



Autologous Fat Graft Retention and Stem Cell Culture; A Pilot Study

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Capital & Coast DHB

Autologous fat graft retention and stem cell culture; a pilot study

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Slocombe, A., Dennett, E., Danielson, K., Meredith, I.

Research funding

- Many thanks to The Breast Cancer Foundation and University of Otago!

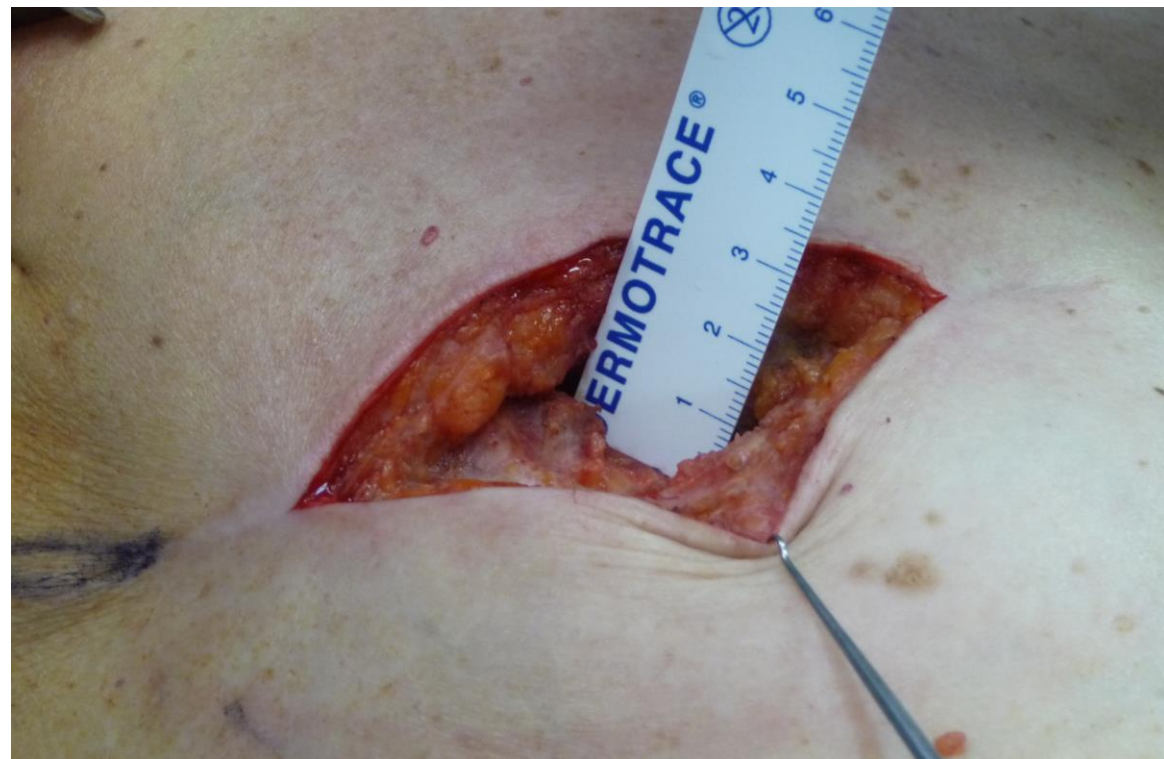
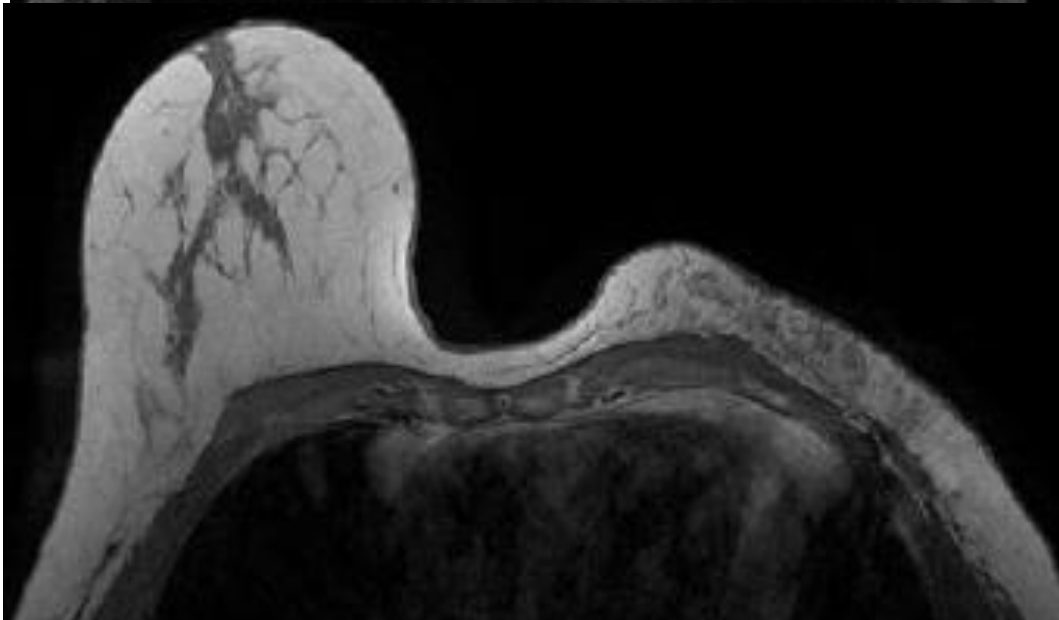
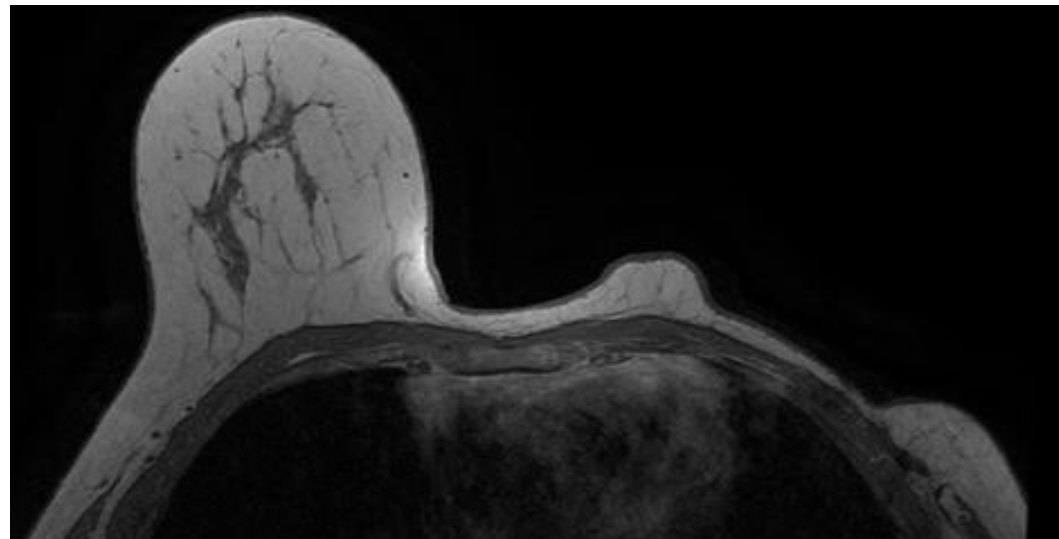
Background

- Harvest and reinjection of autologous fat
- Natural feel and appearance
- Low donor site morbidity
- Reduction in fibrosis and scarring

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-
- Poor graft uptake, retention of 30%-70%
 - Time intense, needs motivated patient and surgeon
 - Research suggests that adipose derived stem cells play a large part in retention

LIPOFILLING PRIOR TO IMPLANT





Aims

- 1. To assess fat graft retention via MRI in a pilot cohort of women undergoing AFG
- 2. To develop methods for consistent isolation and culture of ADSCs from donor sites at the time of surgery

Methods

- 20 patients with reconstruction prospectively enrolled
- Six consecutive patients imaged pre and post AFG
- 1. Volume change at 3 months versus grafted volume as outcome
- 2. Success of stem cell culture as outcome
 - Lipoaspirates taken at surgery
 - ADSCs Cultured
 - ADSCs characterized and viability determined
 - Differentiation into osteoblasts and adipocytes with stimulants - pluripotent

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- Demographics/clinical
- Tumour factors
- Operative factors

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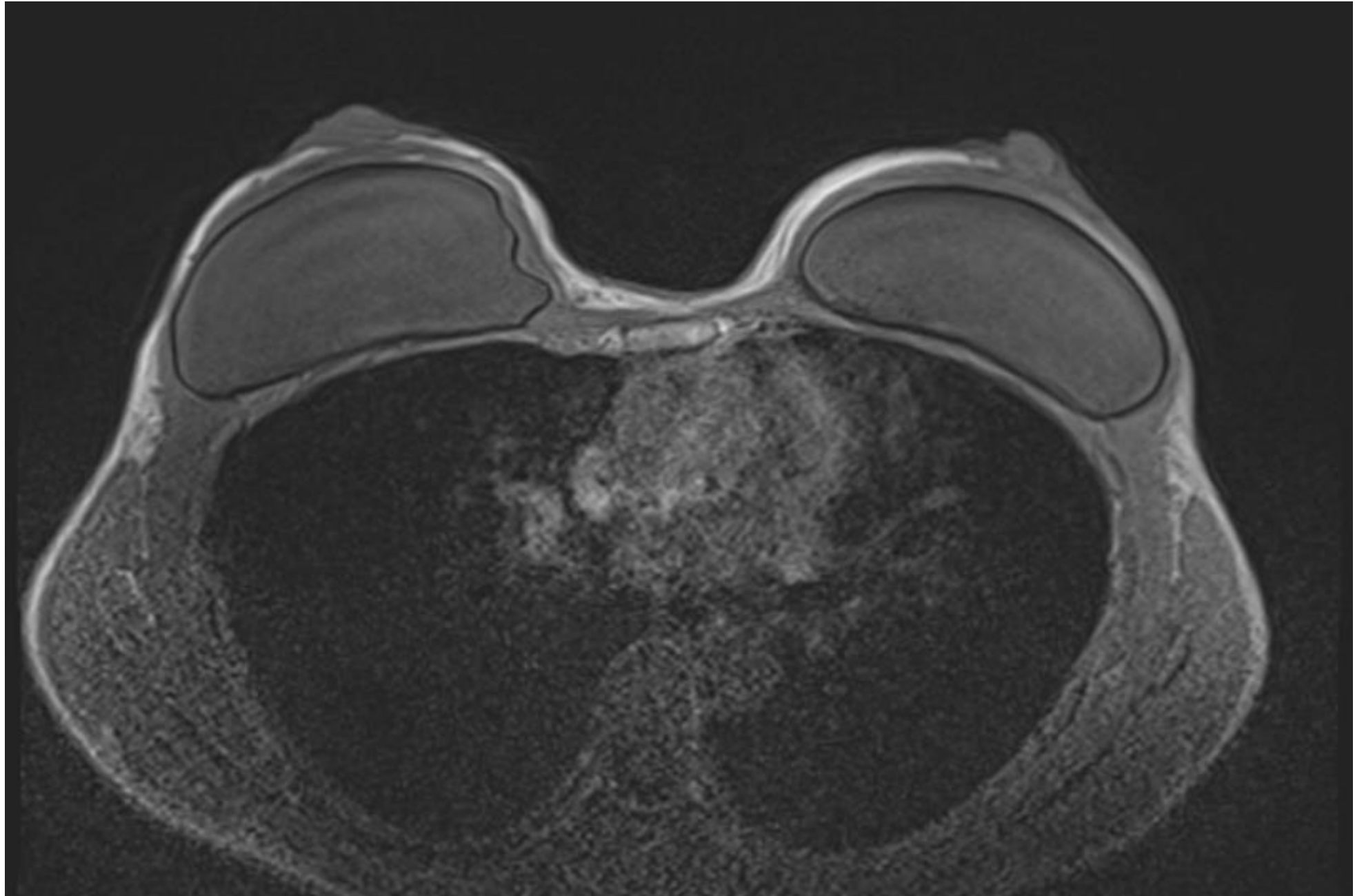
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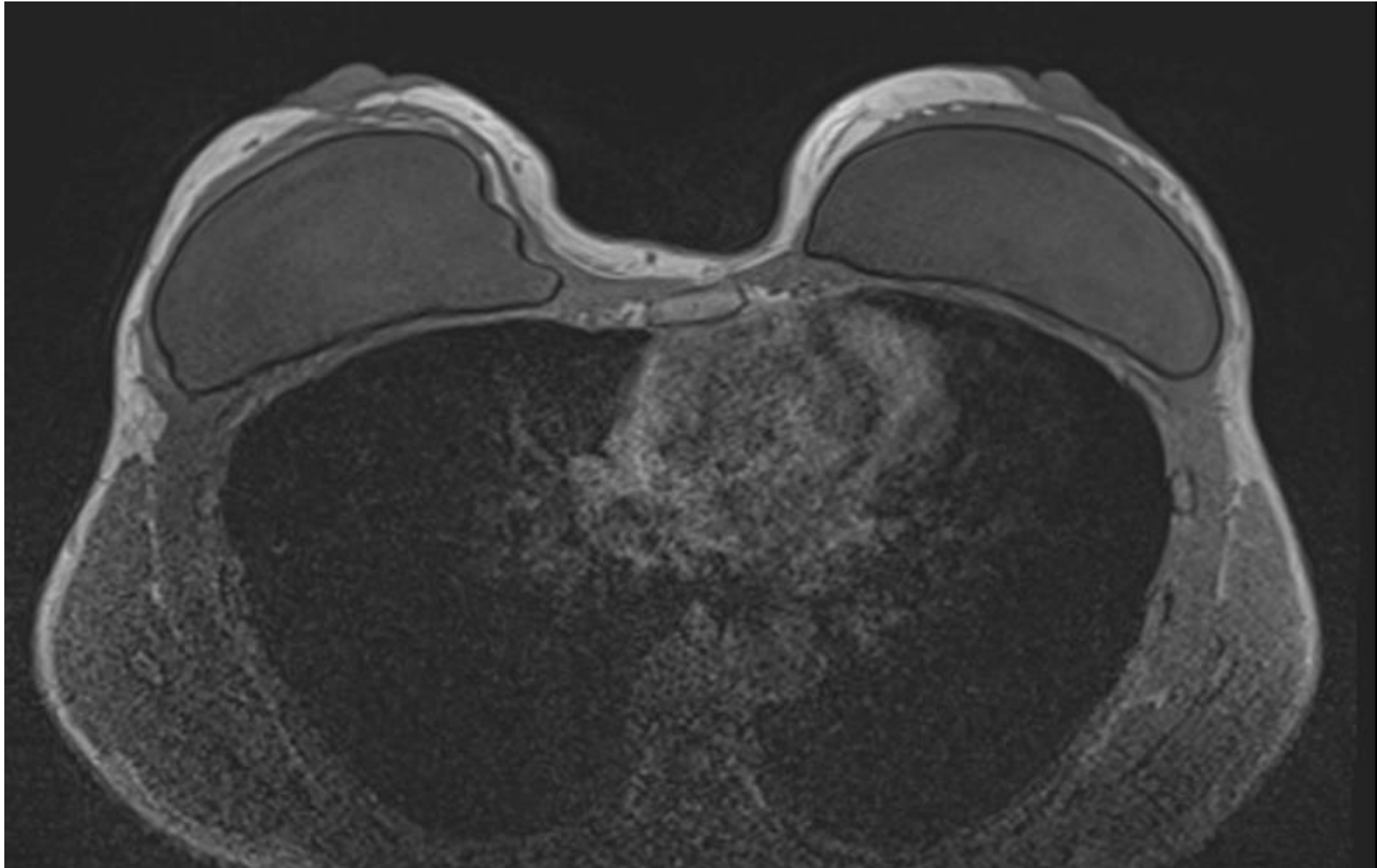
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 - Age, BMI, comorbidity
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 - TNM, Grade, receptors, adjuvant therapy
- Operative factors
 - Harvest site, volume harvested

Demographics

Characteristic		N (%)	Mean ± SD
Cases		20	
Age			49.95 ± 12.28
BMI			26.19 ± 5.01
Ethnicity	NZ European	11 (55)	
	Māori	4 (20)	
	English	1 (5)	
	Danish	1 (5)	
	African	1 (5)	
	Samoan	1 (5)	
	Filipino	1 (5)	
Pathological Stage of Breast Cancer	I	10 (50)	
	II	7 (35)	
	III	1 (5)	
	No breast cancer	2 (10)	
Radiation	Adjuvant	15 (75)	
	None	5 (25)	





MR Basic

MR Basic Reading



Single Click



Follow Up

Basic

Viewing

3D

Follow-Up



Findings Navigator

Name	Value	Source			
✓ S2 Sn...					
✓ VOI2	388. ...	MR Basi...	MR		
VOI1	433. ...	MR Basi...	MR		
✓ S1 Sn...					
Left B...	385. ...	MR Basi...	MR		

Tools



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Snapshot



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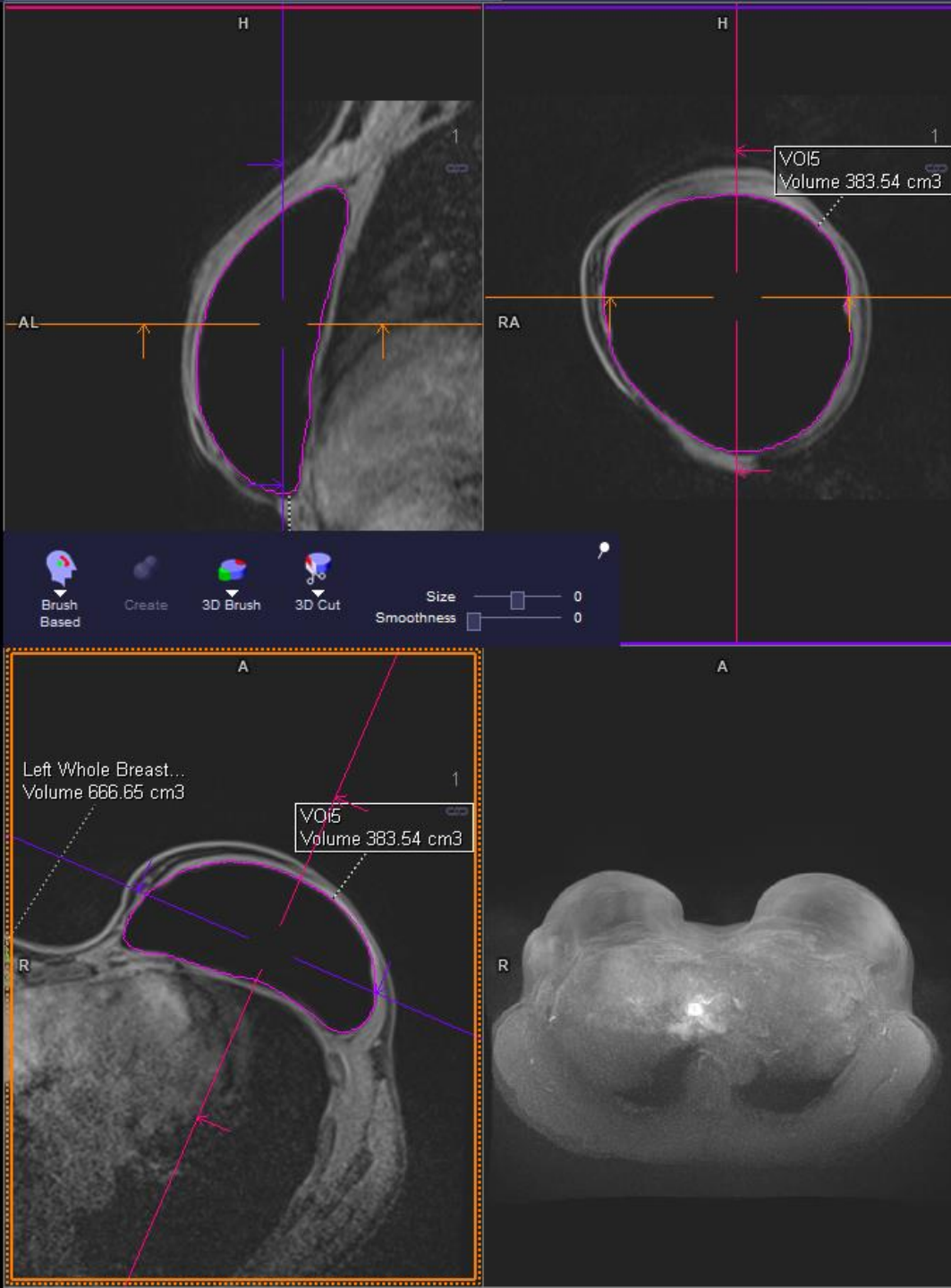
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MR Basic

MR Basic Reading

Single Click Follow Up

Basic

Viewing

3D

Follow-Up

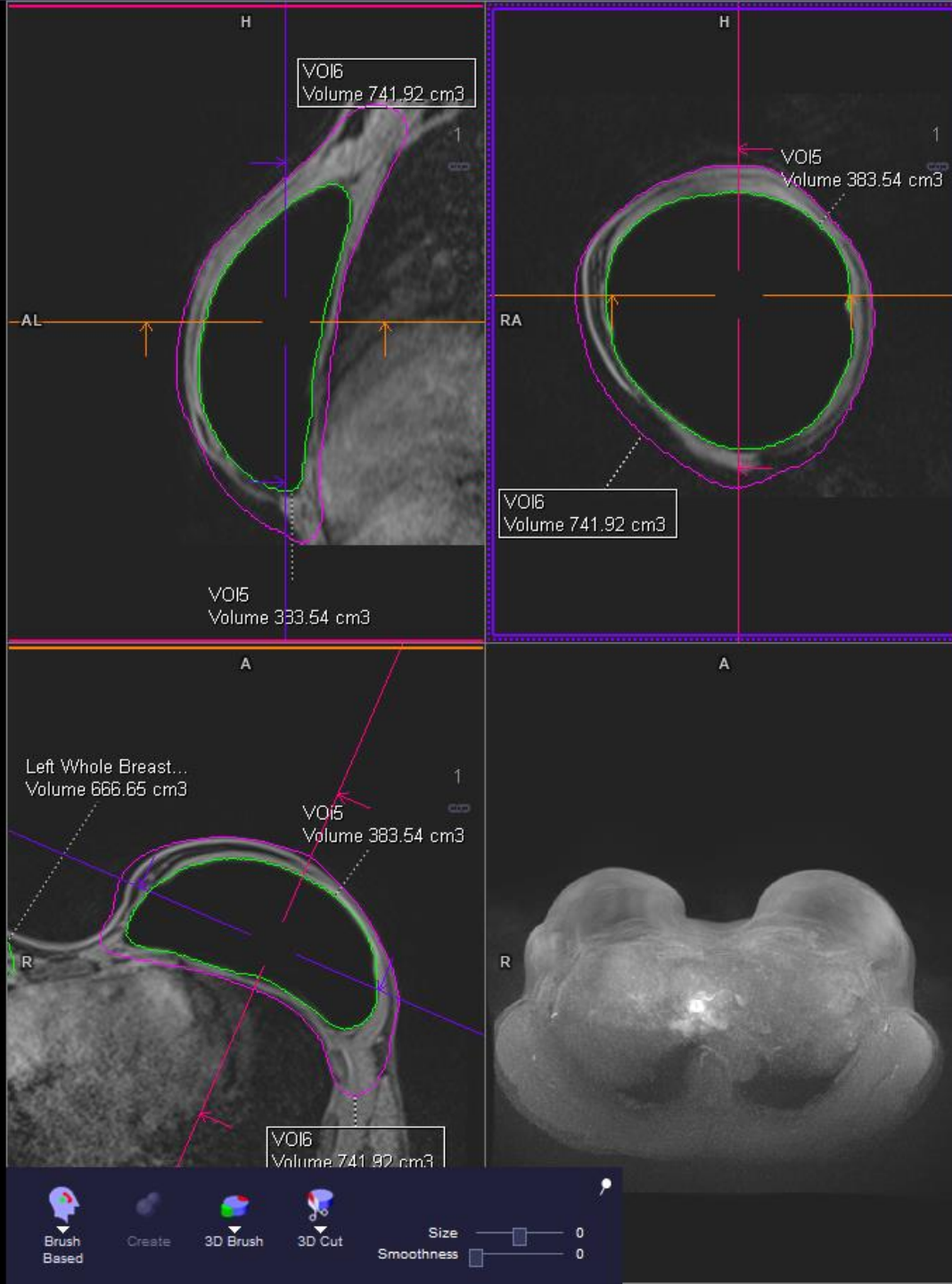


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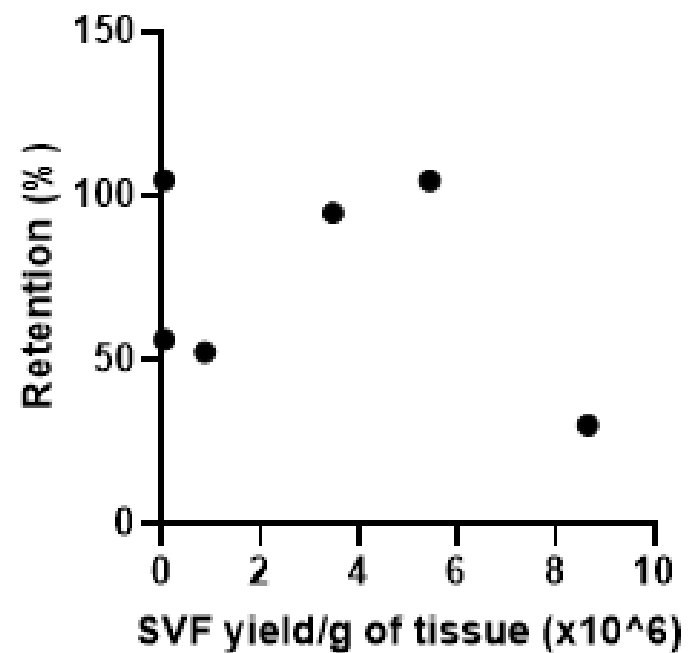
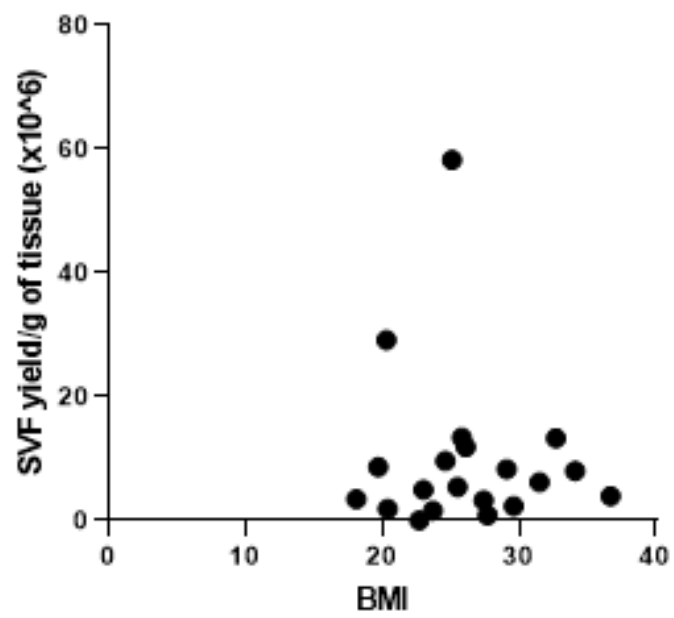
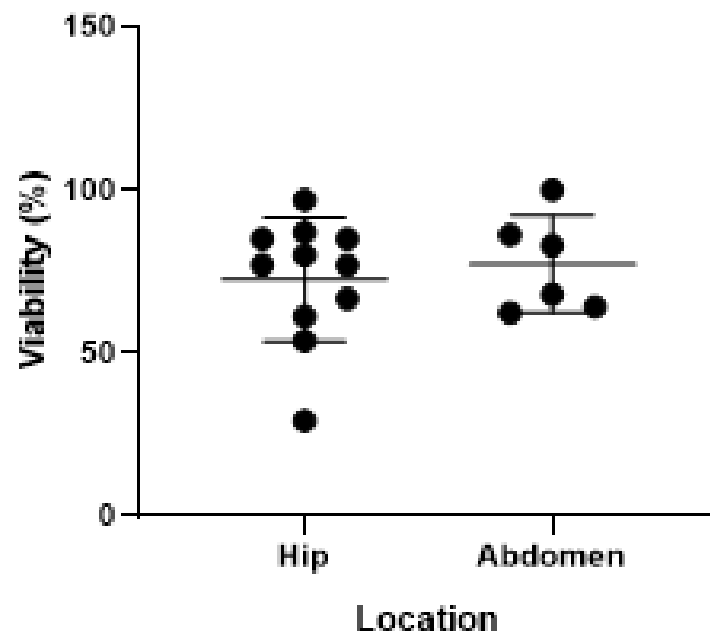
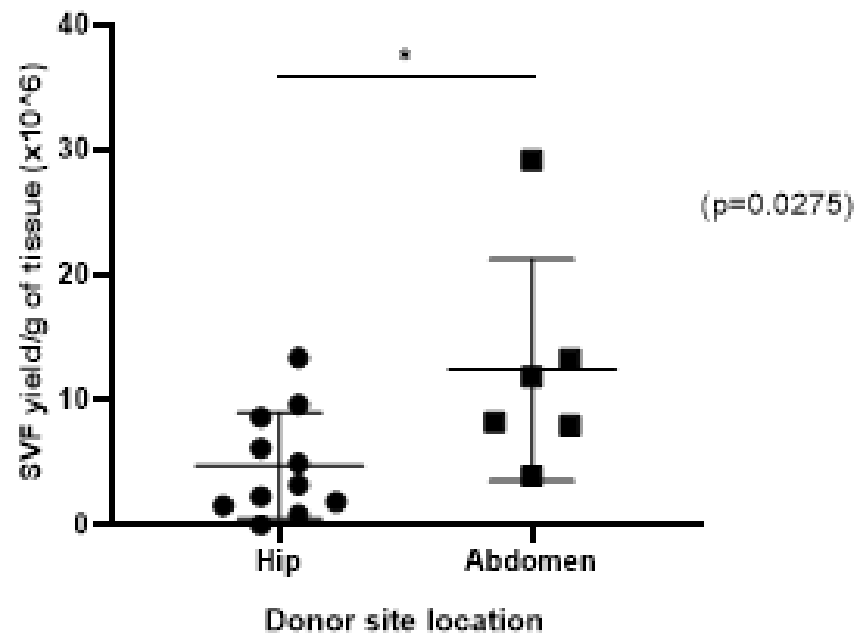
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Brush Based Create 3D Brush 3D Cut Size Smoothness

Results

Patient	Amount injected (mL)	% Retention
AD10 Right Breast	150	104.7
AD10 Left Breast	150	56.0
AD13 Left Breast	200	104.6
AD8 Right Breast	150	94.7
AD5 Left Breast***	Expander rupture at grafting	
AD7 Left Breast	160	30.0
AD9 Right Breast	200	52.3
Mean	168.3	73.7



Results

Factor	Correlation	P Value
SVF Yield/Retention	-0.46	0.36
ADSC viability/Retention	0.66	0.15
BMI/Retention	0.02	0.96
Chemotherapy/Retention	0.35	0.50
Endocrine therapy/Retention	-0.32	0.53
Tumour Grade/Retention	0.61	0.25

- SVF yield by donor site: 12.4m cells/g vs 5.0m (Abdomen/Hip p=0.03)

Conclusions

- Graft retention varies widely
- Factors influencing this are unclear
- It is possible to culture ADSCs in vitro, this has clinical implications
- The next steps would be to:
 - Examine signaling molecules in extracellular vesicles
 - Use a bigger sample with more data to more accurately explore factors affecting graft retention