferation theory began to gain attention. The theory describes how local tissue trauma leads to the release of inflammatory cytokines, which successively signals the development of preadipocytes or adipose tissue–derived stem cells (ASCs) into mature adipocytes.<sup>4</sup> Most patients report a history of a hematoma in the area of pseudolipoma development, which strongly supports this newer theory. Studies exploring hematomas have found elevated levels of growth factors and inflammatory markers.<sup>2,9</sup> In particular, tumor necrosis factor  $\alpha$ , peroxisome proliferator-activated receptor  $\gamma$ , vascular endothelial growth factor, and IL-6 and IL-8 may foster an environment in which adipogenic cells are both chemotaxed to the area of trauma and differentiated to white adipose tissue.<sup>2,10</sup>

Despite addressing the role of the preadipocyte, the available research fails to address the general development of mesenchymal cells into the preadipocyte. White adipose tissue develops at sites of neovascularization and frequently has been observed spreading into the nearby tissue toward other blood vessels. Furthermore, these white adipose tissue expansions remain reliant on

multiple growth factors and cell-signaling molecules.<sup>10</sup> Numerous investigations into stem cell grafting have found that implantation of ASCs in vivo within animal models does not result in the proliferation and differentiation of ASCs unless specific conditions have been met such as prior tissue injury or immunodeficiency.<sup>10-12</sup> These investigations support and expand on the inflammatory proliferation pathway. Thus, most of the true PTLs in the available research appear as de novo tumors and are more congruent with the inflammatory proliferation model.<sup>1,2,4-6,8</sup>

Typical treatment of a PTL is surgical excision or liposuction depending on the pathology and size of the pseudolipoma. Biopsy examination prior to liposuction is critical for evaluation of liposarcoma and may help identify damage to Scarpa fascia. Recurrence of a PTL is rare regardless of treatment method; however, in a study of 31 PTL cases, only 6 were pathologically identified as PTLs without fibrous material.<sup>1</sup>

Our patient experienced a blunt trauma to the buttocks and subsequently developed a PTL that was surgically excised and recurred within 3 months. Research surrounding the pathogenesis of the PTL has evolved from the theory of physical herniation of adipose tissue to an inflammatory differentiation of preadipocytes, but there is still much to learn about how and why it occurs and the mesenchymal differentiation following tissue injury.

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