

# X-ray IMPC\_XRY\_001

## Purpose

Construct and analyse digital X-ray images in immobilised mice using a Faxitron X-Ray system or NTB digital X-ray scanner.

## Experimental Design

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

## Procedure

Perform steps 3.1 and 3.2 unless the mouse is coming from DEXA analysis

3.1 Anesthetize the mice.

3.2 Monitor the animal carefully until unconsciousness by ensuring the mouse is adequately sedated.

3.3 Mount the anesthetized mouse onto an X-ray permeable plate. Curve the tail along the left side of the mouse. (Note: this will enable identification of the X-ray as a dorsal or ventral image.)

Faxitron X-ray system

3.3.1 Insert the plate into the Faxitron X-ray system.

3.3.2 Take an image using the software that is supplied by the X-ray scanner.

3.3.3 Set the machine to a voltage of 25kV with an integration time of 40ms.

3.3.4 Take an image using the iX-Pect software that is supplied by the X-ray scanner.

NTB digital X-ray scanner

3.4 Remove the mouse once the image is captured. Place the mouse on a heated mat, set at 37°C, in a cage and monitor closely until consciousness is fully regained.

3.5 Analyze the image.

3.6 Or continue with ABR.

## Notes

The protocol described herein employs anaesthesia using intraperitoneal (IP) administration; however, anaesthesia using isoflurane is also suitable.

[Digit integrity IMPC\\_XRY\\_031\\_001](#) *Definition:* The state of being whole and undivided.

## Parameters and Metadata

### Skull shape IMPC\_XRY\_001\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Description: skull\_shape

Options: imageOnly, normal, abnormal, unobservable,

---

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

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Description: zygomatic\_bone

Options: imageOnly, normal, abnormal, unobservable,

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** maxilla

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** mandibles

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

---

## **Teeth** IMPC\_XRY\_005\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** teeth

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** scapulae

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** clavicle

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** number\_of\_ribs\_right

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** number\_of\_ribs\_left

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** shape\_of\_ribs

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** fusion\_of\_ribs

**Options:** imageOnly, fused, not fused, unobservable,

---

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

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: true

Description: pelvis

Options: imageOnly, normal, abnormal, unobservable,

---

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

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Description: number\_of\_cervical\_vertebrae

---

## Number of thoracic vertebrae IMPC\_XRY\_014\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Description: number\_of\_thoracic\_vertebrae

---

## Number of lumbar vertebrae IMPC\_XRY\_015\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

**Description:** number\_of\_lumbar\_vertebrae

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** number\_of\_pelvic\_vertebrae

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** number\_of\_caudal\_vertebrae

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** shape\_of\_vertebrae

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** fusion\_of\_vertebrae

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

---

## Processes on vertebrae IMPC\_XRY\_020\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** processes\_on\_vertebrae

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** humerus

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



---

## Radius IMPC\_XRY\_022\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** radius

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** ulna

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** femur

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

---

## **Tibia** IMPC\_XRY\_025\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** tibia

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

---

## **Fibula** IMPC\_XRY\_026\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** fibula

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

---

## **Joints** IMPC\_XRY\_027\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** joints

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Description:** number\_of\_digits

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** syndactylism

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** completeness\_of\_digits

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

---

## Digit integrity IMPC\_XRY\_031\_001 | v1.0

simpleParameter

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** true

**Description:** digit\_integrity

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** false

**Description:** comment\_on\_xray\_image

---

## Tibia length IMPC\_XRY\_033\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

**Unit Measured:** mm

**Description:** tibia\_length

---

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

seriesMediaParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: false

Description: xray\_images

Increments: Minimum 1

---

## **Alive** IMPC\_XRY\_035\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: false

Description: alive

---

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

procedureMetadata

Req. Analysis: false

Req. Upload: true

Is Annotated: false

Description: xray\_equipment\_name

---

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

procedureMetadata

**Req. Analysis:** true

**Req. Upload:** false

**Is Annotated:** false

**Description:** xray\_equipment\_manufacturer

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

---

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

procedureMetadata

**Req. Analysis:** true

**Req. Upload:** false

**Is Annotated:** false

**Description:** xray\_equipment\_model

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

---

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

procedureMetadata

**Req. Analysis:** false

**Req. Upload:** true

**Is Annotated:** false

**Unit Measured:** s

**Description:** settings\_time\_of\_exposure

---

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

procedureMetadata

Req. Analysis: false

Req. Upload: true

Is Annotated: false

Description: settings\_level

---

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

procedureMetadata

Req. Analysis: false

Req. Upload: true

Is Annotated: false

Description: experimenter\_scan\_

---

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

procedureMetadata

Req. Analysis: false

Req. Upload: true

Is Annotated: false

Description: experimenter\_analysis\_

---

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

procedureMetadata

Req. Analysis: false

Req. Upload: true

Is Annotated: false

Description: voltage\_settings

---

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

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Description: scanner\_equipment\_name

---

## Scanner equipment manufacturer IMPC\_XRY\_045\_001 | v1.1

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Description: scanner\_equipment\_manufacturer

---

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

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Description: scanner\_equipment\_model



---

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

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

---

## XRay Images Whole Body Lateral Orientation IMPC\_XRY\_048\_001 | v1.2

seriesMediaParameter

Req. Analysis: false

Req. Upload: true

Is Annotated: false

Increments: Minimum 1

---

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

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

---

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

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

---

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

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

---

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

seriesMediaParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Increments: Minimum 1

---

## **Date Scanner equipment last calibrated** IMPC\_XRY\_053\_001 | v1.

1

procedureMetadata

Req. Analysis: false

Req. Upload: false

Is Annotated: false

---

## Free Ontology IMPC\_XRY\_054\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

---

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

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: normal, abnormal, imageOnly, unobservable,

---

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

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: yes, no, imageOnly, unobservable,

---

## **Kyphosis** IMPC\_XRY\_057\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

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

---

## **Lordosis** IMPC\_XRY\_058\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

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

---

## **Transitional vertebrae** IMPC\_XRY\_060\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

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

---

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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

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

---

## **Polysyndactylism** IMPC\_XRY\_062\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

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

---

## **Cervical processes** IMPC\_XRY\_063\_001 | v1.1

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

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

---

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

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: normal, abnormal, imageOnly, unobservable,

---

## Lumbar processes IMPC\_XRY\_065\_001 | v1.1

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: normal, abnormal, imageOnly, unobservable,

---

## Sacral processes IMPC\_XRY\_066\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: normal, abnormal, imageOnly, unobservable,

---

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

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: normal, abnormal, imageOnly, unobservable,

---

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

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: false

Options: Yes, No,

---

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

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: normal, abnormal, imageOnly, unobservable,

---

## Cervical vertebrae morphology IMPC\_XRY\_070\_001 | v1.0

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: abnormal, normal, unobservable, imageOnly,

---

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

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: imageOnly, normal, abnormal, unobservable,

---

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

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: unobservable, normal, abnormal, imageOnly,

---

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

simpleParameter

Req. Analysis: false

Req. Upload: false

Is Annotated: true

Options: normal, imageOnly, unobservable, abnormal,

---



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

simpleParameter

**Req. Analysis:** false

**Req. Upload:** false

**Is Annotated:** true

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

---