



Step By Step Guide – Hip Pinning

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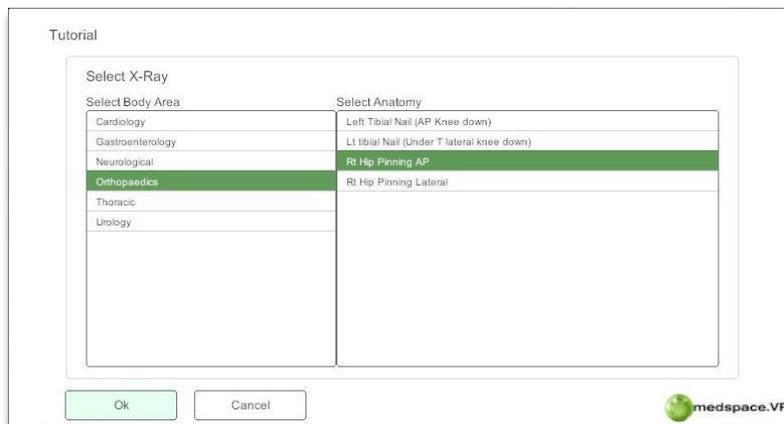
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This tutorial will take you through the following steps.

- Selecting an operating procedure – Hip Pinning
- Room Preparation and Initial Equipment Placement
- C-arm Movement
- Base Movements
- C-arm Height Adjustment
- Skeleton View
- kVp and mAs Controls
- Magnification
- Single Pulse and Continuous X-ray Screening
- Monitor Display Settings
- Collimation size and rotation
- Taking the Exposure
- Trouble Shooting

Selecting a Tutorial

Clicking the ‘Tutorial’ button will display the available tutorials panel. You cannot move forward until a tutorial has been selected.



The Tutorial Selection Panel

In the following example we will be conducting a hip pinning procedure. Select ‘Orthopaedics’ from the ‘Select Body Area’ column and ‘Rt Hip Pinning AP’ from the ‘Select Anatomy’ column. Click the ‘OK’ button with your LMB.

Note *Students can only gain access to the VR operating room if they select a projection that the medspace.VR™ administrator has created. By selecting the operating procedure, you are entering into the pre-existing patient positioning and room set up as per administration and as a radiographer, you are unable to alter the patient position. The selection of the procedure will enable direct comparison between the pre-set administration ideal image/standard and the image the student has performed.*

Room Preparation and Initial Equipment Placement

Clicking the 'Ok' button on the Projection Selection Panel will place you in the medspace.VR™ work environment. As per real operating theatre situations, the radiographer can only manipulate their machine and not the patient position.



The medspace.CA™ environment

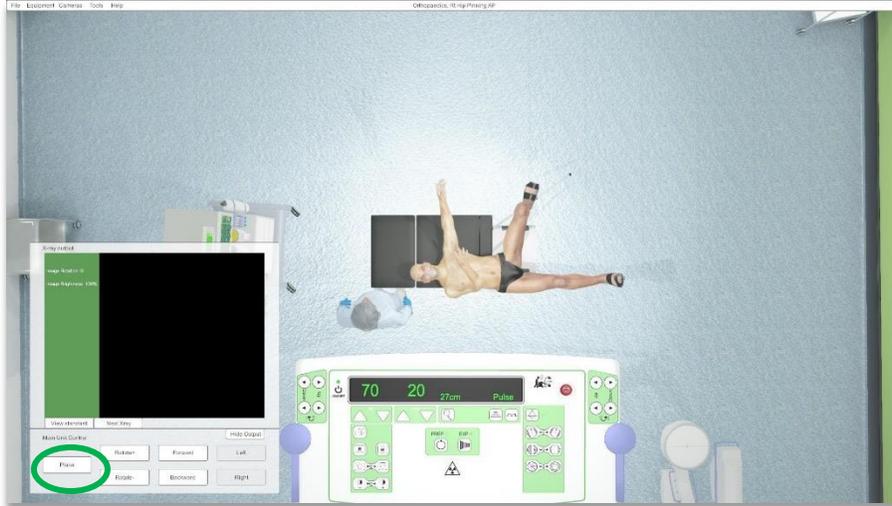
The first step is to position the C-arm roughly in the correct position.

It is important to note that the best view for initial equipment placement is from above the table using the 'Top' view - Ctrl + 3

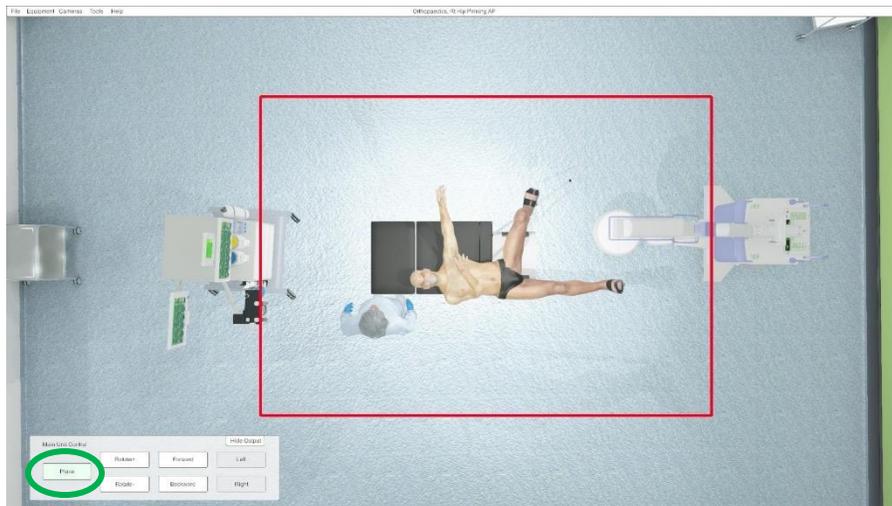
1. Click on the C-arm base with the LMB or use the short cut key '1'
2. Click the "Place" button. The C-arm is now 'attached' to your mouse and a red rectangle is outlined around the table.
3. Move the C-arm to a good start position relative to the table and surgeon. The C-arm cannot be placed inside the boundaries of the rectangle. If the C-arm collides with any other object such as the table, patient or surgeon, a sound will be emitted, and the screen will be overlaid with red.

Repeat for monitor placement

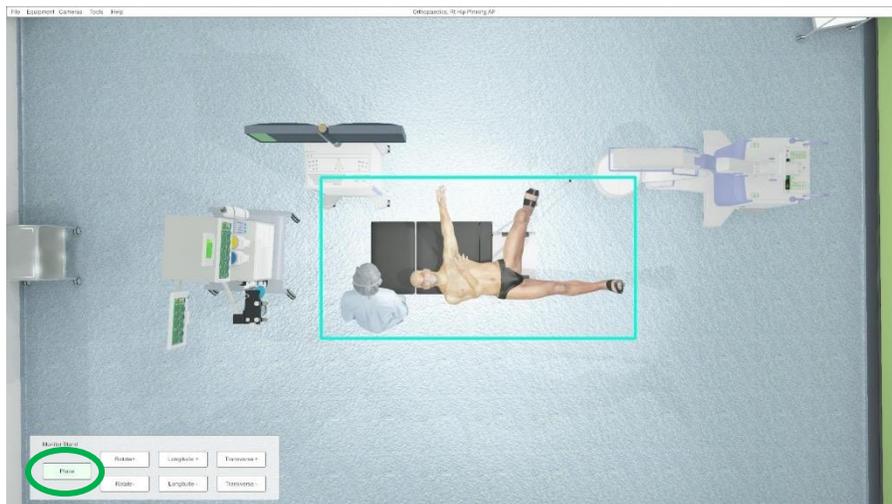
4. Click on the Monitor trolley with the LMB or use the short cut key '3'.
5. Click the "Place" button. The Monitor trolley is now 'attached' to your mouse and a blue rectangle is outlined around the table.
6. Move the Monitor trolley to a good starting position relative to the table and surgeon. The Monitor trolley cannot be placed inside the boundaries of the rectangle. If the trolley collides with any other object such as the table, patient or surgeon, a sound will be emitted, and the screen will be overlaid with red.



Top view prior to placing the C-arm and trolley in an initial starting position



Top view showing the boundary area for the C-arm initial placement.



Top view showing the boundary area for the Monitor initial placement.

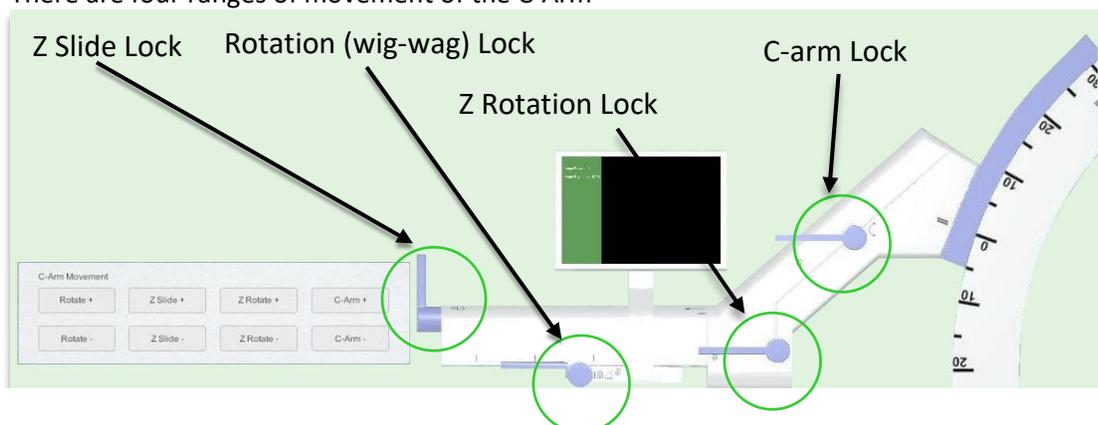
Before the C-Arm is positioned, think about whether the detector or the x ray source is at the top. You may need to spin the C-Arm around its 'Z' axis and the surgeon does not want you to do that during surgery! You will need to consider the full range of movement if a lateral is required.



- To alter the C-Arm orientation (detector/tube at the top) select the C-Arm
- Either
 - Use the drop down menu under “Equipment – C Arm”
 - Click on the C-Arm
 - Use **short cut key 2**
- Select the appropriate lock and left click on it to unlock the C-Arm Z axis rotation

C-arm movement – short cut key 2

There are four ranges of movement of the C-Arm



1. **Rotation (wig-wag)** of the C-Arm on the base column
2. **Z slide** C-Arm slide forward and back with base remaining fixed
3. **Z rotation** C-Arm spin left or right of column to alter detector at the top or the bottom
4. **C-Arm** to go from vertical to horizontal C Arm position

To move the C-Arm, click on a lock with the LMB. This will move the lever to either “locked” or ‘unlocked’ position.

The corresponding ‘C-arm Movement’ buttons will be enabled.

Click on the buttons with the LMB to move the C-arm in the chosen direction.

To speed movement up, press and hold the shift key whilst holding the desired movement key.

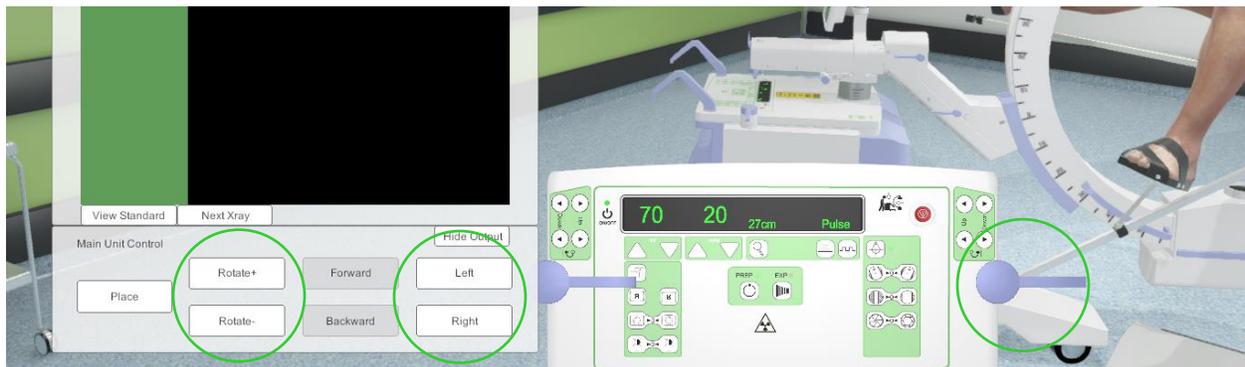
*This machine is capable of ‘under the table lateral’ when the **detector is on top** for an AP/PA projection and ‘over the table lateral’ when the **tube is on top** for an AP/PA projection.*

Base Movements – Short cut key 3

To move the base select it either by using the drop down menu, clicking on the base of the C-Arm or short cut key 1



Table 1 Movement forward and backward (lock lever facing end on)

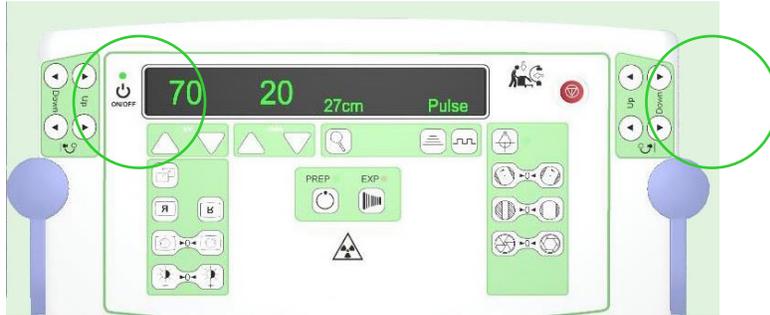


Rotation and left and right (when directional levers are sideways)

Lock levers indicate the direction of movement. Click on the lever and it will alternate between forward/backward and left/right.

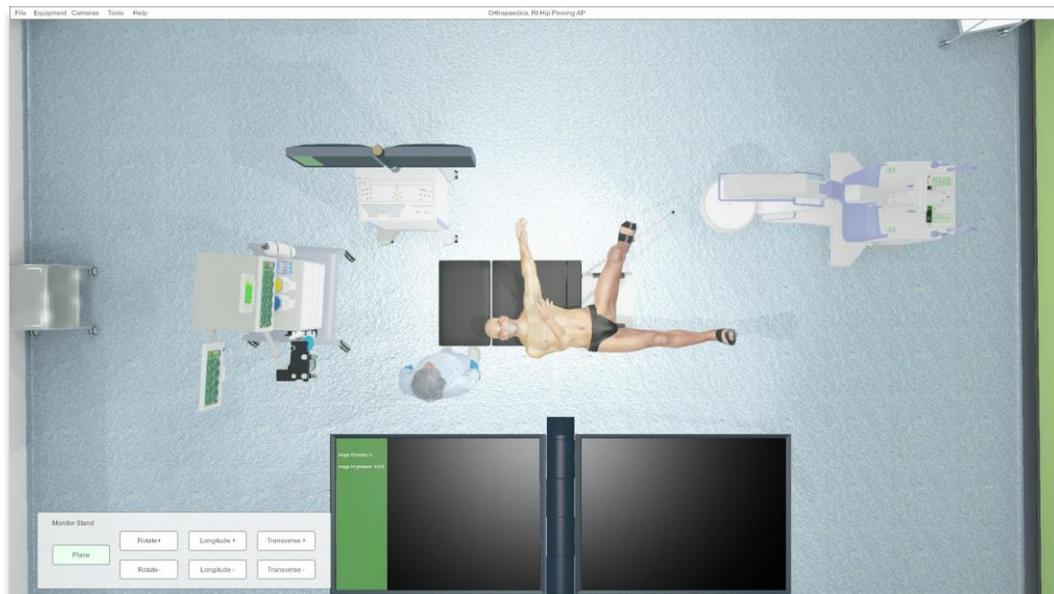
C-Arm Height Adjustment

To raise the height of the C-Arm on the base, click and hold with the LMB on the up and down arrows on the base console.



Monitor Movement

Click on the Monitor trolley with the LMB or use the short cut key '3'
The monitors can be rotated, moved longitudinally, and moved transversely



Top view showing monitor controls

Place the monitors using the 'Place' button.

Once placed where you want it, click on the movement buttons to finely adjust the final position.

Skeleton View

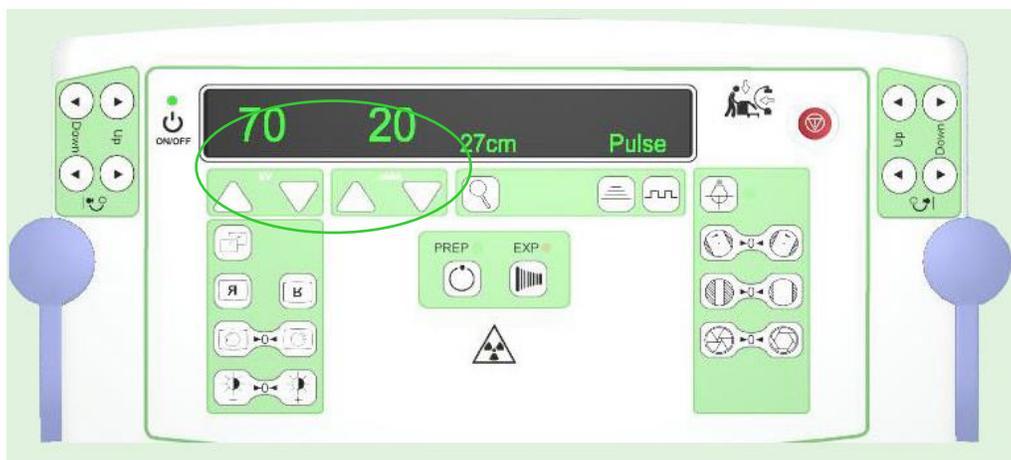
Skeleton view can be enabled through the 'Tools' menu by selecting the 'Bone' option. Alternatively use the shortcut key Ctrl + 8.



Skeleton view

kVp and mAs Controls

Once the C-arm has been positioned in the correct position the exposure settings can be set. The kVp and mAs controls are located on the C-arm base. Select the base by either using the dropdown menus, the shortcut keys or simply clicking on the C-arm base with the LMB.

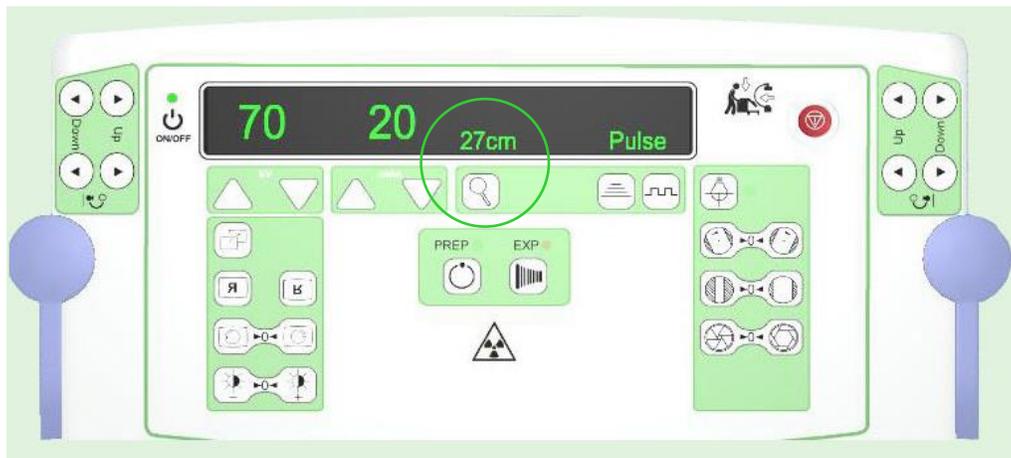


C-arm exposure controls

Use the Up/Down buttons to adjust both kVp and mAs settings by clicking on the buttons with the LMB. Each mouse click will result in an increment of one unit. The resulting setting will be displayed on the digital screen above the buttons in real-time.

Field Size/Magnification

The C-arm allows for set field size of 13cm, 18cm and 27cm.

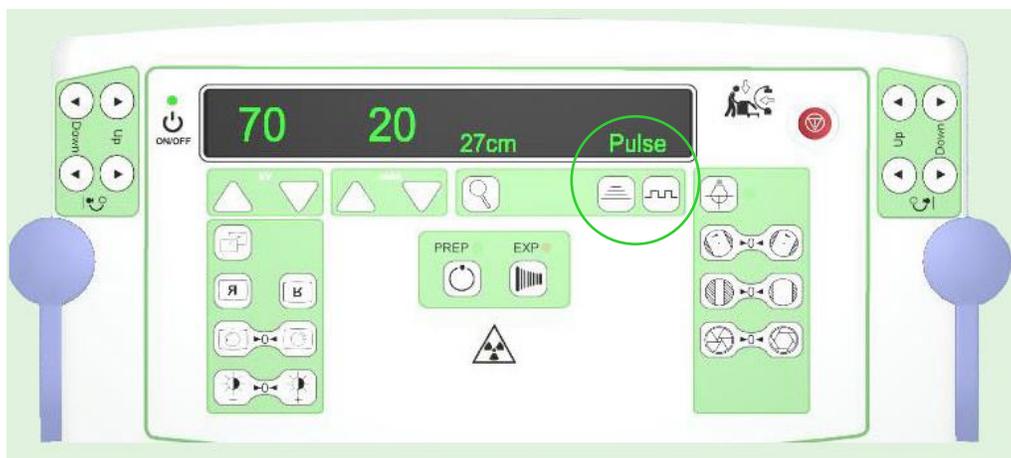


Magnification settings

To change the field size, simply click on the magnification button with your LMB. Each time you click the button the field size decreases as the magnification will increase. To set a less magnified setting, simply continue to click the button until the field size cycles to the setting you want.

Single Pulse and Continuous X-ray Screening

The C-arm allows you to switch between single pulse X-ray mode and continuous screening.

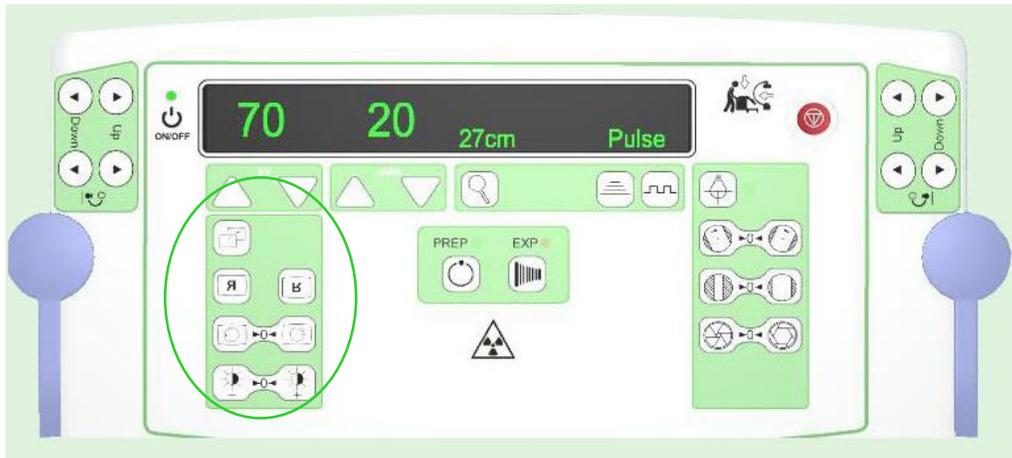


Continuous and Pulse screening options

To switch between Pulse and Screening modes, click the appropriate button on the console with your LMB. The mode will be displayed on the digital screen above the buttons.

Monitor Display Settings

The C-arm allows you to manipulate the monitor output images. The monitor display setting allows you to perform a range of image functions.



Monitor display settings

The following display settings are available and can be activated by clicking on the relevant buttons with the LMB.



Image hold - Display the current image on the right-hand monitor

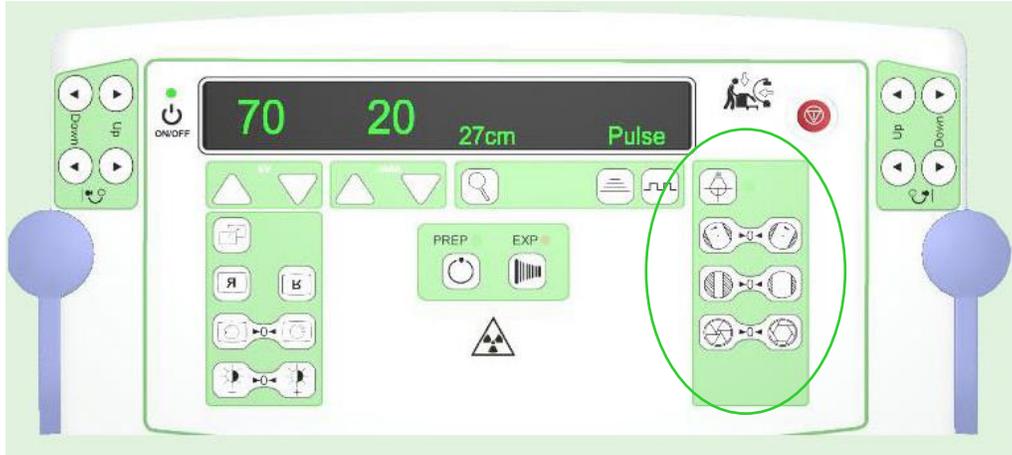
Reverse the image – horizontal or vertical flip

Rotate the image clockwise or anti-clockwise

Adjust the contrast of the image

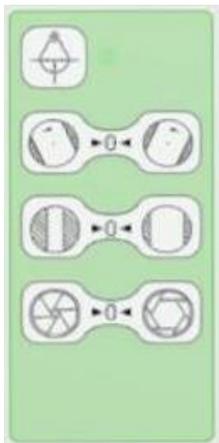
Collimation size and rotation

The C-arm allows you to manipulate the collimator size and rotation by clicking on the relevant buttons on the console.



Collimation size and rotation settings

The following collimation settings are available and can be activated by clicking on the relevant buttons with the LMB.



Turn the crosshair light on/off

Adjust the Collimator rotation

Adjust the Collimator clipping

Adjust the collimation size

Taking the Exposure

Once you have positioned the C-arm where you want it and set relevant exposure settings, you are ready to take an exposure.



Click on the 'PREP' button with your LMB and wait for the green light.

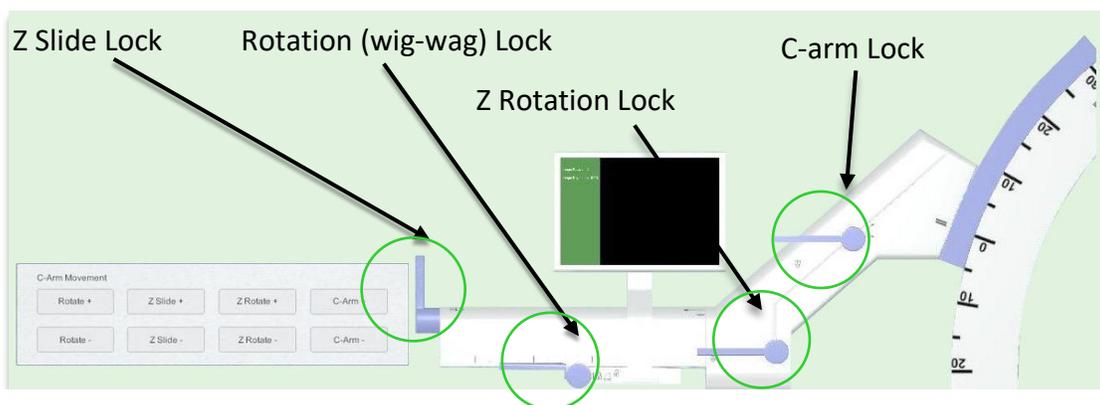
Once the Prep light has come on click the 'EXP' button. The red LED light will be displayed as the exposure is taken.

In the case of the hip pinning, once the radiographer has a good image of the AP hip, you now need to reposition the C-Arm and try and get a lateral view of the hip. This is where the importance of being able to swing the tube under the patient (because the detector is on top). Before you swing under the leg there are a few important things to consider:



1. Save the AP image to the Right Monitor by pressing this button on the base console.
2. You need to make sure you are not going to hit the surgeon, the patient or the base of the operating table. You may need to adjust many locks a little at a time, to move without hitting anything - just like in real life.

You will need to have the base of the C-Arm at close to 45 degrees. You will need to move the C-Arm vertically as well as manipulate one or more of the C-Arm locks



3. It is difficult, and it is frustrating - much like reality, except this time you are able to calmly and safely practice, manipulate the machine and try again.

Trouble Shooting

The machine will not move into position

- Check you are not hitting anything (table, patient, surgeon, monitors etc)
- Just as in real life, you may need to manipulate more than one lock to gradually manoeuvre the c-arm without hitting anything

“The patient is not correctly lateral so I cannot get a good image”

As in real life, the radiographer has little say in the position of the patient. Therefore, it is the c-arm that needs to be angled to get the correct projection of the anatomy required.

Help and Support

Support Options:

Website: <http://medspacevr.com>

Email: support@medspacevr.com

User Forums: <http://www.medspacevr.com/forum/>

Please allow 24 hours for support requests to be answered.

Contact Details:

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