Opinion

Standardization of Marking of the Surgical Borders According to the Fibonacci (Golden) Ratio in Female Genital Aesthetic Surgery: Presentation of a Novel Marking Gadget

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Abstract

The anatomy of the female external genitalia may differ due to developmental or acquired events. However, several anatomical landmarks such as the anterior and posterior commissures, glans clitoridis, and perineal body do not differ across most patients and can be used to evaluate post-surgical tissue symmetry and proportion. Patient preference seems to be subjective; interestingly, however, the desired post-surgical appearance is very similar in itself, almost to the standard in most patients. In addition, surgeons may change the entire process according to their individual aesthetic perceptions and experience. Thus, the outcomes of genital aesthetic surgery may be affected by multiple factors, with patient preference and surgical evaluation and approach appearing to be the most person-dependent. From this perspective, we defined a sticker model for marking the external female genitalia in genital aesthetic surgery. Inspired by the golden ratio, we incorporated the Fibonacci spiral in the stickers.

Keywords: Fibonacci ratio; marking gadget; female genital aesthetic surgery

1. Introduction

With changes in the perception of the human body and beauty, aesthetic surgery has become an important field. During most of this period, genital aesthetic surgery has remained in the background, but the demand for and number of surgeries have taken off in the last two decades. There are many underlying reasons for patient application, but aesthetic concerns and improvement of external genital appearance seem to be the main reasons.

The external genital appearance after genital aesthetic surgery depends on the primary anatomical structure, patient preference, and surgical evaluation. These components primarily determine the surgical approach to be used. However, efforts to standardize genital aesthetic surgery have been ongoing for several years. These involve not only the surgical reconstruction of the organ, but also the scaling of the whole anatomy with the adjacent structures. In this area, the golden ratio presented by Fibonacci has found use, and the Fibonacci sequence has become one of the most well-accepted proportional measurement techniques in this area [1]. In addition, the Fibonacci spiral, conducted in terms of the golden ratio, has become a tool for calculating these measurements on patients.

The anatomy of the female external genitalia may differ due to developmental or acquired events. However, several anatomical landmarks such as the anterior and posterior commissures, glans clitoridis, and perineal body do not differ across most patients and can be used to evaluate post-surgical tissue symmetry and proportion. Patient preference seems to be subjective; interestingly, however, the desired post-surgical appearance is very similar in itself, almost to the standard in most patients. In addition, surgeons may alter the entire process based on their own aesthetic perception and experience. As such, genital aesthetic surgery may be affected by multiple factors, with patient preference and surgical evaluation and approach appearing to be the most person-dependent.

From this perspective, we defined a sticker model for marking the external female genitalia in genital aesthetic surgery. Inspired by the golden ratio, we incorporated the Fibonacci spiral in these stickers.

The aim of our study was to evaluate the proportions of the external genitalia as a whole and establish a standard post-surgical appearance with standard ratios.

2. Materials and Marking Techniques

2.1 Sticker Material

We composed three sizes of stickers (7 × 8.5 cm, 9 × 10.5 cm, and 11 × 12.5 cm) (Fig. 1) which may be used according to external genitalia size. Two types of paper structures were used: The first was a three-layer hard paper that was used as a mold without an adhesive component on the reverse side, while the second was a thin two-layer...
softer paper with an adhesive side. A Fibonacci spiral was printed on the stickers, ensuring that the original ratio remained undisturbed.

Fig. 1. Stickers in different sizes.

2.2 Application of Stickers and Marking

The Fibonacci spiral area which constituted the marking gap was cut from the sticker. The first step was to select the size of the sticker. The sticker was used vertically (Fig. 2, Ref. [2]). The selection was done in the vertical position, whereas the open part of the spiral was directed medially. The size was considered adequate when point A (the medial point of the upper part) was on the clitoris and point B (the lowest point of the spiral) was on the anus. The sticker was then stabilized at this position. The mold type was placed as close as possible to the skin to avoid distance- and angle-related marking mistakes. A thinner sticker would stick to the skin, which was not expected.

After sticker application, the Fibonacci spiral area was dyed with either a surgery-compatible spray dye or medical markers. Marking is easy, painless, and can be performed before or at the start of surgery. The spiral-shaped space was painted with a color spray, and the sticker was removed. At the end, the colored area on the vulva shows the surgical borders in accordance with the Fibonacci spiral (Fig. 3) (Videos 1,2, Ref. [2]). The procedure was then repeated on the other side.

The marked areas show the ideal surgical borders of the vulva. Subsequently, the clitoral, labial, and perineal markings were obtained within the external surgical border. To reduce the margin of error, the borders of the labia minor and labia major were reviewed using three differently colored pens after spray marking (Fig. 4).

Fig. 2. The sticker is used vertically [2]. A: Midpoint of the clitoris; B: Midpoint of the anus. (c: postoperative labia minor widest horizontal length; d: labia major to vaginal introitus horizontal widest length; e: vertical length of the vaginal introitus; f: distance from the apex of the clitoris to the posterior forchette skin fold; g: vertical length of the vaginal introitus from the anterior wall of the vein to the posterior wall of the vagina).

3. Discussion

To the best of our knowledge, this is the first study to present a marking gadget in the genital aesthetics practice. In this study, we present a novel device that can be useful in surgical approaches and the standardization of genital aesthetic surgeries. The initial patient responses were promising. Additionally, the spray is an organic hair spray that does not harm patients. For the sticker molds, we developed three sizes inspired by the molds used in the construction industry; we designed them considering the body mass index.

There are studies classifying genital aesthetic disorders [3], but in many cases, patient concerns and organ-based disorders were discussed. Thus, discussions on surgical approach are limited as organ-based. No studies have evaluated the vulvar anatomy as a whole. In many studies, the surgical margins were determined according to the surgeon’s experience or rule of thumb. Our device is useful for the proportional evaluation of the entire vulva. It is also useful in evaluating the measurement or proportion of one structure, such as the labium minus or majus, as well as that of the vulva. This is very important for several reasons: Firstly, genital aesthetic surgery has become popular, and many patients visit clinics for immediate surgery despite a substantial proportion of these patients having no indications for surgery (Figs. 1,2). Measurements using our device will show the exact proportions of the structures, and patients can thus avoid a potential non-mandatory approach. Second, increasing the surgical rate results in increased revision requirements. We believe that our device will be useful in revision procedures. Moreover, it can also be used to standardize sex reassignment surgeries.
**Fig. 3.** Marking and interpretation of safety/end points. The area bounded by asterisks represents the distance from the most medial to most medial in the horizontal plane ideal labial width. The boundaries with the safety mark coincided with the outermost line of the labia majora and the midpoint of the anus.

**Fig. 4.** Reduction of the margin of error after spray mold marking.

Video 1. Spray sticker mold marking [2]. The embedded movie may also be viewed at https://doi.org/10.31083/j.ceog5105104.

Video 2. After spray sticker mold marking [2]. The embedded movie may also be viewed at https://doi.org/10.31083/j.ceog5105104.

4. Conclusions

In conclusion, there is a gap in the standardization of genital aesthetic surgery. In the whole body, the Fibonacci ratio may be a key proportional standard in the evaluation of the vulva. In light of these, we designed our gadget and believe that it may guide genital aesthetic surgery and reduce intersurgeon variability using a standard approach.

**Author Contributions**

EO and EG designed the research study; EO and EG wrote the manuscript; EO performed the surgery; EO, EG, and NP analyzed the data and statistics; EO, EG, and NP performed the literature search; EO, EG, and NP critically reviewed the study; and NP supervised the final version. All authors contributed to the editorial changes in
the manuscript. All authors participated sufficiently in the work to take public responsibility for appropriate portions of the content and agreed to be accountable for all aspects of the work to ensure that questions are related to its accuracy or integrity. All authors have read and approved the final version of the manuscript.

**Ethics Approval and Consent to Participate**

This opinion was linked with a detailed video demonstration of the research approved by the Batman training and research hospital ethics committee (Decision No: 787, date 24/10/2020) and conducted in accordance with the principles of the Declaration of Helsinki. Informed consent was obtained from every study participant [2].

**Acknowledgment**

We would like to express our gratitude to all those who helped us during the writing of this manuscript. We thank all peer reviewers for their opinions and suggestions.

**Funding**

This research received no external funding.

**Conflict of Interest**

The authors declare no conflicts of interest. Nurullah Peker is a guest editor for this journal. We declare that Nurullah Peker was not involved in the peer review of this article and has no access to information regarding the peer review. Full responsibility for the editorial process of this article was delegated to Michael H. Dahan.

**Supplementary Material**

Supplementary material associated with this article can be found in the online version, at https://doi.org/10.31083/j.ceog5105104.

**References**

