

NTQA

Image Optimization

Nuchal Translucency Quality Assurance (NTQA) program

Ultrasound machine presets provide a good starting point for image optimization. Users should verify the 1 st Trimester preset characteristics

ALARA



“As Low As Reasonably Achievable”

- use the lowest possible Thermal Index (TI) and Mechanical Index (MI) values, for the least amount of time possible, while obtaining diagnostic-quality images
- TIB should be used at 10 weeks' gestation or greater when bone ossification is evident

Source: A.C. Fleischer, J.S. Abramowicz, L.F. Gonçalves, F.A. Manning, A. Monteagudo, I.E. Timor, E.C. Toy: Fleischer's Sonography in Obstetrics and Gynecology: Textbook and Teaching Cases, Eighth Edition Copyright © McGraw-Hill Education. All rights reserved.

It is important to know how to use the full range of the machine's functions



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Image Factors

1. Acoustic Power
2. Field Depth
3. Focus
4. Overall Gain and TGC
5. Frequency
6. Sector Width
7. Dynamic Range + Dynamic Contrast
8. Harmonic Imaging
9. Post Processing



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Acoustic Power

- Acoustic power = output from transducer
- Power required to achieve a good image depends on patient BMI and the orientation of the fetus.
- Power is the main factor affecting Mechanical Index (MI) and Thermal index (TI).
- Excessive amounts of power can cause noise and reverb in the image that obscures detail.
- Reducing power reduces the brightness and noise

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Back to Basics: Depth, Focus, Gain

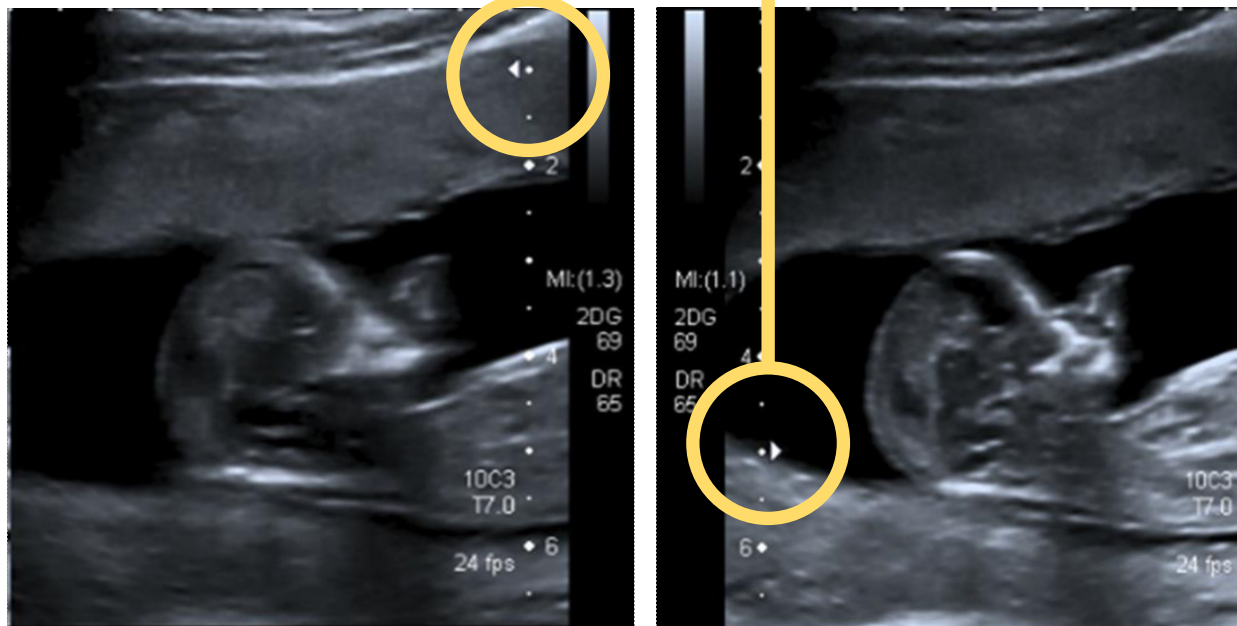
Depth

Depth should be set at the minimum level required to visualize all structures of interest

Focus

Focus should be placed at the depth of interest in the image, or just deep to it:

- spatial resolution will be maximized
- improved image clarity
- more accurate caliper measurement



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Gain and TGC

Excessive gain:

- results in a brighter display of echoes with an increase in image noise, artifact, and a possible loss of contrast
- thickens the skin line, blurs the edges, and obscures the nuchal space



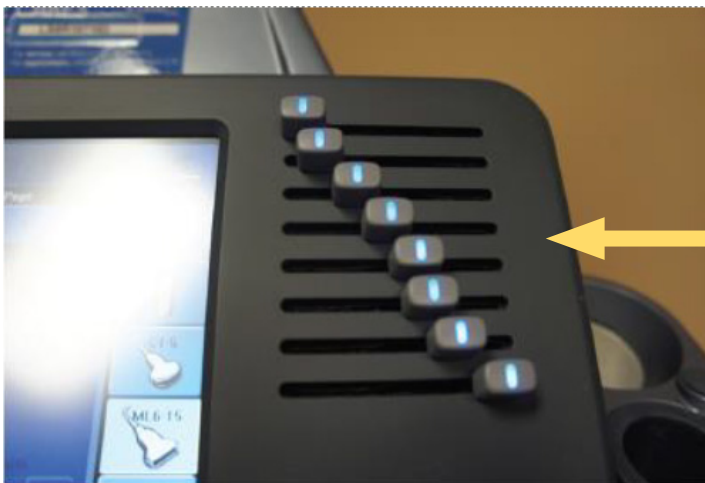
Too much overall gain



Too little overall gain



Appropriate overall gain



(d)

TGC function changes the gain at varying depths in the field of view

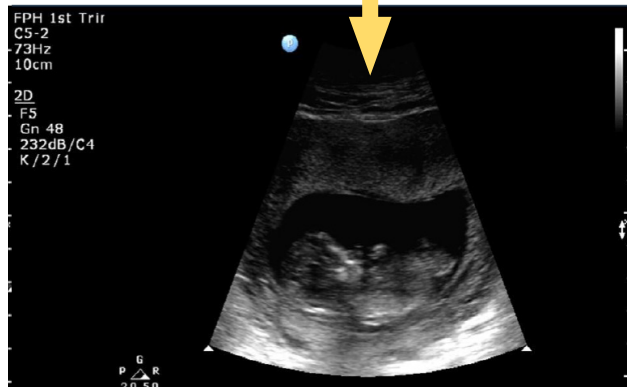
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Frequency

- High frequency transducers provide the best images in the near field with limited penetration.
- Low frequency transducers offer increased penetration with reduced resolution.
- Choose the transducer best suited for the exam, based on gestational age, uterine position and maternal body habitus

Sector Width

- Reducing the sector width will improve lateral resolution



Dynamic Range and Contrast

- Refers to how many shades of grey are displayed.
- Dynamic contrast is inversely proportional to dynamic range.
- When the dynamic range is set too high, the image has a low contrast and looks flatter with more shades of grey.
- When the dynamic contrast is increased, the dynamic range is decreased (fewer shades of grey, more black and white).



Low Dynamic Contrast

High Dynamic Contrast

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Harmonic Imaging

- THI improves resolution without the loss of penetration
- HI tends to thicken the skin line reducing the apparent nuchal space = under measurement.
- Manipulating other factors such as power/gain will reduce the skin thickness restoring the appearance of the nuchal space.

Do not use harmonics unless absolutely necessary

Post Processing

- Edge enhancement, speckle reduction imaging (SRI), grey maps, and chroma (image tint) are all post-processing tools that can be used to optimize your image.



Zoom Optimization PDF is available on request

Looking for more information?

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Find out more on our
website for Sonographers



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