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In Zusammen-
arbeit mit:



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Diagnostik und Therapie früher und fortgeschrittener Mammakarzinome

Onkoplastische und rekonstruktive Mammachirurgie




Plastisch-rekonstruktive Aspekte nach Mastektomie

- **Versionen 2002–2022:**

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Definition der onkoplastischen Operation

Einsatz plastischer operativer Techniken zum Zeitpunkt der Tumorentfernung, um sichere Resektionsgrenzen zu erreichen und eine ästhetische Brustform zu ermöglichen.

Fokus auf günstige Narbenplatzierung, adäquate Weichteilformierung, Wahl des geeigneten Wiederaufbauverfahrens (auch unter der Bedingung einer Radiatio) und Darlegung zu Möglichkeiten der Angleichung der Gegenseite, um eine Symmetrie zu erreichen.


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



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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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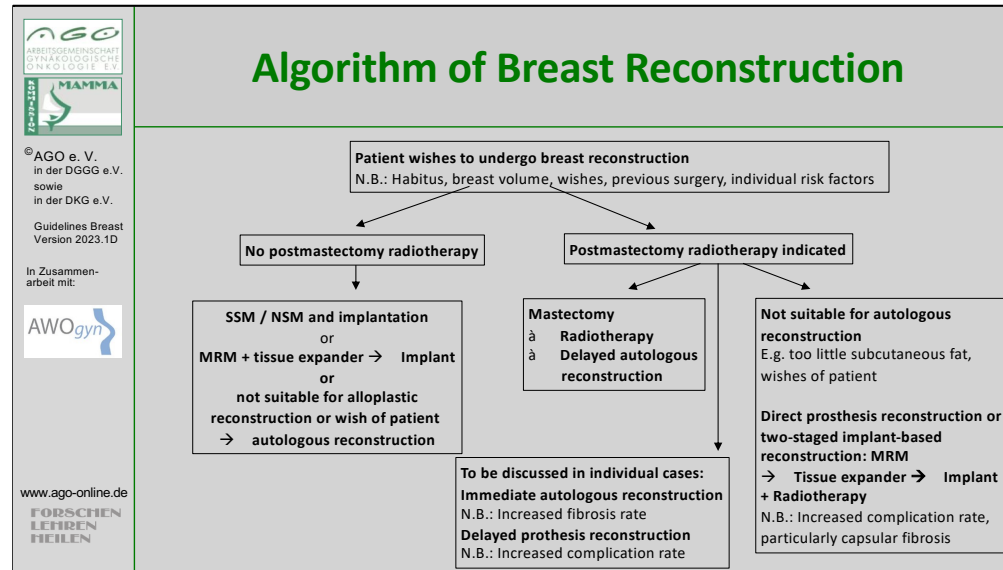
Onkoplastische brusterhaltende Operation (OPS)

	Oxford		
	LoE	G R	AGO
▪ OPS kann in ausgewählten Fällen eine Mastektomie ersetzen	2b	B	+
▪ auch bei multizentrischen/multifokalen Tumoren	2b ^(a)	B	+
▪ OPS und BEO sind onkologisch gleichwertig	2a	B	++
▪ OPS und BEO Komplikationsraten sind vergleichbar	2a	B	+/-


1. Francesca De Lorenzi, Francesco Borelli, Eleonora Pagan: Oncoplastic Breast-Conserving Surgery for Synchronous Multicentric and Multifocal Tumors: Is It Oncologically Safe? A Retrospective Matched-Cohort Analysis. Ann Surg Oncol (2022) 29:427–436
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radiation and need for reexcision: A database evaluation. *Ann Plast Surg* 89:e11-e17 (2022).

8. Ida Oberhauser, Jasmin Zeindler, Mathilde Ritter et al. Impact of oncoplastic breast surgery on rate of complications, time to adjuvant treatment and risk of recurrence. *Breast Care* 16: 452-460 (2021)
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Breast Reconstruction Principles Good Clinical Practice

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 tumorbiologically indicated) in case of 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 esthetic result (prefer BCS / OPS over mastectomy)
- Avoid delay of adjuvant therapy due to reconstruction
- Assessment of outcome, e.g. Patient Reported Outcome (PRO)
- Oncologic safety is not impaired

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Mastektomie und Möglichkeiten der Rekonstruktion

	Oxford		
	LoE	GR	AGO
▪ Einsatz von mit Silikongel gefüllten Implantaten einzeitig (primär)* oder zweizeitig nach Expander	2a	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, bilaterale ME,

* Dokumentation in Implantatregister

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Adverse Event Rates with Silicone Implants versus National Norms and Saline Implants. *Plast Reconstr Surg*. 2017; 140(4):666-679.

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Zeitpunkt der Rekonstruktion mit Implantaten und Bezug zur Strahlentherapie

- **Implantat-Rekonstruktion (IR)**
 - IR ohne Strahlentherapie (RT)
 - IR vor RT
 - IR nach RT
 - IR nach sekundärer Mastektomie nach BET
 - Perioperative antibiotische Prophylaxe (max. 24 Stunden)

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

Radiation:

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Prophylactic antibiotics:


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Metaanalysis of Prophylactic Antibiotics > 24 h 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.

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


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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: (SIR 5.96)
 - stillbirth: (SIR 4.50)
 - melanoma: (SIR 3.71)
- 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)	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.




Brust-Implantat-assoziiertes großzellig-anaplastisches Lymphom (BIA-ALCL)

- Etwa 10.000.000 Implantatträgerinnen weltweit
- Selten, 3 % aller Non-Hodgkin-Lymphome, 0,04–0,5 % aller malignen Brusterkrankungen
- geschätzte jährliche Inzidenz 0,6–1,2 je 100.000 Frauen mit Implantaten (medianes Patientenalter 54 J.)
- 1:3.000-30.000 bei Frauen mit texturierten Implantaten (CAVE: Underreporting!)
- Auftreten überwiegend bei texturierten Implantaten
- 5-Jahres-OAS 89 %
- Intervall zur Lymphomdiagnose: 8 Jahre (Median)
- Klinische Präsentation
 - Schwellung und Serom (60 %)
 - Tumöröse Raumforderung (17 %)
 - Serom und Raumforderung (20 %)
 - Axilläre Lymphadenopathie (20 %)
- Histologisch: CD30+ / ALK- T-Zell-Lymphom
- Meldepflicht als SAE nach §3 MPSV an das BfArM


Reviews

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BIA-ALCL - Implantatoberflächen

- 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– 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 Späterom	3a	D	++
▪ Untersuchung von mind. 50 ml			
▪ komplette Aufarbeitung			
▪ Flowzytometrie (T-Zell-Klon)			
▪ BIA-ALCL spezifische zytol. Diagnostik (CD 30+)			
▪ Stanzbiopsie bei soliden Herdbefunden	3a	D	++
▪ Lymphomdiagnostik am Resektat und histologisches Staging			
▪ Dokumentation des Implantates (Hersteller, Größe, Füllung, Oberfläche, Batch-Nummer) und Eingabe in Register	5	D	++

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S13.

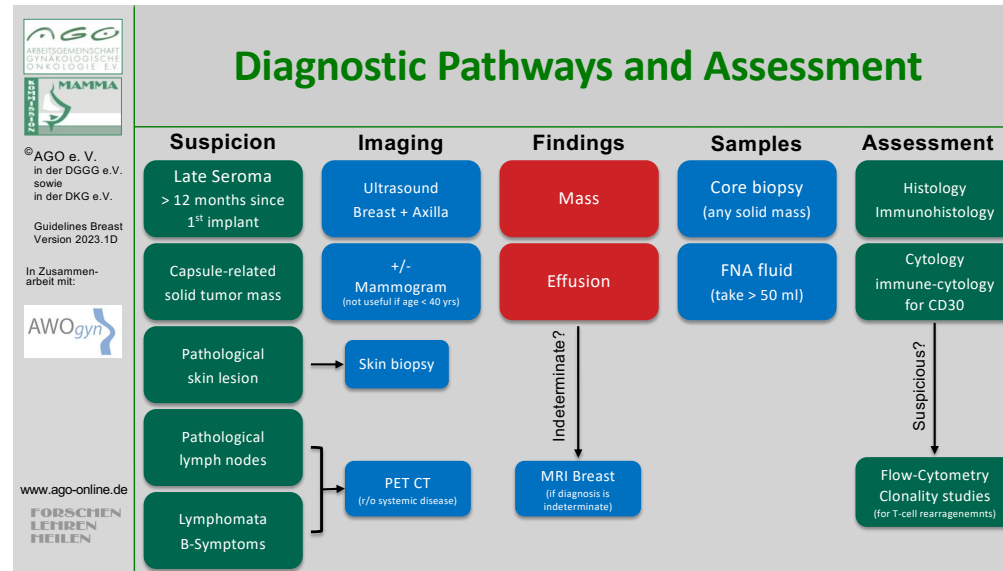
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BIA-ALCL – Therapie

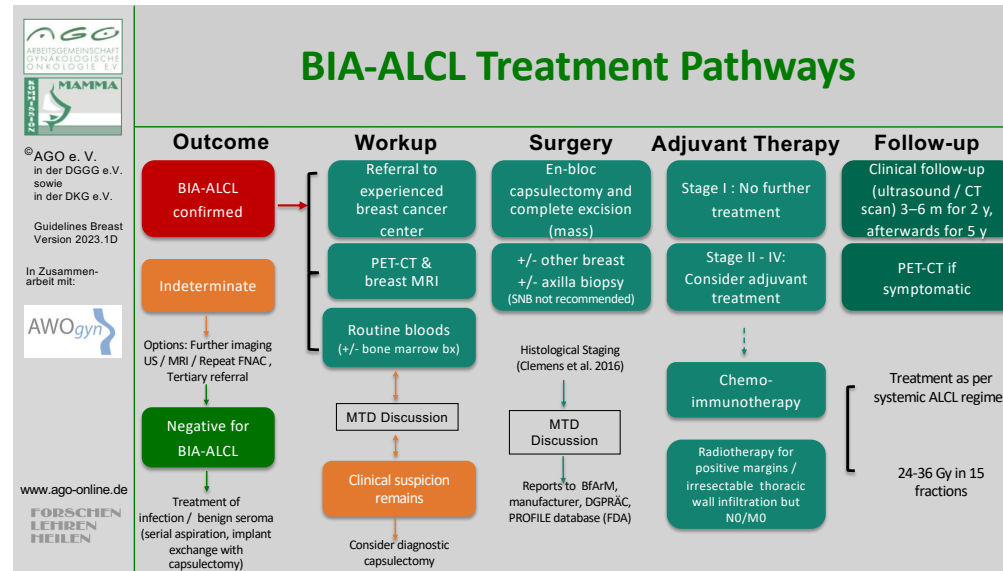
	Oxford		
	LoE	GR	AGO
▪ Implantatentfernung und vollständige Kapsulektomie einschließlich Tumorentfernung	3a	C	++
▪ Entfernung suspekter Lymphknoten, keine routine-mäßige Sentinel-Node Biospie, keine Axilladisektion	4	D	++
▪ Polychemotherapie (z. B. CHOP) bei extrakapsulärer Tumorausbreitung	4	D	+
▪ Radiatio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

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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

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BIA-ALCL – EUSOMA-Recommendation


- **Despite an increase of BIA-ALCL in association with texture implants the use of textured implants is still permitted!**

„For the moment, textured implants can safely continue to be used with patient's fully informed consent, and that women that have these type of implants already in place don't need to remove or substitute them, which would undoubtedly cause harm to many tens of thousands of women, to prevent an exceptionally rare, largely curable and currently poorly understood disease.“

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Breast Implant Capsule-Associated Squamous Cell Carcinoma

- Squamous cell carcinomas associated with breast implant augmentation are exceedingly rare (11 cases reported).
- Breast implant capsule-associated squamous cell carcinoma occurs in patients with long standing breast implant augmentations (>11 years).
- Presentation with breast enlargement/swelling and pain, skin changes
- 3/11 pts. developed metastatic disease within 1 year.
The reported metastatic sites include axilla, soft tissue (arm and leg), liver, lung, mediastinum, retroperitoneum, and leptomeninges.
- 4/5 patients with follow-up data showed a correlation between extracapsular extension and development of metastases (1-8 months; mean 4.25 months).
- In this limited cohort it is difficult to ascribe prognostic factors, but extracapsular extension does appear to be a concerning finding.

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Implantatloge, Netze und ADMs mit Implantat- rekonstruktion- Endpunkt QoL / Komplikationen

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

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Lipotransfer

- **Lipotransfer nach ME und Rekonstruktion**
- **Lipotransfer nach brusterhaltender Therapie**
- **Mit Stammzellen (ACS) angereicherte, autologe Fettgewebstransplantation vs. ohne Stammzellen**

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

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Gestielte Lappen zur Rekonstruktion

	Oxford		
	LoE	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	+
▪ Omentum Flap	4	C	+/-
▪ Radiotherapie:			
▪ BR nach RT	2a	B	+
▪ BR vor RT	2a	B	+/-
(erhöhte Rate an Fibrosen, Wundheilungsstörungen, Lipoidnekrosen, reduziertes ästhetisches Outcome)			

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Freie Lappen zur Rekonstruktion

	Oxford		
	LoE	GR	AGO
Freier Gewebettransfer			
▪ DIEP	2a	B	+
▪ Freier TRAM	2a	B	+
▪ SIEA	3a	C	+/-
▪ Gluteallappen (SGAP- / IGAP, FCI)	4	C	+/-
▪ Free gracilis flap (TMG)	4	C	+/-
▪ Omentum Flap	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			

* ICG: Indocyaningrün

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Gestielter vs. freier Gewebettransfer

Oxford		
LoE	GR	AGO
3a	A	++

- Muskelsparende Techniken und sorgfältiger Verschluss der Bauchdecke führen zu niedrigen Komplikationsraten unabhängig von der verwendeten Methode
- Autologer Gewebettransfer von der Bauchdecke hat die höchste Zufriedenheitsrate (PROM)
- Morbidität der Spenderregion (z. B. reduzierte Muskelfunktion) kann bei allen Lappentechniken auftreten

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

	Oxford		
	LoE	GR	AGO
Hautsparende Mastektomie (SSM / NSM)			
▪ Sicher (gleiche Rezidivrate wie bei ME 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

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New slide!



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

Guidelines Breast
Version 2023.1D

In Zusammen-
arbeit mit:



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FORSCHEN
LEBEN
HEILEN

Mastectomy + Reconstruction

Risk of complications with the addition of radiotherapy

Autologous reconstruction		Implant-based reconstruction	
Endpoint	Risk Ratio with addition of radiotherapy (95%-CI)	Endpoint	Risk Ratio with addition of radiotherapy (95%-CI)
Wound infection	1.14 (NA)	Wound infection	2.49 (1.43, 4.35)
Secondary surgery	1.62 (1.06, 2.48)	Secondary surgery	1.64 (1.17-2.31)
Reconstructive failure	0.80 (NA)	Reconstructive failure	2.89 (1.30, 6.39)
Volume loss	8.16 (4.26, 15.63)		
Fat necrosis	1.91 (1.45, 2.52)		
		Capsular contracture	5.17 (1.93, 13.80)
		ME skin flap nekrosis	1.62 (1.27, 2.08)
		Implant extrusion	3.44 (2.18, 5.43)

Further risks of autologous reconstruction:
Distorsion of breast shape, fibrosis, vascular complications
Autologous reconstruction is favored in terms of patient satisfaction and assessment of the aesthetic outcome.

NA: not available

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Prävention und Therapie der Kapselfibrose

	Oxford		
	LoE	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	+

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
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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
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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

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Textured implants:

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Serome nach Implantatrekonstruktion I		
 <p>© AGO e. V. in der DGGG e.V. sowie in der DKG e.V.</p> <p>Guidelines Breast Version 2023.1D</p> <p>In Zusammen- arbeit mit:</p>  <p>www.ago-online.de</p> <p>FORSCHEN LEBEN HEILEN</p>	Oxford	
	LoE	GR
	2a	B
	Inzidenz: ca. 5-10 % (2-50 %)	
	Einflussfaktoren:	
	<ul style="list-style-type: none"> Z. n. Radiatio erhöht Risiko (RR ca. 3) 	
	2a	B
	<ul style="list-style-type: none"> Adipositas erhöht Risiko (z. B. BMI > 30 vs. < 30; RR ca. 3) 	
	2a	B
	<ul style="list-style-type: none"> Einsatz von ADM erhöht Risiko (RR ca. 3) 	
	2a	B
	<ul style="list-style-type: none"> Glatte Expander erhöhen Risiko (RR ca. 5) 	
	3b	C
	<ul style="list-style-type: none"> Z. n. neoadjuvanter Chemotherapie erhöht Risiko eher nicht 	
	2a	B
	<ul style="list-style-type: none"> 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.00000000000007417.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.00000000000007326
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Serome nach Implantatrekonstruktion II

	Oxford		
	LoE	GR	AGO
Prävention			
▪ Drainage	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.
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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
4. Ditsch N, Pochert N, Jeschke U....Kühn T: OT3-20-0 4; SerMa – Seroma formations of the mammary gland in breast cancer patients after mastectomy and implant-based reconstruction (EUBREAST 5); SABCS 2022

Chirurgische Prävention

	Oxford		
	LoE	GR	AGO
■ Risiko-reduzierende, unilaterale oder bilaterale Mastektomie (RRME) ohne Vorliegen von genetischen Risikofaktoren (führt nicht zu einer Mortalitätsreduktion)	2a	B	-*
■ Axilladisektion oder Sentinel-Lymphknoten Exzision bei RRME	2a	B	--

* Studienteilnahme empfohlen

RRME ohne gentisches Risiko

1. Kurian AW, Lichtensztajn DY, Keegan TH, et al. Use of and mortality after bilateral mastectomy compared with other surgical treatments for breast cancer in California, 1998-2011. JAMA. 2014;312(9):902-14.
2. Copson ER, Maishman TC, Tapper WJ, et al: Germline BRCA mutation and outcome in young-onset breast cancer (POSH): a prospective cohort study. Lancet Oncol 2018, DOI: [http://dx.doi.org/10.1016/S1470-2045\(17\)30891-4](http://dx.doi.org/10.1016/S1470-2045(17)30891-4).

Sentinel-Lymphknoten Exzision bei RRME

1. Wong SM, Ferroum A, Apostolova C et al. Incidence of Occult Breast Cancer in Carriers of BRCA1/2 or Other High-Penetrance Pathogenic Variants Undergoing Prophylactic Mastectomy: When is Sentinel Lymph Node Biopsy Indicated? Ann Surg Oncol. 2022 Oct;29(11):6660-6668.

Chirurgische Prävention bei gesunden *BRCA1/2* Mutationsträgerinnen

		Oxford		
		LoE	GR	AGO
■ Risiko-reduzierende bilaterale Salpingo-Oophorektomie (RR-BSO)**		2a	B	
■ reduziert die Eierstockkrebsinzidenz und -mortalität				++*
■ reduziert die Gesamtmortalität				++*
■ Risiko-reduzierende bilaterale Mastektomie (RRBM)				
■ reduziert die Brustkrebsinzidenz		2b	B	+*
■ reduziert die Mortalität bei <i>BRCA1</i> Mutationsträgerinnen***		2b	B	+*
* Studienteilnahme empfohlen				
** Die RR-BSO wird ab ca. 35 Jahren für <i>BRCA1</i> und ab ca. 40 Jahren für <i>BRCA2</i> Mutationsträgerinnen unter Berücksichtigung des Erkrankungsalters in der Familie und des Familienplanungs-Status empfohlen.				
*** Für <i>BRCA2</i> Mutationsträgerinnen konnte keine Mortalitätsreduktion gezeigt werden. RRBM 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.
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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.
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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.

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

1. Domchek SM, Jhaveri K, Patil S et al. Risk of metachronous breast cancer after BRCA mutation associated ovarian cancer. *Cancer* 2013;119:1344-8.
2. 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.
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