

# Ultrasound-Assisted Liposuction and Helium-Activated Radiofrequency Skin Tightening for Treatment of Paradoxical Adipose Hyperplasia After Cryolipolysis

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## Abstract

Paradoxical adipose hyperplasia (PAH) following cryolipolysis is a rare but deforming complication. This likely underreported adverse event has been described as being refractory to both traditional tumescent liposuction and repeated cryolipolysis treatments. Here, we present 3 isolated cases with PAH deformity created by cryolipolysis. Management of PAH on the abdomen and flanks involved 2 key elements: ultrasound-assisted liposuction (UAL) technology and helium-activated radiofrequency (RF) energy subdermal coagulation. We observed complete resolution and definitive correction of PAH deformities at 2 weeks, 1 month, and 3 months postoperatively. UAL combined with helium-activated RF subdermal coagulation is a viable surgical modality to correct contour irregularities seen in PAH following cryolipolysis.

## Keywords

cryolipolysis, paradoxical adipose hyperplasia, ultrasound-assisted liposuction, high-definition liposuction, case report

## Introduction

Liposuction and body contouring are among the most popular surgical procedures. In recent years, cryolipolysis has been implemented as a noninvasive means of reducing subcutaneous adipose tissue by selectively inducing apoptosis in adipose cells without harming adjacent tissues. This technique became available in June 2009 and more than 4 000 000 cryolipolysis procedures have been performed worldwide.<sup>1,2</sup> The exact mechanism of subcutaneous or superficial fat layer loss is not yet completely understood.<sup>3</sup> Cold-induced panniculitis is involved, with injury of adipocytes and inflammation correlated with tissue loss.<sup>4</sup> Manstein et al demonstrated fat reduction confined to the superficial fat, with deep fat appearing less affected.

Paradoxical adipose hyperplasia (PAH) is a rare but serious adverse event associated with cryolipolysis that is likely underreported.<sup>5,6</sup> PAH begins typically a few months after treatment and is characterized by disorganized adipocytes of varying sizes, fibrotic changes, and perilobular septal thickening.<sup>5,7</sup> The underlying pathogenesis of PAH is yet to be elucidated. There appears to be a slightly higher incidence in the abdomen of males.<sup>1,7,8</sup> Although traditional tumescent liposuction has been proposed as a treatment for PAH, Friedmann et al reported a case of PAH after

cryolipolysis refractory to tumescent liposuction.<sup>9</sup> William Stefani reported that repeated cryolipolysis treatments in a 29-year-old male showed no improvements, suggesting that repeated treatments may actually make PAH worse.<sup>1</sup>

## Case Descriptions

A 22-year-old female, 49-year-old male, and a 52-year-old male presented for management of enlarged adipose collection in the abdomen and flanks, which was created by cryolipolysis. The patients all had history of slight weight gain since treatment with cryolipolysis. The 52-year-old patient was offered a second treatment of cryolipolysis but declined due to reports of PAH being refractory to additional treatments. The patients' abdomen and flank demonstrated localized adiposity in 6 areas corresponding to

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