

Jonathan Kalman

MULTIPLE CRANIAL WOUNDS FROM KABERLA, NORTH ESTONIA

This article presents a case study of a skeleton displaying multiple wounds from several weapon types, including both projectile and hand-to-hand weapons. Most lesions are clustered on the skull, suggesting that the head was deliberately targeted. Although death in the past from interpersonal violence was not unusual, few cases show the extent of aggression as indicated by the wounds on this skeleton. The paper describes the lesions and the weapon types used to inflict them, and attempts to deduce the sequence of events leading to the man's death.

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Introduction

Aggression and interpersonal violence are behaviours that can be traced back to the very beginnings of *Homo sapiens*, and even before to our evolutionary ancestors. The roots of our sometimes brutal nature do not go unnoticed in the archaeological record, and it is the palaeopathologists' task to reconstruct such behaviours. Not all signs of trauma to the human skeleton represent evidence of deliberate intentions to harm one another, though, and many are simply results of mankind's interaction with his natural environment. However, in some cases, weapons leave their mark on the human skeleton and help us to reconstruct the events that transpired immediately prior to death. Such a case recently came to light at Kaberla cemetery in North Estonia.

Kaberla cemetery has produced 242 skeletons, dating from the 12th to the 17th centuries. The subject of this paper (skeleton LI) appears to be from the 14th–15th centuries, as judged by the size and shape of the crossbow bolt impressions imprinted on the skeleton (Ain Mäesalu, pers. comm.). There were no peculiarities concerning the position of the burial. That is, he was lain with his head roughly to the north and his arms folded across his waist, similar to many of the burials at Kaberla cemetery.

Human osteology

Skeleton LI is well preserved and the majority of the bones are present (Table 1). Unfortunately the most accurate part of the skeleton for sex determination, the pelvis, is absent. Nevertheless, the extreme robustness of the skeleton leaves little doubt that the skeleton belongs to a male (Table 2).

Age at death was determined from a number of observations about the development and degeneration of the teeth and bones. An average age at death of 30–40 years was assessed (Table 3).

Stature was calculated by applying regression formulae to the length of the major long bones (Trotter, 1970), resulting in a stature of 169 ± 3 cm.

Table 1. Skeletal representation of skeleton LI

| Bone element | Present |
|-------------------------------|-------------|
| Cranium | + |
| Mandible | + |
| Left clavicle, right clavicle | -, + |
| Left scapula, right scapula | +, - |
| Sternum | + |
| Ribs | 7 fragments |
| Vertebrae | - |
| Left humerus, right humerus | +, + |
| Left ulna, right ulna | +, + |
| Left radius, right radius | +, + |
| Hand bones | - |
| Pelvis | - |
| Left femur, right femur | +, + |
| Left patella, right patella | -, - |
| Left tibia, right tibia | +, - |
| Left fibula, right fibula | +, - |
| Foot bones | - |

Table 2. Sex-diagnostic characters of skeleton LI

| Skeletal landmark | Description | Indication |
|-----------------------|-------------|------------|
| Supraorbital ridges | Prominent | Male |
| Mastoid processes | Large | Male |
| Nuchal crest | Large | Male |
| Frontal slope | Inclined | Male |
| Anterior mandible | Large | Male |
| Femoral head diameter | 48-mm | Male |
| Humeral head diameter | 45-mm | ? Male |
| Overall assessment | | Male |

Table 3. Age at death determination

| Age determining method | Age indication |
|--|----------------|
| Dental eruption | > 18–20 years |
| Epiphyseal fusion | > 26 years |
| Dental attrition (Miles 1962) | 30–40 years |
| Cranial suture closure (Meindl & Lovejoy 1985) | 30–40 years |
| Overall assessment | 30–40 years |

Although this man was of average height, he was very well built. Large entheses around the nuchal area at the back of the skull, and large prominent mastoid processes indicate extremely powerful head and neck muscles (entheses are modifications to tendinous or ligamentous attachments that derive from increasing development of muscles as they are continually recruited in the performance of a task). His arms are also robust, especially the attachment point of his left deltoid muscle (the muscle used to raise and move the upper arm away from the body), which has also formed a large entheses (Fig. 1). His left shoulder also displays evidence of arthritis, again indicating the habitual use of the left arm to perform tasks. Also, a slight size discrepancy between the left and right arms suggests that he was left-handed.

The general pattern of muscle enlargement and arthritis indicate that the man was involved in habitual bending and raising his left arm. This is perhaps suggestive that he was a trained warrior, and the left arm would have been continually used in raising a heavy weapon. There are no signs of healed fractures or wounds on his skeleton, though, which we might expect from a warrior. An alternative occupation that comes to mind is a blacksmith, and the habitual use of the arm would have been for raising a heavy hammer. Other occupations, of course, are possible, but nonetheless he clearly participated in strenuous work from an early age.

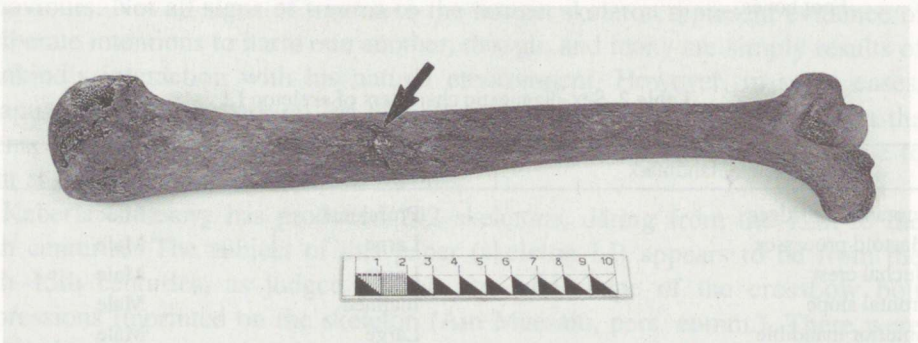


Fig. 1. Enthesis at the attachment point of the left deltoid muscle. Photos by Jaanus Heinla.

Joon. 1. *Enthesis* vasaku deltalihase liitekohas. Fotod Jaanus Heinla.

Bodily injuries

The skeleton shows many signs of trauma from several weapon types, all but two located on the skull.

- There are six puncture wounds located on the skull. The wounds are rhomboid in shape and have been produced by crossbow bolts (Ain Mäesalu, pers. comm).

A) The wound penetrates the skull immediately above the right supra-orbital ridge; the outline of the puncture is clearly rhomboid and the bolt entered downward at an angle of ca 40° (Fig. 2). Although puncturing the skull, it does not pass through the skull into the brain case.

B) Also located on the frontal bone, 38 mm above the lateral half of the left orbit (Fig. 2). The wound is similar in shape and appearance to the first and enters at an angle of ca 30°.

C) Again on the frontal bone, but located much higher than the others, ca 90 mm superior to the medial half of the left orbit (Fig. 3). The placement of the wound near the top of the skull (at an angle of ca 60° from the horizon) suggests that the head was angled when the bolt hit, or the victim was lying on his right side.

D) This wound is located on the right side of the skull (right parietal bone), 75 mm above the right auditory canal (Fig. 4). The shape of the wound is not as clearly defined as the others, and the projectile appears to have had a narrower tip. The angle of entry was ca 15°.

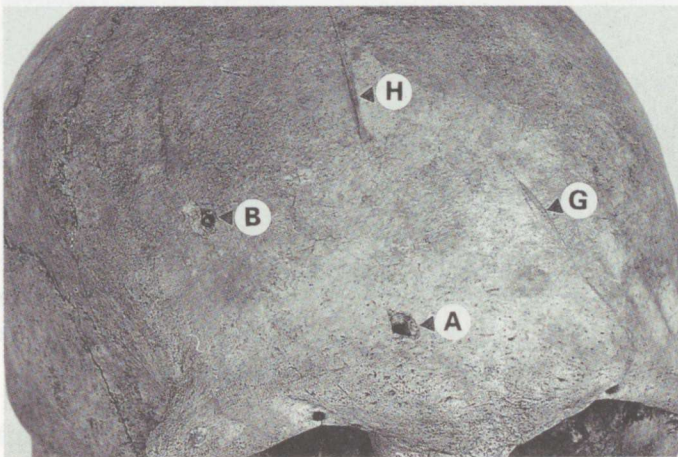


Fig. 2. Two rhomboid shaped crossbow bolt wounds (A, B) and two slashes produced by a bladed weapon (G, H).

Joon. 2. Kaks rombikujulist ammuoole tekitatud haava (A, B) ja kaks lõikehaava (G, H).



Fig. 3. Crossbow bolt wound on top of the frontal bone.

Joon. 3. Ammuoole tekitatud haav otsmikuluu ülaosas.



Fig. 4. Two more puncture wounds on the right parietal.

Joon. 4. Kaks torkehaava kiiruluul.

E) The fifth bolt was fired from someone situated behind the victim, and enters at the back half of the right parietal (Fig. 4). The wound is again not as clearly defined as the ones entering the frontal bone, and it has a similar angle of entry as wound D.

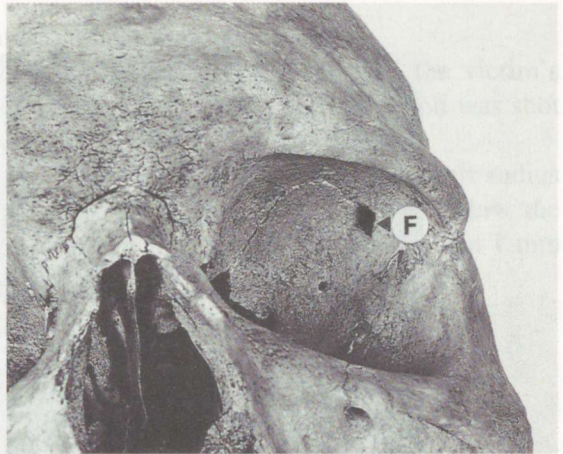


Fig. 5. Penetration wound of the left eye.

Joon. 5. Vasakut silma läbistav torkehaav.

F) The sixth projectile has entered the left eye orbit, almost horizontally (Fig. 5), and the bolt was shot from the victim's right side, where it would have grazed across the tip of the nose. This is the only wound to have perforated the inner skull. After puncturing the eyeball, the bolt would have lodged in the lateral part of the right cerebral hemisphere of the brain.

- There are five cutmarks located on the skull vault that were produced by a bladed instrument(s):

G) The first is located on the frontal bone above the right orbit, beginning 85 mm above the superior rim of the right eye and traverses vertically downward 35 mm (Fig. 2). The wound is only about 0.6 mm wide and not very deep. The wound, however, deepens slightly and widens towards the front half of the skull, indicating a cut directed with a downward swing.

H) The second cut lies above the left orbit, beginning about 45 mm above the medial edge of the left eye, and runs 41 mm diagonally down to the right at an angle of about 60° (Fig. 2). This mark has similar dimensions to the first.

I) The third cut is situated at the back of the skull around lambda (Fig. 6). It is shorter, but wider and deeper than the cuts on the front of the skull, suggesting a different weapon or the weapon had two dissimilar edges. The wound runs downward at an angle of ca 60° from the horizontal. It has a length of 17 mm, width of 2 mm and is about 1 mm deep.

J) Again located on the back of the skull, about 30 mm to the right of the last one (Fig. 6). It runs in a vertical direction a length of 29 mm. Its width and appearance suggests that it was made by the same blade that inflicted the two cuts on the front of the skull.

K) The final mark is a cut that has completely split the skull, and the weapon would have penetrated the brain. The wound is ca 70 mm long and located on the left parietal (Fig. 7). The fracture continues across the right half of the skull, but this is a fracture line resulting from the force of the blow. The true wound is recognisable by its straight polished-like edges.



Fig. 6. Two cutmarks to the back of the skull.

Joon. 6. Kaks lõikehaava kolju tagaosas.



Fig. 7. Split cranial wound to left parietal.

Joon. 7. Lõhestatud vasak kiiruluu.

- There are an additional two marks on the post-cranial skeleton.

L) Another puncture wound from a crossbow bolt has entered the victim's back in the left scapula, just below the shoulder blade (Fig. 8). The bolt was shot from the victim's right side and is angled horizontally.

M) There is a small cutmark located on the proximal part of the left radius (lateral forearm bone). It is on the dorsal side of the bone, 25 mm below the radial head (Fig. 9). It is 6 mm long and about 2 mm wide, and runs about 1 mm deep.

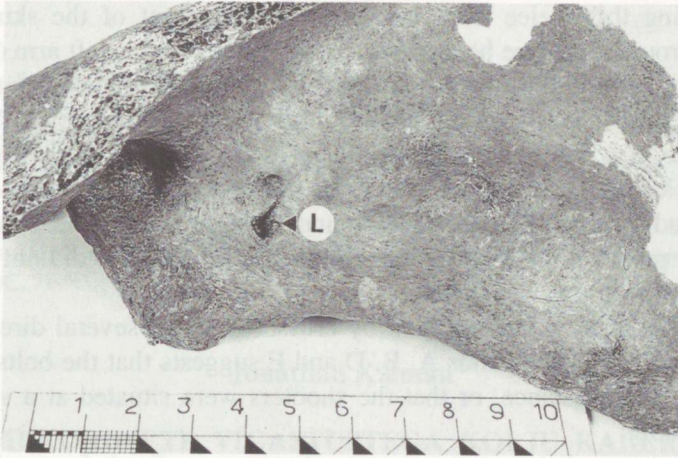


Fig. 8. Puncture wound to left scapula.

Joon. 8. Torkehaav vasakul abaluul.



Fig. 9. Small cutmark to the proximal end of the left radius.

Joon. 9. Väike lõikejäl vasaku kodarluu proksimaalosas.

The sequence of events and discussion

From the evidence it is clear that this man died at the hands of aggressors, armed with weapons of war. However, the distribution of wounds, and the presence of several weapon types reveals the particularly brutal nature of this man's death. It is somewhat complicated to reconstruct the conflict that took place with this man because of the presence of wounds produced in a hand-to-hand combat and wounds from projectile weapons; however, we can suppose a plausible scenario.

At some point the man was involved in hand-to-hand combat with at least one person. During this melee two slashes grazed the front of the skull (wounds G and H). Around this time he sustained the cut-mark on his left arm (wound M), a very typical wound that results as the arm is raised to block an attack to the upper body. With blood seeping down his head from the slashes to his head he turned to flee, a wise choice after the blow to his left arm (his principal arm). With his back to the assailant(s), two more slashes came to the back of his skull (wounds I and J). None of the above wounds run particularly deep, and the lack of fracturing produced by the weapons means that the wounds did not necessarily incapacitate the victim at this point.

At some point he was fired upon by crossbows from several directions. The downward trajectory of wounds A, B, D and E suggests that the bolts were fired from a fairly long distance, or that the shooters were situated at a significantly higher elevation.

From a closer distance two more shots were fired from shooters on approximately the same elevation of the victim. Crossbow wound L was caused from someone behind and to the right of the victim and lodged itself into the back of the left scapula. The next projectile entered the left eye (wound F), and was either fired from someone else or the victim turned and received this last bolt in the left eye. Penetrating the eye and the thin wall of bone protecting the brain, the victim at last fell landing on his right side. As the man lay bleeding another shot was fired hitting the top of the skull. The final blow was directed from a heavy bladed weapon (axe or sword), and split the left side of the skull open, ending this bloody encounter.

Of course, multiple scenarios are plausible, but some things are certain: several bolts must have been fired from a distance, judging by their angle of impact, or the shooters had a height advantage, e.g. they were situated on a hill, or the man was in a kneeling position. Only wounds F and L were shot from a closer distance or from people on level ground, while wound C appears to be made while the victim was lying on the ground. Second, there was a hand-to-hand fight with at least one person. Third, the cluster of wounds on the skull suggests that the head was intentionally targeted and perhaps suggests that the victim was wearing armour on other parts of his body. Finally, all wounds came at around the time of death since there are no signs of healing. This is not to say,

though, that there could not have been several encounters that took place up to several hours apart.

The nature of this conflict is unknown, and only one other individual from Kaberla had a cranial wound, but only the skulls from this site have been completely analysed. However, since cranial injuries are by far the most common injury during armed aggression, it is safe to assume that the cemetery does not represent a war grave, leaving us to ponder the circumstances for the man's savage demise.

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MITMEKORDSETE VIGASTUSTEGA KOLJU KABERLAST

Resiime

Agressiivsus ja inimestevaheline vägivald on käitumisjooned, mida esines juba *Homo sapiens* algusaegadel ja isegi enne neid. Jälgi inimeste julmusest võib tihti leida ka arheoloogilises materjalis, kusjuures paleopatoloogide ülesanne on seesugust käitumist rekonstrueerida. Mitte iga traumajalg inimese luustikul ei ole veel tõend selle kohta, et talle on taotluslikult haiget tehtud; mõned märgid tulenevad lihtsalt inimese läbikäimisest oma loodusliku keskkonnaga. Mõnel puhul on relvad jätnud inimese luudele jälje, mis aitab taastada inimese huku põhjustanud sündmused. Üks niisugustest juhtumitest tuli päevavalgele Põhja-Eestis Kaberla kalmistul.

Kaberla kalmistult on leitud 242 matust, mis pärinevad 12.–17. sajandist. Siin käsitletav luustik (nr. LI), millel panuseid ei olnud, tundub olevat pärit 14.–15. sajandist. Nõnda lubab otsustada surma toonud ammunoolte dateerimine nende poolt skeletile jäetud jälgede põhjal (Ain Mäesalu suulised andmed).

Luustik LI on hästi säilinud ning enamik selle luudest olemas (tab. 1). Kahjuks aga puudub vaagnaluu, mis aitab kõige täpsemini sugu kindlaks määrata. Sellele vaatamata ei jäta skeleti robustsus kahtlust, et see on kuulunud mehele (tab. 2).

Vaatlusaluse inimese vanus surmahetkel määrati kindlaks hammaste, luude arengu ja degeneratsiooniastme põhjal. Vanust surmahetkel võib hinnata 30–40 eluaasta vahele (tab. 3). Indiviidi pikkus arvatati pikkade luude põhjal regressioonivalemit kasutades (Trotter 1970) ning tulemuseks saadi 169 ± 3 cm. Kuigi mees oli keskmist kasvu, oli ta väga tugeva kehaehitusega. Koljuehituse iseärasused viitavad ülitagevatele pea- ja kaelalihastele. Tema käed olid samuti suured ja jõulised, eriti silmatorkav oli vasaku deltalihase liitekoht (deltalihast kasutatakse ülakäe tõstmiseks ja kehast eemale liigutamiseks) (joon. 1). Tema vasakul õlal on jälgi artriidist, mis samuti viitab vasaku käe harjumuspärasele kasutamisele. Arvestades ka vasaku käe suurust paremaga võrreldes võibki väita, et mees oli vasakukäeline.

Lihaste kasvu iseärasused ja artriit osutavad sellele, et mees oli harjunud kummardama ja oma vasakut kätt üles tõstma. Selle põhjal võib oletada, et ta oli väljaõpetatud sõdalane, kes kasutas pidevalt oma kätt tõstes rasket relva. Samas tuleb märkida, et luustikul pole märke paranenud murdudest või haavadest, mida oleks võinud sõdalase puhul oodata. Teine võimalus on, et mees oli sepp ja tema tavapärane tegevus oli raske haamri tõstmine. On veelgi ameteid, mida mees võis pidada, aga kindel on see, et ta tegi rasket tööd juba varasest east alates.

Vigastused

Luustikul on mitmeid märke traumadest, mis on saadud erinevat tüüpi relvade toimel. Nendest haavadest kõik peale kahe on koljul.

- Koljul on kuus torkehaava. Haavad on rombikujulised ning arvatavasti ammu-noolte põhjustatud.

A) Haav läbib kolju täpselt ülalpool paremat kulmu; haava piirjoon on selgelt rombikujuline (joon. 2). Nool sisenes suunaga allapoole u. 40° nurga alt. Kuigi nool läbib kolju, ei tunginud see läbi kolju ajuu.

B) Haav asub laubal, 38 mm vasaku silmakoopa küljest kõrgemal (joon. 2). Haav on kujult ja väljanägemiselt sarnane esimesega ning tekkis noole sisene-misest 30° nurga all.

C) Haav on jällegi laubal, aga märksa kõrgemal kui teised – u. 90 mm vasakust silmakoopast kõrgemal (joon. 3). Haava asukoht pea peal (horisontaalist 60° nurga all) viitab sellele, et pea oli viltu, kui nool seda tabas, või lamas ohver paremal küljel.

D) Haav on kolju paremal küljel, 75 mm paremast kuulmiskanalist kõrgemal (joon. 4). Haava kuju ei ole nii selgelt defineeritav kui teistel; tundub, et viske-relva teravik oli kitsam. Sisenumisnurk oli u. 15° .

E) Viies nool lasti ohvrile tagant ja see sisenes parema kiiruloo tagumisse poolde (joon. 4). Jällegi ei ole haav nii selgesti defineeritav kui need, mis tekkisid laupa. Noolel on samasugune sisenumisnurk kui haava D puhul.

F) Kuues nool tabas ohvri vasakut silmakoobast peaaegu horisontaalselt, natuke ülespidise nurga alt (joon. 5). Nool lasti ohvri paremalt küljelt ning see riivas ninaotsa. See on ainuke haav, mis tungis kolju sisemusse. Pärast silma läbistamist jäi nool pidama parema ajupoolkera külgmisse ossa.

- Koljul on viis löikejälge, mille on tekitanud terariist(ad).

G) Esimene on laubal paremast silmakoopast kõrgemal (joon. 2). See on 35 mm pikk, 0,6 mm lai ja mitte kuigi sügav. Haav muutub sügavamaks ja laiemaks alles kolju eespoolele jõudes, viidates sellele, et hoobi suund oli ülevalt alla.

H) Teine löige on ülalpool vasakut silmakoobast (joon. 2). See algab u. 45 mm vasaku silma külgmisest servast kõrgemal ja läheb 41 mm diagonaalselt allapoole paremale u. 60° nurga all. Sellel jäljel on esimesega sarnased mõõtmed.

I) Kolmas löige on kolju tagaosas (joon. 6). See on lühem, aga laiem ja sügavam kui kolju eesosas olevad löiked, viidates sellele, et kasutati teist relva või et samal relval oli kaks erinevat tera. Haav läheb horisontaalist allapoole u. 60° nurga all, selle pikkus on 17, laius 2 ning sügavus 1 mm.

J) Neljas haav on samuti kolju tagapoolel, u. 30 mm eelmisest paremal (joon. 6). See läheb vertikaalselt 29 mm pikkuselt. Haava laius ja välimus viitavad, et selle põhjustas sama tera, mis tekitas kaks löiget kolju eesossa.

K) Viimane löige purustas kolju täielikult ja relv tungis ajju. Haav on u. 70 mm pikk ja asub vasakul kiiruluul (joon. 7). Murd ulatub kolju paremale küljele, aga see on juba murrujoon ning põhjustatud löögijõust. Õige haav on äratuntav selle sirgete ja poleeritud servade tõttu.

- Kaks traumajälge asub luustiku kehaosas.

L) Torkehaav, mille on põhjustanud ammunool, mis tungis ohvri selga, tema vasakusse abaluisse natuke õlanukist allpool (joon. 8). Nool lasti ohvri paremalt küljelt ja horisontaalse nurga all.

M) Väike löikejalg on vasaku kodarлуу proksimaalosas (joon. 9). See on 6 mm pikk, u. 2 mm lai ning 1 mm sügav.

Juhtunu järjekord ja arutelu

Olemasolevatest tõenditest selgub, et mees suri ründajate käe läbi, kes kasutasid sõjarelvi. Haavade jaotus ja erinevate relvatüüpide jäljed viitavad aga suremise iseäranis julmale viisile. Keeruline on taastada konflikti, milles mees osales, sest haavad on saadud nii lähivõitluses kui ka viskerelvadest. Võimalikku stsenaariumi võib siiski ette kujutada järgmiselt.

Mingil hetkel oli mees vähemalt ühe inimesega lähivõitluses. Selle tapluse käigus läbistas kaks lööki lauba (haavad G ja H). Samas sai ta ka löikejälje vasakule käele (haav M). Viimane on väga tüüpiline haav, mis on seotud käe ülestõstmisega, et kaitsta ülakeha rünnaku vastu. Seejärel ta arvatavasti põgenes. See oli kindlasti tark tegu pärast seda, kui ta oma peamisele, vasakule käele löögi

sai. Olles seljaga ründaja(te) poole, sai ta veel kaks lõikehaava kuklasse (haavad I ja J). Ükski nimetatud haavadest ei olnud väga sügav ja et relvad ei põhjustanud luumurde, siis ei olnud ohver sellel ajal veel tingimata teovõimetu.

Mõne aja pärast lasti mehe pihta erinevatest suundadest ammunooli. Haavade A, B, D ja E allapoole suund viitab sellele, et nooled lasti küllalt kaugel maa tagant või olid laskjad palju kõrgemal tasapinnal.

Lähemalt lasti kaks noolt nende poolt, kes olid ohvriga enam-vähem samal tasandil. Ammuolehaava L tekitab keegi, kes oli ohvri taga paremal. Nool kiilus vasaku abaluu taha. Järgmine viskerelv sisenes vasakusse silma (haav F). Selle laskis keegi teine või pööras ohver ümber ning sai eelmise haava tekitajalt noole silma. Kui nool oli silma ja õhukese aju kaitsva luuseina läbistanud, kukkus ohver viimaks paremale küljele. Kui mees seal niimoodi veritsedes lamas, lasti talle nool lagipähe. Viimane hoop tuli raskest terariistast (kirves või mõõk), mis lõi kolju vasaku poole lahti ja lõpetas veretöö.

Muidugi on siinkohal võimalikud ka teised variandid, kuid mõned seigid on vaieldamatud. Esiteks, arvestades noole kehasse sattumise nurka, lasti mitu noolt kaugel vahemaa tagant või olid laskjad kõrgemal, näiteks künka otsas. Ainult haavad F ja L tekkisid lähedalt või samalt tasandilt tehtud laskudest. Haav C tundub olevat tekitatud ajal, kui ohver lamas maas. Teiseks, vähemalt ühe inimesega toimus lähivõitlus. Kolmandaks, mitmed haavad koljul viitavad sellele, et pea oli märklauaks. On ka võimalus, et ohvril oli kaitserüü kehakatteks. Lõpuks, kõik haavad tekitati enam-vähem samaaegselt ja neil ei ole ühtegi paranemismärki. See aga ei tähenda, et ei võinud olla mitu rünnakut, mis toimusid paaritunniste vaheaegadega.

Konflikti põhjus on teadmata. Võib lisada, et ainult ühel teisel isikul Kaberla kalmistust oli peahaav ning et ainult sellest kohast pärit koljusid on seni täielikult analüüsitud. Kuigi koljuvigastused tekkisid kõige sagedamini just relvastatud võitluse ajal, võib oletada, et Kaberla kalmistu ei kujuta endast siiski sõjas langenute matmispaika. Seetõttu jäävad mehe surmaga seotud täpsed asjaolud mõistatuseks.