

# CT/CBCT scans for ProModel orders

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## CT scanning

- Use bone algorithm. Standard or soft tissue series may also be useful in some cases.
- 0,5mm-1mm slices. Slice thickness must equal to slice interval.
- Axial slices - no reformatting. Each series must represent a continuous scan volume.
- No gantry tilt.
- The scan must not suffer from motion artefacts, at least if they affect bone surfaces that are essential for the case.
- No tissue type based dose adjustments such as Siemens Xcare, GE ODM etc.
- Jewelry and such metallic parts have to be removed if possible, since they cause metal artefacts.

## CBCT scanning

- In general, use as high parameters as possible (120 kV, large volume, High Resolution mode etc.).
- Because large high resolution volumes imply long scanning times, one must be very careful with the motion artefacts. The scan must not suffer from them, at least if they affect bone surfaces that are essential for the case.
- Orbital floors or any intracranial details will typically not be captured in the CBCT-based surface model with sufficient accuracy for 3D-planning.
- Also the sinus region might suffer some inaccuracies (lefort1 plates). Although it is possible to have good results with CBCT data, its appropriateness has to be evaluated case by case.
- Patient positioning: It is beneficial to position the essential area as close to FoV (bottom of the volume) as possible.
- It might be advantageous to use as shallow (in axial direction) volume as possible, however, being wide enough to comprise the whole width of the cranium or limb. Before cropping the volume, one should make sure that all bone surfaces needed for the case are included.
- Scattering compensation algorithm may benefit 3D-planning.

## Marking tumors

If a tumor is to be marked in the slices for printing an anatomic model or for resection planning,

- Use arrows or such visual means to mark the tumor perimeter to axial slices. Please use the same 1 mm series that is to be used to print the model or as basis for the 3D-planning.
- Use as many arrows as needed to unambiguously define the tumor shape, since it will be segmented by the markings, not by observing the tissue.
- Save the marked slices as jpeg images (or similar) and submit them along with DICOM data. They may be compressed to an individual zip file to be uploaded, or burned to a cd.

## Orthognathic surgery

- Volume must include the whole mandibula, nasion, sella turcica, ear canals and laterally the whole cranium. Supraorbital rims may also be useful.
- If an occlusion splint is used, it has to be properly bitten. Please make sure that the splint sits tight and thus the condyle position is as prescribed.

## Orthopedics

- In cases of forearm, the wrist and elbow have to be included. The same applies to the healthy side, if it is to be used as reference.
- In general, include the whole bone, especially if the healthy side is used as reference. Epiphyses are the only reliable means to assess the axial rotation of long bones.
- The limbs should be positioned as symmetrically as possible. This applies especially to rotational position of the forearm (supine). If the injury prevents the conventional imaging position, positioning the healthy side accordingly should be considered. If any clinical issues arise, such as diagnostic inaccuracies, hold to the conventional position.