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# Dynamic ultrasound examination: a useful tool for the diagnosis of multiple muscular hernias

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## Abstract

Muscular hernias are an uncommon condition that typically present as subcutaneous nodules on the legs that appear or enlarge while standing or exercising. They are usually asymptomatic, although they may sometimes be tender or painful and may cause cramps, especially in athletes. Physical examination and ultrasound imaging are the key for determining the diagnosis. We present a 67-year-old woman with tender subcutaneous nodules on both lower legs in which dynamic ultrasound examination confirmed the diagnosis of muscular hernias.

*Keywords: dynamic, muscular hernia, nodule, ultrasound*

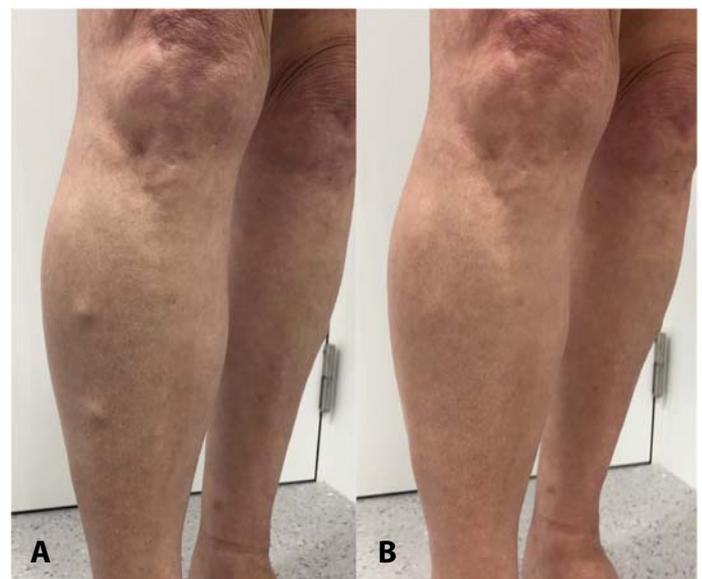
## Introduction

Muscular hernias are a rare condition that usually manifest as subcutaneous nodules on the legs of young athletes. They are often underdiagnosed or misdiagnosed as varicosities or soft tissue tumors. Physical examination and ultrasound imaging are fundamental for the diagnosis. We describe the case of a 67-year-old woman who presented with tender subcutaneous nodules on both lower legs. A dynamic ultrasound examination was conducted, confirming the diagnosis of muscular hernias.

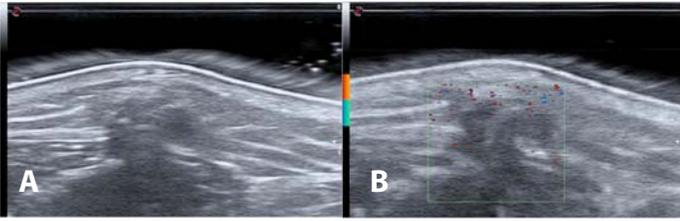
## Case Synopsis

A 67-year-old woman presented with a one-year history of tender subcutaneous nodules in both

lower legs that appeared while standing and disappeared when muscles were relaxed (**Figure 1**). The patient denied any history of trauma or vigorous physical activity. An ultrasound performed in B mode with a high frequency (6-18 MHz) linear transducer revealed some areas of fascial defect and protrusion of a hypoechoic structure with a convex border that became more evident with muscular contraction. These findings were suggestive of muscular hernias. Power Doppler mode did not show any vascularization (**Figure 2**). The patient was not considered suitable for surgical treatment due to her mild symptoms and was treated conservatively with analgesics.



**Figure 1. A)** Subcutaneous nodules on both legs that appeared during muscle contraction, and **B)** disappeared when muscles were relaxed.



**Figure 2.** Ultrasound image of the patient with a high-frequency (6-18 MHz) linear transducer. **A)** Disruption of the fascia and protrusion of a hypoechoic structure into the subcutaneous fat. **B)** Power Doppler mode ultrasound image showing no increased vascularity.

## Case Discussion

Muscular hernias consist of focal protrusions of muscle through fascial defects, most frequently found on the legs of young athletes. They may be congenital or acquired, the latter usually related to trauma or overuse. Although hernias are usually solitary, they may be multiple, especially congenital hernias. The tibialis anterioris is the most affected muscle, due to its superficial and tight fascial compartment. Muscular hernias typically present as soft nodules on the legs that appear or enlarge while standing or exercising [1]. They are usually asymptomatic, but sometimes cause pain or cramping, especially in athletes [2,3]. Differential diagnosis includes varicose veins, hematomas, muscle tears, arteriovenous malformations, or soft tissue tumors [4].

The diagnosis is easily confirmed with dynamic ultrasound examination using a high-frequency linear transducer. It is a noninvasive and widely

available technique that offers the possibility to examine the patient while standing or contracting the muscles. In subtle hernias, focal thinning or slight elevation of the fascia might be seen. Sometimes, the herniated muscle overlaps the fascial defect and has a convex superficial contour with a mushroom-like appearance. The herniated muscle and adjacent non-herniated muscle are less echogenic than normal muscle, possibly because of atrophy or anisotropy. Applying low pressure with the transducer is crucial so that the hernia is not effaced [3]. In Doppler mode, vessels penetrating the fascia at the site of the defect may be seen [1]. Asymptomatic patients do not require treatment and patients with mild symptoms may be encouraged to use compression stockings. On the other hand, those with severe pain may benefit from surgical treatment. Longitudinal fasciotomy is usually the preferred surgical technique [4].

## Conclusion

Muscular hernias are rare, but should be suspected in patients presenting with subcutaneous nodules or chronic leg pain. Dynamic ultrasound imaging is a non-invasive technique that confirms the diagnosis and helps to reassure the patient.

## Potential conflicts of interest

The authors declare no conflicts of interest.

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