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## Incidence of Fat Necrosis Associated with Compromised Subdermal Plexus of DIEP Flaps for Breast Reconstruction

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### **Presenter Information**

Aran Yoo, Jonathan Richard, Hannah Doran, Daniel J. Womac, Hugo St. Hilaire, and Mark Stalder

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# **Incidence of Fat Necrosis Associated with Compromised Subdermal Plexus of DIEP Flaps for Breast Reconstruction NEW ORLEANS** School of Medicine Aran Yoo MD, Jonathan Richard BS, Hannah Doran BS, Daniel J Womac MD, Hugo St. Hilaire MD, Mark Stalder MD

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# Introduction

LSU

The deep inferior epigastric perforator flap (DIEP) is a widespread option for autologous breast reconstruction. Fat necrosis is still a complication that has varied severity (6-17.4%).

Prevention of fat necrosis includes maximizing the perforasome of the flap through preservation of direct (linking vessels) and indirect linking vessels (subderma playue) in addition to taking into account other

## Methods

• A retrospective study was conducted with data collection performed by two authors (AY and JR). All patients undergoing autologous breast reconstruction within multiple hospitals affiliated with Louisiana State University (LSU) were analyzed. • Exclusion criteria: use of stacked flaps or bi-pedicled flaps, previous autologous breast reconstruction, hybrid reconstruction with flaps and implants

# Discussion

- In contrast to previous animal studies which demonstrate significant decrease in vascular supply to the DIEP flap with excision of the subdermal plexus, our study demonstrates the safety of flap de-epithelialization.
- Limitations of the study: retrospective nature, lack of uniformity in definition of fat necrosis, diversity within study groups, diversity in surgeon techniques, inability to assess true damage to subdermal plexus, absence of true "undamaged subdermal plexus" group
- Future plans: SPV studies to assess for possible dynamic changes to flan

considerations: location of main perforator, patient body mass index (BMI), flap thickness and venous				ent S of t	<ul> <li>Patients were grouped into two categories: (1) complete de-epithelialization of the flap via excision of the epidermis and dermis and (2) none or partial</li> </ul>				after de-epithelialization							
outflow. A previous animal study has demonstrated significant decrease in the vascular supply to the flap with complete excision of the subdermal plexus (Laungani et. al, 2015). This has not been explored in a clinical setting. The subdermal plexus may be damaged if part or all of the flap is de-epithelialized before burial under a mastectomy flap.				gani cal de- fat op exc ("o fat the rec	<ul> <li>de-epithelization of the flap.</li> <li>Fat necrosis was recorded if detected during post-operative physical exam ("clinically significant") or if excised during the second stage operation ("operative").</li> <li>The incidence of fat necrosis was only followed until the second stage operation since patients would receive fat grafting during this procedure.</li> </ul>				<b>Conclusion</b> De-epithelialization and inevitable damage to the subdermal plexus does not appear to increase the rate of fat necrosis. This may indicate that linking vessels may have more significant contribution to vascular supply of adipose tissue. Complete flap de-epithelialization would appear to be a reasonable technique for breast reconstruction without fear of adverse consequences. Further study is necessary to explore these findings.							
<ul> <li>Results</li> <li>Fat necrosis r decrease in fat weight In an</li> </ul>	rate of 14.8% at necrosis ra	with any deg ate associated	ree of de-epit with complet	ce in fat necr	is comparable to fat nec alization of flaps was att osis between study grou	crosis rates r tributable to	reported in o surgeon te	iterature. T echnique an	he initial d flap	Table 3. Incidence	of surgic	al complica	ations amo	ong sample p	atients	
	aujustea and				USIS DELWEEN Study grot	102				CONFLICATION	JAIVIPL	LE E	ARTIAL	COMPLET	E P-V	ALUE
										FAT NECROSIS						
										OPERATIVE	14.8%	(50) 1	8.7% (43)	6.5% (7)	0.00	)4
										CLINICAL	16.67	(59) 2	0.1% (47)	10.0% (12)	) 0.07	2
<b>Table 1.</b> Demographic and medical history of patients undergoing breast				broact	<b>Table 2.</b> Description of sample patients' reconstructed breasts by DIEP flaps characterized by relevant preoperative and operative conditions				FLAP NECROSIS FLAP LOSS	15.2%	(54) 1	7.9% (42)	9.9% (12)	0.04	18	
				breast					PARTIAL	2.0% (3	3) 6	.1% (2)	0.8% (1)	0.12	2	
reconstruction by L	ЛЕР Пар				CHARACTERISTIC	SAMPLE	EXTENT OF FL	AP BURIAL		TOTAL	5.7% (9	9) 5	.7% (5)	0	<0.0	)001
						N =	PARTIAL	COMPLETE	P-VALUE	TAKEBACK	8.8% (3	31) 8	.9% (21)	8.4% (10)	0.86	5
CHARACTERISTIC	SAMPLE	SUBGROUPS				356	66.0% (235)	33.9% (121)		SEROMA	5.1% (.	18) 4 5) 1	.3% (10)	0.0% (8)	0.34	+ a
	N =	PARTIAL	COMPLETE	p-value	CHEMOTHERAPY	15.1% (53)	17.3% (40)	10.9% (13)	0.11	INFECTION	1.1% (4	4) O	9% (2)	1.7% (2)	0.5	1
N AGE (VDC)	232	71.1% (165)	28.8% (67)	0.00	RADIATION <sup>+1</sup>	19.5% (69)	23.6% (55)	11.6% (14)	0.006	BREAST	2.0% (	7) 2	.1% (5)	1.7% (2)	0.99	) J
AGE (YRS)	51.0 ±10.2	50.8 ±10.4	51.5±9.5	0.68	RECONSTRUCTION				0.0003	DEHISCENCE		,	τ,	17		
RACE				0.60	TIMING	F7 00( (20C)	F1 10( (120)	71 10/ (00)								
BLACK	32.8% (77)	34.2% (56)	31.3% (21)			57.9% (206)	51.1% (120)	71.1% (86)								
WHITE	60.6%	59.8% (98)	62.7 (42)		FLAP WEIGHT (G) <sup>+</sup>	696.5+251.7	725.3+247.0	628.3+250.7	0.002							
OTHER	(140) 6.0% (14)	6.1% (10)	6.0% (4)		NUMBER OF PERFORATORS <sup>+</sup>	000.01201.7	12010221110	02010220017	0.002							
ASA				0.23	1	40.5% (134)	34.2% (77)	53.8% (57)								
CLASSIFICATION					2	46.5% (154)	50.7% (114)	37.7% (40)								
1	3.5% (8)	2.4% (4)	6.3% (4)		3	11.8% (39)	14.2% (32)	6.6% (7)								
II	65.8% (150)	68.3% (112)	59.4% (38)		4+ PERFORATOR	1.2% (4)	0.9% (2)	1.9% (2)	0.19	Table 6 Fatimates of		:	· · · · · · · · · · · · · · · · · · ·			
III	30.7% (70)	29.3% (48)	34.4 (22)		LOCATION					Table 4. Estimates of	relative r	isk of operat	live fat nech	OSIS.		
					MEDIAL	73.5% (147)	/6.1% (118)	64.4% (29)		PREDICTORS	UNIV	ARIABLE MO	DELS	ADIUST	ED MOL	DEL
SMOKING						5 5 (11)	10.2% (28) 5.8% (9)	51.1 % (14) A A% (2)			RR	CI 95%	Р	RR CI	95%	P
STATUS					NUMBER OF	5.5 (11)	5.670 (5)	4.470 (Z)	0.46		2.96	1 22 6 14	0.007	1 00 0 00	1 12	0 1 2 1
CURRENT	0.9% (2)	0.6% (1)	1.5% (1)	0.49	RECIPIENT VEINS	65 2% (232)	63.8% (150)	7 8% (82)	0.70		2.86	1.32, 6.14	<0.007	2.07 1.22	4.42	0.006
EVER SMOKER	20.7% (48)	18.8% (31)	25.4% (17)	0.25	2	34.8% (124)	36.2% (85)	32.2% (39)			2.04	1.75, 4.07	0.0001	2.07 1.22,	1.00	0.000
BMI (KG/M <sup>2</sup> )	30.8+5.4	30.7±5.2	31.0±5.9	0.78	DIAMETER OF		20.2/0 (00)	22.270 (00)		FLAP WEIGHT (100 G)	1.12	1.02, 1.2	0.022	1.1 1.00	, 1.20	0.045

CHARACTERISTIC	SAMPLE	SUBGROUPS		
	N =	PARTIAL	COMPLETE	p-value
Ν	232	71.1% (165)	28.8% (67)	
AGE (YRS)	51.0 ±10.2	50.8 ±10.4	51.5±9.5	0.68
RACE				0.60
BLACK	32.8% (77)	34.2% (56)	31.3% (21)	
WHITE	60.6% (140)	59.8% (98)	62.7 (42)	
OTHER	6.0% (14)	6.1% (10)	6.0% (4)	
ASA CLASSIFICATION				0.23
1	3.5% (8)	2.4% (4)	6.3% (4)	
II	65.8% (150)	68.3% (112)	59.4% (38)	
III	30.7% (70)	29.3% (48)	34.4 (22)	
SMOKING STATUS				
CURRENT SMOKER	0.9% (2)	0.6% (1)	1.5% (1)	0.49
EVER SMOKER	20.7% (48)	18.8% (31)	25.4% (17)	0.25
BMI (KG/M <sup>2</sup> )	30.8±5.4	30.7±5.2	31.0±5.9	0.78
DIABETES, TYPE	12.7% (30)	13.9% (23)	10.5% (7)	0.41

CHARACTERISTIC	SAMPLE	EXTENT OF FLA		
	N =	PARTIAL	COMPLETE	P-VALUE
	356	66.0% (235)	33.9% (121)	
CHEMOTHERAPY	15.1% (53)	17.3% (40)	10.9% (13)	0.11
RADIATION <sup>+1</sup>	19.5% (69)	23.6% (55)	11.6% (14)	0.006
RECONSTRUCTION TIMING <sup>†</sup>				0.0003
IMMEDIATE	57.9% (206)	51.1% (120)	71.1% (86)	
DELAYED	42.13% (150)	49.0% (115)	28.9% (35)	
FLAP WEIGHT (G) <sup>+</sup>	696.5±251.7	725.3±247.0	628.3±250.7	0.002
NUMBER OF PERFORATORS <sup>+</sup>				0.002
1	40.5% (134)	34.2% (77)	53.8% (57)	
2	46.5% (154)	50.7% (114)	37.7% (40)	
3	11.8% (39)	14.2% (32)	6.6% (7)	
4+	1.2% (4)	0.9% (2)	1.9% (2)	
PERFORATOR LOCATION				0.19
MEDIAL	73.5% (147)	76.1% (118)	64.4% (29)	
LATERAL	21.0% (42)	18.2% (28)	31.1 % (14)	
COMBINATION	5.5 (11)	5.8% (9)	4.4% (2)	
NUMBER OF				0.46
RECIPIENT VEINS				
1	65.2% (232)	63.8% (150)	7.8% (82)	
2	34.8% (124)	36.2% (85)	32.2% (39)	
DIAMETER OF				
	25104	26104	24104	<0.0001



## This research project was supported through the LSU Health Sciences Center, School of Medicine.