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.

<u>Digit integrity IMPC_XRY_031_001</u> *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

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 Reg. Analysis: false Reg. Upload: true Is Annotated: true **Description:** teeth Options: imageOnly, normal, abnormal, unobservable,

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

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

Description: number_of_ribs_left

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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,

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Pelvis IMPC_XRY_012_001 | v1.0

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 0	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

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,

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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

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

Tibia IMPC_XRY_025_001 | v1.0

simpleParameter

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

Description: tibia

Options: imageOnly, normal, abnormal, unobservable,

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Fibula IMPC_XRY_026_001 | v1.0

simpleParameter

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

Description: fibula

Options: imageOnly, normal, abnormal, unobservable,

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Joints IMPC_XRY_027_001 | v1.0

simpleParameter

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

Description: joints

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

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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, Mediso,

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, Nanoscan SPECT/CT/PET 82S,

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

Reg. Analysis: false **Reg. 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_

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_0 01 | 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

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

Increments: Minimum 1

XRay Images Skull Dorso Ventral Orientation IMPC_XRY_051_0

01 | v1.2

seriesMediaParameter

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

Increments: Minimum 1

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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

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Date Scanner equipment last calibrated IMPC_XRY_053_001 | v1.

1

procedureMetadata

Req. Analysis: false	Req. Upload: false	Is Annotated: false
Free Ontology IMPC simpleParameter	_XRY_054_001 v1.0	
Req. Analysis: false	Req. Upload: false	Is Annotated: false
Shape of spine IMPO simpleParameter	C_XRY_055_001 v1.1	
Req. Analysis: false	Req. Upload: false	Is Annotated: true
Options: normal, abnormal, in	nageOnly, unobservable,	
Scoliosis IMPC_XRY_0 simpleParameter	056_001 v1.2	
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 I simpleParameter	MPC_XRY_062_001 v1.1		
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, in	mageOnly, 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

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: unobservable, abnormal, imageOnly, normal,

Cervical vertebrae morphology IMPC_XRY_070_001 | v1.0

simpleParameter

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

Options: abnormal, unobservable, normal, imageOnly,

Thoracic vertebrae simpleParameter	morphology IMPC_X	RY_071_001 v1.0	
Req. Analysis: false	Req. Upload: false	Is Annotated: true	
Options: unobservable, abnor	mal, imageOnly, normal,		
Lumbar vertebrae morphology IMPC_XRY_072_001 v1.0 simpleParameter			
Req. Analysis: false	Req. Upload: false	Is Annotated: true	
Options: abnormal, unobserva	able, normal, imageOnly,		
Pelvic vertebrae morphology IMPC_XRY_073_001 v1.0 simpleParameter			
Req. Analysis: false	Req. Upload: false	Is Annotated: true	
Options: abnormal, normal, imageOnly, unobservable,			

Caudal vertebrae morphology IMPC_XRY_074_001 | v1.0

simpleParameter

Req. Analysis: false	Req. Upload: false	Is Annotated: true	
Options: abnormal, normal, unobservable, imageOnly,			