

Measurements	Abbr.	Description
<i>Linear measurements</i>		
Cranial length	g-op	Linear distance from glabella to opisthocranio
Cranial height	b-ba	Linear distance from bregma to basion
Cranial breadth	eu-eu	Linear distance between both landmarks eurion
Cranial base length	n-ba	Linear distance from nasion to basion
Frontal chord	n-b	Linear distance from nasion to bregma
Lower frontal chord	n-m	Linear distance from nasion to metopion
Upper frontal chord	m-b	Linear distance from metopion to bregma
Parietal chord	b-l	Linear distance from bregma to lambda
Occipital chord	l-o	Linear distance from lambda to opisthion
Upper occipital chord	l-in	Linear distance from lambda to inion
Lower occipital chord	in-o	Linear distance from inion to opisthion
Foramen magnum length	ba-o	Linear distance from basion to opisthion
Upper facial breadth	fmt-fmt	Linear distance between both landmarks frontomolare temporale
Minimum frontal breadth	ft-ft	Linear distance between both landmarks frontotemporale
Bistephanion breadth	st-st	Linear distance between both landmarks stephanion
Bisphenion breadth	sph-sph	Linear distance between both landmarks sphenion
Occipital breadth	ast-ast	Linear distance between both landmarks asterion
Bimastoid breadth	ms-ms	Linear distance between both landmarks mastoidale
Coronal suture length R	b-sphR	Linear distance from bregma to right sphenion
Coronal suture length L	b-sphL	Linear distance from bregma to left sphenion
Lambdoid suture length R	l-astR	Linear distance from lambda to right asterion
Lambdoid suture length L	l-astL	Linear distance from lambda to left asterion
Facial length	ba-pr	Linear distance from basion to prosthion
Upper facial height	n-pr	Linear distance from nasion to prosthion
Nasal bone length	n-rhi	Linear distance from nasion to rhinion
Nasal height	n-ss	Linear distance from nasion to subspinale
Alveolar height	ss-pr	Linear distance from subspinale to prosthion
Maxillofrontal breadth	mf-mf	Linear distance between both landmarks maxillofrontale
Biorbital breadth	fmo-fmo	Linear distance between both landmarks frontomolare orbitale
Orbital breadth R	mf-ek R	Linear distance from right maxillofrontale to right ektoconchion
Orbital breadth L	mf-ek L	Linear distance from left maxillofrontale to left ektoconchion
Orbital height R	sk-zo R	Linear distance from right suprakonchion to right zygoorbitale

Orbital height L	sk-zo L	Linear distance from left suprakonchion to left zygoorbitale
Nasal aperture breadth	nl-nl	Linear distance between both landmarks nasolaterale
Midfacial breadth	zm-zm	Linear distance between both landmarks zygomaxillare
Bijugale breadth	ju-ju	Linear distance between both landmarks jugale
Bizygomatic breadth	zy-zy	Linear distance between both landmarks zygon
Angles		
Frontal angle	n-m-b	Angle constructed between landmarks nasion, metopion and bregma with vertex at metopion
Parietal angle	b-ob-l	Angle constructed between landmarks bregma, obelion and lambda with vertex at obelion
Occipital angle	l-in-o	Angle constructed between landmarks lambda, inion and opisthion with vertex at inion
Transversal frontal angle	stR-m-stL	Angle constructed between right stephanion, metopion and left stephanion with vertex at metopion
Transversal occipital angle	astR-in-astL	Angle constructed between right asterion, inion and left asterion with vertex at inion
Vertical frontal angle	sphR-b-sphL	Angle constructed between right sphenion, bregma and left sphenion with vertex at bregma
Vertical occipital angle	astR-l-astL	Angle constructed between right asterion, lambda and left asterion with vertex at lambda
Upper facial angle	n-ba-pr	Angle constructed between nasion, basion and prosthion with vertex at basion
Nasal bone projection angle	n-rhi-pr	Angle constructed between nasion, rhinion and prosthion with vertex at rhinion
Nasomalar angle	fmo-n-fmo	Angle constructed between right frontomale orbitale, nasion and left frontomale orbitale with vertex at nasion
Zygomaxillar angle	zm-ss-zm	Angle constructed between right zygomaxillare, subspinale and left zygomaxillare with vertex at subspinale
Nasoglabellar angle	g-n-rhi	Angle constructed between glabella, nasion and rhinion with vertex at nasion
Areas		
Sagittal frontal triangle area	Area n-m-b	Area of the triangle formed between nasion, metopion and bregma
Transversal frontal triangle area	Area stR-m-stL	Area of the triangle formed between metopion and both right and left stephanion
Vertical frontal triangle area	Area sphR-b-sphL	Area of the triangle formed between right stephanion, bregma and left sphenion
Sagittal parietal triangle area	Area b-ob-l	Area of the triangle formed between bregma, obelion and lambda
Transversal parietal triangle area	Area euR-ob-euL	Area of the triangle formed between right eurion, obelion and left eurion
Sagittal occipital triangle	Area l-in-o	Area of the triangle formed between lambda, inion and opisthion

area		
Transversal occipital triangle area	Area astR-in-astL	Area of the triangle formed between right asterion, inion and left asterion
Nasoglabellar triangle area	Area g-n-rhi	Area of the triangle formed between glabella, nasion and rhinion
Nasal triangle area	Area n-rhi-pr	Area of the triangle formed between nasion, rhinion and prosthion
Nasomalar triangle area	Area fmoR-n-fmoL	Area of the triangle formed between right frontomale orbitale, nasion and left frontomale orbitale
Zygomaxillar triangle area	Area zmR-ss-zmL	Area of the triangle formed between right zygomaxillare, subspinale and left zygomaxillare
Total mastoid triangle area	Area total MT	Sum of the areas of the right and left mastoid triangle (the triangle formed between porion, mastoidale and asterion)
<i>Triangle heights</i>		
Height at metopion	height m	Height at metopion of the triangle formed between nasion, metopion and bregma
Height at obelion	height ob	Height at obelion of the triangle formed between bregma, obelion and lambda
Height at inion	height in	Height at inion of the triangle formed between lambda, inion and opisthion
<i>Indices</i>		
Cranial length-breadth index	eu-eu/g-op	Ratio between cranial breadth and cranial length
Cranial length-height index	b-ba/g-op	Ratio between cranial height and cranial length
Cranial breadth-height index	b-ba/eu-eu	Ratio between cranial height and cranial breadth
Frontal index	st-st/n-b	Ratio between bistephanion breadth and frontal chord
Frontal index I	ft-ft/n-b	Ratio between minimum frontal breadth and frontal chord
Parietal index	eu-eu/b-l	Ratio between cranial breadth and parietal chord
Occipital index	ast-ast/l-o	Ratio between occipital breadth and occipital chord
Transverse frontoparietal index	ft-ft/eu-eu	Ratio between minimum frontal breadth and cranial breadth
Transverse parietooccipital index	ast-ast/eu-eu	Ratio between occipital breadth and cranial breadth
Upper facial index	n-pr/zy-zy	Ratio between upper facial height and bizygomatic breadth
Upper facial index I	n-pr/zm-zm	Ratio between upper facial height and midfacial breadth
Upper facial index II	n-pr/ju-ju	Ratio between upper facial height and bijugale breadth
Nasal index	nl-nl/n-ss	Ratio between nasal aperture breadth and nasal height
Nasofacial index	nl-nl/zy-zy	Ratio between nasal aperture breadth and bizygomatic breadth

Orbital index R	sk-zo/mf-ek R	Ratio between right orbital height and right orbital breadth
Orbital index L	sk-zo/mf-ek L	Ratio between left orbital height and left orbital breadth
Facial projection index	ba-pr/ba-n	Ratio between facial length and cranial base length
Lengthwise craniofacial index	ba-pr/g-op	Ratio between facial length and cranial length
Transverse craniofacial index	zy-zy/eu-eu	Ratio between bizygomatic breadth and cranial breadth
Frontal chord-height index	height m/n-b	Ratio between height at metopion and frontal chord
Parietal chord-height index	height ob/b-l	Ratio between height at obelion and parietal chord
Occipital chord-height index	height in/l-o	Ratio between height at inion and occipital chord
<i>Target attribute</i>		
sex	sex	nominal; 0 – female, 1 – male; ? - unknown

R- right; L - left

Landmarks	Abbr.	Description	Cranial landmarks
Nasion	n	The intersection point of the frontonasal suture and the midsagittal plane.	
Glabella	g	The most forward projecting point in the midline of the forehead at the level of the supraorbital ridges.	
Bregma	b	The intersection point of the coronal and sagittal sutures.	
Metopion	m	The intersection point of the horizontal line connecting the frontal eminences and the midsagittal plane.	
Obelion	ob	The intersection point of the sagittal suture and the line connecting the parietal foramina.	
Lambd	l	The intersection point of the sagittal and lambdoid sutures.	
Opisthocranium	op	The most posterior point on the occipital bone in the midsagittal plane and the posterior measuring point of the greatest cranial length.	
Inion	in	The point of intersection of the superior nuchal lines with the midsagittal plane.	
Opisthion	o	The midpoint of the posterior margin of the foramen magnum.	
Basion	ba	The midpoint of the anterior margin of the foramen magnum.	
Rhinion	rhi	The point of intersection of the upper end of the piriform aperture and the internasal suture.	
Prosthion	pr	The most anterior point in the midline on the upper alveolar process.	
Subspinale	ss	The most posterior point on the intermaxillary suture, immediately below the anterior nasal spine.	
Frontomolare-temporale	fnt	The most lateral point on the zygomaticofrontal suture.	
Frontomolare-orbitale	fmo	The point of intersection of the lateral orbital margin with the zygomaticofrontal suture.	
Frontotemporale	ft	The most medial point on the incurve of the temporal ridge of the frontal bone.	
Stephanion	st	The intersection point of the coronal suture and the superior temporal line.	

Sphenion	sph	The most anterior endpoint of the sphenoparietal suture.
Eurion	eu	The most lateral point on the lateral surface of the skull.
Asterion	ast	The point of intersection of the lambdoid, occipitomastoid and parietomastoid sutures.
Mastoidale	ms	The most inferior point on the mastoid process.
Porion	po	The uppermost point on the margin of the external auditory meatus.
Maxillofrontale	mf	The point of intersection of the medial orbital margin with the frontomaxillary suture.
Ektokonchion	ek	The intersection point of the lateral orbital margin and the line originating from maxillofrontale and crossing the orbit parallel to the upper orbital margin.
Suprakonchion	sk	The most superior point of the superior orbital margin.
Zygoorbitale	zo	The intersection of the orbital margin and the zygomaticomaxillary suture.
Nasolaterale	nl	The most posterior point on the lateral margin of the piriform aperture.
Zygomaticomaxillare	zm	The most inferior point on the zygomaticomaxillary suture.
Jugale	ju	The vertex of the angle built by the posterior vertical edge of the zygomatic bone and the superior horizontal edge of the zygomatic arch.
Zygion	zy	The most lateral point on the zygomatic arch.

