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in der DGGG e.V.  
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Qualitätsstandard  
Version 2021.12

ERFOLICHEN  
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# Diagnosis and Treatment of Patients with early and advanced Breast Cancer

## Oncoplastic and Reconstructive Surgery




AGO e.V.  
in der DGO e.V.  
DGS  
in der DG-Gyn.  
Qualifiziertes Breast  
Team 2021.12

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## Plastic-reconstructive aspects after mastectomy

- **Versions 2002–2020:**  
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- **Version 2021:**  
Thill / Heil




**Definition of oncoplastic surgical procedures**

**Use of plastic surgical techniques at the time of tumor removal to enable safe resection margins and to preserve aesthetic breast contour.**

**Focus on favorable scar placement, adequate soft tissue formation, choice of proper reconstruction procedure (including in the context of radiation) and reconstruction of the contralateral side to achieve symmetric results.**

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1. Bertozzi N, et al. Oncoplastic breast surgery: comprehensive review. 2017; 21(11): 2572-2585.
2. Kuerer H et al. Optimizing breast cancer adjuvant radiation and integration of breast and reconstructive surgery. ASCO Educational Book 2017



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## Classifications

**1. By Hoffmann/Wallwiener:**  
**Classification by reconstructive surgery complexity with respect to breast conservation and mastectomy: PubMed Central, Figure 1: BMC Cancer. 2009; 9: 108. Published online 2009 Apr 8. doi: 10.1186/1471-2407-9-108 (nih.gov)**

**2. By Clough:**  
**Oncoplastic classification for breast conservation according to relative resection volume: Level 1: < 20% of breast volume resection („simple oncoplastic surgery“) and Level 2 > 20% of breast volume resection with quadrant per quadrant techniques of mastopexy.**

Hoffmann D et al., BMC 2009, Clough KB et al., Ann Surg Oncol 2010

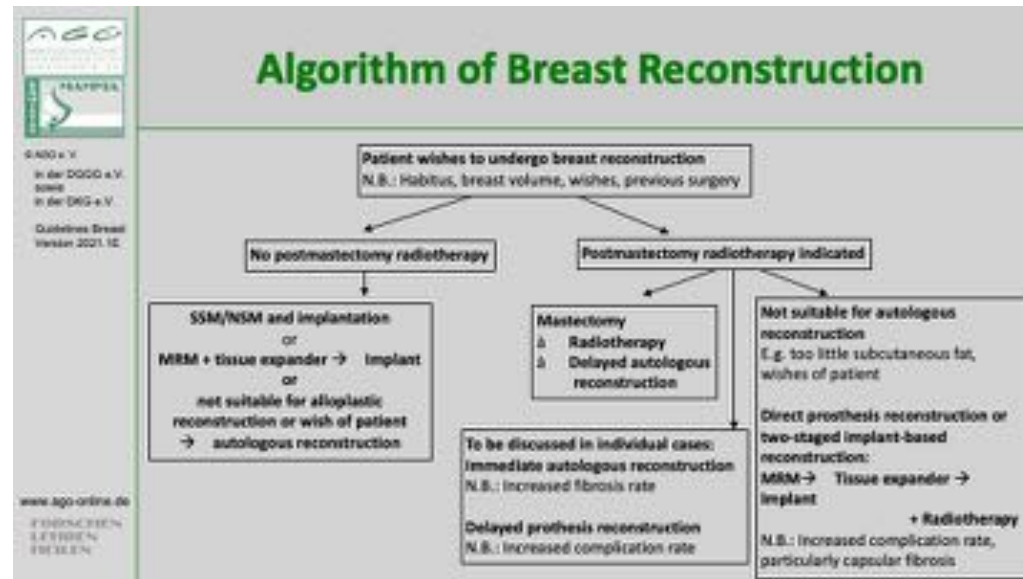
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## Oncoplastic breast conserving surgery (OPS)

	Oxford		
	LoE	GR	AGO
• OPS may replace mastectomy in selected patients	2b	B	+
• OPS and BCS are oncologically equivalent	2b	B	+
• Aesthetic outcome of OPS might be better in selected cases	2b	B	+
• Complication rates of OPS and BCS are similar	3b	C	+

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3. 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.
4. 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.
5. 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.
6. 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.
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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
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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.
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## Breast Reconstruction Principles Good Clinical Practise

AGO: ++

- Planning of reconstructive procedure by interdisciplinary tumor board before mastectomy
- Counseling regarding all surgical techniques, including advantages and disadvantages
- Preference for autologous reconstruction after radiotherapy or if radiotherapy is planned
- Offer second opinion
- Discussion of neoadjuvant treatment if unfavorable tumor-breast-relation
- Consideration of contralateral breast;
  - discuss possible alignment / sequencing surgical procedures to produce symmetry; usually after at least 3-6 months (Caveat: need for post-resections, consider effects of radiotherapy for affected side)
- Preference for less stressful surgical technique with stable long-term aesthetic result (prefer BCS / OIS over mastectomy)
- Avoid delay of adjuvant therapy due to reconstruction
- Assessment of outcome (e.g. PROM)
- Ensure that oncologic safety is not impaired

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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.
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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
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## Postmastectomy Reconstruction

	Oxford		
	LoE	GR	AGO
▪ Use of silicone gel filled breast implants one step or two steps after expander	2a	B	+
▪ Safety comparable to saline implants	2b	B	
▪ Autologous tissue reconstruction	2a	B	+
▪ Pedicled tissue reconstruction	2a	B	+
▪ Free tissue reconstruction (including vascular anastomoses)	2a	B	+
▪ Autologous tissue procedure plus implants	3a	C	+/-

**Caveat:** BMI >30, smoking status, diabetes, radiotherapy, age, bilateral mastectomy

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.
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## Timing of Reconstruction

	Oxford		
	LoE	GR	AGO
• <b>Immediate breast reconstruction</b>	3b	B	++
• Mandatory: SSM/NSM			
• Avoidance of a postmastectomy syndrome			
• <b>Delayed breast reconstruction (2-step)</b>	3b	B	++
• No interference with adjuvant procedures (CHT, RT)			
• Disadvantage: loss of skin envelope			
• <b>„Delayed-immediate“ breast reconstruction (placeholder before definitive reconstruction)</b>	3b	B	+

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.
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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.

## Timing of implant Based Reconstruction and Radiotherapy

	Oxford		
	LoE	GR	AGO
▪ <b>Implant reconstruction (IR)</b>			
▪ IR without radiotherapy	2a	B	++
▪ IR prior to radiotherapy	2a	B	+
▪ IR following radiotherapy	2b	B	+/-
▪ IR following secondary mastectomy (after BCS* with radiotherapy)	2a	B	+/-
▪ Perioperative antibiotic prophylaxis (max. 24 hours)	2a	B	+

\* BCS: Breast Conserving Surgery

### Radiation:

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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. Alborno 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.
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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.
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#### Prophylactic antibiotics:

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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



**Metaanalysis of Prophylactic Antibiotics >24h in Implant-based Immediate Breast Reconstruction (IBR)**

- **11 studies (15,966 mastectomy procedures)**
- **Three studies comparing topical antibiotics with no topical antibiotics demonstrated statistical significance (RR= 0.26, 95% CI: 0.12–0.60,  $P = 0.001$ )**
- **8 studies comparing extended systemic antibiotics with standard of care found no statistical significance (RR = 0.80, 95% CI: 0.60–1.08,  $P = 0.13$ ).**

**LoE 2a B**


In the setting of immediate breast reconstruction (IBR) following mastectomy, there is insufficient evidence for the use of extended prophylactic antibiotics to reduce surgical site infection (SSI) rates. Well-designed randomized controlled trials in patients undergoing IBR should be conducted to determine the appropriate regimen and/or duration of prophylactic antibiotics on SSI outcomes.

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Hai Y et al. Plast Reconstr Surg Glob Open 2020;8:e2613, doi: 10.1097/GOX.0000000000002613.

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## Radiotherapy and Implant-based Reconstruction


**Cave: High complication rate in combination with radiotherapy (capsular contracture, revision surgery, reconstruction failure, reduced cosmetic outcome and patient satisfaction)**

**Cave: Lower patient satisfaction with implant-based reconstruction plus radiotherapy compared to autologous reconstruction plus radiotherapy**

**LoE 2b B**

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.
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## Possible Associations between Implants and rare Diseases

- **US FDA Breast Implant Postapproval Studies (LPAS)**  
**Long-term Outcomes in 99,993 Patients**  
*(Primary Augmentation: N= 71.937 / Primary Reconstruction: N= 9942)*
  - 56% of implants were silicone implants
- **Possible Associations:**
  - Sjogren syndrome: (SIR\*8.14)
  - scleroderma: (SIR 7.00)
  - rheumatoid arthritis: (SIR5.96)
  - stillbirth: (SIR4.50)
  - melanoma: (SIR3.71)
- At 7 years, reoperation rate is 11.7% for primary augmentation, and 25% for primary/revision reconstruction.
- One case of BIA-ALCL

Associations need to be further analyzed with patient-level data to provide conclusive evidence !

\*Standardized incidence ratio

### 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**

**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)	OR	95% CI	P Value
Minorsyngel	Allergan	3	3.0	112.8	0.02	0.01-0.03	<0.001
	Mentor	307	28.4	112.8	0.25	0.22-0.28	<0.001
Blauzynd givvils	Allergan	3	2.8	5.4	0.52	0.04-6.38	>0.001
	Mentor	349	32.2	5.4	5.96	5.35-6.62	<0.001
Glutodermis	Mentor	95	8.2	0.6	13.66	5.12-35.34	<0.001
Apogen syndrome	Mentor	32	5.7	0.7	8.14	6.24-10.61	<0.001
Systemic lupus erythematosus	Allergan	3	0.5	5.4	0.11	0.02-0.52	<0.001
	Mentor	34	6.0	5.4	1.11	0.86-1.41	0.398
Cancer	Allergan	80	16.0	45.3	0.35	0.31-0.48	<0.001
	Mentor	512	61.8	45.3	1.34	1.40-1.68	<0.001
Breast cancer	Mentor	335	11.9	12.5	1.11	0.93-1.33	0.26
Long cancer	Mentor	5	0.5	5.2	0.12	0.04-0.27	<0.001
Breast cancer	Mentor	3	0.4	0.6	0.67	0.14-3.05	0.636
Melanoma	Mentor	35	7.8	2.1	3.71	2.87-4.75	<0.001
Neurological disorder	Allergan	13	3.4	22.1	0.15	0.06-0.25	<0.001
	Mentor	234	23.8	22.5	1.05	1.44-1.75	<0.001
Multiple sclerosis	Mentor	37	4.3	2.5	1.72	1.36-2.19	0.001
Myositis	Mentor	17	1.1	0.8	1.38	1.09-1.66	0.018

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

### New Background slide

1. Coroneos CJ, Selber JC, Offodile AC 2nd et al.: US FDA Breast Implant Postapproval Studies: Long-term Outcomes in 99,993 Patients. Ann Surg. 2019 Jan;269(1):30-36.



## Breast Implant Associated Anaplastic Large Cell Lymphoma (BIA-ALCL)

- Approximately 10.000.000 implant carriers
- Rare disease, 3 % of Non-Hodgkin Lymphomas, 0.04-0.5 % of all malignant breast diseases
- 1:3.000 – 30.000 in women with textured implants (caveat: underreporting!)
- Estimated incidence 0.6-1.2 / 100.000 women with implants (median age: 54 y)
- Mainly associated with textured implants
- Interval to diagnosis: 8 years (median)
- Clinical symptoms
  - Swelling and seroma. (60 %)
  - Solid tumor (17 %)
  - Seroma and solid tumor (20 %)
- Histology: CD30+ / ALK-T-Cell Lymphoma
- Mandatory registration as SAE (§3 MPSV to BfArM)

### 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>
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<http://doi.org/10.1097/PRS.0000000000001033>

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## BIA-ALCL - Surfaces of Breast Implants

- 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

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## BIA-ALCL– Diagnosis

	Oxford		
	LoE	GR	AGO
• Breast US (assessment of new seromas > 1 year after implant insert, solid lesion (sensitivity: 84%, specificity: 75%))	3a	D	++
• Breast-MRI in confirmed cases	3a	D	++
• Staging (imaging, e.g. CT, PET-CT)	3a	D	++
• Cytology of late seromas <ul style="list-style-type: none"> <li>• - &gt; 50 ml</li> <li>• - Complete assessment</li> <li>• - flow-cytology (T-cell clone)</li> <li>• - BIA-ALCL specific cytologic diagnostic (CD 30+)</li> </ul>	3a	D	++
• Core needle biopsy in solid lesions	3a	D	++
• Lymphoma assessment of resected tissue and histologic staging			
• Documentation of the implant (manufacturer, size, volume, surface, Batch-number) and entry in registry	5	D	++

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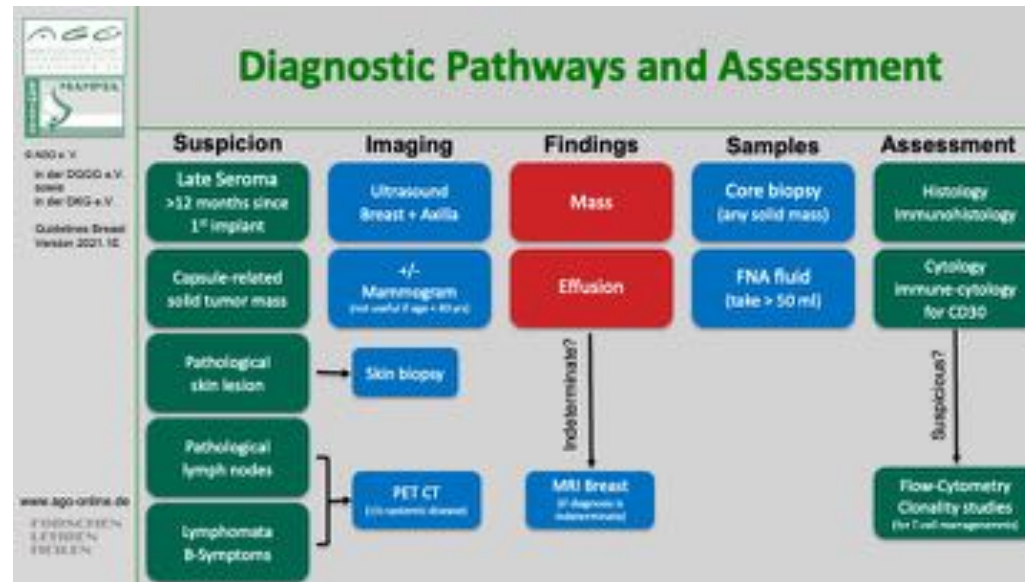
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## BIA-ALCL – Therapy

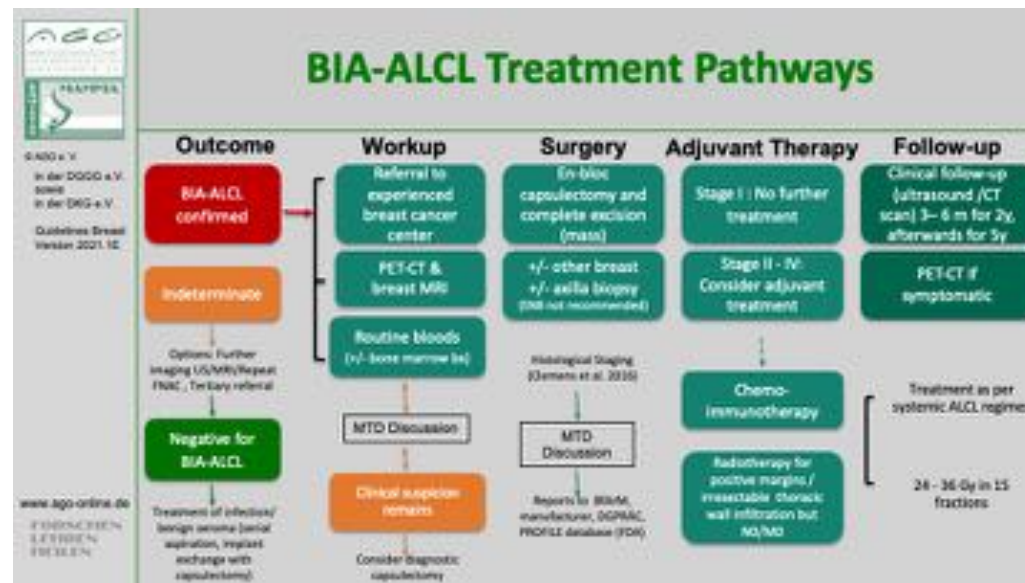
	Oxford		
	LoE	GR	AGO
▪ Implant resection and complete capsulectomy including tumorectomy	3a	C	++
▪ Resection of suspicious lymph nodes, no routine use of sentinel-node-biopsy, no axillary dissection	4	D	++
▪ Polychemotherapy (e.g. CHOP) in cases of extra capsular extension	4	D	+
▪ Radiotherapy in unresectable tumors	5	D	+/-
▪ Case discussion in an interdisciplinary tumor board in the presence of a lymphoma specialist	5	D	++

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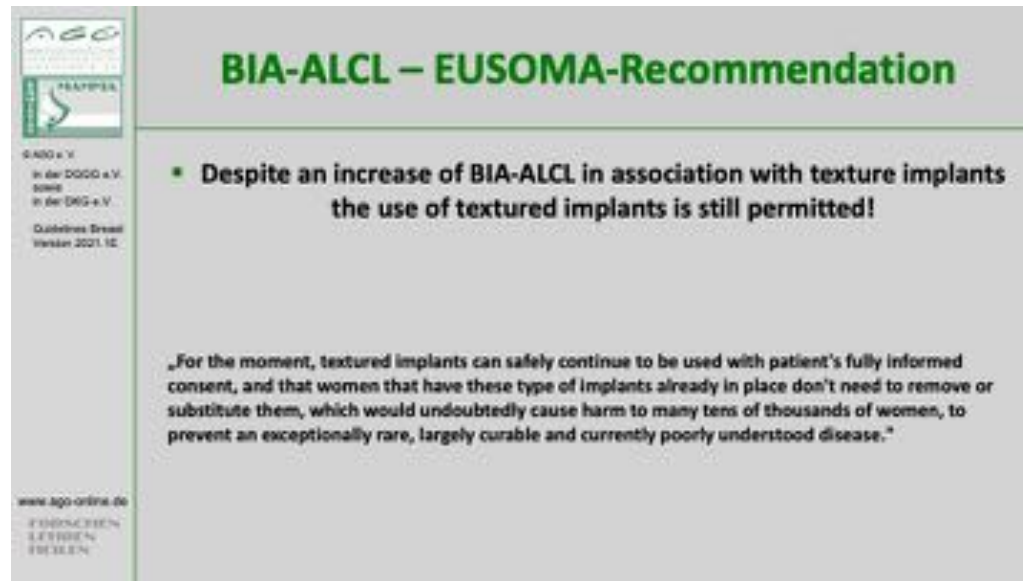
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TNM Staging of BIA-ALCL				
	TNM-Kategorie	Definition	Stage	Definition
Tumor extent (iT/pT)	T1	Confined to seroma or a layer on luminal side of capsule	IA	T1 N0 M0
	T2	Early capsule infiltration	TB	T2 N0 M0
	T3	Cell aggregates or sheets infiltrating the capsule	TC	T3 N0 M0
	T4	Lymphoma infiltrates beyond the capsule	IIA	T4 N0 M0
Regional lymph nodes (iN/pN)	M0	No lymph node involvement	IIIB	T1-3 N1 M0
	M1	One regional lymph node positive	III	T4 N1-2 M0
	M2	Multiple regional lymph nodes positive	IV	T any N any M1
Metastasis (iM/pM)	M0	No distant spread		
	M1	Spread to other organs or distant sites		

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## Tissue Replacement Techniques and Meshes (Details of Implant Reconstruction)

- The subcutaneous lodge is superior to the subpectoral lodge
- Acellular dermal matrix (ADM)
  - subpectoral
  - subcutaneous
- Synthetic meshes
  - subpectoral
  - subcutaneous

Participation in registry studies recommended

Oxford		
LoE	GR	AGO
3b	C	+/-
1b	A	+/- <sup>2</sup>
2b	B	+/- <sup>2</sup>
2b	B	+ <sup>2</sup>
2b	B	+ <sup>2</sup>

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## Lipotransfer

- Lipotransfer following mastectomy and reconstruction
- Lipotransfer after BCS\*
- Autologous adipose derived stem cells (ASCs)-enriched fat grafting vs. without stem cells

Oxford		
LoE	GR	AGO
2a	B	+
2a	B	+
2a	B	-

\*BCS: Breast Conserving Surgery

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## Postmastectomy Pedicled Reconstruction

	Oxford		
	LoE	GR	AGO
<b>Breast reconstruction (BR) with autologous tissue</b>			
▪ TRAM, latissimus-dorsi-flap (both can be performed as a muscle-sparing technique)	2a	C	+
▪ Delayed TRAM in patients at high-risk	3a	B	+
▪ Ipsilateral pedicled TRAM	2a	B	+
▪ Radiotherapy:			
▪ BR following radiotherapy	2a	B	+
▪ BR prior to radiotherapy	2a	B	+/-
▪ (higher rates of fibrosis, wound healing problems, liponecrosis and reduced aesthetic outcome)			

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## Free flaps for reconstruction

	Oxford		
	LoE	GR	AGO
<b>Type of free flap</b>			
• DIEP	2a	B	+
• Free TRAM	2a	B	+
• SIEA	3a	C	+/-
• Glutealis flaps (SGAP- / IGAP, FCI)	4	C	+/-
• Free gracilis flap (TMG)	4	C	+/-
• Use of ICG* to assess flap perfusion	2a	B	+
<b>Advantages</b>			
• DIEP and free TRAM are potentially muscle-sparing procedures. DIEP has a lower rate of abdominal hernias, especially in obesity			
<b>Disadvantages</b>			
• Time- and personnel consuming microsurgical procedures			
• Intensified postoperative monitoring			
• Pre-reconstruction radiotherapy increases rate of vascular complications			

\*ICG: indocyanin green

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## Pediced versus free tissue transfer

Oxford		
LoE	GR	AGO
3a	A	++

- Muscle-sparing techniques and accuracy of abdominal wall closure lead to low rates of late donor site complications independent of method used
- Autologous abdominal-based reconstructions have highest satisfaction rates (PROM)
- Donor site morbidity (e.g. impaired muscle function) has to be taken into consideration for all flap techniques

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## Skin-/nipple-sparing Mastectomy (SSM/NSM) and Reconstruction

	Oxford		
	LoE	GR	AGO
▪ Skin-/nipple-sparing Mastectomy (SSM/NSM)			
▪ Safe (same recurrence rate as MX)	2b	B	++
▪ Higher QoL for patients	2b	B	++
▪ NAC can be preserved under special conditions	2b	B	++
▪ Feasible after mastopexy / reduction mammoplasty	4	C	++
▪ Use of ICG* to predict necrosis of the skin	1b	B	+
▪ Skin incisions - different possibilities:			
▪ Periareolar			
▪ Hemi-periareolar with/without medial/ lateral extension			
▪ Reduction pattern: „inverted-T“ or vertical			
▪ Inferior lateral approach, inframammary fold			
▪ Lowest incidence of complications	2b	B	+

\* ICG = Indocyanine Green

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## Prevention and therapy of capsular contracture

	Oxford		
	LoE	GR	AGO
<b>Prevention</b>			
• Textured implantats (Caveat: BIA-ALCL)	1a	A	+
• Acellular Dermal Matrix (ADM) vs. nil	2a	B	+
• Synthetic mesh vs. nil	3a	C	+
• Topical antibiotics/antiseptics	2a	B	+
• PVP (Povidone-Iodine)	2a	B	+/-
• Leukotriene-antagonists	2a	B	+/-
• Breast massage	3a	C	-
<b>Surgical interventions</b>			
• Capsulectomy	3b	C	+
• Capsulotomy (Caveat: exclusion of BIA-ALCL)	3b	C	+

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# Seroma after implant-based reconstruction I

	Oxford		
	LoE	GR	AGO
▪ Incidence: around 5-10% (2-50%)	2a	B	
Co-variables:			
▪ History of radiation increases the risk (RR ca. 3)	2a	B	
▪ Obesity increases risk (e.g. BMI > 30 vs. < 30; RR ca. 3)	2a	B	
▪ ADM increases risk (RR ca. 3)	2a	B	
▪ Smooth expanders increase risk (RR ca. 5)	3b	C	
▪ History of neoadjuvant systemic chemotherapy does not increase the risk	2a	B	
▪ Epipectoral pocket does not increase the risk	2b	B	

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## Seroma after implant-based reconstruction II

	Oxford		
	LoE	GR	AGO
<b>Prevention</b>			
▪ Drain with no, little and much suction	3b	C	+
▪ Drain removal at < 30ml per 24 hours	2b	B	+
<b>Therapy</b>			
▪ Evacuation of seroma by FNA or re-insertion of drain	4	C	+
▪ Dressings	5	D	+/-
▪ Revision surgery with capsulectomy (ultima ratio)	5	D	+
▪ Revision surgery with implant removal (ultima ratio)	5	D	+

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## Risk-reducing bilateral mastectomy for healthy women (RRBM)

	Oxford		
	LoE	GR	AGO
• RRBM reduces breast cancer incidence	2b	B	++
• RRBM in deleterious BRCA1/2 mutation	2a	B	++
• RRBM in high-risk situation without BRCA 1/2 mutation (individual decision depending on personal- family history and mutational status – e.g. high and moderate-risk genes, Hodgkin lymphoma)	4	D	+/-*
• High risk and no BRCA counselling in specialized centre*	5	D	–
• Non-directive counselling prior to RR-BM	2b	B	++
• RR-BM should be considered with other risk-reducing surgical options incl. bilateral salpingo-oophorectomy (BSO) and in the context of pre-existing diseases	2a	A	++
• Further need for education of physicians regarding possibilities and advantages of RRBM	1b	A	++
* Counselling, risk prediction, and follow-up in specialized centers recommended			

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Surgical Prevention for <u>Healthy</u> Female <b>BRCA1/2</b> Mutation Carriers			
	Oxford		
	LoE	GR	AGO
<ul style="list-style-type: none"> <li>▪ Risk-reducing bilateral salpingo-oophorectomy (RR-BSO)**               <ul style="list-style-type: none"> <li>▪ Reduces OvCa incidence and mortality</li> <li>▪ Reduces overall mortality</li> </ul> </li> <li>▪ Risk-reducing bilateral mastectomy (RR-BM)               <ul style="list-style-type: none"> <li>▪ Reduces BC incidence</li> <li>▪ Reduces BC mortality in BRCA1 mutation carriers***</li> </ul> </li> </ul>	2a	B	*  ++* ++*  +* +*
*study participation recommended ** The RR-BSO is recommended from about 35 years for BRCA1 and from about 40 years for BRCA2 mutation carriers, taking into account the age of ovarian cancer diagnosis in the family and family planning status. *** No reduction in mortality could be shown for BRCA2 mutation carriers. BRM counselling should be individualised.			

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Risk-reducing Interventions for BRCA1/2 Female Mutation Carriers <u>Affected</u> by Breast Cancer			
	Oxford		
	LoE	GR	AGO
<ul style="list-style-type: none"> <li>▪ Risk-reducing bilateral salpingo-oophorectomy (RR-BSO) <ul style="list-style-type: none"> <li>* Reduces OvCa incidence and mortality</li> <li>* Reduces overall mortality (contradictory results for reduction of cl BC incidence)</li> </ul> </li> <li>▪ Prophylactic contralateral mastectomy (RR-CM) reduces BC incidence and mortality</li> <li>▪ Tamoxifen (reduces contralateral BC incidence)</li> <li>▪ Indication for RR-CM should consider age at onset of first breast cancer in affected gene</li> <li>▪ RR-BM after ovarian cancer <ul style="list-style-type: none"> <li>* study participation recommended</li> <li>** Depends on tumor stage (FIGO I/II), recurrence free interval (≥ 5y), age</li> </ul> </li> </ul>	2b	B	++
	2b	B	++
	2b	B	+/-*
	2a	B	+++
	4	C	+/-**

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## Forms of risk-reducing (bilateral) mastectomy (RR-BM)

	Oxford		
	LoE	GR	AGO
<b>RR-BM reduces breast cancer incidence;** BC-specific mortality also likely reduced</b>			
▪ Simple mastectomy	2b	B	+
▪ RR-BM by SSM*	2b	C	+
▪ RR-BM by NSM* (NAC* sparing)	2b	C	+
▪ Contralateral prophylactic mastectomy	4	C	+/-

\* SSM / NSM: Skin-/Nipple-Sparing Mastectomy

# NAC: nipple-areola complex

\*\* depending on prior illnesses, e. g. pre-existing ovarian cancer 1-2% (stage III-IV)

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