ORIGINAL ARTICLE

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The Role of 3D Simulation in Surgery Decision Making in Rhinoplasty Patients: A Survey-Based Study

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Abstract

Objective: Three-dimensional (3D) and computerized imaging technologies are increasingly popular in the field of rhinoplasty and other esthetic surgical procedures. In this study, we evaluated the role of 3D simulated preoperative rhinoplasty images in patient decision-making.

Methods: We conducted this retrospective study included patients who underwent rhinoplasty between January 1, 2022 and January 1, 2023. Our clinic uses VECTRA® (H2 Handheld 3D Face, Breast, and Body Imaging System, Canfield Canfield Scientific, Parsippany, NJ, USA) imaging technology for 3D simulation. A total of 146 patients (female, 108; male, 38) participated in the study. The mean age was 30.94 years; the age range was 18-64 years. Survey: Did the results obtained using the 3D imaging program before your surgery influence your decision to undergo surgery?

Results: The data was collected through an online survey platform to provide ease of access and convenience for respondents. The responses were then compiled and analyzed using statistical software to identify trends and key findings. 88.4% of the patients reported that 3D imaging affected their decision to undergo surgery.

Conclusion: Our study suggests that 3D simulation systems will become increasingly important in surgical practice and that clinics using these systems will become more active in the future.

Keywords: Rhinoplasty, 3D simulation, aesthetics

INTRODUCTION

Three-dimensional (3D) and computerized imaging technologies are increasingly popular in the field of rhinoplasty and other esthetic surgical procedures. These technologies allow for improved visualization and detailed preoperative planning, providing both surgeons and patients with a clearer understanding of potential surgical outcomes (1,2). In particular, 3D facial contouring programs provide a platform for simulating postoperative outcomes from various perspectives (1-3). In this study, we evaluated the role of 3D simulated preoperative rhinoplasty images in patient decision-making for surgery.

METHODS

Study Design

This retrospective study included patients who presented for rhinoplasty between January 1, 2022 and January 1, 2023. Our clinic uses VECTRA® (H2 Handheld 3D Face, Breast, and Body Imaging System, Canfield Canfield Scientific, Parsippany, NJ, USA) imaging technology for 3D simulation (Figure 1a,1c).

We applied imaging technology (Canfield Scientific, Parsippany, NJ, USA) for 3D simulation. The aim of this study was to evaluate the impact of 3D imaging simulations on the decision to undergo surgery. We surveyed the patients 1 year after surgery. We asked the patients, “Did 3D imaging affect your decision to undergo

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Figure 1. (a) VECTRA® imaging technology is applied for 3D simulation pre-operation simulation, (b) postoperative result afer one year, (c) VECTRA® (H2 Handheld 3D Face, Breast, and Body Imaging System; Canfield)
3D: Three-dimensional

surgery?" We performed power statistical analysis. Statistical analyses were performed based on the survey responses. The study was approved by the Ondokuz Mayıs University Clinical Research Ethics Committee (approval number: 2024-475, date: 30.10.2024).

Features and Capabilities

High-Resolution Imaging: The 3D system uses multiple high-resolution cameras to capture detailed images from different angles, which are then combined to create a coherent 3D model.

Simulation Software: This software allows surgeons to manipulate a 3D model by simulating various surgical procedures and outcomes. This step helps visualize potential changes and set realistic expectations for the patient.

Measurement Tools: This system includes precise measurement tools that allow surgeons to evaluate anatomical structures and plan surgery with high accuracy.

Patient Communication: The 3D system provides a visual representation of potential outcomes, improving communication between the surgeon and patient, and allowing for a clear understanding of the surgical plan and expected results.

Pre-Postoperative Comparison: The system allows for side-by-side comparisons of preoperative simulations with actual postoperative results, thereby helping to assess surgical success and patient satisfaction.

Participants

Findings: A total of 146 patients (female, 108, male, 38) participated in the study. The mean age was 30.94 years; the age range was 18-64 years.

The educational background of the patients was as follows: 66.4% university graduates, 17.8% high school graduates, 8.9% master's degree, 6% doctorate, and 1.4% primary school graduates. Participants were selected from a pool of patients who underwent rhinoplasty within the past 12 months. The inclusion criteria were: Age: Patients between 18-64 years, Gender: Male and female patients,

Health: Patients without significant comorbidities that may affect recovery or outcomes, Consent: Patients who gave informed consent to participate in the study.

Survey Design

The questionnaire consisted of the following sections:

Demographic Data:

- Gender: Male, female, do not want to specify
- Age: Numeric input
- Education status: Primary school graduate, high school graduate, university graduate, diploma, doctorate, other

The Effect of 3D Imaging on the Decision of Surgery:

- Did the results obtained using the 3D imaging program before your surgery affect your decision to undergo surgery?
- Yes
- No
- Other (Please specify)

Statistical Analysis

The data were collected through an online survey platform to provide ease of access and convenience to the respondents. The responses were then compiled and analyzed using statistical software to identify trends and key findings. 88.4% of patients reported that 3D imaging affected their decision to undergo surgery (Figure 2).

DISCUSSION

Impact of 3D Imaging on Surgical Decision-Making

The survey results indicate that 3D imaging plays an important role in the decision-making process for patients considering rhinoplasty. The vast majority of patients reported that preoperative 3D images influenced their decision to undergo surgery. These findings suggest that visualization of potential outcomes may provide reassurance and confidence, leading to patients being more likely to proceed with surgery (4,5).

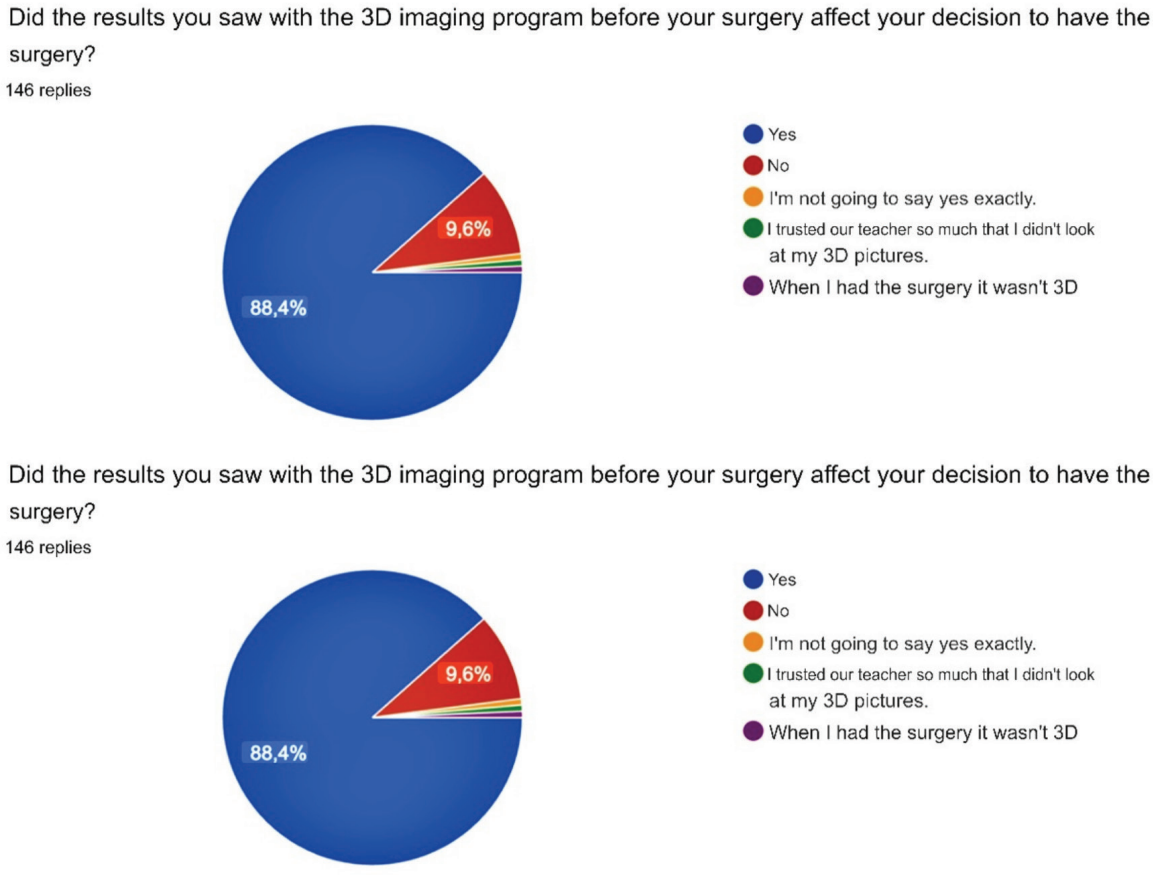

Figure 2. Did the result you saw with the 3D imaging program before your surgery affect your decision to have surgery?
3D: Three-dimensional

Our study demonstrated the significant impact of 3D imaging technologies on patient satisfaction and decision-making in rhinoplasty. 3D imaging is a reliable tool for setting realistic expectations and achieving high levels of patient satisfaction (5-7). We recommend further research with larger, more diverse populations and longer follow-up periods to confirm these findings and further enhance the integration of 3D imaging into esthetic surgery.

Overall, the high level of satisfaction among patients who reported similar or better-than-expected results suggests that 3D imaging is a valuable tool for improving patient satisfaction (8). By providing a realistic preview of potential outcomes, patients may enter the surgery with a clearer understanding of what to expect, which may reduce anxiety and increase overall satisfaction with the results (8-10).

While the study provides valuable information, it has some limitations that should be addressed in future research. The sample size, while adequate, could be expanded to include a more diverse patient population. In addition, follow-up beyond 1 year may provide more information about the stability of results and long-term patient satisfaction.

CONCLUSION

Our study suggests that 3D simulation systems will become increasingly important in surgical practice and that clinics using these systems will become more active in the future.

Ethics

Ethics Committee Approval: The study was approved by the Ondokuz Mayıs University Clinical Research Ethics Committee (approval number: 2024-475, date: 30.10.2024).

Informed Consent: Patients who gave informed consent to participate in the study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: E.S., M.B.G., A.D., Concept: B.G., Design: E.S., M.B.G., A.D., Data Collection or Processing: E.S., M.B.G., A.D., Analysis or Interpretation: E.S., M.B.G., A.D., Literature Search: B.G., Writing: E.S., M.B.G., A.D.

Conflict of Interest: No conflict of interest was declared by the authors.

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