

Duarte Nuno Vieira • Anthony Busuttil
Denis Cusack • Philip Beth
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L. Andrello¹, P. Basso¹, T. Congiu², G. Carlesi, L. Tajana¹, A. Osculati¹

¹ *Medicine and Public Health Department, Forensic Medicine Unit, Insubria University, Varese, Italy*

² *Human Morphology Department, Insubria University, Varese, Italy*

HISTORICAL-ANTHROPOLOGICAL-FORENSIC ANALYSIS OF A SKELETON FROM A GRAVE DATABLE ABOUT YEAR 1000 WITH TRAUMATIC LESIONS THAT INDICATE CAUSES AND MODALITIES OF THE DEATH

Abstract: The archaeological finding of an isolated buried skeleton in the neighbourhood of a small medieval church has made to date, by the archaeologists, the grave approximately about the year 1000. The study of the skeleton with forensic-anthropological techniques has allowed to obtain many marks about the physical features of the subject; but, above all, very thorough forensic-pathological examination, also using of optical and electronic microscopical techniques, has allowed to characterize meaningful injuries at the head, evocative of their intra-vitam production, indicative of some features of the productive mean and much evocative of causes and modalities of the death, probably identifiable in an execution. The purpose is to suggest the comparative use of macroscopic, microscopic and ultra-microscopic morphologic analysis compared can suggest solutions of cases happened in far historical ages, cases of which we only have the skeletal substrate.

Introduction

The church of San Biagio is situated higher than the town of Cittiglio, to which it belongs. From the ecclesiastical viewpoint, Cittiglio's area borders with the Ambrosian diocese of Milan and the Roman one of Como (fig 1). Church's origins are undoubtedly Romanesque if not even paleochristian and its bell-tower, which dates around 1.000 a.C., distinguishes for the archaic shape of its mullioned window with crutch capital.

The on-going excavation has brought to light at least 3 different floor layers laid down in the past under the more recent floor belonging to the '70s (one layer of brick dated 1630, one of red-coloured mortar dated 1200 and one of trodden mortar dated around 1000).

Several architectonic structures belonging to an older church – smaller than the present one – were found out; among them there are the remains of a church's front demolished during Medieval Age – in place of the medieval apse there is the door entering the present churchyard, which was the graveyard at the time.

Together with the wall remains many old manufactured objects have been found out and they date between XII and XVI centuries.

A first and still temporary stratigraphic analysis of the fossil documentation of the site, carried on by Doctor R. Mella Pariani, dates the burial between 1000 and beginning 1200 a.C.

In addition, these data are enhanced by the dating of the floor, below which the grave containing the bones of the subject was located and which belongs to the same historical period of time.

The grave was a lithic burial niche with obliquely laid stones and mortar was not used to bind them. Characterized by a very narrow and anthropomorphic shape, it was placed along the narthex of the church with east-west direction and the head of the dead looked towards west (that was a privileged position reserved to aristocrats and founders (fig 2,3).

Materials and methods

Biological profile.

Race diagnosis: Caucasian. Orbits of quadrangular shape with particularly rounded corners, long and narrow nasal fossae, ogival palate, typical morphology of the incisors and of the first molar tooth (fig 4).

Gender diagnosis: Male. According to criteria identified by Ascàadi and Nemeskéri for studies concerning cranial bones.

Age diagnosis: between 20 and 30 years old. According to the observation of cranial sutures on the points indicated by Meinland and Lovejoy and basing on the study of dental elements.

Height calculation: about 174 cm. Use of Trotter and Gleser method (on the right femur 172.08 cm. and on the right tibia 172.36 cm.). Use of Meadows and Jantz formula on metacarpus (176.42 cm) and use of the Byers and team's members on the metatarsus (174.53 cm.).

Dental evaluation (fig 5,6). Teeth are generally very well preserved. All dental elements are present except for 46, taken ante-mortem (within 6 months before death) (fig 20,21,22,23). Arches are wide and dental elements are in line. The inter-arch relation is I Class of Angle with normal OVJ (overjet) and OVB (overbite). Worn areas are evident on palatine cusps of first molars and upper premolars bilaterally and on vestibular cusps of the first left lower molar, of the second left molar – though less seriously – and of both lower right premolars (fig 11,12,13,14). The features of the dental wear are indicative of a peculiar mastication or of particularly hard food or of the use of the denture for somewhat activity; there's no relation with the methods to establish the age of the subject. The marked periodontal disease of the lower frontal area can be attributed to the juvenile periodontal pathology, associated with life and food habits of the subject (fig 17,18,19). The loss of element 46 ante-mortem – within 6 months before death – does not seem to be due to chronic dental caries, since the periapical bone structure is intact and the post-extraction regeneration is effective. The third molars are at different phases of eruption (fig 15,16); this is a very useful

detail in order to establish the age of the subject together with radiographic images of the incomplete apical closure of the elements (about 20).

Lesion 1 (Fig. 24,25,26). It involves the right parietal bone and part of the occipital bone and it ends on the left branch of the lambdoid suture. Length 11,4 cm. Cranio-caudal inclination of 27,5° towards the sagittal plane and of about 10° in back-frontal direction towards the frontal plane. Sharp cut area in correspondence of the external bony lamina and of part of the diploe.

Lesion 2 (Fig. 27, 28 ,29) It starts from the squama of the occipital bone, 2 cm left of the right branch of the lambdoid suture and it ends in correspondence of the squamous suture. It has a front-back inclination of 40° towards the sagittal plane and creates a cranio-caudal angle of few degrees towards the frontal plane. It involves the whole thickness of the external bony lamina, of the diploe and of the internal bony lamina. A huge number of big and parallel sulci, which are perpendicular to the bony plane, can be seen with the naked eye.

Lesion 3 (Fig. 30,31,32). It is placed over the occipital protuberance and, with oblique course, it extends laterally and right towards the crest (direction: cranio-caudal and back-front) till it touches the area of the lesion 2 with an inclination of 40° towards the frontal plane and of 35° towards the plantar plane. It involves the whole thickness of the external bony lamina, of the diploe and of the internal bony lamina.

Results

At a first rough observation of the neuro-cranium of the dead in the grave T13-us 168b some lesions due to naked steel were noticed and they became more and more evident after the cleaning of the bones. Therefore, an additional research was requested to analyze lesions, which – if vital considering their place – could have caused death through a peculiar and violent action bound to the death.(Fig. 33)

The cranium was then recomposed and that allowed to evaluate the real wideness of the lesions and to calculate their size and inclination.

From the very beginning the extremely sharp characteristic of the cut sections was amazing. For that reason, it was decided to go on studying the lesions at the epimicroscope to better analyze the morphological features of the holes and of the crests, which were already visible by the naked eye, and to possibly reconstruct the profile of the cutting item, which was likely to be a saw, considering that lesions are indented. It seems more and more reliable the hypothesis that lesions were inflicted in perimortem.

The observation by growing enlargements of the cut sections shows thick holes of different size and with course reciprocally parallel and perpendicular to the bony lamina at level of all lesions. This last consideration excludes the use of a saw as a cutting item due to grounds of dynamic type.

Additional analysis at the scanning electronic microscope (SEM) are carried out, because it offers a higher definition level of details by means of its higher in-depth analysis capacity.

These data indicate that lesions were caused by naked steel used like a cutting item. Even if it is not absolutely sure, the type of inhumation and the topographic situation of the lesions enhance the hypothesis that lesions were caused in the perimortal period of time.

At this stage of the study, the following conclusions can be drawn: the cutting item can reasonably be a quite long blade, which was very sharp (so that to be able to cut a fragment of occipital bone without causing any sign of fracture) and not too much heavy (otherwise, it would have acted like a contusive mechanism causing secondary fractures); the holes visible at every enlargement were not due to the teeth of a saw but to the irregularity of the profile bound to the sharpening of the blade.

Discussion

At that time the problem of the historical compatibility of so clean cut lesions arose: the circumstance when lesions were made, the type of cutting item and the technical possibility bound to the production of such sharp blades. Trajectories of the blows of naked steel were reconstructed on a model (Fig 34,35). The reconstruction of the direction of the trajectories have made to hypothesize a case of decapitation.

At first the presence of multiple lesions on the cranium led to think that it was a decapitation happened during a fight: in literature the presence of multiple lesions often indicates an excited and chaotic event happening during a battle rather than an execution.

Conclusion

Some experts in medieval history and in blades were asked for advice in order to better frame the facts from the historical viewpoint and to identify the cutting item probably used. Doctor Mario Scalini of the Soprintendenza Speciale of Polo Museale in Florence contributed to elaborate the following possible reconstruction of the facts.

Death dynamics seem to be that of a capital execution: the condemned person knelt and the executioner was on his right.

The first blow caused lesion 2 and a second blow followed, while the condemned person was staggering, and caused lesion 3 – this dynamic was given value by the observation of the prosecution of lesion 2 on the bone fragment cut by lesion 3; finally, when the person lay on earth, the third blow was given and caused lesion 1 (the fact that this is the last lesion is deducible by the growing irregularity of the cut surface, like due to the wear of the blade).

The reconstruction is based both on the topography of the lesions as well as on the fact that the lesions by naked steel do not seem compatible with a war sword – particularly heavy and that could have caused bone lesions with sinking and certainly secondary fractures – but with an execution sword – lighter, extremely sharp, with a blade with lenticular section and without central veining (Fig 36).

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Figure 1 – The San Biagio Church in Cittiglio

Figure 2, 3 – The grave T13 US168b

Figure 4 – The skull

Figure 5 – maxillary arch

Figure 6 – mandibular arch

Figure 7,8 – Palatine suture: the ossification of the palatine suture is not complete, especially at the level of the first third of the suture in the intra-alveolar section; it indicates that cartilage was present there when he was alive and it's a useful detail for the age calculation.

Figure 9,10 – Right maxillary sinus: wide pneumatic cavity without thickening of the floor (this radiographic detail excludes sinus chronic inflammatory diseases).

Figure 11,12 16, 17 and 18 dental elements – the upper right third molar looks partially included (mucosa) with well-developed radicular apparatus, with very wide canals and without visible apices. It is evident that palatine cusps of 16 are particularly worn, while palatine cusps of 17 are unworn.

Figure 13,14 25, 26 and 27 dental elements – the third molar is nearly completely erupted with the third apical of the roots developed and still open apices. It is evident the relation between the roots of 16 and the floor of the left maxillary sinus.

Figure 15,16 37 and 38 dental elements – the third molar is in the eruption phase but it is still partially included, third apical in the development phase, pulp chamber, wide radical canals and open apex. By applying Kulmann method, the man should be aged around 20(+/- 2).

Figure 17,18,19 41, 42, 43 and 44 dental elements – despite the wideness of the arch and the excellent inter-cusp, there is a mesial inclination and a partial rotation of the 43, there's an evident periodontal disease of the frontal portion with a bone resorption both vertically and horizontally, also visible in the following radiography of the elements 41, 31, 32 and 33.

Figure 20,21 45 and 47 dental elements – the alveolar site of 46, which was taken ante-mortem, is empty and there is a thin post-extraction regenerative bony reticulum. No signs of periapical disease are present. The inter-radical sedimentation is still recognizable and it indicates that the tooth was taken within 6 months before the death.

Figure 22,23 47 dental element – the recent loss of element 46 did not cause either the shift of close dental elements 45 and 47 nor the extrusion of the antagonist 16.

Figure 24 lesion 1 – macroscopic view

Figure 25 lesion 1 – epimicroscopic view

Figure 26 lesion 1 – electron microscopic view

Figure 27 lesion 2 – macroscopic view

Figure 28 lesion 2 – epimicroscopic view

Figure 29 lesion 2 – electron microscopic view

Figure 30 lesion 3 – macroscopic view

Figure 31 lesion 3 – epimicroscopic view

Figure 32 lesion 3 – electron microscopic view

Figure 33 – three lesions at the skull

Figure 34, 35 – the lesions reproduced on a model

Figure 36 – the measurement of the lesion 1

Figure 37 – fac-simile of a miniature on wood in the “Cosmographie Universelle” of Munster. In folio, Sale 1952

Figure 38 – the possible used weapon



Figure 1



Figure 2



Figure 3

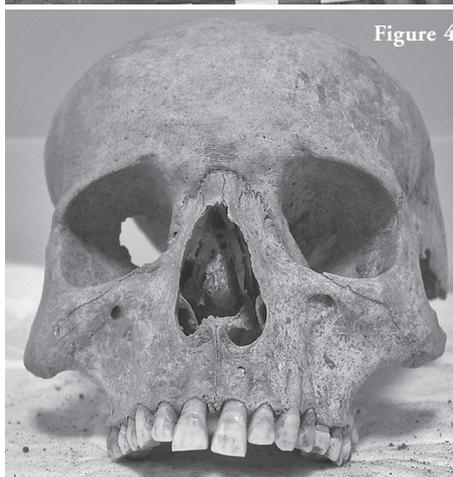


Figure 4



Figure 5



Figure 6

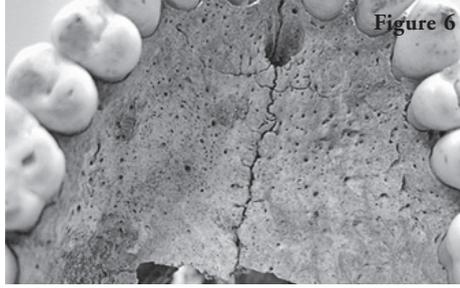


Figure 6



Figure 8

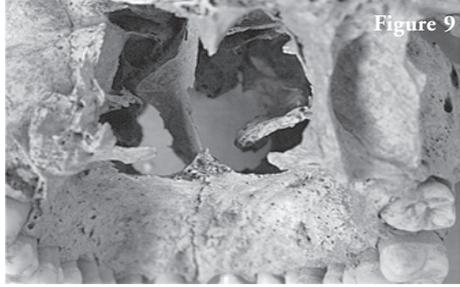


Figure 9



Figure 11



Figure 10



Figure 12

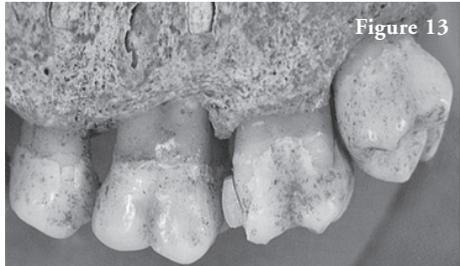


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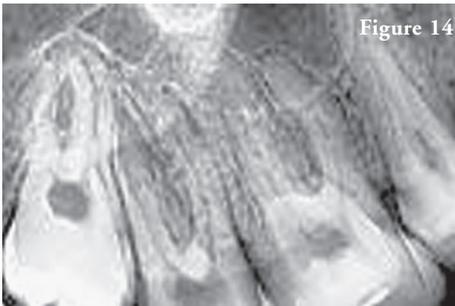


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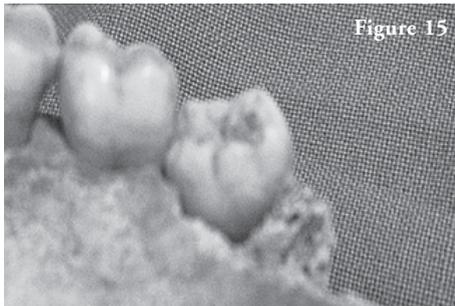


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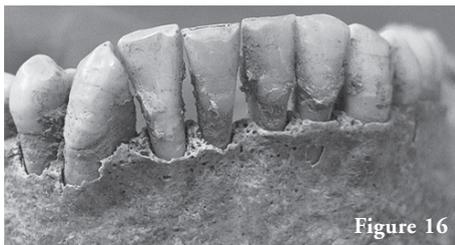


Figure 16



Figure 17

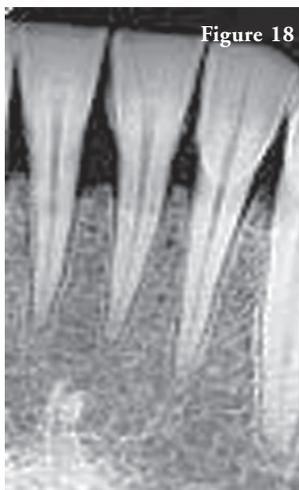


Figure 18



Figure 19

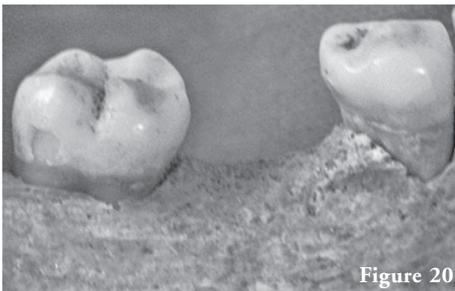


Figure 20

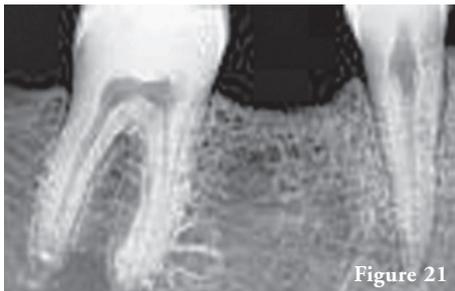


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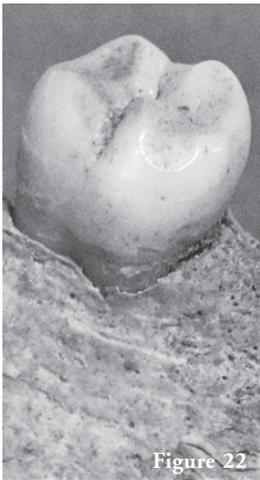


Figure 22



Figure 23

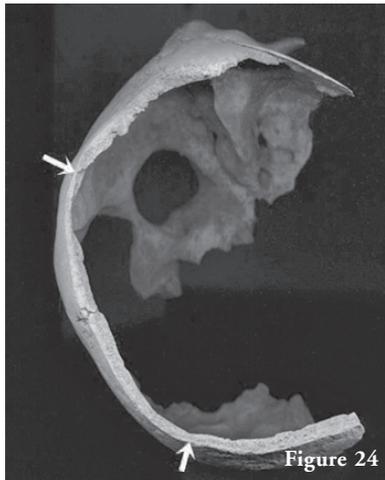


Figure 24

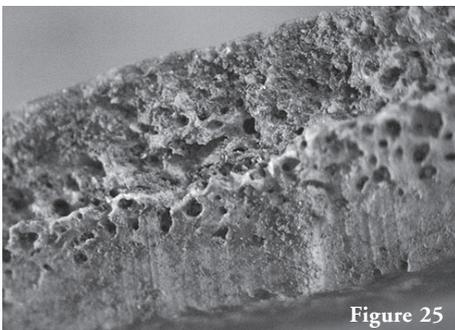


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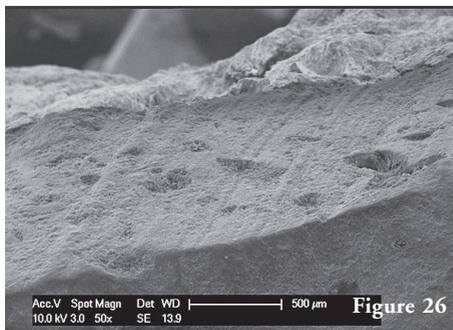


Figure 26

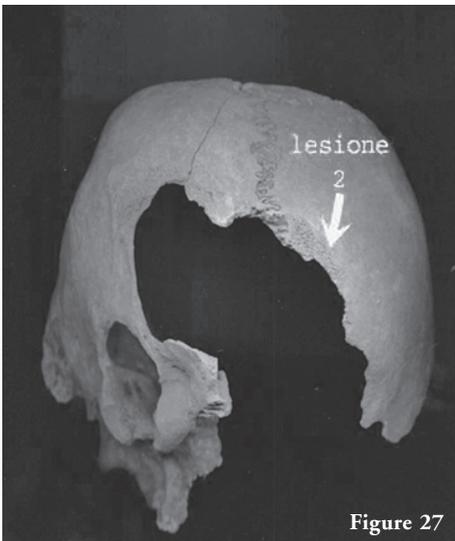


Figure 27

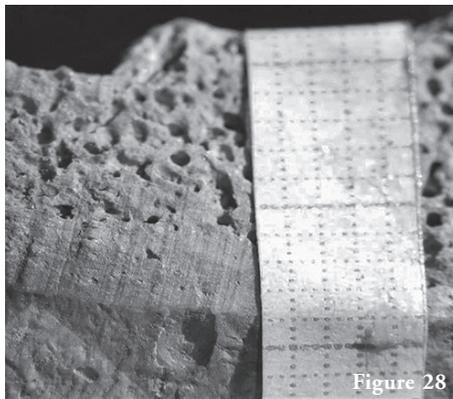


Figure 28

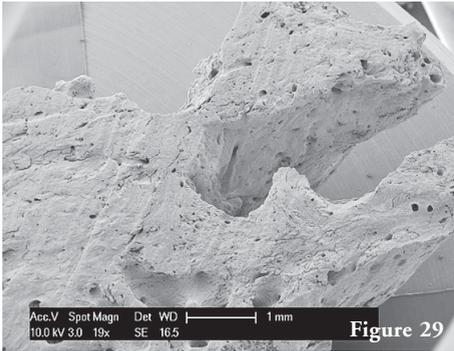


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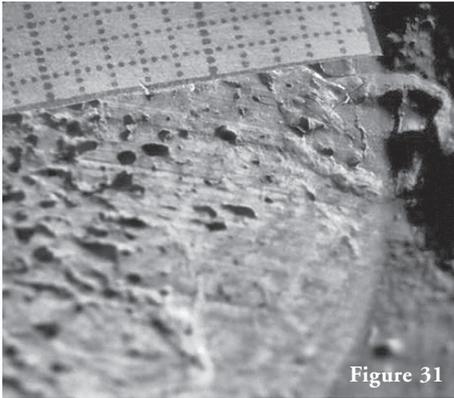


Figure 31



Figure 30

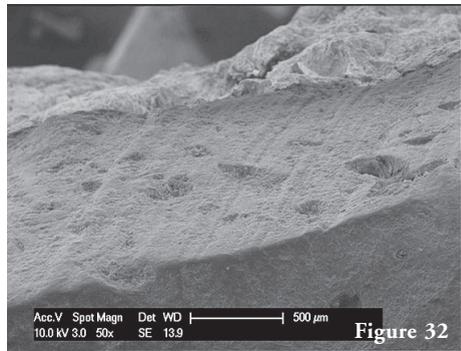


Figure 32

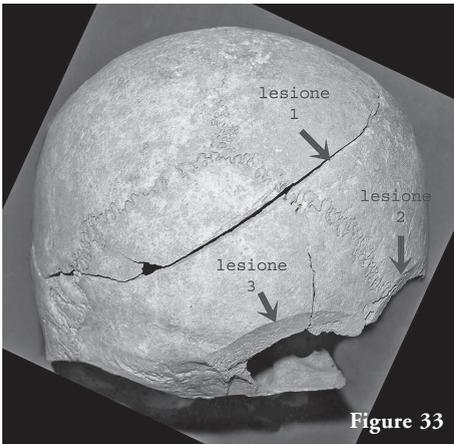


Figure 33

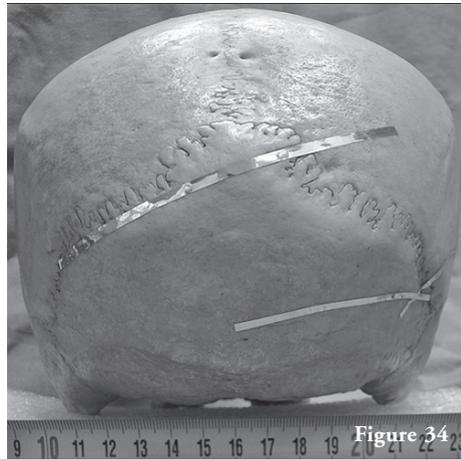


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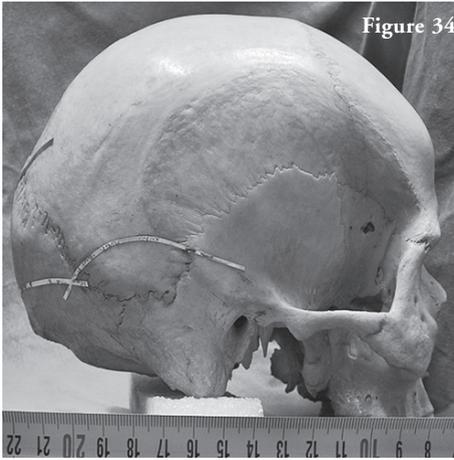


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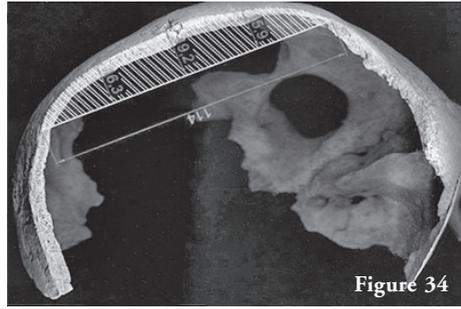


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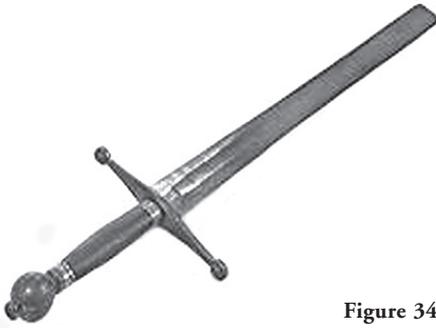


Figure 34



Figure 34