Synopsis of study protocol

Sponsor / Sponsor-Investigator	Prof. Dr. Walter Paul Weber
Study Title:	Retrospective international multicenter study comparing polyurethane versus non-polyurethane covered implants in immediate prepectoral implant-based breast reconstruction in the setting of postmastectomy radiotherapy
Short Title / Study ID:	PRExRT
Protocol Version and Date:	Version 1, 25.11.2024
Trial registration:	Clinicaltrials.gov
Study category and Rationale	Retrospective, multicenter Study
Clinical Phase:	Retrospective
Background and Rationale:	Immediate implant-based breast reconstruction (IBBR) in patients receiving radiotherapy (RT) has been associated with a lower quality of life in women with breast cancer, compared to other reconstruction methods or no reconstruction at all. Effective strategies to mitigate RT-induced side effects in IBBR are urgently needed. One of the primary side effects of RT on IBBR is capsular contracture, followed by hematoma, infection, and implant loss. Capsular contracture significantly reduces quality of life in women after IBBR and is routinely monitored during clinical follow-up. Polyurethane (PU)-covered implants have shown a reduced number of myofibroblasts in their capsules, and studies have demonstrated the lowest rates of capsular contracture when using PU-covered implants compared to other implant types. However, there has been no direct comparison between PU and non-PU breast implants in the context of radiotherapy, which is why we have chosen these two study groups. We hypothesize that prepectoral IBBR with a PU-covered implant will result in lower rates of capsular contracture and implant loss in patients undergoing radiotherapy, compared to non-PU implants.
Objective(s):	The aim of this multicenter retrospective cohort study is to assess the impact of radiotherapy on capsular contracture and implant loss rates in breast cancer patients undergoing prepectoral implant-based breast reconstruction (IBBR), comparing polyurethane (PU) and non-PU coated implants.

Outcome(s):	**Primary** • To determine the **capsular contracture rate** in women with IBBR in combination with RT comparing the use of PU with non-PU implants **Secondary** • To determine the **implant loss rate** in women with IBBR in combination with RT comparing the use of PU with non-PU implants • To determine the **re-surgery rate** in women with IBBR in combination with RT comparing the use of PU with non-PU implants • To determine the **hematoma rate** in women with IBBR in combination with RT comparing the use of PU with non-PU implants • To determine the **infection rate** in women with IBBR in combination with RT comparing the use of PU with non-PU implants • To determine the **implant exchange rate** in women with IBBR in combination with RT comparing the use of PU with non-PU implants
Study design:	Retrospective cohort study
Inclusion / Exclusion criteria:	**Inclusion criteria** • Patients with confirmed diagnosis of primary or recurrent breast cancer • Patients undergoing nipple - or skin-sparing mastectomy with prepectoral IBBR (all types of implants, with or without mesh, all types of biologic and synthetic mesh, one- or two-stage) in the setting of PMRT (or any type or RT before reconstruction) between 2016 and 2022. • Patients undergoing two-stage IBBR with radiotherapy to the expander before reconstruction with implant are eligible. • Patients with recurrent breast cancer after breast conserving surgery and radiotherapy are eligible. • Follow up must be at least 2 years after IBBR. **6. Exclusion criteria** • Patients undergoing subpectoral IBBR or autologous reconstruction as initial type of reconstruction. • No radiotherapy.
Measurements and procedures:	All necessary data will be directly entered into REDCap database or a CRF
Study Product / Intervention:	na
Control Intervention (if applicable):	na

Number of Participants with Rationale:	Patients undergoing nipple - or skin-sparing mastectomy with prepectoral IBBR (all types of implants, with or without mesh, all types of biologic and synthetic mesh, one- or two- stage) in the setting of PMRT between 2016 and 2022.
Study Duration:	1 year
Study Schedule:	na
Investigator(s):	**Project Leader:** Prof. Dr. Walter Paul Weber Chief of the Breast Surgery Clinic Breast Surgeon SSO Medical Director Department Breast, Abdomen, Pelvis Universitätsspital Basel Spitalstrasse 21 4031 Basel **Coordinating Projekt Leader:** Prof. Dr. Florian Fitzal Department of Surgery and Comprehensive Cancer Center Medical University of Vienna Spitalgasse 23 1090 Vienna Austria
Study Centre(s):	To be announced
Statistical Considerations:	The data will be descriptively analyzed using adequate statistical measures and plots. The determination of the sample size will be pragmatic and based on the number of patients available at the participating sites.
GCP Statement:	This study will be conducted in compliance with the protocol, the current version of the Declaration of Helsinki, the ICH-GCP guidelines as well as all national legal and regulatory requirements.

The most relevant references:

Sobti N, Weitzman RE, Nealon KP, et al. Evaluation of capsular contracture following immediate prepectoral versus subpectoral direct-to-implant breast reconstruction. Sci Rep. Jan 24 2020;10(1):1137. doi:10.1038/s41598-020-58094-4

Berniz C, Carmona-Torre F, Gomez-Martinez C, Fernendez- Ciriza L, Del Pozo JL, Hontanilla B. Breast Implant Capsule: A Murine Model Comparing Capsular Contracture Susceptibility Among Six Breast Implants Available in the Market. Aesthetic Plast Surg. Oct 2023;47(5):2093-2105. doi:10.1007/s00266-023-03323-0

Bergmann PA, Tamouridis G, Lohmeyer JA, et al. The effect of a bacterial contamination on the formation of capsular contracture with polyurethane breast implants in comparison with textured silicone implants: an animal study. J Plast Reconstr Aesthet Surg. Oct 2014;67(10):1364-70. doi: 10.1016/j.bjps.2014.05.040