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Research Article

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Neck Revitalization with Suture Suspension and Adipocytolysis

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Introduction

A demand for a youthful appearance is progressively evolving with multitude aesthetic procedures and techniques designed for clinical developments of facial and neck rejuvenation and contouring.

Many cosmetic procedures provides a more youthful looking face including the neck. The neck often ages than the other areas of the body. Due of intrinsic and extrinsic aging, the neck undergoes changes in all anatomical layers and the ability to treat this concerns successfully requires a well knowledgeable physician both surgically and non-surgically [1].

One of the features in determining attractive and youthful faces lies in naturally elevated eyebrows, full alert eyes, strong jawline, firm neck, plumper and tighter facial skin and facial symmetry. However, a well-contoured neck emanates health, attractiveness and a youthful appearance and its shape and contour plays an important role in facial aesthetics. It should be characterized by an acute cervicomental angle of 105° to 120° and a firm, well-defined jawline. This is exemplified by smooth and devoid of horizontal or vertical neck lines; has no platysmal bands; no visible submandibular glands; small, non-hypertrophic masseter muscles ; and skin that is bright and even in color, with minimal melanin or vascular lesions [2].

Neck is the most neglected area compared to the face when it comes to rejuvenation and has been one of the great challenge for aesthetic practitioners [3]. The skin of the neck is the most delicate part when it comes to aging. Compared to the face, neck contains less elastin fiber which results into weaker supporting structure to the collagen matrix. Furthermore, neck also lacks fatty structure to give support to the less elastic skin which results in platysmal edge shortening and banding. Skin laxity, preplatysmal or subplatysmal fat excess, digastric muscle hypertrophy and hypertrophied ptotic submandibular glands are also factors that contributes in the aging of the neck [2].

Since there is a multifactorial aging of the neck, multimodal and non-surgical approach for the neck rejuvenation have been developed. Aside from the devices that is used to treat neck redundancy and skin tightening, combination treatment of minimally invasive procedures using bioabsorbable threads for improving and repositioning of the sagginess of the skin and administration of Adipocytolysis for fat destruction through the presence of adipocytolytic agent have been practiced.

Materials and Method

Patient Selection

Participants included in this study should be 35-60 years old with Class 1 to Class 3 classification of an aging neck from the Dedo classification of cervicomental abnormalities which required mild to moderate lifting. Patients whose concern is the submental fullness of their neck, no known history of hypersensitivity to components of the specified threads and lipodissolve were also included in the study. Exclusion criteria in the study were patients whom laxity and cutaneous hypo tonicity were most advance, pregnant, lactating patient, patients undergoing anti-coagulation therapies, patient with existing neuromuscular conditions and patients with excessive overabundance of the skin, thus requiring removal. Patients who requested immediate results, excessive lifting, and those with very advanced cutaneous-muscular prolapse, pathologies to diagnose or with diagnosed pathologies were also excluded. The treatment were done at Everlast Wellness Medical Center, Abu Dhabi, United Arab Emirates. A written consent were given to patients before the procedure.

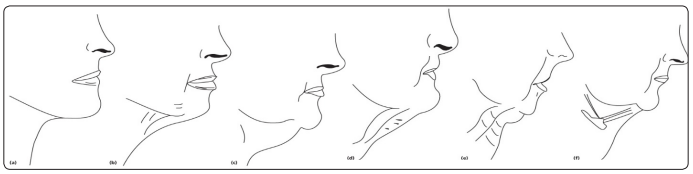

Figure 1: Dedo classification of Cervicomental Abnormalities (a) Class 1: demonstrating good muscle tone, no submental fat, and a well-defined cervicomental angle. (b) Class 2: demonstrating cervical skin laxity and an obtuse cervicomental angle. (c) Class 3: demonstrating submental fat accumulation; may require submental lipectomy. (d) Class 4: demonstrating significant platysmal muscle banding. (e) Class 5: demonstrating retrognathia and/or microgenia. (f) Class 6: demonstrating a low hyoid.

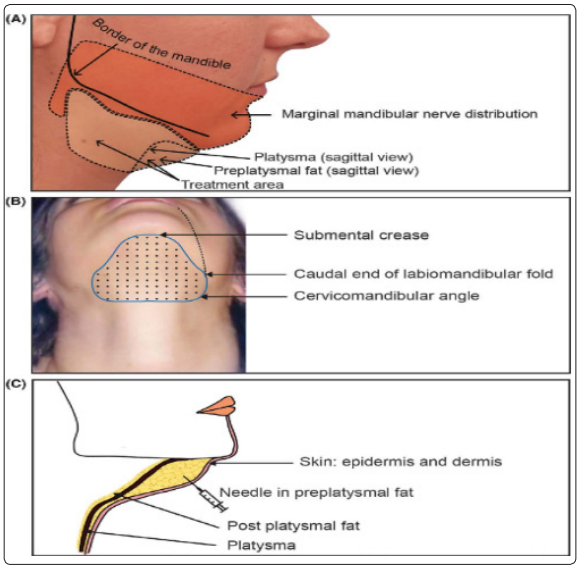

Figure 2: Landmark (A), Injection points (B) Treatment Depth (C) Submental fat with DCA

Treatment Protocol

Appearance of an aging neck is caused by a variety of factors associated with hereditary and aging process. These anatomic factors includes unfavorable cervical contour, low positioned hyoid bone, poor chin projection and the collection of submental fat. Each patient demonstrate different factor contributing to the aging neck was evaluated preoperatively and addressed to proper treatment to provide a pleasing outcome.

Adipocytolysis using Deoxycholic Acid Injection was administered to the submental region to treat the submental fullness as a result of fat accumulation. This treatment consist of multiple micro-injections administered under the chin which help in defining the jawline and improving the appearance of the lower face and neck. Treatment area was marked with a surgical pen with 1 cm in space to mark the injection sites from submental crease to cervicomandibular angle. A 0.2 mL per injection site were administered subcutaneously to the submental fat using 30 G needle. The needle was placed with respect to the mandible to avoid marginal mandibular nerve injury, thus allowing DCA to be injected with the target submental fat. DCA injections were given for 4 sessions with 2 weeks interval and should be administered within 2 months before the thread lifting of the submental region was performed.

Thread lifting using bioabsorbable sutures that are composed of Polylactic Acid in combination with Polycaprolactone absorbable threads with barbs, USP 2/0, 25 cm for the jawline and USP 2/0, 50 cm. long for the submental area. These threads associated with barbs on the filament are hooked on the tissues to initiate lifting of the sagging and loose skin and are absorbed by the body's biochemical processes such as collagen proliferation and fibroblast stimulation. A total of 4 pieces of threads were implanted under the skin of the jawline and submental area with 1 cm incision made from the parotid area to the premastoid periosteum as an entry point. Injection and implantation area were marked and carried out in upright position. Betadine were also applied to the treatment area before infiltration of anesthesia was performed to sanitize the treatment site and prevent infection. An hour before the procedure, local anesthesia consist of 2% lidocaine with epinephrine (1:200,000) buffered with 8.4% sodium bicarbonate having a ratio of 9:1 cocktail solution was injected to minimize the pain and comfortability.

Assessment

Submental area and neck were evaluated in a manner similar to jowl-mandibular region for skin elastosis through visual inspection with Dedo Classification and manual palpation. It is a useful tool to help delineate the features contributing to a particular patient's pathology and to help guide targeted surgical intervention [2]. The medial-lateral as well as the superior-inferior movement together with the amount of adipose tissue on both subcutaneous and subplatysmal were assessed using both visualization and palpation.

A 3-dimensional imaging system using Vectra H1 (Cannefield Scientific, New Jersey, USA) were used for assessing the changes of the neck from pre-operative to post-operative conditions during 2 months, 3 months and 6 months after the procedure by capturing 3 different angles of the same position. Results were also evaluated by each patient involved in the study and blinded physicians using Global Aesthetic Improvement Scale (Table 1) where scores given to each patients were derived.

Table 1. The Global Aesthetic Improvement Scale

	Degree	Description
1	Excellent improvement	Excellent corrective result
2	Very improved patient	Marked improvement of the appearance, but not completely optimal
3	Improved patient	Improvement of the appearance, better compared with the initial condition, but a touch-up is advised
4	Unaltered patient	The appearance substantially remains the same compared with the original condition
5	Worsened patient	The appearance has worsened compared with the original condition

Results

Six patients, all female with mean age of 50.5 years old, who met the criteria were sequentially treated with combination treatment using Adipocytolysis and Thread lifting. Most patients displayed improved appearance on their contoured neck.

50% of the patient (Figure 4) from patient evaluation were scored as improved and unaltered patients during the second month and gradually improved on the sixth month were 67% scored themselves as excellent improvement while 33% scored as very improved.

Figure 3: A 54 years old patient upper row) and a 38 years old patient (lower row) demonstrate skin laxity and submental fullness

(left side) shows well-defined jawline and more attractive neck appearance (right) 6 months after the combination treatment of Threads and Adipocytolysis

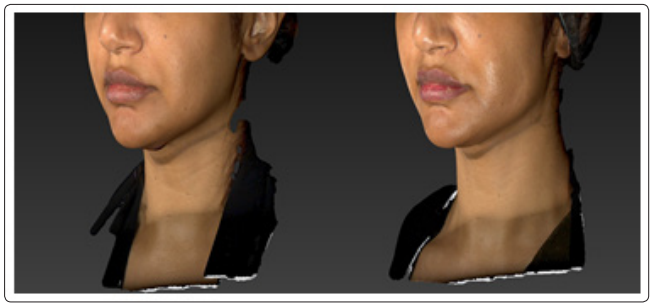

Figure 4: illustrates the satisfaction rate from the blinded physicians also in different timelines. 67% of the patients demonstrates improved patient 2 months after the procedure. On the third month, 67% were considered as very improved patient while 33% were improved patients. An evident increase is observe on the sixth month were most of the patients 83% were scored with excellent improvement

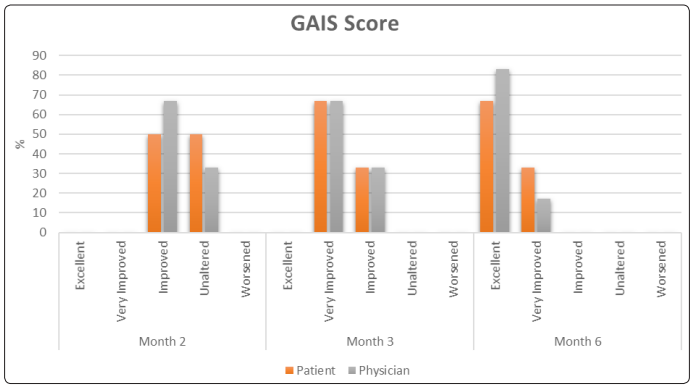

Figure 4: Global Aesthetic Improvement Scale Score from patient and physicians

Patients experienced some stinging, pain and discomfort under the chin after each session of Adipocytolysis. This effect peaks 5 minutes after the treatment and substantially decreases within 15 minutes and resolves by 24 hours. Edema were also developed 2 weeks after the procedure. On the other hand, slight swelling and bruising were noted after threads implantation which resolved after 3-5 days. This is due to the slight injury during the thread implantation.

A significant improvement of the cervicomental contour as well as decrease of submental fullness and neck laxity can be observed base from the comparison of the before and after photos taken by Vectra H1 6 months after the procedure.

Discussion

A well contoured neck is a hallmark of youth, health and attractiveness but due to continuous process of aging, loss of youthful contour of the neck may affect the overall appearance of the face which includes changes on the muscles, body soft tissues and bones [3].

Loss of skin elasticity, sagging and fat accumulation are the most common complaints of patients who seeks cervical rejuvenation. Neck skin, being the most superficial layer undergo degeneration of collagen and elastin due to continuous sun exposure which makes it less resistant to the pull of gravity [3]. The constant mechanical pull to the unsupported and lax skin exposes changes related to fat depletion, fat accumulation as well as of formation of rhytids which no longer approximate the contours of the deep structures of the neck [3-5]. Fat along the cervicomental angle occurs at all ages and causes deformities. Preplatysmal adipose tissue accumulation on the submental and submandibular fat pads occurs in both young and older. Formation of new adipose tissue, jowl and nasolabial folds as a result of descended soft tissues as an individual ages may require combination of cosmetic intervention for it's the restoration of youthful appearance.

Concerns of an aging neck can be restored through surgical interventions such as liposuction and neck lifting for the removal of the fat deposits on the submental area and to lift the sagging skin of the neck. The efficacy of these procedures have been already proven but was also associated with certain risks and drawbacks which made minimally invasive procedures to be the on the limelight of neck rejuvenation due to its minimal side effects and rapid recovery time.

One of the most common method for treating submental fullness is adipocytolysis using micro-injections of solution containing deoxycholic acid. Adipocytolysis, also known as cytolytic method, are techniques to solubilize through partial or total ablation which destroys the plasma membrane of lipids. These causes permanent changes of the adipocyte thus promoting improvement on contour Injectable form of deoxycholic acid was recently approved injectable drug by FDA for the submental fat reduction [6]. DCA is an active adipocytolytic agent which endogenously is a secondary bile acid produced in the intestine involve in dietary fat emulsification and solubilization which aids in breakdown and absorption with gastrointestinal tract [7]. Subcutaneously injected, DCA disrupts adipocyte cell membranes thus causes cell death. Cellular and lipid debris as a result of cell death is being cleared by microphages with subsequent fibroblast-mediated thickening of fibrous septa thus indicates neocollagenesis [8]. Deoxycholic acid injection does not alter systemic levels of lipids and adipokines to any clinically relevant event [9]. Common side effects in adipocytolysis such as inflammation and swelling appears to be an indicator of efficacy and promotion of secondary skin tightening [10]. The inflammatory process can improve the efficacy of the procedure which may result in tissue regeneration or fibrosis by stimulating the lipolytic process. Scarring collagen deposition from the tissue repair displays more cohesive and resistant collagen fibers thus prevents cell proliferation and cell migration to the adipocytolytic area that are capable on promoting the shrinkage of the treated area which helps on the reduction process of body contouring and avoid sagging during the rapid weight loss [6].

Thread lifting, a popular minimally invasive method in lifting soft facial tissue using absorbable sutures. After thread was inserted subcutaneously, immediate lifting as its primary mechanism of action is observed to counteract skin laxity and tissue descent [11-13]. It also generates non-specific immune responses to the implanted material which includes macrophages, lymphocytes and mast cells which lasts several months. By-products of these cells contribute on the formation of connective tissue capsule around the foreign material which plays important role in the ability of the suture to lift tissues that holds and supports them to maintain elevated position to prevent future ptosis [11]. The effect of ptotic tissue reposition, neovascularization and neocollagenesis during thread lifting influences the skin texture, structure, tone and body couture.

In this study, the objective was to evaluate the efficacy of the combined treatment using adipocytolysis and thread lifting for submental and neck issues due to aging. A total of 6 patients presented were dissatisfied with the appearance of their neck due to accumulation of fat on the cervical area and loose and sag neck skin. The satisfaction with the procedure was evaluated separately for patients and for the physicians with GAIS score 2 months, 3 months and 6 months after the procedure. In addition, pre-operative and post-operative photos were also evaluated for the changes. The results obtained indicates satisfaction from both patients and physicians which increased over time.

Two months after the adipocytolysis procedure, the satisfaction of the patients was evaluated. The results showed that the patients are satisfied with the procedure. An increased on the level of satisfaction were noted from 50% improved patients in 2 months to 67% very improved patients during the third month were threads have been implanted. A more significant increase in satisfaction score has been noted where 67 % evaluated themselves as excellent improvement and the rest as very improved 6 months after the procedure.

Physician's level of satisfaction were also evaluated. 67% of the patients scored as improved (GAIS 3) during the second month and on the third month as very improved patients (GAIS 2). The rest were scored as unaltered on the second month and improved during the third month. Excellent improvement from 0% on the second month to 83% during the sixth month after the procedure where peak of the result is prominent has been recorded.

Based on the assessment using 3 dimensional photo of the pre-operative and the post-operative, patient had continuous significant improvement on the neck and submental fullness. Most patients demonstrates a more defined jawline, less submental fullness and improvement on the skin laxity. The condition after the treatment demonstrate a firmer skin and shows a better tone due to the recovery of skins ability in the stimulation of elastin and collagen as well as the facial lines correction. The treatment was well tolerated and the patients were satisfied with the overall aesthetic outcome and duration of the results which made the combination of thread lifting and adipocytolysis a good alternative to surgical intervention in the restoration of the neck contour.

Conclusion

Aging neck is still one of the greatest challenges for an aesthetic physician since it has always been always an overlooked concern. A youthful neck includes clear skin texture and tone without laxity. A multifactorial age related changes of the neck requires a combination approach as it works best collaboratively and produces better clinically significant result when properly planned and executed well. However, the neck has more complex anatomical structure and in order to acquire a better result, a practitioner should be well knowledgeable and understand the underlying anatomical and cellular changes while addressing the neck rejuvenation.

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