
APPENDIX I

ETHICAL APPROVAL



Universiti Sains Malaysia

Pusat Pengajian Sains Perubatan
School of Medical Sciences

Our Ref.: USM/PPSP@/Ethics Com./2001[61.3(1)]

Date : 30 August 2001

Mr. Abdul Hakim Abdul Basir
School of Dental Sciences
Universiti Sains Malaysia
Health Campus
16150 Kubang Kerian
Kelantan.

Dear Mr.,

APPLICATION FOR ETHICAL APPROVAL

Protocol Title: Three-Dimensional Craniofacial Morphometrics : Pre and Post-Operative Assessment of Malay Cleft Lip and Palate Children.

I refer to your Application of 19 June 2001.

I am pleased to inform you that Research & Ethics Committee, School of Medical Sciences, Universiti Sains Malaysia has met on 3 July 2001 and has approved in proposal the application of the above title.

Title : Three-Dimensional Craniofacial Morphometrics : Pre- and Post-Operative Assessment of Malay Cleft Lip and Palate Children.

Research Centre : Hospital Universiti Sains Malaysia

Date Start : 1 September 2001

Duration: 1 year

Number of Sampel : 100 subjects

Name of Research Principle : Mr. Abdul Hakim Abdul Basir

Members of the Research & Ethics Committee who reviewed the study proposal are as follows:

Chairman :

Assoc. Prof. Abd. Rashid Abd. Rahman - Deputy Dean (Research)

Members:

- | | | | |
|------|--|---|---|
| i. | Professor W. Mohamad W. Bebakar | - | Deputy Dean (Post Graduate Studies & Professional Training) |
| ii. | Prof. Rabindarjeet Singh | - | Coordinator, Sport Science Unit |
| iii. | Assoc. Prof. Kamaruddin Jaalam | - | Lecturer, Anaesthesiology Dept. |
| iv. | Dr. Syed Hatim Noor | - | Coordinator, Biostatistic & Research Methodology Unit |
| v. | Dr. Anwar Hau Abdullah
(Representative to Mary Abraham) | - | Director, Hospital Kota Bharu |
| vi. | Hj. Ismail Hassan | - | Ex-USM Linguistic Teacher |

Thank you.

“GLOBAL COMPETITIVENESS: OUR COMMITMENT”

Yours sincerely

(ASSOC. PROF. ZABIDI AZHAR MOHD. HUSSIN)
Chairman of Research & Ethics Committee

- c.c. ✉ *Deputy Dean (Research)*
 ✉ *Secretary of Research & Ethics Committee*
 ✉ *Assoc. Prof. Ahmad Hj. Zakaria (Co-Researcher)*
 ✉ *Assoc. Prof. Hj. Ibrahim Lutfi Shuaib (Co-Researcher)*
 ✉ *Mr. Zainul Ahmad Rajion (Co-Researcher)*

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APPENDIX II

OSSEOUS LANDMARK DEFINITIONS (BY REGION)

This is a complete list of all the landmarks produced by the *Persona* program. In Chapters 4 – 8 the relevant landmarks for each chapter are described. Not all the landmarks produced are relevant to this study.

MANDIBLE

condylion laterale left/right (cdl/cdr): The most lateral point on the condylar head.

coronoid base left/right (cbl/cbr): The minimum distance from gonion to the inferior limit of the anterior border of the coronoid process (usually located near or at the junction of the ramus with the body of the mandible).

coronoid tip left/right (ctl/ctr): The most superior point on the coronoid process.

gnathion (gn): The most inferior point on the mandibular symphysis in the mid-sagittal plane (sometimes referred to as menton).

gonion left/right (gol/gor): A point on the angle of the mandible located by the bisection of the angle formed by the mandibular line and the ramus line.

infradentale (id): The most antero-superior point on the mandibular alveolar margin in the mid-sagittal plane.

mandibular canal left/right (mcl/mcr): The most inferior point on the posterior opening of the mandibular canal.

mandibular notch left/right (mnl/mnr): The most inferior point on the mandibular notch (sigmoid notch).

mental foramen left/right (mfl/mfr): The centre of the mental foramen.

pogonion (pg): The most anterior point on the mandibular symphysis in the mid-sagittal plane relative to the mandibular line.

supramentale (sm): The most posterior point on the anterior contour of the mandibular alveolar process in the mid-sagittal plane. (Also known as Down's Point B).

Mandibular Teeth

incision inferius left/right (il/iir): The mid-point of the incisal edge of the mandibular central incisor.

incision laterale inferius left/right (ilil/ilir): The mid-point of the incisal edge of mandibular lateral incisor.

canine inferius left/right (cil/cir): The tip of the buccal cusp of the mandibular canine.

1st pre-molare inferius left/right (pm1il/pm1ir): The tip of the buccal cusp of the mandibular first pre-molar.

2nd pre-molare inferius left/right (pm2il/pm2ir): The tip of the buccal cusp of the mandibular second pre-molar.

medio-molare 1st inferius left/right (mm1il/mm1ir): The tip of the medio-buccal cusp of the mandibular first molar.

disto-molare inferius left/right (dmil/dmir): The disto-buccal cusp of the mandibular first molar.

medio-molare 2nd inferius left/right (mm2il/mm2ir): The tip of the medio-buccal cusp of the mandibular second molar.

medio-molare 3rd inferius left/right (mm3il/mm3ir): The tip of the medio-buccal cusp of the mandibular third molar.

ecto-incision central inferius left/right (eicil/eicir): The most anterior point on the alveolar ridge, opposite the centre of the mandibular central incisor.

ecto-incision laterale inferius left/right (eilil/eilir): The most anterior point on the alveolar ridge, opposite the centre of the mandibular laterale incisor.

ecto-canine inferius left/right (ecil/ecir): The most anterior point on the alveolar ridge, opposite the centre of the mandibular canine.

ecto-pre-molare 1st inferius left/right (ep1il/ep1ir): The most lateral point on the alveolar ridge, opposite the centre of the mandibular first pre-molar.

ecto-pre-molare 2nd inferius left/right (ep2il/ep2ir): The most lateral point on the alveolar ridge, opposite the centre of the mandibular second pre-molar.

ectomolare 1st inferius left/right (em1il/em1ir): The most lateral point on the alveolar ridge, opposite the centre of the mandibular first molar.

ectomolare inferius left/right (emil/emir): The most lateral point on the anterior surface of the alveolar ridge, opposite the centre of the mandibular second molar.

ectomolare 3rd inferius left/right (em3il/em3ir): The most lateral point on the alveolar ridge, opposite the centre of the mandibular third molar.

MAXILLA

alare left/right (all/alr): The most lateral point on the anterior nasal aperture.

anterior nasal spine (ans): The apex of the anterior nasal spine. (Also known as spinal point (sp) or acanthion (ac)).

greater palatine foramen left/right (gpfl/gpfr): The centre of the greater palatine foramen.

hamular notch left/right (hnl/hnr): The deepest point of the hamular notch located centrally between the maxillary tuberosity and the pterygoid process of the sphenoid.

inferior naso-maxillare left/right (inml/inmr): The most inferior point on the naso-maxillary suture.

inferior orbital fissure left/right (iobfl/iobfr): The most anterior point on the margin of the inferior orbital fissure.

infraorbital foramen left/right (iofl/iofr): The centre of the infraorbital foramen.

lesser palatine foramen left/right (lpfl/lpfr): The centre of the lesser palatine foramen.

maxillare superius left/right (msl/msr): The most postero-superior point on the maxilla determined from CT slice images. (located in sagittal view as the most superior point on the maxillary surface, at the junction of orbital and infra-temporal surfaces.)

medial orbitale left/right (morl/morr): The most medial point on the orbital margin in the region of the fronto-lacrimar suture. (Located near the craniometric point Dacryon).

nasale (na): The tip of the nasal bone.

nasion (n): The most anterior point of the frontonasal suture. (If suture not clearly identified then the deepest point on the nasal notch can be substituted in the midline.)

naso-lacrimar inferius left/right (nlil/nlir): The most antero-inferior point on the margin of the naso-lacrimar groove as it exits the orbit (usually this point is located at the small spicule of bone covering the lateral wall of the naso-lacrimar groove and the inferior orbital rim).

orbitale left/right (orl/orr): The most inferior point on the infraorbital margin.

posterior nasal spine (pns): The apex of the posterior nasal spine.

prosthion (pr): The most antero-inferior point on the maxillary alveolar margin in the mid-sagittal plane.

pterygo-lateralis left/right (ptll/ptlr): The most lateral point on the lateral pterygoid plate located at the posterior/inferior angle.

pterygo-superius left/right (ptsl/ptsr): The postero-superior extremity of the medial pterygoid plate, where it approximates the apex of the petrous temporal bone.

subspinale (ss): The most posterior point on the anterior contour of the maxillary alveolar process in the mid-sagittal plane. (Also known as Down's Point A).

superior naso-maxillare left/right (snml/snmr): The most superior point on the naso-maxillary suture.

zygomaxillare inferius left/right (zml/zmir): The most inferior point on the zygoma, in the region of the craniometric landmark, zygomaxillare - the lowest point on the external suture between zygomatic and maxillary bones.

Maxillary Teeth

incision superius left/right (isl/isr): The mid-point of the incisal edge of the maxillary central incisor.

incision laterale superius left/right (ilsl/ilsr): The mid-point of the incisal edge of maxillary lateral incisor.

canine superius left/right (csl/csr): The tip of the buccal cusp of the maxillary canine.

1st pre-molare superius left/right (pm1sl/pm1sr): The tip of the buccal cusp of the maxillary first pre-molar.

2nd pre-molare superius left/right (pm2sl/pm2sr): The tip of the buccal cusp of the maxillary second pre-molar.

medio-molare 1st superius left/right (mm1sl/mm1sr): The tip of the medio-buccal cusp of the maxillary first molar.

disto-molare superius left/right (dmsl/dmsr): The disto-buccal cusp of the maxillary first molar.

medio-molare 2nd superius left/right (mm2sl/mm2sr): The tip of the medio-buccal cusp of the maxillary second molar.

medio-molare 3rd superius left/right (mm3sl/mm3sr): The tip of the medio-buccal cusp of the maxillary third molar.

ecto-incision central superius left/right (eicsl/eicsr): The most anterior point on the alveolar ridge, opposite the centre of the maxillary central incisor.

ecto-incision laterale superius left/right (eilsl/eilsr): The most anterior point on the alveolar ridge, opposite the centre of the maxillary laterale incisor.

ecto-canine superius left/right (ecsl/ecsr): The most anterior point on the alveolar ridge, opposite the centre of the maxillary canine.

ecto-pre-molare 1st superius left/right (ep1sl/ep1sr): The most lateral point on the alveolar ridge, opposite the centre of the maxillary first pre-molar.

ecto-pre-molare 2nd superius left/right (ep2sl/ep2sr): The most lateral point on the alveolar ridge, opposite the centre of the maxillary second pre-molar.

ectomolare 1st superius left/right (em1sl/em1sr): The most lateral point on the alveolar ridge, opposite the centre of the maxillary first molar.

ectomolare superius left/right (emsl/emsr): The most lateral point on the anterior surface of the alveolar ridge, opposite the centre of the maxillary second molar.

ectomolare 3rd superius left/right (em3sl/em3sr): The most lateral point on the alveolar ridge, opposite the centre of the maxillary third molar.

NASAL BONES

inferior naso-maxillare left/right (inml/inmr): The most inferior point on the naso-maxillary suture.

nasale (na): The tip of the nasal bone.

nasion (n): The most anterior point of the frontonasal suture. (If suture not clearly identified then the deepest point on the nasal notch can be substituted in the midline.)

superior naso-maxillare left/right (snml/snmr): The most superior point on the naso-maxillary suture.

VOMER

anterior nasal spine (ans): The apex of the anterior nasal spine. (aka spinal point (sp) or acanthion (ac)).

hamulus left/right (hpl/hpr): The tip of the hamular process.

hormion (h): The most posterior and medial point on the junction of the vomer and sphenoid bones.

posterior nasal spine (pns): The apex of the posterior nasal spine.

vomo-ethmoid inferius (vei): The most inferior point on the vomer ethmoid suture.

vomo-ethmoid superius (ves): The most superior point on the vomer ethmoid suture.

ZYGOMA

inferior orbital fissure left/right (iobfl/iobfr): The most anterior point on the margin of the inferior orbital fissure.

infero-lateral orbitale left/right (ilorl/ilorr): The point is determined approximately mid-way between the sutures limiting the zygomatic bone or, alternatively, at the intersection of the anterior projection of the maxillary border of the inferior orbital fissure with the lateral orbital rim.

lateral orbitale left/right (lorl/lorr): The most lateral point on the orbital rim.

orbitale left/right (orl/orr): The most inferior point on the infraorbital margin.

pre-articulare left/right (parl/parr): The most superior point on the lower border of the zygomatic arch located anterior to point articular eminence.

supero-lateral orbitale left/right (slorl/slorr): The intersection of the fronto-zygomatic suture with the lateral orbital rim (almost the intersection of the curve of the supra-orbital rim with the lateral orbital rim).

zygion left/right (zgl/zgr): The most lateral point on the zygomatic arch.

zygo-frontale left/right (zfl/zfr): The point located at the posterior extremity of the fronto-zygomatic suture.

zygo-frontale sphenoidale left/right (zfsl/zfsr): The point located at the intersection of the frontal, zygomatic and sphenoid bones.

zygomaxillare inferius left/right (zmil/zmir): The most inferior point on the zygoma, in the region of the craniometric landmark, zygomaxillare - the lowest point on the external suture between zygomatic and maxillary bones.

zygo-temporale left/right (ztl/ztr): The mid-point of the bony concavity formed between the frontal and temporal processes of the zygomatic bone.

CRANIAL BONES*ETHMOID*

cribriform plate anterior left/right (cpal/cpar): The most antero-lateral point on the cribriform plate.

cribriform plate posterior left/right (cppl/cppr): The most postero-lateral point on the cribriform plate.

crista galli (cg): The tip of the crista galli.

ethmoid spine (es): The tip of the ethmoid spine.

foramen caecum (fc): The centre of the foramen caecum.

maxillare superius left/right (msl/msr): The most postero-superior point on the maxilla determined from CT slice images. (located in sagittal view as the most superior point on the maxillary surface, at the junction of orbital and infra-temporal surfaces.)

medial orbitale left/right (morl/morr): The most medial point on the orbital margin in the region of the fronto-lacrimal suture.

naso-lacrimal inferius left/right (nlil/nlir): The most antero-inferior point on the margin of the naso-lacrimal groove as it exits the orbit (usually this point is located at the small spicule of bone covering the lateral wall of the naso-lacrimal groove and the inferior orbital rim).

optic foramen left/right (ofl/ofr): The centre of the anterior opening of the optic canal.

vomo-ethmoid inferius (vei): The most inferior point on the vomer ethmoid suture.

vomo-ethmoid superius (ves): The most superior point on the vomer ethmoid suture.

FRONTAL

bregma (br): The intersection of the sagittal and the coronal sutures on the surface of the cranial vault.

glabella (g): The most prominent point in the mid-sagittal plane between the eyebrow ridges.

cribriform plate anterior left/right (cpal/cpar): The most antero-lateral point on the cribriform plate.

cribriform plate posterior left/right (cppl/cppr): The most postero-lateral point on the cribriform plate.

foramen caecum (fc): The centre of the foramen caecum.

medial orbitale left/right (morl/morr): The most medial point on the orbital margin in the region of the fronto-lacrimal suture.

nasion (n): The most anterior point of the frontonasal suture. (If suture not clearly identified then the deepest point on the nasal notch can be substituted in the midline.)

optic foramen left/right (ofl/ofr): The centre of the anterior opening of the optic canal.

sphenion c left/right (spcl/spcr): The junction of the coronal suture and the sphenoid bone.

superior naso-maxillare left/right (snml/snmr): The most superior point on the naso-maxillary suture.

superior orbitale left/right (sosl/sorr): The most superior point on the supra-orbital margin.

superior orbital fissure left/right (sobfl/sobfr): The most lateral point on the margin of the superior orbital fissure.

supero-lateral orbitale left/right (slorl/slorr): The intersection of the fronto-zygomatic suture with the lateral orbital rim (almost the intersection of the curve of the supra-orbital rim with the lateral orbital rim.

zygo-frontale left/right (zfl/zfr): The point located at the posterior extremity of the fronto-zygomatic suture.

zygo-frontale sphenoidale left/right (zfsf/zfsr): The point located at the intersection of the frontal, zygomatic and sphenoid bones.

OCCIPITAL

asterion left/right (asl/asr): The intersection between temporal, parietal and occipital sutures on the surface of the cranial vault.

asterion inner left/right (asil/asir): The intersection between temporal, parietal and occipital sutures on the inner surface of the cranial vault.

basion (ba): The mid-sagittal point on the anterior margin of the foramen magnum (determined as the point of maximum convexity on the clivus of the skull at the anterior margin of the foramen magnum).

foramen magnum lateralis left/right (fml/fmlr): The most lateral point on the margin of the foramen magnum.

internal occipital protuberance (iop): The most prominent point on the internal occipital crest (located at the antero-inferior attachment of falx cerebri to the occipital).

jugular foramen lateralis left/right (jfl/jflr): The most lateral point on the jugular foramen at/near the temporal occipital suture.

jugular foramen medial left/right (jfml/jfmr): The most antero-medial point on the jugular foramen at/near the temporal occipital suture.

jugular foramen posterius left/right (jfpl/jfpr): The most posterior point on the jugular foramen.

lambda (l): The intersection between the lambdoid and sagittal sutures on the surface of the cranial vault.

lambda inner (li): The intersection between the lambdoid and sagittal sutures on the inner surface of the cranial vault.

opisthion (o): The mid-sagittal point on the posterior margin of the foramen magnum. This landmark is difficult to locate in the living due to the presence of the spinal column, in which case a good knowledge of related anatomical features aids identification.

opisthocranion (op): The most distal point on the skull from glabella in the mid-sagittal plane, excluding the external occipital protuberance.

pterygo-superius left/right (ptsl/ptsr): The postero-superior extremity of the medial pterygoid plate, where it approximates the apex of the petrous temporal bone.

PARIETAL

asterion left/right (asl/asr): The intersection between temporal, parietal and occipital sutures on the surface of the cranial vault.

bregma (br): The intersection of the sagittal and the coronal sutures on the surface of the cranial vault.

lambda (l): The intersection between the lambdoid and sagittal sutures on the surface of the cranial vault.

sphenion c left/right (spcl/spcr): The junction of the coronal suture and the sphenoid bone.

sphenion t left/right (sptl/sptr): The intersection of the temporal, parietal and sphenoid bones.

SPHENOID

anterior clinoid left/right (acl/acr): The most posterior point on the anterior clinoid of the lesser wing of the sphenoid bone. In the cases of bridging between the anterior and posterior clinoid the point is determined mid-way along the bridge.

cribriform plate posterius left/right (cppl/cppr): The most postero-lateral point on the cribriform plate.

ethmoid spine (es): The tip of the ethmoid spine.

foramen in ovale left/right (foil/foir): The most anterior point on the margin of the foramen ovale.

foramen in spinosum left/right (fisl/fisir): The most antero-medial point of the foramen spinosum.

foramen out ovale left/right (fool/foor): The most anterior point on the margin of the foramen ovale, determined on the skull base.

foramen out spinosum left/right (fosl/fosr): The most antero-medial point of the foramen spinosum, determined on the skull base.

foramen rotundum left/right (frl/frr): The centre of the foramen rotundum.

hamular notch left/right (hnl/hnr): The deepest point of the hamular notch located centrally between the maxillary tuberosity and the pterygoid process of the sphenoid.

hamular process left/right (hpl/hpr): The tip of the hamular process of the medial pterygoid plates of the sphenoid.

hormion (h): The most posterior and medial point on the junction of the vomer and sphenoid bones.

infra-temporal crest left/right (itcl/itcr): The most inferior point on the infra-temporal crest.

inferior orbital fissure left/right (iobfl/iobfr): The most anterior point on the margin of the inferior orbital fissure.

maxillare superius left/right (msl/msr): The most postero-superior point on the maxilla determined from CT slice images. (located in sagittal view as the most superior point on the maxillary surface, at the junction of orbital and infra-temporal surfaces.)

optic foramen left/right (ofl/ofr): The centre of the anterior opening of the optic canal.

posterior clinoid left/right (pcl/pcr): The mid-point of the tip of the posterior clinoid of the dorsum sellae. In the cases of bridging between the anterior and posterior clinoid the point is determined mid-way along the bridge.

pterygo-lateralis left/right (ptll/ptlr): The most lateral point on the lateral pterygoid plate located at the posterior/inferior angle.

pterygo-superius left/right (ptsl/ptsr): The postero-superior extremity of the medial pterygoid plate, where it approximates the apex of the petrous temporal bone.

sella (s): The centre of the sella turcica.

sphenoidale anterior left/right (spal/spar): The most anterior point on the posterior margin of the lesser wing of sphenoid.

sphenion c left/right (spcl/spcr): The junction of the coronal suture and the sphenoid bone.

sphenion t left/right (sptl/sptr): The intersection of the temporal, parietal and sphenoid bones.

superior orbital fissure left/right (sobfl/sobfr): The most lateral point on the margin of the superior orbital fissure.

zygo-frontale left/right (zfl/zfr): The point located at the posterior extremity of the fronto-zygomatic suture.

zygo-frontale sphenoidale left/right (zfsf/zfsr): The point located at the intersection of the frontal, zygomatic and sphenoid bones.

TEMPORAL

articular eminence left/right (ael/aer): The most infero-lateral point on the articular eminence of the temporal bone.

articular fossa left/right (afl/afr): The most supero-lateral point on the articular fossa of the temporal bone.

asterion left/right (asl/asr): The intersection between temporal, parietal and occipital sutures on the surface of the cranial vault.

asterion inner left/right (asil/asir): The intersection between temporal, parietal and occipital sutures on the inner surface of the cranial vault.

auriculare left/right (aul/aur): The most superior point on the root of the zygoma nearest to craniometric point porion.

external auditory meatus left/right (eaml/eamr): The centre of the external auditory meatus.

external auditory meatus anterior left/right (eamal/eamar): The most anterior point on the margin of the external auditory meatus.

external auditory meatus inferior left/right (eamil/eamir): The most inferior point on the margin of the external auditory meatus.

external auditory meatus posterior left/right (eampl/eampr): The most posterior point on the margin of the external auditory meatus.

external auditory meatus superius (ie porion) left/right (pol/por): The most superior point on the margin of the external auditory meatus.

foramen out spinosum left/right (fosl/fosr): The most antero-medial point of the foramen spinosum, determined on the skull base.

internal auditory meatus left/right (iaml/iamr): The centre of the internal auditory meatus.

jugular foramen lateralis left/right (jfl/jflr): The most lateral point on the jugular foramen at/near the temporal occipital suture.

jugular foramen medial left/right (jflm/jflmr): The most antero-medial point on the jugular foramen at/near the temporal occipital suture.

mastoidale left/right (mal/mar): The most inferior point on the mastoid process.

petrous anterior left/right (petal/petar): The most anterior point on the crest of the petrous temporal bone at the margin of the foramen lacerum.

petrous posterior left/right (petpl/petpr): The most posterior point on the crest of the petrous temporal bone at its junction with the lateral wall of the posterior cranial fossa.

porion left/right (pol/por): The most superior point on the margin of the external auditory meatus.

pre-articulare left/right (parl/parr): The most superior point on the lower border of the zygomatic arch located anterior to point articular eminence.

pterygo-superius left/right (ptsl/ptsr): The postero-superior extremity of the medial pterygoid plate, where it approximates the apex of the petrous temporal bone.

sphenion t left/right (sptl/sptr): The intersection of the temporal, parietal and sphenoid bones.

stylomastoid foramen left/right (smfl/smfr): The centre of the stylomastoid foramen.

zygo-temporale left/right (ztl/ztr): The mid-point of the bony concavity formed between the frontal and temporal processes of the zygomatic bone.

ORBITAL CAVITY

infero-lateral orbitale left/right (ilorl/ilorr): The point on the lateral orbital rim closest to the bony concavity at the junction of frontal and temporal processes of the zygomatic bone.

inferior orbital fissure left/right (iobfl/iobfr): The most anterior point on the margin of the inferior orbital fissure.

infraorbital foramen left/right (iofl/iofr): The centre of the infraorbital foramen.

lateral orbitale left/right (lorl/lorr): The most lateral point on the orbital rim.

maxillare superius left/right (msl/msr): The most postero-superior point on the maxilla determined from CT slice images. (located in sagittal view as the most superior point on the maxillary surface, at the junction of orbital and infra-temporal surfaces.)

medial orbitale left/right (morl/morr): The most medial point on the orbital margin in the region of the fronto-lacrimal suture.

naso-lacrimal inferius left/right (nlil/nlir): The most antero-inferior point on the margin of the naso-lacrimal groove as it exits the orbit (usually this point is located at the small spicule of bone covering the lateral wall of the naso-lacrimal groove and the inferior orbital rim).

optic foramen left/right (ofl/ofr): The centre of the anterior opening of the optic canal.

orbitale left/right (orl/orr): The most inferior point on the infraorbital margin.

superior orbitale left/right (sorl/sorr): The most superior point on the supra-orbital margin.

superior orbital fissure left/right (sobfl/sobfr): The most lateral point on the margin of the superior orbital fissure.

supero-lateral orbitale left/right (slorl/slorr): The intersection of the fronto-zygomatic suture with the lateral orbital rim (almost the intersection of the curve of the supra-orbital rim with the lateral orbital rim).

zygo-temporale left/right (ztl/ztr): The mid-point of the bony concavity formed between the frontal and temporal processes of the zygomatic bone.

NASAL CAVITY

anterior nasal spine (ans): The apex of the anterior nasal spine. (Also known as spinal point (sp) or acanthion (ac)).

cribriform plate anterior left/right (cpal/cpar): The most antero-lateral point on the cribriform plate.

cribriform plate posterior left/right (cppl/cppr): The most postero-lateral point on the cribriform plate.

crista galli (cg): The tip of the crista galli.

ethmoid spine (es): The tip of the ethmoid spine.

foramen caecum (fc): The centre of the foramen caecum.

hormion (h): The most posterior and medial point on the junction of the vomer and sphenoid bones.

inferior naso-maxillare left/right (inml/inmr): The most inferior point on the naso-maxillary suture.

maxillare superius left/right (msl/msr): The most postero-superior point on the maxilla determined from CT slice images. (located in sagittal view as the most superior point on the maxillary surface, at the junction of orbital and infra-temporal surfaces.)

medial orbitale left/right (morl/morr): The most medial point on the orbital margin in the region of the fronto-lacrimal suture.

nasale (na): The tip of the nasal bone.

nasion (n): The most anterior point of the frontonasal suture. (If suture not clearly identified then the deepest point on the nasal notch can be substituted in the midline.)

naso-lacrimal inferius left/right (nlil/nlir): The most antero-inferior point on the margin of the naso-lacrimal groove as it exits the orbit (usually this point is located at the small spicule of bone covering the lateral wall of the naso-lacrimal groove and the inferior orbital rim).

optic foramen left/right (ofl/ofr): The centre of the anterior opening of the optic canal.

posterior nasal spine (pns): The apex of the posterior nasal spine.

superior naso-maxillare left/right (snml/snmr): The most superior point on the naso-maxillary suture.

vomo-ethmoid inferius (vei): The most inferior point on the vomer ethmoid suture.

vomo-ethmoid superius (ves): The most superior point on the vomer ethmoid suture.

OTHER MEASUREMENTS

eurion left/right (eul/eur): The bilateral points of maximum convexity on the cranial vault between which maximum cranial breadth is recorded.

latero-frontale left/right (lfl/lfr): The bilateral points located behind the lateral orbital margin on the frontal bone which define minimum frontal breadth.

odontoid (odp): The apex of the odontoid process of the second cervical vertebra.

vertex (v): The most superior point in the mid-sagittal plane when the skull is oriented along the Frankfort Horizontal.

APPENDIX III

**PLOTS OF VALUES OF STUDY VARIABLES IN
CLEFT LIP AND PALATE AND
NON-CLEFT GROUPS**

Appendix III contains graphs of the raw data for study variables. The individual values for distances and angles are plotted against age, for each variable discussed in Chapter 4 to Chapter 8.

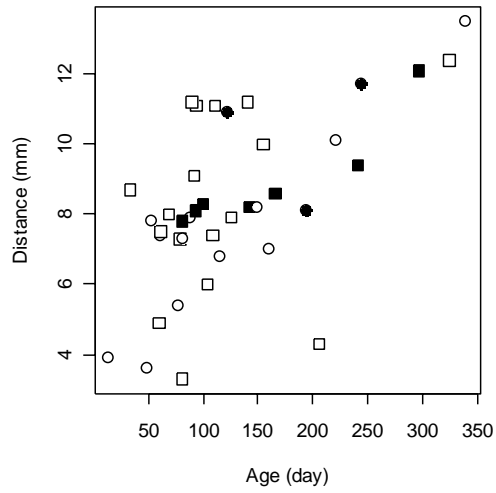
Legend

In the following plots:

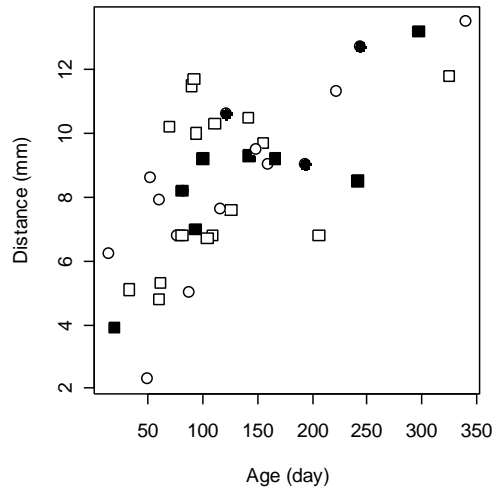
- - CLP male
- - CLP female
- - NC male
- - NC female

HYOID

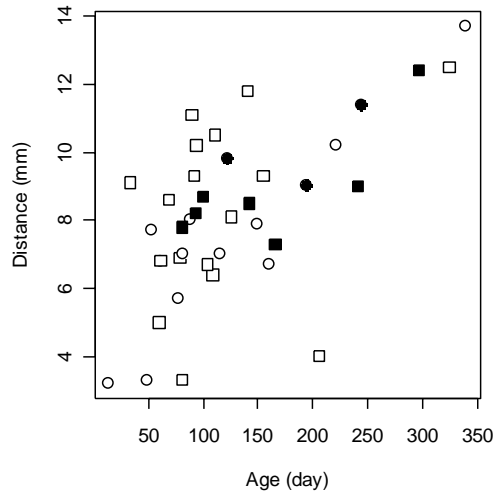
Lower length left GH



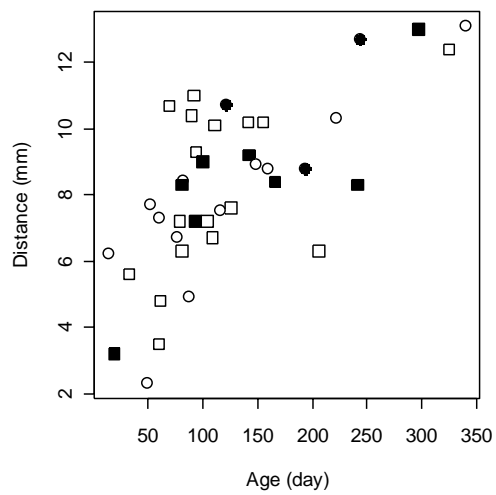
Lower length right GH



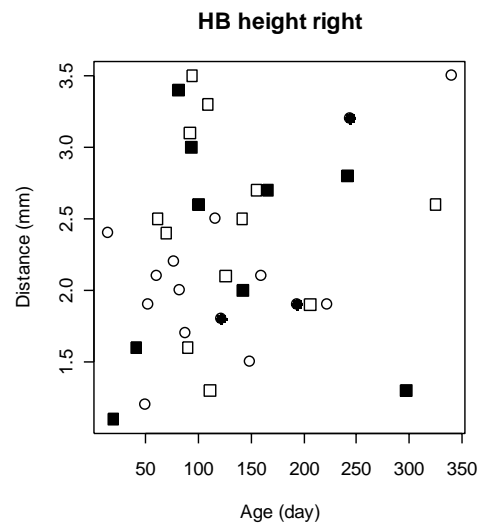
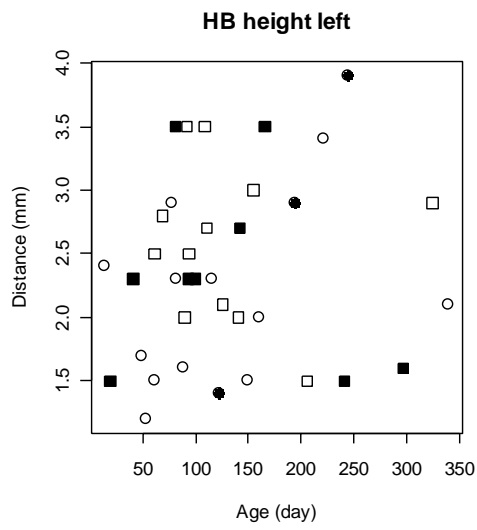
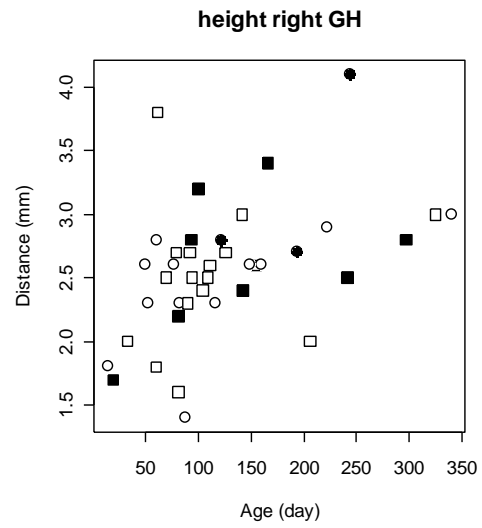
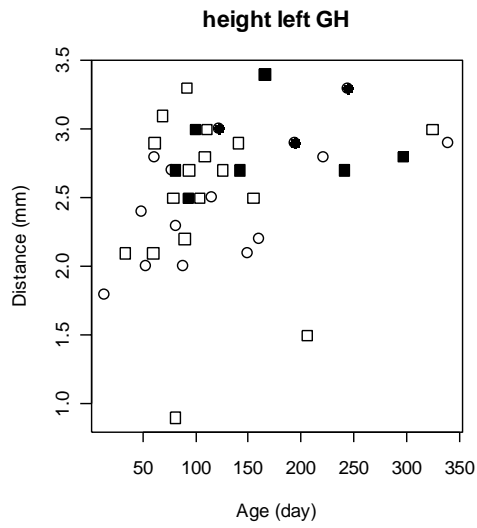
Upper length left GH



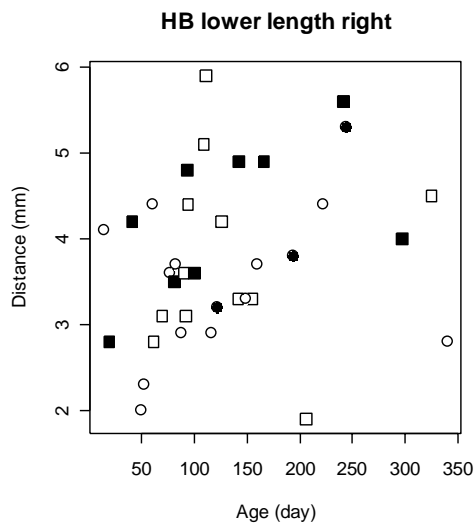
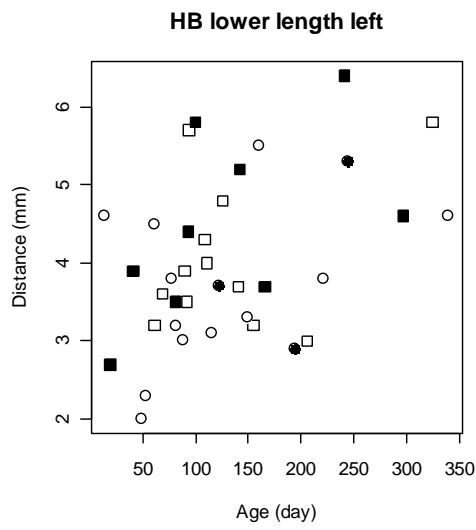
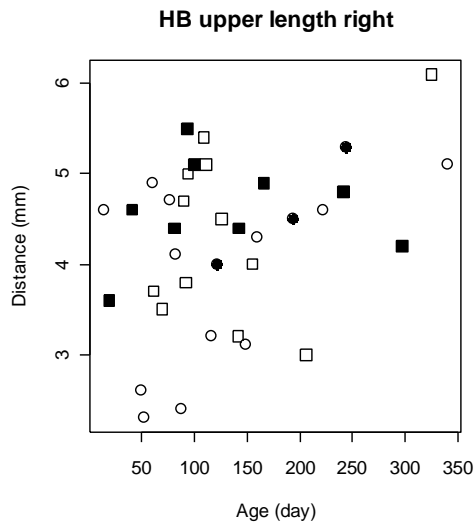
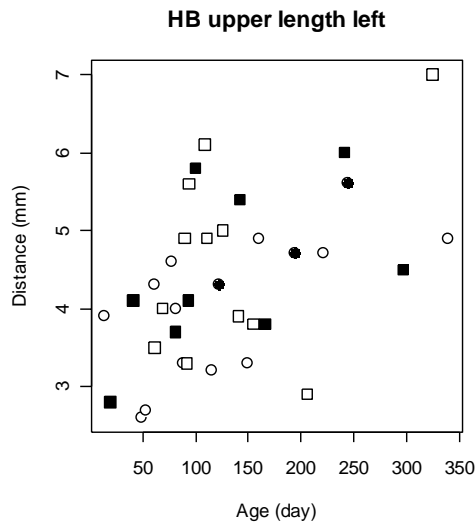
Upper length right GH

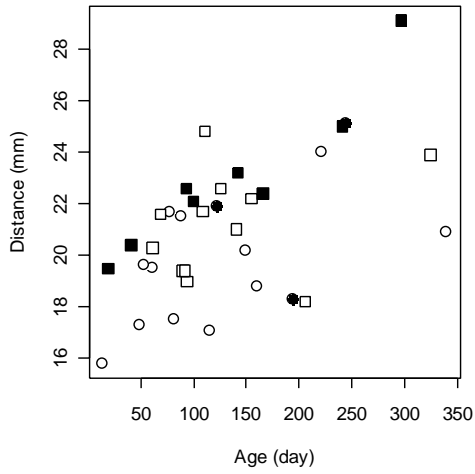
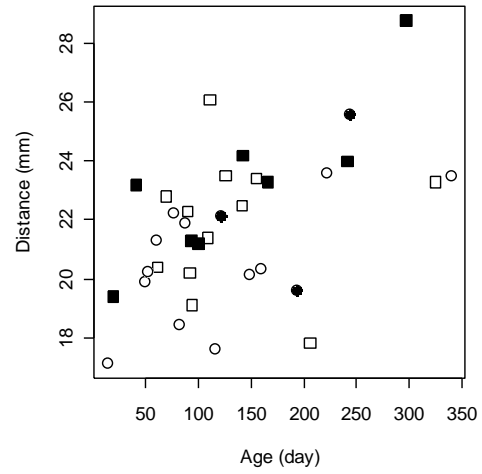
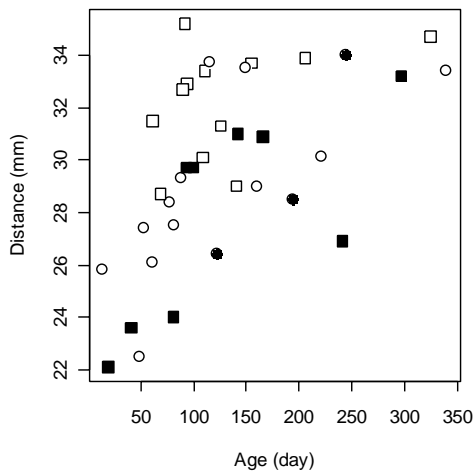
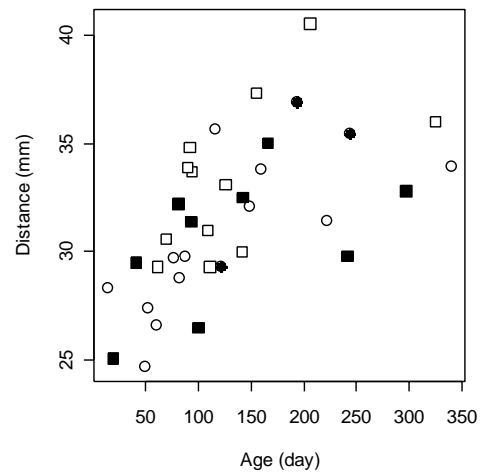


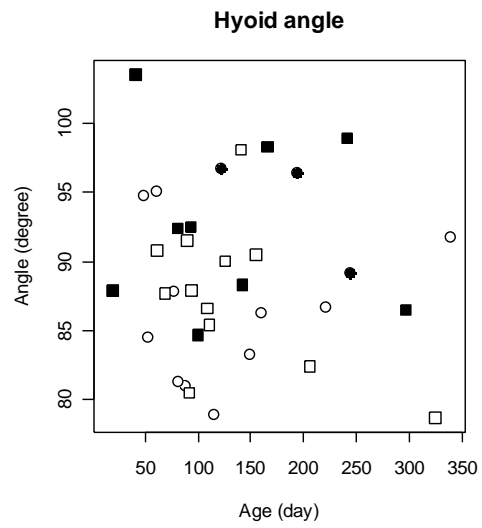
Hyoid (cont.)



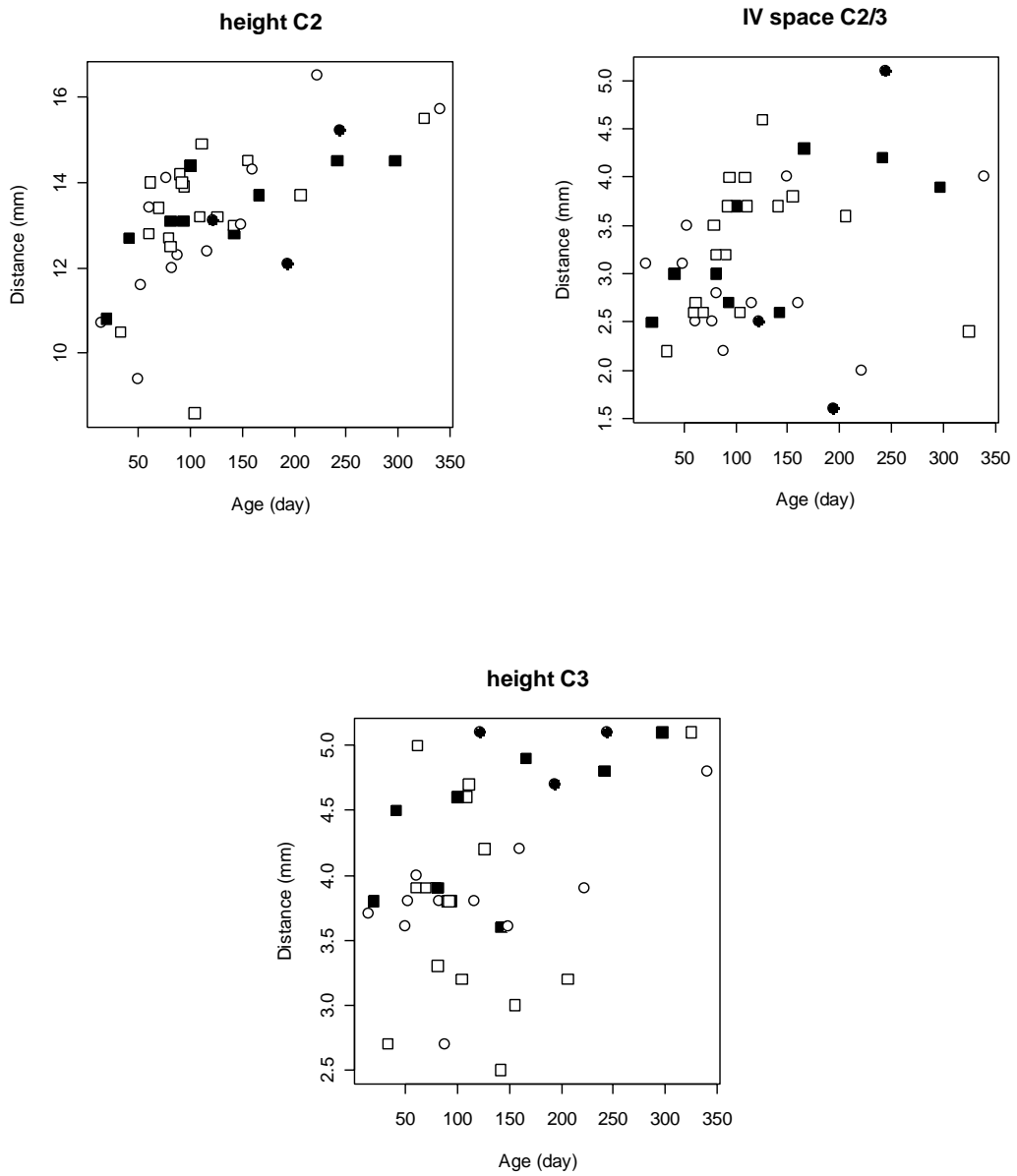
Hyoid (cont.)



Hyoid (cont.)**Hyoid - upper cervical****Hyoid - lower cervical****Hyoid - basion****Hyoid - inferior SOS**

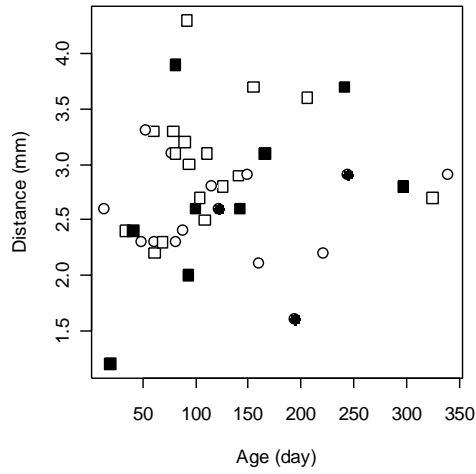
Hyoid (cont.)

CERVICAL SPINE

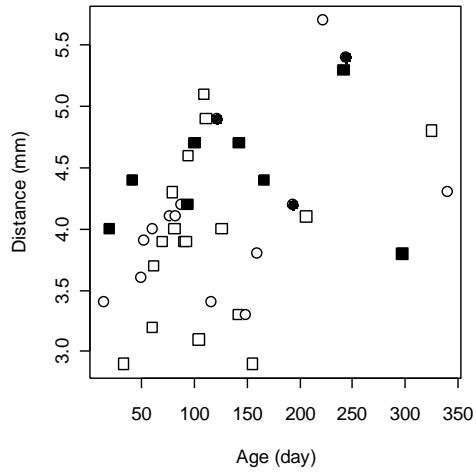


Cervical Spine (cont.)

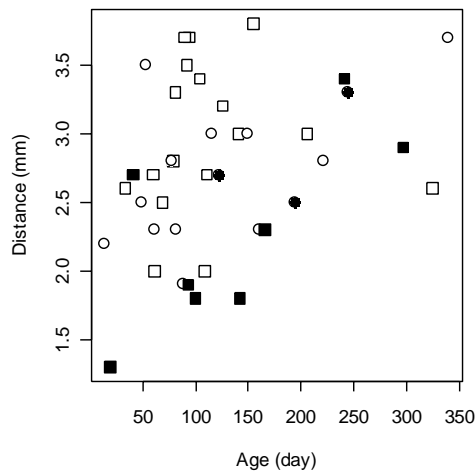
IV space C3/4



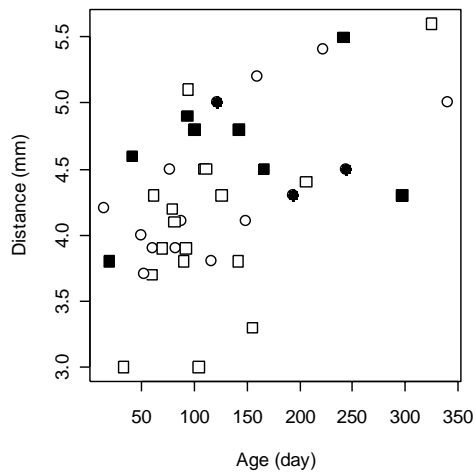
height C4



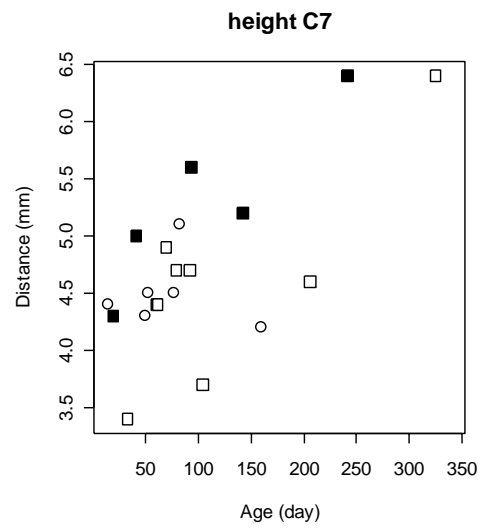
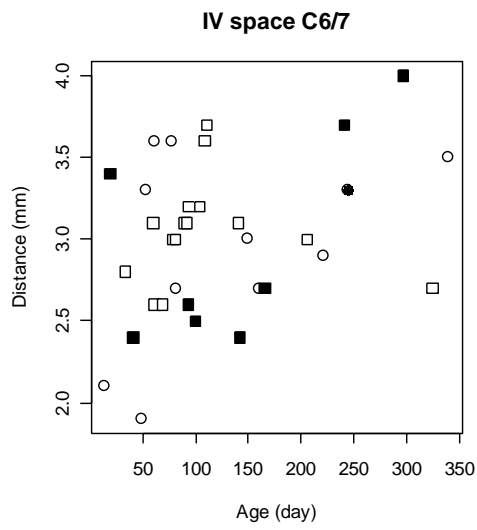
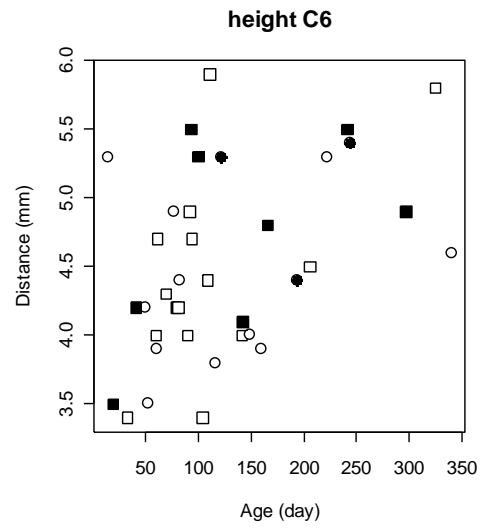
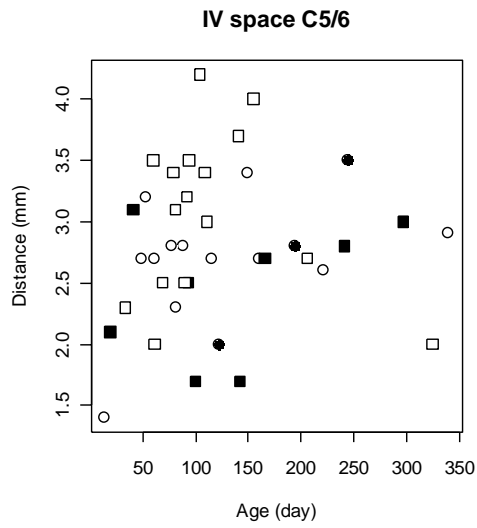
IV space C4/5



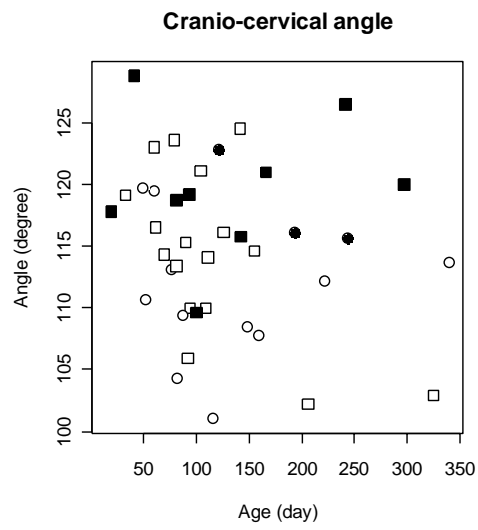
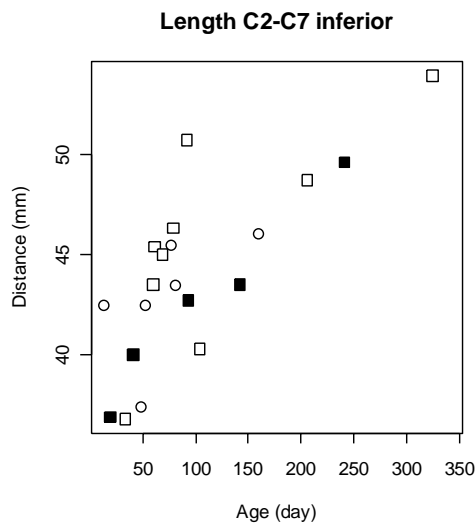
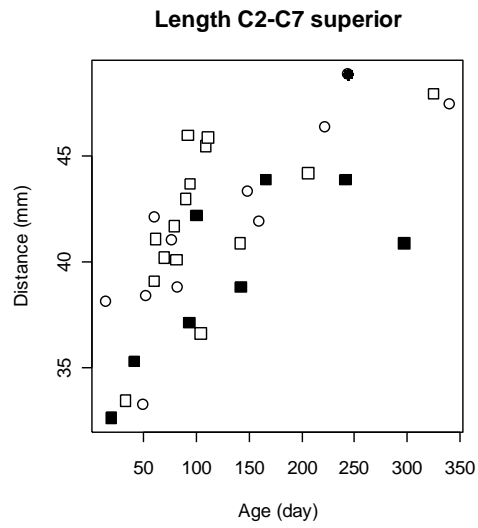
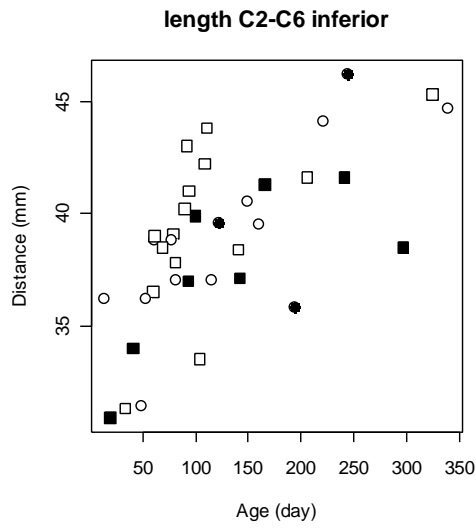
height C5



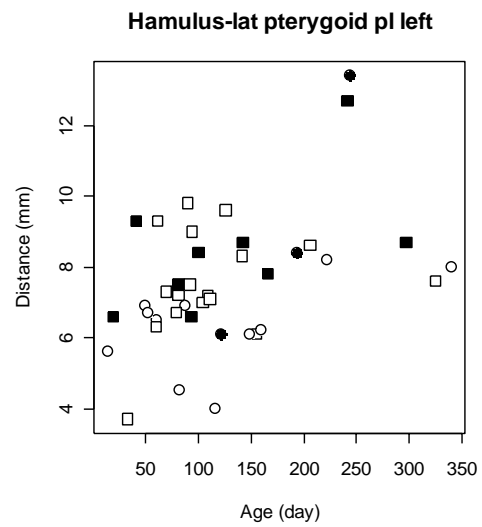
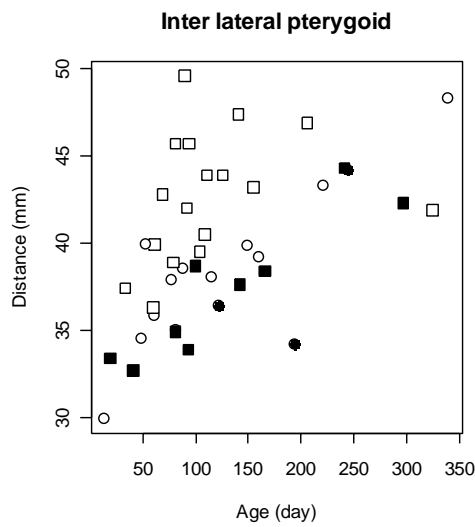
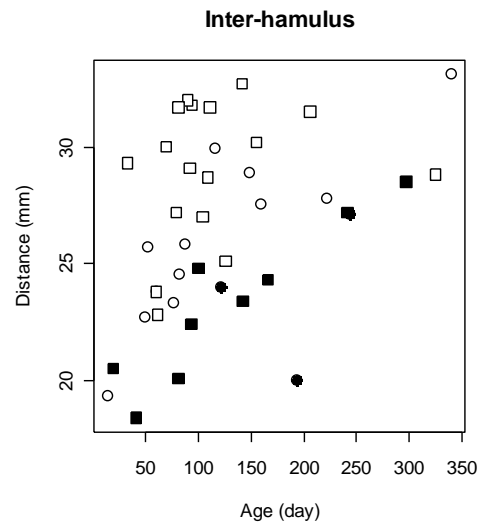
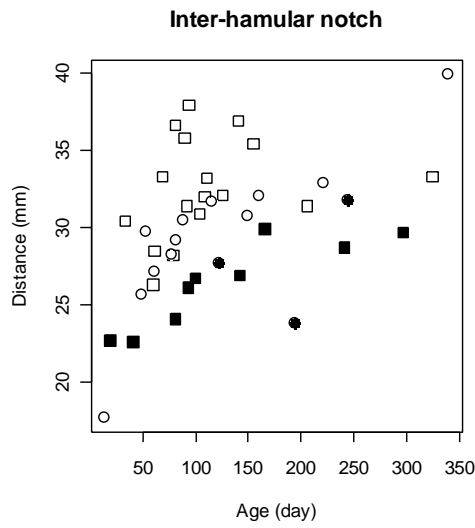
Cervical Spine (cont.)



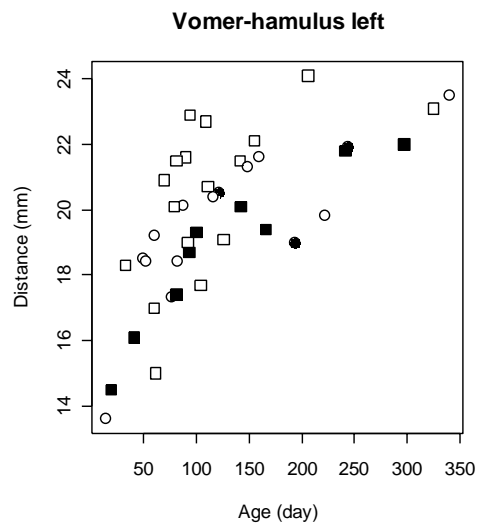
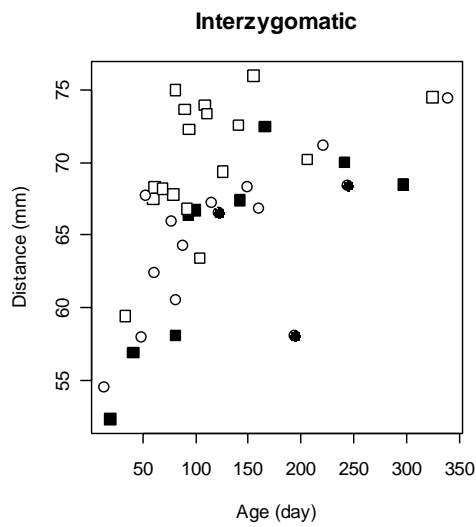
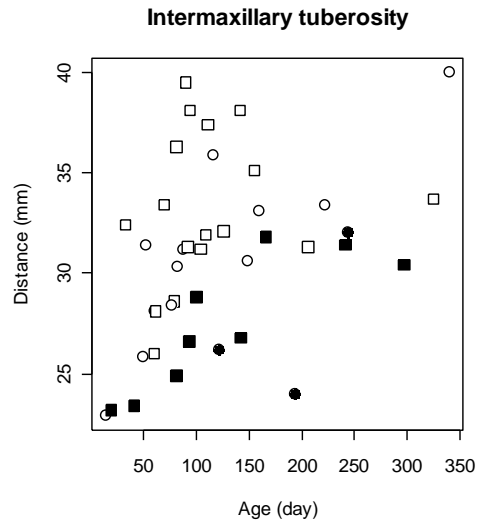
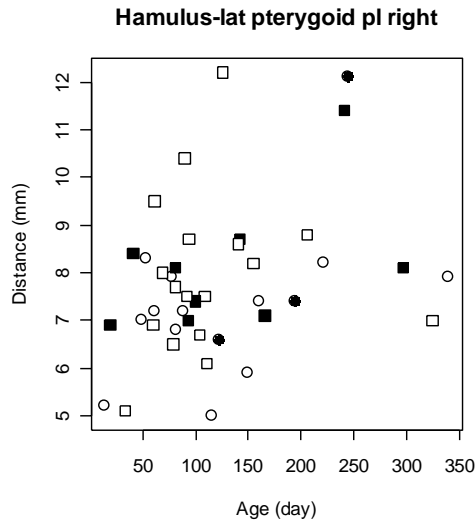
Cervical Spine (cont.)



NASOPHARYNX

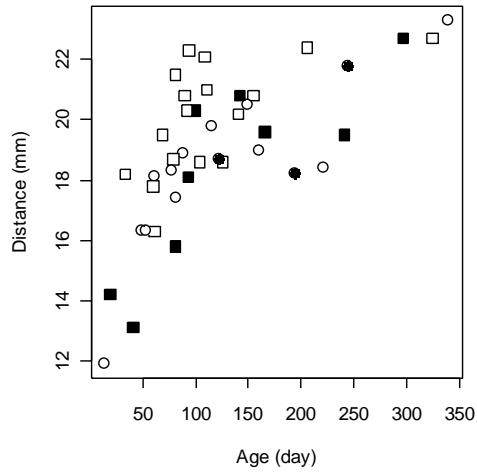


Nasopharynx (cont.)

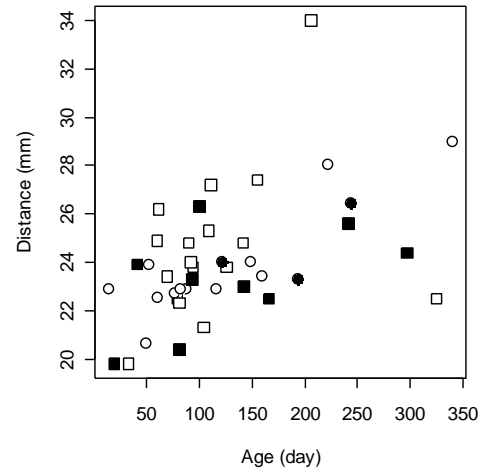


Nasopharynx (cont.)

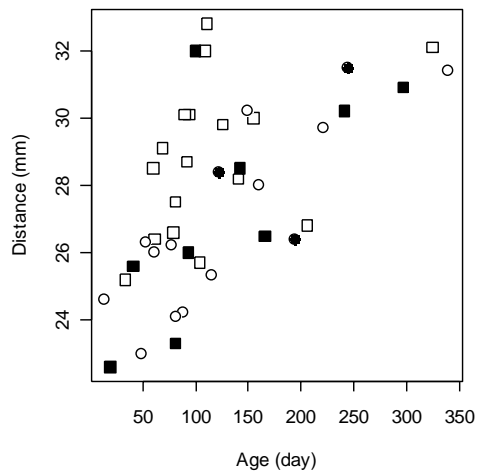
Vomer-hamulus right



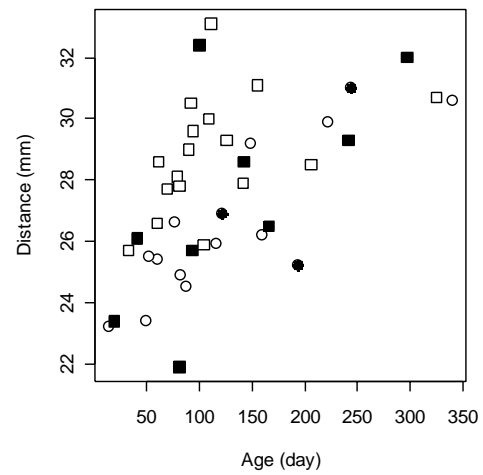
Vomer-basion



Basion-hamulus left

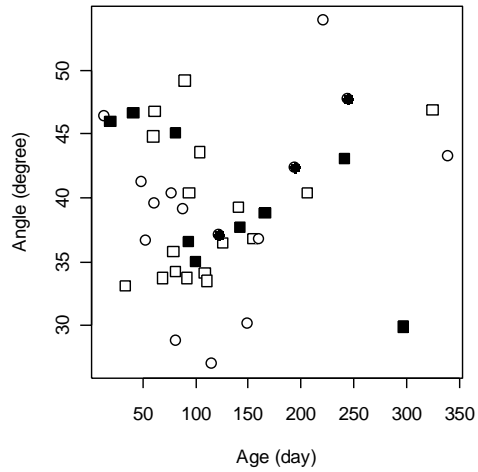


Basion-hamulus right

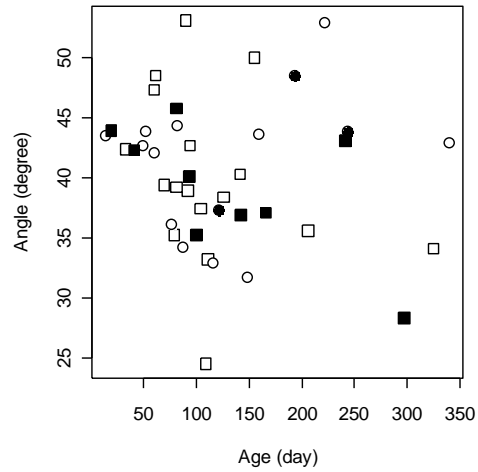


Nasopharynx (cont.)

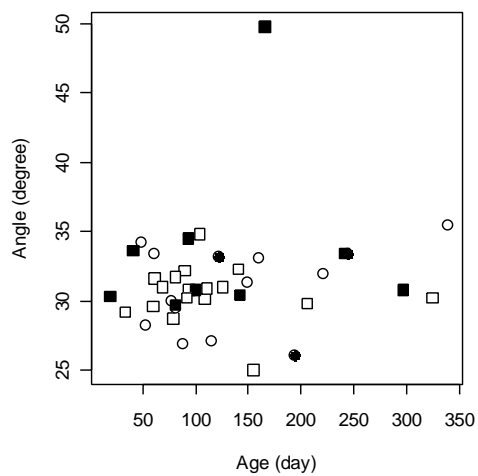
Hamulus angle left



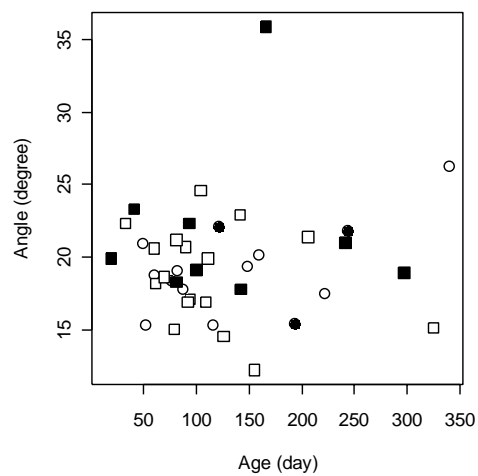
Hamulus angle right



Sphenopalatine angle

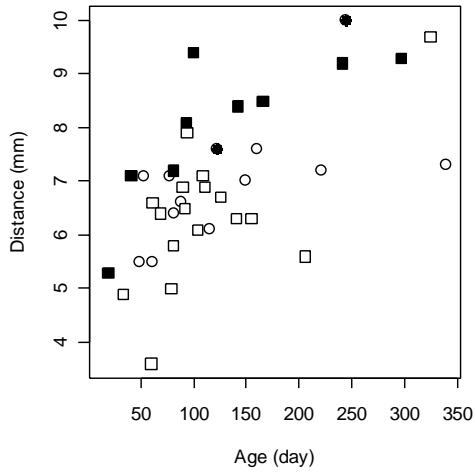


Vomerine angle

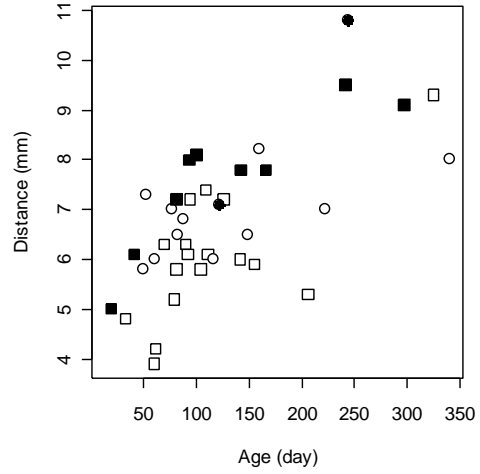


CRANIAL BASE

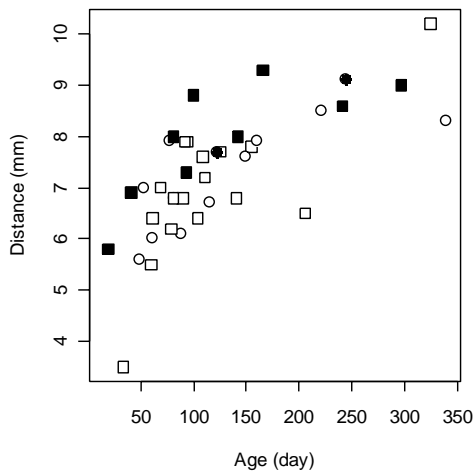
Left sphenoid height



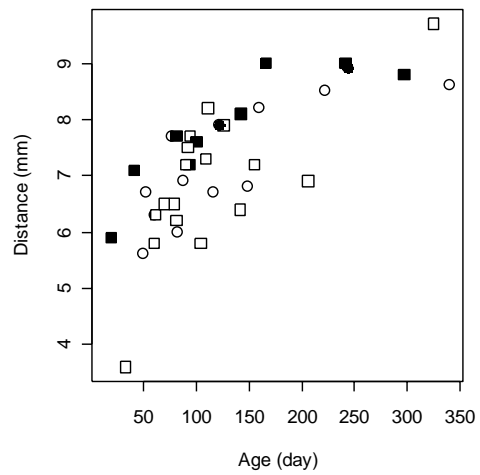
Right sphenoid height



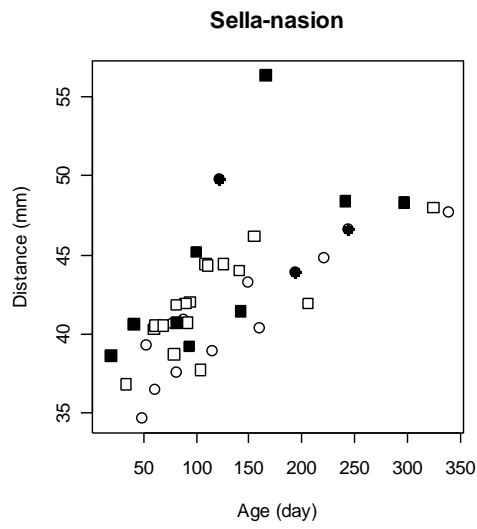
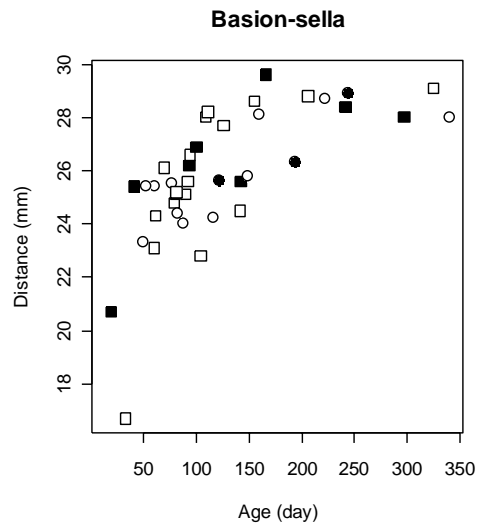
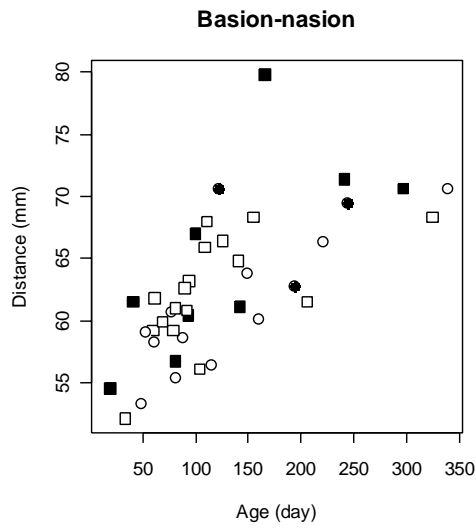
Left basioccipital height

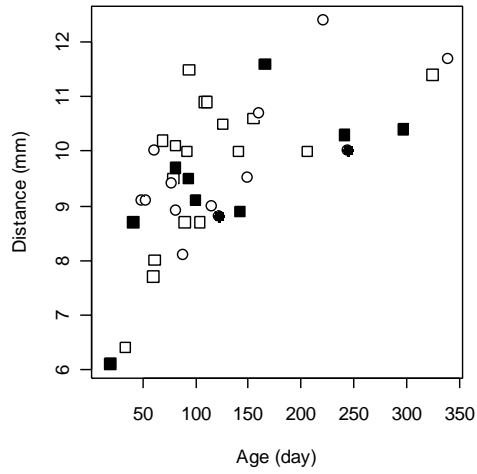
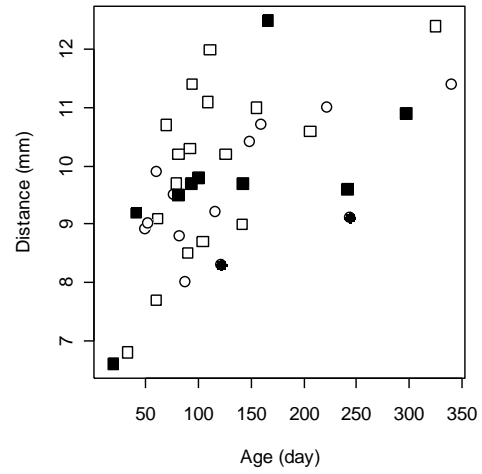
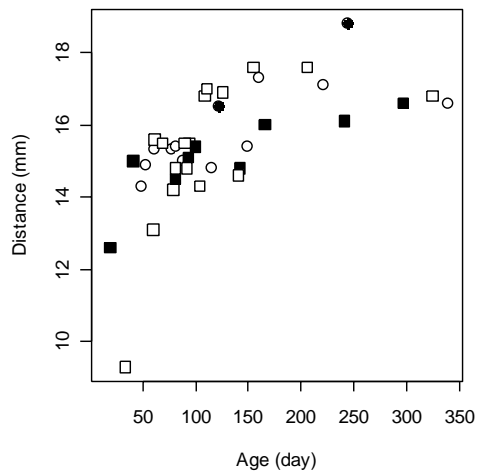
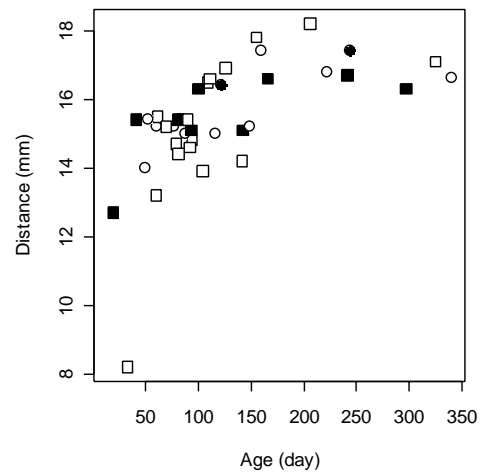


Right basioccipital height

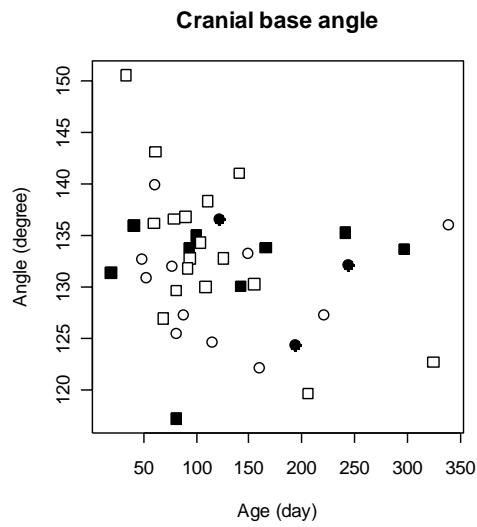
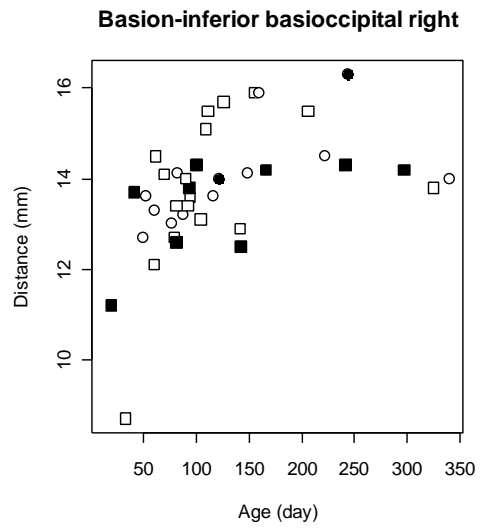
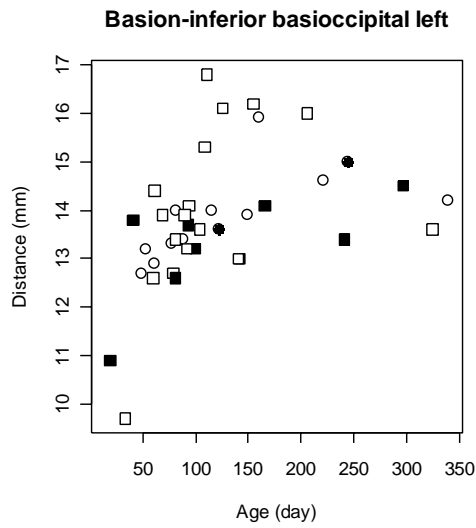


Cranial Base (cont.)



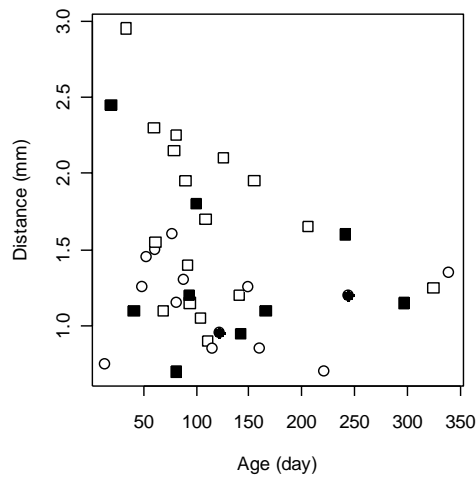
Cranial Base (cont.)**Sella-superior sphenoid left****Sella-superior sphenoid right****Basion-superior basioccipital left****Basion-superior basioccipital right**

Cranial Base (cont.)

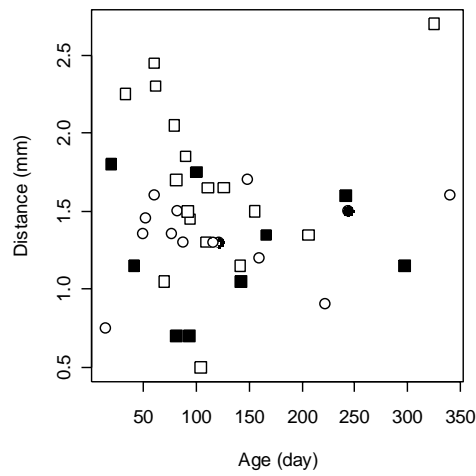


SPHENO-OCCIPITAL SYNCHONDROSIS

Superior SOS



Inferior SOS



APPENDIX IV

RESULTS OF GENERALIZED LINEAR MODELING ANALYSIS

Analysis of Variance (ANOVA) Tables from the Generalized Linear Modeling.

HYOID

<i>Dependent Variable: a1</i>			<i>Lower length left GH</i>		
		R-Square 0.520535	Coeff Var 22.58614	Root MSE 1.873491	Mean 8.294872
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	92.08663786	92.08663786	26.24	<.0001
Gender	1	0.18347503	0.18347503	0.05	0.8206
Group	4	31.05711482	7.76427871	2.21	0.0899
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.02003826	0.02003826	0.01	0.9402
ICP vs other affected	1	16.94542203	16.94542203	4.83	0.0354

<i>Dependent Variable: a4</i>			<i>Lower length right GH</i>		
		R-Square 0.609838	Coeff Var 20.63263	Root MSE 1.749131	Mean 8.477500
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	126.4418597	126.4418597	41.33	<.0001
Gender	1	0.5013934	0.5013934	0.16	0.6882
Group	4	35.3072323	8.8268081	2.89	0.0374
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.29076154	0.29076154	0.10	0.7598
ICP vs other affected	1	3.69989597	3.69989597	1.21	0.2794

<i>Dependent Variable: a3</i>			<i>Upper length left GH</i>		
		R-Square 0.552090	Coeff Var 22.58093	Root MSE 1.846425	Mean 8.176923
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	101.5501388	101.5501388	29.79	<.0001
Gender	1	0.1960606	0.1960606	0.06	0.8120
Group	4	36.2703245	9.0675811	2.66	0.0506
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.01353786	0.01353786	0.00	0.9501
ICP vs other affected	1	19.74706115	19.74706115	5.79	0.0220

Hyoid (cont.)

<i>Dependent Variable: a6</i>			<i>Upper length right GH</i>		
		R-Square 0.603755	Coeff Var 21.46888	Root MSE 1.773329	Mean 8.260000
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	132.5507627	132.5507627	42.15	<.0001
Gender	1	0.4172042	0.4172042	0.13	0.7180
Group	4	31.6493666	7.9123416	2.52	0.0601
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.21834132	0.21834132	0.07	0.7938
ICP vs other affected	1	7.87617128	7.87617128	2.50	0.1231

<i>Dependent Variable: a2</i>			<i>Height left GH</i>		
		R-Square 0.272399	Coeff Var 18.33842	Root MSE 0.471156	Mean 2.569231
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	0.52428334	0.52428334	2.36	0.1342
Gender	1	0.01373332	0.01373332	0.06	0.8052
Group	4	1.56025188	0.39006297	1.76	0.1619
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.84543655	0.84543655	3.81	0.0598
ICP vs other affected	1	0.26892334	0.26892334	1.21	0.2793

<i>Dependent Variable: a5</i>			<i>Height right GH</i>		
		R-Square 0.279287	Coeff Var 19.38114	Root MSE 0.496642	Mean 2.562500
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	1.52883605	1.52883605	6.20	0.0180
Gender	1	0.00462902	0.00462902	0.02	0.8919
Group	4	0.96274390	0.24068598	0.98	0.4340
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.38830165	0.38830165	1.57	0.2184
ICP vs other affected	1	0.00006939	0.00006939	0.00	0.9867

<i>Dependent Variable: a7</i>			<i>HB height left</i>		
		R-Square 0.059994	Coeff Var 32.67858	Root MSE 0.774301	Mean 2.369444
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	0.22303570	0.22303570	0.37	0.5467
Gender	1	0.62943615	0.62943615	1.05	0.3140
Group	4	0.13947905	0.03486976	0.06	0.9934
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.00329140	0.00329140	0.01	0.9414
ICP vs other affected	1	0.00052294	0.00052294	0.00	0.9766

Hyoid (cont.)

<i>Dependent Variable: a10</i>			<i>HB height right</i>		
		R-Square 0.126061	Coeff Var 30.26148	Root MSE 0.688449	Mean 2.275000
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	0.65663699	0.65663699	1.39	0.2488
Gender	1	0.63772785	0.63772785	1.35	0.2555
Group	4	0.66084588	0.16521147	0.35	0.8428
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.15626712	0.15626712	0.33	0.5703
ICP vs other affected	1	0.00137624	0.00137624	0.00	0.9574

<i>Dependent Variable: a8</i>			<i>HB upper length left</i>		
		R-Square 0.408988	Coeff Var 20.43958	Root MSE 0.886283	Mean 4.336111
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	8.38424480	8.38424480	10.67	0.0028
Gender	1	1.52069178	1.52069178	1.94	0.1747
Group	4	4.48356251	1.12089063	1.43	0.2501
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.03301306	0.03301306	0.04	0.8390
ICP vs other affected	1	0.43912588	0.43912588	0.56	0.4607

<i>Dependent Variable: a11</i>			<i>HB upper length right</i>		
		R-Square 0.369987	Coeff Var 18.62238	Root MSE 0.792486	Mean 4.255556
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	2.13250167	2.13250167	3.40	0.0756
Gender	1	1.83054593	1.83054593	2.91	0.0985
Group	4	5.24110495	1.31027624	2.09	0.1083
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.88004610	0.88004610	1.40	0.2461
ICP vs other affected	1	0.14460705	0.14460705	0.23	0.6349

<i>Dependent Variable: a9</i>			<i>HB lower length left</i>		
		R-Square 0.305776	Coeff Var 23.99907	Root MSE 0.963296	Mean 4.013889
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	5.28943592	5.28943592	5.70	0.0237
Gender	1	2.10710885	2.10710885	2.27	0.1427
Group	4	2.47298420	0.61824605	0.67	0.6206
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.35087287	0.35087287	0.38	0.5434
ICP vs other affected	1	0.02677268	0.02677268	0.03	0.8663

Hyoid (cont.)

<i>Dependent Variable: a12</i>			<i>HB lower length right</i>		
		R-Square 0.218978	Coeff Var 24.99107	Root MSE 0.943413	Mean 3.775000
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	1.33037855	1.33037855	1.49	0.2313
Gender	1	0.89506207	0.89506207	1.01	0.3242
Group	4	3.46477566	0.86619391	0.97	0.4373
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	1.89531724	1.89531724	2.13	0.1552
ICP vs other affected	1	0.38558224	0.38558224	0.43	0.5156

<i>Dependent Variable: a14</i>			<i>Hyoid - upper cervical</i>		
		R-Square 0.560147	Coeff Var 9.446461	Root MSE 1.990774	Mean 21.07429
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	72.03686516	72.03686516	18.18	0.0002
Gender	1	13.44731990	13.44731990	3.39	0.0761
Group	4	31.88908081	7.97227020	2.01	0.1201
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	14.75836155	14.75836155	3.72	0.0638
ICP vs other affected	1	13.81487923	13.81487923	3.49	0.0724

<i>Dependent Variable: a15</i>			<i>Hyoid - lower cervical</i>		
		R-Square 0.465582	Coeff Var 9.299527	Root MSE 2.023577	Mean 21.76000
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	56.28326870	56.28326870	13.74	0.0009
Gender	1	6.73245879	6.73245879	1.64	0.2103
Group	4	25.12524389	6.28131097	1.53	0.2195
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	7.88263664	7.88263664	1.93	0.1763
ICP vs other affected	1	14.68015595	14.68015595	3.59	0.0687

<i>Dependent Variable: a16</i>			<i>Hyoid - basion</i>		
		R-Square 0.632671	Coeff Var 7.976975	Root MSE 2.379354	Mean 29.82778
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	182.7119274	182.7119274	32.27	<.0001
Gender	1	21.6398791	21.6398791	3.82	0.0603
Group	4	128.2544561	32.0636140	5.66	0.0017
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	79.73253474	79.73253474	14.08	0.0008
ICP vs other affected	1	7.85556772	7.85556772	1.39	0.2484

Hyoid (cont.)

<i>Dependent Variable: a17</i>			<i>Hyoid - inferior SOS</i>		
		R-Square 0.461174	Coeff Var 9.126270	Root MSE 2.884915	Mean 31.61111
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	162.4873556	162.4873556	19.52	0.0001
Gender	1	13.5352006	13.5352006	1.63	0.2123
Group	4	39.3965572	9.8491393	1.18	0.3388
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	15.34874466	15.34874466	1.84	0.1849
ICP vs other affected	1	0.31941763	0.31941763	0.04	0.8461

<i>Dependent Variable: a13</i>			<i>Hyoid angle</i>		
		R-Square 0.258896	Coeff Var 6.505551	Root MSE 5.792357	Mean 89.03714
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	23.1274807	23.1274807	0.69	0.4134
Gender	1	1.2223365	1.2223365	0.04	0.8500
Group	4	299.3808470	74.8452118	2.23	0.0912
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	257.4811562	257.4811562	7.67	0.0098
ICP vs other affected	1	0.1059610	0.1059610	0.00	0.9556

CERVICAL SPINE

<i>Dependent Variable: a55</i>			<i>Height C2</i>		
		R-Square 0.422823	Coeff Var 10.09542	Root MSE 1.329640	Mean 13.17073
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	37.98829290	37.98829290	21.49	<.0001
Gender	1	1.81468842	1.81468842	1.03	0.3182
Group	4	1.73552795	0.43388199	0.25	0.9104
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.38409696	0.38409696	0.22	0.6441
ICP vs other affected	1	1.12419979	1.12419979	0.64	0.4307

<i>Dependent Variable: a56</i>			<i>Inter vertebral space C2/3</i>		
		R-Square 0.174811	Coeff Var 23.91987	Root MSE 0.760185	Mean 3.178049
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	2.53134958	2.53134958	4.38	0.0439
Gender	1	1.03690690	1.03690690	1.79	0.1893
Group	4	0.68819611	0.17204903	0.30	0.8774
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.00442168	0.00442168	0.01	0.9308
ICP vs other affected	1	0.39586760	0.39586760	0.69	0.4136

<i>Dependent Variable: a57</i>			<i>Height C3</i>		
		R-Square 0.513881	Coeff Var 13.11127	Root MSE 0.525410	Mean 4.007317
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	1.82749934	1.82749934	6.62	0.0146
Gender	1	0.00387535	0.00387535	0.01	0.9064
Group	4	6.06152915	1.51538229	5.49	0.0016
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	3.50026161	3.50026161	12.68	0.0011
ICP vs other affected	1	0.52491700	0.52491700	1.90	0.1769

<i>Dependent Variable: a58</i>			<i>Inter vertebral space C3/4</i>		
		R-Square 0.218449	Coeff Var 20.91897	Root MSE 0.580119	Mean 2.773171
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	0.86017423	0.86017423	2.56	0.1191
Gender	1	1.12903524	1.12903524	3.35	0.0758
Group	4	1.63211020	0.40802755	1.21	0.3236
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.80763645	0.80763645	2.40	0.1306
ICP vs other affected	1	0.20606638	0.20606638	0.61	0.4393

Cervical Spine (cont.)

<i>Dependent Variable: a59</i>			<i>Height C4</i>		
		R-Square 0.336549	Coeff Var 14.41378	Root MSE 0.592406	Mean 4.110000
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	1.43098508	1.43098508	4.08	0.0516
Gender	1	0.04105955	0.04105955	0.12	0.7345
Group	4	3.12220903	0.78055226	2.22	0.0877
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	2.05069195	2.05069195	5.84	0.0213
ICP vs other affected	1	0.00307606	0.00307606	0.01	0.9260

<i>Dependent Variable: a60</i>			<i>Inter vertebral space C4/5</i>		
		R-Square 0.447693	Coeff Var 18.13017	Root MSE 0.495860	Mean 2.735000
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	3.15912729	3.15912729	12.85	0.0011
Gender	1	0.00044912	0.00044912	0.00	0.9662
Group	4	5.04490749	1.26122687	5.13	0.0025
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	2.33624530	2.33624530	9.50	0.0041
ICP vs other affected	1	0.98272006	0.98272006	4.00	0.0539

<i>Dependent Variable: a61</i>			<i>Height C5</i>		
		R-Square 0.458134	Coeff Var 11.48932	Root MSE 0.494615	Mean 4.305000
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	2.42929010	2.42929010	9.93	0.0034
Gender	1	0.00510383	0.00510383	0.02	0.8860
Group	4	2.52901052	0.63225263	2.58	0.0550
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.88517009	0.88517009	3.62	0.0659
ICP vs other affected	1	0.52955555	0.52955555	2.16	0.1507

<i>Dependent Variable: a62</i>			<i>Inter vertebral space C5/6</i>		
		R-Square 0.275294	Coeff Var 20.84167	Root MSE 0.583032	Mean 2.797436
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	0.91406872	0.91406872	2.69	0.1108
Gender	1	0.09377028	0.09377028	0.28	0.6031
Group	4	3.70978274	0.92744569	2.73	0.0463
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	1.54791185	1.54791185	4.55	0.0406
ICP vs other affected	1	1.71635678	1.71635678	5.05	0.0317

Cervical Spine (cont.)

<i>Dependent Variable: a63</i>			<i>Height C6</i>		
		R-Square 0.265486	Coeff Var 14.23911	Root MSE 0.643069	Mean 4.516216
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	1.97365500	1.97365500	4.77	0.0369
Gender	1	0.11817916	0.11817916	0.29	0.5969
Group	4	1.26524440	0.31631110	0.76	0.5565
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.63024522	0.63024522	1.52	0.2266
ICP vs other affected	1	0.19104300	0.19104300	0.46	0.5019

<i>Dependent Variable: a64</i>			<i>Intervertebral space C6/7</i>		
		R-Square 0.211184	Coeff Var 15.74278	Root MSE 0.472746	Mean 3.002941
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	1.20952005	1.20952005	5.41	0.0277
Gender	1	0.00060296	0.00060296	0.00	0.9590
Group	4	0.69682421	0.17420605	0.78	0.5483
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.06287708	0.06287708	0.28	0.6002
ICP vs other affected	1	0.49965189	0.49965189	2.24	0.1465

<i>Dependent Variable: a65</i>			<i>Height C7</i>		
		R-Square 0.699568	Coeff Var 10.51455	Root MSE 0.497864	Mean 4.735000
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	3.00585262	3.00585262	12.13	0.0040
Gender	1	0.00819914	0.00819914	0.03	0.8585
Group	4	2.57346008	0.64336502	2.60	0.0856
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	2.21363480	2.21363480	8.93	0.0105
ICP vs other affected	1	0.05537636	0.05537636	0.22	0.6443

<i>Dependent Variable: a66</i>			<i>Length C2 – C6 inferior</i>		
		R-Square 0.492782	Coeff Var 7.591974	Root MSE 2.949174	Mean 38.84595
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	226.4934864	226.4934864	26.04	<.0001
Gender	1	3.0879271	3.0879271	0.36	0.5557
Group	4	32.5995265	8.1498816	0.94	0.4560
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	17.55327900	17.55327900	2.02	0.1657
ICP vs other affected	1	0.58968280	0.58968280	0.07	0.7963

Cervical Spine (cont.)

<i>Dependent Variable: a67</i>			<i>Length C2 – C7 superior</i>		
		R-Square 0.544730	Coeff Var 7.594777	Root MSE 3.135526	Mean 41.28529
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	286.4680354	286.4680354	29.14	<.0001
Gender	1	0.5684739	0.5684739	0.06	0.8118
Group	4	46.0515034	11.5128759	1.17	0.3456
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	28.38953322	28.38953322	2.89	0.1008
ICP vs other affected	1	0.22585987	0.22585987	0.02	0.8807

<i>Dependent Variable: a68</i>			<i>Length C2 – C7 inferior</i>		
		R-Square 0.739121	Coeff Var 6.386226	Root MSE 2.810897	Mean 44.01500
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	151.3701987	151.3701987	19.16	0.0007
Gender	1	9.2535009	9.2535009	1.17	0.2988
Group	4	58.9498088	14.7374522	1.87	0.1767
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	10.70769254	10.70769254	1.36	0.2653
ICP vs other affected	1	15.23511108	15.23511108	1.93	0.1883

<i>Dependent Variable: a69</i>			<i>Cranio-cervical angle</i>		
		R-Square 0.304969	Coeff Var 5.299909	Root MSE 6.091583	Mean 114.9375
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	78.9351276	78.9351276	2.13	0.1542
Gender	1	67.2373455	67.2373455	1.81	0.1874
Group	4	361.4954389	90.3738597	2.44	0.0667
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	312.5539332	312.5539332	8.42	0.0066
ICP vs other affected	1	1.3160982	1.3160982	0.04	0.8518

NASOPHARYNX

<i>Dependent Variable: a18</i>			<i>Inter hamular notch</i>		
		R-Square 0.727487	Coeff Var 8.466708	Root MSE 2.539186	Mean 29.99024
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	297.6852565	297.6852565	46.17	<.0001
Gender	1	22.4622521	22.4622521	3.48	0.0706
Group	4	409.8688200	102.4672050	15.89	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	287.7410192	287.7410192	44.63	<.0001
ICP vs other affected	1	52.8367273	52.8367273	8.19	0.0071

<i>Dependent Variable: a19</i>			<i>Inter hamulus</i>		
		R-Square 0.798929	Coeff Var 7.300608	Root MSE 1.934483	Mean 26.49756
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	217.1287487	217.1287487	58.02	<.0001
Gender	1	30.3737245	30.3737245	8.12	0.0074
Group	4	374.9334801	93.7333700	25.05	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	244.7337181	244.7337181	65.40	<.0001
ICP vs other affected	1	35.1134819	35.1134819	9.38	0.0043

<i>Dependent Variable: a20</i>			<i>Inter lateral pterygoid</i>		
		R-Square 0.688287	Coeff Var 7.041115	Root MSE 2.810607	Mean 39.91707
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	362.7214624	362.7214624	45.92	<.0001
Gender	1	83.0133157	83.0133157	10.51	0.0027
Group	4	286.4128425	71.6032106	9.06	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	183.2376327	183.2376327	23.20	<.0001
ICP vs other affected	1	16.8731074	16.8731074	2.14	0.1531

<i>Dependent Variable: a21</i>			<i>Hamulus - lateral pterygoid plate left</i>		
		R-Square 0.351010	Coeff Var 21.73826	Root MSE 1.640443	Mean 7.546341
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	20.08499204	20.08499204	7.46	0.0099
Gender	1	6.08521058	6.08521058	2.26	0.1419
Group	4	13.51950381	3.37987595	1.26	0.3063
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	12.33543216	12.33543216	4.58	0.0395
ICP vs other affected	1	0.00003823	0.00003823	0.00	0.9970

Nasopharynx (cont.)

<i>Dependent Variable: a22</i>			<i>Hamulus - lateral pterygoid plate right</i>		
		R-Square 0.172527	Coeff Var 20.47398	Root MSE 1.590978	Mean 7.770732
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	8.48751513	8.48751513	3.35	0.0759
Gender	1	4.60243302	4.60243302	1.82	0.1864
Group	4	2.48065248	0.62016312	0.25	0.9107
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	1.33533912	1.33533912	0.53	0.4726
ICP vs other affected	1	0.00388182	0.00388182	0.00	0.9690

<i>Dependent Variable: a23</i>			<i>Inter - maxillary tuberosity</i>		
		R-Square 0.731506	Coeff Var 8.197527	Root MSE 2.529437	Mean 30.85610
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	257.5505323	257.5505323	40.25	<.0001
Gender	1	15.9454780	15.9454780	2.49	0.1237
Group	4	455.0728369	113.7682092	17.78	<.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	285.9907091	285.9907091	44.70	<.0001
ICP vs other affected	1	49.1583478	49.1583478	7.68	0.0090

<i>Dependent Variable: a24</i>			<i>Inter - zygomatic distance</i>		
		R-Square 0.601298	Coeff Var 6.040756	Root MSE 4.044654	Mean 66.95610
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	562.7181830	562.7181830	34.40	<.0001
Gender	1	140.9861552	140.9861552	8.62	0.0059
Group	4	337.0280037	84.2570009	5.15	0.0024
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	257.5478672	257.5478672	15.74	0.0004
ICP vs other affected	1	29.2788106	29.2788106	1.79	0.1898

<i>Dependent Variable: a25</i>			<i>Vomer - hamulus left</i>		
		R-Square 0.662973	Coeff Var 7.746511	Root MSE 1.530597	Mean 19.75854
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	141.6782657	141.6782657	60.48	<.0001
Gender	1	1.2692456	1.2692456	0.54	0.4667
Group	4	45.2042026	11.3010506	4.82	0.0034
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	21.74913136	21.74913136	9.28	0.0044
ICP vs other affected	1	22.83689179	22.83689179	9.75	0.0037

Nasopharynx (cont.)

<i>Dependent Variable: a26</i>			<i>Vomer - hamulus right</i>		
		R-Square 0.691141	Coeff Var 8.089302	Root MSE 1.544465	Mean 19.09268
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	156.8213109	156.8213109	65.74	<.0001
Gender	1	10.5826295	10.5826295	4.44	0.0426
Group	4	49.6060340	12.4015085	5.20	0.0022
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	24.59623275	24.59623275	10.31	0.0029
ICP vs other affected	1	22.47033404	22.47033404	9.42	0.0042

<i>Dependent Variable: a27</i>			<i>Vomer - basion</i>		
		R-Square 0.449941	Coeff Var 8.738881	Root MSE 2.102873	Mean 24.06341
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	58.15671164	58.15671164	13.15	0.0009
Gender	1	7.54709523	7.54709523	1.71	0.2002
Group	4	57.17130802	14.29282700	3.23	0.0237
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	11.32896382	11.32896382	2.56	0.1187
ICP vs other affected	1	36.57332888	36.57332888	8.27	0.0069

<i>Dependent Variable: a28</i>			<i>Basion - hamulus left</i>		
		R-Square 0.493794	Coeff Var 7.629369	Root MSE 2.122267	Mean 27.81707
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	129.0846161	129.0846161	28.66	<.0001
Gender	1	19.3203052	19.3203052	4.29	0.0460
Group	4	20.0996036	5.0249009	1.12	0.3653
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	9.30299105	9.30299105	2.07	0.1598
ICP vs other affected	1	4.61346271	4.61346271	1.02	0.3186

<i>Dependent Variable: a29</i>			<i>Basion - hamulus right</i>		
		R-Square 0.517969	Coeff Var 7.351060	Root MSE 2.033913	Mean 27.66829
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	117.1757157	117.1757157	28.33	<.0001
Gender	1	34.8758881	34.8758881	8.43	0.0064
Group	4	21.1141276	5.2785319	1.28	0.2986
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	13.55151625	13.55151625	3.28	0.0792
ICP vs other affected	1	3.63487776	3.63487776	0.88	0.3552

Nasopharynx (cont.)

<i>Dependent Variable: a30</i>			<i>Hamulus angle left</i>		
		R-Square 0.157685	Coeff Var 15.35494	Root MSE 6.036363	Mean 39.31220
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	0.6943220	0.6943220	0.02	0.8910
Gender	1	7.1536882	7.1536882	0.20	0.6605
Group	4	213.5131273	53.3782818	1.46	0.2344
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	17.4401344	17.4401344	0.48	0.4937
ICP vs other affected	1	142.4206264	142.4206264	3.91	0.0562

<i>Dependent Variable: a31</i>			<i>Hamulus angle right</i>		
		R-Square 0.249543	Coeff Var 14.42175	Root MSE 5.811966	Mean 40.30000
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	57.5229967	57.5229967	1.70	0.2007
Gender	1	8.1445957	8.1445957	0.24	0.6266
Group	4	325.3157926	81.3289482	2.41	0.0685
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.5486272	0.5486272	0.02	0.8993
ICP vs other affected	1	183.6397519	183.6397519	5.44	0.0258

<i>Dependent Variable: a32</i>			<i>Sphenopalatine angle</i>		
		R-Square 0.155100	Coeff Var 12.08886	Root MSE 3.795599	Mean 31.39750
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	3.33776404	3.33776404	0.23	0.6335
Gender	1	4.60194660	4.60194660	0.32	0.5758
Group	4	68.53614916	17.13403729	1.19	0.3337
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	44.23657155	44.23657155	3.07	0.0890
ICP vs other affected	1	10.08890496	10.08890496	0.70	0.4087

<i>Dependent Variable: a33</i>			<i>Vomerine angle</i>		
		R-Square 0.177516	Coeff Var 20.00991	Root MSE 3.912438	Mean 19.55250
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	0.02693319	0.02693319	0.00	0.9668
Gender	1	2.97418743	2.97418743	0.19	0.6622
Group	4	98.63775933	24.65943983	1.61	0.1948
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	54.72350135	54.72350135	3.58	0.0675
ICP vs other affected	1	30.67076419	30.67076419	2.00	0.1663

CRANIAL BASE

<i>Dependent Variable: a37</i>			<i>Left sphenoid height</i>		
		R-Square 0.657832	Coeff Var 12.76911	Root MSE 0.889909	Mean 6.969231
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	24.01376443	24.01376443	30.32	<.0001
Gender	1	0.75309033	0.75309033	0.95	0.3368
Group	4	21.26554590	5.31638648	6.71	0.0005
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	16.98795070	16.98795070	21.45	<.0001
ICP vs other affected	1	3.64433592	3.64433592	4.60	0.0396

<i>Dependent Variable: a38</i>			<i>Right sphenoid height</i>		
		R-Square 0.732650	Coeff Var 12.03669	Root MSE 0.816026	Mean 6.779487
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	31.43741036	31.43741036	47.21	<.0001
Gender	1	4.85955040	4.85955040	7.30	0.0109
Group	4	21.50443344	5.37610836	8.07	0.0001
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	14.18773727	14.18773727	21.31	<.0001
ICP vs other affected	1	6.06014890	6.06014890	9.10	0.0050

<i>Dependent Variable: a39</i>			<i>Left basioccipital height</i>		
		R-Square 0.628235	Coeff Var 11.34607	Root MSE 0.829427	Mean 7.310256
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	26.09645770	26.09645770	37.93	<.0001
Gender	1	0.01109191	0.01109191	0.02	0.8998
Group	4	7.29821842	1.82455461	2.65	0.0510
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	5.29709884	5.29709884	7.70	0.0091
ICP vs other affected	1	0.76504008	0.76504008	1.11	0.2995

<i>Dependent Variable: a40</i>			<i>Right basioccipital height</i>		
		R-Square 0.658633	Coeff Var 10.52547	Root MSE 0.760802	Mean 7.228205
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	25.08510811	25.08510811	43.34	<.0001
Gender	1	0.05223584	0.05223584	0.09	0.7658
Group	4	5.89875528	1.47468882	2.55	0.0583
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	4.55111663	4.55111663	7.86	0.0085
ICP vs other affected	1	0.34790160	0.34790160	0.60	0.4439

Cranial Base (cont.)

<i>Dependent Variable: a41</i>			<i>Basion - nasion</i>		
		R-Square 0.533548	Coeff Var 6.861585	Root MSE 4.300155	Mean 62.67000
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	545.3806413	545.3806413	29.49	<.0001
Gender	1	29.4684465	29.4684465	1.59	0.2157
Group	4	59.9896959	14.9974240	0.81	0.5272
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	47.07368085	47.07368085	2.55	0.1201
ICP vs other affected	1	10.43965481	10.43965481	0.56	0.4578

<i>Dependent Variable: a42</i>			<i>Basion - sella</i>		
		R-Square 0.492160	Coeff Var 7.497073	Root MSE 1.939305	Mean 25.86750
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	95.57938243	95.57938243	25.41	<.0001
Gender	1	0.93218429	0.93218429	0.25	0.6219
Group	4	8.33087703	2.08271926	0.55	0.6976
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.58916340	0.58916340	0.16	0.6948
ICP vs other affected	1	0.12878233	0.12878233	0.03	0.8543

<i>Dependent Variable: a43</i>			<i>Sella - nasion</i>		
		R-Square 0.580378	Coeff Var 7.088345	Root MSE 3.007762	Mean 42.43250
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	299.3978765	299.3978765	33.09	<.0001
Gender	1	13.4459771	13.4459771	1.49	0.2314
Group	4	56.9487309	14.2371827	1.57	0.2044
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	42.90624144	42.90624144	4.74	0.0367
ICP vs other affected	1	7.02434165	7.02434165	0.78	0.3846

<i>Dependent Variable: a44</i>			<i>Sella - superior sphenoid left</i>		
		R-Square 0.481352	Coeff Var 10.89550	Root MSE 1.050717	Mean 9.643590
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	28.93638190	28.93638190	26.21	<.0001
Gender	1	0.14584361	0.14584361	0.13	0.7187
Group	4	5.26513593	1.31628398	1.19	0.3331
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	2.73838906	2.73838906	2.48	0.1251
ICP vs other affected	1	0.58148271	0.58148271	0.53	0.4733

Cranial Base (cont.)

<i>Dependent Variable: a45</i>			<i>Sella – superior sphenoid right</i>		
		R-Square 0.439265	Coeff Var 11.33703	Root MSE 1.107831	Mean 9.771795
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	25.66634216	25.66634216	20.91	<.0001
Gender	1	2.97462325	2.97462325	2.42	0.1293
Group	4	6.01188201	1.50297050	1.22	0.3199
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	3.01688877	3.01688877	2.46	0.1268
ICP vs other affected	1	0.61592230	0.61592230	0.50	0.4838

<i>Dependent Variable: a46</i>			<i>Basion – superior basioccipital left</i>		
		R-Square 0.428841	Coeff Var 8.607647	Root MSE 1.330213	Mean 15.45385
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	31.01040691	31.01040691	17.53	0.0002
Gender	1	1.35108642	1.35108642	0.76	0.3887
Group	4	2.26791819	0.56697955	0.32	0.8622
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.04522293	0.04522293	0.03	0.8740
ICP vs other affected	1	0.26665670	0.26665670	0.15	0.7004

<i>Dependent Variable: a47</i>			<i>Basion – superior basioccipital right</i>		
		R-Square 0.408409	Coeff Var 9.295283	Root MSE 1.434334	Mean 15.43077
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	28.36317954	28.36317954	13.79	0.0008
Gender	1	0.47408284	0.47408284	0.23	0.6345
Group	4	5.98655786	1.49663947	0.73	0.5798
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.96669872	0.96669872	0.47	0.4980
ICP vs other affected	1	1.43366388	1.43366388	0.70	0.4100

<i>Dependent Variable: a48</i>			<i>Basion – inferior basioccipital left</i>		
		R-Square 0.244948	Coeff Var 9.274699	Root MSE 1.280384	Mean 13.80513
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	10.89532027	10.89532027	6.65	0.0147
Gender	1	0.22373446	0.22373446	0.14	0.7142
Group	4	5.12822149	1.28205537	0.78	0.5452
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	3.05250231	3.05250231	1.86	0.1819
ICP vs other affected	1	1.02540555	1.02540555	0.63	0.4348

Cranial Base (cont.)

<i>Dependent Variable: a49</i>			<i>Basion – inferior basioccipital right</i>		
		R-Square 0.251108	Coeff Var 9.459536	Root MSE 1.302748	Mean 13.77179
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	11.81804013	11.81804013	6.96	0.0127
Gender	1	0.19884533	0.19884533	0.12	0.7344
Group	4	2.76925876	0.69231469	0.41	0.8015
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.05249448	0.05249448	0.03	0.8615
ICP vs other affected	1	0.88491163	0.88491163	0.52	0.4755

<i>Dependent Variable: a50</i>			<i>Cranial base angle</i>		
		R-Square 0.116335	Coeff Var 4.942654	Root MSE 6.529741	Mean 132.1100
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	55.42918402	55.42918402	1.30	0.2624
Gender	1	42.28769360	42.28769360	0.99	0.3266
Group	4	29.96857752	7.49214438	0.18	0.9493
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	5.47537155	5.47537155	0.13	0.7224
ICP vs other affected	1	17.96751382	17.96751382	0.42	0.5207

SPHENO-OCCIPITAL SYNCHONDROSIS

<i>Dependent Variable: ave51</i>			<i>Inferior SOS</i>		
		R-Square 0.198595	Coeff Var 31.16078	Root MSE 0.455337	Mean 1.461250
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	0.08932349	0.08932349	0.43	0.5161
Gender	1	0.61463838	0.61463838	2.96	0.0945
Group	4	1.34738160	0.33684540	1.62	0.1913
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.92108635	0.92108635	4.44	0.0427
ICP vs other affected	1	0.00056443	0.00056443	0.00	0.9587

<i>Dependent Variable: a53</i>			<i>Superior SOS</i>		
		R-Square 0.333207	Coeff Var 35.51291	Root MSE 0.461683	Mean 1.420000
Source	DF	Type III SS	Mean Square	F Value	Pr > F
Age	1	0.38567171	0.38567171	1.81	0.1878
Gender	1	1.63575947	1.63575947	7.67	0.0091
Group	4	1.41828026	0.35457006	1.66	0.1820
Contrast	DF	Contrast SS	Mean Square	F Value	Pr > F
Controls vs others	1	0.65533996	0.65533996	3.07	0.0888
ICP vs other affected	1	0.09416675	0.09416675	0.44	0.5109

APPENDIX V

ACADEMIC ACTIVITIES

CONFERENCE PRESENTATIONS (PUBLISHED ABSTRACTS)

1. Rajion ZA, Abdullah HK, Samsudin A, Shuaib I, Abbott AH, Netherway DJ, Townsend G. CT analysis of infants with cleft lip and palate. *Malaysia J Med Sci. Proceedings of the 7th National Conference on Medical Sciences*, Kota Bharu, Malaysia. 2002.
2. Rajion ZA, Abdullah HK, Samsudin A, Shuaib I, Abbott AH, Netherway DJ, Townsend G. Comparison of the position of the hyoid bone and hard palate in infants with cleft lip and palate and infants without cleft lip and palate. *Malaysia J Med Sci. Proceedings of the 7th National Conference on Medical Sciences*, Kota Bharu, Malaysia. 2002.
3. Rajion ZA, Netherway DJ, Townsend GC, Abbott AH, David DJ. Hyoid bone position in infants with cleft lip and palate. *J Den Res. Proceedings of the International Association of Dental Research (ANZ Division) 42nd Annual Meeting: Science Meets the Clinic*, Sydney, Australia. 2003
4. Rajion ZA, Abdullah HK, Samsudin A, Shuaib I, Abbott AH, Netherway DJ, Townsend G. CT analysis of infants with cleft lip and palate. *Homo: Journal of Comparative Human Biology. Proceedings of the Australasian Society for Human Biology, 16th Annual Scientific Meeting*, Perth, Western Australia. 2003;54:75.
5. Rajion ZA, Netherway D, Townsend G, Shuaib I, Halim A, Samsudin R, McLean N, David DJ. 3D CT Analysis of the cervical spine in cleft lip and palate. *J Den Res. Proceedings of the International Association of Dental Research (ANZ Division) 42nd Annual Meeting: Science Meets the Clinic*, Melbourne, Australia. 2003; Vol 82, Special Issue C, 15, p93.

CONFERENCE PRESENTATIONS (ORAL)

1. Rajion ZA, Netherway DJ, Townsend GC, Shuaib I, Halim A, Samsudin R, David DJ. A 3D CT analysis of the hyoid bone in children with cleft lip and palate. *Australasian Society for Medical Research (SA Division) Annual Scientific Meeting*. Adelaide, May, 2003.
2. Rajion ZA, Netherway DJ, Townsend GC, Shuaib I, Halim A, Samsudin R, David DJ. A 3D CT analysis of the nasopharynx in patients with cleft lip and palate. *Australasian Cleft Lip and Palate Association*, Sydney, August, 2003.
3. Rajion ZA, Netherway DJ, Townsend GC, Shuaib I, Halim A, Samsudin R, McLean N, David DJ. 3D CT analysis of the cervical spine in children with cleft lip and palate. *Colgate Australian Clinical Research Centre Research Day*, Adelaide, August, 2003.
4. Rajion ZA, Netherway DJ, Townsend GC, Shuaib I, Halim A, Samsudin R, David DJ. A 3D CT analysis of the nasopharynx in children with cleft lip and palate. *14th Biennial Congress - Asian Surgical Association*, Kota Kinabalu, Sabah, Malaysia, December, 2003

CONFERENCE PRESENTATIONS (POSTER)

1. Rajion ZA, Netherway DJ, Townsend GC, Shuaib I, Halim A, Samsudin R, David DJ. A 3D CT analysis of the nasopharynx in children with cleft lip and palate. *Australian Society for Medical Research Annual Scientific Meeting*, Adelaide, May, 2004.
2. Rajion ZA, Netherway DJ, Townsend GC, Shuaib I, Halim A, Samsudin R, David DJ. 3D CT analysis of the cervical spine in children with cleft lip and palate. *Australian Society for Medical Research Annual Scientific Meeting*, Adelaide, May, 2004.
3. Rajion ZA, Netherway DJ, Townsend GC, Shuaib I, Halim A, Samsudin R, David DJ. A 3D CT analysis of the hyoid bone in children with cleft lip and palate. *14th Biennial Congress - Asian Surgical Association*, Kota Kinabalu, Sabah, Malaysia, December, 2003

ADDITIONAL PRESENTATIONS

1. Rajion ZA (Invited speaker). Application of 3D CT Imaging in the study of craniofacial dysmorphology. *The Universiti Sains Malaysia Craniofacial Surgery Course-Team Building*, Kota Bharu, Malaysia, July, 2002.
2. Rajion ZA. Overview of CT morphology of cleft lip and palate. *Australian Craniofacial Symposium. Australian Craniofacial Unit, Women's and Children's Hospital*, Adelaide, May, 2003.
3. Rajion ZA. Progress in understanding craniofacial malformation. *Australian Dental Association, Limestone Coast Seminar*, Mount Gambier, October, 2003.
4. Rajion ZA. 3D CT analysis of anatomical structures in patients with cleft lip and palate. *Research Seminar, Flinders Institute for Health and Medical Research, Human Communication Research Group*, Flinders Medical Centre, Adelaide, March, 2004.

PAPERS IN PREPARATION FOR PUBLICATION

1. Rajion ZA, Netherway DJ, Townsend GC, Shuaib IL, Halim AS, Samsudin AR, McLean NR, David DJ (2004). A 3D computed tomographic analysis of the hyoid bone in patients with cleft lip and palate. *Cleft Palate-Craniofacial J.* (In preparation)
2. Rajion ZA, Netherway DJ, Townsend GC, Shuaib IL, Anderson PJ, Halim AS, Samsudin AR, David DJ (2004). A 3D computed tomographic analysis of the cervical spine in patients with cleft lip and palate. *Cleft Palate-Craniofacial J.* (In preparation)
3. Rajion ZA, Netherway DJ, Townsend GC, Shuaib IL, Halim AS, Samsudin AR, McLean NR, David DJ (2004). A 3D computed tomographic analysis of the nasopharynx in patients with cleft lip and palate. *Cleft Palate-Craniofacial J.* (In preparation)
4. Rajion ZA, Netherway DJ, Townsend GC, Shuaib IL, Halim AS, Samsudin AR, McLean NR, David DJ (2004). A 3D computed tomographic analysis of the

cranial base in patients with cleft lip and palate. *Cleft Palate-Craniofacial J.* (In preparation)

5. Rajion ZA, Netherway DJ, Townsend GC, Shuaib IL, Halim AS, Samsudin AR, McLean NR, David DJ (2004). A 3D computed tomographic analysis of the spheno-occipital synchondrosis in patients with cleft lip and palate. *Cleft Palate-Craniofacial J.* (In preparation)

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