

White Paper

SmoothShapes Treatment in Combination with Liposuction: A Case Report

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Introduction

Liposuction remains the second most popular cosmetic surgical procedure as reported by the American Society of Plastic Surgeons in 2010. Today, the trend for all cosmetic procedures calls for less invasive approaches and therapies to minimize and accelerate the postoperative recovery period. The postoperative recovery period for liposuction can include prolonged inflammation, edema, and ecchymosis, as well as additional treatments for contour irregularities. This paper discusses the use of the SmoothShapes® XV device to enhance the post-operative recovery period for liposuction and the reduction of contour corrections.

Methodology

Several studies have reported positive treatment outcomes as a result of the use of laser therapy combined with lymphatic massage. These reported therapeutic effects include a faster and more comfortable postoperative recovery process which includes less pain, less bleeding and ecchymosis, reduced inflammation, and increased promotion of the healing of cutaneous wounds.¹⁻¹⁰

The SmoothShapes XV body shaping platform combines laser therapy with mechanical massage. In this study, treatments were performed pre- and post liposuction. The platform comes equipped with a 915nm continuous wave diode laser and a 650nm light that fire simultaneously. The 915nm laser has been clinically shown to penetrate into tissue and is absorbed by lipids, creating a thermal effect within the adipocyte.¹ In the pre-op liposuction treatment, the 650nm light modifies the permeability of the adipocyte membrane, allowing treated fat from the 915nm wavelength to move into the interstitial space providing a gentler means of liposuction and therefore

minimizing trauma to the area.³ As a result, the removal of fat is less traumatic and minimizes the occurrence of edema and ecchymosis.

In addition, the workstation provides mechanical massage capability by having both a vacuum and rollers contained within the handpiece. Lymphatic massage is then used in post-op treatment to aid in lymphatic drainage. Several studies have shown lymphatic drainage to enhance the post-op recovery period, minimize irregularities and improve patient satisfaction.^{3,8}

In addition, the use of phototherapy has been shown to coagulate blood vessels through the absorption of hemoglobin and therefore heat blood vessels and reduce bleeding through small vessel coagulation.⁹⁻¹⁰

Lastly, the 650nm laser (LLLT or phototherapy) has been shown to accelerate the wound healing process and thus it may provide benefit in the post op treatment. Several studies have demonstrated the benefits of applying low-level light therapy to accelerate this process.⁵⁻⁷

Methods and Materials

A 37-year-old patient presented with lipodystrophy of the anterior, posterior, lateral and medial thighs. The patient's Fitzpatrick skin type was II. Her BMI was 21. Pre-op lab results were within normal limits and included CBC, liver and SMA tests.

A split leg study was performed whereby the left lateral thigh received a SmoothShapes treatment one hour prior to the procedure and the right lateral thigh was not treated with SmoothShapes. The treatment time was 20 minutes at 15 watts. Vacuum setting was 1-2. The patient was then prepped and infused with tumescent anesthesia and the liposuction procedure was performed. Each lateral thigh yielded approximately 300 ml of aspirate.

The patient was then provided post-op instructions and scheduled for six post-liposuction SmoothShapes treatments at the following intervals: once a week post surgery at week one

and week two; twice a week post surgery at week three and week four. The six post-liposuction treatments were performed for 20 minutes at 15 watts with a vacuum setting of 1-2 on the left lateral thigh.

Patient feedback surveys were completed at each post-op treatment and photographs were taken to determine the efficacy of the side treated with SmoothShapes. The photographs were taken within 48 to 72 hours after the SmoothShapes treatments.

Results

At one week post-op, the side that was not treated with SmoothShapes reported moderate to severe bruising to the lateral and posterior thigh (see photo 1) including erythema and edema. The side treated with SmoothShapes exhibited significantly less bruising and minimal edema.

Not Treated with SmoothShapes



1 Week Post Op



2 Weeks Post Op



3 Weeks Post Op

Treated with SmoothShapes



At three weeks post op, both clinician and patient reported no bruising on the side treated with SmoothShapes. In addition, the patient reported less pain and inflammation, and more comfort on the side treated with SmoothShapes while the non-treated side reported a continued occurrence of mild bruising and swelling.

Discussion

As discussed previously, several studies support the combined benefits of laser energy and mechanical massage to improve the postoperative recovery period.

In a study by Neira and colleagues, they demonstrated that on human adipose tissue, that the exposure of the 635nm low-level laser on adipocytes caused the opening of transitory pores within the cell membrane, causing subsequent release of fat into the interstitial space. In addition, in a study by Anderson et al, the 915nm laser was shown to be highly absorbed by lipids, at a higher rate than water.¹ Both wavelengths combine to facilitate the releasing of fat and contribute to the disruption of the fat panicles, allowing the fat to go from inside to outside the cell and placing it in the interstitial space. With easier fat extraction and less surgical trauma, edema and ecchymosis are reduced, thus accelerating the patient's recovery.²

In other studies, photo dynamic therapy has been reported to cause vasoconstriction and blood coagulation.¹⁰ The theory of selective photothermolysis shows that hemoglobin is absorbed by both wavelengths, producing a thermal effect that would coagulate tissue in pre- and post-liposuction treatments.

The manual removal of fat cells causes trauma to the subcutaneous layer and creates wounding. Studies on the benefits for wound healing report that the effect of phototherapy in the mid-600 wavelength range had a positive influence on

wounded cells.^{4,5} In a study by Hawkins and Abrahamse, photomodulation was proven to stimulate mitochondrial activity, which leads to the normalization of cell function and ultimately stimulates cell proliferation and migration of wounded fibroblasts, thus accelerating wound closure and healing.⁵ In a second study by Kavani and colleagues, complete wound healing occurred in 11 weeks for those treated with low-level light therapy (LLLT), in comparison to 14 weeks for the untreated wound.⁶

The trauma resulting from liposuction damages the subcutaneous cellular tissue and subsequently the lymphatic structures. This damage can compromise lymphatic drainage, which may appear clinically as some degree of edema. Dirican and colleagues studied the use of LLLT in the management of lymphedema of the arms following post mastectomy surgery in combination with manual lymphatic drainage. In the treatment of 17 patients with a median age of 51⁸, they reported a reduction in limb circumference and pain, and an increase in range of motion and scar mobility. The circumferences of the treated arms (edema) showed a decrease of 54% (15-85%) and 73% (33-100%) after the first and second cycle of LLLT.⁷ The mechanism of action provides stabilization of the vascular endothelia to prevent tissue hypoperfusion and reduce edema.

In an analysis of postoperative complications from liposuction, Y.H. Kim reported that the most common complication was postoperative contour irregularities.⁴ In the course of lipoplasty, not all dislodged subcutaneous fat is aspirated and some of it survives, as does an autologous fat graft. Mechanical massage applied intraoperatively with primary liposuction can assist with the even distribution of this residual fat. As reported by Fedor, a palpable difference in the subcutaneous fat can be appreciated because it becomes more even and pliable after the application of mechanical massage.⁸

The lymphatic system plays critical roles in the transportation of lymph, proteins and digested lipids, allowing fluid to be returned to the blood stream. As previously discussed, the lymphatic system can be compromised following liposuction causing edema and inflammation of subcutaneous tissues. Mechanical massage has been reported to accelerate blood flow and assist with mobilizing the interstitial edema fluid into the capillary circulation system and therefore minimizing edema and inflammation.³

Conclusion

The use of SmoothShapes XV (laser therapy combined with lymphatic massage) is a viable option to enhance the postoperative recovery process and increase patient satisfaction. This option is supported by several clinical studies that demonstrate the laser's positive effect on adipose tissue (minimizing trauma), the benefits of mechanical massage and lymphatic drainage, and the benefits of LLLT to enhance the wound healing process.

References

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