



Surgery of congenital breast asymmetry-which objective parameter influences the subjective satisfaction with long-term results

Vivien Noisser¹ · Andreas Eigenberger^{1,2} · Maximilian Weiherer³ · Stephan Seitz⁴ · Lukas Prantl¹ · Vanessa Brébant¹

Published online: 10 March 2022
© The Author(s) 2022

We would like to thank the authors for their great interest in our study and your engagement with our findings. In the following, we would like to respond to your questions and comments as best as possible.

Our study describes a very rare clinical picture of congenital breast asymmetry. These patients are very young at the time of corrective surgery and usually live with the post-operative result for most of their lives. The aim of our study was to identify objective criteria that have a positive effect on the subjective long-term satisfaction of this special group of patients. Several forms of congenital breast asymmetry were examined, to be able to generate as large a collective as possible, despite the rarity of the clinical picture. Although our study collective of 34 patients is not unusual compared to similar studies of congenital breast asymmetry (Kuzbari et al. [1] $n=30$; Neto et al. [2] $n=35$; Eder et al. [3] $n=28$), the small collective should still be viewed critically, as it allows only limited generalizations [4].

It is interesting to note that in medicine, patients and surgeons may evaluate an outcome as favorable differently [5]. Our study aims to help identify this gap in the context of long-term outcomes in congenital breast asymmetry and consequently provide opportunities to close it. Our

data were mainly gathered through manual measurements, patient-reported outcome measures (Breast QTM), and breast volumetry based on 3D scans (Vectra® H2, Canfield Scientific) [4].

We agree that it would be interesting to investigate the influence of mastopexy and MRP on outcome satisfaction. The patients in our study received either lipofilling or silicone implant therapy, which was applied unilaterally or bilaterally. Furthermore, a number of the patients in the collective underwent breast reduction or mastopexy additionally. A comparison between surgical techniques was not a question of the present study. We focused on post-operative visible or measurable criteria that influence patients' subjective satisfaction. Nevertheless, we would like to thank you for the interesting angle, to connect a corresponding follow-up study on the influence of various surgical techniques on patient satisfaction.

We agree that SN-N is not irrelevant in our study either, but merely did not reveal any significant correlation in our collective. This result is quite remarkable and could be an indication of the aforementioned gap between the assessments of outcome reached by patients and physicians [5]. Other studies have also highlighted the NAC as a particular focus of outcome assessment in patients [6, 7], which underlines the results of our study. Patient and surgeon may have different foci [5]. However, to increase patient satisfaction, to which this study aims to contribute, one should consider the focus of the patient even more. Important consequences for surgery can therefore be derived from our work. We may conclude that a greater focus on the NAC by surgeons leads to greater patient satisfaction in our collective in the long term.

It is true that many factors can influence the long-term satisfaction of patients. We agree that limiting patient satisfaction to areola diameter or mean difference between left and right diameter would not be appropriate and was not the conclusion of our study. We would like to point

✉ Vanessa Brébant
vanessa.brebant@klinik.uni-regensburg.de

¹ University Centre of Plastic, Aesthetic, Hand and Reconstructive Surgery, University Hospital Regensburg, Franz-Josef-Strauß-Allee 11, 93053 Regensburg, Germany

² Faculty of Mechanical Engineering, Ostbayerische Technische Hochschule Regensburg (OTH Regensburg), Regensburg, Germany

³ Regensburg Medical Image Computing (ReMIC), Ostbayerische Technische Hochschule Regensburg (OTH Regensburg), Regensburg, Germany

⁴ Department of Obstetrics and Gynecology, Caritas Hospital St. Josef, University of Regensburg, Regensburg, Germany

out here that an average overall satisfaction of 74% was achieved, which is already a good result overall. This is in part the subject of a further publication. We would like to clarify that our study focuses on quality assurance and improvement and thus aims to contribute to elucidating which details or aspects of an already good result need even greater attention to get even closer to 100% subjective patient satisfaction.

Regarding our methodology, we would like to point out that we used one of the most innovative techniques currently available on the market, the 3D scanning system Vectra® H2 (Canfield Scientific, USA), which is frequently used in the current literature [8–12]. It was particularly interesting that the volume difference calculated by 3D technology had a significant influence on satisfaction with similarity of the breasts. Following this result of our study, we recommend investigating the use of this system in real time during surgery in further studies.

In addition, manual measurements were also recorded in our study. We explicitly point out that these also include the inferior mammary fold, differences in breast width and projection, as well as positioning of the nipple [4]. Although significant correlations were not found for all parameters in our study, we agree that they could exist and recommend analyzing the results in more detail in a multi-center study with a greater number of patients.

Thank you for the reference to the study on Scandinavian women by Sandberg et al. [13]. The results are interesting, but we would like to point out that Sandberg et al. took healthy women without surgery as a collective [13]. In our study, the research refers to patients with congenital breast asymmetry who were examined postoperatively. Because patients with congenital breast asymmetry are explicitly excluded, the results of Sandberg et al. [13] are not transferable to our study. However, it would be an interesting approach for a follow-up study to examine the transferability to our collective.

In summary, the small patient population, among others, must be seen as limitation, but our study still impresses with the use of the most innovative 3D scan technology and the analysis of the post-operative outcome with a focus on the long-term post-operative perspective. We are pleased to be able to contribute to improving long-term outcomes for patients with this rare condition. However, we recommend repeating these initial findings in a multi-center study with a larger population. We would like to thank you for your letter and hope that we have addressed the questions you raised.

Acknowledgements We thank Karolina Müller (Centre for Clinical Trials and Studies, Regensburg, Germany) for her consultation regarding statistical analysis. Furthermore, we would like to thank all our team members who supported this study and drove it forward.

Author contributions VN: conceptualization, data collection, data analysis and interpretation, original draft, and writing of the article. AE: photo editing, critical revision of the manuscript, and final approval. MW: critical revision of the manuscript, data preparation, and final approval. SS: critical revision of the manuscript and final approval. LP: critical revision of the manuscript and final approval. VB: conceptualization, data collection, supervision, critical revision of the manuscript, and final approval.

Funding Open Access funding enabled and organized by Projekt DEAL.

Declarations

Conflict of interest The authors declare that there are no conflicts of interest.

Ethics approval The institutional ethics committee of the University of Regensburg Faculty of Medicine approved this study (approval number: 20-1654-101). All procedures performed in studies involving human participants were in accordance with the ethics standards of the institutional research committee and with the 1964 Helsinki Declaration and its later amendments as well as comparable standards of ethics.

Informed consent Written informed consent was obtained from all individual participants included in the study.

Consent for publication The written consent to use patient photographic documentation and data for publication was obtained from all patients included in this study.

Open Access This article is licensed under a Creative Commons Attribution 4.0 International License, which permits use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons licence, and indicate if changes were made. The images or other third party material in this article are included in the article's Creative Commons licence, unless indicated otherwise in a credit line to the material. If material is not included in the article's Creative Commons licence and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder. To view a copy of this licence, visit <http://creativecommons.org/licenses/by/4.0/>.

References

1. Kuzbari R, Deutinger M, Todoroff BP et al (1993) Surgical treatment of developmental asymmetry of the breast long term results. *Scand J Plast Reconstr Surg Hand Surg* 27:203–207. <https://doi.org/10.3109/02844319309078112>
2. Neto M, Dasilva A, Garcia E et al (2007) Quality of life and self-esteem after breast asymmetry surgery. *Aesthetic Surg J* 27:616–621. <https://doi.org/10.1016/j.asj.2007.09.002>
3. Eder M, Waldenfels FV, Sichtermann M et al (2011) Three-dimensional evaluation of breast contour and volume changes following subpectoral augmentation mammoplasty over 6 months. *J Plast Reconstr Aesthet Surg* 64:1152–1160. <https://doi.org/10.1016/j.bjps.2011.03.037>
4. Noisser V, Eigenberger A, Weiherer M et al (2021) Surgery of congenital breast asymmetry-which objective parameter

- influences the subjective satisfaction with long-term results. *Arch Gynecol Obstet*. <https://doi.org/10.1007/s00404-021-06218-0>
5. Hsia HC, Thomson JG (2003) Differences in breast shape preferences between plastic surgeons and patients seeking breast augmentation. *Plast Reconstr Surg* 112:312–320. <https://doi.org/10.1097/01.PRS.0000066365.12348.A7>
 6. Cai LZ, Paro JAM, Lee GK, Nazerali RS (2018) Where do we look? Assessing gaze patterns in breast reconstructive surgery with eye-tracking technology. *Plast Reconstr Surg* 141:331e–340e. <https://doi.org/10.1097/PRS.0000000000004106>
 7. Pietruski P, Paskal W, Paskal AM et al (2019) Analysis of the visual perception of female breast aesthetics and symmetry: an eye-tracking study. *Plast Reconstr Surg* 144:1257–1266. <https://doi.org/10.1097/PRS.0000000000006292>
 8. Hartmann R, Weiherer M, Schiltz D et al (2020) New aspects in digital breast assessment: further refinement of a method for automated digital anthropometry. *Arch Gynecol Obstet*. <https://doi.org/10.1007/s00404-020-05862-2>
 9. Wesselius TS, Vreeken RD, Verhulst AC et al (2018) New software and breast boundary landmarks to calculate breast volumes from 3D surface images. *Eur J Plast Surg* 41:663–670. <https://doi.org/10.1007/s00238-018-1431-2>
 10. O’Connell RL, Khabra K, Bamber JC et al (2018) Validation of the Vectra XT three-dimensional imaging system for measuring breast volume and symmetry following oncological reconstruction. *Breast Cancer Res Treat* 171:391–398. <https://doi.org/10.1007/s10549-018-4843-6>
 11. Schenck TL, Koban KC, Etzel L et al (2018) Objektivierung von Eingriffen der Brust durch 3D Fotografie und digitaler Volumetrie. *Senologie—zeitschrift für mammadiagnostik und -therapie*. Georg Thieme Verlag KG, p 123
 12. Diaz JF (2017) Review of 494 consecutive breast augmentation patients: system to improve patient outcomes and satisfaction. *Plast Reconstr Surg Glob Open*. <https://doi.org/10.1097/GOX.0000000000001526>
 13. Sandberg LJ, Tønseth KA, Kloster-Jensen K et al (2020) An aesthetic factor priority list of the female breast in scandinavian subjects. *Plast Reconstr Surg Glob Open* 8:e3173. <https://doi.org/10.1097/GOX.0000000000003173>

Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.