

## CASE REPORTS

# Pressure-Induced Lipoatrophia Semicircularis

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**Abstract.** Lipoatrophia semicircularis of the thighs is an uncommon form of localized lipodystrophy characterized by horizontal semicircular depressions distributed to form a band. The asymptomatic, often bilateral, and symmetric lesions are localized on the anterolateral aspect of the thighs. The pathogenesis of these lesions is unknown, although most cases are associated with repetitive trauma. A new hypothesis has implicated electromagnetic fields produced by computers and their cables in modern buildings as a cause. We describe a case in a 28-year-old woman of lipoatrophia semicircularis that was related to wearing tight pants.

**Key words:** lipoatrophia semicircularis, trauma, pressure, electromagnetic fields.

### LIPOATROFIA SEMICIRCULAR INDUCIDA POR PRESIÓN

**Resumen.** La lipoatrofia semicircular de los muslos es una forma de lipodistrofia localizada poco frecuente caracterizada por unas depresiones horizontales semicirculares a modo de banda, asintomáticas, a menudo bilaterales y simétricas localizadas en la cara anterolateral de los muslos. Su etiopatogenia es desconocida, aunque la mayoría de los casos se asocian a traumatismos de repetición. Una nueva hipótesis implicaría como causa los campos electromagnéticos generados por los ordenadores y sus cables en los edificios modernos. Describimos el caso de una mujer de 28 años que presentaba esta entidad relacionada con el uso de pantalones ajustados.

**Palabras clave:** lipoatrofia semicircular, traumatismo, presión, campos electromagnéticos.

## Introduction

Lipoatrophia semicircularis of the thighs is an uncommon skin condition characterized by localized atrophy of subcutaneous tissue. It manifests clinically as depressed horizontal bands on the anterolateral aspect of the thighs. These are usually asymptomatic, bilateral, symmetric, and isolated, although there have been reports of unilateral<sup>1-3</sup> and multiple bands accompanied by symptoms (cramps, sluggishness, sensation of heat, and pain after sports).<sup>4</sup> The condition more frequently—although not exclusively—affects women aged 20 to 40. The ratio of women to men is 6:1, possibly because female subcutaneous tissue is more susceptible to this condition and concern over the appearance of the lesions may lead women to consult their doctor.<sup>5</sup>

Several hypotheses have been posited to explain its

pathogenesis, the most widely accepted being repetitive trauma, although it has recently been associated with the electromagnetic fields generated by computers and their cables in modern buildings.<sup>6</sup>

We report a new case of pressure-induced lipoatrophia semicircularis caused by repeated wearing of tight jeans.

## Case Description

The patient was a 28-year-old woman with no relevant clinical history who consulted for completely asymptomatic horizontal depressions on the thighs that had been present for a year and a half and that she attributed to weight loss after giving birth 7 months earlier. She worked at a filling station, although she could not remember injury resulting from bumping into the counter, which was also higher than the depressions on her thighs.

The lesions appeared over a period of weeks, with no previous inflammation or general symptoms. The patient denied having received injections of corticosteroids or insulin, or having undergone other interventions in this area. When asked about tight-fitting clothes, she showed us a pair of jeans that she wore frequently and whose folds exerted

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pressure on the affected areas when she was seated.

Physical examination revealed horizontal depressions in the form of bands on the middle to upper third of both thighs. These were 4 to 5 cm wide, and were more evident on the right thigh, with normal overlying skin and no induration or changes in color (Figure 1).

The results of laboratory tests (complete blood count, thyroid function tests, immunologic study, and testing for autoimmune disorders) were normal.

The histologic study revealed partial atrophy of the fatty tissue with the presence of small adipocytes interspersed with normal-sized adipocytes. Scant, patchy remains of eosinophilic hyaline material were observed among the adipocytes (Figure 2). The immunohistochemical study showed the adipocytes to be positive for vimentin and S-100 protein, and scant CD68<sup>+</sup> histiocytes were also observed.

## Discussion

Lipoatrophy semicircularis was diagnosed in our patient using clinical data and additional tests. Further questioning as to possible causes of the condition revealed that the patient had frequently worn very tight-fitting jeans and that she had spent a long time in a seated position wearing this garment after giving birth. The area where the jeans had exerted most pressure was observed to correspond to the position of the skin lesions.

Lipoatrophia semicircularis of the thighs is an uncommon skin condition that was first described in 1974 by Gschwandtner and Münzberger.<sup>7</sup> However, it may be more common than reported in the literature, since most patients do not consult their doctor, and even if they do, the condition may not be diagnosed correctly.<sup>5</sup>

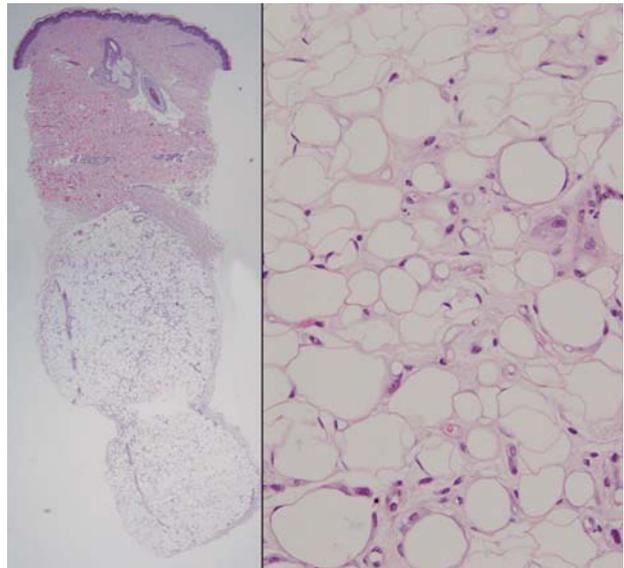
Although its pathogenesis is unknown, several different hypotheses have been posited. The most likely options seem to be repetitive external trauma that may or may not be related to the workplace (for example, laundry workers, steam press operators, and office workers),<sup>4,8</sup> constant pressure on the same area (tight-fitting clothes such as jeans<sup>9</sup> or sports leggings<sup>10</sup>), or both.

Another hypothesis on the pathogenesis of this condition was put forward by Bloch and Runne,<sup>11</sup> who postulated the existence of a congenital defect of the lateral circumflex femoral artery, as a result of which repeated trauma would produce ischemic atrophy of fatty tissue.

In 2006, electromagnetic lipolysis of fatty tissue was put forward as a hypothesis.<sup>6</sup> It was suggested that the electromagnetic fields generated by computer equipment and cables would lead to alterations in the intrinsic bioelectric properties of the skin and activate macrophages with lipophagic activity in the hypodermis. Electrical stimulation could also damage adipocytes directly. Similarly, air



**Figure 1.** Horizontal depressions in the form of bands on the anterolateral aspect of the thighs. These are more noticeable on the right thigh.



**Figure 2.** Partially atrophied fatty tissue with small adipocytes interspersed with other, normal-sized adipocytes. Scant, patchy remains of eosinophilic hyaline material can be observed in the interstitium (hematoxylin-eosin,  $\times 200$ ).

conditioning systems would modify relative indoor humidity and alter the conductivity of materials; that is, the lower the humidity, the greater the conductivity. This hypothesis would explain the lipoatrophy semicircularis that affects numerous workers in new offices equipped with the latest technology, in which large electromagnetic fields can be generated. Such was the case of 160 workers in the C&A company in Belgium,<sup>6</sup> 150 workers in the offices of Gas Natural in Barcelona, Spain (elmundo.es; March 1, 2007), and 104 cases in the building of La Caixa de Barcelona (elmundo.es; April 4, 2007), which are still being followed

up. Neither the work nor home environment of our patient could account for this pathogenesis.

The results of the additional tests undergone by these patients—laboratory workup, radiologic studies, and electromyographic examinations—are usually normal. Magnetic resonance imaging has proven useful to differentiate between this condition and other fatty tissue disorders. In panniculitis, we can observe thickening of interlobular septa with a reduction in the size of fat lobules, whereas in lipoatrophy there is a clear superficial loss of subcutaneous tissue with no changes in the septa and normally shaped fat lobules.<sup>12</sup>

Little histopathology data is available. Therefore, our report is particularly interesting—as this entity is benign, most patients refuse biopsy. The microscopic changes observed in our case are similar to those reported in the literature<sup>8</sup>—partial or total loss of fatty tissue that is replaced by collagen fibers with no signs of inflammation and deposits of eosinophilic hyaline material. The lack of sufficient histologic samples may mean that other histopathologic patterns go unnoticed.

Diagnosis of this condition is based on clinical information, but histology can help differentiate it from other processes and enable us to understand its pathogenesis.

Treatment is based on eliminating the triggers. If this is successful, the disease gradually resolves over a period ranging from 9 months to 4 years. The trigger is not always obvious, and it must therefore be determined by means of an exhaustive clinical history.

Electromagnetic lipolysis can be avoided by taking a series of measures to reduce the influence of electromagnetic fields in the workplace. These include the following: (1) desks with lower electrical resistance, (2) increased relative indoor humidity using humidifiers, and (3) reduced contact between the source of electromagnetic radiation and the desk by insulating the computer on a 2-mm-thick aluminium sheet and passing the cables behind the desk so that there is no contact between them and the desk.<sup>6</sup> If this theory proves to be well founded, environmental factors could be considered to play an important role in the

pathogenesis of lipoatrophia semicircularis and we could face epidemic outbreaks of the disease among the employees of large companies.

We report a new case of localized lipoatrophy on the thighs due to pressure exerted by jeans. We emphasize the fact that repetitive trauma, continuous pressure, or both are currently the most feasible explanation for the appearance of lipoatrophia semicircularis on the thighs.

#### Conflict of Interests

The authors declare no conflicts of interest.

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