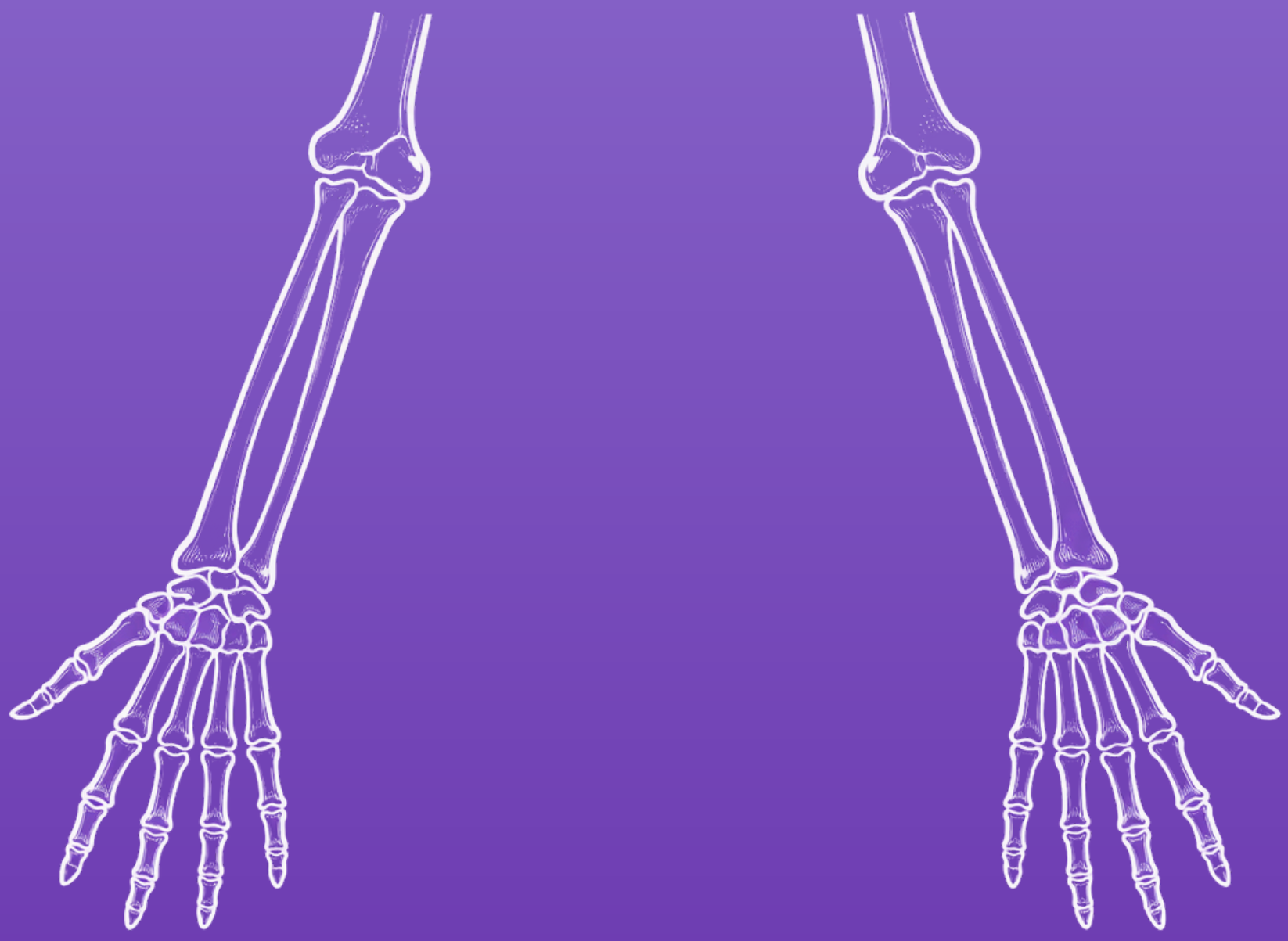
Unique anatomies, costumised solutions

RADIOLOGICAL PROTOCOL

CT - BILATERAL FOREARM



VALOR IMPLANT

Radiological protocol CT - Bilateral Forearm

The basic requirement for digital surgical planning is a high-quality computed tomography scan with clear and well-defined bone edges. These qualities are essential for the correct design of personalised instruments and implants.

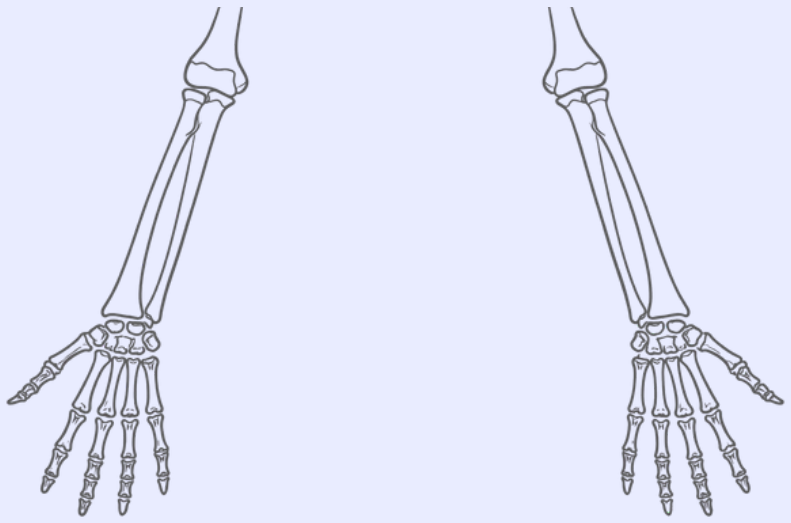
Indications

This protocol is indicated for personalised surgical planning studies of wrist arthrodesis and radius and/or ulna osteotomy, where bilateral acquisition is required to provide an anatomical reference from the healthy side.

Recommendations

wrist arthrodesis and radius and/or ulna osteotomy, where bilateral acquisition is required to provide an anatomical reference from the healthy side.

Adquisición:

Topogram	Right and left forearms in a similar pronation-supination position, from the wrist to the elbow, including the entire radius and ulna 
Field of view (FOV)	Adjust the FOV so that no anatomical region is cropped, ensuring inclusion of the entire forearm
Matrix	512 x 512

Detector collimation	0.625 mm. Continuous slice increment
Pitch	≤ 1
kVp	90-120 if the patient is obese, elderly or has metallic components
Automatic exposure control	Enabled
Rotation time	≤ 1 s

Reconstruction:

Multiplanar reconstruction (MPR)	Reconstruction of the complete study in all three planes
Reconstruction algorithm	Soft tissue/moderate algorithm. Do not use the bone algorithm. Use a single window
MPR slice thickness	0.625 mm

Appendix- Reduction of metal artefacts (MAR) and noise

Objetctive

Minimise artefacts caused by screws or osteosynthesis while preserving bone and soft tissues diagnostic image quality and enable valid reconstructions for 3D planning and STL export.

Acquisition settings (add without modifying the original ROI)

Parameter	Recommended	Notes / Justification
Region	Both forearms, from the wrist to the elbow, including the entire radius and ulna. Ensure inclusion of any metallic material	Prevents implant truncation
kVp	140 kVp (fallback 120 kVp)	Reduces beam hardening from metallic materials
mA / AEC	Automatic with an upper limit 20–30% above standard	Compensates for increased noise due to MAR and high kVp
Rotation time	0.5-1.0 s (prioritise 0.5 s)	Minimises motion artefacts
Pitch	0.6-1.0 (recommended 0.8)	Balance between coverage and resolution
Collimation/slice thickness	≤0.625 mm	Isotropy for MAR and 3D reconstructions

FOV	Centered between both forearms	Prevents the prosthesis from being located at the detector edge
Patient position	Supine, arms extended in a neutral position at the sides or in front (depending on the scanner), forearms geometrically centered	Centring the metal reduces asymmetrical streaks

ALWAYS generate paired series with and without MAR.

- Reference (without MAR): Soft/moderate kernel, FBP or mild IR; slices 0.6 mm / 0.4 mm increment.
- MAR activated: Soft/moderate kernel + manufacturer algorithm (iMAR/O-MAR/Smart MAR/ SEMAR).
- DECT / Spectral (if available): VMI 100–140 keV (save at least 100, 120, and 140 keV); consider 70 keV for soft tissues if artefact saturation is absent.
- 3D volume (planning): Use the series without MAR, isotropic 0.6 mm, intended for STL export.

Post-processing and verification

- Check bone and soft tissue windows; confirm cortical continuity near metal..
- If streak artifacts persist, increase VMI keV (120 → 140 keV) and/or compare with the series without MAR.
- Confirm implant centering and absence of truncation before sending to PACS.
- Always export STL from the series without MAR (MAR can alter geometries).

Console setup sheet

```
Name: ORTO_[CLAVICLE]_MAR
   kVp: 140 (fallback 120)
   mA (AEC): ON, upper limit +20–30%
   Rotation: 0.5–1.0 s
   Pitch: 0.8 (≤1)
   Collimation: 0.6 mm (recon 0.6 / inc. 0.4)
   Kernels: B40s (soft) + B70f (bone)
   Series:
      1) Standard IR (B70f)
      2) MAR ON
      3) VMI 100–140 keV (if DECT)
      4) 3D export (without MAR)


FOV: 250–300 mm centered on both forearms
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