Diagnostik und Therapie früher und fortgeschrittener Mammakarzinome

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

FORSCHEN
LEHREN
HEILEN

Onkoplastische und rekonstruktive Mammachirurgie

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

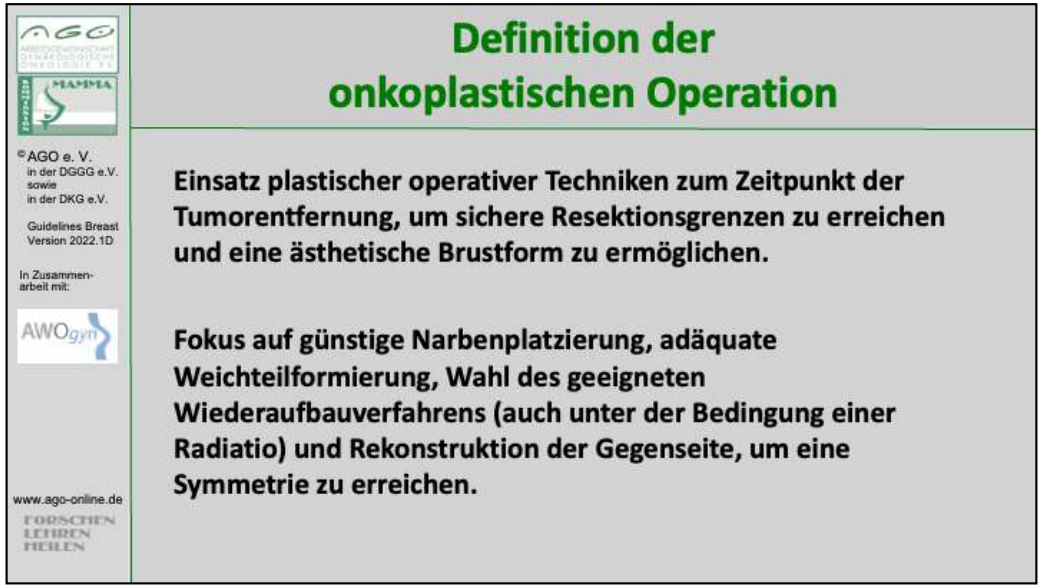
www.ago-online.de

FORSCHEN
LEHREN
HEILEN

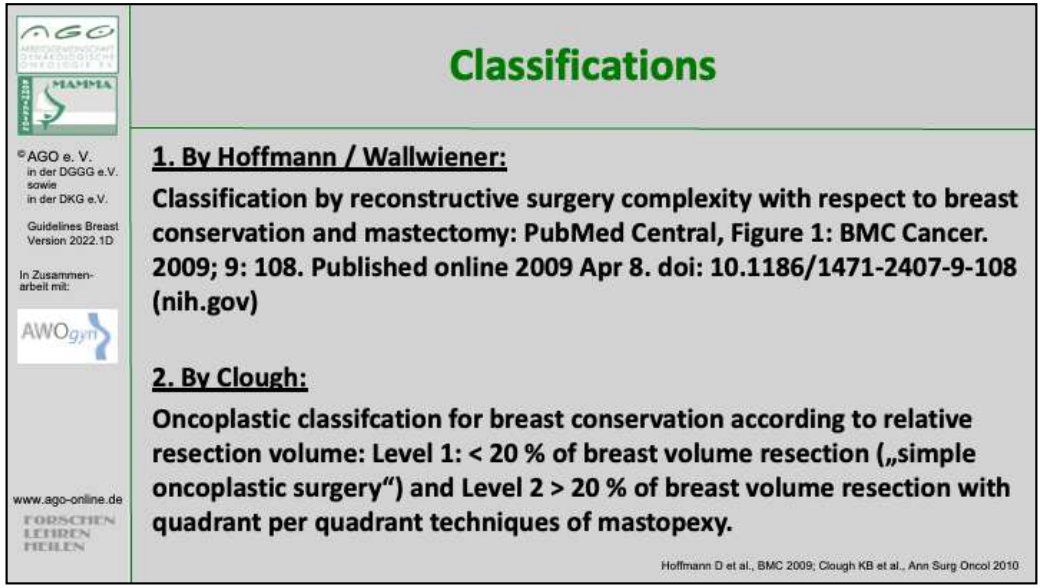
Plastisch-rekonstruktive Aspekte nach Mastektomie

- **Versionen 2002–2021:**
  Audretsch / Bauerfeind / Blohmer / Brunnert / Dall / Ditsch / Fersis / Friedrich/ Gerber / Hanf / Heil / Kühn / Kümmel / Lux / Nitz / Rezai / Rody / Scharl / Solbach / Thill / Thomssen

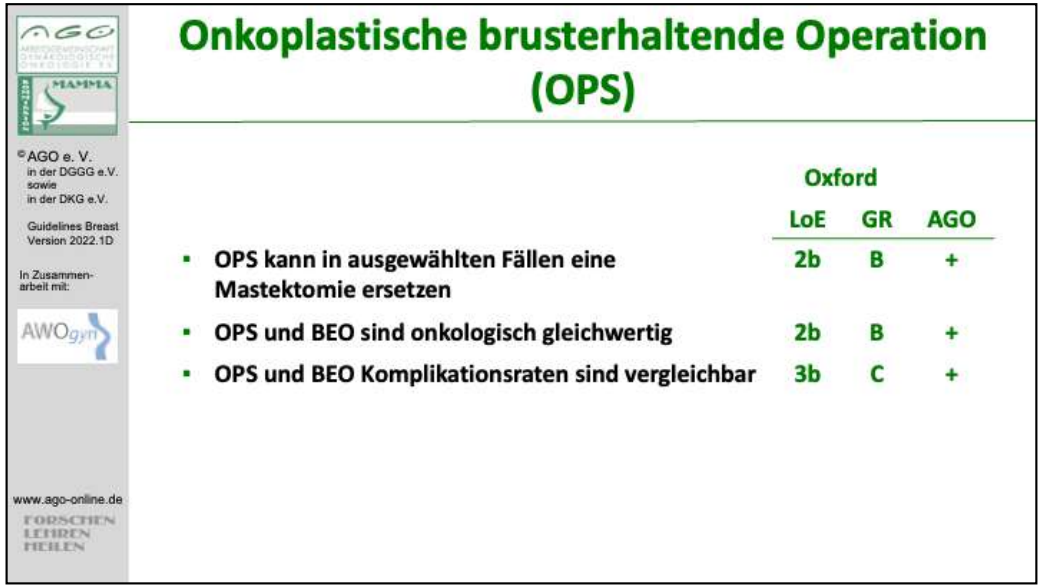
- **Version 2022:**
  Kümmel / Wöckel



1. Abhishek Chatterjee , Jennifer Gass , Krishnabhai Patel et al.; A Consensus Definition and Classification System of Oncoplastic Surgery Developed by the American Society of Breast Surgeons. Ann Surg Oncol. 2019 Oct;26(11):3436-3444.
2. Bertozzi N, et al. Oncoplastic breast surgery: comprehensive review. 2017; 21(11): 2572-2585.
3. Kuerer H et al. Optimizing breast cancer adjuvant radiation and integration of breast and reconstructive surgery. ASCO Educational Book 2017

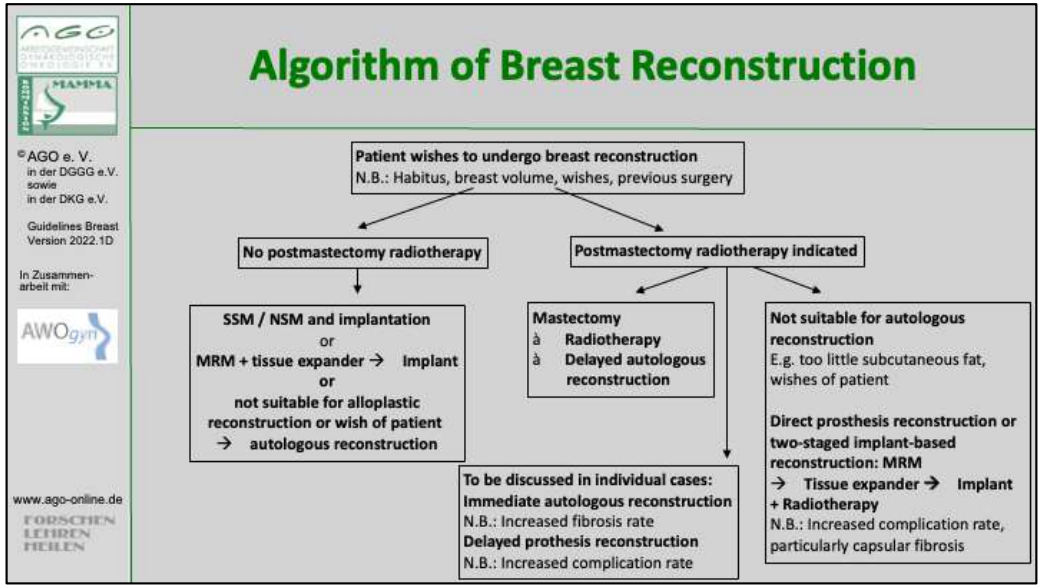


1. Hoffmann D et al Classifying breast cancer surgery: a novel, complexity-based system for oncological, oncoplastic and reconstructive procedures, and proof of principle by analysis of 1225 operations in 1166 patients. BMC Cancer. 2009 Apr 8;9:108. doi: 10.1186/1471-2407-9-108.
2. Clough KB et al Improving breast cancer surgery: a classification and quadrant per quadrant atlas for oncoplastic surgery. Ann Surg Oncol. 2010 May;17(5):1375-91. doi: 10.1245/s10434-009-0792-y. Epub 2010 Feb 6.
3. Weber WP et al First international consensus conference on standardization of oncoplastic breast conserving surgery. Breast Cancer Res Treat. 2017 Aug;165(1):139-149.



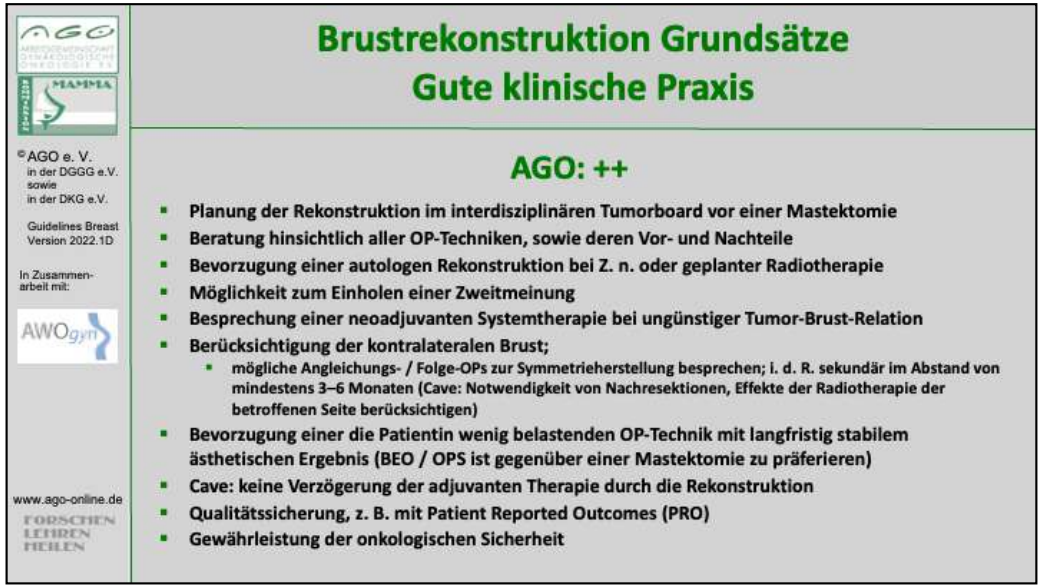
1. Florian Fitzal, Michael Bolliger, Daniela Dunkler Retrospective, Multicenter Analysis Comparing Conventional with Oncoplastic Breast Conserving Surgery: Oncological and Surgical Outcomes in Women with High-Risk Breast Cancer from the OPBC-01/iTOP2 Study. Ann Surg Oncol. 2021 Oct 13. doi: 10.1245/s10434-021-10809-1.
2. Gulcelik MA et al Feasibility of level II oncoplastic techniques in the surgical management of locally advanced breast cancer after neoadjuvant treatment. Int J Clin Pract. 2021 Jan 6;e13987. doi: 10.1111/ijcp.13987.
3. Kosasih S et al Is oncoplastic breast conserving surgery oncologically safe? A meta-analysis of 18,103 patients. Am J Surg. 2020 Aug;220(2):385-392. doi: 10.1016/j.amjsurg.2019.12.019. Epub 2020 Jan 2.
4. Aristokleous I et al Quality of life after oncoplastic breast-conserving surgery: a systematic review. ANZ J Surg. 2019 Jun;89(6):639-646. doi: 10.1111/ans.15097. Epub 2019 Apr 12.
5. Mansell J et al Oncoplastic breast conservation surgery is oncologically safe when compared to wide local excision and mastectomy. Breast. 2017 Apr;32:179-185. doi: 10.1016/j.breast.2017.02.006. Epub 2017 Feb 17.
6. Piper ML et al Outcomes Following Oncoplastic Reduction Mammoplasty: A Systematic Review. Ann

Plast Surg. 2016 May;76 Suppl 3:S222-6. doi: 10.1097/SAP.0000000000000720.
7. Wijgman DJ et al Short term safety of oncoplastic breast conserving surgery for larger tumors. Eur J Surg Oncol. 2017 Apr;43(4):665-671. doi: 10.1016/j.ejso.2016.11.021. Epub 2016 Dec 18.
8. Crown A et al Oncoplastic Breast-Conserving Surgery Reduces Mastectomy and Postoperative Re-excision Rates. Ann Surg Oncol. 2015 Oct;22(10):3363-8. doi: 10.1245/s10434-015-4738-2. Epub 2015 Jul 25.



1. El-Sabawi B, et al. Radiation and breast reconstruction: Algorithmic approach and evidence-based outcomes. J Surg Oncol. 2016; 113(8):906-12
2. Gerber B, et al. Breast Reconstruction Following Cancer Treatment. Dtsch Arztebl Int. 2015; 112(35-36):593-600
3. Kuerer H , et al. Optimizing breast cancer adjuvant radiation and integration of breast and reconstructive surgery. ASCO Educational Book 2017; Memorial Sloan Kettering Cancer Center, Fig. 2 und 3
4. Cordeiro P, et al. What is the optimum timing of postmastectomy radiotherapy in two-stage prosthetic reconstruction: radiation to the tissue expanderor permanent implant? Plast Reconstr Surg. 2015 Jun;135(6):1509-1517. doi: 10.1097/PRS.0000000000001278.PMID: 25742523
5. Bennett KG, Qi J, Kim HM, et al.: Comparison of 2-Year Complication Rates Among Common Techniques for Postmastectomy Breast Reconstruction. JAMA Surg. 2018 Oct 1;153(10):901-908. doi: 10.1001/jamasurg.2018.1687.
6. He WY et al. Complications and Patient-reported Outcomes after TRAM and DIEP Flaps: A Systematic

Review and Meta-analysis. Plast Reconstr Surg Glob Open. 2020 Oct 29;8(10):e3120. doi: 10.1097/GOX.0000000000003120. eCollection 2020 Oct.PMID: 33173667



1. AWMF Leitlinien: S3-LL. Brustrekonstruktion mit Eigengewebe. Registernummer 015 – 075, Stand: 01.04.2015 , gültig bis 31.03.2020?
2. Bertozzi N et al. Oncoplastic breast surgery: comprehensive review. Eur Rev Med Pharmacol Sci. 2017; 21(11):2572-2585.
3. Smith BL et al. Oncologic safety of nipple-sparing mastectomy in women with breast cancer. J Am Coll Surg 2017 Sep;225(3):361-365. doi: 10.1016/j.jamcollsurg.2017.06.013. Epub 2017 Jul 17.PMID: 28728962
4. Colwell AS et al. Nipple-sparing mastectomy and direct to implant breast reconstruction. Plast Reconstr Surg. 2017; 140(5S Advances in Breast Reconstruction):44S-50S.
5. Brice Jabo, Ann C. Lin, Mayada A. Aljehani et al. Impact of Breast Reconstruction on Time to Definitive Surgical Treatment, Adjuvant Therapy, and Breast Cancer Outcomes. Ann Surg Oncol 2018 Oct;25(10):3096-3105.
6. Cordova LZ, Hunter-Smith DJ, Rozen WM. Patient reported outcome measures (PROMs) following mastectomy with breast reconstruction or without reconstruction: a systematic review. Gland Surg 2019;8(4):441-451
7. Khajuria A, Prokopenko M, Greenfield M et al. Meta-analysis of Clinical, Patient-Reported Outcomes

and Cost of DIEP versus Implant-based Breast Reconstruction. Plast Reconstr Surg Glob Open 2019;7:e2486
8. Phan R, Hunter-Smith DJ, Rozen WM. The use of Patient Reported Outcome Measures in assessing patient outcomes when comparing autologous to alloplastic breast reconstruction: a systematic review. Gland Surg 2019;8(4):452-460

Möglichkeiten der Rekonstruktion nach Mastektomie

	Oxford LoE	Oxford GR	AGO
▪ Einsatz von mit Silikongel gefüllten Implantaten einzeitig (primär) oder zweizeitig nach Expander	2a	B	+
▪ Sicherheit vergleichbar mit Kochsalzimplantaten	2b	B	
▪ Autologer Gewebetransfer	2a	B	+
▪ Gestielter Gewebetransfer	2a	B	+
▪ Freier Gewebetransfer (mit Gefäßanastomosen)	2a	B	+
▪ Autologer Gewebetransfer kombiniert mit Implantaten	3a	C	+/-

Cave: BMI > 30, Raucher, Diabetes, Strahlentherapie, Alter, bilaterales ME

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de
FORSCHEN
LEHREN
HEILEN

1. Wilkins EG, et al. Complications in Postmastectomy Breast Reconstruction: One-year Outcomes of the Mastectomy Reconstruction Outcomes Consortium (MROC) Study. Ann Surg. 2018 Jan;267(1):164-170. doi: 10.1097/SLA.0000000000002033.PMID: 27906762
2. Zhu L, et al. Comparison of subcutaneous versus submuscular expander placement in the first stage of immediate breast reconstruction. J Plast Reconstr Aesthet Surg. 2016; 69(4):e77-86.
3. Singh N, et al. Five-Year Safety Data for More than 55,000 Subjects following Breast Implantation: Comparison of Rare Adverse Event Rates with Silicone Implants versus National Norms and Saline Implants. Plast Reconstr Surg. 2017; 140(4):666-679.
4. Potter S et al. Short-term safety outcomes of mastectomy and immediate implant-based breast reconstruction with and without mesh (iBRA): a multicentre, prospective cohort study. Lancet Oncol 2019 Jan 9. pii: S1470-2045(18)30781-2.
5. Porter BE et al. Comparison of Saline Expanders and Air Expanders for Breast Reconstruction. Ann Plast Surg. 2020 Jun;84(6S Suppl 5):S396-S400. doi: 10.1097/SAP.0000000000002154.PMID: 31868761

1. Jagsi R et al. Complications After Mastectomy and Immediate Breast Reconstruction for Breast Cancer: A Claims-Based Analysis. Ann Surg. 2016; 263(2):219-27.
2. Maione L et al. What Is the Optimum Timing of Postmastectomy Radiotherapy in Two-Stage Prosthetic Reconstruction: Radiation to the Tissue Expander or Permanent Implant? Plast Reconstr Surg. 2016; 138(1):150e-1e.
3. Ribuffo D et al. Comparison of Delayed and Immediate Tissue Expander Breast Reconstruction in the Setting of Postmastectomy Radiation Therapy. Ann Plast Surg. 2016; 76(6):743-4.
4. Sharpe SM et al. Impact of bilateral versus unilateral mastectomy on short term outcomes and adjuvant therapy, 2003–2010: a report from the National Cancer Data Base. Ann Surg Oncol. 2014; 21:2920–7.
5. Zhong T et al. A Comparison of Surgical Complications Between Immediate Breast Reconstruction and Mastectomy: The Impact on Delivery of Chemotherapy-An Analysis of 391 Procedures. Ann Surg Oncol. 2012; 19(2):560-6.
6. D'Souza N et al. Immediate versus delayed reconstruction following surgery for breast cancer. Cochrane Database Syst Rev. 2011; (7):CD008674.
7. Srinivasa DR et al. Direct to implant versus two stage tissue expander/implant reconstruction: 2 year

risks and patient reported outcomes from a prospective, multicenter study. Plast Reconstr Surg. 2017; 140(5):869-877.
8. Negenborn VL, Young-Afat DA, Dikmans REG et al: Quality of life and patient satisfaction after one-stage implant-based breast reconstruction with an acellular dermal matrix versus two-stage breast reconstruction (BRIOS): primary outcome of a randomised, controlled trial. Lancet Oncol 2018 Sep;19(9):1205-1214.

Zeitpunkt der Rekonstruktion mit Implantaten in Bezug zur Strahlentherapie

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

FORSCHEN
LEHREN
HEILEN

	Oxford		
	LoE	GR	AGO
▪ Implantat-Rekonstruktion (IR)	2a	B	+
▪ IR ohne Strahlentherapie (RT)	2a	B	++
▪ IR vor RT	2a	B	+
▪ IR nach RT	2b	B	+/-
▪ IR nach sekundärer Mastektomie nach BET	2a	B	+/-
▪ Perioperative antibiotische Prophylaxe (max. 24 Stunden)	2a	B	+

Radiation:

1. Santosa KB et al. Postmastectomy Radiation Therapy and Two-Stage Implant-Based Breast Reconstruction: Is There a Better Time to Irradiate? Plast Reconstr Surg. 2016; 138(4):761-9.
2. Maione L et al. What Is the Optimum Timing of Postmastectomy Radiotherapy in Two-Stage Prosthetic Reconstruction: Radiation to the Tissue Expander or Permanent Implant? Plast Reconstr Surg. 2016; 138(1):150e-1e.
3. El-Sabawi B et al. Radiation and breast reconstruction: Algorithmic approach and evidence-based outcomes. J Surg Oncol. 2016; 113(8):906-12.
4. Lee KT, Mun GH. Prosthetic breast reconstruction in previously irradiated breasts: A meta-analysis. J Surg Oncol. 2015; 112(5):468-75.
5. Albornoz CR et al. Implant breast reconstruction and radiation: a multicenter analysis of long-term health-related quality of life and satisfaction. Ann Surg Oncol. 2014; 21(7):2159-64.
6. Valdatta L et al. Acellular dermal matrices and radiotherapy in breast reconstruction: a systematic review and meta-analysis of the literature. Plast Surg Int. 2014; 472604.
7. Kkelley BP et al. A systematic review of morbidity associated with autologous breast reconstruction before and after exposure to radiotherapy: are current practices ideal? Ann Surg Oncol. 2014;

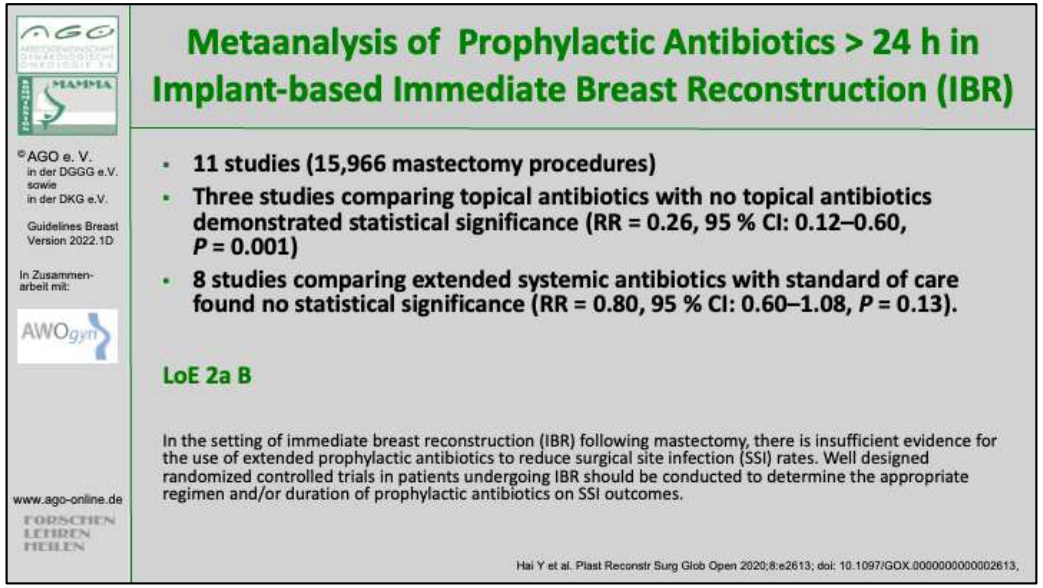
21(5):1732-8.
8. Berbers J et al. Reconstruction: before or after postmastectomy radiotherapy? A systematic review of the literature. Eur J Cancer. 2014; 50(16):2752-62.
9. Eriksson M et al. Radiotherapy in implant-based immediate breast reconstruction: risk factors, surgical outcomes, and patient-reported outcome measures in a large Swedish multicenter cohort. Breast Cancer Res Treat. 2013; 142(3):591-601.
10. Momoh AO et al. Delayed autologous breast reconstruction after postmastectomy radiation therapy: is there an optimal time? Ann Plast Surg. 2012; 69(1):14-8.
11. Mirzabeigi MN et al. Extended trimethoprim/sulfamethoxazole prophylaxis for implant reconstruction in the previously irradiated chest wall. Plast Reconstr Surg. 2012; 129(1):1e-7e.
12. Barry M, Kell MR. Radiotherapy and breast reconstruction: a meta-analysis. Breast Cancer Res Treat. 2011; 127(1):15-22.
13. Magill LJ et al. Determining the outcomes of post-mastectomy radiation therapy delivered to the definitive implant in patients undergoing one- and two-stage implant-based breast reconstruction: A systematic review and meta-analysis. J Plast Reconstr Aesthet Surg. 2017; 70(10):1329-1335.
14. Jagsi R et al. Impact of Radiotherapy on Complications and Patient-Reported Outcomes After Breast Reconstruction. J Natl Cancer Inst. 2018; 110(2).
15. Batenburg MCT et al. on behalf of the UMBRELLA study group. Patient-reported cosmetic satisfaction and the long-term association with quality of life in irradiated breast cancer patients. Breast Cancer Research and Treatment https://doi.org/10.1007/s10549-019-05470-y

<u>Prophylactic antibiotics:</u>

1. Phillips BT, Halvorson EG. Antibiotic Prophylaxis following Implant-Based Breast Reconstruction: What Is the Evidence? Plast Reconstr Surg. 2016; 138(4):751-7.
2. Hunter JG. Discussion: Antibiotic Prophylaxis following Implant-Based Breast Reconstruction: What Is the Evidence? Plast Reconstr Surg. 2016; 138(4):758-9.
3. Phillips BT, et al. Prophylactic Postoperative Antibiotics Necessary for Immediate Breast Reconstruction? Results of a Prospective Randomized Clinical Trial. J Am Coll Surg. 2016; 222(6):1116-24.
4. Townley WA, et al. single pre-operative antibiotic dose is as effective as continued antibiotic prophylaxis in implant-

based breast reconstruction: A matched cohort study. J Plast Reconstr Aesthet Surg. 2015; 68(5):673-8.

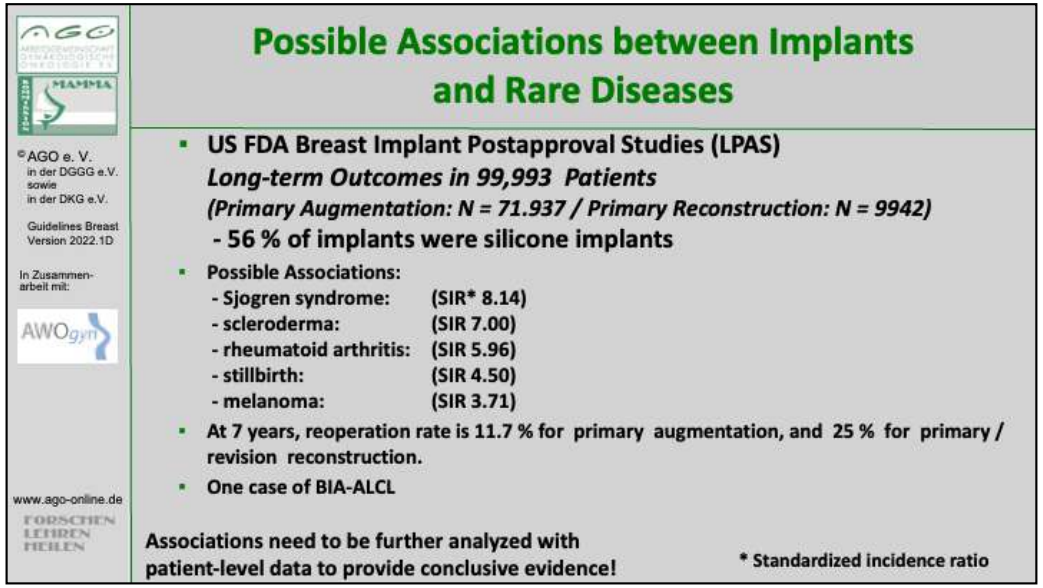
5. Hai Y, Chong W, Lazar MA. Extended Prophylactic Antibiotics for Mastectomy with Immediate Breast Reconstruction: A Meta-analysis. Plast Reconstr Surg Glob Open. 2020 Jan 27;8(1):e2613. doi: 10.1097/GOX.0000000000002613. eCollection 2020 Jan.PMID: 32095414
6. Yamin, Feras; Nouri, Andrew; McAuliffe, Phoebe BA et al.; Routine Postoperative Antibiotics After Tissue Expander Placement Postmastectomy Does Not Improve Outcome. Annals of Plastic Surgery:July 2021 - Volume 87 - Issue 1s - p S28-S30



1. Hai Y, Chong W, Lazar MA. Extended Prophylactic Antibiotics for Mastectomy with Immediate Breast Reconstruction: A Meta-analysis. Plast Reconstr Surg Glob Open. 2020 Jan 27;8(1):e2613. doi: 10.1097/GOX.0000000000002613. eCollection 2020 Jan.PMID: 32095414

1. Magill LJ et al. Determining the outcomes of post-mastectomy radiation therapy delivered to the definitive implant in patients undergoing one- and two-stage implant-based breast reconstruction: A systematic review and meta-analysis. J Plast Reconstr Aesthet Surg. 2017; 70(10):1329-1335.
2. Jagsi R et al. Impact of Radiotherapy on Complications and Patient-Reported Outcomes After Breast Reconstruction. J Natl Cancer Inst. 2018; 110(2).
3. Sinnott CJ et al. Impact of Postmastectomy Radiation Therapy in Prepectoral Versus Subpectoral Implant-Based Breast Reconstruction. Ann Surg Oncol 2018 Oct;25(10):2899-2908
4. Naoum GE, Salama L, Niemierko A, et al. Single Stage Direct-to-Implant Breast Reconstruction Has Lower Complication Rates Than Tissue Expander and Implant and Comparable Rates to Autologous Reconstruction in Patients Receiving Postmastectomy Radiation. Int J Radiat Oncol Biol Phys. 2020 Mar 1;106(3):514-524. doi: 10.1016/j.ijrobp.2019.11.008. Epub 2019 Nov 19.PMID: 31756414
5. J et al. Determining the outcomes of post-mastectomy radiation therapy delivered to the definitive implant in patients undergoing one- and two-stage implant-based breast reconstruction: A systematic review and meta-analysis. J Plast Reconstr Aesthet Surg. 2017; 70(10):1329-1335.
6. Jagsi R et al. Impact of Radiotherapy on Complications and Patient-Reported Outcomes After Breast Reconstruction. J Natl Cancer Inst. 2018; 110(2).

7. Sinnott CJ et al. Impact of Postmastectomy Radiation Therapy in Prepectoral Versus Subpectoral Implant-Based Breast Reconstruction. Ann Surg Oncol 2018 Oct;25(10):2899-2908
8. Naoum GE, Salama L, Niemierko A, et al. Single Stage Direct-to-Implant Breast Reconstruction Has Lower Complication Rates Than Tissue Expander and Implant and Comparable Rates to Autologous Reconstruction in Patients Receiving Postmastectomy Radiation. Int J Radiat Oncol Biol Phys. 2020 Mar 1;106(3):514-524. doi: 10.1016/j.ijrobp.2019.11.008. Epub 2019 Nov 19.PMID: 31756414
9. Dong-YunKim, EonjuPark, Chan YeongHeo et al.; Influence of Hypofractionated Versus Conventional Fractionated Postmastectomy Radiation Therapy in Breast Cancer Patients With Reconstruction. In press https://doi.org/10.1016/j.ijrobp.2021.09.031



Statistical Analysis:

LPAS data is expressed relative to normative population rates using standardized incidence ratios (SIRs)

Systemic harm rates in the study population are calculated per 10,000 person-years.

Normative population rates for systemic harms, self-harm, and reproductive outcomes are obtained from the literature; rates reflect LPAS demographics for female sex, age, and race in the United States.

1. Coroneos CJ et al. US FDA Breast Implant Postapproval Studies: Long-term Outcomes in 99,993 Patients. Ann Surg 2019 Jan;269(1):30-36.

Possible Associations between Implants and Rare Diseases

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

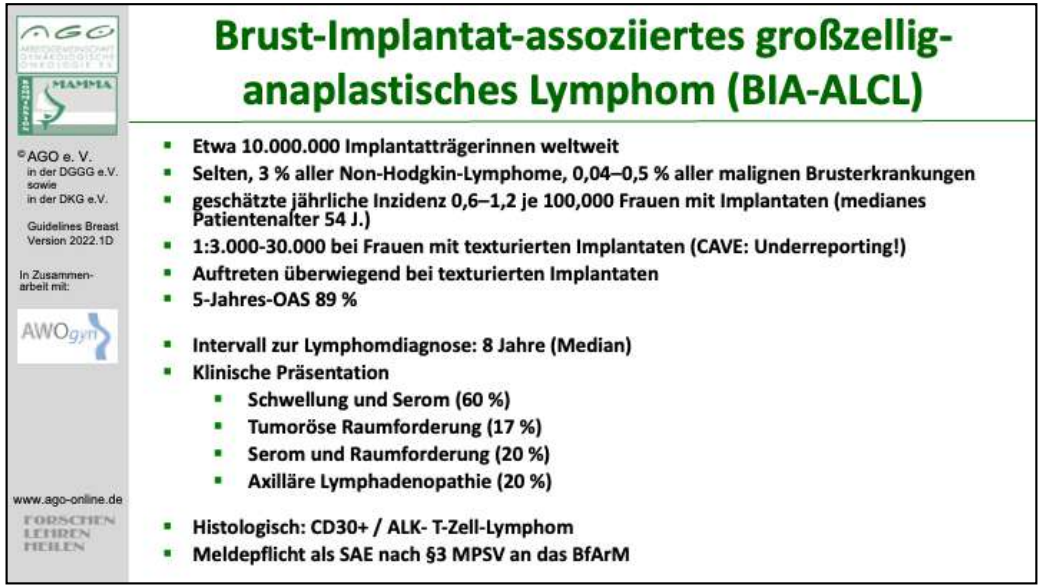
FORSCHEN
LEHREN
HEILEN

Rare Systemic Harms Compared With the General Population:

	Manufacturer	Study Events	Study Event Rate (Per 10,000 Person Yr)	General Population Event Rate (Per 10,000 Person Yr)	SIR	SIR 95% CI	P Value
Fibromyalgia	Allergan	9	1.8	112.8	0.02	0.01–0.03	< 0.001
	Mentor	307	28.4	112.8	0.25	0.22–0.28	< 0.001
Rheumatoid arthritis	Allergan	4	0.8	5.4	0.15	0.04–0.38	< 0.001
	Mentor	349	32.2	5.4	5.96	5.35–6.62	< 0.001
Scleroderma	Mentor	46	4.2	0.6	7.00	5.12–9.34	< 0.001
Sjogren syndrome	Mentor	62	5.7	0.7	8.14	6.24–10.44	< 0.001
Systemic lupus erythematosus	Allergan	3	0.6	5.4	0.11	0.02–0.32	< 0.001
	Mentor	66	6.0	5.4	1.11	0.86–1.41	0.398
Cancer	Allergan	80	16.0	41.3	0.39	0.31–0.48	< 0.001
	Mentor	532	63.8	41.3	1.54	1.42–1.68	< 0.001
Breast cancer	Mentor	116	13.9	12.5	1.11	0.92–1.33	0.26
Lung cancer	Mentor	5	0.6	5.2	0.12	0.04–0.27	< 0.001
Brain cancer	Mentor	3	0.4	0.6	0.67	0.14–1.95	0.639
Melanoma	Mentor	65	7.8	2.1	3.71	2.87–4.73	< 0.001
Neurological disorder	Allergan	18	3.6	22.5	0.16	0.09–0.25	< 0.001
	Mentor	394	35.8	22.5	1.59	1.44–1.76	< 0.001
Multiple sclerosis	Mentor	47	4.3	2.5	1.72	1.26–2.29	0.001
Myositis	Mentor	17	1.5	0.8	1.88	1.09–3.00	0.018

Allergan follow-up 2 years
Mentor follow-up 7 years

1. Coroneos CJ et al. US FDA Breast Implant Postapproval Studies: Long-term Outcomes in 99,993 Patients. Ann Surg 2019 Jan;269(1):30-36.



Reviews

1. Kim, B., Predmore, Z. S., Mattke, S., et al. (2015). Breast Implant-associated Anaplastic Large Cell Lymphoma: Updated Results from a Structured Expert Consultation Process. Plast Reconstr Surg Glob Open. 2015 Feb 6;3(1):e296. doi: 10.1097/GOX.0000000000000268. eCollection 2015 Jan.PMID: 25674377
2. Eaves F, Nahai F. Anaplastic large cell lymphoma and breast implants: FDA report. Aesthetic Surgery Journal 2011; 31(4), 467–468. http://doi.org/10.1177/1090820X11407872
3. Rupani A et al. Lymphomas Associated with Breast Implants: A Review of the Literature. Aesthetic Surgery Journal 2015;35(5), 533–544. http://doi.org/10.1093/asj/sjv016
4. Clemens MW and Miranda RN. Commentary on: Lymphomas Associated With Breast Implants: A Review of the Literature. Aesthetic Surgery Journal 2015;35(5), 545–547. http://doi.org/10.1093/asj/sjv056
5. Gidengil CA et al. Breast implant-associated anaplastic large cell lymphoma: a systematic review. Plast Reconstr Surg 2015;135(3), 713–720. http://doi.org/10.1097/PRS.0000000000001037
6. Brody GS et al. Anaplastic large cell lymphoma occurring in women with breast implants: analysis of 173 cases. Plast Reconstr Surg 2015; 135(3), 695–705.

http://doi.org/10.1097/PRS.0000000000001033
7. Miranda RN et al. Breast implant-associated anaplastic large-cell lymphoma: long-term follow-up of 60 patients. Journal of Clinical Oncology 2014;32(2), 114–120. http://doi.org/10.1200/JCO.2013.52.7911
8. Blohmer JU, Sinn HP. Zum möglichen Zusammenhang von Brustsilikonimplantatenn und dem Auftreten von Lymphomen. 243rd Statement by the German Society of Gynecology and Obstetrics (DGGG) in Response to the call for Data on the Safety of PIP Silicone Breast Implants and the Possible Association between Breast Implants and ALCL by the Scientific Committee on Health, Environmental and Emerging Risks (SCHEER) of the European Commission. Geburtshilfe Frauenheilkd 2017; 77(06):617, doi:10.1055/s-0043-106280.
9. Leberfinger AN et al. JAMA Surg.Breast Implant-Associated Anaplastic Large Cell Lymphoma: A Systematic Review 2017;152(12):1161-1168. doi: 10.1001/jamasurg.2017.4026.
10. Kricheldorff J, Fallenberg EM, Solbach C et al. Breast Implant-Associated Lymphoma. Dtsch Arztebl Int. 2018;115(38):628-635. doi: 10.3238/arztebl.2018.0628.
11. Quesada AE, Medeiros LJ, Clemens MW, et al. Breast implant-associated anaplastic large cell lymphoma: a review. Mod Pathol. 2019 Feb;32(2):166-188. doi: 10.1038/s41379-018-0134-3. Epub 2018 Sep 11.PMID: 30206414
12. Cordeiro PG, Ghione P, Ni A, et al. Risk of breast implant associated anaplastic large cell lymphoma (BIA-ALCL) in a cohort of 3546 women prospectively followed long term after reconstruction with textured breast implants. J Plast Reconstr Aesthet Surg. 2020 May;73(5):841-846. doi: 10.1016/j.bjps.2019.11.064. Epub 2020 Jan 20.PMID: 32008941
13. Clemens MW, Jacobsen ED, Horwitz SM. 2019 NCCN Consensus Guidelines on the Diagnosis and Treatment of BreastImplant-Associated Anaplastic Large Cell Lymphoma (BIA-ALCL). Aesthet Surg J. 2019 Jan 31;39(Suppl_1):S3-S13. doi: 10.1093/asj/sjy331.PMID: 30715173
14. BfArm recommendations https://www.bfarm.de/SharedDocs/Risikoinformationen/Medizinprodukte/DE/Brustimplantate_ALCL_FDA.html (access 30.01.2021)

BIA-ALCL - Implantatoberflächen

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammen-
arbeit mit:

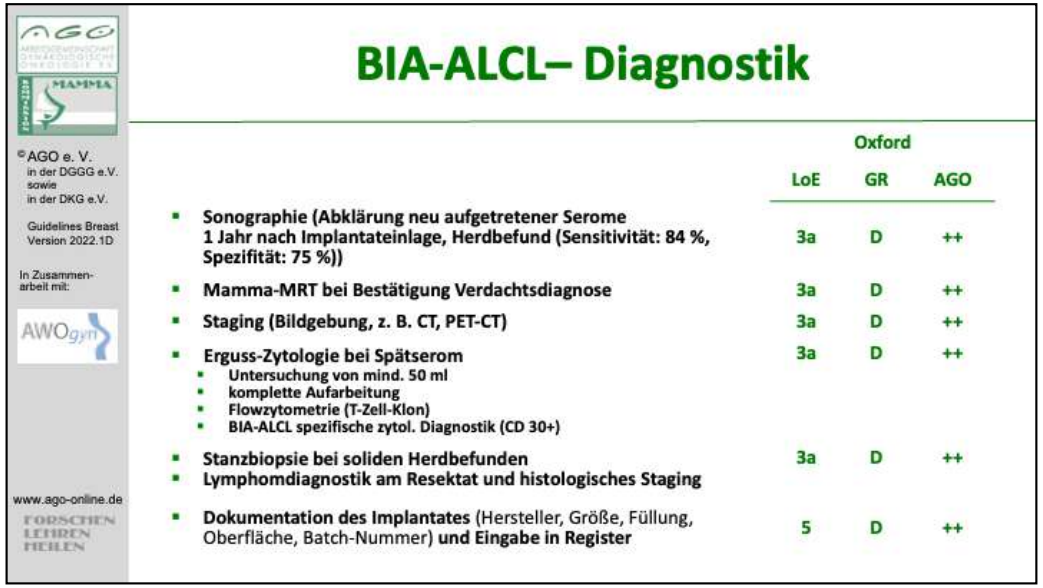
www.ago-online.de

FORSCHEN
LEHREN
HEILEN

- The cause of BIA-ALCL is not established; however, it has been proposed that lymphomagenesis may be driven by a chronic inflammatory reaction induced by capsule contents or surface. **The risk for BIA-ALCL has been shown to be significantly higher for implants with grade 3 and 4 surfaces.**

Process	Polyurethane foam	Salt Loss (Biocell/ Eurosilicone)	Gas Diffusion	Salt Loss (Nagotex)	Imprinting	Smooth/ Nano
Surface Area	high	intermediate	intermediate	low	low	minimal
Roughness	high	intermediate	low	low	low	minimal
SURFACE TYPE	4	3	3	2	2	1

1. Jones P, Mempin M, Hu H et al. The functional influence of breast implant outer shell morphology on bacterial attachment and growth. Plast Reconstr Surg. 2018;142:837–849
2. Collett DJ, Rakhorst H, Lennox P et al.: Current Risk Estimate of Breast Implant-Associated Anaplastic Large Cell Lymphoma in Textured Breast Implants. Plast Reconstr Surg. 2019 Mar;143(3S A Review of Breast Implant-Associated Anaplastic Large Cell Lymphoma):30S-40S. doi: 10.1097/PRS.0000000000005567.
3. Wiley J. Histopathology 2019: 75, 787–796.
4. Loch-Wilkinson A et al. Breast Implant-Associated Anaplastic Large Cell Lymphoma in Australia: A Longitudinal Study of Implant and Other Related Risk Factors. Aesthet Surg J. 2020 Jul 13;40(8):838-846. doi: 10.1093/asj/sjz333.PMID: 31738381© 2019 The American Society for Aesthetic Plastic Surgery, Inc. Reprints and permission: journals.permissions@oup.com



© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

FORSCHEN
LEHREN
HEILEN

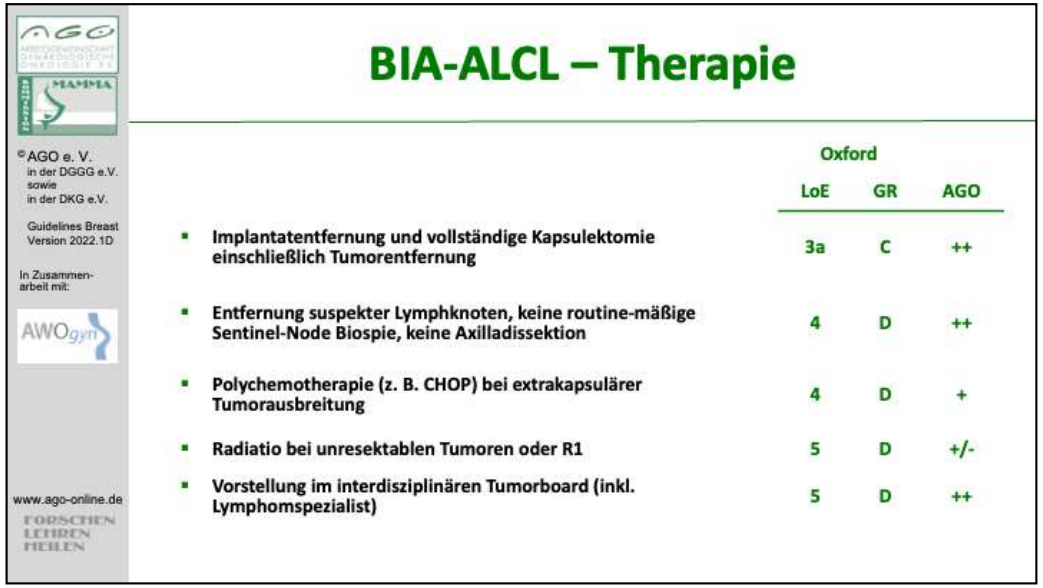
BIA-ALCL– Diagnostik

	Oxford		
	LoE	GR	AGO
▪ **Sonographie (Abklärung neu aufgetretener Serome 1 Jahr nach Implantateinlage, Herdbefund (Sensitivität: 84 %, Spezifität: 75 %))**	3a	D	++
▪ **Mamma-MRT bei Bestätigung Verdachtsdiagnose**	3a	D	++
▪ **Staging (Bildgebung, z. B. CT, PET-CT)**	3a	D	++
▪ **Erguss-Zytologie bei Spätserom** ▪ **Untersuchung von mind. 50 ml** ▪ **komplette Aufarbeitung** ▪ **Flowzytometrie (T-Zell-Klon)** ▪ **BIA-ALCL spezifische zytol. Diagnostik (CD 30+)**	3a	D	++
▪ **Stanzbiopsie bei soliden Herdbefunden** ▪ **Lymphomdiagnostik am Resektat und histologisches Staging**	3a	D	++
▪ **Dokumentation des Implantates** (Hersteller, Größe, Füllung, Oberfläche, Batch-Nummer) **und Eingabe in Register**	5	D	++

1. Clemens MW et al. Complete Surgical Excision Is Essential for the Management of Patients With Breast Implant-Associated Anaplastic Large-Cell Lymphoma. Journal of Clinical Oncology 2016;34(2), 160–168. http://doi.org/10.1200/JCO.2015.63.3412
2. Laurent C et al. Breast implant-associated anaplastic large cell lymphoma: two distinct clinicopathological variants with different outcomes. Annals of Oncology 2016;27(2), 306–314. http://doi.org/10.1093/annonc/mdv575
3. Hoda S et al. Breast implant-associated anaplastic large cell lymphoma. International Journal of Surgical Pathology, 23(3), 209–210. http://doi.org/10.1177/1066896915576406
4. Weathers WM et al. Implant-associated anaplastic large cell lymphoma of the breast: Insight into a poorly understood disease. The Canadian Journal of Plastic Surgery 2013;21(2), 95–98.
5. Granados R et al. Cytological Diagnosis of Bilateral Breast Implant-Associated Lymphoma of the ALK-Negative Anaplastic Large-Cell Type. Clinical Implications of Peri-Implant Breast Seroma Cytological Reporting. Diagnostic Cytopathology 2016;44(7), 623–627. http://doi.org/10.1002/dc.23485
6. Talagas M et al. Breast implant-associated anaplastic large-cell lymphoma can be a diagnostic challenge for pathologists. Acta Cytol 2014;58(1), 103–107. http://doi.org/10.1159/000355861
7. Clemens MW, Jacobsen ED, Horwitz SM. 2019 NCCN Consensus Guidelines on the Diagnosis and

Treatment of Breast Implant-Associated Anaplastic Large Cell Lymphoma (BIA-ALCL). Aesthet Surg J. 2019 Jan 31;39(Supplement_1):S3-S13.

8. Cardoso MJ, Wyld L, Rubio IT, et al EUSOMA position regarding breast implant associated anaplastic large cell lymphoma (BIA-ALCL) and the use of textured implants. Breast. 2019 Apr;44:90-93. doi: 10.1016/j.breast.2019.01.011.
9. NCCN Consensus Guidelines 1.2021, Breast Implant-Asociated Anaplastic Large Cell Lymphoma.
10. Cordeiro PG et al. Risk of breast implant associated anaplastic large cell lymphoma (BIA-ALCL) in a cohort of 3546 women prospectively followed long term after reconstruction with textured breast implants. J Plast Reconstr Aesthet Surg. 2020 May;73(5):841-846. doi: 10.1016/j.bjps.2019.11.064. PMID: 32008941



BIA-ALCL – Therapie

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

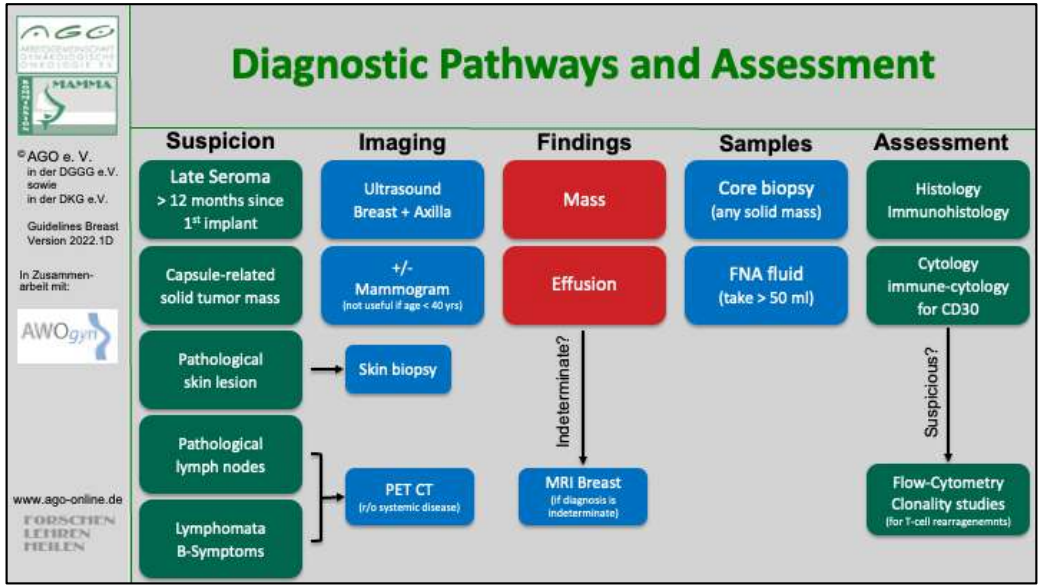
www.ago-online.de

FORSCHEN
LEHREN
HEILEN

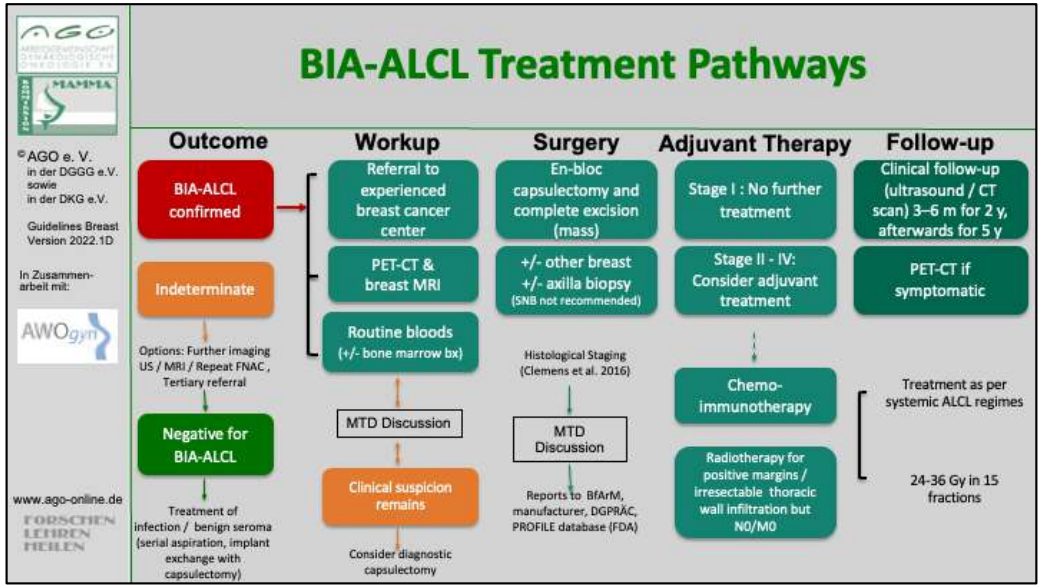
	Oxford LoE	Oxford GR	Oxford AGO
Implantatentfernung und vollständige Kapsulektomie einschließlich Tumorentfernung	3a	C	++
Entfernung suspekter Lymphknoten, keine routine-mäßige Sentinel-Node Biospie, keine Axilladissektion	4	D	++
Polychemotherapie (z. B. CHOP) bei extrakapsulärer Tumorausbreitung	4	D	+
Radiatio bei unresektablen Tumoren oder R1	5	D	+/-
Vorstellung im interdisziplinären Tumorboard (inkl. Lymphomspezialist)	5	D	++

1. Clemens MW et al. Complete Surgical Excision Is Essential for the Management of Patients With Breast Implant-Associated Anaplastic Large-Cell Lymphoma. Journal of Clinical Oncology 2016;34(2), 160–168. http://doi.org/10.1200/JCO.2015.63.3412
2. Gidengil CA et al. Breast implant-associated anaplastic large cell lymphoma: a systematic review. Plast Reconstr Surg 2015;135(3), 713–720. http://doi.org/10.1097/PRS.0000000000001037
3. Kim B et al. Breast Implant-associated Anaplastic Large Cell Lymphoma: Updated Results from a Structured Expert Consultation Process. Plastic and Reconstructive Surgery Global Open 2015;3(1), e296. http://doi.org/10.1097/GOX.0000000000000268.
4. Johnson L et al. Breast implant associated anaplastic large cell lymphoma: The UK experience. Recommendations on its management and implications for informed consent. Eu J Surg Oncol. 2017;43:1393-1401. doi: 10.1016/j.ejso.2017.05.004. Epub 2017 May 18.
5. Mehta-Shah N et al. How I treat breast implant-associated anaplastic large cell lymphoma. Blood, 2018;132(18):1889-1898. doi: 10.1182/blood-2018-03-785972.
6. Horwitz SM et a. NCCN guidelines insights: non-Hodgkin’s lymphomas, version 2.2018. J Natl Compr Canc Netw. 2018;16(2):123-135. doi: 10.6004/jnccn.2018.0007.
7. NCCN Consensus Guidelines 1.2021, Breast Implant-Asociated Anaplastic Large Cell Lymphoma.

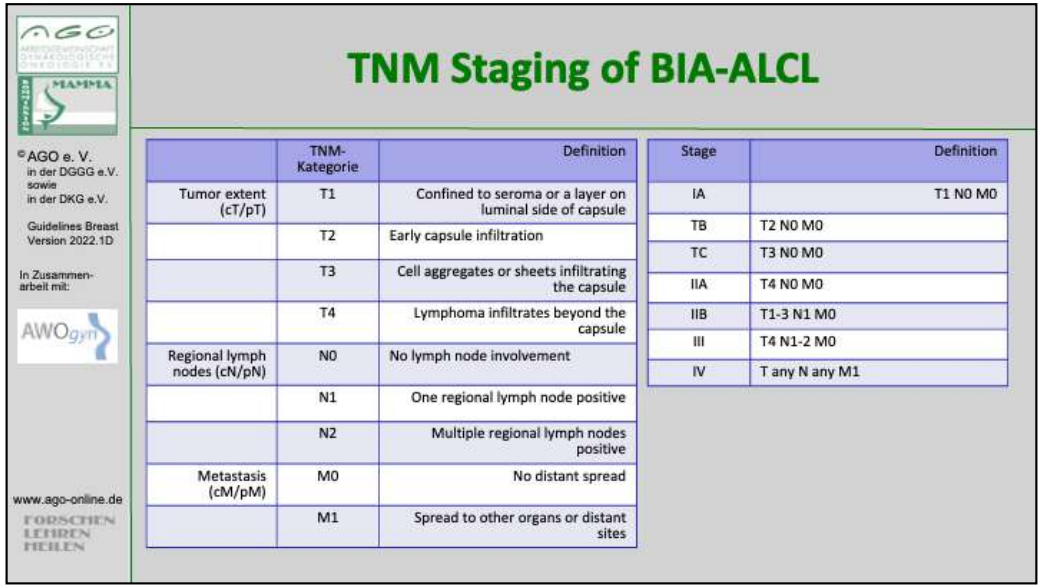
8. Clemens MW et al. 2019 NCCN Consensus Guidelines on the Diagnosis and Treatment of BreastImplant-Associated Anaplastic Large Cell Lymphoma (BIA-ALCL). Aesthet Surg J. 2019 Jan 31;39(Suppl_1):S3-S13. doi: 10.1093/asj/sjy331.PMID: 30715173
9. DeCoster RC, Lynch EB, Bonaroti AR, et al. Breast Implant-associated Anaplastic Large Cell Lymphoma: An Evidence-based Systematic Review. Ann Surg. 2021 Mar 1;273(3):449-458.



1. Turton P, El-Sharkawi D, Lyburn I, et al. UK Guidelines on the Diagnosis and Treatment of Breast Implant-Associated Anaplastic Large Cell Lymphoma (BIA-ALCL) on behalf of the Medicines and Healthcare products Regulatory Agency (MHRA) Plastic, Reconstructive and Aesthetic Surgery Expert Advisory Group (PRASEAG). *Eur J Surg Oncol*. December 2020. doi:10.1016/j.ejso.2020.07.043.
2. Kricheldorff J, Fallenberg EM, Solbach C, Gerber-Schäfer C, Rancsó C, Fritschen UV. Brustimplantat-assoziiertes Lymphom. *Deutsches Ärzteblatt international*. 2018;115(38):628-635. doi:10.3238/arztebl.2018.0628.
3. NCCN Guidelines Version 1.2020 Breast implant-associated ALCL, https://biaalcl.com/wp-content/uploads/NCCN-Guidelines-January-2020.pdf



1. Turton P, El-Sharkawi D, Lyburn I, et al. UK Guidelines on the Diagnosis and Treatment of Breast Implant-Associated Anaplastic Large Cell Lymphoma (BIA-ALCL) on behalf of the Medicines and Healthcare products Regulatory Agency (MHRA) Plastic, Reconstructive and Aesthetic Surgery Expert Advisory Group (PRASEAG). *Eur J Surg Oncol*. December 2020. doi:10.1016/j.ejso.2020.07.043.
2. Kricheldorff J, Fallenberg EM, Solbach C, Gerber-Schäfer C, Rancsó C, Fritschen UV. Brustimplantat-assoziiertes Lymphom. *Deutsches Ärzteblatt international*. 2018;115(38):628-635. doi:10.3238/arztebl.2018.0628.
3. NCCN Guidelines Version 1.2020 Breast implant-associated ALCL, https://biaalcl.com/wp-content/uploads/NCCN-Guidelines-January-2020.pdf



© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

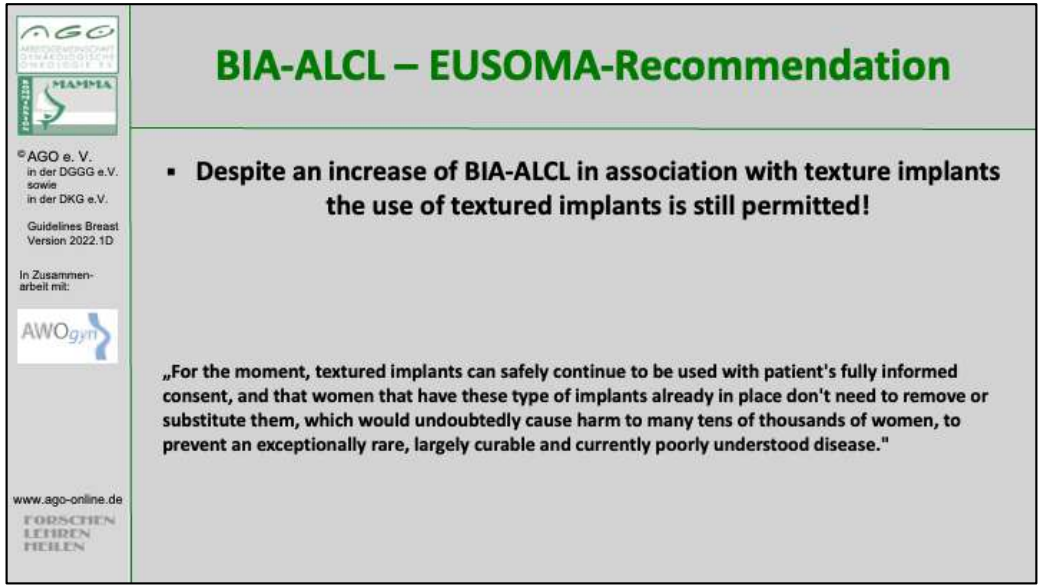
FORSCHEN
LEHREN
HEILEN

TNM Staging of BIA-ALCL

	TNM-Kategorie	Definition
Tumor extent (cT/pT)	T1	Confined to seroma or a layer on luminal side of capsule
	T2	Early capsule infiltration
	T3	Cell aggregates or sheets infiltrating the capsule
	T4	Lymphoma infiltrates beyond the capsule
Regional lymph nodes (cN/pN)	N0	No lymph node involvement
	N1	One regional lymph node positive
	N2	Multiple regional lymph nodes positive
Metastasis (cM/pM)	M0	No distant spread
	M1	Spread to other organs or distant sites

Stage	Definition
IA	T1 N0 M0
TB	T2 N0 M0
TC	T3 N0 M0
IIA	T4 N0 M0
IIB	T1-3 N1 M0
III	T4 N1-2 M0
IV	T any N any M1

1. Clemens MW, Medeiros LJ, Butler CE, et al. Complete Surgical Excision Is Essential for the Management of Patients With Breast Implant-Associated Anaplastic Large-Cell Lymphoma. *J Clin Oncol*. 2016;34(2):160-168. doi:10.1200/JCO.2015.63.3412.
2. Kricheldorff J, Fallenberg EM, Solbach C, Gerber-Schäfer C, Rancsó C, Fritschen UV. Brustimplantat-assoziiertes Lymphom. *Deutsches Ärzteblatt international*. 2018;115(38):628-635. doi:10.3238/arztebl.2018.0628.
3. NCCN Consensus Guidelines 1.2021, Breast Implant-Asociated Anaplastic Large Cell Lymphoma.



1. Cardoso MJ et al EUSOMA position regarding breast implant associated anaplastic large cell lymphoma (BIA-ALCL) and the use of textured implants. Breast. 2019 Apr;44:90-93. doi: 10.1016/j.breast.2019.01.011.

Netze und ADMs mit Implantatrekonstruktion-Endpunkt QoL / Komplikationen

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

FORSCHEN
LEHREN
HEILEN

	Oxford		
	LoE	GR	AGO
▪ Präpektorale Loge der subpektoralen Loge überlegen	3b	C	+/-
▪ Azelluläre Dermis (ADM)			
▪ subpektoral	1b	A	+/-*
▪ präpektoral	2b	B	+/-*
▪ Synthetische Netze			
▪ subpektoral	2b	B	+/-*
▪ präpektoral	2b	B	+/-*

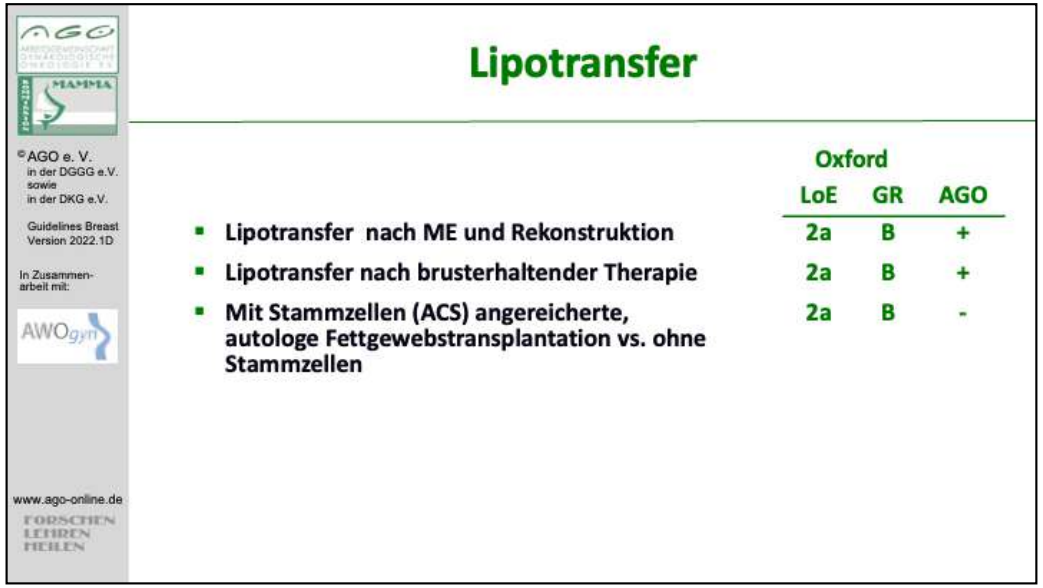
* Teilnahme an Studien empfohlen

1. Elliott LF, et al. The scarless latissimus dorsi flap for full muscle coverage in device-based immediate breast reconstruction: an autologous alternative to acellular dermal matrix. Plast Reconstr Surg 2011; 128(1):71-9
2. Seth AK, et al. Long-term outcomes following fat grafting in prosthetic breast reconstruction: a comparative analysis. Plast Reconstr Surg. 2012; 130(5):984-9.
3. Salzberg CA. Focus on technique: one-stage implant-based breast reconstruction. Plast Reconstr Surg. 2012; 130(5 Suppl 2):95S-103S.
4. Gschwantler-Kaulich D, et al. Mesh versus acellular dermal matrix in immediate implant-based breast reconstruction - A prospective randomized trial. Eur J Surg Oncol. 2016; 42(5):665-71.
5. Dikmans RE, et al. breast reconstruction using Strattice™: A retrospective study. J Plast Reconstr Aesthet Surg. 2016; 69(2):227-33.
6. Salibian AA, et al. Subcutaneous Implant-based Breast Reconstruction with Acellular Dermal Matrix/Mesh: A Systematic Review. Plast Reconstr Surg Glob Open. 2016; 4(11):e1139.
7. Headon H, et al. outcome and patient satisfaction with the use of bovine-derived acellular dermal matrix (SurgiMend™) in implant based immediate reconstruction following skin sparing mastectomy: A prospective observational study in a single centre. Surg Oncol. 2016; 25(2):104-10.

8. Logan Ellis H, et al. Biological and synthetic mesh use in breast reconstructive surgery: a literature review. World J Surg Oncol. 2016; 14:121.
9. Casella D, et al. Subcutaneous Tissue Expander Placement with Synthetic Titanium-Coated Mesh in Breast Reconstruction: Long-term Results. Plast Reconstr Surg Glob Open. 2016; 3(12):e577.
10. Rezai M, et al. , conservative mastectomy-analysis of surgical outcome and quality of life in 272 implant-based reconstructions using TiLoop(®) Bra versus autologous corial flaps. Gland Surg. 2016; 5(1):1-8.
11. Sorkin M, et al. Dermal Matrix in Immediate Expander/Implant Breast Reconstruction: A Multicenter Assessment of Risks and Benefits. Plast Reconstr Surg. 2017; 140(6):1091-1100.
12. Lee KT, Mun GH. Meta-analysis of Studies Comparing Outcomes of Diverse Acellular Dermal Matrices for Implant-Based Breast Reconstruction. Ann Plast Surg. 2017; 79(1):115-123.
13. Hashem T, Farahat A. artery perforator flap as an autologous alternative to acellular dermal matrix. World J Surg Oncol. 2017; 15(1):185.
14. Hillberg NS et al. Single-stage implant-based breast reconstruction (SSBR) with an acellular matrix safe?: Strattice™ or Meso Biomatrix® in SSBR. Eur J Plast Surg. 2018;41(4):429-438. doi: 10.1007/s00238-018-1415-2
15. Prepectoral Versus Subpectoral Implant-Based Breast Reconstruction: A Meta-analysis. Li Y, Xu G, Yu N, Huang J, Long X. Ann Plast Surg. 2020 Jan 6. doi: 10.1097/SAP.0000000000002190. [Epub ahead of print]
16. Banuelos J et al. Should obesity be considered a contraindication for prepectoral breast reconstruction Plast Reconstr Surg. 2019 Dec 17. doi: 10.1097/PRS.0000000000006540. [Epub ahead of print]
17. Li L et al. Comparison of prepectoral and subpectoral breast reconstruction after mastectomies: A systematic review and meta analysis. Eur J Surg Oncol. 2019 Sep;45(9):1542-1550. doi: 10.1016/j.ejso.2019.05.015. Epu
18. Thill M et al. Patient reported outcome and cosmetic evaluation following implant-based breast-reconstruction with a titanized polypropylene mesh (TiLOOP® Bra): A prospective clinical study in 269 patients. Eur J Surg Oncol. 2020 Aug;46(8):1484-1490. doi: 10.1016/j.ejso.2020.04.009. Epub 2020 Apr 15.PMID: 32336622
19. Masià J; iBAG Working Group. The largest multicentre data collection on prepectoral breast reconstruction: The iBAG study. J Surg Oncol. 2020 Oct;122(5):848-860. doi: 10.1002/jso.26073. Epub 2020 Aug 12.PMID: 32786089
20. Wagner RD et al. A systematic review of complications in prepectoral breast reconstruction. J Plast Reconstr Aesthet Surg. 2019 Jul;72(7):1051-1059. doi: 10.1016/j.bjps.2019.04.005. Epub 2019 Apr 21.PMID: 31076195
21. Lo Torto F et al. Prepectoral breast reconstruction with TiLoop Bra Pocket: a single center prospective study. Eur Rev

Med Pharmacol Sci. 2020 Feb;24(3):991-999. doi: 10.26355/eurrev_202002_20149.

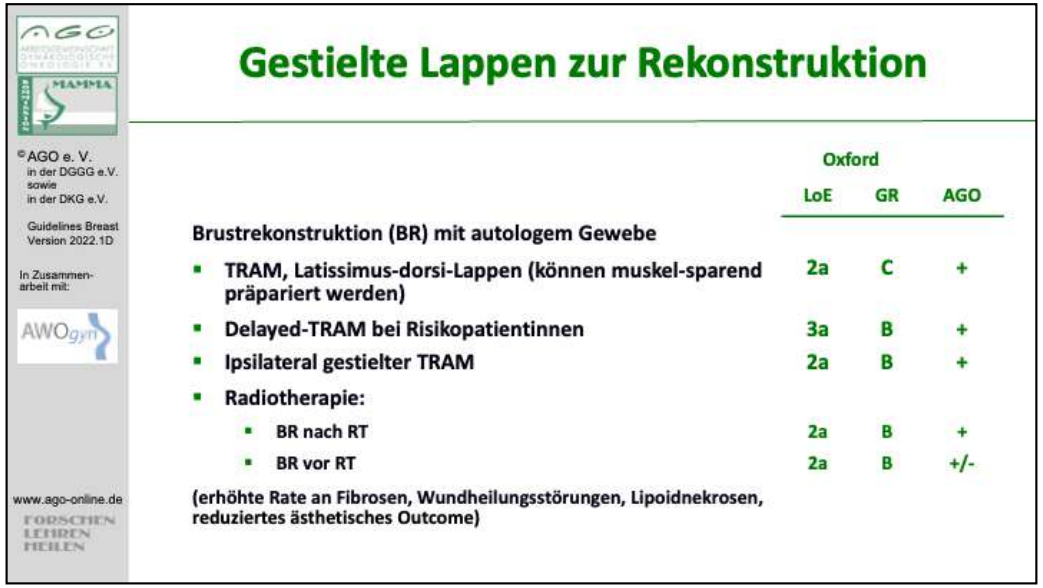
22. First-year complications after immediate breast reconstruction with a biological and a synthetic mesh in the same patient: A randomized controlled study.
23. Hansson E, Edvinsson AC, Elander A, et al First-year complications after immediate breast reconstruction with a biological and a synthetic mesh in the same patient: a randomized controlled study. J Surg Oncol. 2021 Jan;123(1):80-88. doi: 10.1002/jso.26227. Epub 2020 Oct 13.
24. Fredrik Lohmander, MD; Jakob Lagergren; Hemming Johansson; et al Effect of Immediate Implant-Based Breast Reconstruction After Mastectomy With and Without Acellular Dermal Matrix Among Women With Breast CancerA Randomized Clinical Trial. *JAMA Netw Open.* 2021;4(10):e2127806. doi:10.1001/jamanetworkopen.2021.27806
25. Ian J. Saldanha, M.B.B.S., M.P.H., Ph.D., Wangnan Cao, Ph.D., Justin M. Broyles, M.D. et al.; Breast Reconstruction After Mastectomy: A Systematic Review and Meta-Analysis. Rockville (MD): Agency for Healthcare Research and Quality (US); 2021 Jul.Report No.: 21-EHC027



1. AWMF-Leitlinie „Autologe Fetttransplantation“, Klasse: S2k Registernummer: 009/017, 11/2015
2. Simonacci F et al. Autologous fat transplantation for breast reconstruction: A literature review. Ann Med Surg (Lond). 2016; 12:94-100.
3. Waked K, et al. Systematic review: The oncological safety of adipose fat transfer after breast cancer surgery. Breast. 2016; 31:128-136.
4. De Decker M, et al. Breast cancer and fat grafting: efficacy, safety and complications-a systematic review. Eur J Obstet Gynecol Reprod Biol. 2016; 207:100-108.
5. Petit JY, Maisonneuve P. Lipofilling of the Breast Does Not Increase the Risk of Recurrence of Breast Cancer: A Matched Controlled Study. Plast Reconstr Surg. 2016; 138(5):937e-938e.
6. Wazir U, et al. Oncological Safety of Lipofilling in Patients with Breast Cancer: A Meta-analysis and Update on Clinical Practice. Anticancer Res. 2016; 36(9):4521-8.
7. Batista BN, et al. Lipofilling of the Breast Does Not Increase the Risk of Recurrence of Breast Cancer: A Matched Controlled Study. Plast Reconstr Surg. 2016; 138(6):1068e-1069e.
8. Silva-Vergara C, et al. Oncological outcomes of lipofilling breast reconstruction: 195 consecutive cases and literature review. J Plast Reconstr Aesthet Surg. 2016; 69(4):475-81.
9. Kronowitz SJ, et al. of the Breast Does Not Increase the Risk of Recurrence of Breast Cancer: A

Matched Controlled Study. Plast Reconstr Surg. 2016; 137(2):385-93.
10. Zhou Y, et al. and Safety of Cell-Assisted Lipotransfer: A Systematic Review and Meta-Analysis. Plast Reconstr Surg. 2016; 137(1):44e-57e.
11. Spear SL, et al. The Safety, Effectiveness, and Efficiency of Autologous Fat Grafting in Breast Surgery. Plast Reconstr Surg Glob Open. 2016; 4(8):e827.
12. Groen JW, et al. Autologous fat grafting in onco-plastic breast reconstruction: A systematic review on oncological and radiological safety, complications, volume retention and patient/surgeon satisfaction. J Plast Reconstr Aesthet Surg. 2016; 69(6):742-64.
13. Delay E et al. Indications and Controversies in Lipofilling for Partial Breast Reconstruction. Clin Plast Surg. 2018 Jan;45(1):101-110. doi: 10.1016/j.cps.2017.08.008. Epub 2017 Sep 18.
14. O'Halloran N, et al. Adipose-Derived Stem Cells in Novel Approaches to Breast Reconstruction: Their Suitability for Tissue Engineering and Oncological Safety. Breast Cancer (Auckl). 2017; 11:1178223417726777.
15. Debald M, et al. Lipofilling effects after breast cancer surgery in post-radiation patients: an analysis of results and algorithm proposal. Eur J Plast Surg. 2017; 40(5):447-454.
16. Cohen O, et al. Determining the Oncologic Safety of Autologous Fat Grafting as a Reconstructive Modality: An Institutional Review of Breast Cancer Recurrence Rates and Surgical Outcomes. Plast Reconstr Surg. 2017; 140(3):382e-392e.
17. Preisner F et al. Impact of Human Adipose Tissue-Derived Stem Cells on Malignant Melanoma Cells in An In Vitro Co-culture Model. Stem Cell Rev. 2017; doi: 10.1007/s12015-017-9772-y.
18. Lindegren A et al. Improved patient-reported outcomes after autologous fat transplantation and corrective surgery after breast surgery. J Plast Surg Hand Surg. 2019 Jan 17:1-8.
19. Krastev TK et al. Efficacy of autologous fat transfer for the correction of contour deformities in the breast: A systematic review and meta-analysis. J Plast Reconstr Aesthet Surg. 2018 Oct;71(10):1392-1409. doi: 10.1016/j.bjps.2018.05.021.
20. Biazus JV et al. Surgery with Immediate Autologous Fat Grafting Reconstruction: Oncologic Outcomes. Aesthetic Plast Surg. 2018 Oct;42(5):1195-1201. doi: 10.1007/s00266-018-1155-5
21. Johns N, Fairbairn N, Trail M. et al.: breast reconstruction using the immediately lipofilled extended latissimus dorsi flap. Plast Reconstr Aesthet Surg. 2018 Feb;71(2):201-208. doi: 10.1016/j.bjps.2017.10.015.
22. Turner A et al. Fat Grafting in Breast Reconstruction. Semin Plast Surg. 2020 Feb;34(1):17-23. doi: 10.1055/s-0039-1700959. Epub 2020 Feb 15.PMID: 32071575

23. Nava M et al. International Expert Panel Consensus on Fat Grafting of the Breast Plast Reconstr Surg Glob Open. 2019 Oct; 7(10): e2426. Published online 2019 Oct 28. doi: 10.1097/GOX.0000000000002426 PMCID: PMC6846285
24. Stumpf CC et al. Oncologic safety of immediate autologous fat grafting for reconstruction in breast-conserving surgery. Breast Cancer Res Treat. 2020 Apr;180(2):301-309. doi: 10.1007/s10549-020-05554-0. Epub 2020 Feb 6.PMID: 32026213
25. Lutfi D, Turkof E. Adipose-derived stem cell enrichment is counter-productive for the majority of women seeking primary aesthetic breast augmentation by autologous fat transfer: A systematic review. J Plast Reconstr Aesthet Surg. 2020 Nov;73(11):2025-2032. doi: 10.1016/j.bjps.2020.08.057. Epub 2020 Aug PMID: 32919950



© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

FORSCHEN
LEHREN
HEILEN

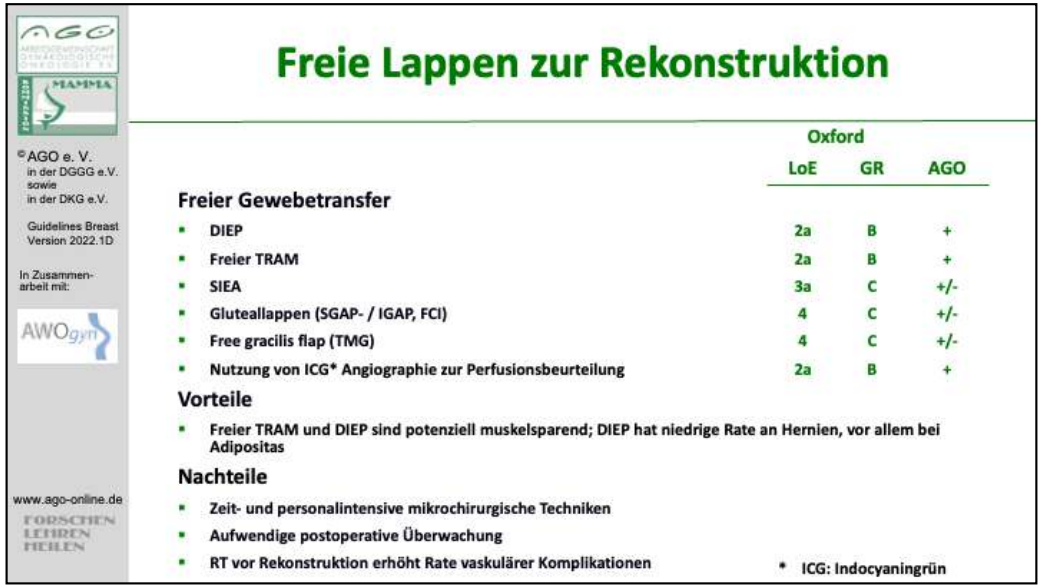
Gestielte Lappen zur Rekonstruktion

	Oxford LoE	Oxford GR	AGO
Brustrekonstruktion (BR) mit autologem Gewebe			
▪ TRAM, Latissimus-dorsi-Lappen (können muskel-sparend präpariert werden)	2a	C	+
▪ Delayed-TRAM bei Risikopatientinnen	3a	B	+
▪ Ipsilateral gestielter TRAM	2a	B	+
▪ Radiotherapie:			
▪ BR nach RT	2a	B	+
▪ BR vor RT	2a	B	+/-

(erhöhte Rate an Fibrosen, Wundheilungsstörungen, Lipoidnekrosen, reduziertes ästhetisches Outcome)

1. Knox AD, et al. Comparison of Outcomes following Autologous Breast Reconstruction Using the DIEP and Pedicled TRAM Flaps: A 12-Year Clinical Retrospective Study and Literature Review. Plast Reconstr Surg. 2016; 138(1):16-28.
2. Golpanian S, et al. Versus Pedicled TRAM Flaps: Cost Utilization and Complications. Aesthetic Plast Surg. 2016; 40(6):869-876.
3. Macadam SA, et al. of Life and Patient-Reported Outcomes in Breast Cancer Survivors: A Multicenter Comparison of Four Abdominally Based Autologous Reconstruction Methods. Plast Reconstr Surg. 2016; 137(3):758-71.
4. Landis LV, et al. Effect of Progressive-Tension Closure on Donor Site Seroma Formation in Delayed Latissimus Dorsi Flaps for Breast Reconstruction. Ann Plast Surg. 2016; 76(2):170-3.
5. Teisch LF, et al. dorsi flap versus pedicled transverse rectus abdominis myocutaneous breast reconstruction: outcomes. J Surg Res. 2015; 199(1):274-9.
6. Mennie JC, et al. Donor-Site Hernia Repair in Abdominal Flap Breast Reconstruction: A Population-Based Cohort Study of 7929 Patients. Plast Reconstr Surg. 2015; 136(1):1-9.
7. Latissimus Dorsi Flap for Total Autologous Immediate Breast Reconstruction without Implants. Jia Y, et al. Plast Reconstr Surg. 2015; 136(2):267e-268e.

8. Christensen BO, et al. evaluation of postmastectomy breast reconstruction with the pedicled transverse rectus abdominis musculocutaneous flap. J Plast Surg Hand Surg. 2013; 47(5):374-8.
9. Aboutanos SZ, et al. Angigraphic delay: a viable alternative to surgical delay. Ann Plast Surg. 2012; 68(6):562-7.
10. Sajid MS, et al. Prevention of postoperative seroma-related morbidity by quilting of latissimus dorsi flap donor site: a systematic review. Clin Breast Cancer. 2011; 11(6):357-63.
11. Ribuffo D, et al. Angio-CT Preliminary study of the TRAM flap after selective vascular delay. Ann Plast Surg 2007; 59(6):611-616.
12. Jones G. The pedicled TRAM flap in breast reconstruction. Clin Plast Surg. 2007; 34(1):83-104.
13. Gradishar WJ, et al. Cancer Version 2.2015. J Natl Compr Canc Netw. 2015
14. Bennett KG, Qi J, Kim HM, et al.: Comparison of 2-Year Complication Rates Among Common Techniques for Postmastectomy Breast Reconstruction. JAMA Surg. 2018 Oct 1;153(10):901-908. doi: 10.1001/jamasurg.2018.1687.
15. He WY et al. Complications and Patient-reported Outcomes after TRAM and DIEP Flaps: A Systematic Review and Meta-analysis. Plast Reconstr Surg Glob Open. 2020 Oct 29;8(10):e3120. doi: 10.1097/GOX.0000000000003120. eCollection 2020 Oct.PMID: 33173667



© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

FORSCHEN
LEHREN
HEILEN

Freie Lappen zur Rekonstruktion

	Oxford LoE	Oxford GR	AGO
Freier Gewebetransfer			
▪ DIEP	2a	B	+
▪ Freier TRAM	2a	B	+
▪ SIEA	3a	C	+/-
▪ Gluteallappen (SGAP- / IGAP, FCI)	4	C	+/-
▪ Free gracilis flap (TMG)	4	C	+/-
▪ Nutzung von ICG* Angiographie zur Perfusionsbeurteilung	2a	B	+

Vorteile

- Freier TRAM und DIEP sind potenziell muskelsparend; DIEP hat niedrige Rate an Hernien, vor allem bei Adipositas

Nachteile

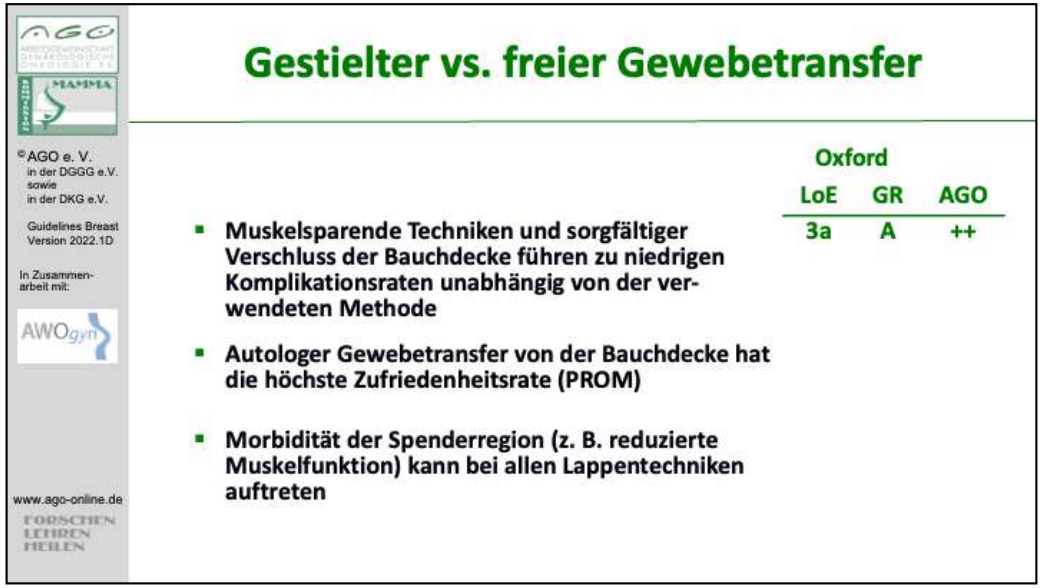
- Zeit- und personalintensive mikrochirurgische Techniken
- Aufwendige postoperative Überwachung
- RT vor Rekonstruktion erhöht Rate vaskulärer Komplikationen

* ICG: Indocyaningrün

1. Lee KT, Mun GH. Effects of Obesity on Postoperative Complications After Breast Reconstruction Using Free Muscle-Sparing Transverse Rectus Abdominis Myocutaneous, Deep Inferior Epigastric Perforator, and Superficial Inferior Epigastric Artery Flap: A Systematic Review and Meta-analysis. Ann Plast Surg. 2016; 76(5):576-84.
2. Sanati-Mehrizy P, et al. Factors Leading to Free Flap Failure: Analysis From the National Surgical Quality Improvement Program Database. J Craniofac Surg. 2016; 27(8):1956-1964.
3. Lin IC, et al. Assessing Surgical and Medical Complications in Bilateral Abdomen-Based Free Flap Breast Reconstructions Compared With Unilateral Free Flap Breast Reconstructions. Ann Plast Surg. 2016; 77(1):61-6.
4. Struckmann V, et al. free fasciocutaneous infragluteal (FCI) flap: Outcome and patient satisfaction after 142 breast reconstructions. J Plast Reconstr Aesthet Surg. 2016; 69(4):461-9.
5. Mull AB, et al. Impact of Time Interval between Radiation and Free Autologous Breast Reconstruction. J Reconstr Microsurg. 2016; [Epub ahead of print]
6. Kelley BP, et al. Tamoxifen may increase the risk of mircrovascular flap complications. Surgeons should consider temporarily stopping the drug 28 days before microsurgical breast reconstruction. J Plast Reconstr Surg. 2012; 129(2):305-14.

7. Garvey PB, et al. Perfusion-related complications are similar for DIEP and muscle-sparing free TRAM flaps harvested on medial or lateral deep inferior epigastric Artery branch perforators for breast reconstruction. Plast Reconstr Surg. 2011; 128(6):581e-9e.
8. Momoh AO, et al. Analysis of Complications and Patient Satisfaction in Pedicled Transverse Rectus Abdominis Myocutaneous and Deep Inferior Epigastric Perforator Flap Breast Reconstruction. Ann Plast Surg. 2012 Jul;69(1):19-23. doi: 10.1097/SAP.0b013e318221b578.PMID: 21659842
9. Semple JL, et al. Survival Differences in Women with and without Autologous Breast Reconstruction after Mastectomy for Breast Cancer. Plast Reconstr Surg Glob Open. 2017; 5(4):e1281.
10. Shay P, Jacobs J. Autologous reconstruction following nipple sparing mastectomy: a comprehensive review of the current literature. Gland Surg. 2018 Jun;7(3):316-324. doi: 10.21037/gs.2018.05.03.
11. Liu T et al. Patients with abdominal-based free flap breast reconstruction a decade after surgery: A comprehensive long-term follow-up study. J Plast Reconstr Aesthet Surg. 2018 Sep;71(9):1301-1309. doi: 10.1016/j.bjps.2018.06.009.
12. Sbitany H. Breast Reconstruction. Surg Clin North Am. 2018 Aug;98(4):845-857. doi: 10.1016/j.suc.2018.03.011.
13. Xu F et al. of surgical complication between immediate implant and autologous breast reconstruction after mastectomy: A multicenter study of 426 cases. J Surg Oncol. 2018 Nov;118(6):953-958. doi: 10.1002/jso.25238.
14. Hauck T et al. Secondary breast reconstruction after mastectomy using the DIEP flap. A. Surg Oncol. 2018 Sep;27(3):513. doi: 10.1016/j.suronc.2018.06.006.
15. Tan MG et al. A cost-effectiveness analysis of DIEP vs free MS-TRAM flap for microsurgical breast reconstruction. J Surg Oncol. 2018 Dec 18. doi: 10.1002/jso.25325.
16. Torabi R et al. Assessing Age as a Risk Factor for Complications in Autologous Breast Reconstruction. Plast Reconstr Surg. 2018 Dec;142(6):840e-846e. doi: 10.1097/S.0000000000004990.
17. Zhao R et al. A Multicenter Analysis Examining Patients Undergoing Conversion of Implant-based Breast Reconstruction to Abdominally based Free Tissue Transfer. Reconstr Microsurg. 2018 Nov;34(9):685-691. doi: 10.1055/s-0038-1641680.
18. Lindenblatt N et al. A systematic review of donor site aesthetic and complications after deep inferior epigastric perforator flap breast reconstruction. Gland Surg 2019;8(4):389-398
19. He WY et al. Complications and Patient-reported Outcomes after TRAM and DIEP Flaps: A Systematic Review and Meta-analysis. Plast Reconstr Surg Glob Open. 2020 Oct 29;8(10):e3120. doi: 10.1097/GOX.0000000000003120. eCollection 2020 Oct.PMID: 33173667

20. Heiman AJ et al. A Meta-Analysis of Autologous Microsurgical Breast Reconstruction and Timing of Adjuvant Radiation Therapy. J Reconstr Microsurg. 2020 Sep 21. doi: 10.1055/s-0040-1716846. Online ahead of print.PMID: 32957153
21. Parmeshwar N et al. A Systematic Review of the Utility of Indocyanine Angiography in Autologous Breast Reconstruction. Ann Plast Surg. 2020 Dec 15;Publish Ahead of Print. doi: 10.1097/SAP.0000000000002576. Online ahead of print.PMID: 33346549
22. Ian J. Saldanha, M.B.B.S., M.P.H., Ph.D., Wangnan Cao, Ph.D., Justin M. Broyles, M.D. et al.; Breast Reconstruction After Mastectomy: A Systematic Review and Meta-Analysis. Rockville (MD): Agency for Healthcare Research and Quality (US); 2021 Jul.Report No.: 21-EHC027



1. AWMF Leitlinien: S3-LL. Brustrekonstruktion mit Eigengewebe. Registernummer 015 – 075, Stand: 01.04.2015 , gültig bis 31.03.2020
2. Sabino J, et al. NSQIP Analysis: Increased Immediate Reconstruction in the Treatment of Breast Cancer. Am Surg. 2016; 82(6):540-5.
3. Mennie JC, et al. National trends in immediate and delayed post-mastectomy reconstruction procedures in England: A seven-year population-based cohort study. Eur J Surg Oncol. 2017; 43(1):52-61.
4. Lee HH, et al. Comparison of Long-Term Outcomes of Postmastectomy Radiotherapy between Breast Cancer Patients with and without Immediate Flap Reconstruction. PLoS One. 2016 Feb 10;11(2):e0148318. doi: 10.1371/journal.pone.0148318. eCollection 2016.PMID: 26863006
5. Knox AD, et al. Comparison of Outcomes following Autologous Breast Reconstruction Using the DIEP and Pedicled TRAM Flaps: A 12-Year Clinical Retrospective Study and Literature Review. Plast Reconstr Surg. 2016; 138(1):16-28.
6. Golpanian S, et al. Free Versus Pedicled TRAM Flaps: Cost Utilization and Complications. Aesthetic Plast Surg. 2016; 40(6):869-876.
7. Gart MS, et al. Autologous options for postmastectomy breast reconstruction: a comparison of

outcomes based on the American College of Surgeons National Surgical Quality Improvement Program. J Am Coll Surg. 2013; 216(2):229-38.

8. Lindenblatt N et al. A systematic review of donor site aesthetic and complications after deep inferior epigastric perforator flap breast reconstruction. Gland Surg 2019;8(4):389-398
9. Phan R et al. The use of Patient Reported Outcome Measures in assessing patient outcomes when comparing autologous to alloplastic breast reconstruction: a systematic review. Gland Surg 2019;8(4):452-460
10. Toyserkani NM et al. Autologous versus implant-based breast reconstruction: A systematic review and meta-analysis of Breast-Q patient-reported outcomes. J Plast Reconstr Aesthet Surg. 2020 Feb;73(2):278-285. doi: 10.1016/j.bjps.2019.09.040. Epub 2019 Oct 2.PMID: 31711862
11. Opsomer D et al. Comparing the Lumbar and SGAP Flaps to the DIEP Flap Using the BREAST-Q. Plast Reconstr Surg. 2020 Sep;146(3):276e-282e. doi: 10.1097/PRS.0000000000007094.PMID: 32842100
12. Weitgasser L et al. Bilateral Simultaneous Breast Reconstruction with DIEP- and TMG Flaps: Head to Head Comparison, Risk and Complication Analysis. J Clin Med. 2020 Jun 28;9(7):2031. doi: 10.3390/jcm9072031.PMID: 32605294

Haut / Nippel-sparende Mastektomie (SSM / NSM) und Rekonstruktion

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

FORSCHEN LEHREN HEILEN

	Oxford LoE	Oxford GR	Oxford AGO
▪ **Hautsparende Mastektomie (SSM / NSM)**			
▪ Sicher (gleiche Rezidivrate wie bei MX bei geeigneter Pat.auswahl)	2b	B	++
▪ Höhere Lebensqualität für Patientin	2b	B	++
▪ Erhalt des Mamillen-Areola-Komplex (MAK) unter bestimmten Bedingungen	2b	B	++
▪ Möglich nach Mastopexie / Reduktionsplastik	4	C	++
▪ Nutzung von ICG* zur Vorhersage von Nekrosen	1b	B	+
▪ **Hautschnitte → verschiedene Möglichkeiten:**			
▪ Periareolär			
▪ Hemi-Periareolär mit / ohne medialer / lateraler Erweiterung			
▪ Reduktionsschnittbild: „inverses T" oder vertikal			
▪ Inferior-lateraler Zugang / Inframammärfalte			
▪ Niedrigste Inzidenz von Komplikationen	2b	B	+

* ICG = Indocyaningrün

1. Orzalesi L, et al. Nipple sparing mastectomy: Surgical and oncological outcomes from a national multicentric registry with 913 patients (1006 cases) over a six year period. Breast. 2016; 25:75-81.
2. Headon HL, et al. The Oncological Safety of Nipple-Sparing Mastectomy: A Systematic Review of the Literature with a Pooled Analysis of 12,358 Procedures. Arch Plast Surg. 2016; 43(4):328-38.
3. Gieni M, et al. Local breast cancer recurrence after mastectomy and immediate breast reconstruction for invasive cancer: A meta-analysis. Breast. 2012; [Epub ahead of print]
4. Prabhu R, et al. Impact of Skin-Sparing Mastectomy with Immediate Reconstruction in Patients with Stage III Breast Cancer Treated with Neoadjuvant Chemotherapy and Postmastectomy Radiation. Plast Reconstr Surg. 2012; 129(1):37e-45e.
5. Benediktsson KP, Perbeck L. Survival in breast cancer after nipple-sparing subcutaneous mastectomy and immediate reconstruction with implants: a prospective trial with 13 years median follow-up in 216 patients. Eur J Surg Oncol. 2008; 34(2):143-8.
6. El Hage Chehade H, et al. Nipple-sparing mastectomy using a hemi-periareolar incision with or without minimal medial-lateral extensions; clinical outcome and patient satisfaction: A single centre prospective observational study. Am J Surg. 2017; 213(6):1116-1124.
7. Gorai K, et al. Prediction of Skin Necrosis after Mastectomy for Breast Cancer Using Indocyanine

Green Angiography Imaging. Plast Reconstr Surg Glob Open. 2017; 5(4):e1321.
8. Gschwantler-Kaulich D et al. Direct-to-implant breast reconstruction: Higher complication rate vs cosmetic benefits. Breast J. 2018 Nov;24(6):957-964. doi: 10.1111/tbj.13113. Epub 2018 Sep 19.
9. Radu M et al. Assessment of Mastectomy Skin Flaps for Immediate Implant-Based Breast Reconstruction. J Med Life. 2018 Apr-Jun;11(2):137-145.
10. Yoon-Flannery K et al. Quality of life and sexual well-being after nipple sparing mastectomy: A matched comparison of patients using the breast Q. J Surg Oncol. 2018 Jul;118(1):238-242. doi: 10.1002/jso.25107. Epub 2018 Aug 16
11. Anker AM et al. Assessment of DIEP Flap Perfusion with Intraoperative Indocyanine Green Fluorescence Imaging in Vasopressor-Dominated Hemodynamic Support Versus Liberal Fluid Administration: A Randomized Controlled Trial With Breast Cancer Patients. Ann Surg Oncol. 2020 Feb;27(2):399-406. doi: 10.1245/s10434-019-07758-1
12. Pruimboom T et al. Indocyanine green angiography for preventing postoperative mastectomy skin flap necrosis in immediate breast reconstruction. Cochrane Database Syst Rev. 2020 Apr 22;4(4):CD013280. doi: 10.1002/14651858.CD013280.pub2.PMID: 32320056

Prävention und Therapie der Kapselfibrose

	Oxford LoE	Oxford GR	AGO
Prävention			
Texturierte Implantate (Cave: Aufklärung BIA-ALCL)	1a	A	+
Azelluläre dermale Matrix (ADM) vs. nil	2a	B	+
Synthetisches Netz vs. nil	3a	C	+
Lokale Antibiotika / Antiseptika	2a	B	+
PVP (Povidone-Iodine)	2a	B	+/-
Leukotrien-Antagonisten	2a	B	+/-
Brustmassage	3a	C	-
Chirurgische Interventionen			
Kapsulektomie	3b	C	+
Kapsulotomie (Cave: Ausschluss BIA-ALCL)	3b	C	+

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

FORSCHEN
LEHREN
HEILEN

Povidone-Iodine:

1. Dang T et al. Povidone-Iodine versus antibiotic irrigation in breast implant surgery: Revival of the ideal solution. J Plast Reconstr Aesthet Surg. 2020 Feb;73(2):391-407. doi: 10.1016/j.bjps.2019.09.007. Epub 2019 Sep 24. PMID: 31582320
2. Yalanis GC et al. Efficacy and Safety of Povidone-Iodine Irrigation in Reducing the Risk of Capsular Contracture in Aesthetic Breast Augmentation: A Systematic Review and Meta-Analysis. Plast Reconstr Surg. 2015 Oct;136(4):687-98. doi: 10.1097/PRS.0000000000001576. PMID: 26397246
3. Banerjee S, Featherstone R. Povidone-Iodine for Breast Implant Surgery: A Review of Clinical Effectiveness and Guidelines [Internet]. Ottawa (ON): Canadian Agency for Drugs and Technologies in Health; 2019 May 16.PMID: 31487136
4. Swanson E. A Rebuttal of Antibiotic Irrigation as a Method to Reduce Risk of Capsular Contracture and Breast Implant-Associated Anaplastic Large-Cell Lymphoma. Ann Plast Surg. 2020 Nov;85(5):461-463. doi: 10.1097/SAP.0000000000002230.PMID: 31855865
5. Drinane JJ et al. Examining the Role of Antimicrobial Irrigation and Capsular Contracture: A Systematic Review and Meta-analysis. Ann Plast Surg. 2017 Jul;79(1):107-114. doi:

10.1097/SAP.0000000000001134.PMID: 28542075

Topical antibiotic irrigation:

1. Samargandi OA et al. Antibiotic Irrigation of Pocket for Implant-Based Breast Augmentation to Prevent Capsular Contracture: A Systematic Review. Plast Surg (Oakv). 2018 May;26(2):110-119. doi: 10.1177/2292550317747854. Epub 2018 Jan 18.PMID: 29845049
2. Lynch JM et al. Breast Pocket Irrigation with Antibiotic Solution at Implant Insertion: A Systematic Review and Meta-Analysis. Aesthetic Plast Surg. 2018 Oct;42(5):1179-1186. doi: 10.1007/s00266-018-1166-2. Epub 2018 Jun 8.PMID: 29948092
3. Swanson E. A Rebuttal of Antibiotic Irrigation as a Method to Reduce Risk of Capsular Contracture and Breast Implant-Associated Anaplastic Large-Cell Lymphoma. Ann Plast Surg. 2020 Nov;85(5):461-463. doi: 10.1097/SAP.0000000000002230.PMID: 31855865
4. Drinane JJ et al. Examining the Role of Antimicrobial Irrigation and Capsular Contracture: A Systematic Review and Meta-analysis. Ann Plast Surg. 2017 Jul;79(1):107-114. doi: 10.1097/SAP.0000000000001134.PMID: 28542075
5. Frois AO et al. The Role of Antibiotics in Breast Pocket Irrigation and Implant Immersion: A Systematic Review. Plast Reconstr Surg Glob Open. 2018 Sep 14;6(9):e1868. doi: 10.1097/GOX.0000000000001868. eCollection 2018 Sep.PMID: 30349776

Breast massage:

1. Sood A et al. Breast Massage, Implant Displacement, and Prevention of Capsular Contracture After Breast Augmentation With Implants: A Review of the Literature. Eplasty. 2017 Dec 21;17:e41. eCollection 2017.PMID: 29348783

Textured implants:

1. Liu X et al. Comparison of the postoperative incidence rate of capsular contracture among different breast implants: a cumulative meta-analysis. PLoS One. 2015 Feb 13;10(2):e0116071. doi: 10.1371/journal.pone.0116071. eCollection 2015.PMID: 25680100

2. Wong CH et al. Capsular contracture in subglandular breast augmentation with textured versus smooth breast implants: a systematic review. Plast Reconstr Surg. 2006 Oct;118(5):1224-36. doi: 10.1097/01.prs.0000237013.50283.d2.PMID: 17016195
3. Rocco N et al. Different types of implants for reconstructive breast surgery. Cochrane Database Syst Rev. 2016 May 16;2016(5):CD010895. doi: 10.1002/14651858.CD010895.pub2.PMID: 27182693
4. Barnsley GP et al. Textured surface breast implants in the prevention of capsular contracture among breast augmentation patients: a meta-analysis of randomized controlled trials. Plast Reconstr Surg. 2006 Jun;117(7):2182-90. doi: 10.1097/01.prs.0000218184.47372.d5. PMID: 16772915

Leukotriene antagonists:

1. Wang Y et al. Suppressive Effect of Leukotriene Antagonists on Capsular Contracture in Patients Who Underwent Breast Surgery with Prosthesis: A Meta-Analysis. Plast Reconstr Surg. 2020 Apr;145(4):901-911. doi: 10.1097/PRS.0000000000006629.PMID: 32221199
2. Bresnick SD. Prophylactic Leukotriene Inhibitor Therapy for the Reduction of Capsular Contracture in Primary Silicone Breast Augmentation: Experience with over 1100 Cases. Plast Reconstr Surg. 2017 Feb; 139(2): 379–385. doi: 10.1097/PRS.0000000000003006 PMCID: PMC5327859
3. Graf R et al. Prevention of Capsular Contracture Using Leukotriene Antagonists. Plast Reconstr Surg. 2015 Nov;136(5):592e-6e. doi:10.1097/PRS.0000000000001683.PMID: 26505715

Capsulectomy and capsulotomy:

1. Young VL. Guidelines and indications for breast implant capsulectomy. *Plast Reconstr Surg*. 1998;102:884–891; discussion 892– 894.
2. Sanger JR. Guidelines and indications for breast implant capsulectomy (Discussion). *Plast Reconstr Surg*. 1998;102:892.
3. Swanson E. Open capsulotomy: an effective but overlooked treatment for capsular contracture after breast augmentation. Plast Reconstr Surg Glob Open. 2016, 4:1096. 10.1097/GOX.0000000000001096

4. Melmed EP.A review of explantation in 240 symptomatic women: a description of explantation and capsulectomy with reconstruction using a periareolar technique. Plast Reconstr Surg. 1998 Apr;101(5):1364-73. doi: 10.1097/00006534-199804050-00036.PMID: 9529228
5. Adams WP Jr. Capsular contracture: what is it? What causes it? How can it be prevented and managed? .Clin Plast Surg. 2009 Jan;36(1):119-26, vii. doi: 10.1016/j.cps.2008.08.007.PMID: 19055967

ADM:

1. Hallberg H et al. Benefits and risks with acellular dermal matrix (ADM) and mesh support in immediate breast reconstruction: a systematic review and meta-analysis. J Plast Surg Hand Surg. 2018 Jun;52(3):130-147. doi: 10.1080/2000656X.2017.1419141. Epub 2018 Jan 10.PMID: 29320921
2. Wagner RD et al. A systematic review of complications in prepectoral breast reconstruction. J Plast Reconstr Aesthet Surg. 2019 Jul;72(7):1051-1059. doi: 10.1016/j.bjps.2019.04.005. Epub 2019 Apr 21.PMID: 31076195
3. Masià J; iBAG Working Group. The largest multicentre data collection on prepectoral breast reconstruction: The iBAG study. J Surg Oncol. 2020 Oct;122(5):848-860. doi: 10.1002/jso.26073. Epub 2020 Aug 12.PMID: 32786089
4. Lee KT, Mun GH. Updated Evidence of Acellular Dermal Matrix Use for Implant-Based Breast Reconstruction: A Meta-analysis. Ann Surg Oncol. 2016 Feb;23(2):600-10. doi: 10.1245/s10434-015-4873-9. Epub 2015 Oct 5.PMID: 26438439
5. Vardanian AJ et al. Comparison of implant-based immediate breast reconstruction with and without acellular dermal matrix. Plast Reconstr Surg. 2011 Nov;128(5):403e-410e. doi: 10.1097/PRS.0b013e31822b6637.PMID: 22030500
6. Salzberg CA et al. An 8-year experience of direct-to-implant immediate breast reconstruction using human acellular dermal matrix (AlloDerm). Plast Reconstr Surg 2011;127:514-24.
7. Salzberg CA et al. Acellular Dermal Matrix-Assisted Direct-to-Implant Breast Reconstruction and Capsular Contracture: A 13-Year Experience. Plast Reconstr Surg. 2016 Aug;138(2):329-37. doi: 10.1097/PRS.0000000000002331.PMID: 27064232
8. Mowlds DS et al. Capsular Contracture in Implant-Based Breast Reconstruction: Examining the Role of Acellular Dermal Matrix Fenestrations. Plast Reconstr Surg. 2015 Oct;136(4):629-35. doi: 10.1097/PRS.0000000000001570.PMID: 26090760

Mesh:

1. Dieterich M et al. Patient-Report Satisfaction and Health-Related Quality of Life in TiLOOP Bra-Assisted or Implant-Based Breast Reconstruction Alone. Aesthetic Plast Surg. 2015 Aug;39(4):523-33. doi: 10.1007/s00266-015-0520-x. Epub 2015 Jun 18.PMID: 26085227
2. Hallberg H et al. Benefits and risks with acellular dermal matrix (ADM) and mesh support in immediate breast reconstruction: a systematic review and meta-analysis. J Plast Surg Hand Surg. 2018 Jun;52(3):130-147. doi: 10.1080/2000656X.2017.1419141. Epub 2018 Jan 10.PMID: 29320921

Serome nach Implantatrekonstruktion I

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

FORSCHEN
LEHREN
HEILEN

	Oxford LoE	Oxford GR
▪ **Inzidenz: ca. 5-10 % (2-50 %)**	2a	B
Einflussfaktoren:		
▪ **Z. n. Radiatio erhöht Risiko (RR ca. 3)**	2a	B
▪ **Adipositas erhöht Risiko (z. B. BMI > 30 vs. < 30; RR ca. 3)**	2a	B
▪ **Einsatz von ADM erhöht Risiko (RR ca. 3)**	2a	B
▪ **Glatte Expander erhöhen Risiko (RR ca. 5)**	3b	C
▪ **Z. n. neoadjuvanter Chemotherapie erhöht Risiko eher nicht**	2a	B
▪ **Subcutane Loge erhöht Risiko eher nicht**	2b	B

1. Jordan SW et al. Seroma in Prosthetic Breast Reconstruction. Plast Reconstr Surg. 2016 Apr. 2016 Apr;137(4):1104-16. doi: 10.1097/01.prs.0000481102.24444.72.
2. Chiu WK et al Judging an Expander by Its Cover: A Propensity-Matched Analysis of the Impact of Tissue Expander Surface Texture on First-Stage Breast Reconstruction Outcomes. Plast Reconstr Surg. 2021 Jan 1;147(1):1e-6e. doi: 10.1097/PRS.0000000000007417.Plast Reconstr Surg. 2021. PMID: 33002978
3. Avila A et al: Acute Postoperative Complications in Prepectoral versus Subpectoral Reconstruction following Nipple-Sparing Mastectomy DOI: 10.1097/PRS.0000000000007326
4. Varghese J et al: A systematic review and meta-analysis on the effect of neoadjuvant chemotherapy on complications following immediate breast reconstruction. DOI: 10.1016/j.breast.2020.11.023

Serome nach Implantatrekonstruktion II

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

FORSCHEN
LEHREN
HEILEN

	Oxford		
	LoE	GR	AGO
Prävention			
▪ Drainage mit wenig, mehr oder keinem Vakuum	3b	C	+
▪ Entfernung der Drainage bei Fördermenge < 30ml	2b	B	+
Therapie			
▪ Repetitive Serompunktionen oder Drainagen-Einlage	4	C	+
▪ Druckverband	5	D	+/-
▪ Revision mit Kapsulektomie (ultima ratio)	5	D	+
▪ Revision mit Implantatentfernung (ultima ratio)	5	D	+

1. Jung BK et al Ultrasonic dissection versus electrocautery for immediate prosthetic breast reconstruction. Arch Plast Surg. 2020 Jan;47(1):20-25. doi: 10.5999/aps.2019.00759. Epub 2020 Jan 15.
2. Moyer KE et al Technique for seroma drainage in implant-based breast reconstruction. DOI: 10.1016/j.bjps.2012.06.016
3. Scomacao I et al: The use of surgical site drains in breast reconstruction: A systematic review. DOI: 10.1016/j.bjps.2019.11.019

Risiko-reduzierende bilaterale Mastektomie für nicht erkrankte Frauen (RRBM)

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

	Oxford LoE	Oxford GR	AGO
▪ RRBM verringert die Brustkrebsinzidenz	2b	B	++
▪ RRBM bei BRCA1/2 Mutationsträgerinnen	2a	B	+*
▪ RRBM bei hohem Mammakarzinomrisiko (individuelle Entscheidung in Abhängigkeit von Mutationsstatus und familiärer Belastung – z. B. high-risk / moderate Gene / Hodgkin-Lymphom)	4	D	+/-*
▪ Hohes Risiko und keine Beratung in spezialisierten Zentren*	5	D	--
▪ Nicht direktive Beratung vor RRBM	2b	B	++*
▪ RRBM sollte im Zusammenhang mit anderen Risiko-reduzierenden Op. wie BSO und vorbestehenden Erkrankungen gesehen werden	2a	A	++*
▪ Weitere Notwendigkeit der Fortbildung von Ärztinnen und Ärzten in Bezug auf Möglichkeiten und Vorteile der RRBM	1b	A	++

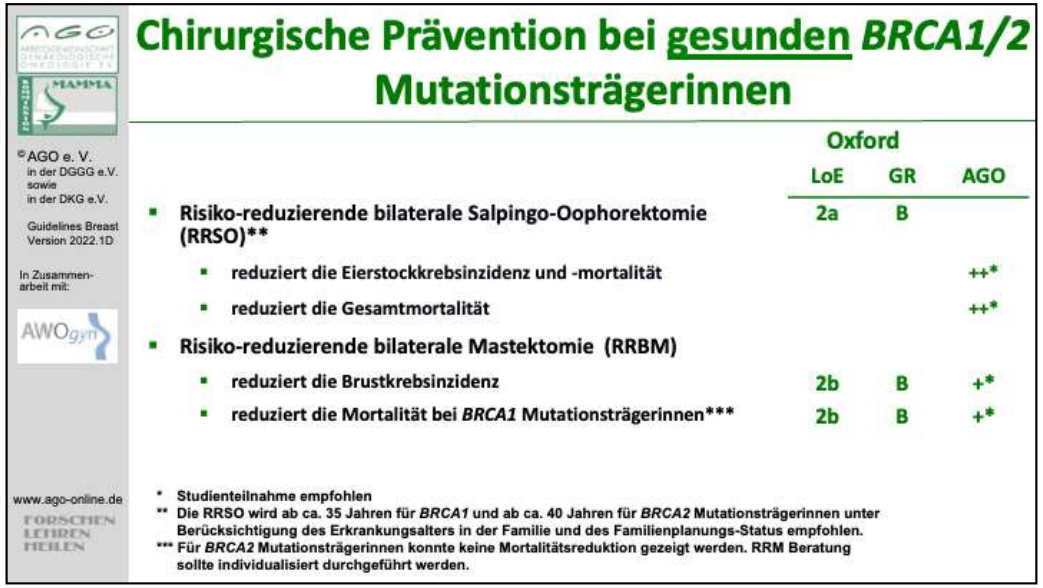
* Beratung, Risikoberechnung und Nachsorge in spezialisierten Zentren empfohlen

www.ago-online.de

FORSCHEN
LEHREN
HEILEN

1. Hunt KK, et al. Society of Surgical Oncology Breast Disease Working Group Statement on Prophylactic (Risk-Reducing) Mastectomy. Ann Surg Oncol. 2017; 24(2):375-397.
2. Razdan SN et al. Quality of life among patients after bilateral prophylactic mastectomy: a systematic review of patient-reported outcomes. Qual Life Res. 2016; 25(6):1409-21.
3. Ludwig KK et al. Risk reduction and survival benefit of prophylactic surgery in BRCA mutation carriers, a systematic review. Am J Surg. 2016; 212(4):660-669.
4. Nagaraja V et al. Is Sentinel Lymph Node Biopsy Necessary in Patients Undergoing Prophylactic Mastectomy? A Systematic Review and Meta-Analysis. Breast J. 2016; 22(2):158-65.
5. Li X et al. Effectiveness of Prophylactic Surgeries in BRCA1 or BRCA2 Mutation Carriers: A Meta-analysis and Systematic Review. Clin Cancer Res. 2016; 22(15):3971-81.
6. Heemskerk-Gerritsen BA, et al. Improved overall survival after contralateral risk-reducing mastectomy in BRCA1/2 mutation carriers with a history of unilateral breast cancer: a prospective analysis. Int J Cancer. 2015; 136(3):668-77.
7. Guillem JG et al. ASCO/SSO review of current role of risk-reducing surgery in common hereditary cancer syndromes. J Clin Oncol. 2006; 24(28):4642-60.
8. Mau C and Untch M. Prophylactic Surgery: For Whom, When and How? Breast Care (Basel). 2017

Dec;12(6):379-384. doi: 10.1159/000485830.
9. Kenny R et al. Mastectomy for risk reduction or symmetry in women without high risk gene mutation: A review. Int J Surg. 2018 Feb;50:60-64. doi: 10.1016/j.ijsu.2017.12.022
10. Eisemann BS et al. Risk-Reducing Mastectomy and Breast Reconstruction: Indications and Evidence for Current Management Strategies. Clin Plast Surg. 2018 Jan;45(1):129-136. doi: 10.1016/j.cps.2017.08.013. Nipple-sparing mastectomy in women at high risk of developing breast cancer. Lewis RS, George A, Rusby JE. Gland Surg. 2018 Jun;7(3):325-336. doi: 10.21037/gs.2018.04.01.
11. Liede A et al. Risk-reducing mastectomy rates in the US: a closer examination of the Angelina Jolie effect. Breast Cancer Res Treat. 2018 Sep;171(2):435-442. doi: 10.1007/s10549-018-4824-9.
12. Carbine NE et al. Risk-reducing mastectomy for the prevention of primary breast cancer. Cochrane Database Syst Rev. 2018 Apr 5;4:CD002748. doi: 10.1002/14651858.CD002748.pub4
13. Henry DA et al. Trends in use of bilateral prophylactic mastectomy vs high-risk surveillance in unaffected carriers of inherited breast cancer syndromes in the Inherited Cancer Registry (ICARE). Breast Cancer Res Treat. 2019 Feb;174(1):39-45. doi: 10.1007/s10549-018-5057-7.
14. Jakub JW et al. Oncologic Safety of Prophylactic Nipple-Sparing Mastectomy in a Population With BRCA Mutations: A Multi-institutional Study. JAMA Surg. 2018 Feb 1;153(2):123-129. doi: 10.1001/jamasurg.2017.3422.



Chirurgische Prävention bei gesunden *BRCA1/2* Mutationsträgerinnen

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

	Oxford LoE	Oxford GR	AGO
▪ **Risiko-reduzierende bilaterale Salpingo-Oophorektomie (RRSO)****	2a	B	
▪ reduziert die Eierstockkrebsinzidenz und -mortalität			++*
▪ reduziert die Gesamtmortalität			++*
▪ **Risiko-reduzierende bilaterale Mastektomie (RRBM)**			
▪ reduziert die Brustkrebsinzidenz	2b	B	+*
▪ reduziert die Mortalität bei *BRCA1* Mutationsträgerinnen***	2b	B	+*

* Studienteilnahme empfohlen
** Die RRSO wird ab ca. 35 Jahren für *BRCA1* und ab ca. 40 Jahren für *BRCA2* Mutationsträgerinnen unter Berücksichtigung des Erkrankungsalters in der Familie und des Familienplanungs-Status empfohlen.
*** Für *BRCA2* Mutationsträgerinnen konnte keine Mortalitätsreduktion gezeigt werden. RRM Beratung sollte individualisiert durchgeführt werden.

1. Domchek SM, Friebel TM, Neuhausen SL, et al. Mortality after bilateral salpingo-oophorectomy in BRCA1 and BRCA2 mutation carriers: a prospective cohort study. Lancet Oncol. 2006;7(3):223-9.
2. Domchek SM, Friebel TM, Singer CF, et al. Association of risk-reducing surgery in BRCA1 or BRCA2 mutation carriers with cancer risk and mortality. JAMA. 2010;304(9):967-75.
3. Heemskerk-Gerritsen BAM, Seynaeve C, van Asperen CJ, et al.: Breast Cancer Risk After Salpingo-Oophorectomy in Healthy BRCA1/2 Mutation Carriers: Revisiting the Evidence for Risk Reduction. JNCI J Natl Cancer Inst (2015) 107(5): djv033
4. Heemskerk-Gerritsen BAM, Jager A, Koppert LB et al: Survival after bilateral risk-reducing mastectomy in healthy BRCA1 and BRCA2 mutation carriers. Breast Cancer Res Treat 2019, 177(3):723-733.
5. Hoogerbrugge N, Bult P, Bonenkamp JJ, et al. Numerous high-risk epithelial lesions in familial breast cancer. Eur J Cancer. 2006;42(15):2492-8.
6. Kauff ND, Satagopan JM, Robson ME, et al. Risk-reducing salpingo-oophorectomy in women with a BRCA1 or BRCA2 mutation. N Engl J Med. 2002;346(21):1609-15.
7. Kotsopoulos J, Huzarski T, Gronwald J, et al: Hereditary Breast Cancer Clinical Study Group. Bilateral Oophorectomy and Breast Cancer Risk in BRCA1 and BRCA2 Mutation Carriers. J Natl Cancer Inst.

2016 Sep 6;109(1). doi: 10.1093/jnci/djw177. Print 2017 Jan.

8. Lostumbo L, Carbine NE, Wallace J. Prophylactic mastectomy for the prevention of breast cancer. Cochrane Database Syst Rev. 2010(11):CD002748.
9. Mavaddat N, Antoniou AC, Mooij TM et al: Risk-reducing salpingo-oophorectomy, natural menopause, and breast cancer risk: an international prospective cohort of BRCA1 and BRCA2 mutation carriers. Breast Cancer Res 2020, 22(1):8.
10. Meijers-Heijboer H, van Geel B, van Putten WL, et al. Breast cancer after prophylactic bilateral mastectomy in women with a BRCA1 or BRCA2 mutation. N Engl J Med. 2001;345(3):159-64.
11. Rebbeck TR, Friebel T, Lynch HAT, et al. Bilateral prophylactic mastectomy reduces breast cancer risk in BRCA1 and BRCA2 mutation carriers: the PROSE Study Group. J Clin Oncol. 2004;22(6):1055-62.
12. Rebbeck TR, Lynch HT, Neuhausen SL, et al. Prophylactic oophorectomy in carriers of BRCA1 or BRCA2 mutations. N Engl J Med. 2002;346(21):1616-22.
13. Xiao YL, Wang K, Liu Q, Li J, Zhang X, Li HY. Risk Reduction and Survival Benefit of Risk-Reducing Salpingo-oophorectomy in Hereditary Breast Cancer: Meta-analysis and Systematic Review. Clin Breast Cancer. 2019 Feb;19(1):e48-e65. doi: 10.1016/j.clbc.2018.09.011. Epub 2018 Oct 4. PMID: 30470623.

Risiko-reduzierende Interventionen bei erkrankten *BRCA1/2* Mutationsträgerinnen

©AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

FORSCHEN
LEHREN
HEILEN

	Oxford		
	LoE	GR	AGO
▪ Risikoreduzierende Salpingo-Oophorektomie (RRSO)	2b	B	+*
▪ reduziert Eierstockkrebsinzidenz und -mortalität			
▪ reduziert die Gesamtmortalität (gegensätzliche Ergebnisse bzgl. kontralateraler Brustkrebsinzidenz)			
▪ Risikoreduzierende kontralaterale Mastektomie (RRCM)* reduziert kontralaterale Brustkrebsinzidenz und die Mortalität	2b	B	+*
▪ Tamoxifen (reduziert kontralaterale Brustkrebsinzidenz)	2b	B	+/-*
▪ Indikationsstellung für RRCM sollte Alter, Ersterkrankungsalter und betroffenes Gen berücksichtigen.	2a	B	++*
▪ Risikoreduzierende bilaterale Mastektomie nach Ovarialkarzinom	4	C	+/-**

* Gesamtprognose muss berücksichtigt werden, Studienteilnahme empfohlen
** in Abhängigkeit vom Tumorstadium (FIGO I/II), rezidivfreier Zeit (≥ 5 Jahre), Alter

1. Domchek SM, Friebel TM, Neuhausen SL, et al. Mortality after bilateral salpingo-oophorectomy in BRCA1 and BRCA2 mutation carriers: a prospective cohort study. Lancet Oncol. 2006;7(3):223-9.
2. Domchek SM, Friebel TM, Singer CF, et al. Association of risk-reducing surgery in BRCA1 or BRCA2 mutation carriers with cancer risk and mortality. JAMA. 2010;304(9):967-75.
3. Evans DG, Ingham SL, Baildam A, et al. Contralateral mastectomy improves survival in women with BRCA1/2-associated breast cancer. Breast Cancer Res Treat. 2013;140(1):135-42.
4. Graeser MK, Engel C, Rhiem K, et al. Contralateral breast cancer risk in BRCA1 and BRCA2 mutation carriers. J Clin Oncol. 2009;27(35):5887-92.
5. Heemskerk-Gerritsen BA, Rookus MA, Aalfs CM, et al. Improved overall survival after contralateral risk-reducing mastectomy in BRCA1/2 mutation carriers with a history of unilateral breast cancer: a prospective analysis. Int J Cancer. 2015;136(3):668-77.
6. Metcalfe K, Gershman S, Ghadirian P, et al. Contralateral mastectomy and survival after breast cancer in carriers of BRCA1 and BRCA2 mutations: retrospective analysis. BMJ. 2014;348:g226.
7. Metcalfe K, Lynch HT, Foulkes WD, et al. Effect of Oophorectomy on Survival After Breast Cancer in BRCA1 and BRCA2 Mutation Carriers. JAMA Oncol. 2015;1(3):306-13.
8. Metcalfe K, Lynch HT, Ghadirian P, et al. Contralateral breast cancer in BRCA1 and BRCA2 mutation carriers. J Clin

Oncol. 2004;22(12):2328-35.
9. Metcalfe KA, Lubinski J, Ghadirian P, et al. Predictors of contralateral prophylactic mastectomy in women with a BRCA1 or BRCA2 mutation: the Hereditary Breast Cancer Clinical Study Group. J Clin Oncol. 2008;26(7):1093-7.
10. Pierce LJ, Levin AM, Rebbeck TR, et al. Ten-year multi-institutional results of breast-conserving surgery and radiotherapy in BRCA1/2-associated stage I/II breast cancer. J Clin Oncol. 2006;24(16):2437-43.
11. Rhiem K, Engel C, Graeser M, et al. The risk of contralateral breast cancer in patients from BRCA1/2 negative high risk families as compared to patients from BRCA1 or BRCA2 positive families: a retrospective cohort study. Breast Cancer Res. 2012;14(6):R156.
12. Domechek SM, Jhaveri K, Patil S et al. Risk of metachronous breast cancer after BRCA mutation associated ovarian cancer. Cancer 2013;119:1344-8.
13. McGee J, Giannakeas V, Karlan B, et al. Risk of breast cancer after a diagnosis of ovarian cancer in BRCA mutation carriers: ismutation carriers: is preventive mastectomy warranted? Gynecol Oncol. 2017 May;145(2):346–351.
14. Jacobson M, Narod SA: Does oophorectomy reduce breast cancer mortality for BRCA mutation carriers after breast cancer? Expert Rev Anticancer Ther. 2018 Apr;18(4):305-306
15. Heemskerk-Gerritsen BAM, Seynaeve C, van Asperen CJ, et al.: Breast Cancer Risk After Salpingo-Oophorectomy in Healthy BRCA1/2 Mutation Carriers: Revisiting the Evidence for Risk Reduction. JNCI J Natl Cancer Inst (2015) 107(5): djv033
16. Ye-Lei Xiao, Kang Wang, Qiang Liu, et al.: Risk Reduction and Survival Benefit of Risk-Reducing Salpingo-oophorectomy in Hereditary Breast Cancer: Meta-analysis and Systematic Review. Clinical Breast Cancer, Vol. 19, No. 1, e48-65risk-reducing
17. Heemskerk-Gerritsen BAM, Jager A, Koppert LB et al: Survival after bilateral mastectomy in healthy BRCA1 and BRCA2 mutation carriers. Breast Cancer Res Treat 2019, 177(3):723-733.
18. Mavaddat N, Antoniou AC, Mooij TM et al: Risk-reducing salpingo-oophorectomy, natural menopause, and breast cancer risk: an international prospective cohort of BRCA1 and BRCA2 mutation carriers. Breast Cancer Res 2020, 22(1):8.
19. Kotsopoulos J, Narod SA Prophylactic mastectomy for BRCA mutation carriers after ovarian cancer treatment: is it beneficial? Expert Rev Anticancer ,18(3):199-200.

20. Phillips KA, Milne RL, Rookus MA et al. Tamoxifen and risk of contralateral breast cancer for BRCA1 and BRCA2 mutation carriers. J Clin Oncol 2013,31(25):3091-9.
21. Fong A, Cass I, John C, et al. Breast Cancer Surveillance Following Ovarian Cancer in BRCA Mutation Carriers. Am Surg. 2020 Oct;86(10):1243-1247. doi: 10.1177/0003134820964208. Epub 2020 Oct 26. PMID: 33106023.

Formen der Risiko-reduzierenden (bilateralen) Mastektomie (RRBM)

© AGO e. V.
in der DGGG e.V.
sowie
in der DKG e.V.

Guidelines Breast
Version 2022.1D

In Zusammenarbeit mit:

www.ago-online.de

FORSCHEN
LEHREN
HEILEN

RRBM reduziert die Inzidenz von MaCa und wahrscheinlich auch MaCa-bedingte Mortalität*	Oxford LoE	Oxford GR	AGO
▪ Einfache Mastektomie	2b	B	+
▪ RRBM mittels SSM**	2b	C	+
▪ RRBM mittels NSM** (MAK*** erhaltend)	2b	C	+
▪ Kontralaterale prophylaktische Mastektomie	4	C	+/-

* in Abhängigkeit von Vorerkrankungen, z. B. bei vorbestehendem Ovarialkarzinom 1-2 %
** SSM / NSM: Skin-/Nipple-Sparing Mastectomy
*** MAK: Mamillen-Areola-Komplex

1. Van Verschuer VM et al. Patient Satisfaction and Nipple-Areola Sensitivity After Bilateral Prophylactic Mastectomy and Immediate Implant Breast Reconstruction in a High Breast Cancer Risk Population: Nipple-Sparing Mastectomy Versus Skin-Sparing Mastectomy. Ann Plast Surg. 2016; 77(2):145-52.
2. Agha RA et al. Nipple sparing versus skin sparing mastectomy: a systematic review protocol. BMJ Open. 2016; 6(5):e010151.
3. Manning AT et al. Conservative mastectomies for breast cancer and risk-reducing surgery: the Memorial Sloan Kettering Cancer Center experience. Gland Surg. 2016; 5(1):55-62.
4. Benson JR et al. Oncologic safety of conservative mastectomy in the therapeutic setting. Gland Surg. 2016; 5(1):37-46.
5. Howard MA et al. Patient satisfaction with nipple-sparing mastectomy: A prospective study of patient reported outcomes using the BREAST-Q. J Surg Oncol. 2016; 114(4):416-22.
6. Boughey JC et al. Contralateral Prophylactic Mastectomy (CPM) Consensus Statement from the American Society of Breast Surgeons: Data on CPM Outcomes and Risks. Ann Surg Oncol. 2016; 23(10):3100-5.
7. Boughey JC et al. Contralateral Prophylactic Mastectomy Consensus Statement from the American Society of Breast Surgeons: Additional Considerations and a Framework for Shared Decision Making.

Ann Surg Oncol. 2016; 23(10):3106-11.
8. Yao K et al. Nipple-sparing mastectomy in BRCA1/2 mutation carriers: an interim analysis and review of the literature. Ann Surg Oncol.; 2015; 22(2):370-6.
9. Guillem JG et al. ASCO/SSO review of current role of risk-reducing surgery in common hereditary cancer syndromes. J Clin Oncol. 2006; 24(28):4642-60.