

# Anatomic study of fatty pockets in the hypogastrium

## *Estudo anatômico de bolsões adiposos na região hipogástrica*

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### ABSTRACT

**Background:** In lipodystrophies of the anterior abdominal wall, variables such as genetic factors, weight gain, age, and loss of muscle tone, either alone or in combination, determine generalized aesthetic changes or changes localized in the epigastrium, hypogastrium, or both. The aim of this study was to describe the limits, distribution, and dimensions of fat bags in the hypogastrium, as well as their anatomic relationships with the neighboring structures. **Methods:** Fifty-seven anatomical specimens were dissected from patients undergoing abdominoplasty, during which the hypogastrium was resected en bloc. Moreover, the anterior abdominal wall was also dissected in 8 cadavers. In all samples, the lamellar layer was resected, keeping the dermis-epidermis, areolar layer, and superficial fascia intact. **Results:** In all specimens, 2 symmetrical adipose clusters were observed bilaterally in the areolar layer, which were in the shape of a bag and had peculiar coloration. These bags were analyzed in relation to their neighboring tissues: the skin, superficial fascia, and deep fat layer. **Conclusions:** The lamellar layer was considered as a structural base of the skin, owing to its thinness. The areolar layer showed accumulations and varying amounts of fat in the various body regions without precise limits, which were particularly observed in dissections of the lower abdominal wall and identified by their elasticity, volume, and coloration.

**Keywords:** Abdomen. Adipose tissue. Lipectomy.

### RESUMO

**Introdução:** Nas lipodistrofias da parede abdominal anterior, fatores genéticos, aumento de peso, idade e lasseamento da musculatura, de forma isolada ou associada, determinam alterações estéticas generalizadas ou localizadas no epigástrico, no hipogástrico ou, mesmo, em ambas as regiões. O objetivo deste estudo é descrever os limites, a disposição, as relações anatômicas das bolsas adiposas no hipogástrico com as estruturas vizinhas e suas dimensões. **Método:** Foram dissecadas 57 peças anatômicas de pacientes submetidas a abdominoplastia, em que o hipogástrico foi ressecado em monobloco. Além disso, foi realizada dissecação da parede abdominal anterior em 8 cadáveres. Em todas as peças, a camada lamelar foi ressecada, mantendo-se a derme-epiderme, a camada areolar e a fâscia superficial íntegras. **Resultados:** Em todas as peças, foram observados dois cúmulos adiposos na camada areolar bilateralmente, simétricos, em forma de bolsa e de coloração peculiar. Essas bolsas foram também analisadas em relação aos tecidos cutâneos vizinhos: pele, fâscia superficial, camada profunda de gordura. **Conclusões:** A camada lamelar foi considerada estrutural

This study was performed at the Service of Plastic Surgery Dr. Ewaldo Bolivar de Souza Pinto, Universidade Santa Cecília de Santos (UNISANTA), Santos, SP, Brazil, and in the Federal University of Triângulo Mineiro (UFTM), Uberaba, MG, Brazil.

Submitted to SGP (Sistema de Gestão de Publicações/Manager Publications System) of RBCP (Revista Brasileira de Cirurgia Plástica/Brazilian Journal of Plastic Surgery).

Article received: April 16, 2012  
Article accepted: August 5, 2012

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como base da pele, pela sua fina espessura, e a camada areolar apresentou acúmulos e volumes variáveis de tecido adiposo nas diversas regiões do corpo, sem limites precisos, particularmente observados nas dissecções da parede abdominal inferior, pela sua elasticidade, pelo volume e pela coloração.

**Descritores:** Abdome. Tecido adiposo. Lipectomia.

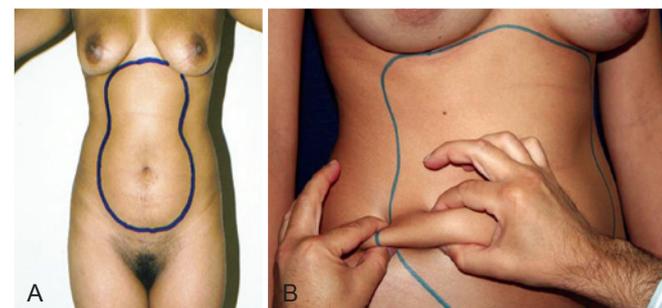
## INTRODUCTION

Subcutaneous fat deposits in the form of dense bags located in the anterior abdominal wall have been referred to as *esteatomas*<sup>1</sup> and are more commonly found in women<sup>2</sup>. The location, distribution, and boundaries of these deposits have not been fully defined in the literature owing to the absence of corroborative dissections. Figures 1A and 1B illustrate this type of fat accumulation, the shape and distribution of which often resembles the number 8.

Topographical knowledge of the anterior abdominal wall, as well as other regions of the body, is imperative for any type of surgery for aesthetic purposes, particularly liposuction. Considering the diversity of fat accumulation in the region of the anterior abdominal wall, the elimination of excessive tissue with excellent initial aesthetic effects may ultimately contribute to further distortions and irregularities in skin relief.

In very obese patients or patients who have undergone major weight loss, macro and microscopic changes occur in the structure of both layers of the adipose tissue as well as the superficial fascia. In these patients, localization of the adipose bags is not evident because of the fragmentation of the fascia and invasion by fatty lobes in the lamellar and areolar layers<sup>3</sup>.

The aim of this study was to describe the borders, distribution, and dimensions of fatty bags in the hypogastrium as well as their anatomic relationships with neighboring structures.



**Figure 1** – Regions of the epigastrium and hypogastrium, delimited by fatty buildups in the form of localized pockets. The difference in thickness was clearly observed by clamping the skin.

## METHODS

Based on previous demarcations performed in the standing position, 57 tummy tucks with low transverse supra-pubic incision were performed in female patients by en bloc resection of the excessive skin of the hypogastrium<sup>4,5</sup>. The abdominal wall of 8 cadavers was also dissected en bloc in the epigastric and hypogastric regions, with preservation of the adipose tissue (Figure 2).

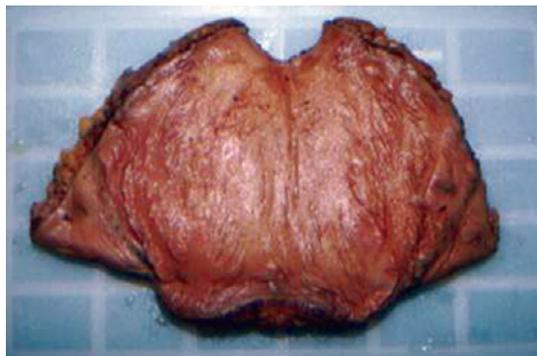
The pieces of the hypogastrium were dissected in an inverted position, with the dermal-epidermal layer on the surgical table. First, the lamellar layer was resected and compacted with clear borders while preserving the superficial fascia directly covering the areolar surface. The lamellar layer in all specimens appeared homogeneous in thickness and extension (Figures 3 to 5). After resection of the lamellar layer and removal of the superficial fascia, the fat bags appeared pinkish, and they could be easily and clearly distinguished from the surrounding gray tissues.

The 2 bags were bilaterally positioned in the hypogastrium and were symmetrical and of equal size. Their major vertical axis reached the level of the umbilicus superiorly, and in some specimens, it reached the inguinal ligament inferiorly. The medial borders showed connective tissue joining them to the level of the dermis (Figure 6).

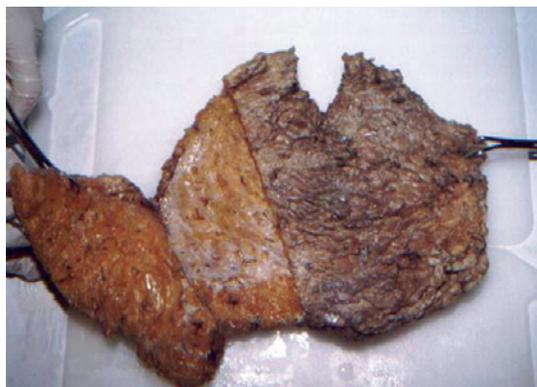
The adipose bags showed a different consistency from the neighboring adiposity, being more elastic and comparable to a “bag of jelly” covered by the surrounding fascia. Outside



**Figure 2** – Cadaver dissection with a single folded skin flap from the epigastrium and hypogastrium without evidence of fat bags or boundaries because of preservation in formaldehyde.



**Figure 3** – Cutaneous monoblock resected from the hypogastrium during abdominoplasty. The dermoepidermal piece was supported by the table for dissection and direct visualization of the superficial fascia was applied to the areolar layer after removal of the lamellar layer. The 2 bags of fat present with clear bilateral limits.



**Figure 4** – Specimen of the hypogastrium of a cadaver with partial incision of the lamellar layer, exposing the adipose bag.



**Figure 5** – A thin lamellar layer was observed in dissected specimens.

their borders, the fascia and fat were less elastic and more consistent, respectively. Figure 7 defines the direct contact of the dermis and superficial fascia with the areolar layer, separating the lamellar layer. Figures 8 and 9 illustrate the

reflection of the superficial fascia of the external borders of the bags towards the dermis, which was considered as their lateral border, comparable to a thin pocket containing these bags. With regard to the volumes observed, the bags could be evaluated as small, medium, or large (Figure 10). The occurrence of herniation from the fat layer to the lamellar layer was also observed (Figure 11). The formaldehyde-preserved samples, which included the epigastrium (Figure 12) and were positioned at the navel center with a folded lamellar layer, showed slight contouring of the bags in the epigastrium and hypogastrium.

This study allows us to draw attention to possible adipose bags, which may be distributed in other body regions (Figure 13) and have not yet been evidenced by studies and more conclusive dissections.

## RESULTS

In patients weighing within the normal range and with epigastric and hypogastric adiposity, fat bags were difficult to visualize. In obese and multiparous patients, fat bags were only clear by palpation in the standing position.

The adipose bags had lengths ranging from 8–17 cm (mean, 12.5 cm), widths ranging from 6.3–10.5 cm (mean, 8.4 cm), and thicknesses ranging from 1.5–4.7 cm (mean, 3.1 cm).

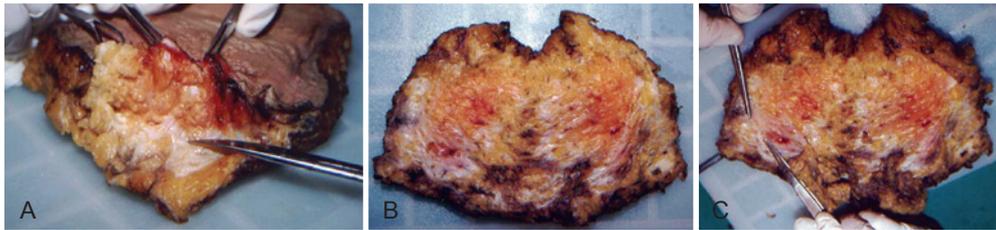
The lamellar layer was thinner than the areolar layer in all specimens. It was consistently possible to visualize and palpate the lamellar layer, and it was always found to have the same thickness. The specimens from cadavers showed no hypogastric bags because they were conserved in formaldehyde.

## DISCUSSION

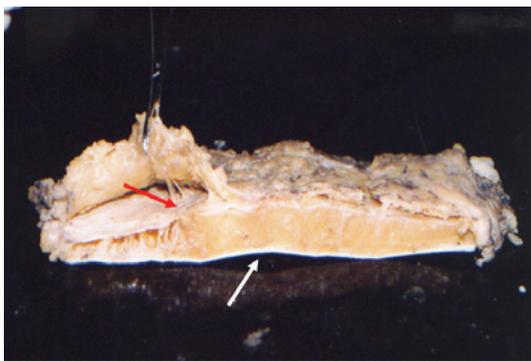
Despite their easy identification upon inspection and palpation, there are no detailed reports describing hypogastric bags in the literature<sup>4-12</sup>. Perforations in the superficial fascia and fat displacement in the lamellar layer by areolar fat (Figure 11) were also observed, corroborating findings from other authors<sup>3</sup>.

The thickness of the fat layer in the lamellar layer and the fatty accumulations in the areolar layer of the anterior abdominal wall were comparable in all dissected specimens. This finding allows us to question the necessity of performing liposuction in the lamellar layer of the anterior abdominal wall, and confirms the requirement of new studies to support this hypothesis. To our knowledge, no studies have been performed to prove the existence of these bags in other regions of adiposity.

We performed dissections on 8 cadavers preserved in formalin; these dissections were carried out on the anterior



**Figure 6** – In A, B, and C, pieces of skin from the hypogastrium are shown; the fat bags can be seen to be positioned bilaterally and are salmon-red in color with clear borders. The partially rebated superficial fascia, indicated with forceps and the end of a pair of scissors, is separated medially by a web of connective fibers from the level of the umbilicus to the inguinal ligament.



**Figure 7** – Cross section of skin where the white arrow indicates the epidermis-dermis and the red arrow indicates the superficial fascia, which are separated by the areolar layer.

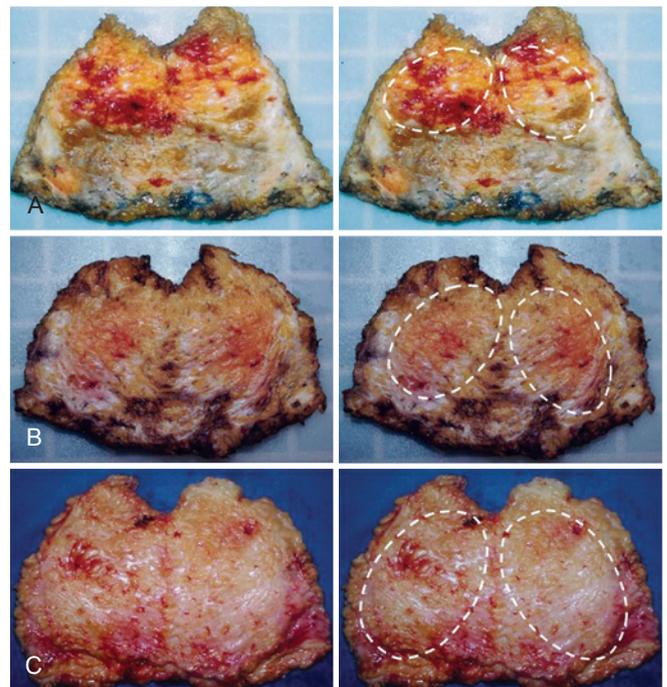


**Figure 9** – Clamping of the superficial fascia laterally, involving a fat purse.



**Figure 8** – Cross-section of skin with the scissors indicating reflection of the superficial fascia on the outer limits of the bags towards the dermis, involving the medial fat purse.

abdominal wall and exposed the epigastrum and hypogastrium, but they were not conclusive when compared to findings in the dissected samples from abdominoplasties. The fatty pockets were not well defined and did not show clear limits because the cadavers were preserved in formalin, and thus served only to establish that this procedure is not viable for this type of study.



**Figure 10** – Adipose bags of different sizes, classified as small (A), medium (B), or large (C).



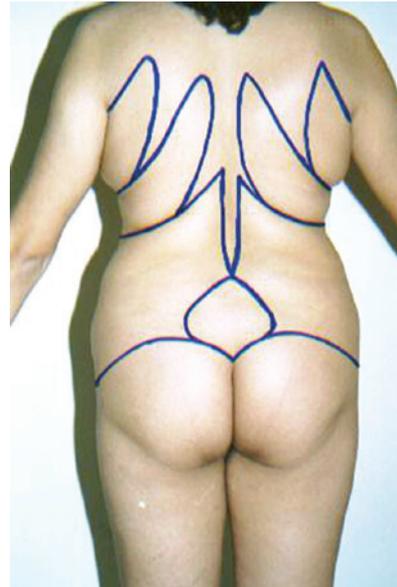
**Figure 11** – Tip of the scissors indicating detail on herniation of adipose tissue through the superficial fascia of the lamellar cover in the direction of the areolar layer.



**Figure 12** – Dissected and inverted specimen of the hypogastrium of a cadaver and inverted segment containing the epigastrium and hypogastrium, with the navel at the center. The lamellar layer folded in 3 directions exposes the superficial fascia containing fat inside bags, as a closed compartment.

## CONCLUSIONS

Anatomical dissections of skin specimens from the hypogastrium showed the presence of adipose tissue in the areolar layer, which had the characteristics of adipose bags and precise limits. The constant lamellar layer thickness within an individual in the region of the hypogastrium and diversification in the areolar layer suggests that there is no need to perform liposuction in the lamellar layer, reducing the risk of adverse postoperative events.



**Figure 13** – Fat bags distributed in other body regions.

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