

Three-Dimensional Imaging in Measuring Facial Aesthetic Outcomes

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Objectives/Hypothesis: Medical imaging techniques have continually improved. However, measuring esthetic outcomes using conventional two-dimensional photography has inherent limitations visualizing in three dimensions such as the face.

Study Design: This study used three-dimensional imaging to visualize facial images preoperatively and postoperatively in patients undergoing Contour threadlift procedures.

Methods: In patients undergoing Contour threadlift placement for midfacial rejuvenation, we prospectively imaged and photographed patients preoperatively and postoperatively. From three-dimensional images, we measured three-axis vector movement of the facial soft tissue in millimeters. Three control subjects ($n = 6$, bilateral sides) who had not undergone any procedure were a control group to confirm stability of the images over time. Patients also completed a questionnaire regarding their results and overall experience.

Results: We studied 6 ($n = 12$, bilateral procedures) undergoing Contour thread placement. Analyzed images revealed a trend of midface soft tissue flattening of nasolabial contour over 3 months. Average nasolabial flattening or tightening was 2.3 mm ($P > .05$) in the Contour patient group. The flattening of the midfacial region returned to baseline postprocedure at 90 days. Three-dimensional imaging for the control subjects demonstrate less than 0.2 mm change ($P < .05$) in the nasolabial region weekly over a period of 3 weeks.

Conclusions: After 3 months, patients undergoing Contour thread placement had three-dimensional imaging measurements suggesting a return to baseline values. Three-dimensional imaging may increase accuracy in

quantifying change after surgery specifically with contour differences; film and digital photography capture in only two dimensions. The use of three-dimensional imaging may be applicable to numerous clinical settings.

Key Words: 3-dimensional imaging, threadlift, facial esthetics, contour.

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INTRODUCTION

The assessment of facial esthetic outcomes is largely based on subjective esthetic observation as compared with measured data. It is not possible to quantify three-dimensional change on a two-dimensional surface such as a photograph. Attempting to make measurements based on photographs, though for many years the state of the art, is inherently inaccurate as the facial structure and other structures of the body are naturally in three dimensions. Previous authors have attempted to visualize the face in three dimensions.^{1–4} One of the most challenging issues of imaging in three dimensions is producing a reliable and consistent method of obtaining three-dimensional images both preoperatively and postoperatively over time.

Additionally, in recent years, the advent of minimal incision facial rejuvenation has become more apparent. As part of a growing trend of minimally invasive procedures, barbed suture techniques and bony fixation devices have been used for facial rejuvenation.^{5,6} Barbed suture has also been used for wound closure as a potentially useful adjunct to avoiding suture knots.⁷

Our aim was to objectively evaluate the longevity of facial rejuvenation techniques using Contour thread barbed suture techniques through three-dimensional imaging techniques.

MATERIALS AND METHODS

This study was approved by the Northwestern University Feinberg School of Medicine Institutional Review Board. Inclusion criteria included patients desiring an improvement in facial appearance, facial ptosis, or facial contour ranging in age from 28 to 70 years. Exclusion criteria included patients with a history of bleeding diatheses, autoimmune disorders, connective tissue disorders, previous facial procedures or placement of facial implants, filler placement, Botox injections, and those patients unable to attend follow-up visits. Consecutive patients were enrolled from August 2005 through July 2006 who were undergoing Contour

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