

Semicircular Lipoatrophy of Occupational Origin (SLOO): Proposal of a Clinical History Sheet for Data Collection and Implementation of Corrective Factors

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Introduction

Definition

Semicircular lipoatrophy (SL) is defined as a benign disorder of the subcutaneous tissue that manifests as atrophy of the adipose tissue and is characterised by semicircular banded depressions affecting mainly the thighs on the anterolateral aspect and, to a lesser extent, the forearms and abdomen uni or bilaterally [1,2], with asymptomatic lesions, and with intact skin and muscle (Figure 1). Where an occupational cause is demonstrated, it most commonly affects females in a 6:1 ratio and in an age range of 30-40 years and in office workers [3]. The course is reversible, benign and without sequelae, remitting within months or years after

cessation of exposure to risk factors. This rare disorder has been linked to the workplace since 1974, when cases of LS were reported in workers in certain buildings in Germany, and since 1995, when new cases have been published in France, Italy, the United Kingdom and the Netherlands, including the appearance of 900 cases in a bank in Brussels [2]. In Spain, the first cases appeared in 2007, causing a health scare with great media coverage among the working population in Catalonia, and cases were subsequently reported in other autonomous communities [4]. Although there is insufficient scientific evidence on the causes, in the studies reviewed, it is associated with repeated microtrauma due to repeated pressure from office furniture, tight clothing, electromagnetic fields and static electricity (work environment factors such as low relative humidity and the influence of computer equipment and wiring) [5].



Figure 1: Asepeyo Barcelona Reference Unit for Occupational Diseases and Non Traumatological Accidents (Guia de procedimiento de actuación en caso de lipoatrofia semicircular de origen laboral. DAS Asepeyo 2013).

Common characteristics and a Etiology

Most of the cases described have the following common features:

- The incidence is not universal. Not all workers in the same building are affected, but it is common to find several cases in the same group.
- It is usually associated with office work with computer equipment, although not always administrative (also cleaning and maintenance).
- Most cases have occurred in modern buildings Most cases have occurred in modern buildings -- smart, airtight, lacking natural ventilation, or smart, airtight, lacking natural ventilation, or following changes or moves to new buildings equipped with new furniture and/or renewal of IT following changes or moves to new buildings equipped with new furniture and/or renewal of IT equipment.
- In most cases, a significant reduction in the relative humidity of the environment has been observed, and it is common for affected workers to report frequent episodes of electrostatic discharges in their work area.
- Once the environmental conditions or factors have been corrected, the clinical signs of lipoatrophy progressively disappear between 9 months and 4 years.
- It is predominantly observed in women, who are more susceptible to accumulate electrostatic charges, possibly due to a laxer structure of the superficial adipose tissue.
- Affected workers do not present other general alterations.
- There is no current scientific evidence of specific effects on the embryo or foetus in case of pregnancy.

Causal Hypothesis

There is insufficient scientific evidence on the causes of LSOL. However, the main risk factors identified, and which should be prevented from the design of workstations are: microtrauma due to repeated pressure on the affected area, low relative humidity and electromagnetic fields [6-8]:

1. Low relative humidity below 45% (objectively measurable).
2. Presence of electrostatic charge higher than 2 KV (objectifiable)
3. Electromagnetic fields of weighted values with respect to the limit curve of the ICNIRP98 (International Commission on Non-Ionizing Radiation Protection) limit curve for the public > 100% (objectifiable)
4. Pressure, compression in injury areas (subjective objective)

The current hypothesis on the causes of LSOL is based on the induction of lipolysis by electric and magnetic fields generated by computer equipment and its cabling. The greater or lesser presence of lipoatrophy in other areas would be due to the different bioelectrical properties of the skin, depending on the region. Is possible that electrical stimulation of macrophages causes a release of tumour necrosis factor (TNF α) that would damage adipocytes and facilitate lipid phagocytosis.

Diagnosis

SL00 is currently considered to be primarily diagnosed clinically (visual inspection and palpation of the skin lesion) and has no evaluated complementary diagnostic test that would substantially improve the diagnosis. In cases of suspected SL00, when visual inspection and palpation are doubtful, a new examination should be performed a few weeks after the first visit to confirm or rule out the diagnosis.

Treatment

There is no specific treatment. The lesions reverse after elimination of the triggering factors [5,8-12]:

Ensure a relative humidity level of not less than 50% throughout the working day.

- Avoid contact with the edges of worktable tops by reviewing the design and work procedures. Adjust the height of the chair to avoid contact of the thighs with the tables, by resting the feet on the floor or footrest. Do not rest your feet on the legs of the chair.
- Avoid materials that generate or accumulate static electricity.

ty. Antistatic products can also be applied to surfaces susceptible to retaining electrostatic electricity (chairs, tables, etc.) in the form of a spray or varnish.

- Improve the electrical insulation of the wiring with respect to the metal structures of the furniture. Collect all electrical cables that may be under the tables and remove any cables that may be in contact with the tables.
- Replace thin edges with rounded edges. This would increase the contact surface. This would increase the contact surface and reduce the intensity of the shock.
- Get up from the chair and walk around at least every hour.
- Maintain good, seated ergonomics.

Do not wear fabrics with artificial fibres (acrylic) when the accumulation of static electricity is important and avoid tight fitting clothing as far as possible.

- Maintain good hydration with water.

Most cases show progressive resolution over a period ranging from 3 months to 4 years.

Material and Method

Proposed Assessment and Anamnesis

Take a medical history with assessment of pathological antecedents in order to determine other pathologies that may be related to semicircular lipoatrophy, such as systemic panniculitis, scleroderma, lipoatrophy caused by antiretrovirals, or by injection of insulin or corticoids; the latter are compatible with linear skin atrophy and hypopigmentation due to this intra articular injection given the anti-proliferative effect that alters the metabolism of the proteins of the extracellular matrix (3,4). There is no evidence of personal history that could be relevant. However, some studies link a congenital defect of the lateral femoral circumflex artery as a predisposing factor. It is important to detail the characteristics of the onset of the lesions, time of onset, coexistence with other symptoms and whether similar lesions were previously present and their evolution, as well as the involvement of other coworkers. If a case of lipoatrophy is detected, information should be sought on the areas frequented by the affected person affected person [4,8,11,13]

- Air conditioning, ventilation, and humidification system.
- Electrical installation around the table where the case occurred. In this case
- The installation is understood to include the wiring of any consumer appliances that may be present.
- Type of flooring and treatments carried out.
- The presence of telecommunications signal amplifiers or possible emitters of electromagnetic fields.
- Electromagnetic fields.
- Shape of the furniture with which it is in contact. Observing

the edges and checking for the

- presence of wiring inside.
- Check that chairs have antistatic treatment.
- Checking that work equipment is in good condition (operation, earthing, appearance, etc.).
- Check that work equipment is in good condition (operation, earthing, appearance, etc.).
- Check that the relative humidity of the air is at least 50%.
- When it is considered that the values of electromagnetic fields may be higher than those of the European regulations, it will be necessary to measure in the spaces closest to the person affected.
- Electrostatic charges should be measured when occupants report electrostatic discharges. The aim is to ensure that the person concerned does not become electrostatically charged or frequently discharged.
- The conductivity of materials in space should be checked to ensure that they assist in dissipating electrostatic charges [14,15].

Results

After the collection of data based on health risk factors such as physical, chemical, biological factors or due to situations in the building or construction and the environment and workplace and their influence on the clinical variables and the occurrence of injuries, the following proposal for a clinical data collection form has been detailed (Table 1).

Table 1.

First visit / Initial	
-	Age:
-	Sex:
-	Date of visit:
-	Date of seniority at work: Date of injury perception: Date of injury perception
-	Date of injury perception:
-	Affection of other co-workers YES / NO:
Details of the workstation	
Recent changes of location or furniture YES/NO	Table with metal structure YES/NO
Table surface: wood / synthetic resin / Other	
Table edge: narrow and angular / wide and angular / wide and rounded	
Table with cable management support YES/NO	
Chair with castors YES/NO	
Chair upholstered with natural textile / synthetic textile / plastic material	
Floor: Wood / metallic / synthetic / ceramic	
Is there regular contact with the furniture? YES/NO	

table edge / table bottom rail / other furniture
Details and location of injury (ies)
Thigh
Calf
Arm
Abdomen
Other locations: -----(free text)
- Laterality: Right / Left / Bilateral
- Location: Anterior face / Lateral face / Posterior face
- Height of the lesion with respect to the ground with usual footwear / in the posture of contact irrigation
Right----- cm
Left-----cm
Measurement of the injury / injuries
Width: RIGHT ----- cm LEFT----- ----- cm
Length: RH----- cm LHQ----- ---- cm
Limb circumference at injury site ----- cm
Subsequent visit
- Date of next visit:
- Corrective action since last visit YES / NO
- Type of corrective measures:
Wired correction
. Modifications to furniture - table edge protection.
. Installation of dissipative wheels on chair.
. Periodic monitoring of relative humidity.
. Installation of humidifiers.
. Removal of carpeting from the floor.
. Change of workstation location.
Subjective impression of the injured person on the evolution of the injuries: improvement, no change, aggravation
- Measurement of the injury / pre-existing injuries (localisation-----)
Width: RIGHT ----- cm LEFT----- ----- cm
Length: RH----- cm LHQ----- ---- cm
Limb circumference at injury site ----- cm
- Height of injury from the ground in usual footwear / in the posture of risk of contact risk of contact
Right----- cm
Left-----cm
Date of SLOO resolution:

Conclusion

When dealing with semicircular lipoatrophy of occupational origin, it is important to consider the health risk factors that may have led to its development and its consequences, which can be found in documentation produced by official bodies (WHO, State Public Health Agencies, etc.). These factors are sometimes intangible to the naked eye, but they affect our health, their effects are rarely immediate, and it is difficult to associate them with any symptomatology. Based on the exposure risk factors and the results of the checks and data collected, technical proposals for correction can be established to be taken into account in the development of the work activity in the work environment and workplace.

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