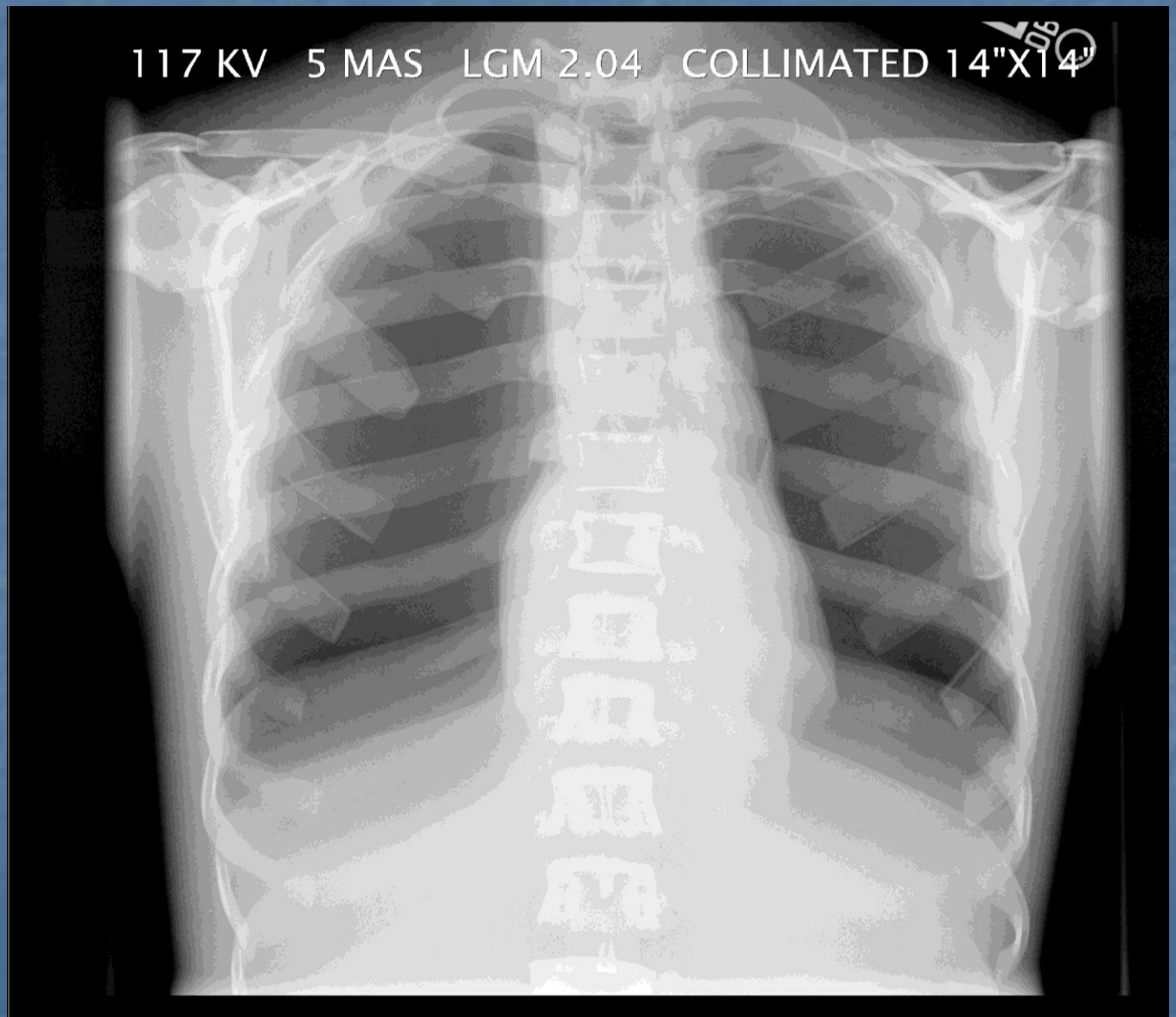
Centering and Collimation and Corrupting Exposure Index Numbers

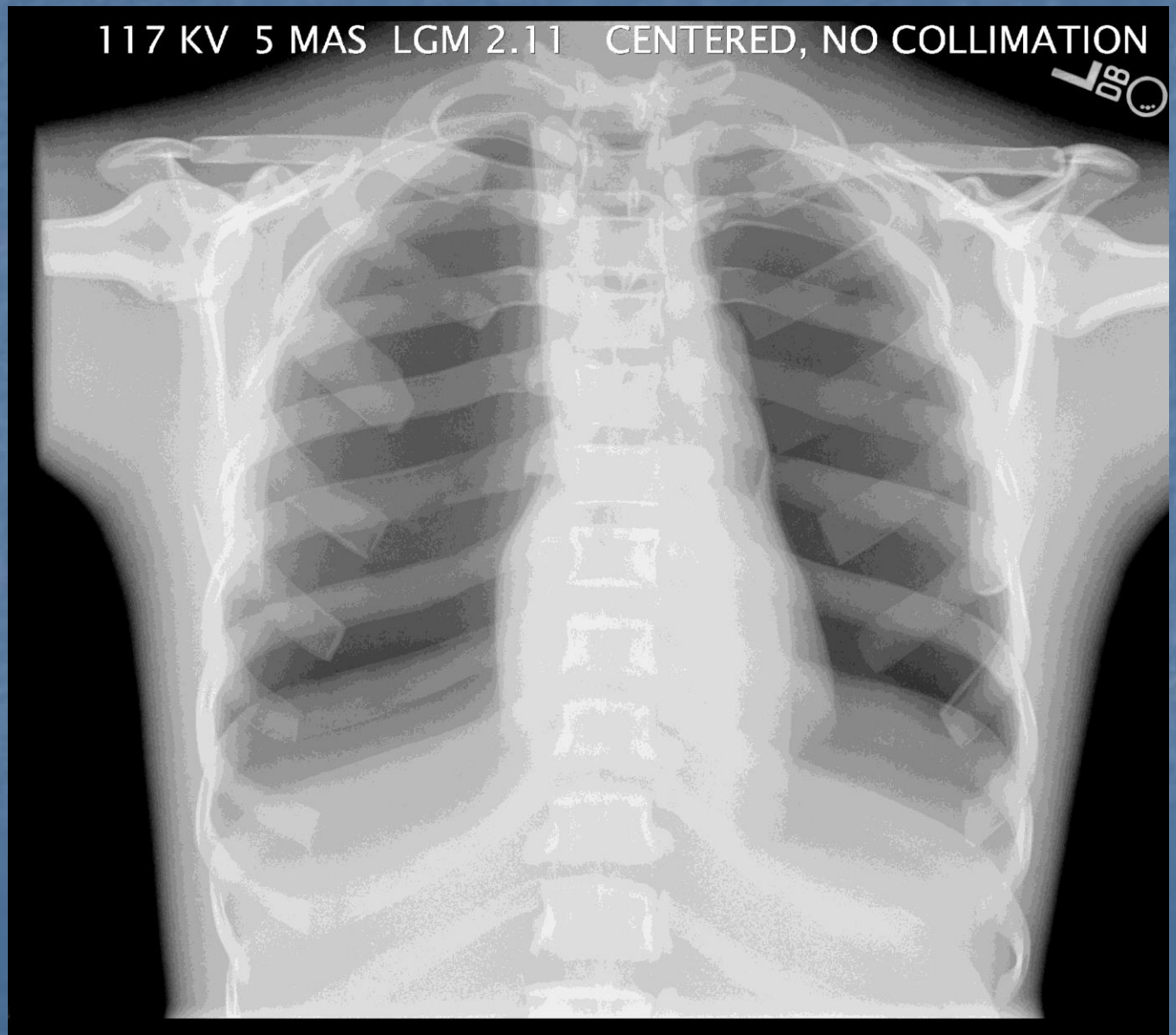
- The following slides show the chest, elbow and shoulder phantom with different centering and /or collimation changes.

Agfa CR Perfectly centered and collimated to 14x14
117 kV @ 5 mAs – LgM is 2.04 or S# is 240

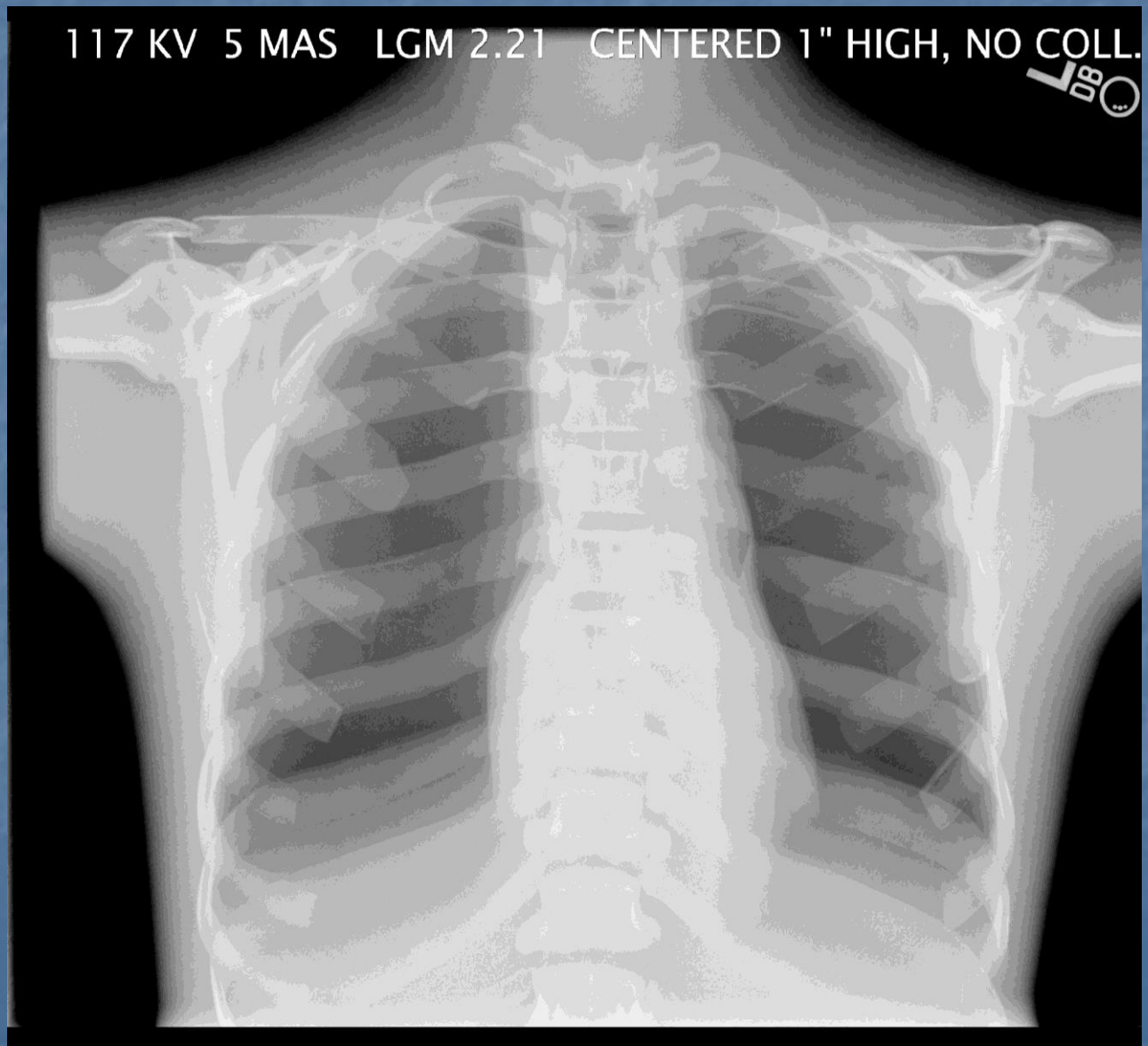


Perfectly centered - now 17x14 - 117 kV @ 5 mAs

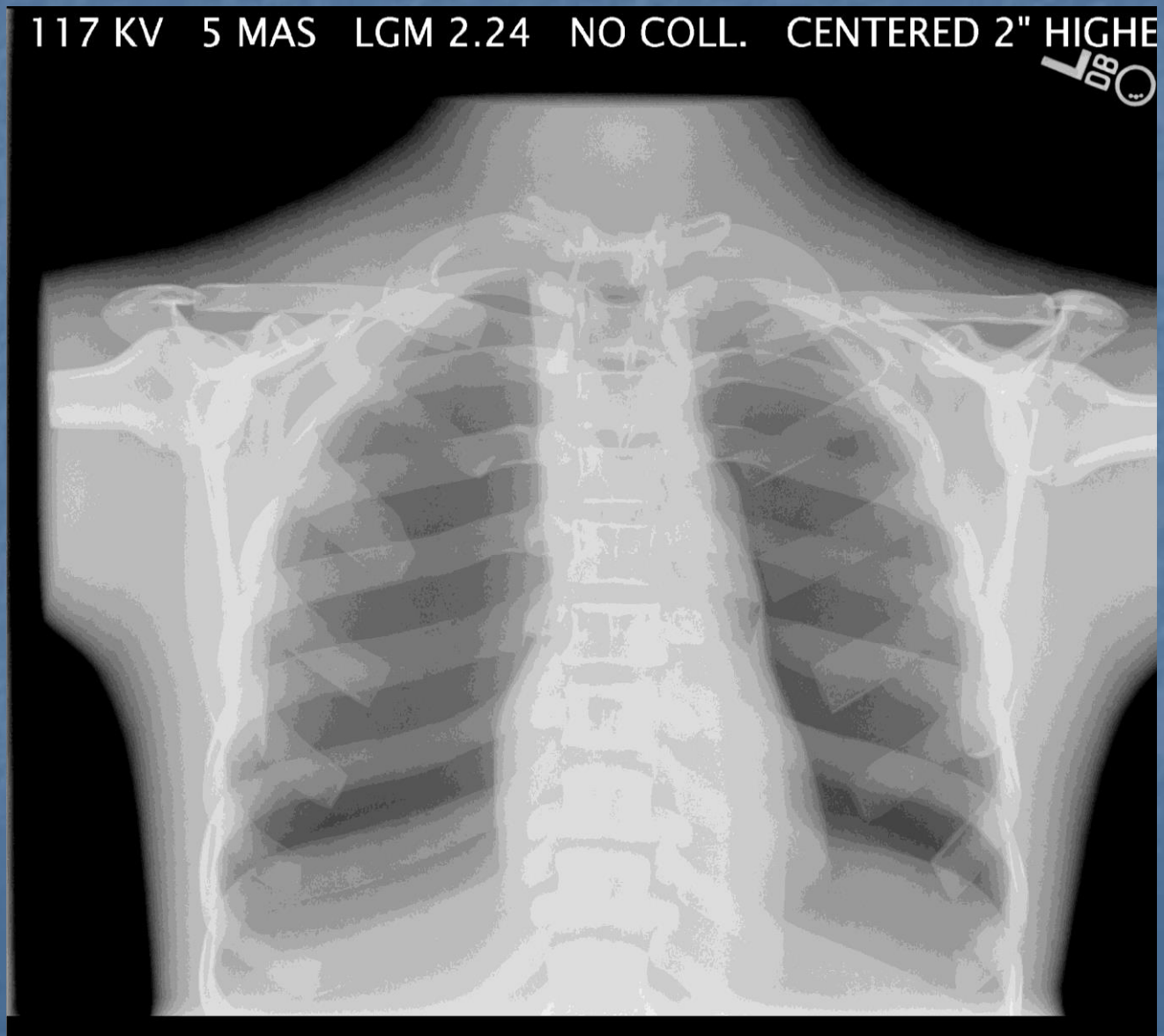
LgM is 2.11 or S# is 196 23.3% change



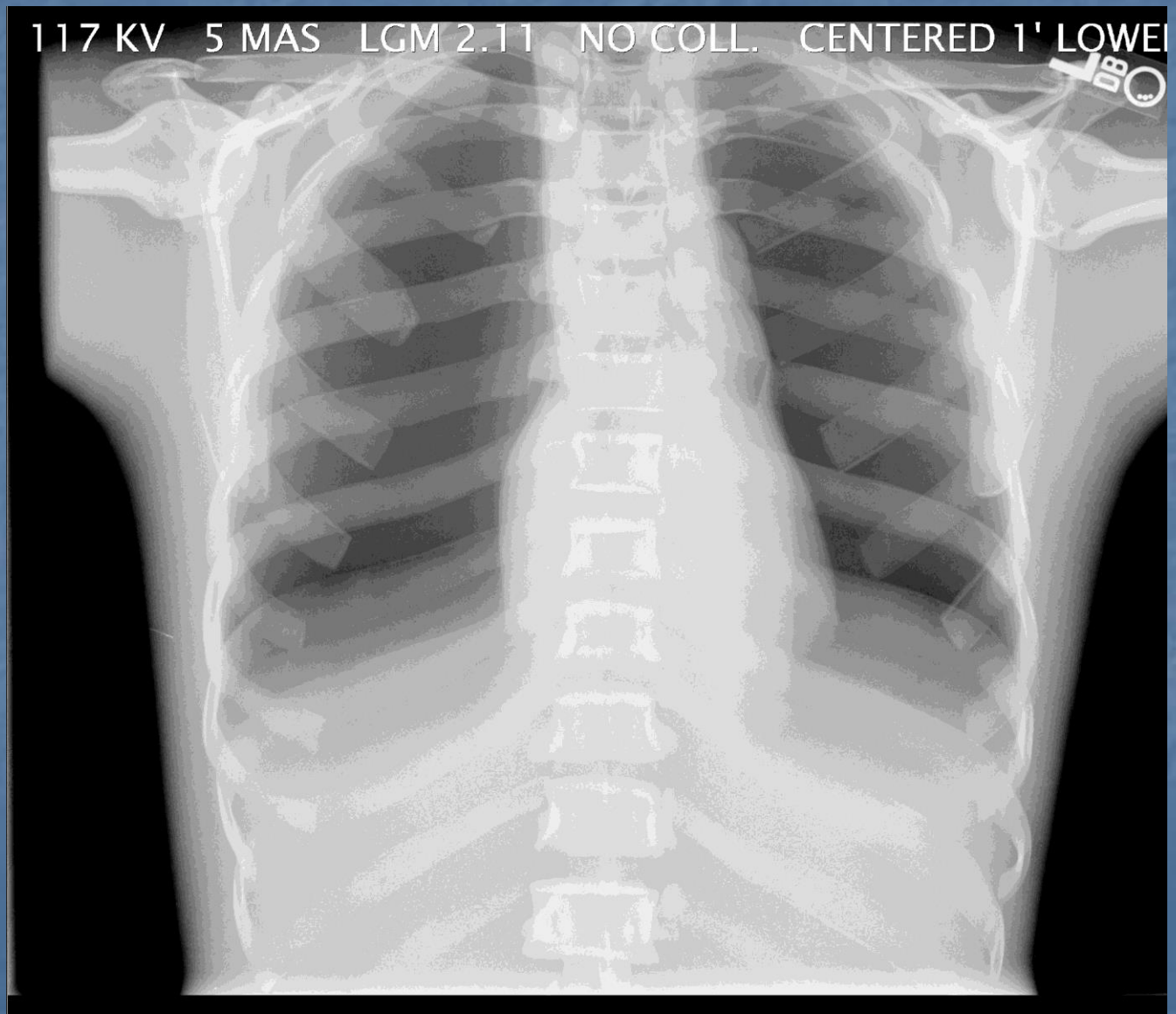
Centered 1” high –117 kV @ 5 mAs
LgM is 2.21 or S# is 163 56.7% change



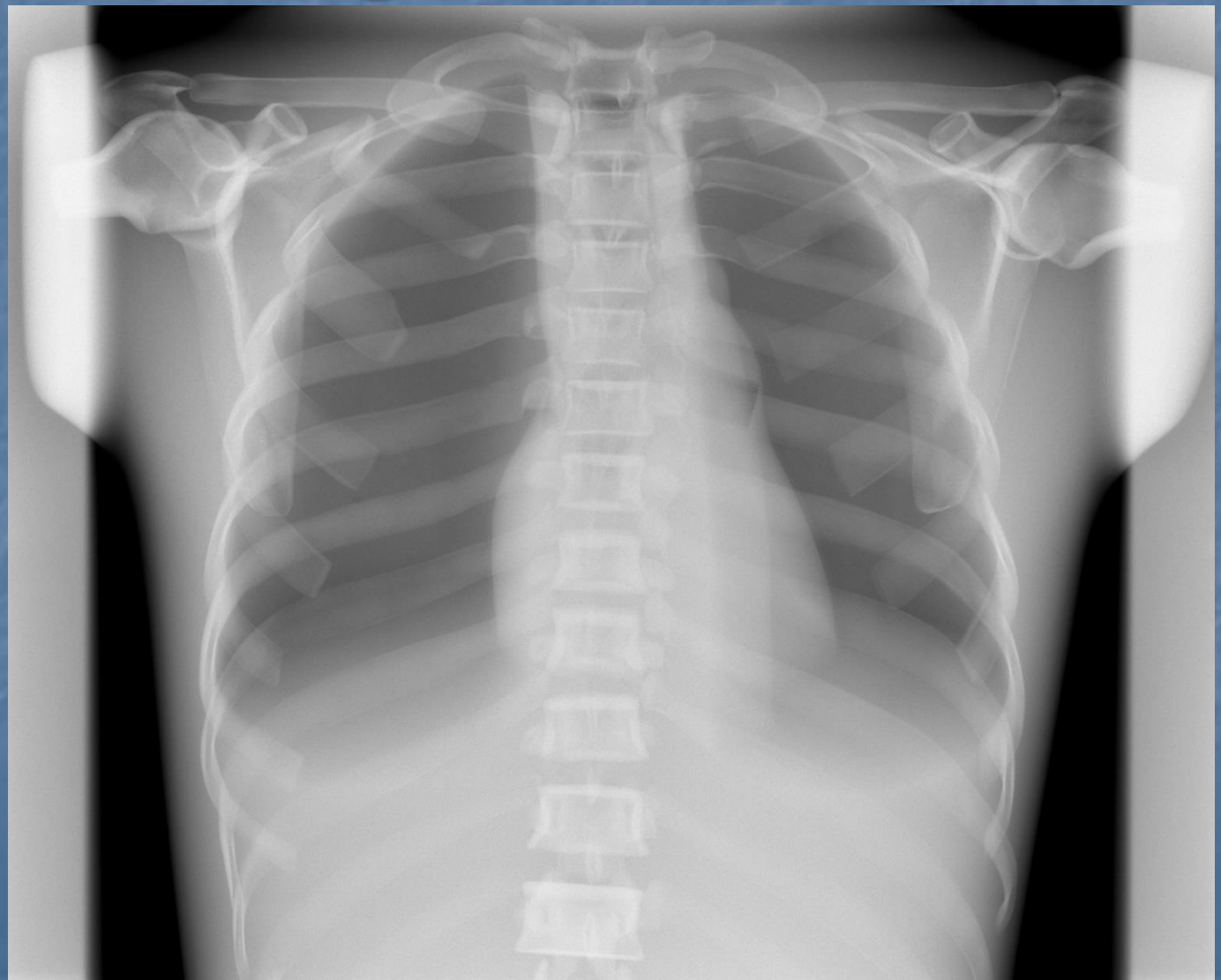
Centered 2” high – 117 kV @ 5 mAs
LgM is 2.24 or S# is 153 66.7% change



Now centered 1” low – 117 kV @ 5 mAs
LgM is 2.11 or S# is 196 23.3% change

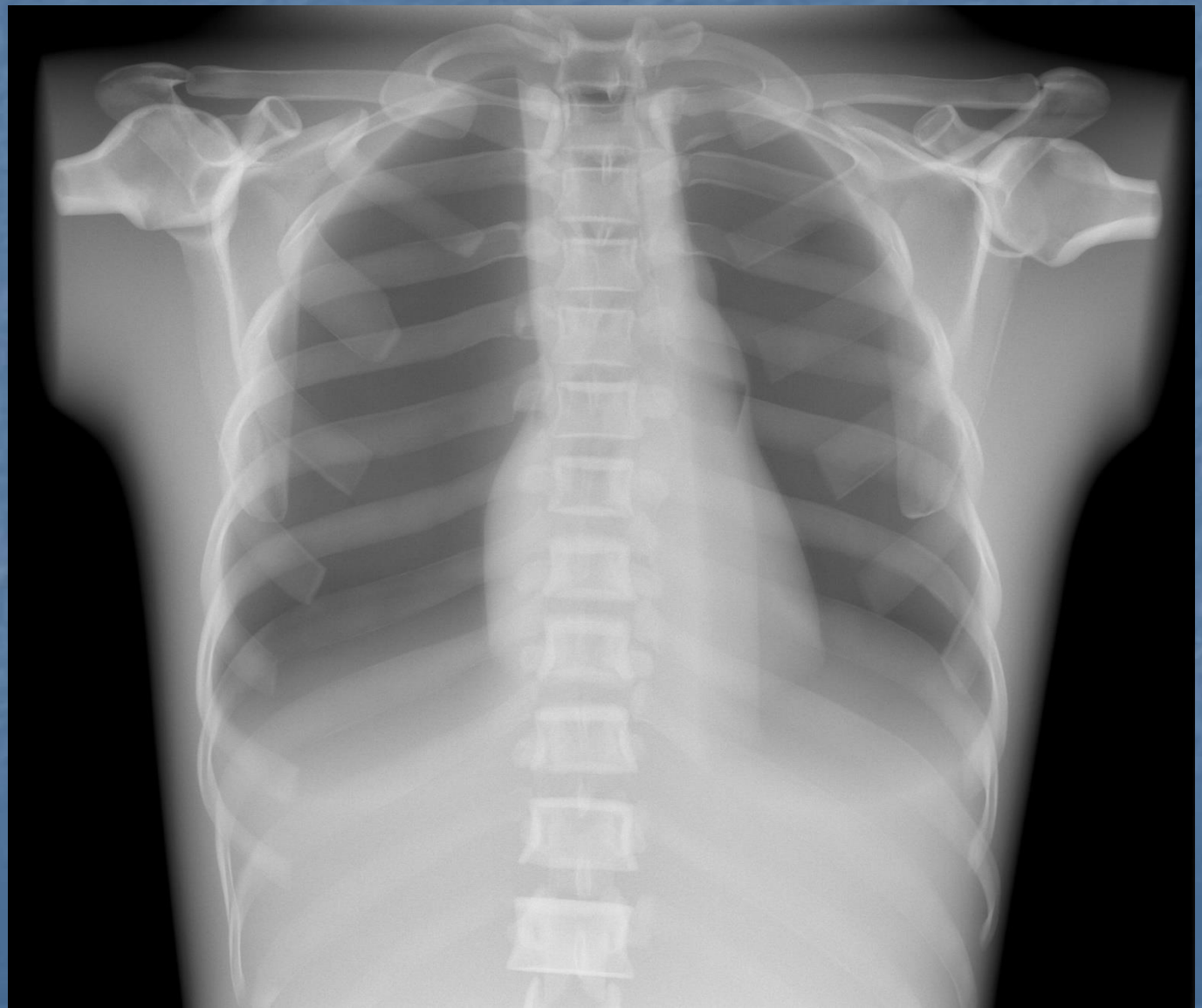


Siemens (Canon) DR portable detector
Perfectly centered and collimated to 14”x14”
125 kV @ 2.7 mAs EXI 356

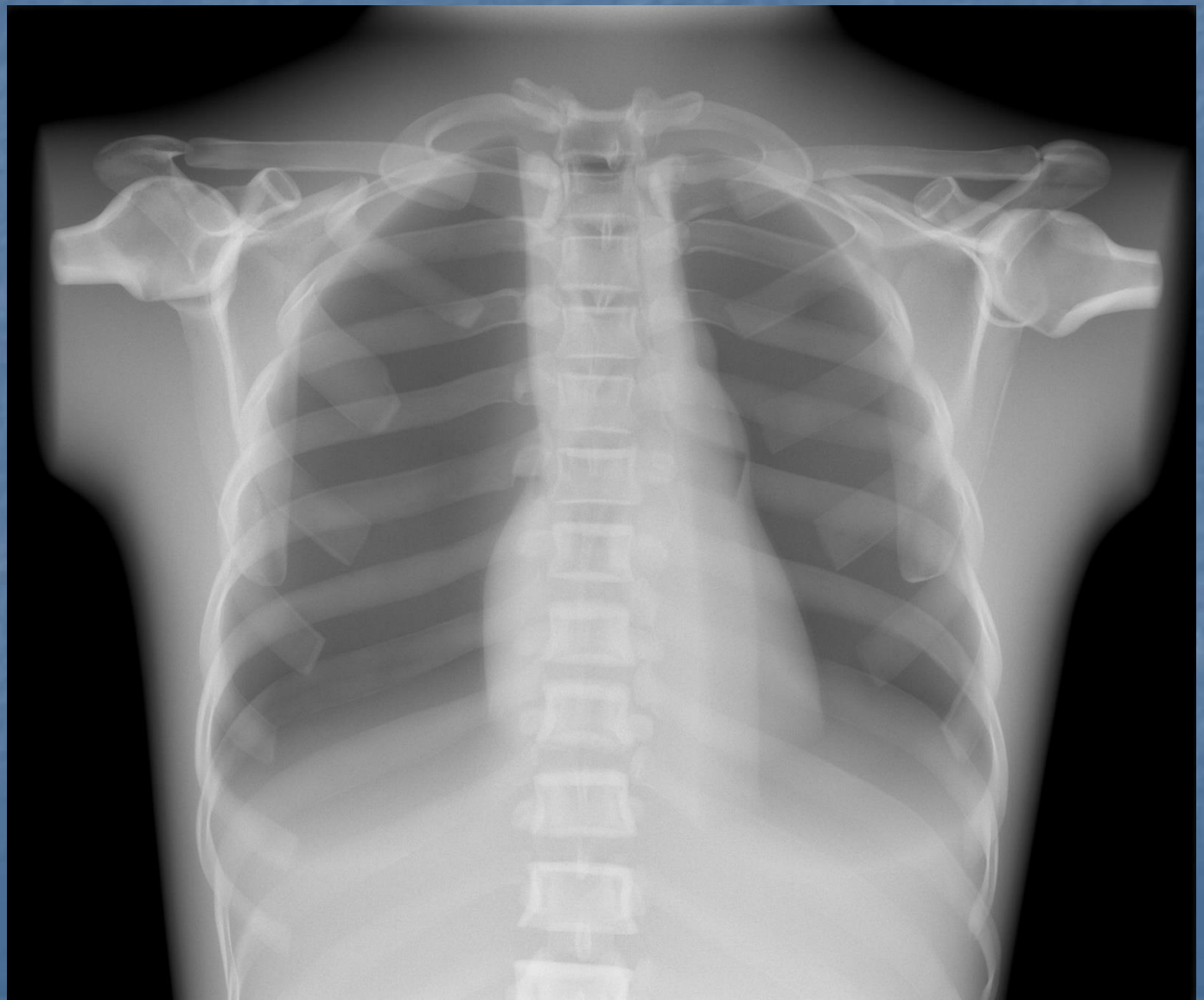


Perfectly centered, no collimation

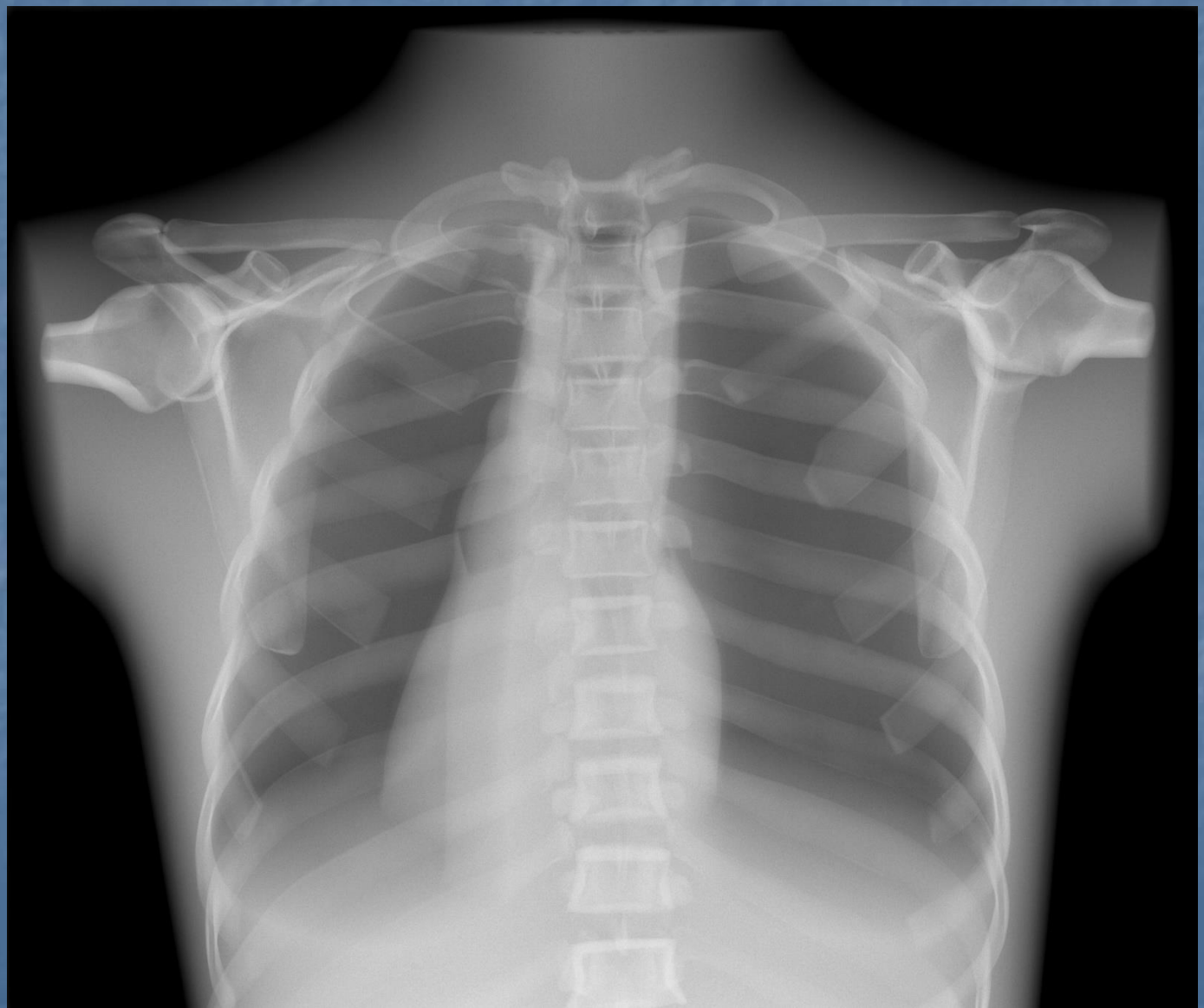
125 kV @ 2.7 mAs EXI 351 2.8% change



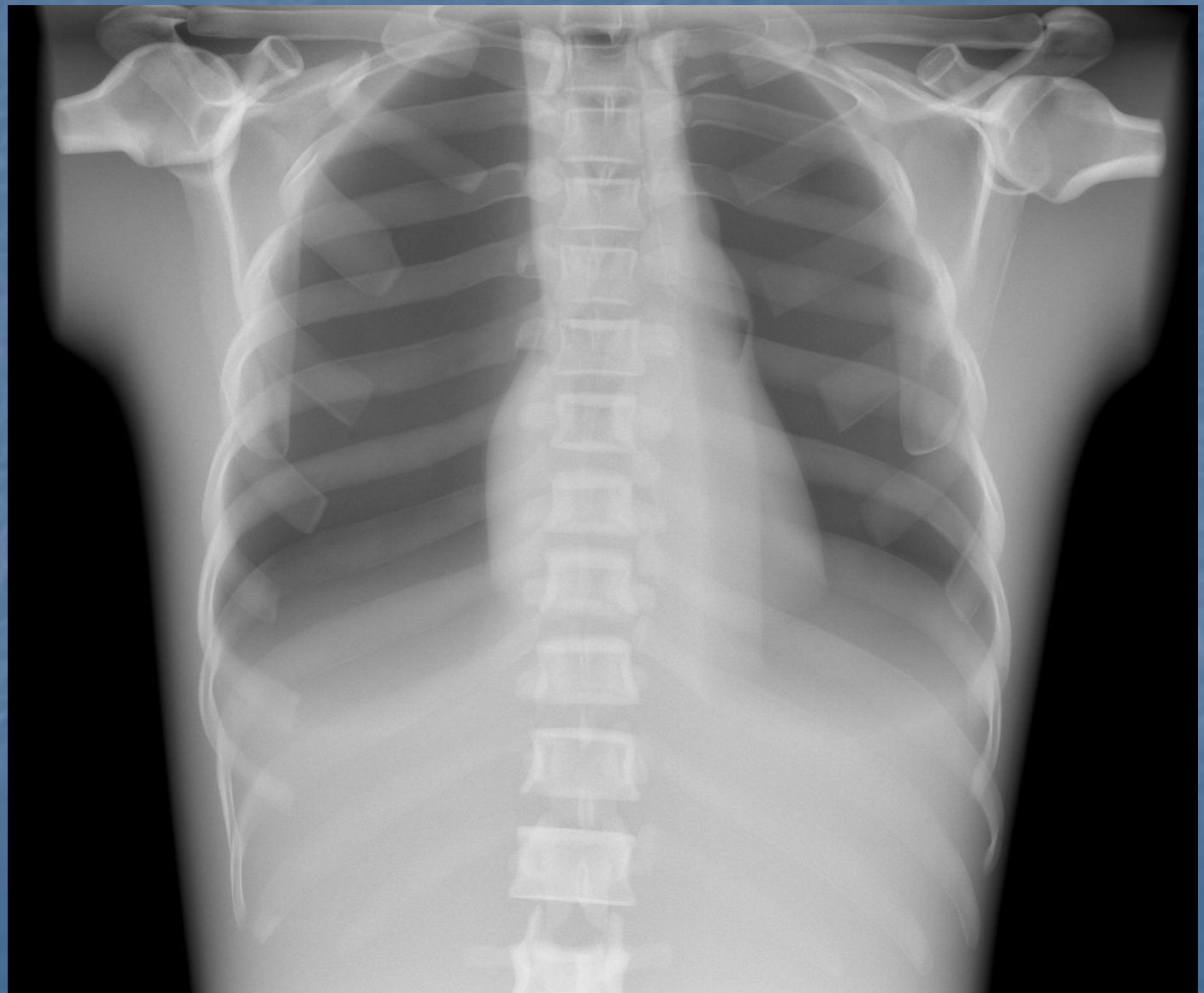
Centered 1” high - 125 kV @ 2.7 mAs
EXI 399 12.1% change



Centered 2” high - 125 kV @ 2.7 mAs
EXI 442 24.2% change



Centered 1” low - 125 kV @ 2.7 mAs
EXI 313 -24.2% change



Agfa CR (LgM range 1.80-2.10)
Perfect centering – 4 sided collimation
LgM 1.81 or S# of 393

PERFECT CENTERING

Digital Radiography Solutions

Centered – top side touching
LgM 1.85 or S# of 366 13.3% change

Long side touching edge

LgM 1.85 or S# of 366 13.3% change

Kitty Corner – touching at both corners
LgM 1.81 or S# of 393 0# change

Konica CR (S range 100-350)
Perfect Centering and Collimation
65 kV @ 1.25 mAs S = 262

Centered and touching bottom
65 kV @ 1 mAs S = 264 .75% change

Off center and touching left side
65 kV @ 1 mAs S = 272 3.8% change

Kitty corner

65 kV @ 1.25 mAs S = 255 5.5% change

Digital Radiography Solutions

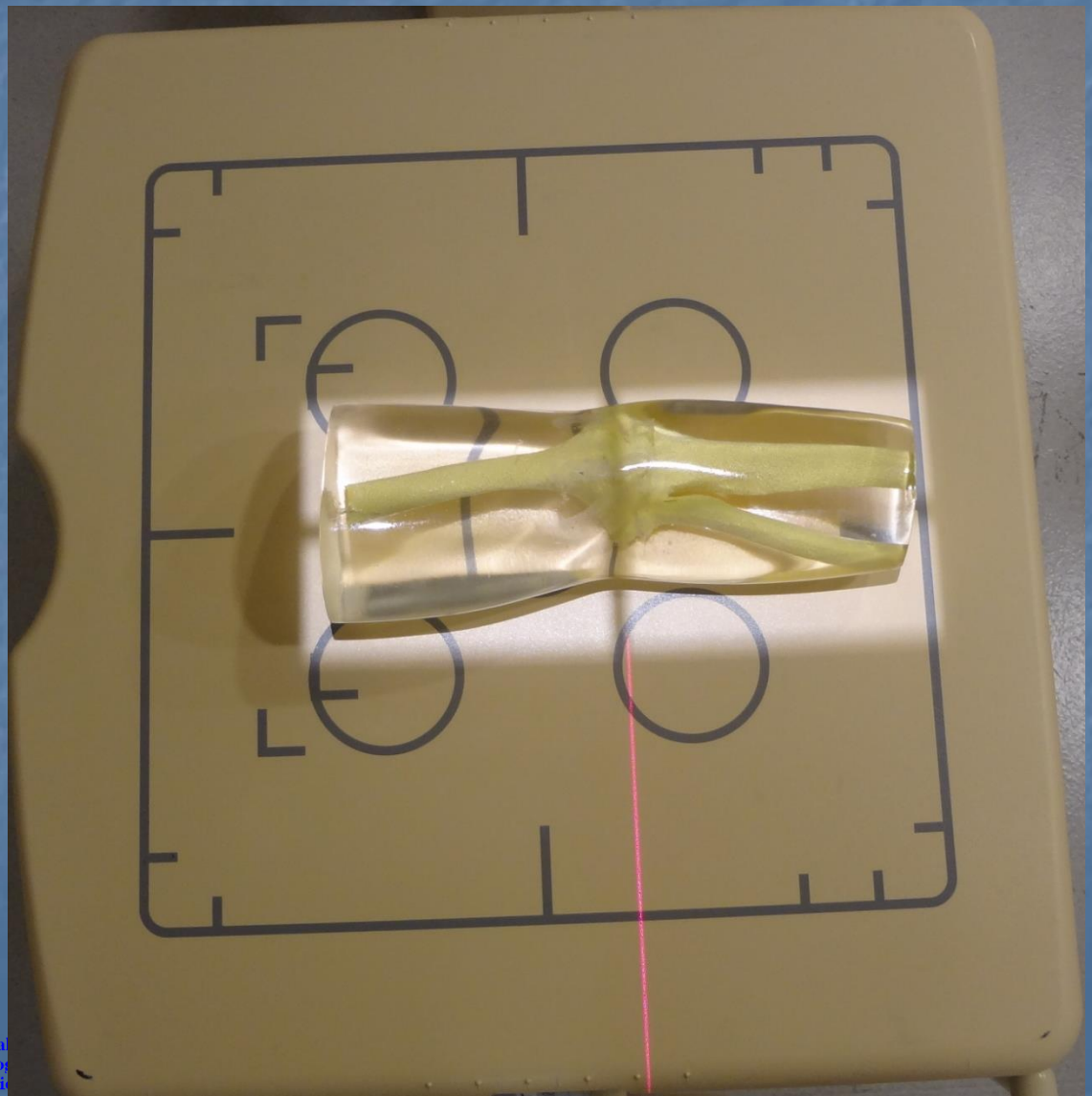
Philips built in detector (EI_s range 100 - 300)

Perfect Centering and Collimation

70 kV @ 1 mAs EI_s 255

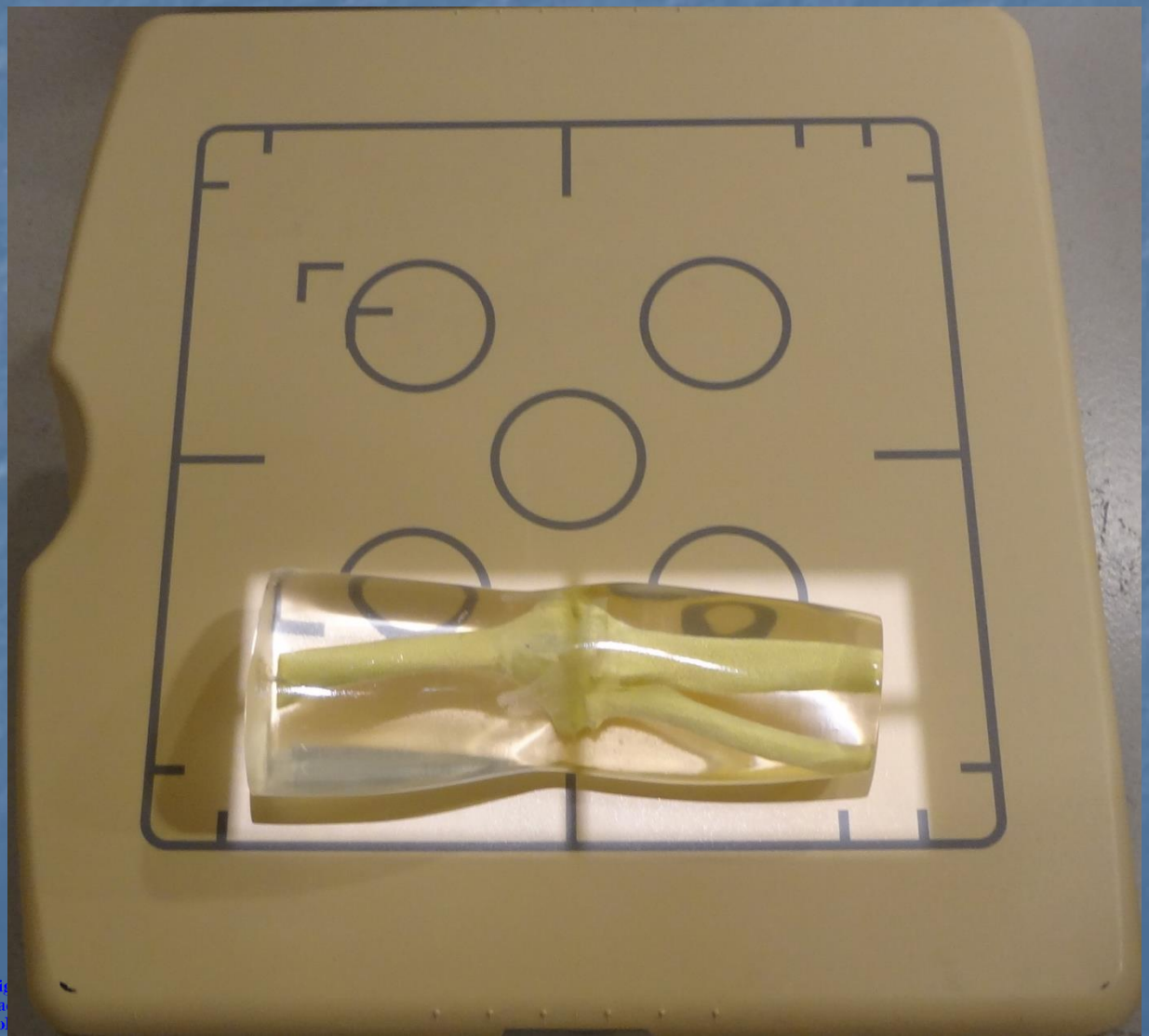
Centered and touching bottom

70 kV @ 1 mAs EI_s 260 .40% change



Off center and touching left side

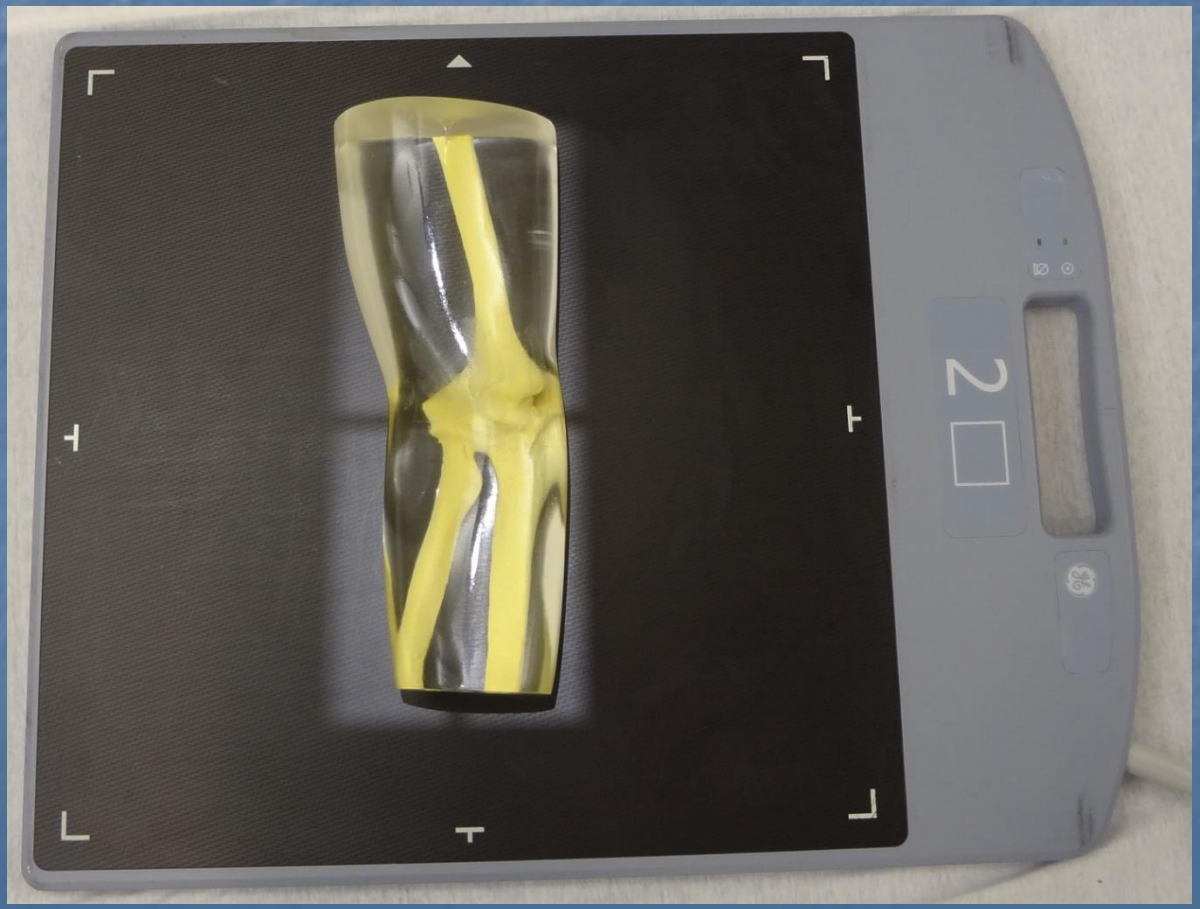
70 kV @ 1 mAs EI_s 261 .75% change



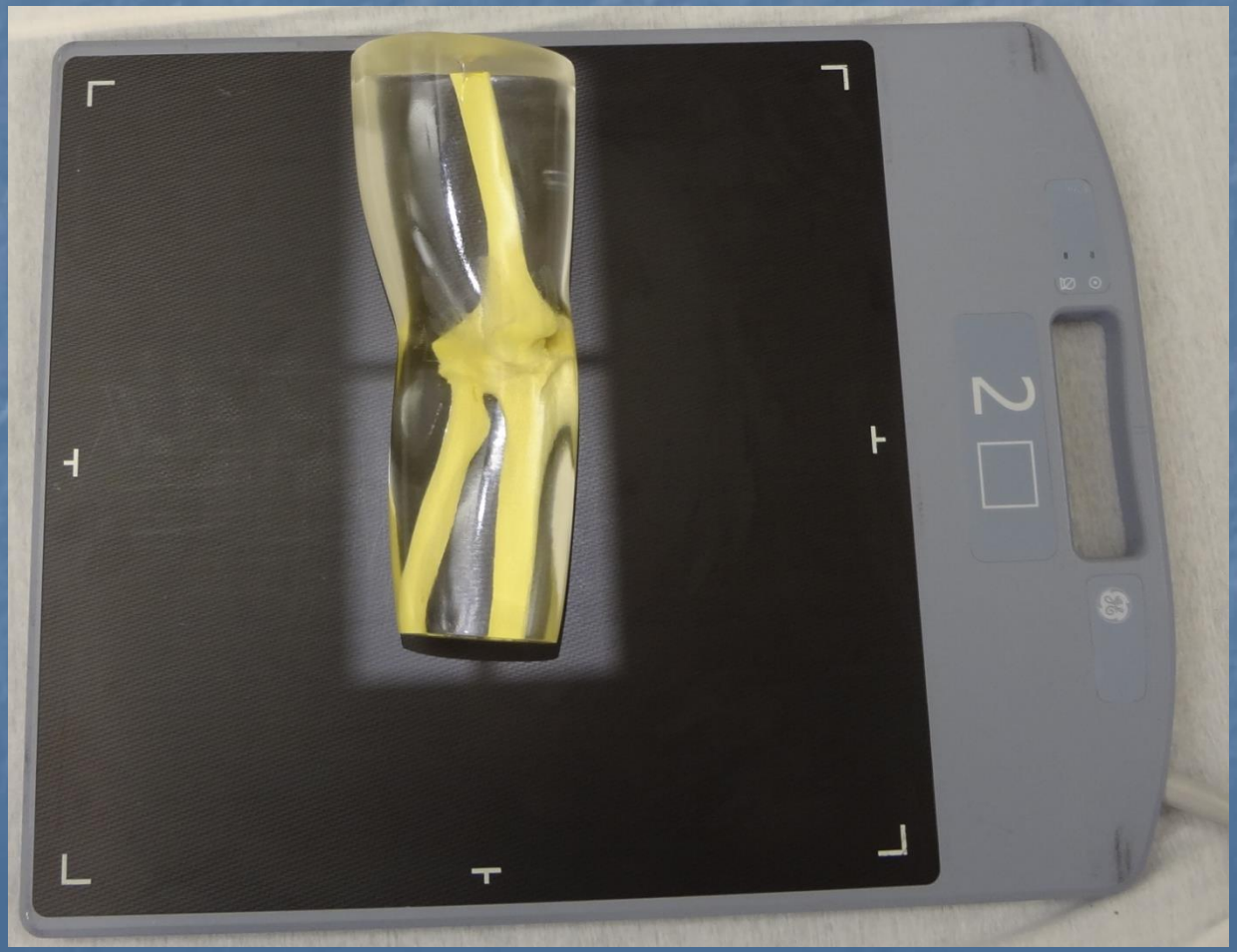
Kitty corner

70 kV @ 1 mAs EI_s 261 4.7% change

GE portable detector (DEI range .30 - .90)
Perfect Centering and Collimation
70 kV @ 1 mAs DEI .35

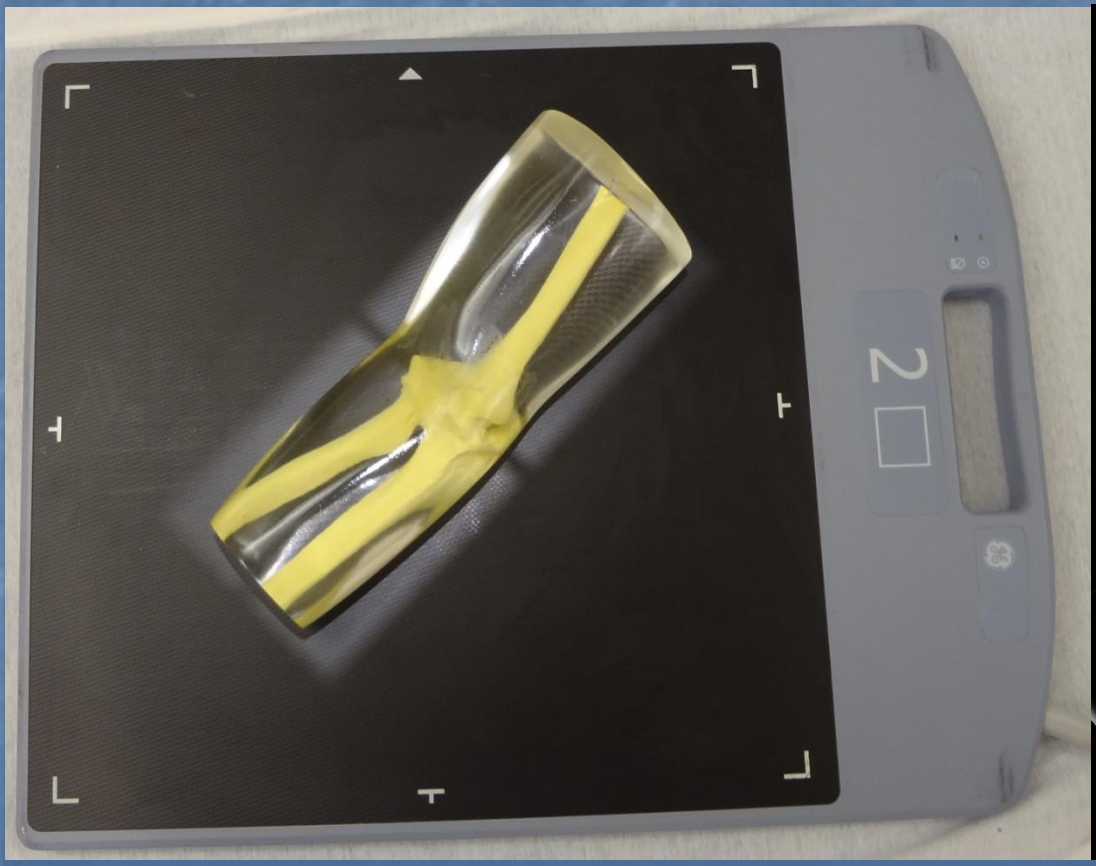


Centered and touching top
70 kV @ 1 mAs DEI .35 0% change



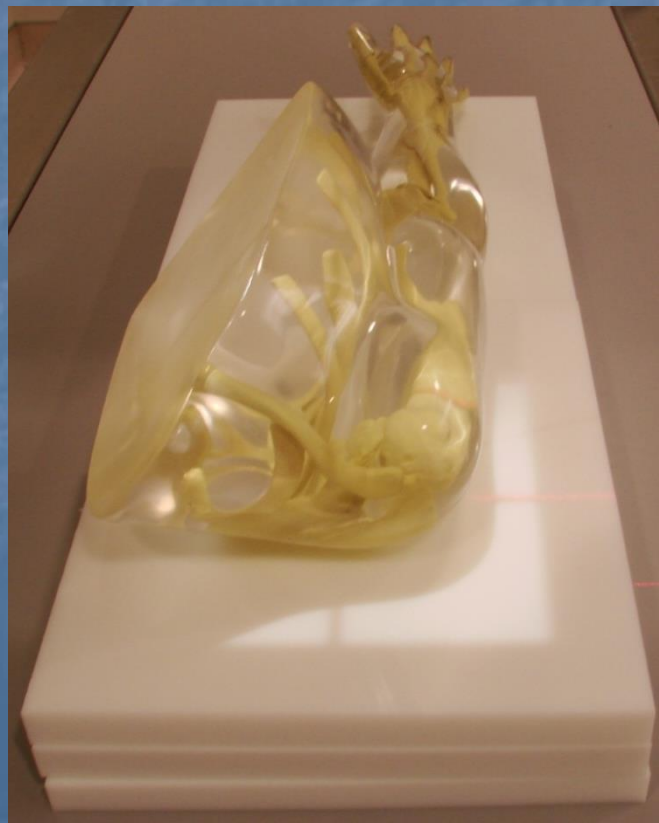
Off center and touching left side
70 kV @ 1 mAs DEI .35 0% change

Kitty corner
70 kV @ 1 mAs DEI .34 3% change



Shoulder phantom with 3 sheets of Polyethylene to make it the thickness of a large adult male.

These experiments will show the difference in EXI and DEI numbers when the collimation is increasingly opened.



Siemens portable (Canon) detector
8”x8” EXI 328

Siemens portable detector

9”x9” EXI 384 7.1% change

Siemens portable detector

10”x10” EXI 427 30.2% change

Digital Radiography Solutions

Siemens portable detector

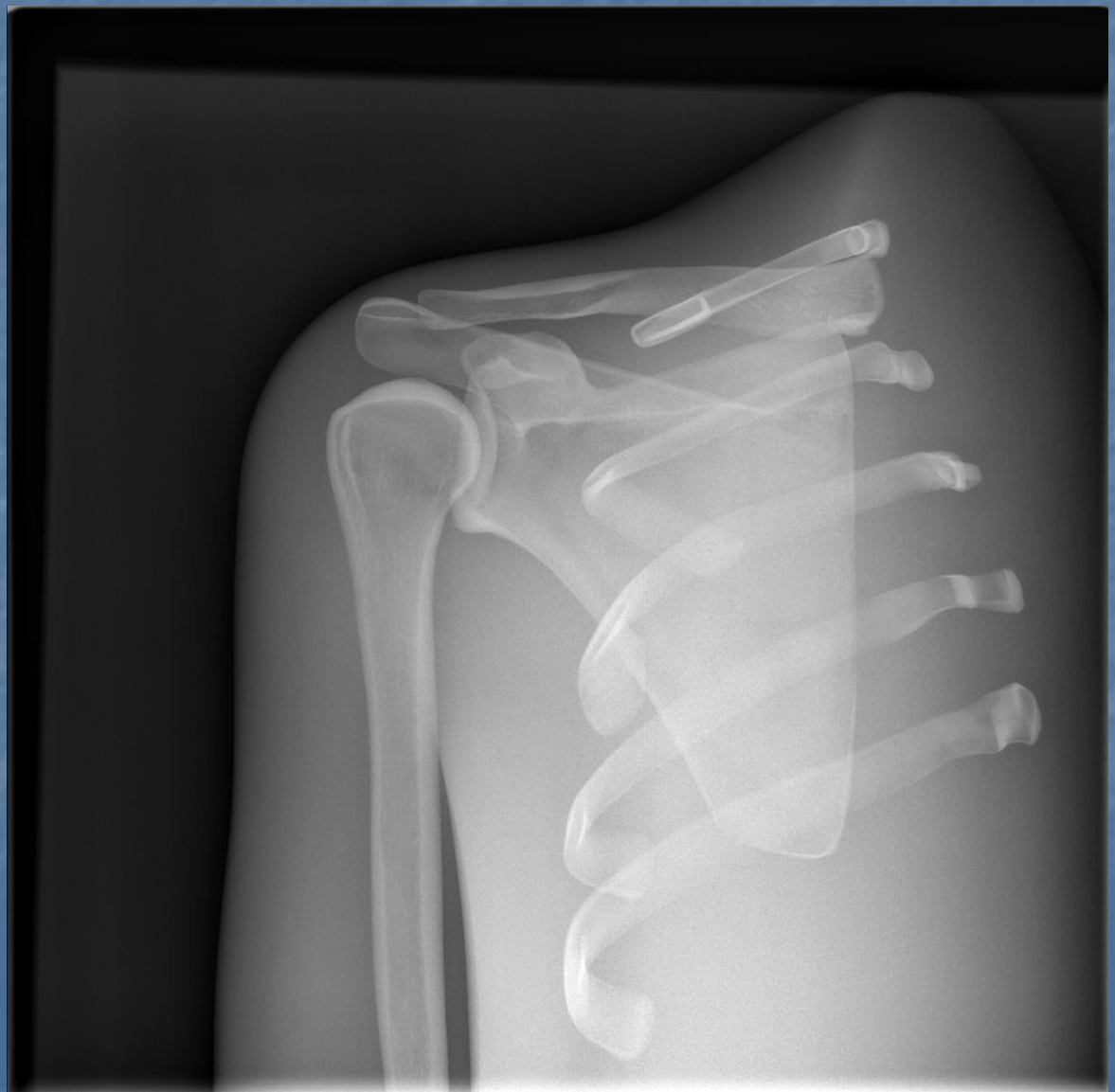
11”x11” EXI 458 42.6% change

Siemens portable detector

12”x12” EXI 495 50.9% change

Siemens portable detector

13”x13” EXI 532 62.2% change



GE built in detector (DEI range .42 -1.27)

8”x8” DEI .60

GE built in detector

9”x9” DEI .66 10.0% change

GE built in detector

10”x10” DEI .71 18.3% change

GE built in detector

11”x11” DEI .80 33.3% change

GE built in detector

12”x12” DEI .89 48.3 % change

GE built in detector

13”x13” DEI .96 60.0 % change

To summarize the previous 38 corrupted Exposure Index (EI) number slides.

- With those 8 examples, the technique always stayed the same. It was just the centering and/or collimation changes that corrupted the EI number.
- Even though the EI number was only corrupted up to 66.7%, we'll say 100% if there was incorrect centering ***and*** collimation.
- **All images are perfectly diagnostic** in any facility.