

Diagnosis and Treatment of Patients with early and advanced Breast Cancer



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Oncoplastic and Reconstructive Breast Surgery

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- **Versions 2002–2024:**
Audretsch / Banys-Paluchowski / Bauerfeind / Blohmer / Brunnert / Dall / Ditsch / Fersis / Friedrich/ Gerber / Hanf / Heil / Kühn / Kümmel / Lux / Nitz / Rezai / Rody / Scharl / Solbach / Thill / Thomssen / Wöckel
- **Version 2025:**
Lux / Thill

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Definition of Oncoplastic Surgery

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Use of plastic surgical techniques at the time of tumor removal to improve aesthetic and quality of life outcomes without compromising oncological safety.

Focus on favorable scar placement, adequate soft tissue formation, choice of a suitable reconstructive technique (taking radiation therapy into consideration) and contralateral symmetrization.

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Classifications

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1. Hoffmann / Wallwiener (2009):

Classification by reconstructive surgery complexity with respect to breast conservation and mastectomy

2. Clough et al. (2010):

**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**

3. American Society of Society of Breast Surgeons (2019):

**Level 1: < 20% breast tissue removed; Level 2: 20–50% of breast tissue removed; Volume
replacement: > 50% of breast tissue removed**

Oncoplastic Breast-Conserving Surgery (OPS)



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- **OPS may replace mastectomy in selected patients**
 - also in case of multicentric / multifocal tumors
- **OPS and BCS have equivalent oncological safety**
- **Complication rates of OPS and BCS are similar**
- **In breast hypertrophy, tumor-adapted reduction before RT is associated with fewer complications than secondary reduction after RT; however, secondary reduction is still possible in terms of complication rate (major complications)**

Oxford	
LoE	GR
2b	B
2b	B
2a	B
2a	B
3a	B

Options for Breast Reconstruction When Radiotherapy is Planned

For patients who ask for breast reconstruction and are scheduled to undergo radiotherapy*

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*Influencing factors: tumor related factors, breast size/shape, skin flap, previous surgery/RT, BMI, comorbidities, patient wishes, physical activities, oncological situation; ABR, autologous breast reconstruction; AFG, autologous fat grafting; PMRT, post mastectomy radiotherapy; SSM/NSM, skin sparing/nipple sparing mastectomy

Breast Reconstruction Principles

Good Clinical Practice

AGO: ++

- **Planning of breast reconstruction 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 indicated based on tumor biology) in case of unfavorable breast-tumor relation**
- **Consideration of contralateral breast:**
 - **Discuss symmetrization procedures**
- **Preference for less radical surgical technique with stable long-term aesthetic 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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Mastectomy and Reconstruction Options

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- **Heterologous reconstruction***
- **Autologous reconstruction**
- **Pedicled flap reconstruction**
- **Free flap reconstruction
(including vascular anastomoses)**
- **Autologous reconstruction combined with implant
placement**
- **AFG prior expander / implant after mastectomy and
radiotherapy**

	Oxford		
	LoE	GR	AGO
Heterologous reconstruction*	2a	B	+
Autologous reconstruction	2a	B	+
Pedicled flap reconstruction	2a	B	+
Free flap reconstruction (including vascular anastomoses)	2a	B	+
Autologous reconstruction combined with implant placement	3a	C	+/-
AFG prior expander / implant after mastectomy and radiotherapy	2b	B	+/-

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

* Documentation in implant registry

Germany: <https://www.bundesgesundheitsministerium.de/implantateregister-deutschland>,

Mandatory documentation of breast implants in the Medical Implants Registry begins on 1st July 2024

Timing of Reconstruction

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- **Immediate breast reconstruction**
 - Prevention of postmastectomy syndrome
- **Delayed breast reconstruction (2-step)**
 - No interference with adjuvant (CHT, RT)
 - Disadvantage: loss of skin envelope
- **„Delayed-immediate“ breast reconstruction (placeholder before definitive reconstruction)**

Oxford		
LoE	GR	AGO
3b	B	++
3b	B	++
3b	B	+

Implant-Based Reconstruction and Radiotherapy



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- **Implant reconstruction**
 - **without radiotherapy**
 - **prior to radiotherapy**
 - **following radiotherapy**
 - **following secondary mastectomy after breast-conserving therapy**

- **Moderately hypofractionated RT after mastectomy (total dose approx. 40 Gy in approx. 15-16 fractions in approx. 3 to 5 weeks)**
 - **after breast reconstruction**

Oxford		
LoE	GR	AGO
2a	B	+
2a	B	++
2a	B	+
2b	B	+/-
2a	B	+/-
1a	A	++
1b	B	++

Cave: Risk of capsular fibrosis after radiation, especially in cases of prolonged wound healing, prolonged pain, seroma and swelling

Infection prophylaxis and Breast Reconstruction

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	Oxford		
	LoE	GR	AGO
Heterologous reconstruction:			
▪ Perioperative antibiotic prophylaxis (max. 24 h)	1a	A	+
▪ Extended antibiotic prophylaxis (> 24 h)	2a	B	+
▪ Prophylactic antibiotic rinse intraoperatively	2a	B	+
▪ Antibiotic therapy after culture from drainage (week 2)	3a	C	+/-
▪ Changing gloves before implantation	4	C	+
▪ Antiseptic rinse	2a	B	+
Autologous reconstruction:			
▪ Perioperative antibiotic prophylaxis (max. 24 h)	2b	B	+
▪ Extended antibiotic prophylaxis (> 24 h)	2a	B	+/-
▪ Extended antibiotic prophylaxis > 24 h in as part of AFG	3b	B	-

Tranexamic Acid in Complex Breast Surgery

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Prevention of:

- Hematoma
- Seroma

No increased risk for thromboembolic complications in patients without history of thromboembolic events

	Oxford		
	LoE	GR	AGO
Hematoma	2a	B	+/-
Seroma	2a	B	+/-
No increased risk for thromboembolic complications in patients without history of thromboembolic events	2a	B	+

CAVE: Dosage and application routes (local, i.v., oral) differ between studies, consider history of thromboembolic events



Breast Implant-associated Diseases

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BIA-ALCL = Breast implant-associated anaplastic large cell lymphoma

BIA-SCC = Breast implant-associated squamous cell carcinoma

SSBI = Systemic Symptoms Associated with Breast Implants

Synonyms:

Breast Implant Illness (BII); Autoimmune syndrome induced by adjuvants (ASIA);
Shoenfeld's syndrome; Silicone implant incompatibility syndrome (SIIS)

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Breast implant-associated anaplastic large cell lymphoma (BIA-ALCL)

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- **Peripheral non-Hodgkin's T-cell lymphoma arising around a textured breast implant or in a patient with a history of a textured surface device**
- **Number of global cases reported as MDR (medical device regulation) to the FDA by 30.06.2023: 1,264 with 63 deaths**
- **Number of global cases reported by the American Society of Plastic Surgeons (ASPS) by 25.11.2024: 1,593**
- **Approximately 35,000,000 implant carriers worldwide**
(According to a survey by the International Society of Aesthetic Plastic Surgeons (ISAPS) 2023: 2,174,616 augmentations worldwide were performed)
- **Prevalence and incidence vary greatly, as the number of women with implants can only be estimated**
 - **30.54/10,000 for textured implants (1 case per 3,274 implanted patients) and 6.70/100,000 for implants any type (1 case per 14,925 implanted patients)**
- **The current lifetime risk ranges between 1:355 and 1:86,029 patients with textured implants**
- **Time interval between last implantation and lymphoma diagnosis: 8 years (median)**
- **5-year-OS 89-92%**
- **Clinical presentation**
 - **Frequently periprosthetic seroma, breast asymmetry**
 - **in rarer cases tumor, regional lymphadenopathy, skin rash and/or capsular contracture**
- **Tumor cells are CD30-positive / ALK-negative**
- **Obligation to notify the BfArM as SAE according to §3 MPSV***

* Germany: BfArM <https://www.bfarm.de/SharedDocs/Formulare/DE/Medizinprodukte/BIA-ALCL-Meldung.html>

BIA-ALCL – Diagnosis

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▪ Breast ultrasound (assessment of new seromas > 1 year after implant placement, solid lesions, axillary lymph nodes)	3a	D	++
▪ Cytology of late seromas			
▪ Assessment of min. 50 ml	3a	D	++
▪ Complete assessment incl. BIA-ALCL specific cytologic diagnostic (CD 30+)			
▪ Flow cytometry (T-cell clone)			
▪ Core needle biopsy of solid lesions	3a	D	++
▪ Breast-MRI in confirmed cases	3a	D	++
▪ Staging (PET-CT, alternatively: CT [neck, chest, abdomen, pelvis])	3a	D	++
▪ Lymphoma assessment in resected tissue and histologic staging	3a	D	++
▪ Documentation of the implant in the Implant Registry *	5	D	++

* Germany: <https://www.bfarm.de/SharedDocs/Formulare/DE/Medizinprodukte/BIA-ALCL-Meldung.html>

BIA-ALCL – Therapy

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- **Case discussion in a multidisciplinary tumor board in the presence of a lymphoma specialist**
- **Implant resection and complete capsulectomy including tumorectomy**
- **Contralateral implant removal and capsulectomy in case of bilateral implants (4-6% bilateral BIA-ALCL)**
- **Resection of suspicious lymph nodes, no routine use of sentinel node biopsy or axillary lymph node dissection**
- **Systemic therapy depending on disease stage**
- **Radiotherapy in unresectable tumors**

	Oxford		
	LoE	GR	AGO
	5	D	++
	3a	C	++
	4	D	+/-
	4	D	++
	4	D	+
	5	D	+/-

BIA-ALCL Treatment Pathways

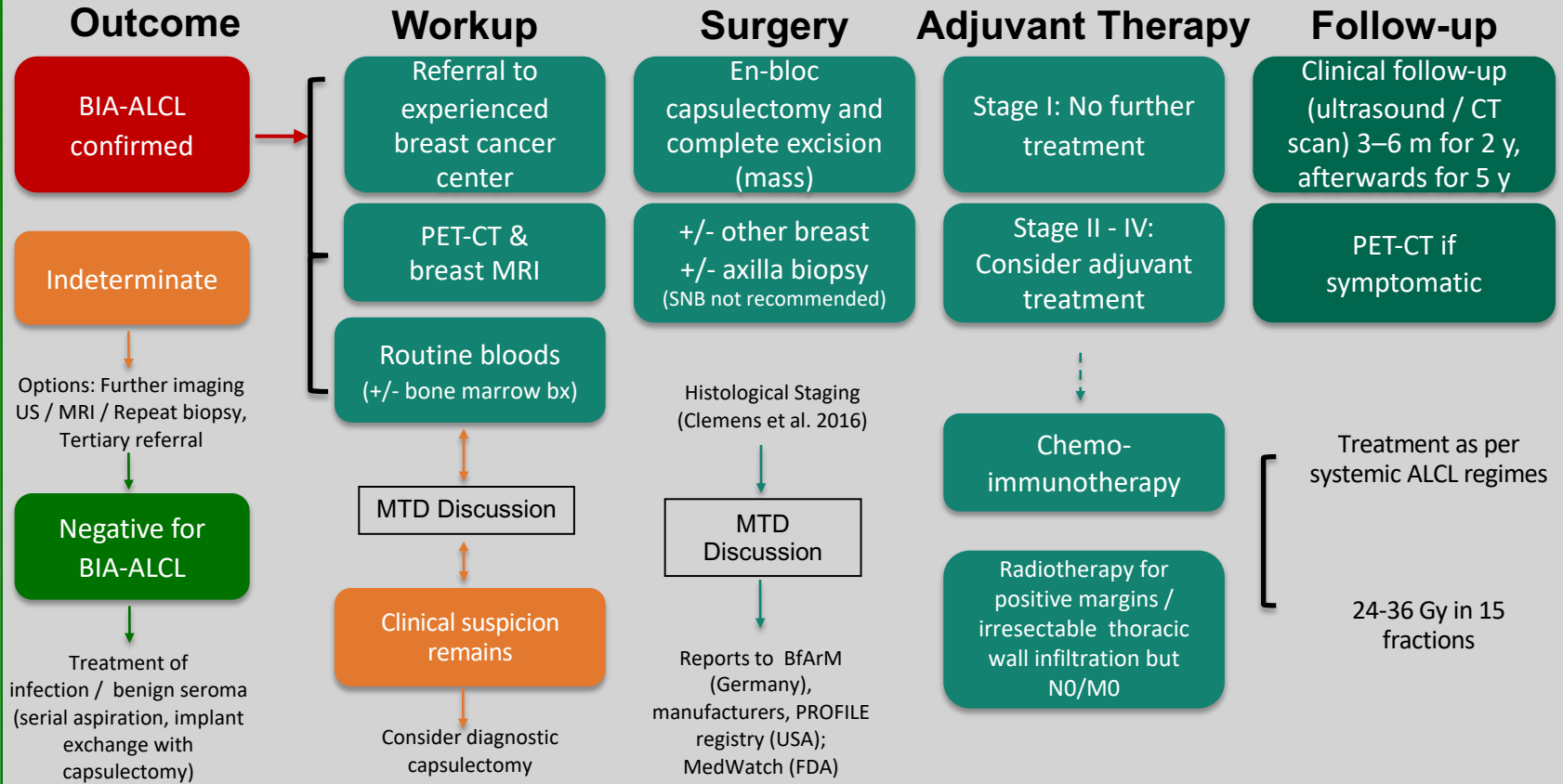
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TNM Staging of BIA-ALCL

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	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
IB	T2 N0 M0
IC	T3 N0 M0
IIA	T4 N0 M0
IIB	T1-3 N1 M0
III	T4 N1-2 M0
IV	T any N any M1

Breast Implant Capsule-Associated Squamous Cell Carcinoma

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- **By March 22, 2023, the FDA had reported 19 cases of BIA-SCC; 30 cases were described up to 11/2023 (Aesthet Surg J. 2024;44(7):757-768)**
- **BIA-SCC occurred approximately 7 to 42 years after initial implant placement (median time 18 years) in aesthetic and reconstructive cases**
- **BIA-SCC was located in the capsule around the breast implant, often in the posterior aspect**
- **There is not a consistent type of implant (textured vs. smooth), content (silicone vs. saline), or location (subglandular vs. retropectoral) that is associated with BIA-SCC**
- **Prevalence 0,61/100,000, lifetime risk 1:164,884**
- **Periprosthetic fluid should be sent for CK5/6 and p63, should be rich in keratin and cytology should display abnormal squamous cells**
- **Initial presentation with breast pain, erythema and swelling**
- **Overall poorer prognosis**
 - **7/21 cases had recurrent cancer within 12 months after definitive resection**
 - **in a review of 18 cases the estimated 12-month mortality rate was 23.8% (calculated from 10 cases with survival data reported)**
- **In this limited cohort it is difficult to ascribe prognostic factors, but extracapsular extension does appear to be a concerning finding.**



Systemic Symptoms Associated with Breast Implants = SSBI

Breast Implant Illness (BII); Autoimmune syndrome induced by adjuvants (ASIA); Shoenfeld's syndrome; Silicone implant incompatibility syndrome (SIIS);

- Summarize a variety of systemic symptoms that have been reported by some women following reconstruction or augmentation with breast implants, independent of the type of implant, filling, shape or surface characteristics, with an onset anywhere from immediately after implantation to years later
- The most frequent systemic symptoms reported in the FDA MDR database (sorted by frequency more to less common):
 - > 40% Fatigue
 - > 30% Joint pain
 - > 20% Brain fog, Autoimmune diseases, Hair loss
 - 10-20% Depression, Rash, Headache, Weight changes
- Currently SSBI are not recognized as a formal medical diagnosis
- SSBI remain a diagnosis of exclusion, there are no specific tests or defined criteria to characterize it
- Any persistent symptoms reported by patients with breast implants should be evaluated for other medical diseases prior to consider implant removal surgery
- More patients with “cosmetic” vs “reconstructive” reasons (cosmetic, 3864/4109 [94.0%] vs. reconstruction, 245/4109 [5.96%]; $p < 0.001$) experience BII symptoms
- Breast implant explantation can show significant improvement of systemic complaints as well as improvement of overall quality of life

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Kabir R et al. Breast Implant Illness as a Clinical Entity: A Systematic Review of the Literature. Aesthet Surg J. 2024 Aug 20;44(9):NP629-NP636

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Fifteen studies of 2572 patients reported implant explantation status, with 72.4% of the patients (1861/2572; 72.4%) choosing to remove their implants:

Implant removal status and patient outcome	
Explantation status	
Implant removed	1861 (1861/2572; 72.4%)
Implant removal with total capsulectomy	(1000/1861; 53.7%)
Symptom improvement	658 (658/788; 83.5%)
Implant to explant time (years)	13.1 (6.58)



BIA-ALCL – EUSOMA-Recommendation

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- **Despite an increase of BIA-ALCL in association with textured 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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Implant Position, Meshes and ADMs in Implant-Based Reconstruction: Outcome QoL / Complication Rate



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	LoE	GR	AGO
<ul style="list-style-type: none"> ▪ No signifikant difference between pre- and subpectoral implant position (complication rate) 	2b	B	
<ul style="list-style-type: none"> ▪ Acellular dermal matrix (ADM) <ul style="list-style-type: none"> ▪ subpectoral ▪ prepectoral 	1b	A	+/-
	2b	B	+/-
<ul style="list-style-type: none"> ▪ Synthetic meshes <ul style="list-style-type: none"> ▪ subpectoral ▪ prepectoral 	2a	B	+/-
	2b	B	+/-

AFG (autologous fat grafting)

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- **AFG**
 - after mastectomy and radiation and prior reconstruction
 - after mastectomy and reconstruction
 - after breast conserving surgery
 - after autologous reconstruction
 - as the sole technique for breast reconstruction
- **Autologous adipose derived stem cells (ASCs)-enriched fat grafting vs. without stem cells**

Oxford		
LoE	GR	AGO
2b	B	+/-
2a	B	+
2a	B	+
2a	B	+
1b	B	+
2a	B	+/-



Piatkowski AA et al. Effect of total breast reconstruction with AFG using an expansion device vs. implants on quality of life among patients with breast cancer - a randomized controlled trial, JAMA Surg 2023

- **BREAST trial - multicenter, randomized clinical trial with an active control including a 1:1 allocation ratio.**
- **n = 193, 11/2015 - 11/2021**
- **Patients receiving postmastectomy radiotherapy were excluded.**
- **The predefined primary outcome was QoL at 12 months after final surgery. This was measured by the BREAST-Q questionnaire**
- **193 patients (mean [SD] age, 49.2 [10.6] years) 18 years or older who desired breast reconstruction were included, 91 patients in the AFG group and 80 in the immediate breast reconstruction (IBR) group received the allocated intervention. In total, 64 women in the AFG group and 68 women in the IBR group completed follow-up. The BREAST-Q scores were higher in the AFG group in all 5 domains and significantly higher in 3: satisfaction with breasts, physical well-being: chest, and satisfaction with outcome. QoL change over time was dependent on the treatment group in favor of AFG. No differences in oncological serious adverse events were found.**
- **Higher QoL and an increase in QoL scores over time in the AFT group compared with the IBR group. No evidence was found that AFT was unsafe.**

Piatkowski AA et al., Effect of Total Breast Reconstruction With Autologous Fat Transfer Using an Expansion Device vs Implants on Quality of Life Among Patients With Breast Cancer - a randomized controlled trial, JAMA Surg 2023,158(5):456-464

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Pedicled Flap Reconstruction

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- **TRAM, latissimus dorsi flap (both can be performed as muscle-sparing techniques)**
- **Delayed TRAM in high-risk patients**
- **Ipsilateral pedicled TRAM**
- **Omentum Flap (unilateral)**
- **Radiotherapy:**
 - **Breast reconstruction following radiotherapy**
 - **Breast reconstruction prior to radiotherapy**

(higher rates of fibrosis, wound healing disorders, liponecrosis and reduced aesthetic outcome)

	Oxford		
	LoE	GR	AGO
	2a	C	+
	3a	B	+
	2a	B	+
	3	B	+/-
	2a	B	+
	2a	B	+/-

Free Flaps for Reconstruction

Oxford

	LoE	GR	AGO
▪ DIEP (deep inferior epigastric artery perforator)	2a	B	+
▪ Free TRAM (transverse rectus abdominis myocutaneus)	2a	B	+
▪ SIEA (superficial inferior epigastric artery)	3a	C	+/-
▪ Glutealis flaps (SGAP [superior gluteal artery perforator] / IGAP [inferior gluteal artery perforator], FCI [fasciocutaneous infragluteal])	4	C	+/-
▪ Free gracilis flap (TMG , transverse myocutaneous gracilis)	4	C	+/-
▪ PAP (profunda artery perforator)	2a	B	+/-
▪ Omentum Flap	3a	B	+/-
Use of ICG* to assess flap perfusion	2a	B	+

Advantages

- **DIEP and free TRAM are potentially muscle-sparing procedures. DIEP has a lower rate of abdominal hernias, especially in obese patients**

Disadvantages

- **Time- and personnel consuming microsurgical procedures, intensified postoperative monitoring**

* ICG: indocyanin green

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Pedicled versus Free Tissue Transfer

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- **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 with all flap techniques**

Oxford		
LoE	GR	AGO
3a	A	++

Skin-/ Nipple-Sparing Mastectomy (SSM / NSM) and Reconstruction

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	Oxford		
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<ul style="list-style-type: none"> ■ Skin-/nipple-sparing Mastectomy (SSM / NSM) <ul style="list-style-type: none"> ■ Oncologically safe (equivalent recurrence rate as in total mastectomy in suitable patients) ■ Higher QoL ■ NAC can be preserved under special conditions <ul style="list-style-type: none"> ■ Feasible after mastopexy / reduction mammoplasty ■ Use of ICG* to predict skin necrosis 	2a	B	++
	2b	B	++
	2b	B	++
	4	C	++
	1b	B	+
<ul style="list-style-type: none"> ■ Skin incisions → different possibilities: <ul style="list-style-type: none"> ■ Periareolar ■ Hemi-periareolar with / without medial / lateral extension ■ Reduction pattern: „inverted-T“ or vertical ■ Inferior lateral approach, inframammary fold <ul style="list-style-type: none"> ■ Lowest incidence of complications 	2b	B	+

* ICG = Indocyanine Green

Mastectomy + Reconstruction

Risk of complications with the addition of radiotherapy

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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 and assessment of the aesthetic outcome.

NA: not available

Prevention and Therapy of Capsular Contracture

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	Oxford		
	LoE	GR	AGO
<ul style="list-style-type: none"> ■ Prevention <ul style="list-style-type: none"> ■ Textured implantats (Caveat: BIA-ALCL) ■ Acellular Dermal Matrix (ADM) vs. nil ■ Synthetic mesh vs. nil ■ Preference of a prepectoral implant position (for post-mastectomy radiation) ■ Topical antibiotics / antiseptics ■ PVP (Povidone-Iodine) ■ Leukotriene-antagonists ■ Breast massage ■ Surgical interventions <ul style="list-style-type: none"> ■ Capsulectomy ■ Capsulotomy (Caveat: exclusion of BIA-ALCL) 	<p>1a</p> <p>2a</p> <p>3a</p> <p>2a</p> <p>2a</p> <p>2a</p> <p>2a</p> <p>3a</p> <p>2a</p> <p>2a</p>	<p>A</p> <p>B</p> <p>C</p> <p>B</p> <p>B</p> <p>B</p> <p>C</p> <p>B</p> <p>B</p>	<p>+</p> <p>+</p> <p>+</p> <p>+</p> <p>+</p> <p>+/-</p> <p>+/-</p> <p>-</p> <p>+</p> <p>+</p>

Seroma after Implant-Based Reconstruction I

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- **Incidence: approx. 5-10% (2-50%)**

Influencing factors:

- **History of radiation increases risk (RR approx. 3)**
- **Obesity increases risk (e.g. BMI > 30 vs. < 30; RR approx. 3)**
- **Use of ADM increases risk (RR approx. 3)**
- **Use of expander with smooth surface increases risk (RR approx. 5)**
- **History of neoadj. chemotherapy does not appear to increase risk**
- **Prepectoral approach does not appear to increase risk**

	Oxford	
	LoE	GR
	2a	B
	2a	B
	2a	B
	3b	C
	2a	B
	2b	B

* Participation in the SERMA study is recommended.

Seroma after Implant-Based Reconstruction II

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Prevention

- Drain
- Drain removal at < 30 ml per 24 hours
- Tranexamic acid
 - i.v. / oral (if no contraindication)
 - Topic

Therapy

- Evacuation of seroma by FNA or re-insertion of drain
- Pressure dressing
- Revision surgery with capsulectomy (ultima ratio)
- Revision surgery with implant removal (ultima ratio)

Oxford		
LoE	GR	AGO
3b	C	+
2b	B	+
2a	B	+
1b	B	+
4	C	+
5	D	+/-
5	D	+
5	D	+

Tranexamic Acid (TXA) in Implant Surgery - Schedules, Dosage and Timing -



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Topic tranexamic acid (Safran T et al., PRS 2023), prospective randomized, double-blind, n = 53, 106 breasts

- 3 g TXA in 100 ml sodium chloride solution for rinsing the implant cavity after NSM and prior implant insertion

Systemic TXA (Guggenheim L et al, J Clin Med 2024), retrospective, n = 132, 155 mastectomies

- First 24 hours:
 - 1 g at the beginning of the operation
 - Then 1 g every 8 hours i.v.
- Second 24 hours:
 - 1 g oral every 8 hours for the next 24 hours

Skin necrosis after mastectomy

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Prevention

- Local nitroglycerin *
- Closed-incision negative pressure therapy (ciNPT)
- Local dimethylsulfoxid
- Oral cilostazol
- Preoperative local heat preconditioning
- Prostaglandin E1

Oxford		
LoE	GR	AGO
1a	A	+
2a	B	+/-
2b	B	+/-
2b	B	+/-
2b	B	+/-
2b	B	+/-

* Dose and regimen vary between studies, off-label

Efficacy and safety of topical nitroglycerin in the prevention of mastectomy flap necrosis – a systematic review and meta-analysis

Wang P et al. Sci Rep 2020



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- **7074 patients (3 randomized clinical trials, 2 retrospective cohort studies)**
- **Intervention: transdermal nitroglycerin treatment (ointment; 4.5-45 mg nitroglycerin, applied immediately after end of surgery and in some studies in the first postoperative period until day 6)**
- **Nitroglycerin significantly reduced the mastectomy flap necrosis rate (immediate breast reconstruction [IBR]: OR, 0.48, 95% CI, 0.33–0.70, $p < 0.01$)**
- **Full-thickness flap necrosis rate in patients receiving IBR was significantly lower in the nitroglycerin group than in the control group (OR, 0.42; 95% CI, 0.25–0.70; $p < 0.01$)**

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Siliconomas

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- **In breast parenchyma or regional lymph nodes, rarely in distant organs (pleura, ribs, muscles)**
- **Incidence unclear**
- **May occur with or without implant rupture (“silicone bleeding”)**
- **Migration of silicone to the lymph nodes takes 6-10 years**
- **Risk of malignancy is not increased**

- **Asymptomatic siliconomas do not require removal**
- **Complete removal of implant and silicone gel (in capsule, if possible) in case of implant rupture**

Oxford		
LoE	GR	AGO
2b	B	+
2b	B	+

Prevalence, clinical characteristics, and management of silicone lymphadenopathy: A systematic review of the literature

Pelegrina Perez TC et al., J Plast Reconstr Aesthet Surg 2024



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- **279 cases of silicone lymphadenopathy and 107 with information on initial diagnosis, 35 (33%) were incidental.**
- **The most common symptom was painless lymphadenopathy, followed by painful lymphadenopathy.**
- **251 (95%) and 13 (5%) patients had silicone and saline implants, respectively, 149 (68%) patients had implant rupture.**
- **Axillary lymphadenopathy was the most affected region (136 cases, 72%), followed by internal mammary (40 cases, 21%), cervical/supraclavicular (36 cases, 19%), and mediastinal (24 cases, 13%) regions.**
- **25% of patients underwent fine-needle aspiration, 12% core needle biopsy, and 59% excisional biopsy. 32% of cases underwent explantation and/or implant exchange.**
- **The most common indication for surgery was implant rupture.**

Surgical Prevention

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- **Risk-reducing unilateral or bilateral mastectomy (RRME) without the presence of clearly defined genetic risk factors**
- **Axillary dissection or Sentinel lymph node excision during RRME**

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

Surgical Prevention for Healthy Female *BRCA1/2* Mutation Carriers

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Oxford		
LoE	GR	AGO
2a	B	
		++*
		++*
2b	B	+*
2b	B	+*

- Risk-reducing bilateral salpingo-oophorectomy (RR-BSO)**

- Reduces OvCa incidence and mortality
- Reduces overall mortality

- Risk-reducing bilateral mastectomy (RR-BM)

- Reduces BC incidence
- Reduces BC mortality in *BRCA1* mutation carriers***

* 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 the family planning status.

*** No reduction in mortality could be shown for *BRCA2* mutation carriers. RRBM counselling should be individualised.

Risk-reducing Interventions for BRCA1/2 Female Mutation Carriers Affected by Breast Cancer



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	Oxford		
	LoE	GR	AGO
<ul style="list-style-type: none"> ▪ Risk-reducing bilateral salpingo-oophorectomy (RR-BSO) <ul style="list-style-type: none"> ▪ Reduces OvCa incidence and mortality ▪ Reduces overall mortality (contradictory results for reduction of cl BC incidence) 	2b	B	+*
<ul style="list-style-type: none"> ▪ Prophylactic contralateral mastectomy (RR-CM)* <ul style="list-style-type: none"> ▪ Reduces BC incidence and mortality 	2b	B	+*
<ul style="list-style-type: none"> ▪ Tamoxifen (reduces contralateral BC incidence) 	2b	B	+/-*
<ul style="list-style-type: none"> ▪ Indication for RR-CM should consider age at onset of first breast cancer in affected gene 	2a	B	++*
<ul style="list-style-type: none"> ▪ RR-BM after ovarian cancer 	4	C	+/-**

* Study participation recommended.

** Depends on tumor stage (FIGO I/II), recurrence free interval (≥ 5 yrs.), age.