Nasal Bone Evaluation

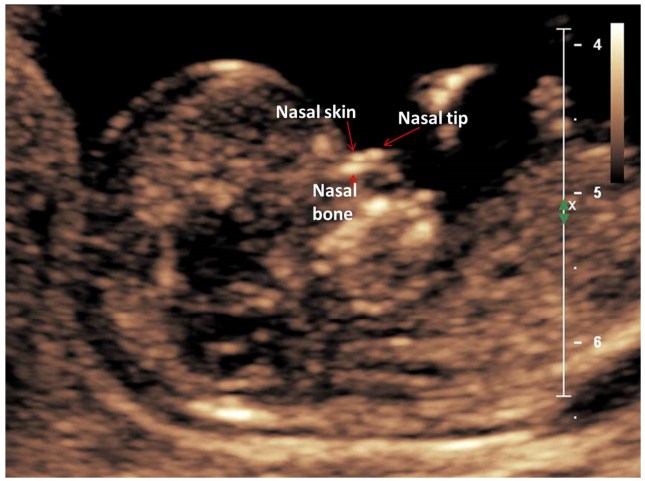
The nasal bone is absent more often in fetuses with trisomy 21; at the 11-13+6 weeks scan the nasal bone is absent in approximately 68% of fetuses with trisomy 21 and 2% of normal fetuses.

Assessment of the nasal bone requires a very specific technique to be accurate. It is important that Down syndrome risks are not modified using the nasal bone by individuals who are not using the correct technique, as nasal bone assessment can be difficult and strongly influences the calculated risk of Down syndrome. It has been shown that on average it takes about 80 supervised nasal bone scans to be able to perform this scan adequately (Cicero 2003).

Nasal bone assessment is now offered in Australia however before you are accredited for nasal bone assessment you must:

1. Be certified to perform the 11–14 weeks first trimester Nuchal Translucency scan
2. Be licensed and participating in audit of the Nuchal Translucency (NT) scan and assessment of images annually
3. Be meeting audit standard
4. Submit a logbook containing **3 images demonstrating the presence of the nasal bone**. Images should be from 3 independent fetuses at 11–13 weeks gestation.
5. Agree to participate in the audit requirements for re-certification of the fetal nasal bone by submitting 1 image with their annual audit demonstrating the presence of the nasal bone.

Guidelines for nasal bone assessment:



1. The nasal bone is assessed at 11-13+6 weeks gestation
2. Magnify the head to midchest to occupy the whole image
3. Obtain a midsagittal view of the face. Ensure the tip of the nose is in the image
4. Avoid imaging the zygomatic process of the maxilla, as this is not a midsagittal view
5. Hold the transducer parallel to the direction of the nose (the angle of insonation is 90 degrees to the nasal bone)
6. You need to demonstrate 3 lines: the skin over the nasal bridge, the nasal tip separate to this and at a more elevated level, and the nasal bone parallel to the skin over the nasal bridge
7. To be present the nasal bone needs to be thicker *and* more echogenic than the overlying skin
8. If the nasal bone is thinner and / or less echogenic than the overlying skin it is classified as absent. It is not yet ossified.

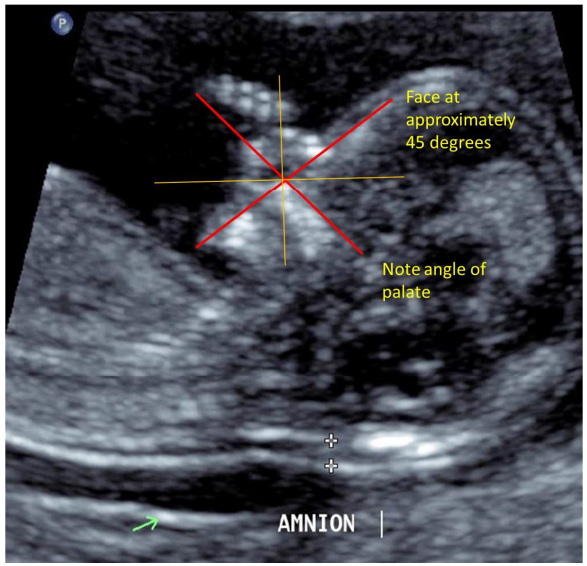
Some examples of commonly encountered problems with nasal bone assessment are as follows:

Image Size

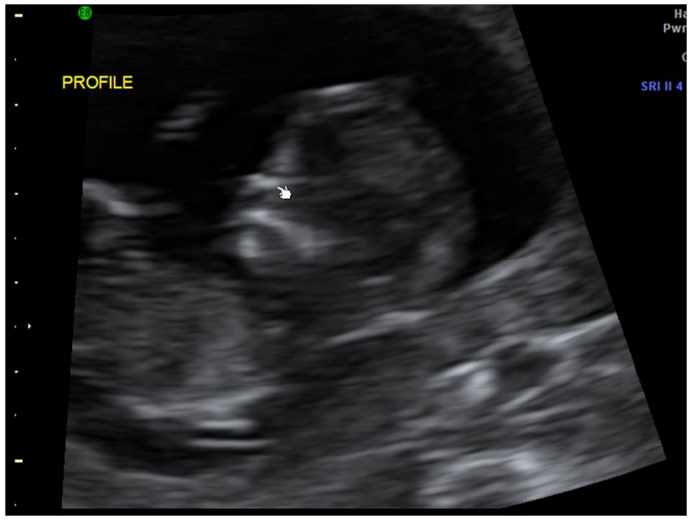
The head to thorax must occupy the whole image. It is inaccurate to assess the nasal bone on a smaller image.

Midsagittal Section

The infraorbital segment of the maxilla should not be visible in an ideal midsagittal section, as its presence indicates that the image is not midsagittal. Hold the transducer parallel to the skin of the nose- the nasal bone should be horizontal across the screen. When the angle of insonation is correct the face should be on an angle of approximately 45 degrees. The palate can also be seen on an angle of approximately 45 degrees. These structures are demonstrated in the image below:



Incorrect images for nasal bone assessment are obtained if the head is too far forward. Note in the following image that the palate is almost horizontal:

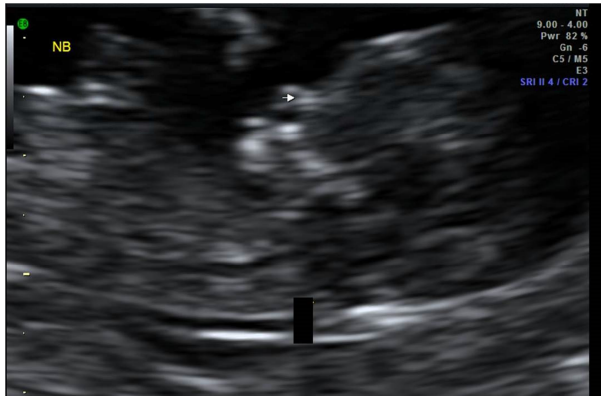


If the head is too far back an incorrect image for nasal bone assessment is obtained. In the example below the palate is almost vertical:

Demonstration of overlying skin

The skin over the nasal bridge and the skin of the tip of the nose need to be seen separately. There needs to be a gap between them, and they need to be seen at a different level (the tip of the nose is more elevated), as demonstrated in this image:

The two skin lines should not be seen as a single line, as they are in the following image:



The nasal bone is absent in the following images...

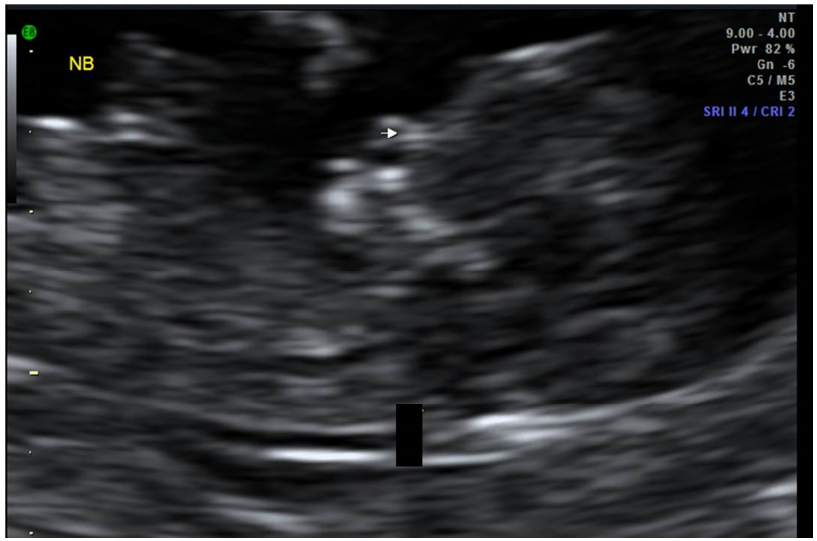
The nasal bone is thinner and less echogenic than the overlying skin in the below image:

The nasal bone has the same thickness and echogenicity as the overlying skin in the below image. The nasal bone is classified as absent.

TIPS for nasal bone assessment:

- If the nasal bone is the same thickness and echogenicity as the overlying skin it is classified as absent. To be sure of this you need to ensure you obtain an optimal image (for example change the settings including harmonics, swap transducers) and gently tilt from side to side assessing the nasal bone
- If the fetus is prone, invert the image to assess the nasal bone with the fetus supine. It helps to have the fetus in a good midsagittal section and with its head tilted downward in the image before you invert the image. Do not use the nasal bone in the algorithm unless you are confident that you have (or have not) demonstrated the nasal bone on a good image
- Do not measure the nasal bone length in the first trimester
- It is possible to get a double line artefact when assessing the nasal bone, as seen in the image below. As for NT measurement, review the use of harmonics if you encounter a double line artefact. You need to optimise the image to clearly demonstrate the nasal bone.

This is an example of double line artefact compromising nasal bone assessment:



It is important that your poor technique does not result in incorrect labelling of the nasal bone as present or absent.

The following image does not demonstrate the nasal bone:

- The head is too extended
- The nasal bone is not horizontal across the screen (the angle of insonation should be 90 degrees to the nasal bone)
- The palate is vertical; it should be at 45 degrees
- The image does not demonstrate the appropriate landmarks- the skin over the nasal bridge, and the skin of the tip of the nose at a slightly higher level, should be demonstrated in the image.

In fact, this fetus had a clearly present nasal bone in an appropriate image: