



Section 1. Clinical Medicine

DOI: 10.29013/EJBLS-26-2.3-3-6



CLINICAL, ULTRASONOGRAPHIC, AND ELECTRONEUROMYOGRAPHIC EVALUATION OF COMPRESSION- RETRACTION KINESIO TAPING EFFICACY FOLLOWING LASER-ASSISTED SUBMENTAL LIPOSUCTION

Kakhramon Erkinovich Shomurodov ¹,
Kamola Khamraevna Shermatova ¹

¹ Department of Maxillofacial Surgery. Tashkent State Medical
University, Tashkent, Republic of Uzbekistan

Cite: Shomurodov K.E., Shermatova K.K. (2026). Clinical, Ultrasonographic, and Electroneuromyographic Evaluation of Compression-Retraction Kinesio Taping Efficacy Following Laser-Assisted Submental Liposuction. The European Journal of Biomedical and Life Sciences 2026, No. 2 – 3. <https://doi.org/10.29013/EJBLS-26-2.3-3-6>

Abstract

Background: Laser-assisted submental liposuction forms a substantial wound “dead space” due to fat evacuation and septal ablation. This architectural disruption predisposes patients to exudate accumulation, collateral edema, and gravitational skin flap ptosis. Continuous elastic compression bandages often compromise venous and lymphatic drainage, inducing tissue hypoxia and necessitating biomechanically optimized fixation protocols.

Aim: To evaluate the clinical and instrumental efficacy of an originally developed compression-retraction kinesio taping protocol for preventing complications, controlling edema, and stimulating dermal retraction following submental liposuction.

Methods: A prospective randomized controlled trial included 60 patients (18–60 years) who underwent a two-stage laser-assisted liposuction procedure. The main group (n=30) received the proprietary taping protocol, featuring a 5–7 mm evacuation port directly over the surgical puncture and 10–20% tape tension along physiological lymphatic pathways. The control group (n=30) utilized a standard elastic bandage. Clinical monitoring on days 1, 3, 5, and 7 included segmental linear anthropometry (sagittal, lateral, and cervical vectors), VAS pain assessment, and neck extension amplitude. Instrumental diagnostics involved ultrasound duplex scanning (USDS) of subcutaneous fat and facial vessels, alongside electroneuromyography (ENMG) of the facial nerve.

Results: The lateral anthropometric vector proved most sensitive to therapy. The control group experienced peak edema on the 3rd postoperative day ($+1.7 \pm 0.2$ cm). In the main group, the edema peak shifted to the immediate postoperative hours, drastically limited to 0.6 ± 0.1 cm

($p=0.005$). By day 7, USDS confirmed a 31.5% reduction in subcutaneous fat thickness in the taping group (12.6 ± 0.8 mm), while pastosity persisted in the control group (18.2 ± 1.0 mm). The main group exhibited enhanced compensatory venous drainage in the facial vein (24.5 ± 1.8 cm/s) and an 80% VAS pain regression by day 7 ($p=0.00008$). Crucially, ENMG verified the complete absence of compressive ischemic block affecting the facial nerve in the taping cohort (M-response 1.95 ± 0.15 mV).

Conclusion: Compression-retraction kinesio taping with an integrated evacuation port is a highly effective, non-pharmacological alternative to traditional circular bandaging. It significantly mitigates exudative edema, prevents venous stasis, eliminates the risk of compression neuropathies, and accelerates dermal retraction without compromising regional hemodynamics. **Keywords:** *Laser-assisted liposuction; submental area; kinesio taping; postoperative edema; ultrasound duplex scanning; electroneuromyography; aesthetic rehabilitation*

Introduction

Laser-assisted liposuction of the submental area has become an essential aesthetic procedure. However, this surgical intervention inevitably provokes significant anatomical and physiological alterations. The aggressive thermal action of the laser and the rapid, voluminous vacuum extraction of the localized fat depot create a substantial wound “dead space” located directly between the platysma muscle fascia and the overlying dermal flap. This mechanical ablation of connective tissue septa acts as a potent trigger for acute inflammatory cascades, predisposing patients to the massive accumulation of protein-rich wound exudate, the formation of resistant seromas, and the development of severe collateral edema throughout the cervical region. Furthermore, the sudden loss of the subcutaneous supporting framework dramatically elevates the critical risk of secondary gravitational ptosis of the surgically separated skin flap. To proactively prevent these complications, minimize interstitial swelling, and ensure adequate dermal retraction, standard postoperative clinical protocols conventionally rely on the continuous application of tight circular elastic bandages. However, routine continuous circumferential compression possesses several critical pathophysiological drawbacks. Excessive external pressure applied to delicate cervical structures frequently compromises the superficial lymphatic capillary network and major regional venous pathways, such as the anterior jugular and facial veins. This mechanically blocks passive fluid outflow, inducing local tissue hypoxia, and significantly increasing the probability of transient compressive neuropathies affecting the peripheral motor branches of the facial

nerve. Therefore, the development of a personalized, biomechanically optimized fixation protocol that provides meticulously dosed focal compression, guarantees enhanced active lymphatic drainage, and supplies reliable retraction without compromising regional hemodynamics is urgently required. Kinesiology tape, originally developed by Kenzo Kase, offers a promising alternative. The tape lifts the skin, creating an intracutaneous space that reduces local lymphatic pressure, facilitating the absorption of prelymph from the interstitium and stimulating drainage towards regional lymph nodes.

Aim

To comprehensively evaluate the clinical and instrumental effectiveness of an originally developed compression-retraction kinesio taping protocol designed for the targeted prevention of postoperative complications, objective control of exudative edema, and active biological stimulation of dermal retraction in patients following laser-assisted liposuction of the submental region.

Materials and methods

A prospective, randomized, controlled clinical trial was conducted in 2025–2026, encompassing a total of 60 adult patients (age range from 18 to 60 years) who presented with localized submental adiposity and underwent a standardized two-stage laser-assisted liposuction procedure. The two-stage protocol included Stage I (adipocyte destruction using a 15 W laser) and Stage II (dermal retraction using a 10 W laser). Following the surgical intervention, the patient cohort was randomized into two structurally comparable groups. The main group (Group

2A, n=30) underwent rehabilitation utilizing a proprietary compression-retraction lymphatic kinesio taping protocol. This specialized technique involved creating an evacuation port (5–7 mm in diameter) positioned exactly over the primary surgical puncture site, applying hypoallergenic tapes with 10% to 20% therapeutic tension strictly along the physiological pathways of regional lymphatic drainage. The control group (Group 2B, n=30) received a conventional postoperative care regimen with a standard circular elastic compression bandage. Comprehensive clinical and instrumental monitoring was systematically performed on the 1st, 3rd, 5th, and 7th days post-surgery (T1-T4). Clinical objective assessment included segmental linear anthropometry across three specific vectors: sagittal (V1), lateral (V2), and cervical (V3). Pain intensity was quantified using a 10-point Visual Analogue Scale (VAS). Cervical mobility was determined by measuring the maximum amplitude of active neck extension (in millimeters). The instrumental diagnostic protocol incorporated high-resolution Ultrasound Duplex Scanning (USDS) using a Philips EpiQElite system (4–18 MHz) to measure the subcutaneous fat layer (SFL) thickness and quantify hemodynamics in the facial vein (v. facialis) and facial artery (a. facialis). Furthermore, superfical Electroneuromyography (ENMG) and Electromyography (EMG) of the facial nerve branches and masseter muscle were conducted using a Natus Medical UltraPro S100 device. Statistical processing was executed using IBM SPSS Statistics 27.0 with Student's t-test, Mann-Whitney U test, and a two-way ANOVA with repeated measures ($p < 0.05$).

Results

Dynamic analysis of segmental linear anthropometry revealed that the lateral vector (V2) exhibited the highest sensitivity to therapeutic interventions. In Group 2B, the absolute peak of edema (Tmax) was consistently registered on the 3rd postoperative day (T2), presenting a maximum volume increase of 1.7 ± 0.2 cm. In stark contrast, kinesio taping in Group 2A favorably shifted the Tmax directly to the immediate early postoperative hours (median 0 days), and the total maximum edema was drastically restricted to

merely 0.6 ± 0.1 cm ($p = 0.005$). Evaluation of the cervical vector (V3) in Group 2A demonstrated accelerated, uniform “adhesion” of the dermal flap, completely preventing the undesirable gravitational sliding of edematous fluid ($p < 0.01$ at T2). By the 7th day, USDS showed that SFL thickness in Group 2A significantly decreased to 12.6 ± 0.8 mm (a 31.5% reduction from the baseline), while the control group retained pronounced tissue pastosity at 18.2 ± 1.0 mm. Doppler ultrasonography in Group 2A detected a powerful compensatory enhancement of venous drainage; maximum outflow velocity in v. facialis on the 3rd day surged to 24.5 ± 1.8 cm/s. Pain regression (VAS) reached 80% by the 7th day in the taping group, compared to 57.1% in the bandage group ($p = 0.00008$). Biomechanical recovery of the neck extension amplitude was significantly superior in Group 2A (absolute increase of 30.6 ± 4.8 mm by day 7) versus Group 2B (23.1 ± 4.2 mm, $p = 0.02$). Crucially, ENMG monitoring objectively verified the complete absence of compressive ischemic block when utilizing tapes. In Group 2A, the amplitude of the evoked M-response for pars inferior m. orbicularis oris fully recovered to 1.95 ± 0.15 mV by day 7 ($p > 0.05$ compared to preoperative values). Conversely, in Group 2B, standard bandaging induced severe neuropraxia, with the M-response dropping to critical levels (0.38 ± 0.03 mV) and latency increasing to 5.52 ± 0.27 ms ($p < 0.001$). Masseter muscle EMG revealed that the reactive myofascial spasm completely resolved in Group 2A, whereas Group 2B patients developed persistent clinical trismus, with resting tone increasing fourfold to 135 ± 12 μ V ($p < 0.001$). Two-way ANOVA mathematically confirmed the highly significant combined effect of the “Treatment*Time” interaction ($p < 0.001$), validating the distinctive rehabilitative trajectory provided by the kinesio taping method.

Conclusions

The implementation of the advanced compression-retraction kinesio taping protocol, featuring an integrated surgical evacuation port, serves as a highly effective and biomechanically superior clinical alternative to traditional circular elastic bandaging following laser-assisted submental liposuction.

Instrumental data conclusively prove that this non-pharmacological method significantly mitigates exudative edema, reliably prevents superficial venous stasis, entirely eliminates the neurotoxic risk of ischemia-induced compression neuropathies affecting

the facial nerve, and thoroughly accelerates dermal retraction. By providing early mechanical decompression without compromising regional hemodynamics, this personalized protocol substantially optimizes aesthetic rehabilitation.

References

- Ristow O., Hohlweg-Majert B., Kehl V., Koerdt S., Hahnefeld L., Pautke C. Does elastic therapeutic tape reduce postoperative swelling, pain, and trismus after open reduction and internal fixation of mandibular fractures? *J Oral Maxillofac Surg.* 2013. – Aug; 71(8). – P. 1387–96.
- Yurttutan ME, Sancak KT. The effect of kinesio taping with the web strip technique on pain, edema, and trismus after impacted mandibular third molar surgery. *Niger J Clin Pract.* 2020. – Sep; 23(9). – P. 1260–1265.
- da Rocha Heras A. C. T., de Oliveira D. M. S., Guskuma M. H., de Araújo M. C., Fernandes K. B. P., da Silva Junior R. A., Andraus R. A. C., Maia L. P., Fernandes T. M. F. Kinesio taping use to reduce pain and edema after third molar extraction surgery: A randomized controlled split-mouth study. *J Craniomaxillofac Surg.* 2020. – Feb; 48(2). – P. 127–131.
- Jie Deng, Elizabeth M. Wulff-Burchfield, Barbara A. Murphy. Late Soft Tissue Complications of Head and Neck Cancer Therapy: Lymphedema and Fibrosis. *J Natl Cancer Inst Mono-gr.* 2019. – P. 53:63–71.

submitted 23.08.2026;

accepted for publication 07.09.2026;

published 30.09.2026

© Shomurodov K. E., Shermatova K. K.

Contact: Kahramon_sh@mail.ru; kamolakhamraevna@mail.ru