

## Study of the Presumed Cranium of Sampiero Corso (1488-1567)

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**Abstract:** We have studied by classic anatomical methods the presumed cranium of Sampiero Corso (1498-1567), who was the first Corsican nationalist. This cranium corresponds to that of a male individual, aged at least of 50 years ; there are many similarities between the cranium face and the one that corresponds to his portrait. The vertical fracture, observed on the cranium left side of the forehead, corresponds probably to the stab sword that caused Sampiero Corso's death. The <sup>14</sup>C radiodating of a bone fragment located at the cranium basis gives a calendar 1450-1510 years interval (at 95% of probability) of age.

**Keywords :** Sampiero Corso (1498-1567) Cranium , Anatomical Study, <sup>14</sup>C radiodating

Sampiero Corso (1498-1567) was a Corsican condottiero who had made the major part of his career to the service of France (1). He is, with Napoléon Ier and Pascal Paoli, one of the famous Corsican and is generally considered as the first Corsican nationalist.

He was ambushed and decapitated by rival Corsican mercenaries (who was a member of his own family) on the 17<sup>th</sup> of January 1567. His head was exposed on the ramparts of Ajaccio and his cranium was kept later on (for more than forty years) in a wall of the Santa Barbara (in Cauro, Corsica) church. The cranium is now the possession of one family of Cauro.

In the present article, we studied the morphology and the distinctive features of this cranium and give a radiodating age estimation from the <sup>14</sup>C of one osseous fragment located at its basis.

### Material and Methods

Classical measures in physical anthropology are taken on the cranium (Figure 1), which is lacking in of mandible. Determinations of gender and age of death are made. We also compared datas obtained on the cranium to those observed on a Sampiero Corso portrait (Figure 2) : the "portrait à la collerette". Determination of the carbon content of a bone portion of the cranium was made by EDX (Energy Dispersive X-ray) and radiocarbon dating of this bone was realized.

**Figure 1:** Photograph of the cranium, in *norma lateralis* (left profile). I : iniac zone ; IN : nuchal impressions.



**Figure 2:** The Sempiero Corso face in “the portrait à la colletterette”.  
SO : supra-orbital relief ; Z : relief of the right zygomatic arch.



## Results and Discussion

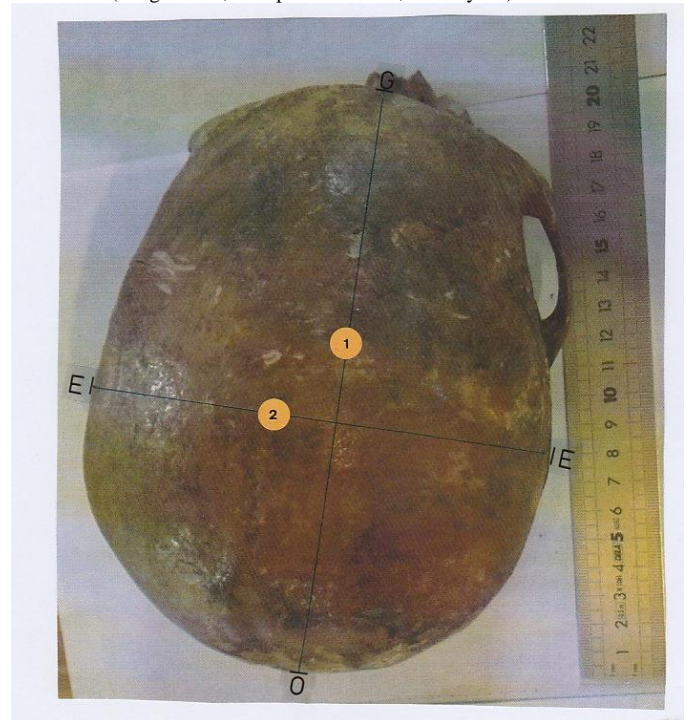
### 1. Mesocephaly

In upper view (**Figure 3**) the cranium outlines are pentagonoid to ovoid. The maximal length of the cranium, as measured from glabella to opisthocranium, is of 19.9 cm ; then it is a cranium of a length slightly superior to the mean, estimated as 18 cm for the craniums of the Piquet-Thérot series (2).

The maximal width, as measured between the two euryons, is of 15.9 cm. The cephalic index  $\frac{\text{width} \times 100}{\text{length}} = 79.9$  ; then the cranium is mesocephalic (75-80), at the limit of brachycephaly.

By this last character the cranium studied can be clearly distinguished from those of Bastelica (2), which are – for most of them – dolichocephalics.

**Figure 3:** Photograph of the cranium , *in norma verticalis*. Line 1 : maximal length of the cranium ; line 2 : maximal width of the cranium (G : glabella ; O : opisthocranium ; E : euryons).



### 2. Gender of the cranium.

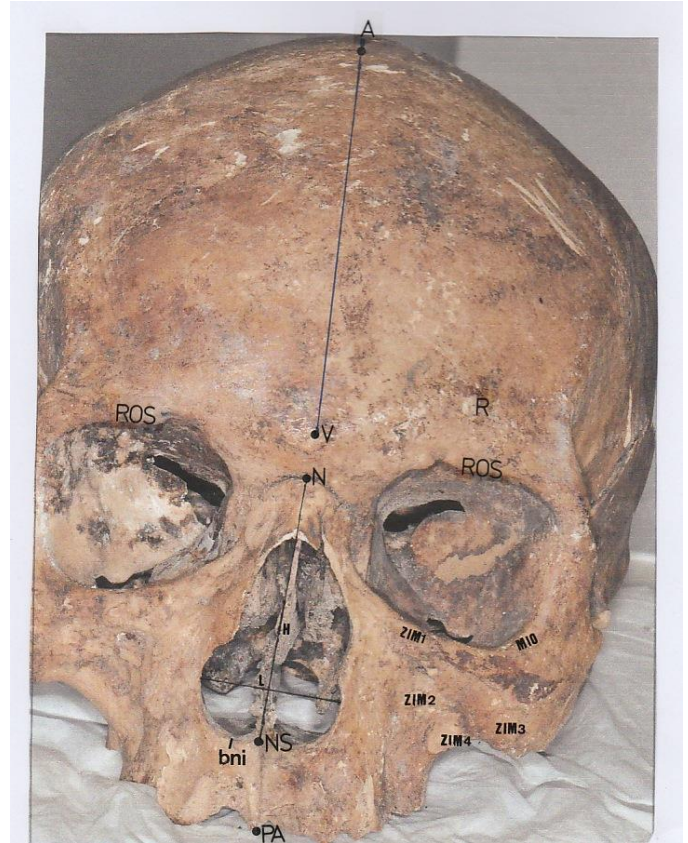
Photograph of **Figure 4** shows that the glabella zone is protruding and that the frontal is flattened and sloping. Photograph of **Figure 5** shows that the orbital edges are smooth and blunted, and that there is a supra-orbital relief on the top of the left socket. Photograph of figure 1 shows that the iniac zone is protruding and that the nuchal impressions are well pronounced ; the photographs of figure 1 and 4 show that the mastoid apophysis is well developed, and that the temporal line is marked.



**Figure 4 :** Enhanced photograph of the left profile of the cranium. G : glabella zone ; F : frontal ; FR : fracture ; T : left temporal line ; M : mastoid apophysis.



**Figure 5 :** Enhanced photograph of the cranium in *norma facialis*. ROS : right and left orbital edges ; R : supra-orbital relief on the top of the left socket ; ZIM 1-2 : left muscular reliefs of the elevator muscles of the superior labium ; ZIM-3 : left muscular relief of great zygomatic muscle ; ZIM-4 : left muscular relief of the little zygomatic muscle. A : apex ; V : vertex ; N : nasion ; NS : nasospinale ; PA : alveolar point . H : nose height ; L : nose width ; bni : inferior nasal border.



Based on these eight characteristics, the cranium is very probably that of a male.

Three other characteristics can be added to these eight ones, in favour to the masculinity of the cranium (**Figure 5**) : socket outlines are rectangular (they are more rounded in women) ; the inferior margin of the left socket is well marked (while smooth in women) ; the left muscular reliefs (ZIM 1-4) are well marked (while less apparent in women).

### 3. Age of death.

Maxillary teeth are absent, or abraded. **Figure 6** shows that the M3 molars (in the corresponding alveols) are growing ; so the cranium is aged of at least 21-35 years.



**Figure 6** : Enhanced photograph of the cranium basis. FM : foramen magnum ; MA : mastoid apophysis ; V : vomer ; ZA : zygomatic arches ; OM : maxillary bone ; OP : palatine bone. D : anterior part of the diastem between the median incisives ; alveols of I1 (incisive 1), I2 (incisive 2) , C (canine) ; PM1 (premolar 1) , PM2 (premolar 2) , M1 (molar 1), M2 (molar 2) and M3 (molar 3) ; BAI alveolar inferior border of the maxillary bone. O : incisive foramen ; 1 : median anterior palatine suture ; 2 : median posterior palatine suture ; 3 : posterior nasal spine ; 4 and 4' : right and left incisive sutures ; 5 and 5' : right and left transverse sutures (obliterated in their central parts, but partially opened in their alveolar parts).



The best estimation of age of death for an aged individual is based on the suture states of the palatine bone (3). Obliteration of the palatines sutures on figure 6 shows that : the median anterior suture is completely obliterated ; it is the same pattern observed for the median posterior suture and for the right and left incisive sutures. For the transversal right and left sutures, they are completely obliterated at their central parts, but partially opened in their alveolar parts.

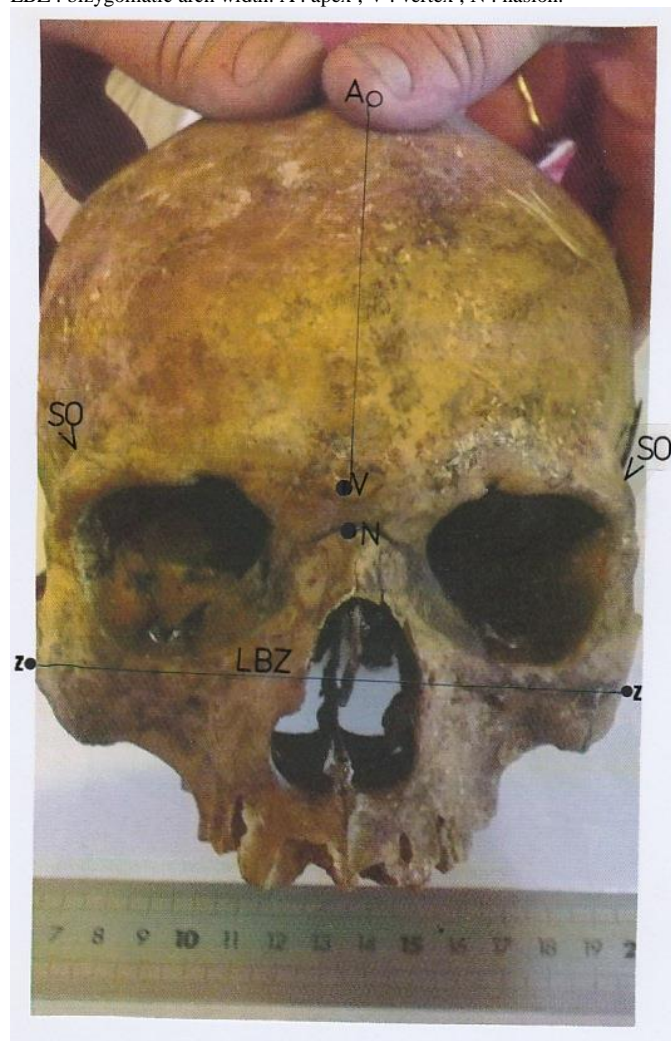
In summary (4) the observation shows that the incisive sutures are obliterated indicates that the age of death is more than 25 years ; the obliteration of the median posterior suture indicates that the age of death is more than 30 years. The obliteration of the median anterior suture of the palatine bone establishes that the age of death of the corresponding individual is more than 50 years (obliterations of the alveolar parts of transversal sutures began since the age of 40

years). In fact Sampiero Corso (born on the 23th of May 1498 and killed on the 17<sup>th</sup> of January 1567) was aged of 68 years at the day of his death.

#### 4. Comparison between the cranium and the portrait.

The two right and left supra-orbital reliefs are well visible on the facial view of the cranium (**Figure 7**) ; that of the right relief is very accentuated, which corresponds to the main characteristic of the portrait (figure 1).

**Figure 7** : Photograph of the cranium, in *norma facialis*. SO : the two supra-orbital right and left reliefs ; Z : right and left zymions ; LBZ : bizygomatic arch width. A : apex ; V : vertex ; N : nasion.



The zygomatic arch is well marked on the right face border of the portrait (figure 2), constituting a second projection of this border of the corresponding eye. The bizygomatic width – between the two zimions – is of 14 cm (figure 7) ; that indicates (the mean width of the bizygomatic arch being of 12.7 cm in the population) a large face, as one can see on the portrait (figure 2).

The distance between the vertex and the apex is of

9.6 cm (figure 7) ; the distance between the vertex and the alveolar point (figure 5) is of 9.8 cm. That indicates a superior face (between the high part of the eyebrows and the border of the superior lip) equilibrated comparing to the forehead, as seen on the portrait.

The photograph of figure 5 shows that the nasal bridge is narrow, that the nasal pit is in the form of a upside down heart with a point separating the indentation at the basis, and that its inferior border is well marked and sharp (all these three characteristics are those of Leucoderms). The nose height is of 5-7.20 cm (so it is a long nose, because the mean is of 2.70 cm in Leucoderms), as on the portrait. The nose width is of 2.7 cm ; the nasal index  $\frac{\text{width} \times 100}{\text{height}} = 38$  (a leptorine nose).

### 5. Orthognathy.

The facial acute angle (**Figure 8**) between the two lines O-P (O is the lowest point of the socket, and P is the most elevated point of the auditive hole) and PA-N (PA is the alveolar point, and N is the nasion) is of 86 °. So the cranium studied is orthognath (80-85°), at the limit of mesognathy.

**Figure 8** : Enhanced photograph of the right profile of the cranium. O : the lowest point of the socket ; P : the most elevated point of the auditive hole. PA : the alveolar point ; N : nasion ; I : iniac zone ; IN : iniac (nuchal) impression ; M : mastoid apophysis.



### 6. Evidence of traumas.

The cranium shows numerous evidence of ancient traumas, particularly at the back. As already studied (5), there is a line of vertical fracture (of several centimetres of length) on the left side of the forehead (figure 4) ; it stars just on the top of the temporal line, pierces the coronal suture and ends at the basics of the parietal. Edge surfaces of this fracture are of the same coloration (dark ocre) than the whole cranium; that indicating that it is not a recent artefact.

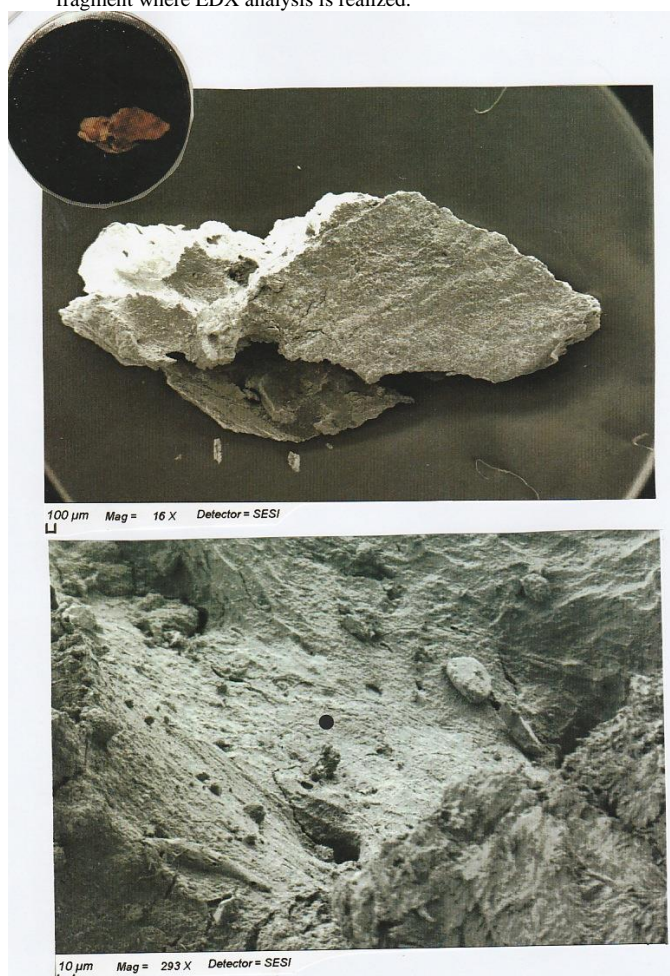
The circumstances of the death of Sempiero Corso is precisely described in the literature (1) ; we known that Michel-Angelo d'Ornano (the Giovani brother) had mortally injured Sempiero Corso (on the 17<sup>th</sup> of January 1567), by a stab sword on his helmet. The fracture observed on the cranium is probably that of this fatal stab sword.

### 7 . Radiodating of a bone located on the cranium basis.

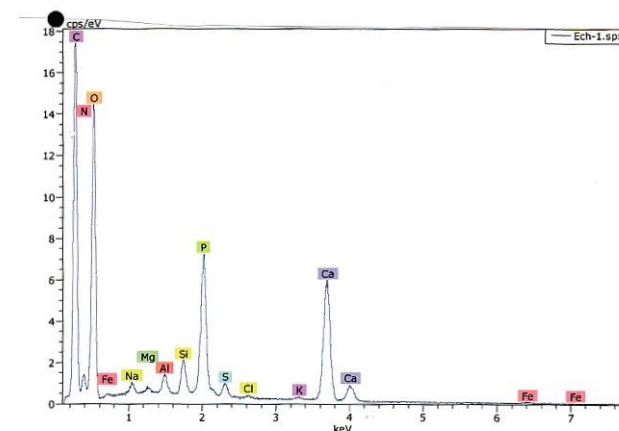
**Figure 9** shows optical and electronic microscopy views of a bone fragment initially located at the cranium basis. **Figure 10** gives the elemental analysis of this bone fragment : it is mainly constituted of calcium phosphate (the osseous matter) and has a normal content in carbon of 26.65%.



**Figure 9** : The bone fragment located at the cranium basis. *Upper photographs* : in the circle : optical view (5x) of the fragment ; below : SEM (Scanning Electron Microscopy) photograph (16x), in SE (Secondary Electrons) of the fragment. *Lower photograph* : SEM photograph (293x), in SE, of a surface portion of the fragment. The black dot indicates the surface area of the bone fragment where EDX analysis is realized.



**Figure 10** : EDX analysis at the black dot. *Above* : EDX spectrum. C : carbon ; N : nitrogen ; O : oxygen ; Fe (three peaks) : iron ; Na : sodium ; Mg : magnesium ; Al : aluminium ; Si : silicium ; P : phosphorous ; S : sulphur ; Cl (traces) : chlorine ; K (traces) : potassium ; Ca (two peaks) : calcium . *Below* : normal composition in the spectrum elements.



Spectrum: Ech-1.spx

Element	Series	unn. C [wt. %]	norm. C [wt. %]	Atom. C [at. %]
Oxygen	K-series	20.63	42.50	43.04
Silicon	K-series	0.59	1.22	0.71
Carbon	K-series	12.93	26.65	35.94
Sodium	K-series	0.22	0.45	0.31
Aluminium	K-series	0.29	0.60	0.36
Phosphorus	K-series	3.01	6.20	3.25
Sulfur	K-series	0.29	0.61	0.31
Calcium	K-series	5.48	11.30	4.57
Magnesium	K-series	0.08	0.17	0.11
Nitrogen	K-series	4.69	9.66	11.17
Potassium	K-series	0.10	0.21	0.09
Iron	K-series	0.16	0.33	0.09
Chlorine	K-series	0.05	0.11	0.05
Total:		48.54	100.00	100.00

Radiodating of this carbon gives a calendar age in the 1450-1510 years interval (at 95% of probability), consisting with a mean age of 1488. This mean age is consistent of Sampiero Corso.

### Conclusion

In the present paper we have realized by anatomical methods a study of the presumed cranium of Sampiero Corso (1498-1567) and have compared it to the face of one of his portrait.

The cranium is mesocephalic and orthognath. It corresponds to that of a male individual, aged at death of at least 50 years. Similarities between the face of the cranium and of the portrait concern the right supra-orbital relief and the right border of the zygomatic arch, the face width, the equilibrated dimensions of the forehead compared to those of the superior face, and the long nose. A marked trauma, visible on the cranium as a vertical fracture on the left side of the forehead, corresponds to the stab sword that caused the Sampiero Corso death.

$^{14}\text{C}$  radiodating of a bone fragment located at the cranium basis gives a mean age of 1488 years, an age

compatible to that of the Sampiero Corso life.

### Acknowledgments

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