

# X-ray CCP\_XRY\_001

## Purpose

Construct and analyse digital 3D reconstructions of immobilised mice using computed X-ray microtomography (CT).

## Experimental Design

- **Minimum number of animals** : 4M + 4F
- **Age at test**: Week 14

## Procedure

1. Anesthetize the mouse and monitor for adequate sedation until unconsciousness.
2. Place the mouse on the pad with the forepaws and hindpaws pointing anteriorly, the hindlimbs positioned below the body, and the tail curved along the right side of the mouse. Secure the mouse in position using tape.
3. Scan the mouse.
  1. Correctly position the mouse in the scanner.
  2. Run a scout scan.
  3. Check the scanning parameters and ensure that the scan area includes the entire mouse.
  4. Start the scan.
4. When the scan is complete, remove the mouse from the machine, untape it and check its condition.
5. Place the mouse on a heated mat (38°C) and monitor closely until consciousness is fully regained, before moving it back to its cage.
6. Reconstruct the scan with appropriate software and analyse the image.

## Notes

Body composition analysis is conducted using the same CT scan.

Digit integrity IMPC\_XRY\_031\_001 *Definition:* **The state of being whole and undivided.**

## Parameters and Metadata

**Number of thoracic vertebrae** CCP\_XRY\_014\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## Caudal vertebrae morphology CCP\_XRY\_074\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: abnormal, imageOnly, normal, unobservable,

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## XRay Images Skull Dorso Ventral Orientation CCP\_XRY\_051\_001 | v1.2

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

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## Clavicle CCP\_XRY\_007\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Options: unobservable, abnormal, imageOnly, normal,

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## Date Xray equipment last calibrated CCP\_XRY\_047\_001 | v1.3

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Ulna CCP\_XRY\_023\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Options: abnormal, unobservable, normal, imageOnly,

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## Shape of ribs CCP\_XRY\_010\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Options: abnormal, unobservable, normal, imageOnly,

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## Thoracic vertebrae morphology CCP\_XRY\_071\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Options:** abnormal, imageOnly, unobservable, normal,

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**Number of lumbar vertebrae** CCP\_XRY\_015\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**XRay Images Hind Leg and Hip** CCP\_XRY\_052\_001 | v1.1

seriesMediaParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** false

**Increments:** Minimum 1

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**Lordosis** CCP\_XRY\_058\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Options:** no, imageOnly, unobservable, yes,

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## Maxilla/Pre-maxilla CCP\_XRY\_003\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Options: imageOnly, normal, abnormal, unobservable,

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## Brachydactyly CCP\_XRY\_030\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Options: imageOnly, no, unobservable, yes,

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## Comment on XRay image CCP\_XRY\_032\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Transitional vertebrae CCP\_XRY\_060\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

**Options:** yes, imageOnly, no, unobservable,

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**Teeth** CCP\_XRY\_005\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Options:** imageOnly, abnormal, normal, unobservable,

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**Joints** CCP\_XRY\_027\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Options:** imageOnly, unobservable, normal, abnormal,

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**Xray equipment ID** CCP\_XRY\_036\_001 | v1.1

procedureMetadata

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** false

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# XRay Images Skull Lateral Orientation CCP\_XRY\_050\_001 | v1.2

seriesMediaParameter

Req. Analysis: false      Req. Upload: false      Is Annotated: false

Increments: Minimum 1

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# Polysyndactylism CCP\_XRY\_062\_001 | v1.1

simpleParameter

Req. Analysis: false      Req. Upload: false      Is Annotated: true

Options: unobservable, imageOnly, yes, no,

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# XRay Images Forepaw CCP\_XRY\_049\_001 | v1.1

seriesMediaParameter

Req. Analysis: false      Req. Upload: false      Is Annotated: false

Increments: Minimum 1

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# Voltage settings CCP\_XRY\_043\_001 | v1.1

procedureMetadata

Req. Analysis: false      Req. Upload: true      Is Annotated: false

---

## Number of pelvic vertebrae CCP\_XRY\_016\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## Caudal processes CCP\_XRY\_067\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: abnormal, unobservable, imageOnly, normal,

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## Lumbar vertebrae morphology CCP\_XRY\_072\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: unobservable, normal, imageOnly, abnormal,

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## Date Scanner equipment last calibrated CCP\_XRY\_053\_001 | v1.1

procedureMetadata



Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## XRay Images Whole Body Lateral Orientation CCP\_XRY\_048\_01 | v1.2

seriesMediaParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: false

Increments: Minimum 1

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## Cervical processes CCP\_XRY\_063\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: unobservable, normal, abnormal, imageOnly,

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## Scanner equipment model CCP\_XRY\_046\_001 | v1.1

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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# XRay Images Whole Body Dorso Ventral CCP\_XRY\_034\_001 | v1.3

seriesMediaParameter

Req. Analysis: false      Req. Upload: true      Is Annotated: false

Increments: Minimum 1

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## Xray equipment model CCP\_XRY\_038\_001 | v1.4

procedureMetadata

Req. Analysis: true      Req. Upload: false      Is Annotated: false

Options: UltraFocus DXA, MX-20-DC12, UltraFocus 100, MS-FX Pro, R\_mCT (Micro-CT), MX-20-DC4, MX-20, SkyScan 1176, SkyScan 1278,

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## Scoliosis CCP\_XRY\_056\_001 | v1.2

simpleParameter

Req. Analysis: false      Req. Upload: false      Is Annotated: true

Options: imageOnly, yes, no, unobservable,

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## Humerus CCP\_XRY\_021\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Options:** abnormal, normal, unobservable, imageOnly,

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## Scanner equipment ID CCP\_XRY\_044\_001 | v1.1

procedureMetadata

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** false

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## Experimenter ID (analysis) CCP\_XRY\_042\_001 | v1.1

procedureMetadata

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** false

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## Number of cervical vertebrae CCP\_XRY\_013\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

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## Alive CCP\_XRY\_035\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** false

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## **Tibia length** CCP\_XRY\_033\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Unit Measured:** mm

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## **Pelvis** CCP\_XRY\_012\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Options:** normal, abnormal, imageOnly, unobservable,

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## **Digit integrity** CCP\_XRY\_031\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Options:** unobservable, yes, imageOnly, no,

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**Free Ontology** CCP\_XRY\_054\_001 | v1.0

simpleParameter

Req. Analysis: false      Req. Upload: false      Is Annotated: false

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**Radius** CCP\_XRY\_022\_001 | v1.0

simpleParameter

Req. Analysis: false      Req. Upload: true      Is Annotated: true

Options: normal, unobservable, imageOnly, abnormal,

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**Skull shape** CCP\_XRY\_001\_001 | v1.0

simpleParameter

Req. Analysis: false      Req. Upload: true      Is Annotated: true

Options: normal, abnormal, imageOnly, unobservable,

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**Tibia** CCP\_XRY\_025\_001 | v1.0

simpleParameter

Req. Analysis: false      Req. Upload: true      Is Annotated: true

**Options:** imageOnly, unobservable, abnormal, normal,

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**Cervical vertebrae morphology** CCP\_XRY\_070\_001 | v1.0

simpleParameter

**Req. Analysis:** false      **Req. Upload:** false      **Is Annotated:** true

**Options:** normal, unobservable, imageOnly, abnormal,

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**Sacral processes** CCP\_XRY\_066\_001 | v1.0

simpleParameter

**Req. Analysis:** false      **Req. Upload:** false      **Is Annotated:** true

**Options:** normal, unobservable, abnormal, imageOnly,

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**Fusion of processes** CCP\_XRY\_061\_001 | v1.1

simpleParameter

**Req. Analysis:** false      **Req. Upload:** false      **Is Annotated:** true

**Options:** unobservable, no, imageOnly, yes,

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## Kyphosis CCP\_XRY\_057\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: imageOnly, unobservable, yes, no,

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## Shape of ribcage CCP\_XRY\_059\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: abnormal, normal, unobservable, imageOnly,

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## Fusion of ribs CCP\_XRY\_011\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Options: not fused, unobservable, fused, imageOnly,

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## Rib morphology CCP\_XRY\_069\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Options:** normal, unobservable, abnormal, imageOnly,

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## Syndactylism CCP\_XRY\_029\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Options:** imageOnly, no syndactylism, unobservable, Syndactylism,

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## Shape of spine CCP\_XRY\_055\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Options:** imageOnly, unobservable, normal, abnormal,

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## Pelvic vertebrae morphology CCP\_XRY\_073\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Options:** imageOnly, unobservable, abnormal, normal,



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## Number of digits CCP\_XRY\_028\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## Settings time of exposure CCP\_XRY\_039\_001 | v1.1

procedureMetadata

Req. Analysis: false

Req. Upload: true

Is Annotated: false

Unit Measured: s

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## Fibula CCP\_XRY\_026\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Options: imageOnly, abnormal, normal, unobservable,

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## Xray equipment manufacturer CCP\_XRY\_037\_001 | v1.4

procedureMetadata

**Req. Analysis:** true

**Req. Upload:** false

**Is Annotated:** false

**Options:** Bruker, Faxitron X-Ray Corporation, Rigaku Corporation (Micro-CT),  
Faxitron Bioptics LLC,

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## **Mandibles** CCP\_XRY\_004\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Options:** imageOnly, normal, abnormal, unobservable,

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## **Number of ribs right** CCP\_XRY\_008\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

## **Scapulae** CCP\_XRY\_006\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Options:** normal, unobservable, imageOnly, abnormal,

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## Thoracic processes CCP\_XRY\_064\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: unobservable, imageOnly, abnormal, normal,

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## Number of ribs left CCP\_XRY\_009\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

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## Zygomatic bone CCP\_XRY\_002\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Options: abnormal, unobservable, imageOnly, normal,

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## Settings level CCP\_XRY\_040\_001 | v1.1

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Femur CCP\_XRY\_024\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Options: abnormal, unobservable, normal, imageOnly,

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## Missing cranial rib CCP\_XRY\_068\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Options: Yes, No,

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## Fusion of vertebrae CCP\_XRY\_019\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Options: unobservable, yes, no, imageOnly,

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**Scanner equipment manufacturer** CCP\_XRY\_045\_001 | v1.1

procedureMetadata

Req. Analysis: false      Req. Upload: false      Is Annotated: false

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**Number of caudal vertebrae** CCP\_XRY\_017\_001 | v1.1

simpleParameter

Req. Analysis: false      Req. Upload: false      Is Annotated: true

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**Processes on vertebrae** CCP\_XRY\_020\_001 | v1.0

simpleParameter

Req. Analysis: false      Req. Upload: true      Is Annotated: true

Options: abnormal, unobservable, normal, imageOnly,

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**Lumbar processes** CCP\_XRY\_065\_001 | v1.1

simpleParameter

Req. Analysis: false      Req. Upload: false      Is Annotated: true

Options: abnormal, unobservable, normal, imageOnly,

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# Experimenter ID (scan) CCP\_XRY\_041\_001 | v1.1

procedureMetadata

Req. Analysis: false

Req. Upload: true

Is Annotated: false

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# Shape of vertebrae CCP\_XRY\_018\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Options: abnormal, normal, unobservable, imageOnly,

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# Presence of baculum bone CCP\_XRY\_075\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Options: yes, no, imageOnly, unobservable,

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# Quality of enamel on incisors CCP\_XRY\_076\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

**Options:** normal, abnormal, imageOnly, unobservable,

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**Quality of enamel on molars** CCP\_XRY\_077\_001 | v1.0

simpleParameter

**Req. Analysis:** false      **Req. Upload:** false      **Is Annotated:** false

**Options:** normal, abnormal, imageOnly, unobservable,

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**Number of forepaw digits** CCP\_XRY\_078\_001 | v1.0

simpleParameter

**Req. Analysis:** false      **Req. Upload:** false      **Is Annotated:** false

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**Number of hindpaw digits** CCP\_XRY\_079\_001 | v1.0

simpleParameter

**Req. Analysis:** false      **Req. Upload:** false      **Is Annotated:** false

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**Total number of teeth** CCP\_XRY\_080\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Tooth formula (left side) CCP\_XRY\_081\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Tooth formula (right side) CCP\_XRY\_082\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Defect pixel masking CCP\_XRY\_083\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Beam hardening correction CCP\_XRY\_084\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false



Unit Measured: %

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## Ring artefact correction CCP\_XRY\_085\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Smoothing CCP\_XRY\_086\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Maximum intensity CCP\_XRY\_087\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Minimum intensity CCP\_XRY\_088\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Reconstruction software manufacturer CCP\_XRY\_089\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Options: Bruker, InstaRecon,

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## Reconstruction software CCP\_XRY\_090\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Options: NRecon, InstaRecon CBR Premium 15K,

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## Reconstruction software version CCP\_XRY\_091\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

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## Averaging CCP\_XRY\_092\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Options: Yes, No,

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## 180 or 360 degree scan CCP\_XRY\_093\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Unit Measured: degrees

Options: 180, 360,

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## Rotation step CCP\_XRY\_094\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Unit Measured: degrees

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## Filter CCP\_XRY\_095\_001 | v1.0

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

**Options:** No Filter, 0.25mm Al, 0.5mm Al, 1mm Al, Cu+Al, 0.11mm Cu,

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**Distance between camera and source** CCP\_XRY\_096\_001 | v1.0  
procedureMetadata

**Req. Analysis:** false      **Req. Upload:** false      **Is Annotated:** false

**Unit Measured:** mm

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**Distance between object and source** CCP\_XRY\_097\_001 | v1.0  
procedureMetadata

**Req. Analysis:** false      **Req. Upload:** false      **Is Annotated:** false

**Unit Measured:** mm

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**Image pixel size** CCP\_XRY\_098\_001 | v1.0  
procedureMetadata

**Req. Analysis:** false      **Req. Upload:** false      **Is Annotated:** false

**Unit Measured:** pixels

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**Camera pixel size** CCP\_XRY\_099\_001 | v1.0

procedureMetadata

Req. Analysis: false      Req. Upload: false      Is Annotated: false

Unit Measured: pixels

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**Source current** CCP\_XRY\_100\_001 | v1.0

procedureMetadata

Req. Analysis: false      Req. Upload: false      Is Annotated: false

Unit Measured: uA

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**Source type** CCP\_XRY\_101\_001 | v1.0

procedureMetadata

Req. Analysis: false      Req. Upload: false      Is Annotated: false

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**Date of sacrifice** CCP\_XRY\_102\_001 | v1.0

procedureMetadata

Req. Analysis: false      Req. Upload: false      Is Annotated: false

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