Table 8.22: Definitions for cranial measurements used in CRANID and FORDISC 3.0

Code	Points	Measurement	CRANID Description of measurement	FORDISC 3.0 Description of Measurement
ASB	as-as	Biasterionic breadth	Direct measurement from one asterion to the other	
ALID		Discorded by Alexandel	Least exterior breadth across the	Last exterior breadth across the roots of the zygomatic processes, wherever found. With the skull resting on the occiput and with the base towards the observer, measure to the outside
AUB	au-au	Biauricular breadth	roots of the zygomatic processes, wherever found	of the roots of the zygomatic processes at their deepest
				incurvature, generally slightly anterior to the external auditory meatus, with the sharp points of the calliper
ВВН	ba-b	Basion-bregma height	Distance from basion to bregma, as defined	Direct distance from the lowest point on the anterior margin of the foramen magnum to bregma
BNL	ba-n	Basion-nasion length, cranial base length	Direct length between basion and nasion	Direct distance from nasion to basion
BPL	ba-pr	Basion-prosthion length	Facial length from basion to prosthion, as defined	
CDB	cdl-cdl	Bicondylar breadth		Direct distance between the most lateral points on the two condyles
DKB	d-d	Interorbital breadth	Breadth across the nasal space	Direct distance between right

			from dacryon to dacryon	and left dacryon
EKB	22.22	Biorbital breadth	Breadth across the orbits from	Direct distance between right
END	ec-ec	Biorottai oreadii	ectoconchion to ectoconchion	and left ectoconchion
			Breadth across the frontal bone	
			between frontomalar anterior on	
			each side (i.e., the most anterior	
			point on the frontomalar suture).	
EMD	fm:a-	D:C4-1 h 44h	Buikstra and Ubelaker (1994)	
FMB	fm:a	Bifrontal breadth	measured between the most	
			laterally positioned points on the	
			frontomalar suture; this distance	
			is perhaps 6 mm longer than	
			Howells' FMB	
				Direct distance between the
		Foramen magnum		lateral margins of foramen
FOB		breadth		magnum at the points of greatest
				lateral curvature
				Direct distance from basion to
FOL	ha a	Foramen magnum		opisthion. Calliper tips should
FOL	ba-o	length		rest precisely on opposing edges
				of the foramen magnum border
			Frontal chord, or direct distance	District Historica Communication to
EDC	l-	Frontal chord, nasion-	from nasion to bregma, is taken	Direct distance from nasion to
FRC	n-b	bregma chord	in the midplane and at the	bregma taken in the midsagittal
			external surface	plane
		Nacion busses	Maximum subtense, at the	
EDC		Nasion-bregma	highest point on the convexity	
FRS		subtense, frontal	of the frontal bone in the	
		subtense	midplane, to the basion-bregma	

			chord	
				Direct distance from
GNI	id-gn	Chin height		
				infradentale to gnathion
				Direct distance between right
				and left gonion. Place the blunt
GOG	go-go	Bigonial width		points of the calliper to the most
				prominent external points at the
				mandibular angles
				Distance between glabella and
				opisthocranion in the midsagittal
				plane, measured in a straight
		Glabello-occipital	Greatest length, from the	line. Place the skull on its side,
GOL	g-op	length, maximum	glabellar region, in the median	holding one end of the calliper
		cranial length	sagittal plane	at the glabella and extending the
				calliper until the maximum
				diameter at posterior aspect of
				the skull is obtained
				Direct distance from the
		II. 14 C 11 1		alveolar process to the inferior
HMF		Height of mandibular		border of the mandible
		body		perpendicular to the base at the
				level of the mental foramen
			External breadth across the	
			malars at the jugalia (i.e., at the	
JUB	ju-ju	Bijugal breadth	deepest points in the curvature	
			between the frontal and	
			temporal process of the malars)	
	ecm-	Maxillo-alveolar	Greatest breadth across the	Maximum breadth across the
MAB	ecm	breadth, palate breadth	alveolar borders, wherever	alveolar borders of the maxilla

		(external)	found, perpendicular to the	measured on the lateral surfaces
			median plane	at the location of the second
				maxillary molars
				Direct distance from prostheon
				to alveon. Position skull with
				basilar portion facing up; apply
		M:1111		a thin wooden rod to the
MAL	pr-alv	Maxillo-alveolar		posterior borders of the alveolar
		length		arch and measure the distance
				from prosthion to the middle of
				the rod (on the midsagittal
				plane)
				Angle formed by the inferior
MAN		Mandibular angle		border of the corpus and the
				posterior border of the ramus
				Vertical projection of the
				mastoid process below and
				perpendicular to the eye-ear
				(Frankfort) plane. Rest skull on
				its right side and apply the
				calibrated bar of the calliper just
MDH		Mastoid height		behind the mastoid process, with
1,12,11		The state of the s		the fixed flat arm tangent to the
				upper border of the external
				auditory meatus and pointing to
				the lower border of the orbit.
				Slide the measuring arm until it
				is level with the tip of the
				mastoid process
		Mandibular length		Distance of the anterior margin

				of the chin from a centre point
				on the projected straight line
				placed along the posterior
				border of the two mandibular
				angles. Apply movable board of
				the mandibulometer to the
				posterior borders of the
				mandibular rami and the fixed
				board against the most anterior
				point of the chin; stabilise the
				mandible by applying gentle
				pressure to the left second molar
			Distance between the anterior	
NLB	al-al	Nasal breadth	edges of the nasal aperture at its	Maximum breadth of the nasal
			widest extent	aperture
				Direct distance from nasion to
			Average height from nasion to	the midpoint of a line
NLH	n-ns	Nasal height	the lowest point on the border of	connecting the lowest points of
			the nasal aperture on either side	the inferior margin of the nasal
				notches
			Greatest cranial length in the	
NOL	n-op	Nasio-occipital length	median sagittal plane, measured	Refer to UFHT
			from nasion	
		Nasion–prosthion	Upper facial height from nasion	
NPH	n-pr	height	to prosthion, as defined	
			Breadth from ectoconchion to	Laterally sloping distance from
			dacryon, as defined,	dacryon to ectoconchion. <i>Note:</i>
ODD	d aa	Orbit broadth 108	•	Measure the left side unless
OBB	d-ec	Orbit breadth, left	approximating the longitudinal	
			axis that bisects the orbit into	damaged, pathological, or
			equal upper and lower parts	absent

OBH Orbit height, left lower borders of the left orbit, superior and inferior of margins, avoiding any the orbit and bisecting it notches  External occipital chord, or direct distance from lambda to opisthion, taken in the midplane and at the external surface or midsagittal plane	
perpendicular to the long axis of the orbit and bisecting it notches  External occipital chord, or Direct distance from I direct distance from lambda to opisthion taken in the midplane  CCC l-o chord, occipital chord opisthion, taken in the midplane	orbital
External occipital chord, or  Lambda–opisthion  OCC 1-o  Chord, occipital chord  Direct distance from I opisthion taken in the midplane  opisthion, taken in the midplane	
Lambda–opisthion OCC l-o chord, occipital chord OCC loo chord, occipital chord opisthion, taken in the midplane Direct distance from l opisthion taken in the midsagittal plane	
CCC l-o chord, occipital chord opisthion, taken in the midplane direct distance from lambda to opisthion taken in the midplane midsagittal plane	ambda to
chord, occipital chord opisthion, taken in the midplane midsagittal plane	
and at the chiefman surface	
Maximum subtense, at the most Lambda–opisthion	
prominent point on the basic OCS subtense, occipital	
contour of the occipital bone in subtense	
the midplane	
External parietal chord, or direct  Direct distance from b	aregma to
Bregma–lambda distance from bregma to  PAC b-l lambda taken in the m	_
chord, parietal chord lambda, taken in the midplane plane	rasagittai
and at the external surface	
Maximum subtense, at the	
Bregma–lambda highest point on the convexity	
PAS subtense, parietal of the parietal bones in the	
subtense midplane, to the bregma-	
lambda chord	
Basion–prosthion  PBL ba-pr  Direct distance from b	asion to
PBL ba-pr length prosthion	
Projection or subtense from	
SSS subspinale to the bimaxillary	
subtense width (ZMB)	
Maximum breadth me	asured in
TMF the region of the ment body	al foramen
perpendicular to the lo	ong axis of

				the mandibular body
				Direct distance between the tw
UFBR	fmt-fmt	Upper facial breadth		external points on the
				frontomalar suture
UFHT	n-pr	Upper facial height	Refer to NOL	Direct distance from nasion to
OTTT	прі	Opper facial neight	Refer to INOL	prosthion
HED.	0.0	Minimum frontal		Direct distance between the tw
WFB	ft-ft	breadth		frontotemporal
			Minimum distance, in any	
			direction, from the lower border	
WMH		Chaole hoight	of the orbit to the lower margin	
WIVITI		Cheek height	of the maxilla, mesial to the	
			masseter attachment, on the left	
			side	
		Minimum ramus		Least breadth of the mandibul
WRB		breadth		ramus measured perpendicula
		orcadiii		to the height of the ramus
				Maximum width of skull
			Maximum cranial breadth	perpendicular to midsagittal
		Maximum cranial	perpendicular to the median	plane wherever it is located,
XCB	eu-eu	breadth	sagittal plane (above the	with the exception of the
			supramastoid crests)	inferior temporal lines and the
				area immediately surrounding
				them
		Maximum frontal	Maximum breadth at the coronal	
XFB		breadth	suture, perpendicular to the	
			medial plane	
XRB		Maximum ramus		Distance between the most
		breadth		anterior point on the mandibul

XRH		Maximum ramus height		ramus and a line connecting the most posterior point on the condyle and the angle of the jaw  Direct distance from the highest point on the mandibular condyle to gonion
ZMB	zm:a- zm:a	Zygomaxillary breadth, bimaxillary breadth	Distance from left to right zygomaxillare. Breadth across the maxillae, from one zygomaxillare to the other	Direct distance between most
ZYB	zy-zy	Bizygomatic diameter		lateral points on the zygomatic arches

Table 8.23: Definitions for cranial measurements used in CRANID and FORDISC 3.0

Code	Points	Measurement	Description of measurement	Programme
ASB	as-as	Biasterionic breadth	Direct measurement from one asterion to the other	CRANID
AUB	au-au	Biauricular breadth	Least exterior breadth across the roots of the zygomatic processes, wherever found	CRANID
AUB	au-au	Biauricular breadth	Last exterior breadth across the roots of the zygomatic processes, wherever found. With the skull resting on the occiput and with the base towards the observer, measure to the outside of the roots of the zygomatic	FORDISC
			processes at their deepest incurvature, generally slightly anterior to the external auditory meatus, with the sharp points of the calliper	
ВВН	ba-b	Basion-bregma height	Distance from basion to bregma, as defined	CRANID
ВВН	ba-b	Basion-bregma height	Direct distance from the lowest point on the anterior margin of the foramen magnum to bregma	FORDISC
BNL	eu-eu	Basion-nasion length	Direct length between basion and nasion	CRANID
BNL	ba-n	Cranial base length	Direct distance from nasion to basion	FORDISC
BPL	ba-pr	Basion-prosthion length	Facial length from basion to prosthion, as defined	CRANID
CDB	cdl-cdl	Bicondylar breadth	Direct distance between the most lateral points on the two condyles	FORDISC
DKB	d-d	Interorbital breadth	Breadth across the nasal space from dacryon to dacryon	CRANID

DKB	d-d	Interorbital breadth	Direct distance between right and left dacryon	FORDISC
EKB	ec-ec	Biorbital breadth	Breadth across the orbits from ectoconchion to ectoconchion	CRANID
EKB	ec-ec	Biorbital breadth	Direct distance between right and left ectoconchion	FORDISC
FMB	fm:a- fm:a	Bifrontal breadth	Breadth across the frontal bone between frontomalar anterior on each side (i.e., the most anterior point on the frontomalar suture). Buikstra and Ubelaker (1994) measured between the most laterally positioned points on the frontomalar suture; this distance is perhaps 6 mm longer than Howells' FMB	CRANID
FOB		Foramen magnum breadth	Direct distance between the lateral margins of foramen magnum at the points of greatest lateral curvature	FORDISC
FOL	ba-o	Foramen magnum length	Direct distance from basion to opisthion.  Calliper tips should rest precisely on opposing edges of the foramen magnum border	FORDISC
FRC	n-b	Frontal chord	Direct distance from nasion to bregma taken in the midsagittal plane	FORDISC
FRC	n-b	Nasion-bregma chord, frontal chord	Frontal chord, or direct distance from nasion to bregma, is taken in the midplane and at the external surface	CRANID
FRS		Nasion-bregma subtense, frontal subtense	Maximum subtense, at the highest point on the convexity of the frontal bone in the midplane, to the basion–bregma chord	CRANID

GNI	id-gn	Chin height	Direct distance from infradentale to gnathion.	FORDISC
			Direct distance between right and left	
GOG	go-go	Bigonial width	gonion. Place the blunt points of the calliper to the most prominent external points at the	FORDISC
			mandibular angles.	
GOL	g-op	Glabello-occipital length	Greatest length, from the glabellar region, in the median sagittal plane	CRANID
			Distance between glabella and opisthocranion in the midsagittal plane, measured in a straight line. Place the skull on	
GOL	g-op	Maximum cranial length	its side, holding one end of the calliper at the	FORDISC
			glabella and extending the calliper until the maximum diameter at posterior aspect of the skull is obtained	
			Direct distance from the alveolar process to	
HMF		Height of mandibular body	the inferior border of the mandible perpendicular to the base at the level of the	FORDISC
			mental foramen	
			External breadth across the malars at the jugalia (i.e., at the deepest points in the	
JUB	ju-ju	Bijugal breadth	curvature between the frontal and temporal	CRANID
			process of the malars)	
	ecm-	Maxillo-alveolar	Maximum breadth across the alveolar borders of the maxilla measured on the	
MAB	ecm	breadth	lateral surfaces at the location of the second	FORDISC
			maxillary molars	
MAB	ecm-	Palate breadth, external	Greatest breadth across the alveolar borders, wherever found, perpendicular to the median	CRANID

			plane	
			Direct distance from prostheon to alveon.	
			Position skull with basilar portion facing up;	
MAL	pr-alv	Maxillo-alveolar length	apply a thin wooden rod to the posterior borders of the alveolar arch and measure the	FORDISC
			distance from prosthion to the middle of the rod (on the midsagittal plane)	
MAN		Mandibular angle	Angle formed by the inferior border of the corpus and the posterior border of the ramus	FORDISC
			Vertical projection of the mastoid process below and perpendicular to the eye-ear (Frankfort) plane. Rest skull on its right side and apply the calibrated bar of the calliper	
MDH		Mastoid height	just behind the mastoid process, with the fixed flat arm tangent to the upper border of	FORDISC
			the external auditory meatus and pointing to the lower border of the orbit. Slide the measuring arm until it is level with the tip of the mastoid process	
			Distance of the anterior margin of the chin from a centre point on the projected straight line placed along the posterior border of the two mandibular angles. Apply movable	
MLN		Mandibular length	board of the mandibulometer to the posterior borders of the mandibular rami and the fixed	FORDISC
			board against the most anterior point of the chin; stabilise the mandible by applying gentle pressure to the left second molar	
		Nasiofrontal subtense	Subtense from nasion to the bifrontal breadth	CRANID

NLB	al-al	Nasal breadth	Distance between the anterior edges of the nasal aperture at its widest extent	CRANID
NLB	al-al	Nasal breadth	Maximum breadth of the nasal aperture	FORDISC
NLH	n-ns	Nasal height	Average height from nasion to the lowest point on the border of the nasal aperture on either side	CRANID
NLH	n-ns	Nasal height	Direct distance from nasion to the midpoint of a line connecting the lowest points of the inferior margin of the nasal notches	FORDISC
NOL		Nasio-occipital length	Greatest cranial length in the median sagittal plane, measured from nasion	CRANID
NPH	n-pr	Nasion-prosthion height	Upper facial height from nasion to prosthion, as defined	CRANID
OBB	d-ec	Orbit breadth, left	Breadth from ectoconchion to dacryon, as defined, approximating the longitudinal axis which bisects the orbit into equal upper and lower parts	CRANID
OBB	d-ec	Orbital breadth	Laterally sloping distance from dacryon to ectoconchion. <i>Note</i> : Measure the left side unless damaged, pathological or absent	FORDISC
ОВН		Orbit height, left	Height between the upper and lower borders of the left orbit, perpendicular to the long axis of the orbit and bisecting it	CRANID
ОВН		Orbital height	Direct distance between the superior and inferior orbital margins, avoiding any orbital notches	FORDISC
OCC		Lambda-opisthion chord, occipital chord	External occipital chord, or direct distance from lambda to opisthion, taken in the	CRANID

			midplane and at the external surface	
OCC	l-o	Occipital chord	Direct distance from lambda to opisthion taken in the midsagittal plane	FORDISC
OCS		Lambda–opisthion subtense, occipital subtense	Maximum subtense, at the most prominent point on the basic contour of the occipital bone in the midplane	CRANID
PAC		Bregma-lambda chord, parietal chord	External parietal chord, or direct distance from bregma to lambda, taken in the midplane and at the external surface	CRANID
PAC	b-l	Parietal chord	Direct distance from bregma to lambda taken in the midsagittal plane	FORDISC
PAS		Bregma–lambda subtense, parietal subtense	Maximum subtense, at the highest point on the convexity of the parietal bones in the midplane, to the bregma–lambda chord	CRANID
PBL	ba-pr	Basion-prosthion length	Direct distance from basion to prosthion	FORDISC
TMF		Breadth of mandibular body	Maximum breadth measured in the region of the mental foramen perpendicular to the long axis of the mandibular body	FORDISC
UFBR	fmt-fmt	Upper facial breadth	Direct distance between the two external points on the frontomalar suture	FORDISC
UFHT	n-pr	Upper facial height	Direct distance from nasion to prosthion	FORDISC
WFB	ft-ft	Minimum frontal breadth	Direct distance between the two frontotemporale	FORDISC
WMH		Cheek height	Minimum distance, in any direction, from the lower border of the orbit to the lower margin of the maxilla, mesial to the masseter attachment, on the left side	CRANID
WRB		Minimum ramus breadth	Least breadth of the mandibular ramus	FORDISC

			measured perpendicular to the height of the ramus	
XCB	eu-eu	Maximum cranial breadth	Maximum cranial breadth perpendicular to the median sagittal plane (above the supramastoid crests)	CRANID
XCB	eu-eu	Maximum cranial breadth	Maximum width of skull perpendicular to midsagittal plane wherever it is located, with the exception of the inferior temporal lines	FORDISC
XFB		Maximum frontal breadth	and the area immediately surrounding them  Maximum breadth at the coronal suture,  perpendicular to the medial plane	CRANID
XRB		Maximum ramus breadth	Distance between the most anterior point on the mandibular ramus and a line connecting the most posterior point on the condyle and	FORDISC
XRH		Maximum ramus height	the angle of the jaw  Direct distance from the highest point on the mandibular condyle to gonion	FORDISC
ZMB	zm:a- zm:a	Bimaxillary breadth	Breadth across the maxillae, from one zygomaxillare to the other	CRANID
ZYB	zy-zy	Bizygomatic diameter	Direct distance between most lateral points on the zygomatic arches	FORDISC
XMB		Zygomaxillary breadth	Distance from left to right zygomaxillare	CRANID
SSS		Zygomaxillary subtense	Projection or subtense from subspinale to the bimaxillary width (ZMB)	CRANID