

# A structured method to teach image acquisition.

## Overview

- Describe a 3 step process for acquiring the best possible sonographic image of the anatomy good sonographic systematic approach for teaching image acquisition
- How to optimise the window and find a home base
- How to optimise the view
- How to optimise the image

## Sonographic window

- An **acoustic window** is the location on the skin from which an **ultrasound** probe makes its scan. The probe can be turned and/or angled in different directions yielding a different view, but all of the views are from the same **acoustic window** or perspective
- Often there are obstacles in the way or constraints that inhibit the desired visualization of the target anatomy and therefore the probe placement on the skin in that particular location makes for a **poor acoustic window**.
- Find your lookout position



## Optimising the window

### Step 1

**Visualise the anatomy** while looking at the patient

Note the orientation of the long axis of the structure of interest

### Step 2

**Position your probe** to align with the expected long axis of the structure of interest

### Step 3

**Look at the image** you have acquired and evaluate whether you have a good image

### Step 4

**Go window shopping.**

Use a systematic “paint the fence” or “mow the lawn” approach

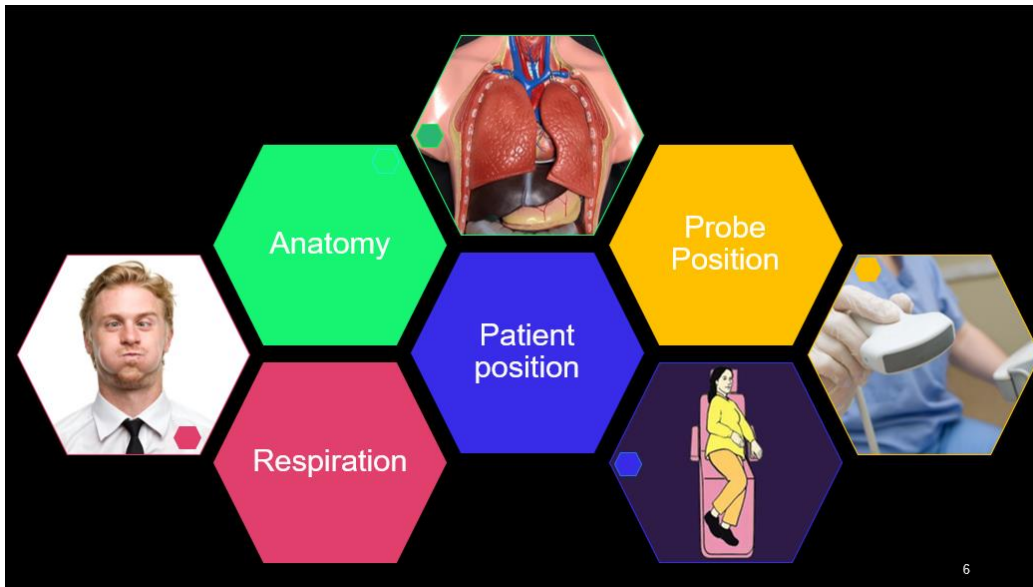
### Step 5

Note your home base position. When you have the best visibility of your target structure, look at your hand position and note where you are. This is home base. If you get lost, you can come back to this position. Over time, you will build up knowledge of where the ideal spot is for particular body habitus’

## Factors affecting the ideal window

- 1) The regional anatomy
  - Windows to the heart are governed by the bony structures of the rib cage and the lung
  - Optimal visualisation of the pelvic organs is governed by the degree of bladder filling
  - The liver can provide a window to deeper structures such as the heart, GB, abdominal vasculature
- 2) Respiration
  - Exaggerated breathing can change the position of the organs to bring the region of interest into a better position for visualisation.
- 3) Patient positioning
  - Changes in patient position can alter the position of organs so that they can be visualised better
- 4) Probe position
  - Changing the probe position relative to the window can aide the visualisation

Optimising the window usually requires big probe movements



### The sonographic view

- The sonographic view is the scan plane that optimally demonstrates the required anatomy in its long axis, short axis or coronally.
- Various probe manipulations are required to ensure that the target anatomy is centred to the field of view, the best acoustic window is used and that the angle of the incident ultrasound beam is as close to perpendicular to the target as possible to ensure best resolution of the returning signal.
- Point your camera (probe) in the right direction to get the best possible view of the anatomy

## Optimise the view

**P**ressure  
**A**ngle of insonation  
**R**otation  
**C**enter the anatomy

## How to optimise the view - **P A R C**

### Step 1 - **P**robe pressure

- Apply enough probe pressure in order to displace gas, compress superficial structures and bring the probe closer to the target

### Step 2 – **A**ngle of insonation

- Ensure that the angle of insonation is as close to perpendicular to the target as possible to ensure the best resolution of the returning signal

### Step 3 - **R**otation

- Align the angle of the incident beam to the long or short axis of the target

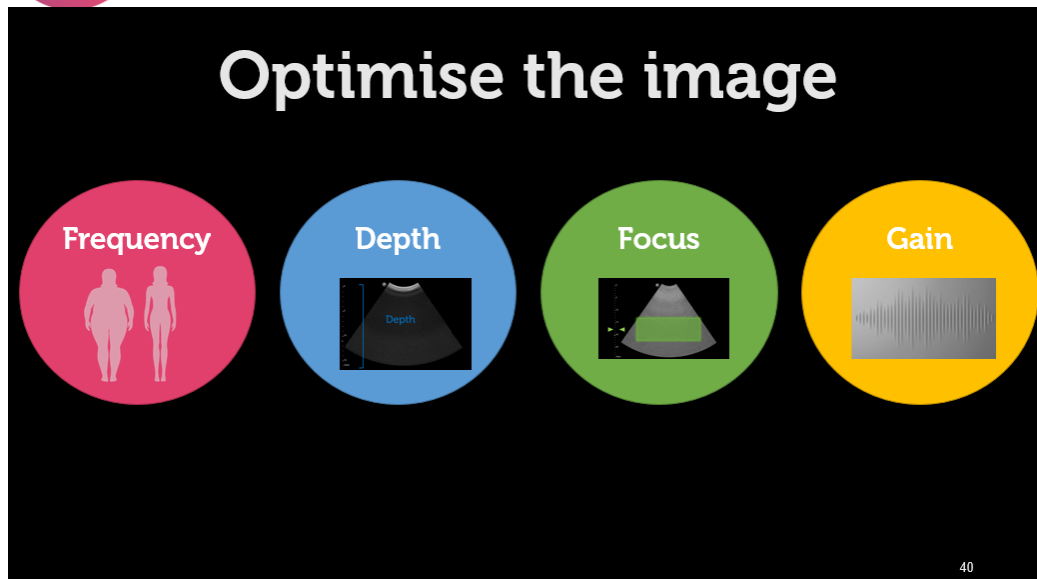
### Step 4 – **C**entre the anatomy

- Ensure that the target anatomy is in the centre of the field of view

Optimising the view usually requires small probe movements

## The sonographic image

- Optimal sonographic imaging requires the ultrasound system settings to be optimised for the target anatomy
- Adjust the camera settings for the best possible picture of the target anatomy



### Optimise the image

- Choose the right probe
- Choose the right preset
- Adjust the frequency
- Optimise the depth
- Adjust the focal zone
- Adjust the gain