

Efficacy Using a Modified Technique for Tissue Stabilized-Guided Subcision for the Treatment of Mild-to-Moderate Cellulite of the Buttocks and Thighs

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BACKGROUND Cellulite can be significantly improved using vacuum-assisted tissue stabilized-guided subcision (TS-GS). However, the treatment of shallow and linear cellulite has remained problematic.

OBJECTIVE In this retrospective study, we describe a modified technique of vacuum-assisted TS-GS. The aim is to demonstrate that this new limited-release technique is an effective treatment for long ripples and interconnected shallow dimples, which are characteristic of mild-to-moderate cellulite.

METHODS Patients with mild-to-moderate cellulite were treated with limited-release vacuum-assisted TS-GS. All subcisions were performed at the 6-mm depth and a minimum of 3 mm between each dimple. Using a 4-point scale, 2 raters graded cellulite improvement on evaluation of prephotographs and postphotographs.

RESULTS A total of 23 female patients were included in this study. The pre- and post-treatment photographs were correctly identified in 22 of the 23 patients (95.6%). The average cellulite improvement was 2.9 of 4 for the buttocks and 2.8 of 4 for the posterior thighs. Global cellulite improvement was reported at 3.1 of 4.

CONCLUSION The results demonstrate that modified, limited-release, vacuum-assisted TS-GS can be an effective and safe method for the treatment of long ripples and shallow dimples that are characteristics of mild-to-moderate cellulite.

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Cellulite is a physiologic, anatomical state of the skin that affects approximately 80% to 90% of postpubertal women, without predilection for race, weight, or body type.¹ It presents as cutaneous dimpling and rippling of the buttocks, thighs, and abdomen, giving the skin the characteristic “orange-peel” appearance that is the hallmark of cellulite. Although it is not a sign of underlying abnormality and has, for years, been considered a normal physiologic phenomenon,² cellulite can have negative impacts on a person’s self-esteem and quality of life because this condition still carries a stigma.³ Consensus is lacking on the exact pathophysiology of cellulite; however, several interconnected mechanisms likely play a role in its development.^{4,5} An integral component of these

mechanisms is the network of subcutaneous fibrous septae. These collagenous septae provide structural support to the dermis, and in areas of cellulite, tend to be much thicker, and run perpendicularly to the skin.⁶

Cellulite can be difficult to treat, and many of the therapeutic options have included, either alone or in combination, physical massage, manual subcision, liposuction, laser, radiofrequency, acoustic waves, and topically applied products.^{1,7-10} However, the results that most of these treatments offer can be modest at best and temporary in longevity. In 2015, Kaminer¹¹ and colleagues published a seminal work that enhanced the treatment of cellulite and introduced the concept of vacuum-assisted tissue stabilized-guided

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subcision (TS-GS) (Cellfina, Merz North America, Inc., Raleigh, NC), which severs the septae causing the dimpling. In this pivotal trial, 94% of subjects who underwent a single treatment demonstrated improvement of 1 grade or more using an objective, validated Cellulite Severity Scale (CSS). The mean change in CSS at 1 year was 2 points ($p < .0001$). At 3 years after treatment, more than 91% of patients demonstrated sustained improvement, and patient satisfaction reached 96% and 93% at 2 and 3 years after treatment, respectively.¹² Unlike other modalities, this treatment option offers patients marked, long-lasting results; available clinical data have supported the clearance of TS-GS by the US Food and Drug Administration for the long-term improvement of the appearance of cellulite (up to 3 years).

Although vacuum-assisted TS-GS has been shown to offer sustained improvement in cellulite, closer examination of the pivotal trials on this modality reveals that the subject population treated in these studies mostly exhibited moderate-to-severe cellulite at baseline. Mild-to-moderate cellulite, especially on the thighs, can present with fine dimpling and rippling that can be difficult to treat. Tissue stabilized-guided subcision has not been previously evaluated in the treatment of this type cellulite. In this retrospective study, we present the results from 23 patients with mild-to-moderate cellulite of the posterolateral thighs and buttocks treated with TS-GS. Furthermore, we described a modified technique composed of smaller focal or limited tissue releases, allowing for treatment of smaller dimples and folds in the buttocks and thighs, as well as linear depressions.

Methods

Modified, Limited-Release Technique

All treatments were performed by M.S.K. as the primary surgeon with 1 to 2 assistants. All cellulite dimples were marked with the patient standing, and in some cases, having the patient use the “lunge” position to highlight shallow dimples. Smaller dimples were marked individually, and longer, interconnected ripples were marked in a series of linear (fractional) target zones (Figure 1).



Figure 1. With the modified, partial-release tissue stabilized-guided subcision, smaller dimples are marked individually, and longer, interconnected ripples are marked in a series of linear (fractional) target zones.

The key concept is to mark the patient using either round markings for larger circular dimples (usually on the buttocks but can be present on the thighs) or linear markings for smaller or more linear dimples and ripples (usually on the thighs and the outer buttocks) (Figure 1). The round markings can either be treated with the round release platform, or when small enough using the first window (P1) of the rectangular release platform (Figure 2). Round or circular markings on buttocks and thighs are generally treated with a full release. Linear ripples or dimples are assessed and marked while keeping in mind the length of the second treatment window (P2) of the rectangular release platform (Figure 2): if the linear dimple fits within the P2 window, a full release is administered, and if the linear dimple is longer than P2 is wide, the ripple or dimple is broken apart into smaller partial (or fractional) P2 releases. Essentially, the linear markings are designed to fit within the P2 window of the rectangular release platform (as opposed to the more traditionally used first window P1). Instead of releasing the area of cellulite over the entire rectangular track, this technique modification allows for smaller, fractional releases that are performed by placing each dimple or marked ripple in the center or on either end of the second treatment window (P2) and that small portion of the second window is treated, leaving P1 and the unaffected skin untreated (Figure 3). Using the aforementioned

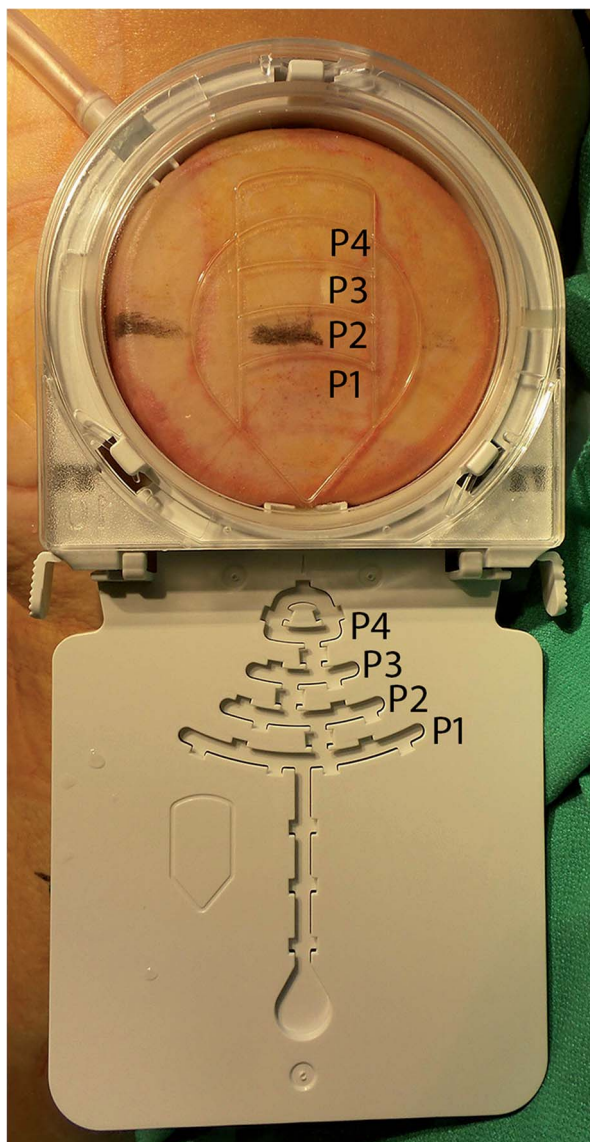


Figure 2. Different treatment zones (P1, P2, P3, and P4) in the rectangular window and their responding tracks on the platform. In this particular patient, the smaller, fractional treatment target was placed in the P2 position.

modifications, the goal is to mark the patient, so the physician is able to treat all areas at 6 mm.

Data Collection

A retrospective chart review was conducted on all patients in our practice who had undergone TS-GS for cellulite from January 1, 2015, to July 31, 2017. Patients with mild-to-moderate cellulite as rated by the treating physician based on number and depth of depressions on the day of consultation were included in the review. Patients with moderate-to-severe cellulite, patients who lacked pre-treatment and post-treatment

photographs, and those who were lost to follow-up were excluded from the study. The data collected included basic demographics, cellulite severity using a quartile scale (0 = 0%, 1 = 1%–25%, 2 = 26%–50%, 3 = 51%–75%, and 4 = 76%–100%), treatment areas, treatment technique and depth (6 or 10 mm), follow-up time, clinical photographs, and patient-reported satisfaction.

Assessments

The primary end point was the degree of cellulite improvement. Clinical photographs were provided to 2 independent blinded raters, not affiliated with the study. The identity of which photographs were pre-treatment and post-treatment was blinded to the raters. The raters labeled photographs as pre-treatment or post-treatment, then rated cellulite improvement after treatment on a quartile scale (0 = 0%, 1 = 1%–25%, 2 = 26%–50%, 3 = 51%–75%, and 4 = 76%–100%). The buttocks and thighs were assigned separate improvement scores, and a global score was assigned to the overall appearance of the cellulite after treatment. Patient-reported satisfaction served as a secondary end point to assess for subjective improvement. Adverse events were assessed for all patients.

Results

Demographics

All patients (23) were female and exhibited cellulite of mild-to-moderate severity. The mean age of the patients was 46 years (range 26–59 years), and each underwent one treatment with a mean final follow-up of 2.4 months (range: 1–11 months). In every patient, the buttocks and posterolateral thighs were treated.

Treatment Technique

Review of the treatment technique revealed that the average number of areas (dimples/folds) treated per procedure was 38 (range: 29–47). All subisions were performed at a fixed depth of 6 mm below the surface of the skin, with a minimum of 3-mm between each dimple/fold (fractional release). Limited, focal tissue releases were used to treat smaller dimples and folds on the buttocks and thighs.

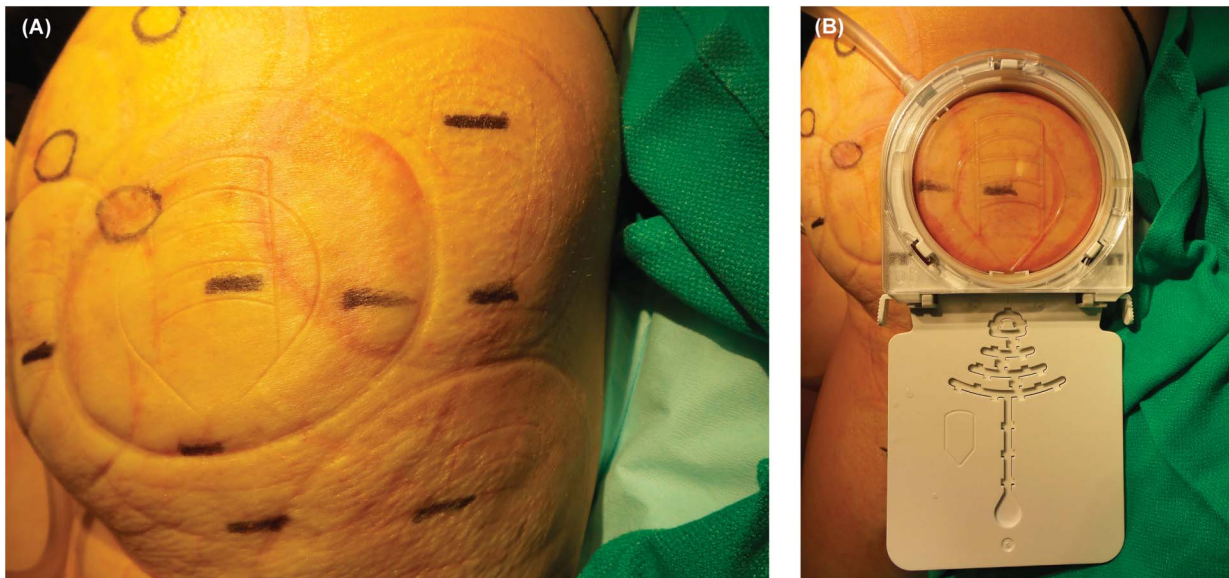


Figure 3. With the modified, partial-release tissue stabilized-guided subcision, multiple dimples in a row can be marked individually and separated by a minimum of 3 mm (A), placed in the center or on either end of the second window of the rectangular platform P2 (B), and that, small portion of the second window is treated, leaving the unaffected skin untreated. Of note, (A) demonstrates the indented imprint left behind on the skin by the platform after a release is administered—this allows the clinician to differentiate areas that have been already released.

Assessments

The blinded raters correctly and independently identified which photographs represented pre-treatment and post-treatment states in 22 of 23 patients (95.7%). Among those correctly identified, the raters’ combined average cellulite improvement scores were 2.9, 2.8, and 3.1 for the buttocks, thighs, and global appearance, respectively, based on the quartiles scale (Table 1). The one patient that was incorrectly identified was also dissatisfied by the results; per the treating physician, this patient exhibited very mild cellulite at baseline. All the remaining 22 patients were satisfied to extremely satisfied with results after treatment (Figure 4).

Adverse Events

There were no instances of scarring, pigmentary changes, infections, seromas, or anetoderma-like reactions. Overall, the procedure was well tolerated, and no unexpected adverse events were reported.

Conclusions

The treatments for cellulite have been vast in number and oftentimes disappointing in results and longevity. Therapeutic options include topical creams, lasers,

radiofrequency devices, massage therapy, and acoustic wave devices.^{13–20} The efficacy of these modalities has ranged from completely ineffective to modestly effective but unsustainable. Furthermore, these treatments can be imprecise, with outcomes that were difficult to reproduce from practitioner to practitioner. The introduction of vacuum-assisted TS-GS provided physicians with a new cellulite treatment that, for the first time, offered reproducible satisfaction rates above 90% and durability of at least 3 years.¹² However, the question remained as to whether these results can be achieved for patients with more mild cellulite.

Cellulite on the milder side of the spectrum tends to present with finer, interconnected waves of rippling

TABLE 1. Blinded Raters’ Scores of Cellulite Improvement After 1 Treatment of Vacuum-Assisted Tissue Stabilized-Guided Subcision

<i>Location</i>	<i>Mean Improvement Score out of 4</i>	<i>Range</i>
Buttocks	2.9	0–4
Posterolateral thighs	2.8	1–4
Global appearance	3.1	1–4

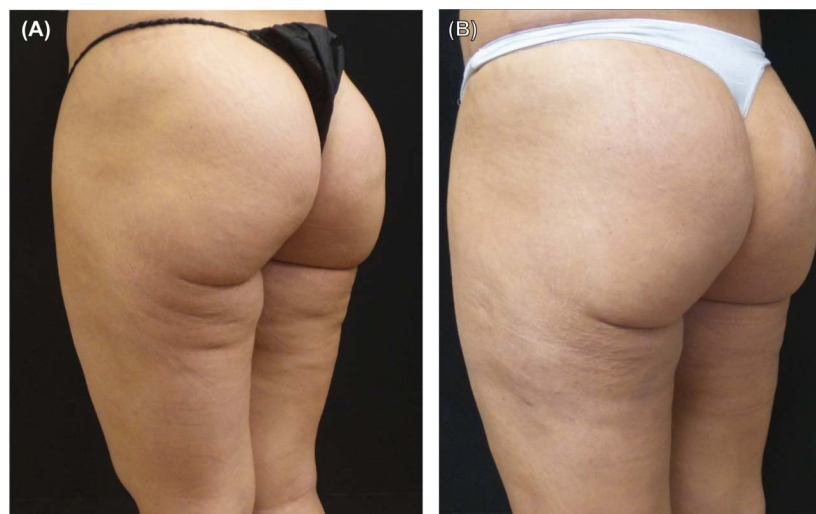


Figure 4. A 42-year-old woman with mild-to-moderate cellulite before (A) and 4 months after one treatment with modified tissue stabilized-guided subcision (B). Marked improvement in ripples of the posterior thighs was observed.

and dimpling that can be difficult to treat. In this retrospective analysis, we have shown that vacuum-assisted TS-GS is indeed safe and effective in the treatment of mild-to-moderate cellulite in women across a broad range of ages. In 95% of our patients, blinded raters noted marked improvement in the overall appearance of mild-to-moderate cellulite after one treatment in both the buttocks and posterolateral thighs, an area where cellulite tends to be especially obstinate.

The treatment technique presented, referred to here as “limited-release” TS-GS, represents a novel modification of previously reported techniques that can be instrumental in the treatment of mild-to-moderate cellulite. In the previous pivotal study,¹¹ the targeted dimple is centered in the first platform window, and the blade-equipped motor is placed on the platform track and swung fully from side to side over the entire track in which it resides. This results in a tangential, complete release of the underlying attachments beneath the entire skin within the platform’s window. Before the pivotal trial, preliminary observations demonstrated that tangential, or perpendicular, releases yielded more predictable results than parallel releases. Using this classic full tangential release technique, each dimple or ripple is fully released by swinging the motor over the entire track, regardless of the size of the dimple. However, the contiguous size of the released area is directly proportional to the risk

of seroma formation.^{11,12} To mitigate the risk of seroma formation, one can alternate treatment depths between 6 and 10 mm; however, this process can be cumbersome throughout the procedure.

We have modified the complete release technique in 3 ways to allow for the treatment of long ripples and interconnected dimples that are characteristic of mild-to-moderate cellulite. First, long ripples are divided into a series of linear target zones (analogous to fractional strategies used with lasers) designed to fit within the smaller second treatment window (P2) of the rectangular platform (Figures 1 and 2). Notably, some clinicians elect to perform partial releases by using a half arc in the P1 track. Second, we adjusted the swing distance of the motor on the track to more closely match the size, or length, of the dimple or fold at hand, allowing for partial releases (Figure 3). Smaller, focal releases not only potentially lower the risk of seroma formation, but also allow for the third and final modification we applied that made the treatment less cumbersome: treating at a uniform depth. When treating dimples very closely situated, adjusting the dimple or ripple at either end of the window, applying smaller focal releases, and leaving a minimum of 3 mm in between each release allow for an entire treatment to be performed at a depth of 6 mm in most cases, avoiding use of the 10-mm window. The fractional release of longer dimples and ripples not only provides consistent efficacy in stubborn cellulite

and less risk of anetoderma-like reactions, but also avoids the time-consuming process of switching the platform back and forth between 6 and 10 mm, resulting in a smoother procedure for the clinician. Of note, the treatment of cellulite in the superolateral buttocks should be approached with extreme caution because clinicians have anecdotally reported anetoderma-like reactions in this area after TS-GS.

There are limitations to this study. The retrospective design of the study may be subject to recall and selection biases that are often minimized in randomized, placebocontrolled prospective studies. Another limitation lies in the definition of mild-to-moderate cellulite severity. The grading of cellulite has for long been a subject of dispute, disagreement, and revision. Cellulite grading scales can be extensive and often depend on the presence of live patients because of their inclusion of depth ratings and possible need of physical manipulation²¹; this makes them cumbersome and difficult to apply to every day clinical practice. As such, the treating physician's subjective clinical grading of cellulite was applied as an alternative to retrospective assessments using more involved cellulite grading scales to clinical photographs. Also, the difficulty of consistently applying cellulite grading scales to standardized photographs necessitated the use of a quartile scale by our blinded raters. Finally, it is worth noting that the treatment of cellulite in the superolateral buttocks should be approached with extreme caution because clinicians have anecdotally reported anetoderma-like reactions in this area after TS-GS.

The results of this study expand and build on previous data demonstrating the efficacy and safety of TS-GS in the treatment of cellulite. Our results demonstrate marked improvement in the buttocks, posterolateral thighs, and overall appearance of mild-to-moderate cellulite in 95% of patients treated with limited-release TS-GS.

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