

Waar kijkt de radioloog naar op het mammogram?

Ruud Pijnappel

DOEL MAMMOGRAFIE

Screening

- Geen klachten
- Vroege opsporing
mammacarcinoom
 - Therapie minder ingrijpend
 - Prognose veelal beter
 - BOB: 775 / jaar

Klinische mammografie

- Verklaring klacht
- Uitsluiten of de klacht
berust op carcinoom

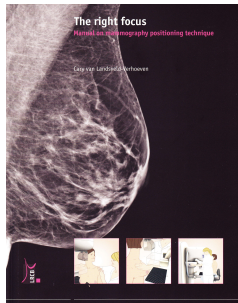
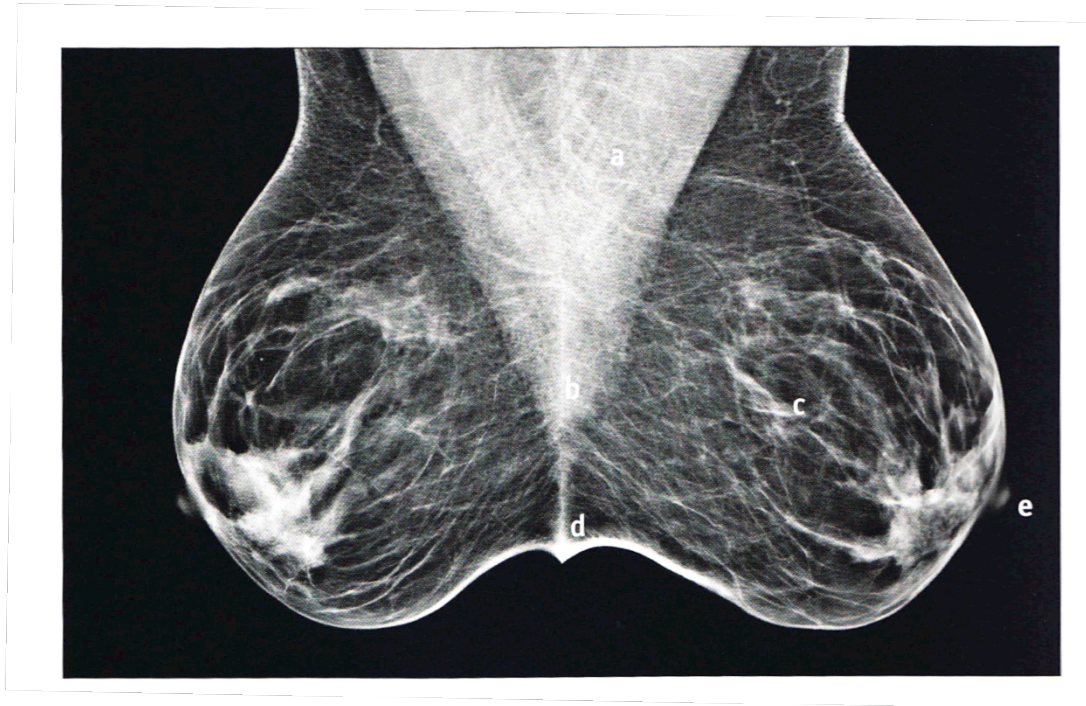
Mammogram

4 opnamen

- Oblique L + R
- CC L+R

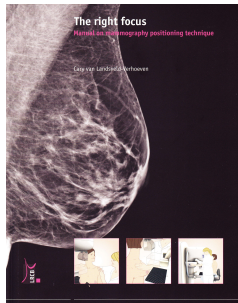
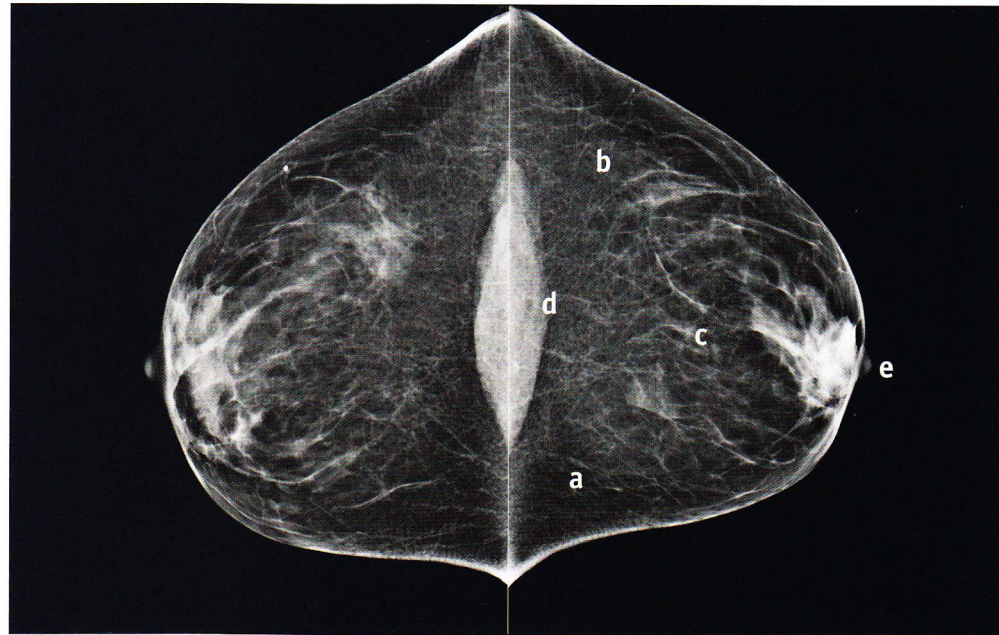


Eerste blik: insteltechniek



Bron: The right focus, C. van Landsveld

Eerste blik: insteltechniek



Bron: The right focus, C. van Landsveld

Beoordelen

- Veranderingen tov vorig onderzoek?
- Afwijkingen?



Beoordelen

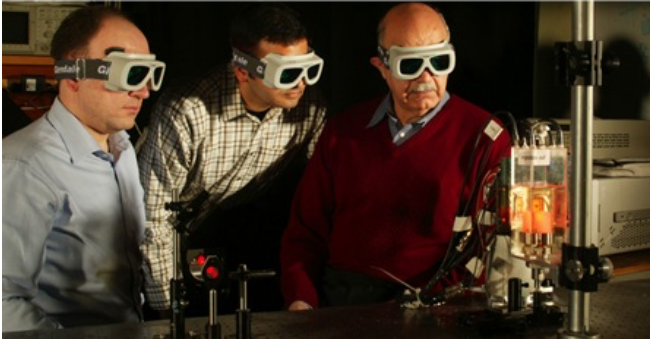
- Veranderingen tov vorig onderzoek?
- Afwijkingen?



Beoordelen

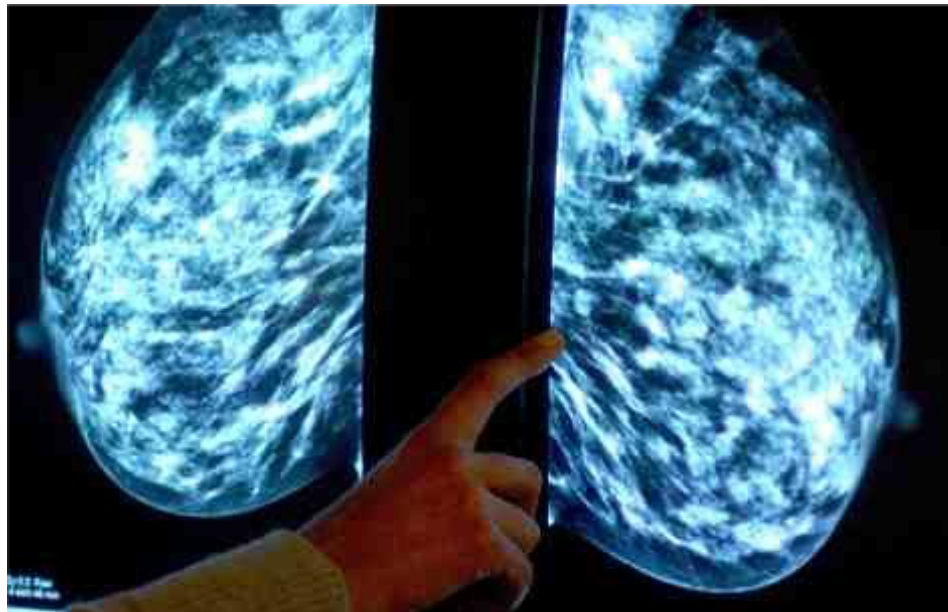
- Veranderingen tov vorig onderzoek?
- Afwijkingen?

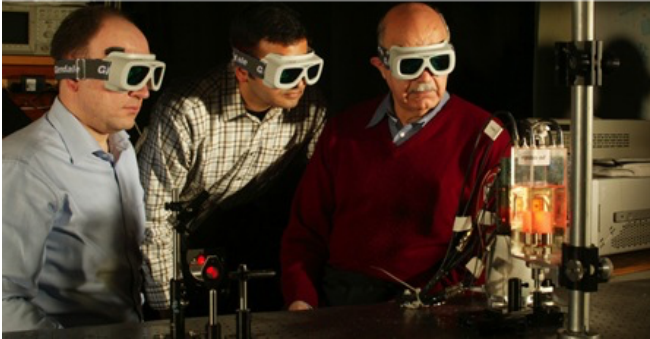




1. Optimale monitor
2. Gedempt omgevingslicht
3. Vergelijk oude opnamen
4. Systematische beoordeling

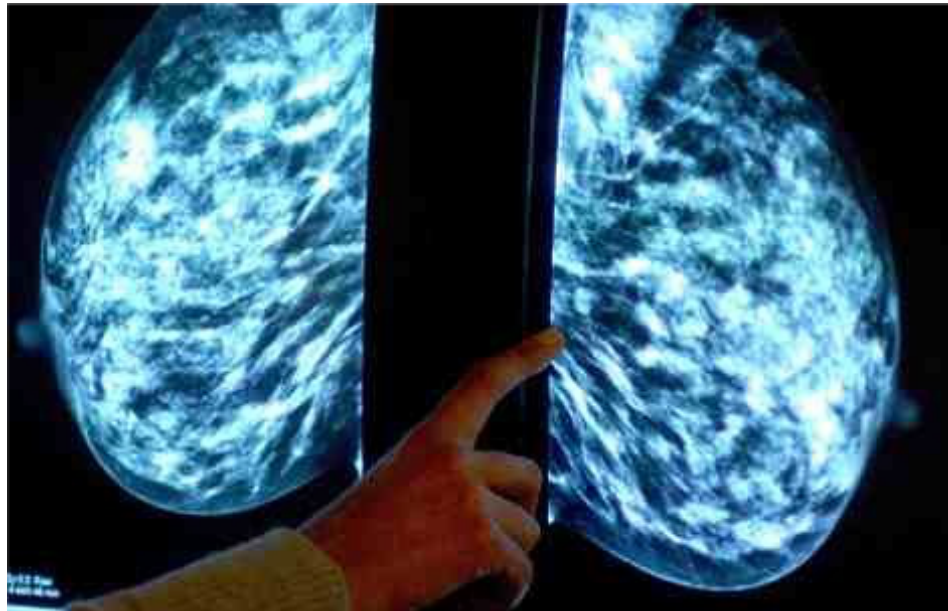
HOE?

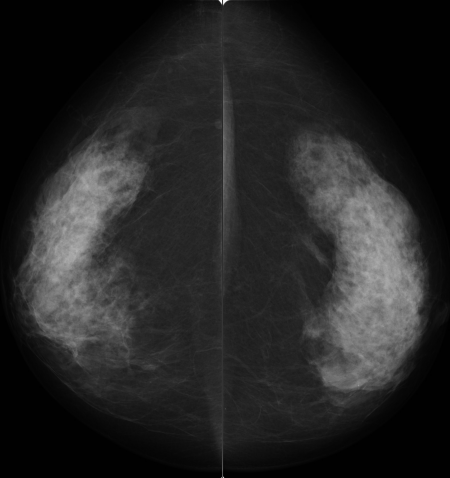
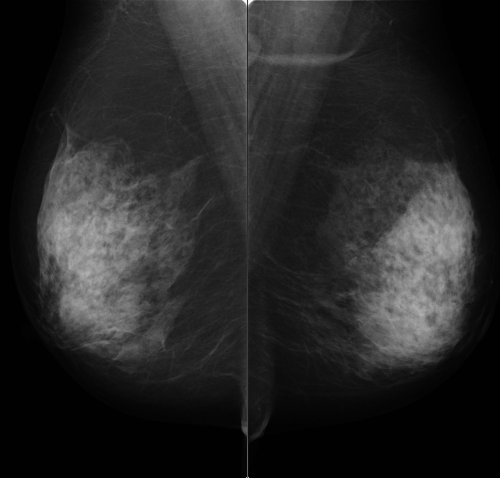




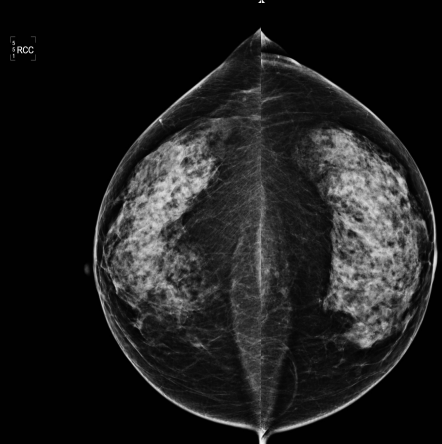
1. Optimale monitor
2. Gedempt omgevingslicht
3. vergelijk oude opnamen
4. systematische beoordeling

HOE?





R MLO



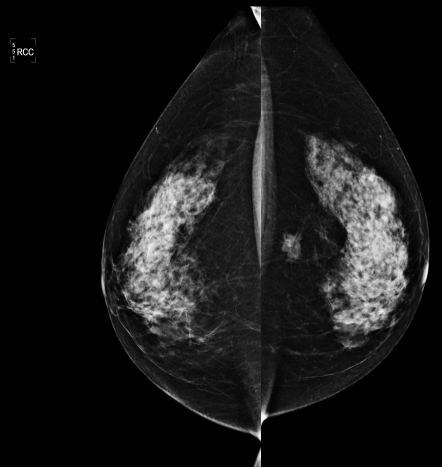
L MLO

L CC



R MLO

L MLO



L MLO

L CC

2010

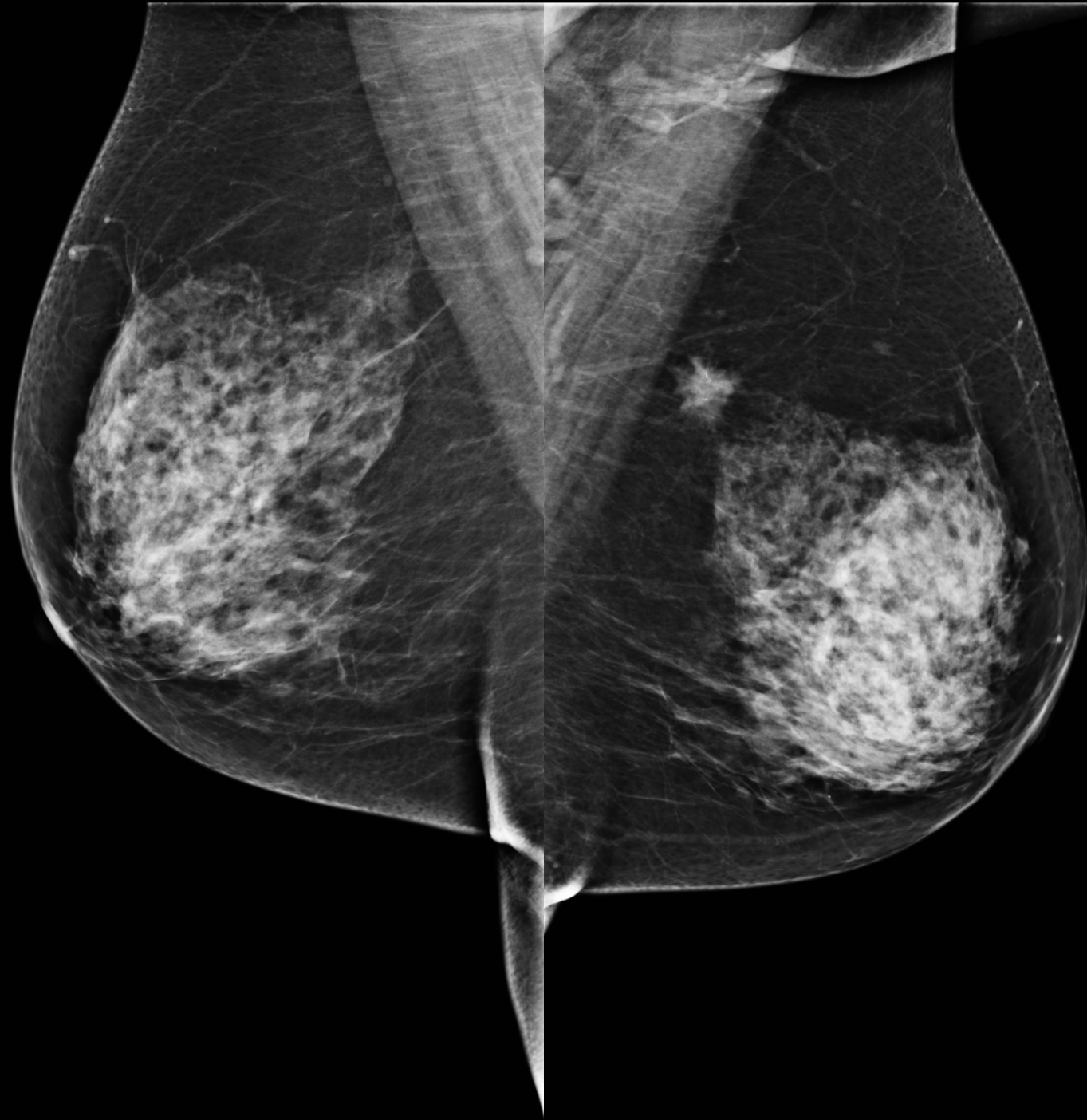
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2012

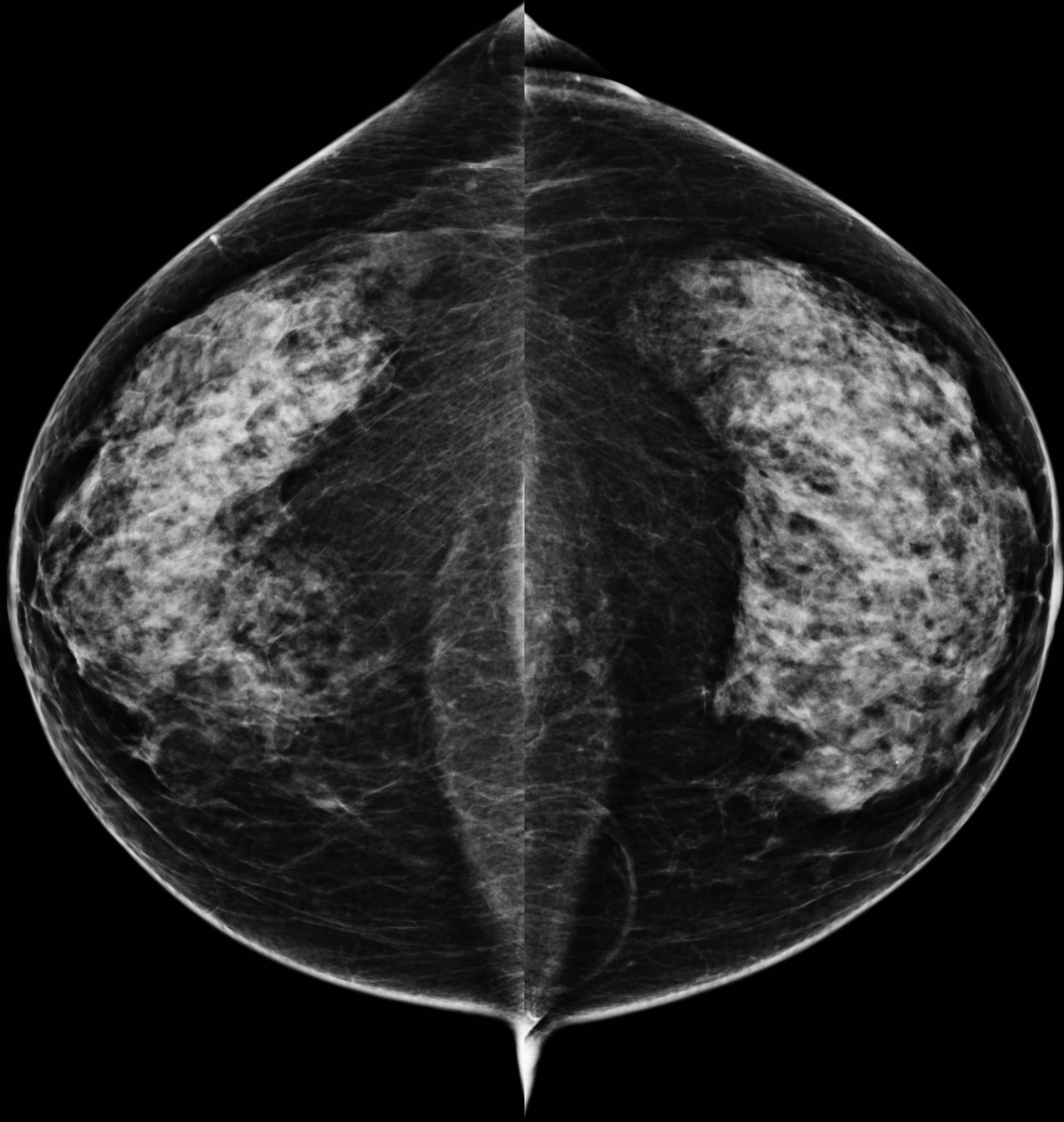
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2010

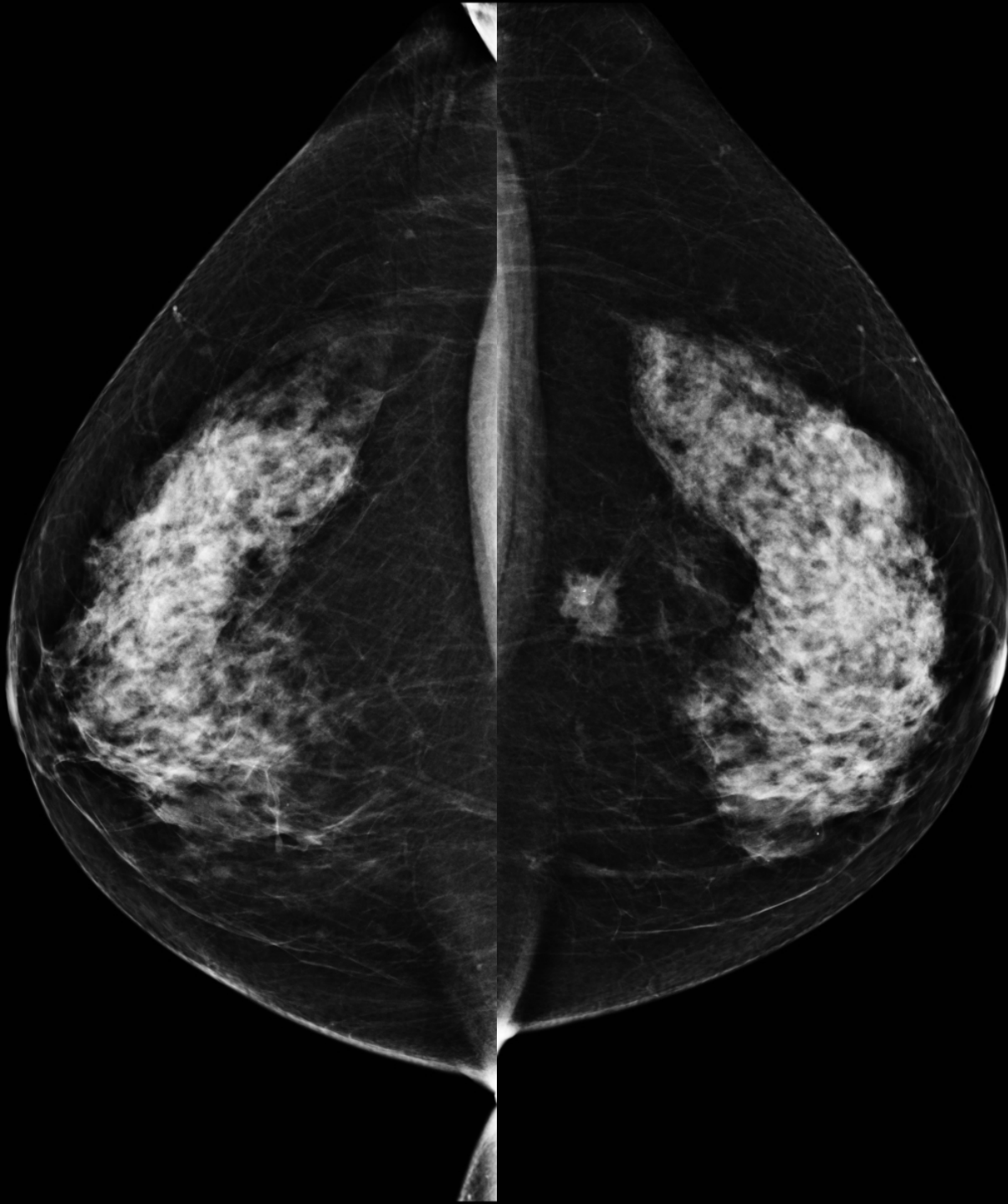
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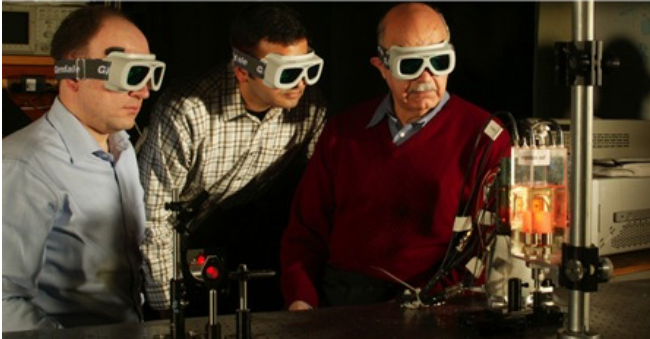
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2012

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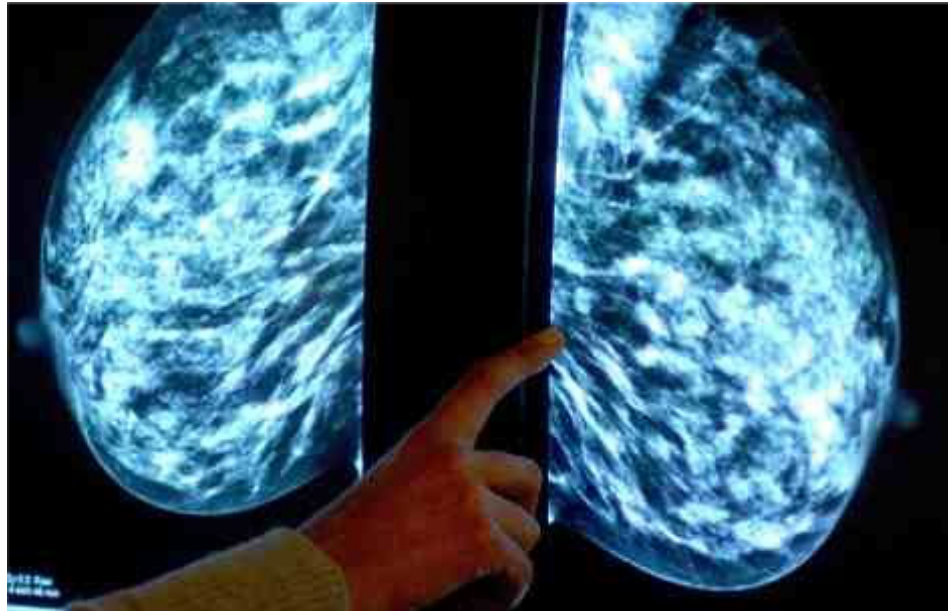


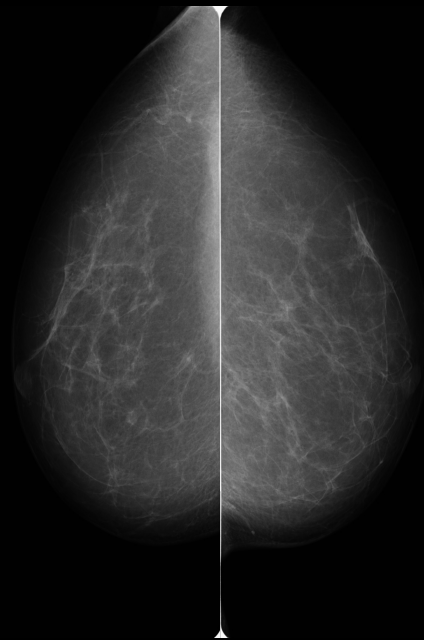
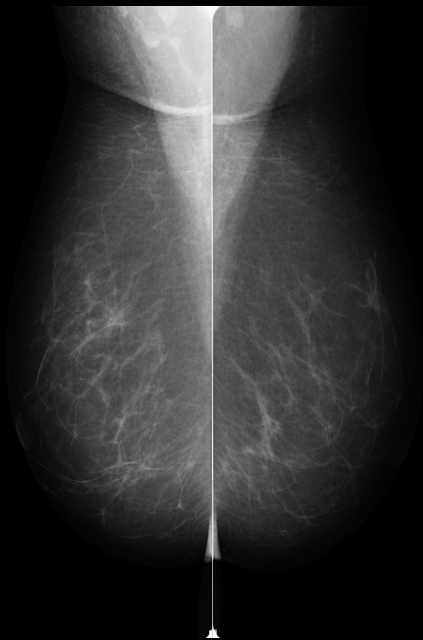
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1. Optimale monitor
2. Gedempt omgevingslicht
3. vergelijk oude opnamen
4. **systematische beoordeling**

HOE?



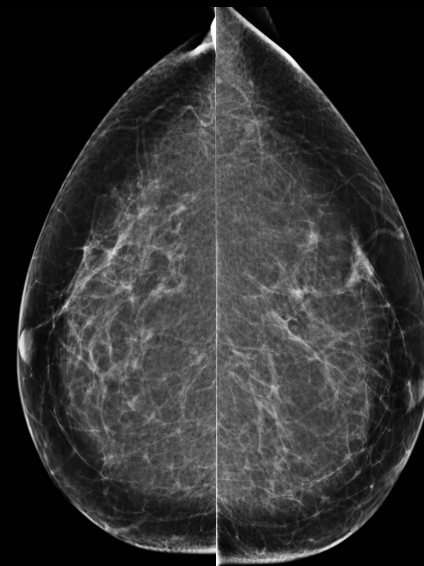


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3 RMLO



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3 LMLO

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3 RCC



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3 LCC

2010

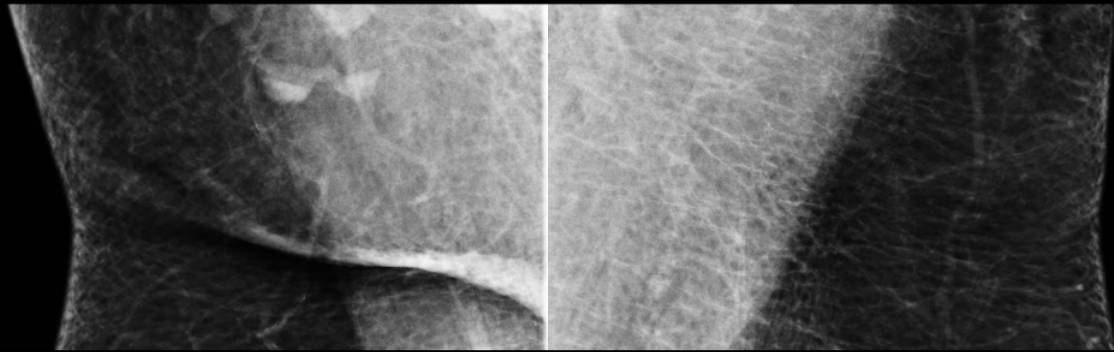
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$\begin{matrix} 5 \\ 3 \end{matrix}$ LMLO

2010

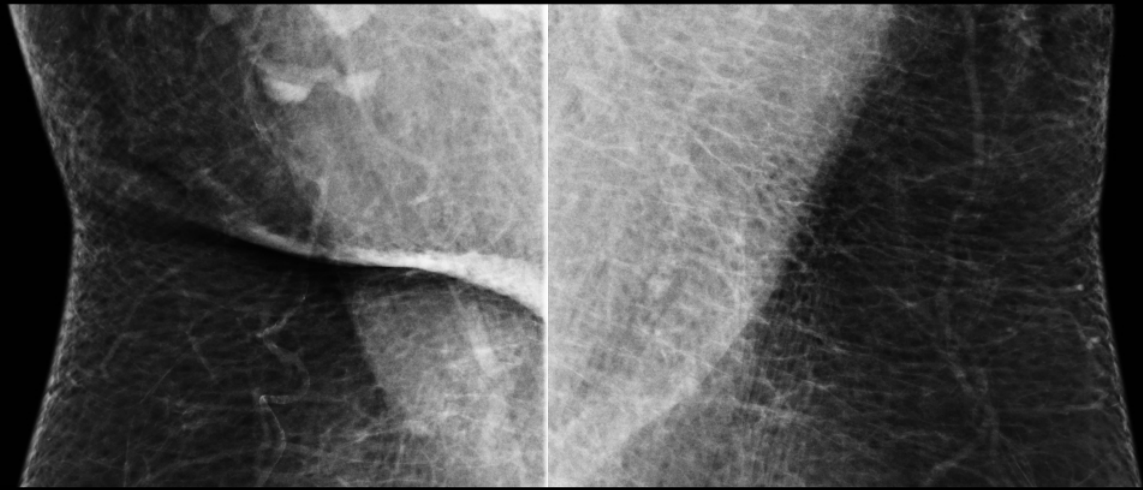
$\begin{matrix} 5 \\ 3 \end{matrix}$ RMLO



$\begin{matrix} 5 \\ 3 \end{matrix}$ LMLO

2010

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$\begin{matrix} 5 \\ 3 \end{matrix}$ LMLO

2010

5
3 RMLO

5
3 LMLO



2012

EBB
RMLO



EBB
LMLO

Op zoek naar afwijkingen

- Densiteit
- Massa
- Architectuurverstoring
- Calcificaties

- Combinatie van deze afwijkingen

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2010

5
5
1 RMLO



5
5
1 LMLO

Op zoek naar afwijkingen

- Densiteit
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- Architectuurverstoring
- Calcificaties

- Combinatie van deze afwijkingen

2011

L
H RMLO

L
H LMLO



2011

L
H RCC

L
H LCC

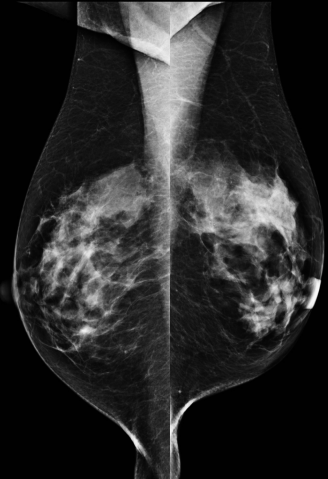


Op zoek naar afwijkingen

- Densiteit
- Massa
- **Architectuurverstoring**
- Calcificaties

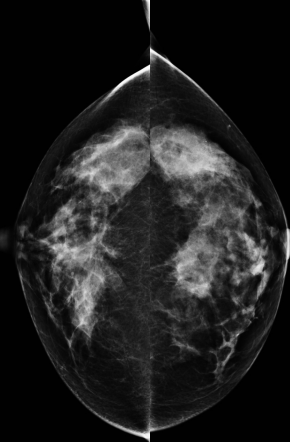
- Combinatie van deze afwijkingen

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RMLO



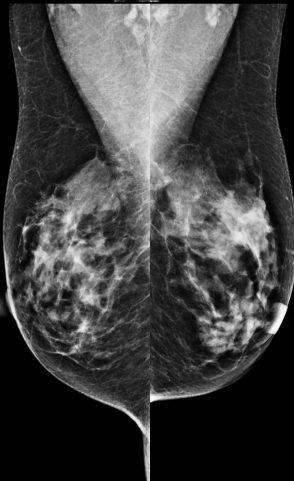
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LMLO

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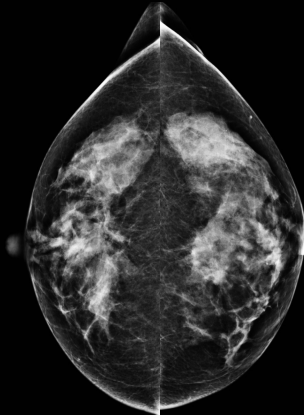
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RMLO



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LMLO

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RCC



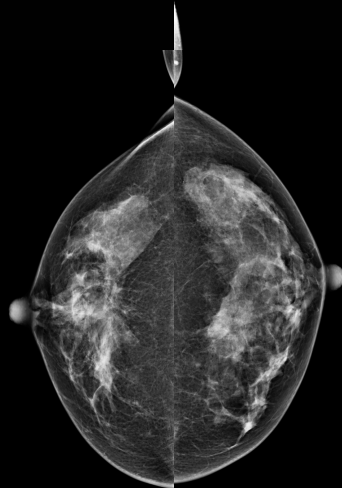
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R-MLO



L-MLO

R-CC

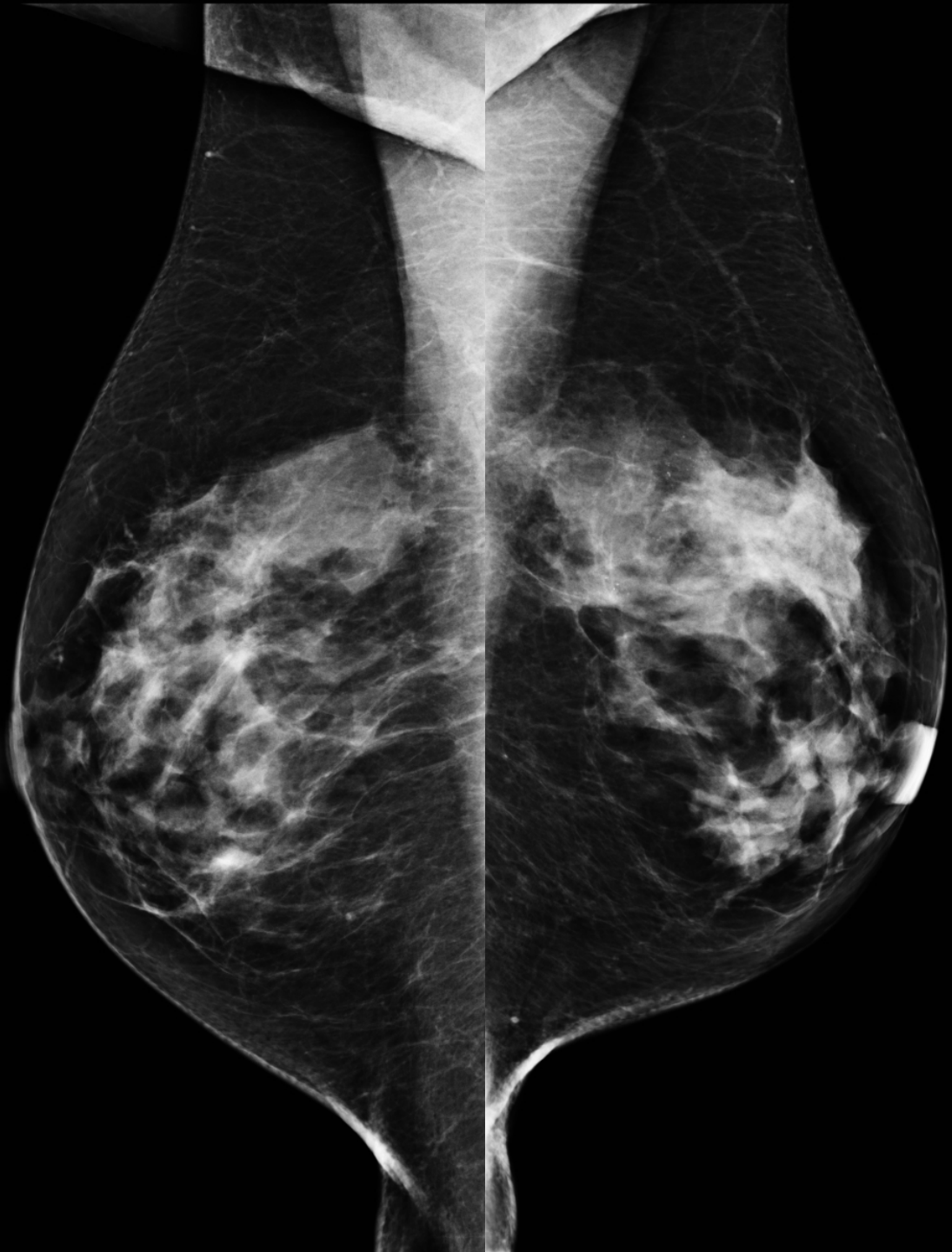


L-CC

2009

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2011

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2012

R-MLO

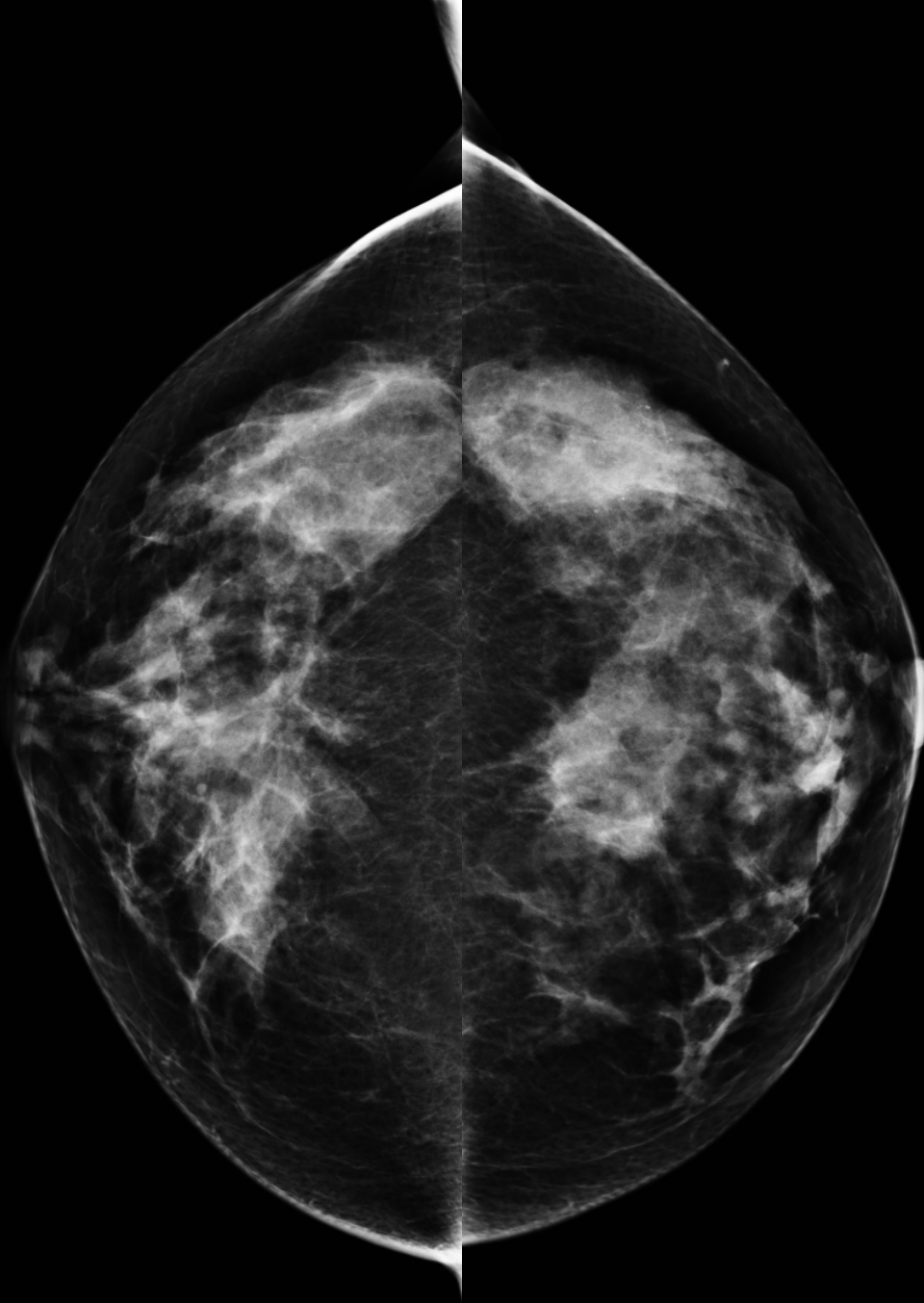
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2009

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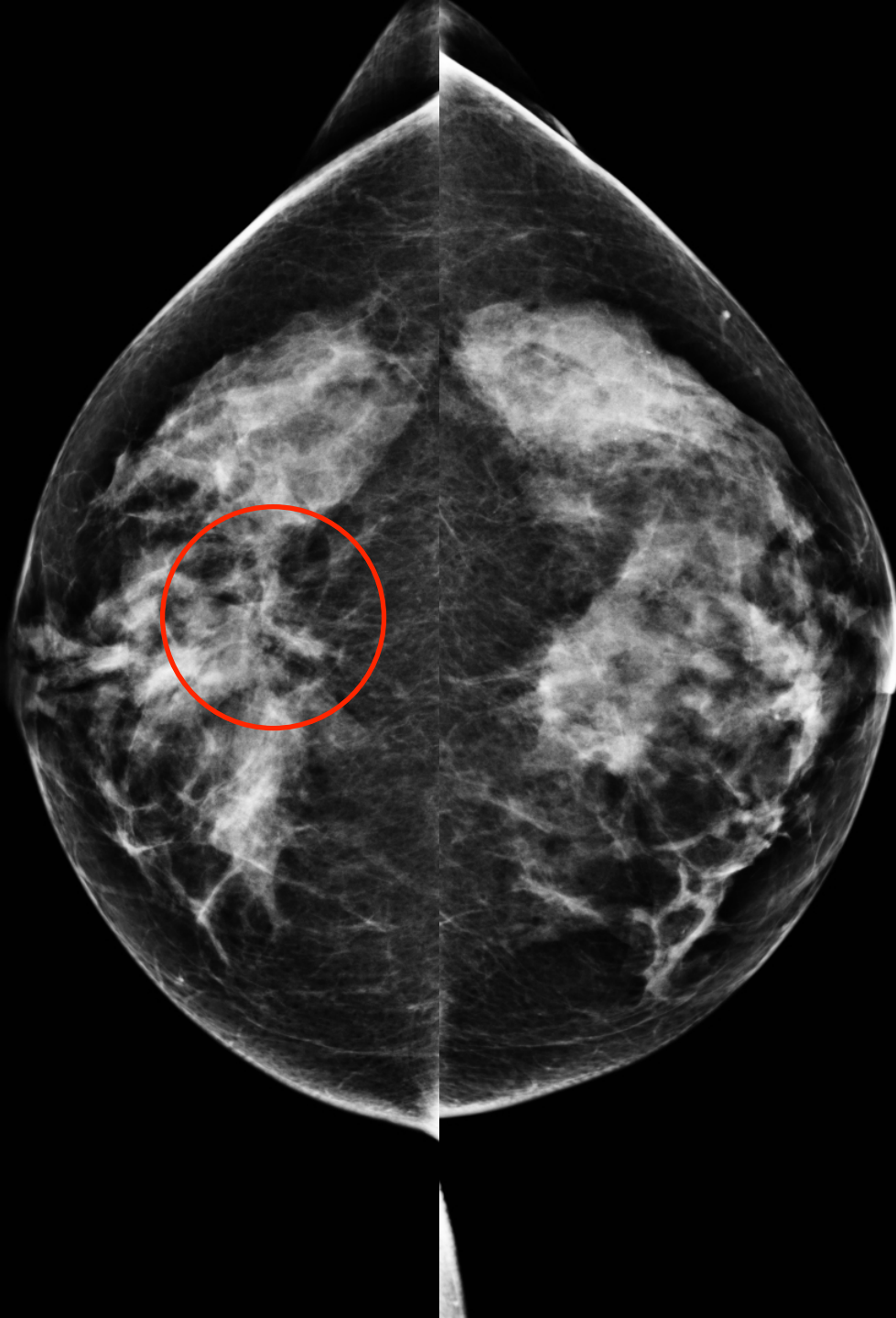
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2011

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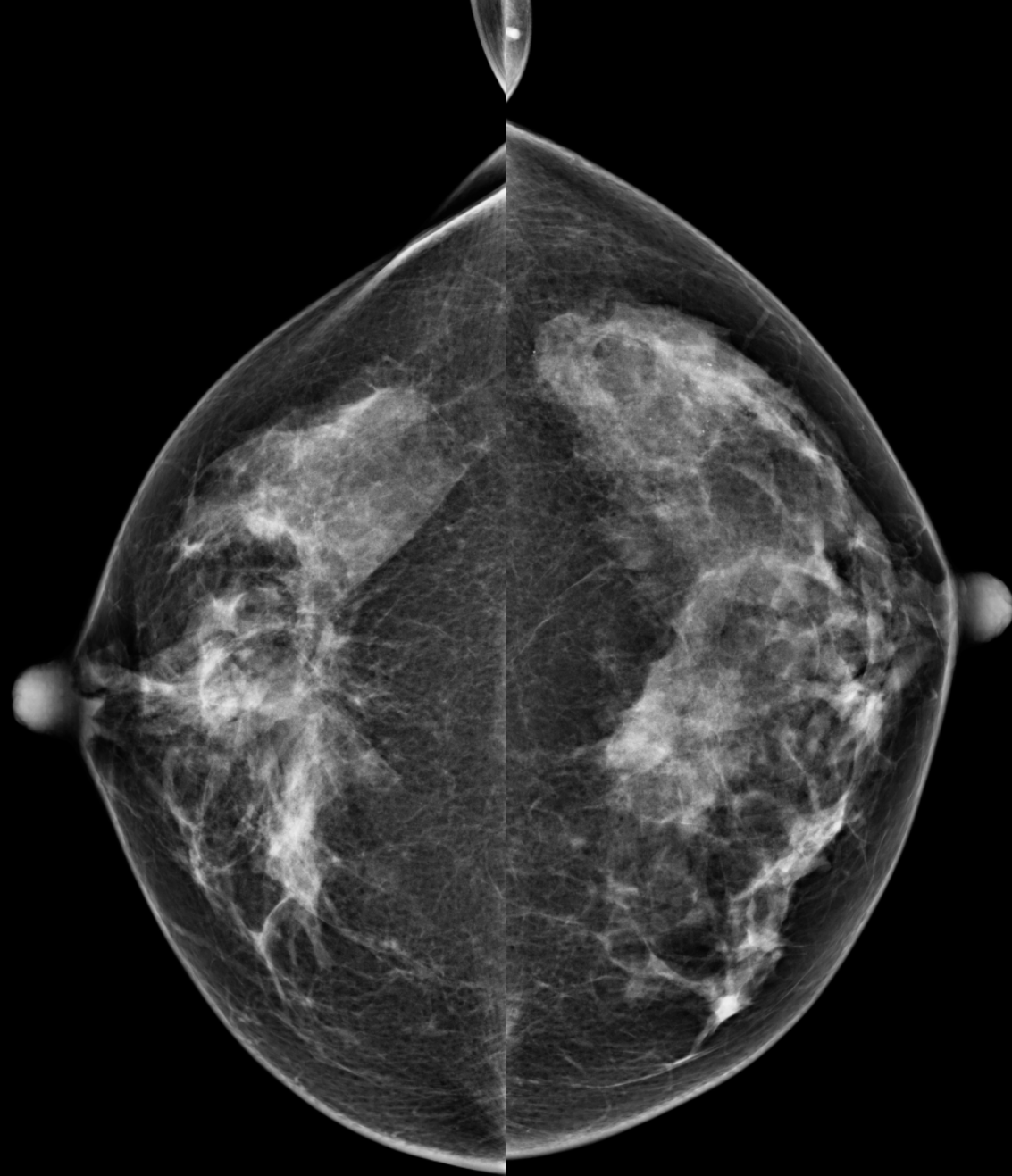
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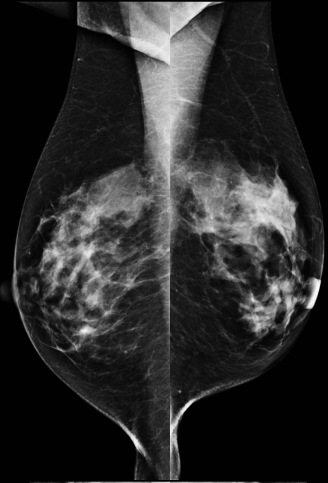
2012

R-CC

L-CC

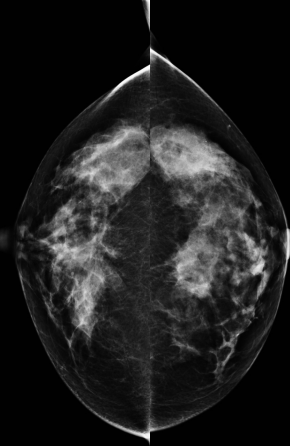


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RMLO



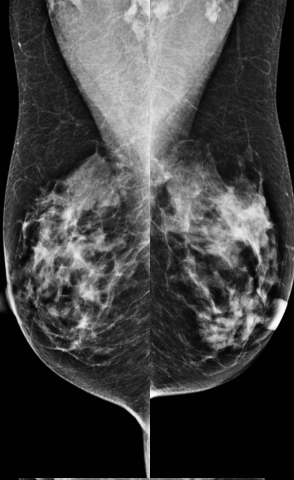
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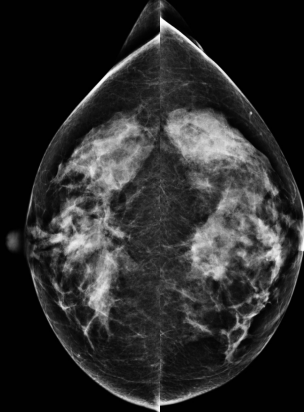
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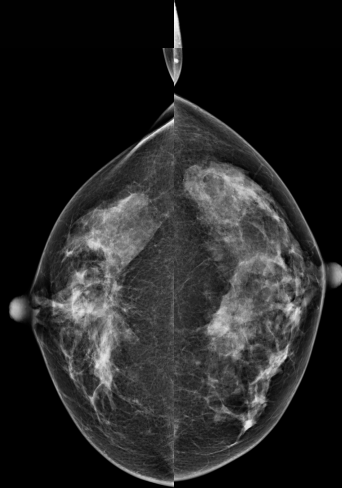
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LCC

R-MLO



L-MLO

R-CC



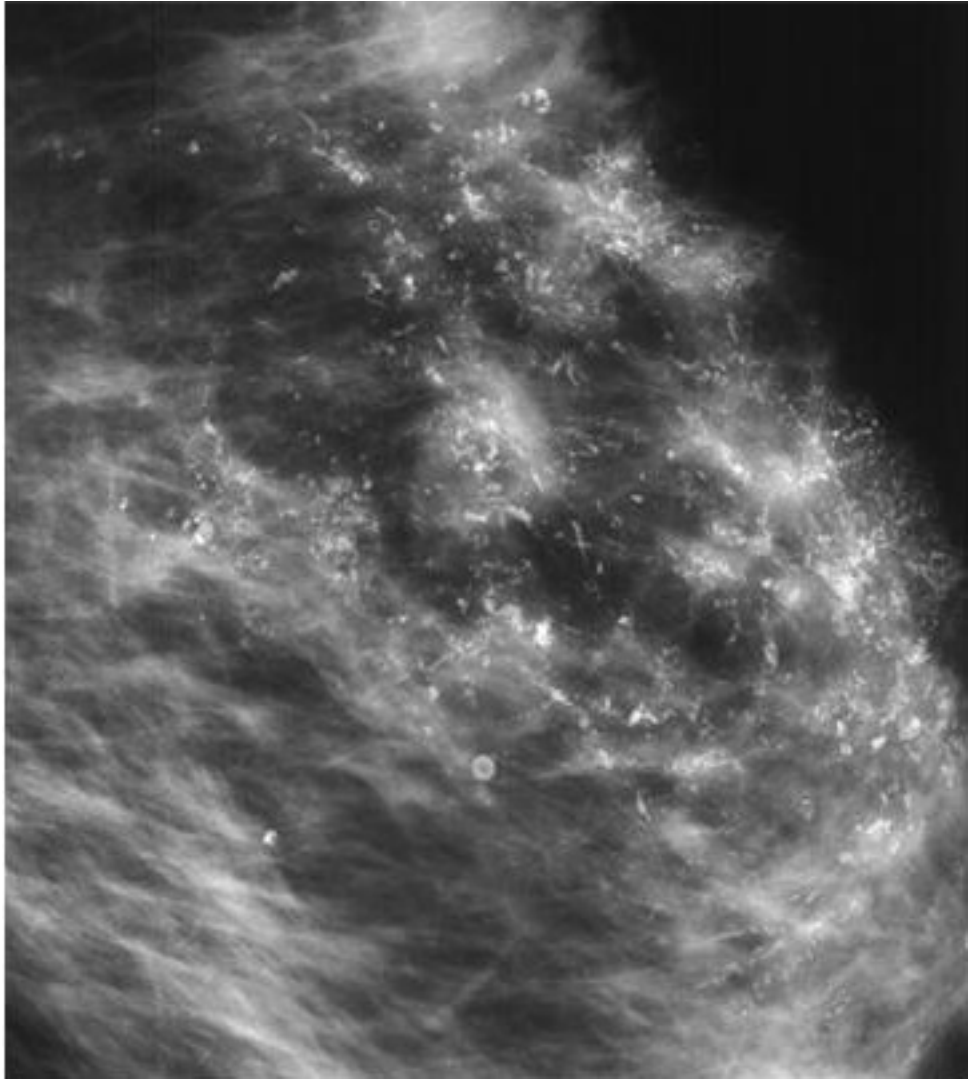
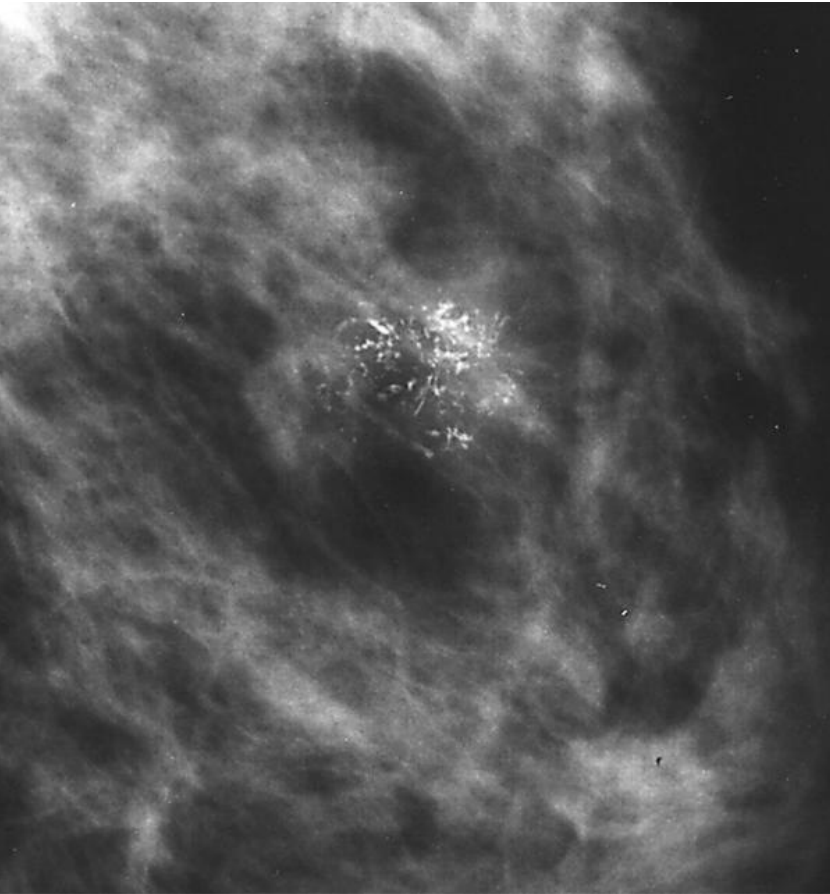
L-CC

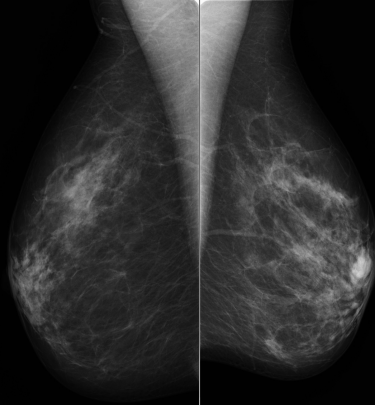
Op zoek naar afwijkingen

- Densiteit
- Massa
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- **Calcificaties**

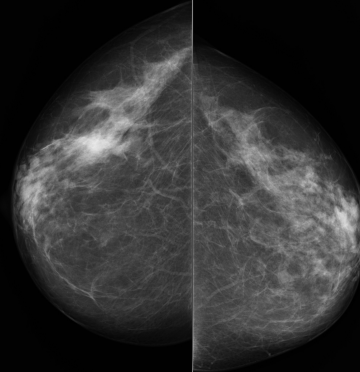
- Combinatie van deze afwijkingen

Calcificaties





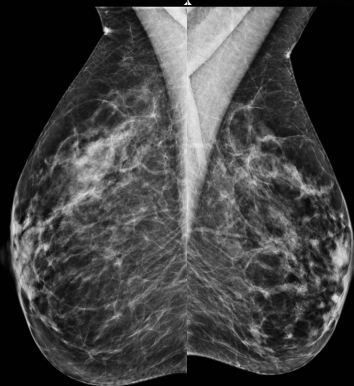
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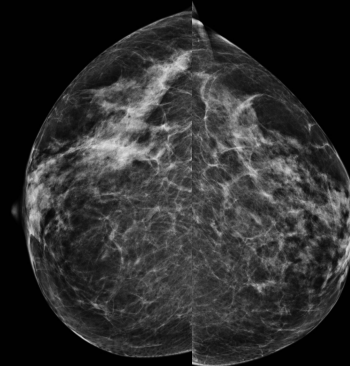
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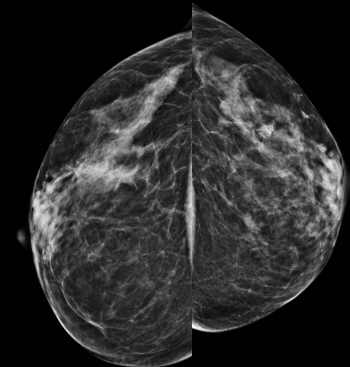
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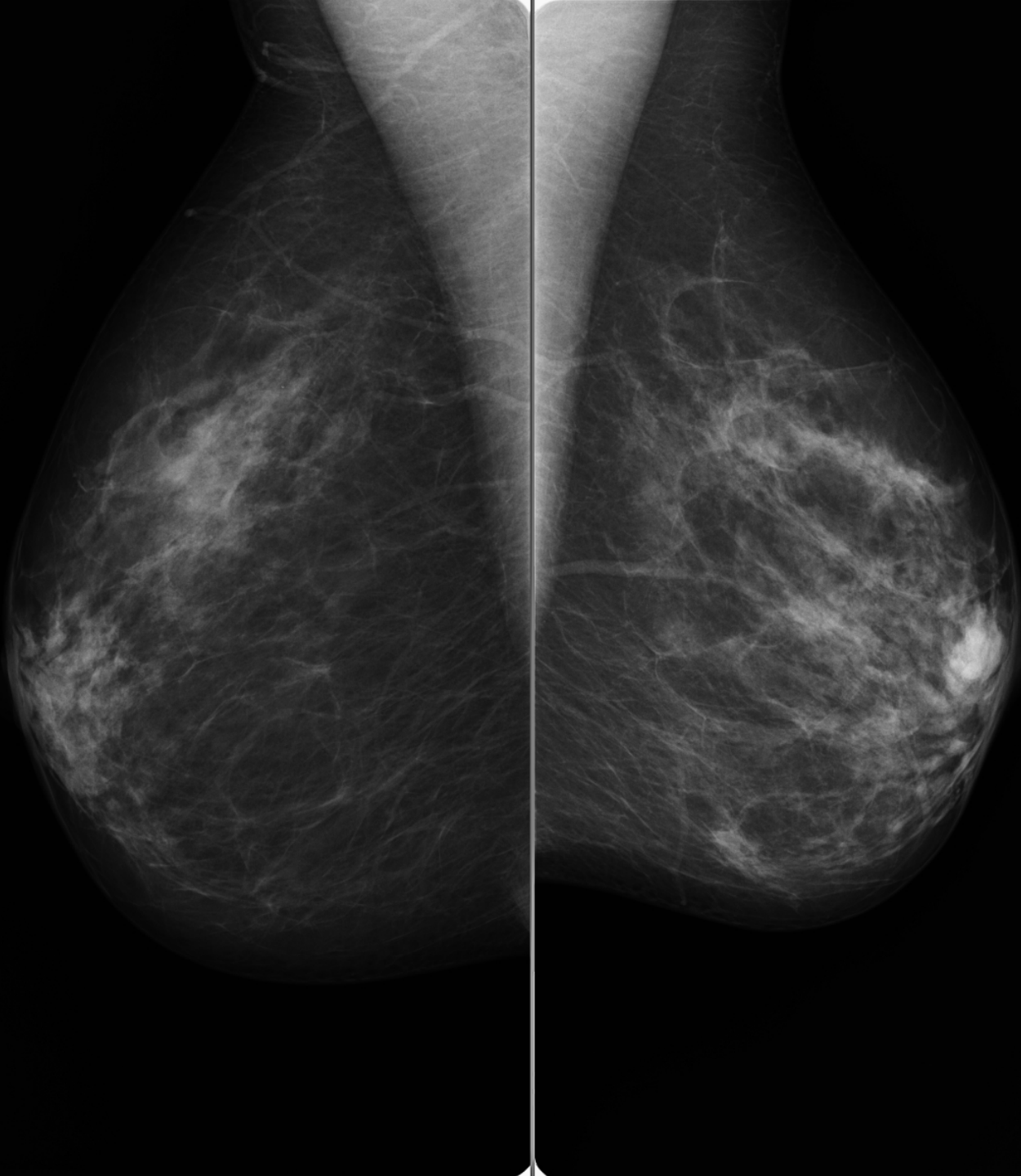


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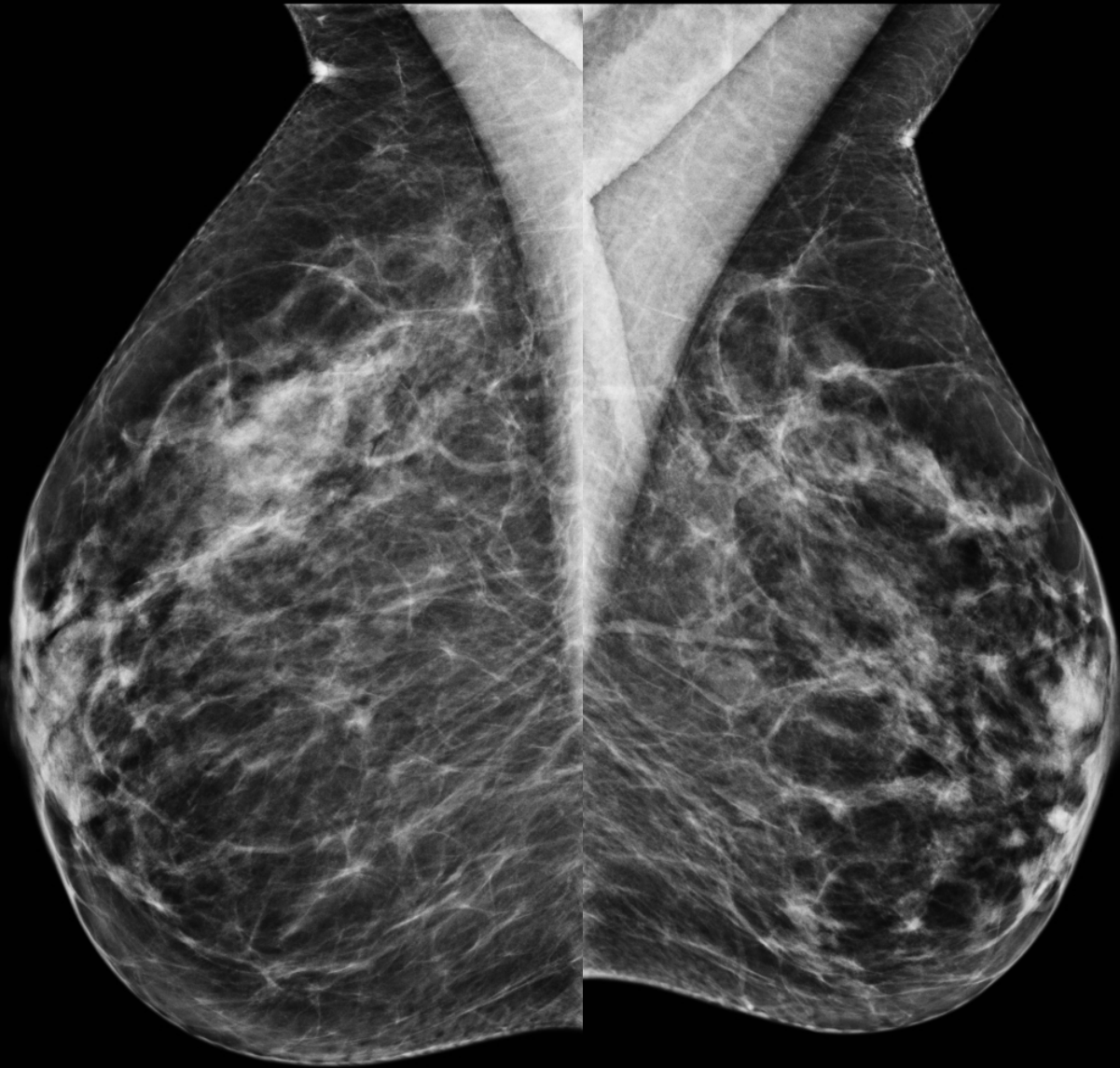
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2010

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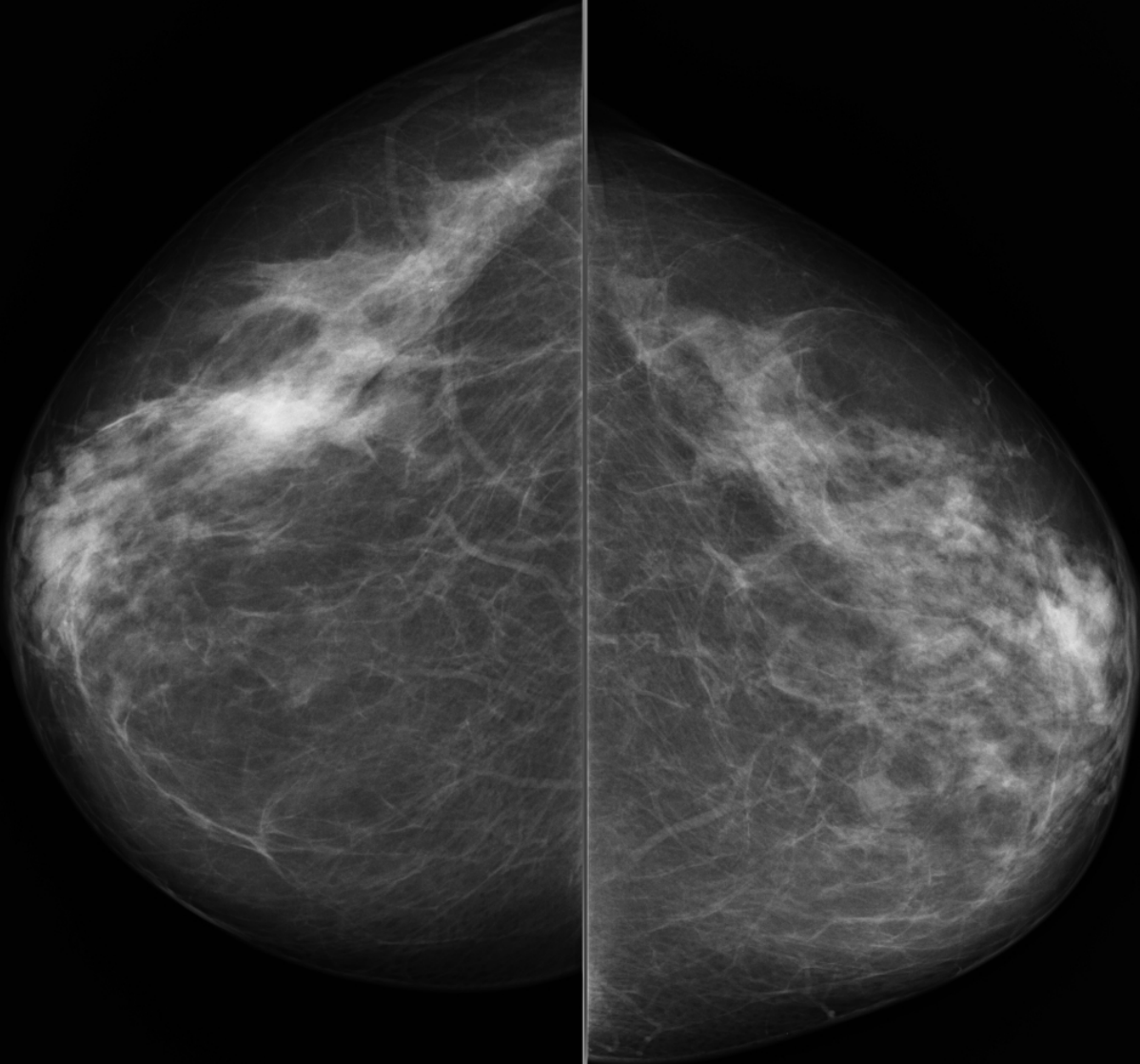
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2012

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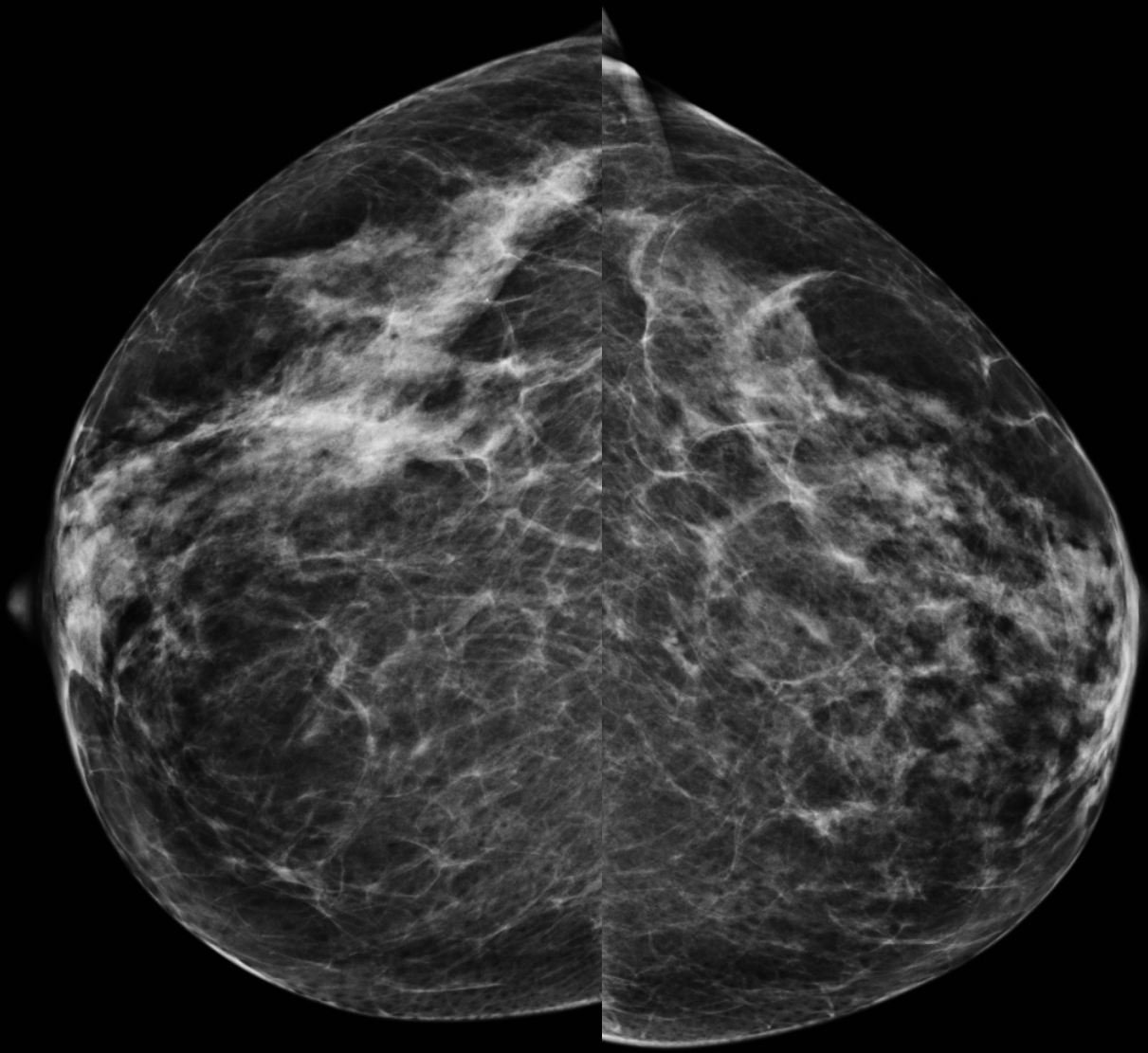


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2010

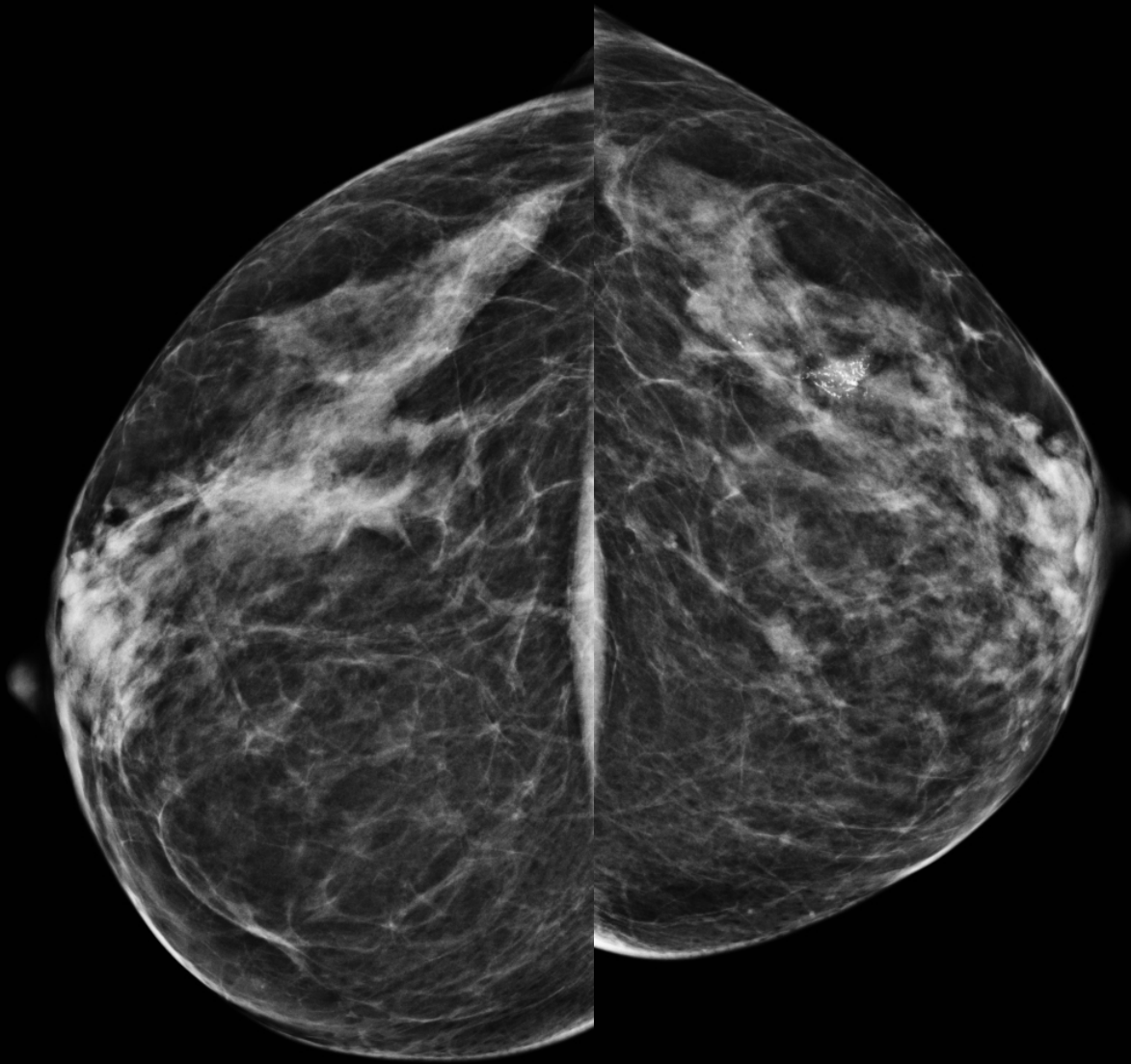
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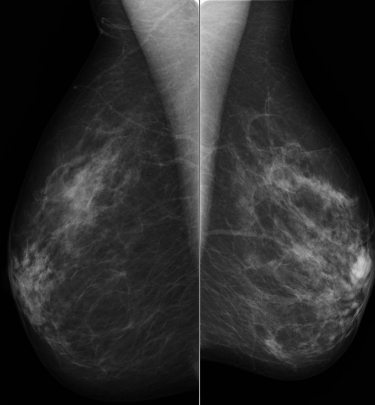
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2012

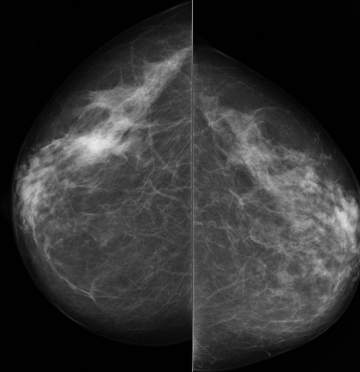
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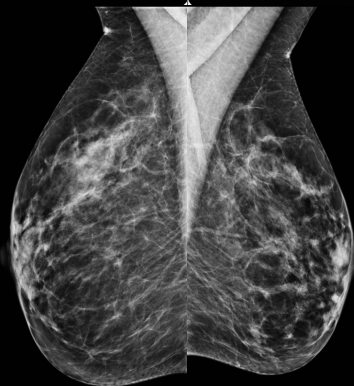
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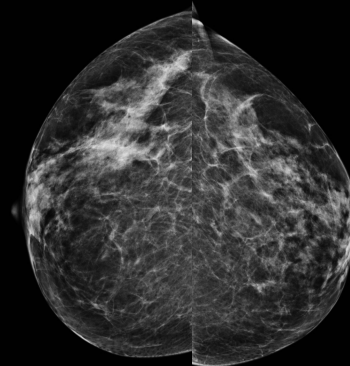
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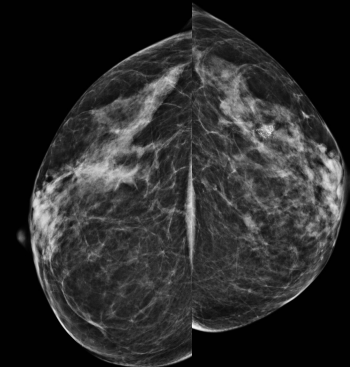
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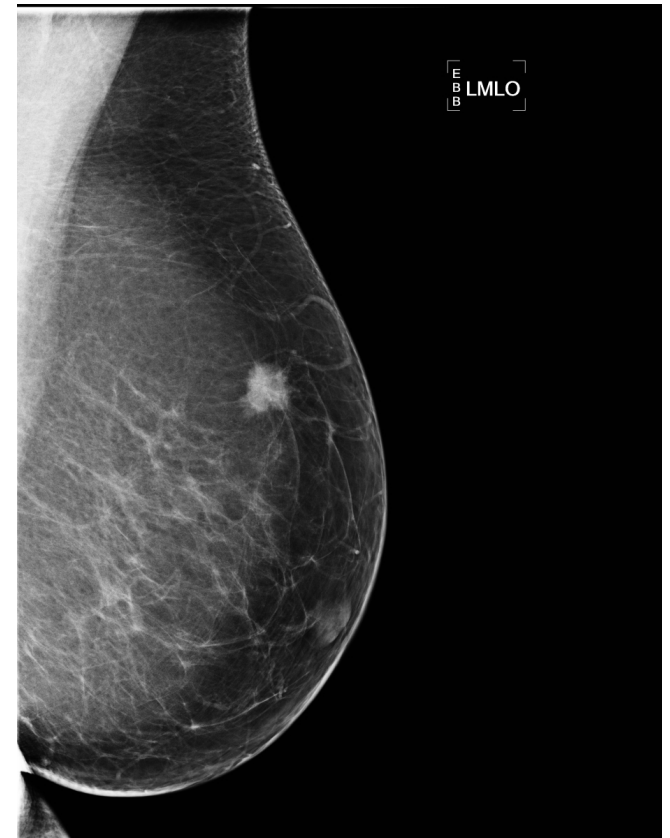
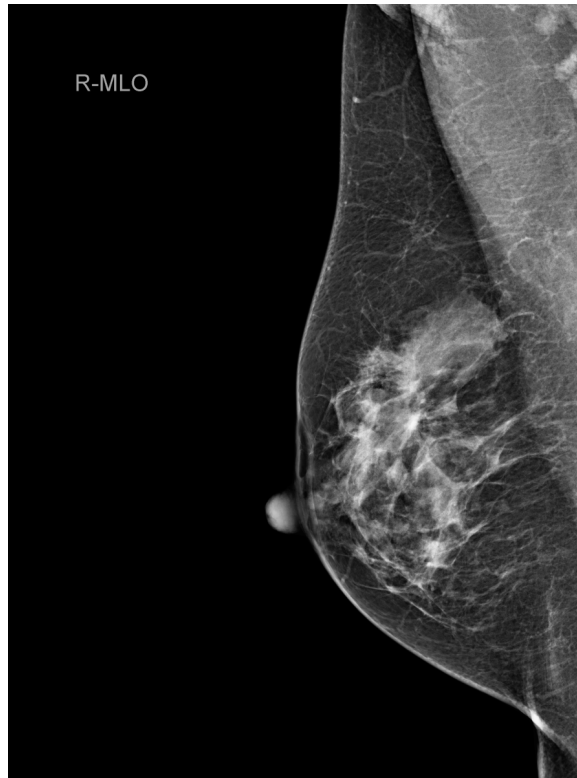
5
1 RCC

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1 LCC



Probleem:

- Alles over elkaar heen geprojecteerd
- Dens beeld



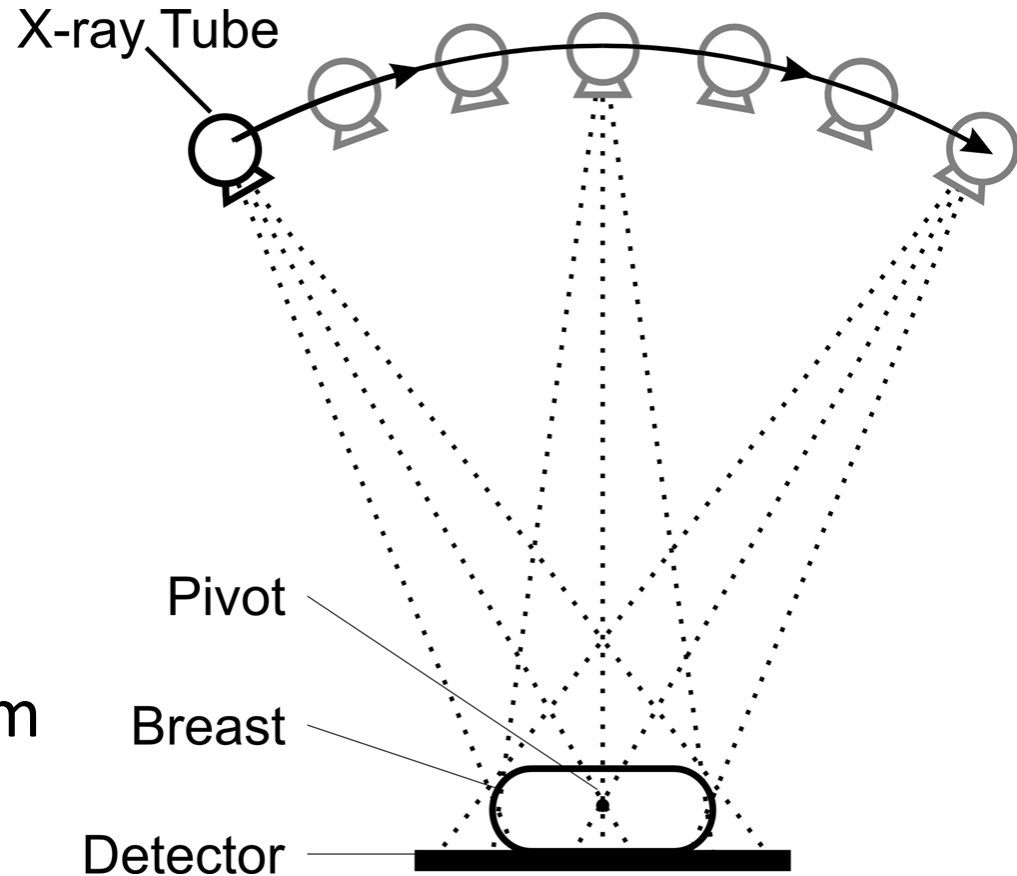
Nieuwe technieken



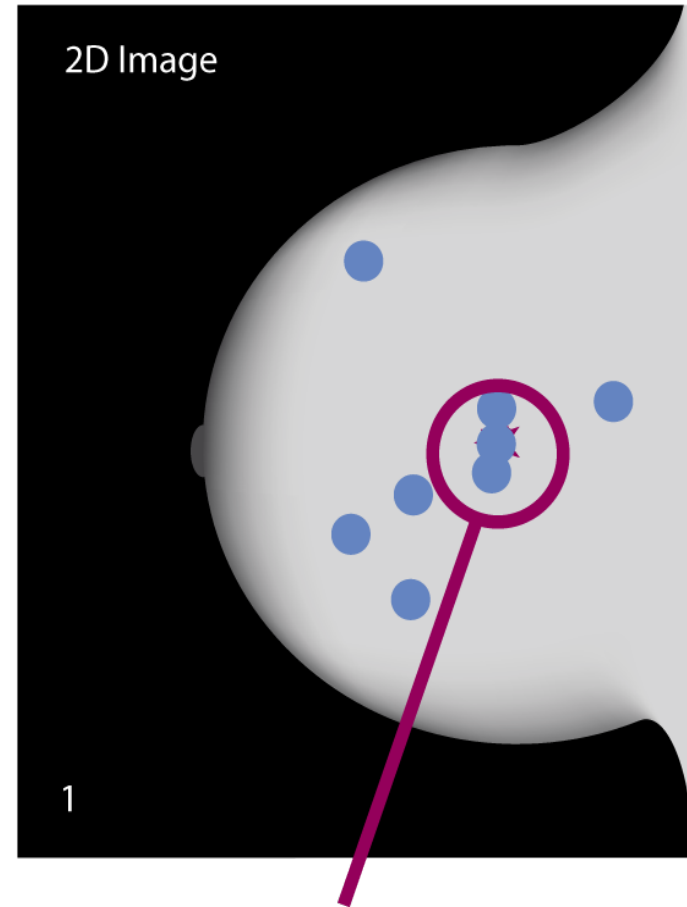
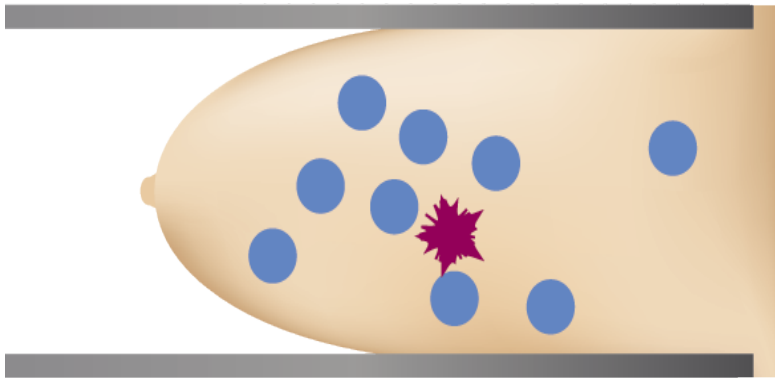
- Tomosynthese
- Contrast Enhanced Spectral Mammography

Tomosynthese

- 'plakjes'
- Multiple lage dosis projecties
- Reduceert parenchym ruis

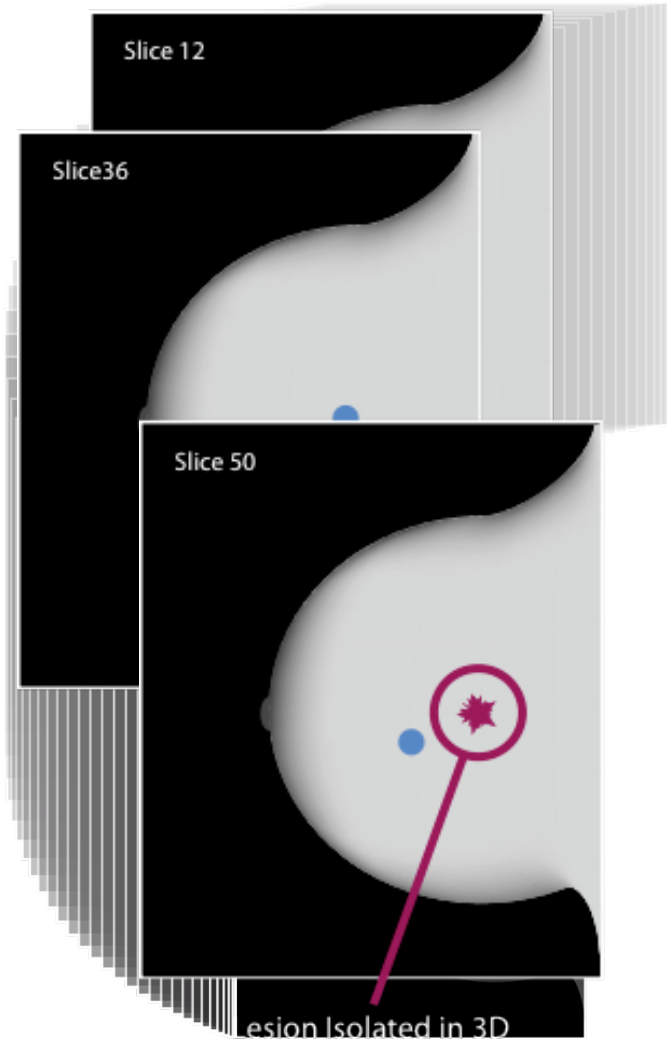


2 D Mammography

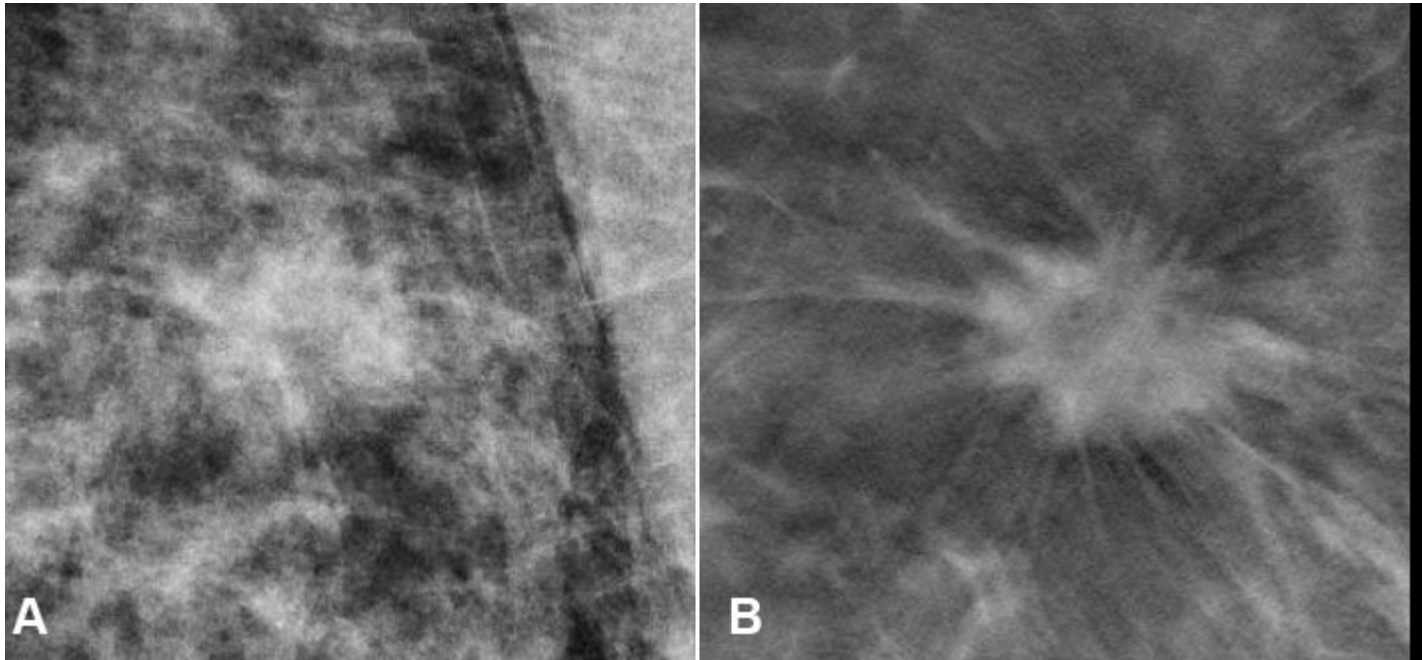


Lesion Superimposed in 2D

3D Mammography



In de praktijk



2D FFDM

1 slice of DBT

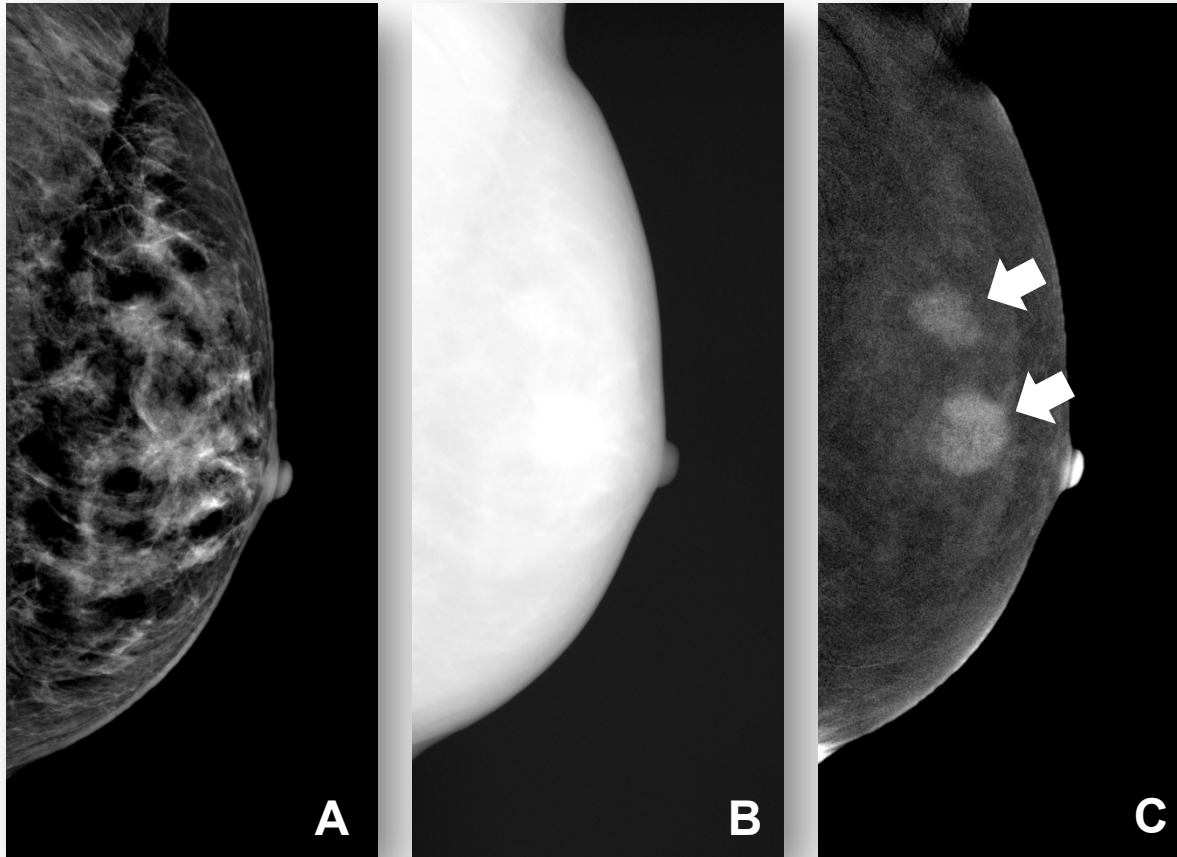
Vragen 3D

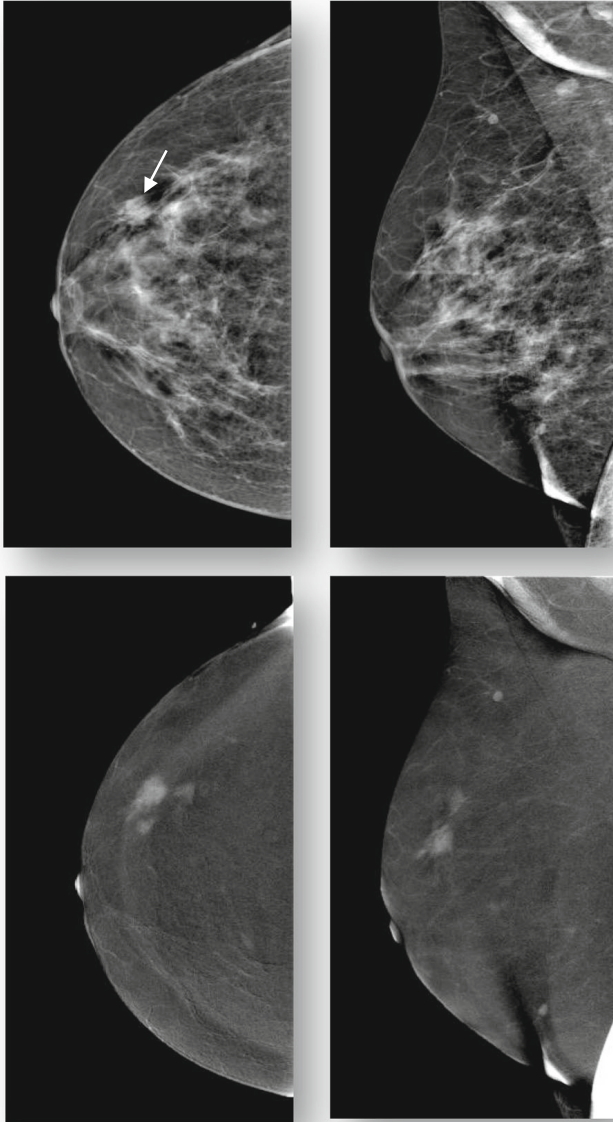
- Stralingsdosis
- Scan time bewegings artefacten
- Tijdrovend?
- Hoeveelheid data?
- Performance echt beter dan 2D?
- Biopsie lesies alleen zichtbaar op 3D?

CESM

- Contrast Enhanced Spectral Mammography
- Mammogram 2 energieniveau's
- IV jodiumhoudend contrast

CESM image voorbeeld





CESM

Table 2 Overview of the diagnostic performance of mammography versus contrast-enhanced spectral mammography (CESM)

	Mammography	CESM
Sensitivity (%)	96.9 (83.7–99.5)	100.0 (89.0–100.0)
Specificity (%)	42.0 (31.1–53.5)	87.7 (78.5–93.9)
Positive predictive value (%)	39.7 (28.8–51.5)	76.2 (60.6–87.9)
Negative predictive value (%)	97.1 (85.0–99.5)	100.0 (94.9–100.0)
Area under the ROC curve	0.779 (0.707–0.851)	0.976 (0.954–0.999)

95 % confidence intervals are in parentheses

- Stralingsdosis: + 80%
- IV contrast

Lobbes et al Eur Radiol DOI 10.1007/s00330

Conclusie:

- Leesomstandigheden
- Vergelijk met eerdere opnamen
- Subtiele verschillen
- Contrast en detail van belang
- Beperking:
 - Overprojectie
 - Veel fibroglandulair weefsel (dens)