

Local Variations in Swordsmanship

Metalwork Wear Analysis on eight Swords and a Spearhead from Early Bronze Age Jutland

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ABSTRACT

This study is centered around local variations in swordsmanship in Bronze Age Denmark. This is studied through Metalwork Wear Analysis (MWA) of eight Early Bronze Age swords and one spearhead from Jutland, three of which were studied in greater detail. The material is primarily from period II and III from Aalborg Amt. Results show high levels of swordsmanship but also demonstrate a remarkable difference in wear mark distribution and clustering. Two contemporary but distinct styles of fencing with swords are therefore suggested through MWA. MWA of the spearhead showed signs of slashing use, which shows that the notion of spears being only thrusting weapons, is too simplistic. Finally, the general results of the MWA have been put into its European context, by comparing the patterns to ones from Italy and Britain. The material studied showed different clustering patterns than seen in Italy in Britain. Furthermore, it is suggested that Northern Jutland fencing style was less focused on the binding of sword blades, as well as being based more on sword versus spear combat, than sword versus sword combat, as is the case in Britain and Italy.

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Introduction

This paper is a study of swordsmanship in Early Bronze Age Jutland, primarily northern Jutland. While the study of Bronze Age weaponry in Scandinavia can be traced back to the earliest developments of the field (Montelius 1885, Müller 1895, Rygh 1885), the study of how they have been used is a recent development (Hermann et al. 2020, 1041). The most potent development of this new wave of Combat Archaeology is the use of experimental archaeology and its combination with use wear analysis, which have been coined as Metalwork Wear Analysis (MWA) (Dolfini and Crellin 2016). This allows for greater understanding of martial practices of the past, and serves as the backbone of this study, as we analyze and discuss differences in fencing styles through MWA of eight swords and one spearhead from Early Bronze Age Jutland.

As we started on this project, we examined several palstaves, swords and spearheads for combat wear marks. Nine artefacts, eight swords and one spearhead, were suitable for analysis and served as

the basis of this study. All the artefacts discussed in this study date to the first half of the Nordic Bronze Age (1700-1100 BC). The spearhead and two of the swords were chosen as case-studies for this paper, which serve as interesting evidence of differences in fencing styles in Early Bronze Age Jutland.

Past studies of Bronze Age swordsmanship have generally tried to get an overview of the fencing practices of the period through MWA of a large sample size (Bridgford 2000; Hermann et al. 2020; Horn 2013; Kristiansen 1984). This study has instead focused on a smaller sample size, which has been studied in detail, to understand the specific use wear patterns, rather than a single overarching system (Figure 1). This study attempts to understand the specific use of the two swords and a spear, and the system which governs the technical and martial application of the weapons in question. These results will then be seen in the broader chronological and geographic context, thanks to the study of Hermann et al. (2020).



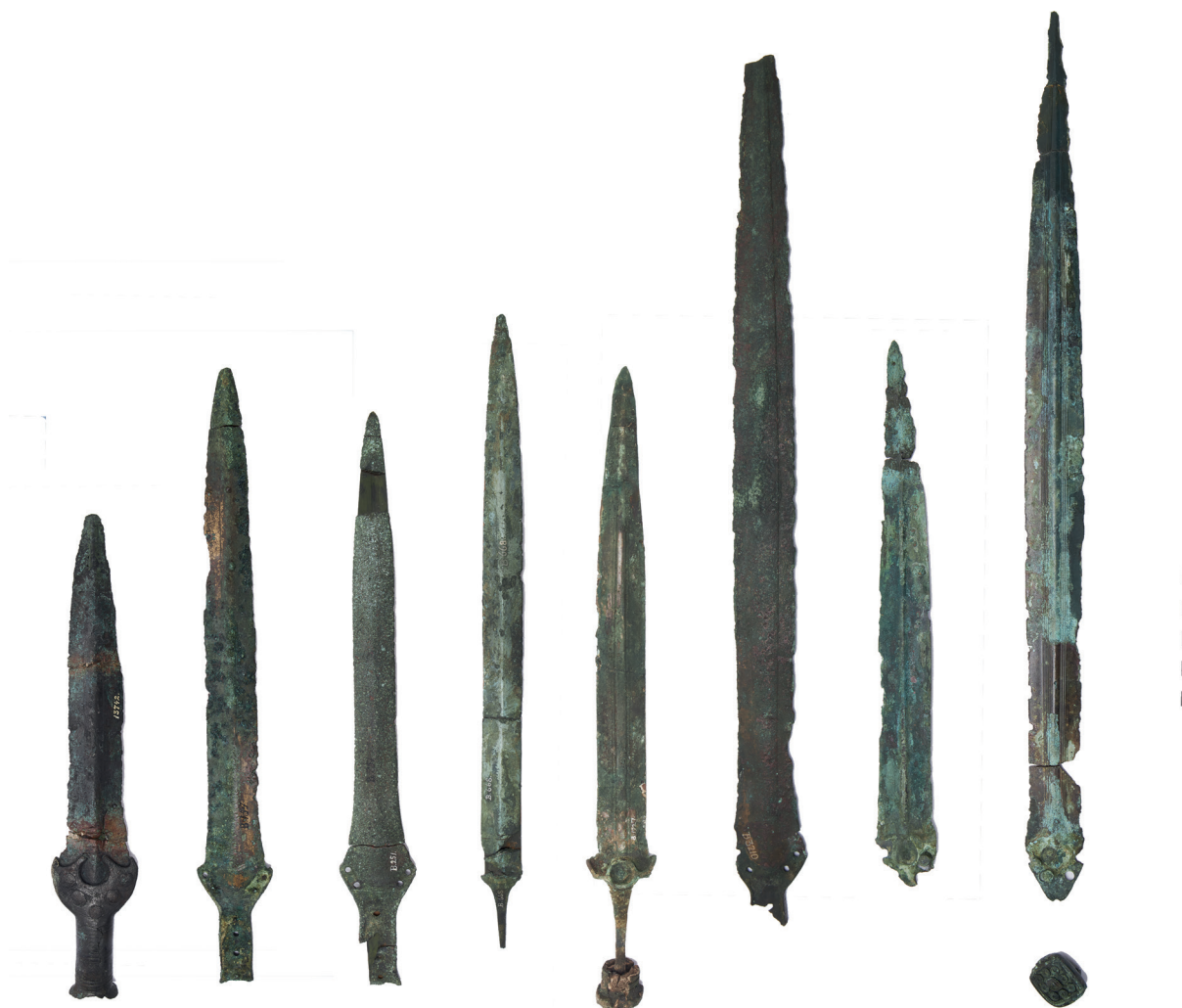


Figure 1. The swords examined in this study. From left to right: 13742, B154, B251, B668, B1927, B3210, B6656, “Sword from Jelling” (Photography: Rasmus Bak Meng, digitally combined by Gustav Hejlesen Solberg, both National Museum of Denmark).

Material

All the weapons were analyzed at the National Museum of Denmark and belong to this museum’s collection. A number of swords, spears and palstaves were first examined to see if they were preserved well enough for MWA to be possible. Two out of three palstaves were excluded from the study, as their edges were too badly preserved. One palstave was examined that was in excellent condition, but it did not have any wear marks and was therefore excluded from the study. Furthermore, multiple swords were not included as their blades were poorly preserved.

Eight swords and one spearhead were chosen to be included in this study. The spearhead and all the swords, except one from Jelling, were found in Aalborg Amt in northern Jutland. The swords date

from period II and period III of the Early Nordic Bronze Age. The swords represent different but generally contemporary types. The material examined in this study was already out of storage and prepared for the *Die Funde* project and was therefore accessible for study by the authors. This ease of access was the main reason for these artefacts to be chosen.

The swords examined were 13742, B154, B668, B251, B1927, B3210, B6656 and a sword from Jelling without an inventory number.

The first sword of these to be received by the National Museum of Denmark is 13742, which was registered in 1854 and is a solid-hilted type, dating to period II. The blade is 23 cm long and is therefore the shortest in this study. The find circumstances for 13742 are unknown.

B154 was registered and found in 1867 and

came from a burial mound in Overlade parish. B154 is a flange-hilted sword dating to period III. This sword was chosen as one of the case-studies.

Another flange-hilted sword is B251, which arrived at the museum in 1968 from pastor Jacobsen from Hobro, was found on a field in Aalstrup parish. B251 is also dated to period III.

The rod-hilted sword, or *griffangel*, B668 is from period III and was registered in 1871. It was discovered in 1868 in a burial mound in Aarestrup parish.

B1927 was registered in 1878, and is a rod-hilted sword, or *griffangel* of Ottenjahn's G2 type (Ottenjahn 1969, 71). It dates to period III, and it was found in a burial mound together with a gold ring in Ulstrup parish.

The flange-hilted sword, B3210, and parts of the leather sheath came to the museum in 1883. The dating of the sword is period II-III. B3210 was found in a burial chamber in a mound together with a tutulus and a comb.

B6656 is the blade of a hilt-plated type, without the tip, featuring a large midrib along the entire blade. It arrived in the museum in 1897. The blade was found in a burial mound in Giver parish. Due to the state of the artefact an exact dating is harder, but most likely period II.

The other focus sword in this study is a hilt-plated sword from Jelling, dating to period III. Little is known of this sword as it has not been registered and only recently found in storage without a museum number.

Lastly, B1693, a spearhead of Valsømagle-type, dating to period IB, was examined in this study. This spearhead was received at the National Museum in 1877 by teacher Petersen from Strandby parish. It weighs 196.4 grams and is 23.6 cm in length.

Method

The material was analyzed through MWA. This method compares blade damage to reference collections of both experimental trials as well as other archaeological examples (Hermann et al. 2020). A Dino-lite digital microscope was used to undertake this task (see Horn 2013, 15 for discussion). Both edges of all the weapons were ex-

amined from the hilt and towards the tip. Every likely wear mark was registered. These were identified according to the system published by Hermann et al. (2020), with the difference that an estimation of the likelihood of the wear marks being produced in combat and not by corrosion was noted for every wear mark. The likelihood was registered as either low, medium, or high, based on multiple factors. These factors are the general preservation of that part of the blade, the presence or lack of displaced material and the likeness of the wear mark's profile to that of the reference collection (see also Horn and Holstein 2017).

To compare the blades of different lengths we chose a similar method as Hermann et al. (2020), and used their formula of $y=(d/D)*100$, where d is the distance of the mark from the tip and D is the sword's total length. Unlike Hermann et al. (2020), we used the length of the blade disregarding the hilt. This was done as some of the grips were not preserved on the analyzed material. These calculations were used in the section *The eight Swords in a European Context*, to compare the generalities of the material studied in this paper, with the Italian and British material studies by Hermann et al. (2020).

Most of the use wear could be categorized according to Herman et al. (2020). Two possible wear marks were found on a sword from Jelling that did not correspond with any wear registered by Hermann et al. (2020), Horn (2013), Kristiansen (2002) or Hester (2018). On the sword from Jelling was an indentation which looked similar to what Hermann et al. call 'toothed notch', which they have not been able to reproduce in experimental trials. The major difference is that this wear mark has rounded sides, where the toothed notch has straight edges (Figure 2).

On the same sword was a mark which seems to be a notch on the blade with an almost square profile (Figure 3). This has some similarity to the straight graze or sharp notch and could perhaps be explained as a combination of multiple different types of wear marks being produced on top of one another. This type of notch has not, to the authors' knowledge, been seen on any other blades until now.



Figure 2. An unidentified type of wear mark with rounded sides on the sword from Jelling (Dino-lite photograph: Gustav Hejlesen Solberg, National Museum of Denmark).



Figure 3. An unidentified type of wear mark with an almost square profile on the sword from Jelling (Dino-lite photograph: Gustav Hejlesen Solberg, National Museum of Denmark).

Some of the wear marks were difficult to determine what category they should be ascribed to. Round notches, indentations, wide-angled notches, and rectangular indentations all share general morphological aspects in their profile. These wear marks exist on a spectrum that defies the categorization at some points. During the analysis, and with the later work with the results, some wear mark categorizations were changed, as our experience with the categorization grew. Furthermore, determining wear surrounding breaking points of blades can be difficult, and was for that reason not included in this study (Horn 2013, 14).

Two of the swords examined, B668 and B251, have in the process of preservation been glued to a piece of wood. This did not just make it more difficult to determine the weight of the objects,

it also made MWA more difficult, as the wood interfered with the outline of the edge. Despite this, it was still possible to do an adequate and satisfactory MWA on these swords.

A report was produced for each weapon with a picture of each wear mark alongside general information, like length, weight and point of balance. These have then been simplified into a spreadsheet with all the information of the wear marks, which has served as the basis of the use wear analysis of each weapon which will be presented in this article.

Relevant wear marks on the studied artefacts were interpreted with a focus on *Diagnostic Combat Marks* and *clustering* (Hermann et al. 2020, 1057-1061). Diagnostic combat marks are types of wear marks that can be attributed to specific fencing

actions, through experimental trials (Hermann et al. 2020, 1057; Gentile and Van Gijn 2019; Gentile, van Dijk and Ter Mors 2024). These are of particular interest for this study, as they can tell us how different parts of the blade were used. Clustering refers to the close distribution of wear marks. If wear marks are clustered together on the blade, it can show that the one who used the weapon, were capable of repeat behavior, which can be linked to higher levels of swordsmanship (Hermann et al. 2020, 1059). Thus, the study of clusters and diagnostic combat marks, can show patterns of different ways of fighting, or as we will call it, different *styles of fencing*. A style of fencing is defined by a likeness of wear mark patterns across multiple contemporary weapons, as will be shown in the sections below. With a larger sample size, it might be possible to show not just variation in style but perhaps demonstrate different schools of fencing. MWA is still a new approach and under development (see Dolfini and Crellin 2016). Revisiting these blades might be possible in a few years, with more possibilities for interpretation.

Results

This section will present the material analyzed in this study, with a focus on the material that was not chosen for the case-studies, as the two swords

and spearhead and their wear marks are described in their respective case-study.

- The sword 13742 shows signs of use in the form of wide-angle notches (3), sharp notches (3), round notches (3), double notch (1), straight graze (1) and curved graze (1).
- MWA of B251 showed micro-notches (10), rectangular indentation (1) and round notch (1).
- The wear marks of B668 are wide-angle notches (4), micro-notches (2), bulge (1), sharp notch (1) and round notch (1).
- The wear marks of B1927 consists of rectangular indentations (2) and micro-notches (6).
- The wear marks of B3210 comprises of wide-angle notches (5), sharp notches (2), round notches (6), rectangular indentations (5), straight graze (1), irregular graze (1), curved grazes (2) and micro-notches (4).
- The wear marks of B6656 consists of wide-angle notches (3), sharp notches (2), round notch (1), rectangular indentation (1), double notch (1), straight graze (1) and micro-notches (2).

In total the study revealed 134 wear marks comprising of wide-angle notches (18), sharp notches (10), round notches (14), double notches (2), indentations (20), rectangular indentations (16), a bulge (1), straight grazes (3), irregular grazes (4),

Inv. Nr:	B 3210	B 1927	13742	B 1693	B 154	B251	Jelling	B 6656	B 668	Total
	(Spear)									
W-A. notch	5	0	3	0	2	0	1	3	4	18
Sharp notch	2	0	3	0	0	0	2	2	1	10
Rd. notch	6	0	3	0	0	1	2	1	1	14
Db. notch	0	0	1	0	0	0	0	1	0	2
Indentation	0	0	0	1	3	0	16	0	0	20
Rect. indentation	5	2	0	1	2	1	4	1	0	16
Bulge	0	0	0	0	0	0	0	0	1	1
Tip pressure	0	0	0	0	0	0	0	0	0	0
St. graze	1	0	1	0	0	0	0	1	0	3
Ir. graze	1	0	0	0	1	0	2	0	0	4
Cu. graze	2	0	1	0	0	0	1	0	0	4
Micronotch	4	6	0	0	10	10	5	2	2	39
Others	0	0	0	0	0	0	3	0	0	3
In total	26	8	12	2	18	12	36	11	9	134

Table 1. Overview of all wear marks found during this study (Andreas Jæger Manøe Schäfler).

curved grazes (4), micro-notches (39), a compression cut (1) and two different unknown wear marks (2) (Table 1).

Discussion

This section will discuss the implications of the registered wear marks, specifically in relation to the three weapons analyzed in separate case-studies. The case-studies aim to relate the results to other studies of Bronze Age weapons and add to the discussion of fencing in this period. Finally, the last section will discuss how the distribution of wear marks across all eight of the swords, relate to the tendencies seen in Italy and Britain.

Case-study: Spearhead B1693

This spearhead of Valsømagle-type was the only spear examined for this study. Other than the wear marks, it is worth noting that the bottom edge of the spear has been resharpened from the middle towards the end of the edge (Figure 4). This was the only case of resharpening that was found during this study.

Horn (2013) analyzed 154 spearheads from Southern Scandinavia for wear marks, which is the largest study of Early Bronze Age spearheads from the study area, as other weapons, particularly the sword, have received the majority of the attention of scholars (Bridgford 2000; Bunnefeld 2016; Hermann et al. 2020; Kristiansen 1978, 1984, 2002; Molloy 2011). Of the spearheads examined by Horn (2013), a total of 127 showed signs from use with the majority of wear marks being notches and curvature or bending.

During MWA of the spearhead two wear marks were discovered (Figure 4). These were on the same side of the edge. These were a rectangular indentation and a normal indentation. In Horn's (2013) study, which does not differentiate between rectangular indentation and other indentations, 37% of the studied spearheads have indentations. The two most common types of wear are not present on this spearhead.

The rectangular indentation was only produced in the testing of Hermann et al. (2020, 1058-1059) when a blade is being blocked by a static parry by another weapon. This type of wear mark is only produced on the slashing weapon, and not the defending one. This points to the likelihood that B1693 was not a spear only used for thrusting, but it was also for slashing (Horn and Karck



Figure 4. MWA of B1693. The rest of the “indentations” which seem to be on the blade all look more like the product of corrosion rather than use (Photography: Rasmus Bak Meng, Dino-lite photography: Gustav Hejlesen Solberg, both National Museum of Denmark).

2019, 11). In the case of this spear, it shows none of the signs that one would expect from a thrusting weapon, i.e., tip-pressure and bending, but two cases of wear that correspond with slashing use.

Furthermore, the idea that spears were not only used for thrusting and throwing, but also shows use of striking or slashing, is not only evident on the spear analyzed in this study. This is further supported by a study conducted by Anderson (2011), that through experimental testing and MWA of Late Bronze Age spearheads from Britain showed that those too were used not only for thrusting. This does not mean that spears were not used for thrusting, but the notion that ‘spears are for thrusting’ is too simplistic (see also Tarbay et al. 2021,15). Recent studies attribute tip-pressure and bending to be prevalent of one-handed spear usage, which could point to B1693 being used in a two-handed manner (Gentile, van Dijk and Ter Mors 2024, 11). The dichotomy of ‘thrusting sword or cutting’ has also been criticized by Clements (2007), who showed that this is a modern way of thinking. B1693 supports this notion that a great value of a weapon is being able to use it in multiple ways.

Case-study: Sword B154

The sword B154 is a flange-hilted sword from period III and was acquired by the National Museum in 1867 from a headmaster from Borregård, in Ranum parish. It has a weight of 320.9 g and a length of 42.8 cm. This sword showed 27 signs of use. These include indentations (3), rectangular indentations (2), flattening (1), micro-notches (10), irregular graze (1), and blow marks (11). The blade is generally well preserved, and MWA was possible on most of the blade. The tip is not connected to the rest of the blade anymore but could be refitted with confidence.

This blade shows signs of measured, well trained, and high levels of swordsmanship (Hermann et al. 2020, 1072). The blow marks on the side of the blade show a remarkable concentration (Figure 5). Eleven blow marks are concentrated on a section measuring 1 cm in length on the flat of the blade. On this area of the blade there is no verdigris, which give doubts about the authenticity of these blow marks. There are numerous spots on both sides of the swords without verdigris. There can be a large variation of verdigris, even on objects from the same hoard, such as the Torsted and Viby hoards (Becker 1965; Jensen 1978, 19). No blow marks were visible on the other

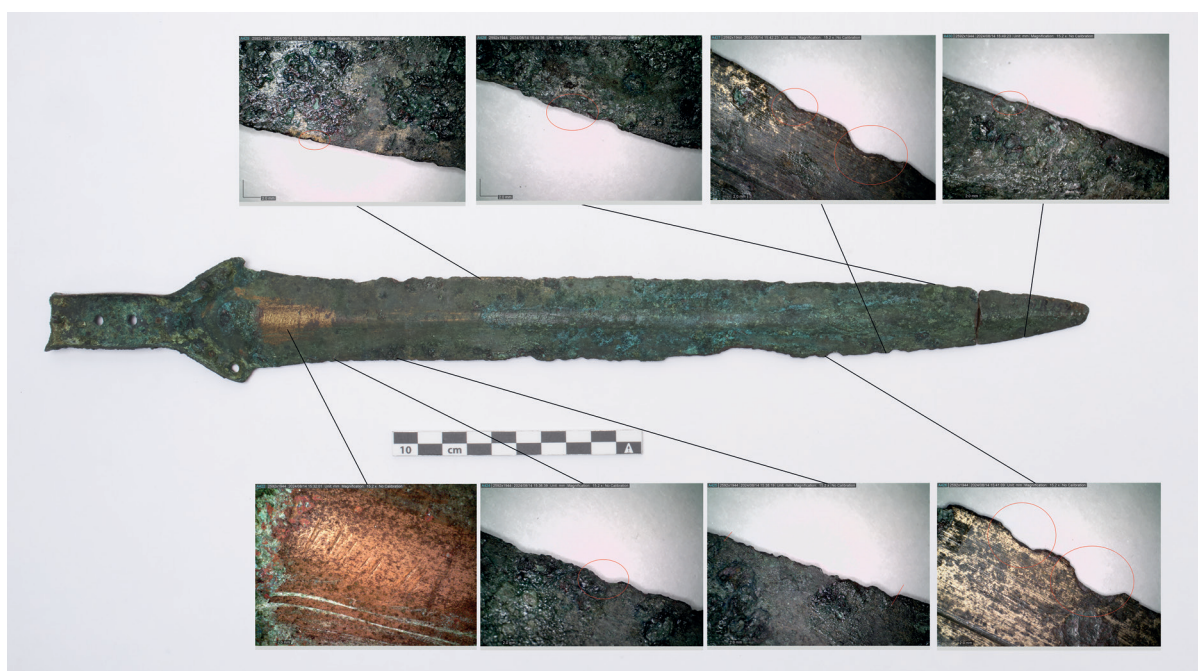


Figure 5. MWA of B154 (Overview photography: Rasmus Bak Meng, Dino-lite photography: Gustav Hejlesen Solberg, both National Museum of Denmark).

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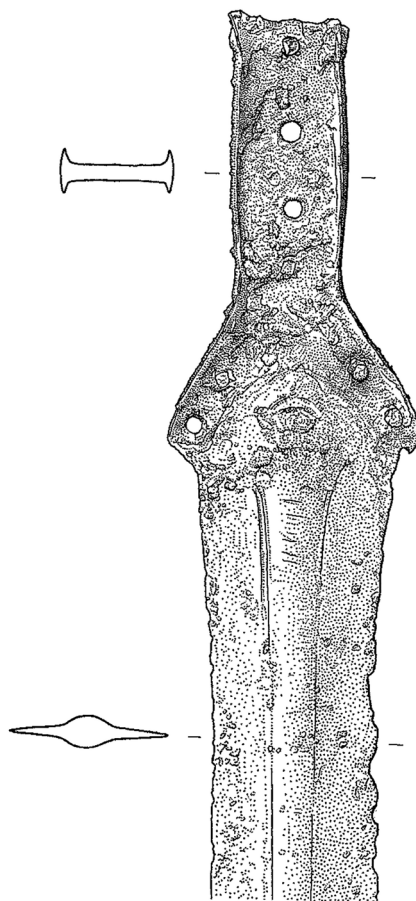


Figure 6. Drawing of B154 from the unfinished publication of Aalborg Amt for the project “Die Funde der älteren Bronzezeit des nordischen Kreises in Dänemark, Schleswig-Holstein und Niedersachsenen”. Note how the blow marks are visible on the side of the blade. The drawings are produced to a degree where preliminary MWA can be undertaken without having the object in hand (Drawing: Poul Wöhliche).

side of the blade. One side of the blade measures 13 total wear marks, as the other only measures three, pointing to the weapon being held in the same way each time it was in use, with there being a dominant and a non-dominant edge. The same tendency of having more wear marks on one edge over the other was also observed on the swords 13742 (8 to 3), B1927 (6 to 2) and B251 (11 to 1).

From 6.0 cm to 7.4 cm from the grip is located a cluster of nine small notches on the dominant edge. Only one other micro-notch is seen on the non-dominant edge of the blade. Micro-notches have been argued to be a by-product of other marks and are usually found together with larger

wear marks (Hermann et al. 2020, 1059-60). This is not the case with this sword. It could be a possibility that the concentration of blow marks and the cluster of micro-notches are signs of the sword being used in training rather than in full speed fighting. The repetition of movements in training could very well leave intense clusters on specific parts of the blade as seen in this example.

Furthermore, this sword showed two cases of rectangular indentation. These are located close to each other circa 23 cm from the grip. In the experiments by Hermann et al. (2020, 1058-1059), rectangular indentations were produced exclusively on the attacking sword when it hit a static block. This is perhaps a situation one would expect to be more likely to happen in a training situation than in an actual combat situation. Hermann et al. (1058-1059) also mentions that they have a group of four archaeological swords that show rectangular indentations and bending, which they hypothesize were achieved from the user trying to parry with the flat of the blade. The sword, B154, does not show any signs of bending, but it does have blow marks on the side of the blade, which could further support this hypothesis. Hermann et al. (1059), further hypothesize that due to one of their swords being damaged during a parry with the flat, that ‘(...)one presumes that Bronze Age fencers would have avoided flat parries as much as possible’. B154, with its cluster of eleven blow marks to the flat of the blade, shows clear signs that flat parrying was practiced intentionally in the Bronze Age (Figure 5, Figure 6).

These rectangular indentations form a group with an irregular graze and indentation on the dominant side and flattening and an indentation on the non-dominant side. These are all connected to attacking actions in the experiments by Hermann et al. (2020, 1057-1058). These marks are all grouped between 23 cm to 31 cm from the grip and show up on both sides of the edge. It therefore seems that there has been a strong preference in the training with, or the use of, this sword to parry with the flat of the blade, or the dominant edge close to the grip, and attack with both edges with part of the blade that is closest to the tip. This corresponds with the tendency observed by Kristiansen (2004, 178) on other swords from Denmark and Hungary, where the

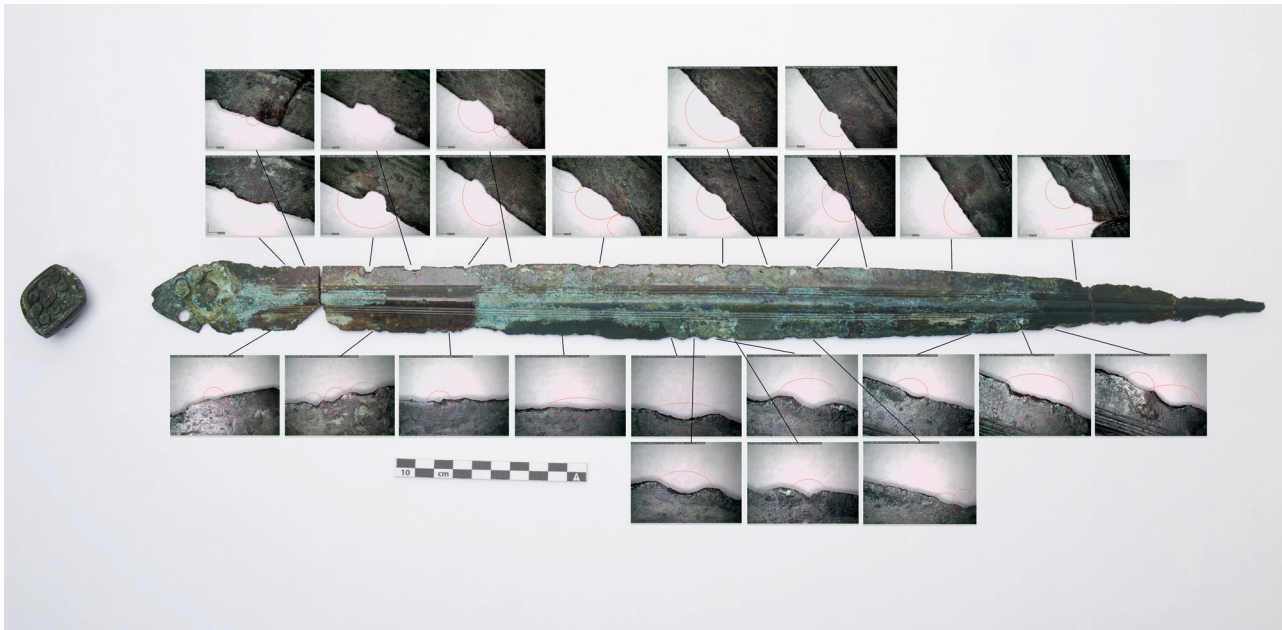


Figure 7. MWA of the sword from Jelling (Overview photography: Rasmus Bak Meng, Dino-lite photography: Gustav Hejlesen Solberg, both National Museum of Denmark).

part of the blade closest to the grip is generally used for defending and the tip is usually used for attacking. The remarkable concentration of these wear marks is clear evidence of the deliberate martial technique, which served as foundation for this sword's use.

Case-study: Sword from Jelling

This sword was uncovered in Jelling and is a hilt-plated type and is dated to period III. Unfortunately, no museum number is associated with the find and information about it has been lost. It weighs 563 g and has a length 59 cm without the handle. The pommel cap is preserved but no longer connected to the blade (Figure 7).

This sword shows 38 signs of use. This was the highest amount of any of the eight swords that were examined in this study. These include indentations (16), round notches (2), rectangular indentations (4), flattening (2), micro-notches (5), irregular grazes (2), sharp notches (2), curved graze (1), wide-angled notch (1), compression curl (1) and two unidentified types of wear mentioned in the method section. The last c. 8 cm of the tip is not preserved to a degree that it can be examined for wear marks.

In contrast to the sword B154, which showed a clear favor of one edge above the other, the same cannot be said for this sword. 18 of the wear marks are on one edge and 20 are on the other. This points to a different fencing style that utilizes both sides of the blade equally, compared to the other. The other possibility is that the wielder of the sword had no preference to which way it should be held, thus changing which way the sword is held between uses. Another explanation is that it was wielded by multiple people during its use time. According to Bunnefeld (2022, 76), a sword is mostly buried with its owner and most likely shows the fencing style of the buried individual. Therefore, if we accept that swords are tied to an individual, then the explanation that the sword from Jelling was used by multiple people should be dismissed. Furthermore, the same pattern of wear marks is also seen on the swords B668 (5 to 4) and B6656 (6 to 6).

Looking at combat indicative marks on this blade, it also shows a clear variation of fencing technical application compared to that was seen on B152. Firstly, rectangular indentations appear on this blade four times. These are located as close as 4 cm from the grip, all of them below 16 cm. This stands as a contrast to what was examined on B152, where signs of attack were located near the point of the blade. The sword from Jelling

does have attacking marks closer to the tip of the sword, namely two irregular grazes, the furthest being at 41.5 cm. This blade does not comply with the tendency put forth by Kristiansen (2004, 178), that the part of the blade closest to the hand is used to defend and the tip is used to attack.

The same can be seen on the sword B3210 which also has rectangular indentation 4.5 cm from the grip and 51 cm from the grip. This sword has 10 wear marks on one edge and 17 on the other, thus the fencing style used with this sword does show similarities with the sword from Jelling.

This is not to say, that the use of the sword from Jelling does not have a pattern. There are multiple clusters present on the blade, which show that repeatable actions while wielding the blade did occur. Close to one of the rectangular indentations at 4 cm from the grip there is a sharp notch and two micro-notches within 0.5 cm. This could point to it not being the only time this part of the blade was used to attack. The same could be argued for the rest of combat indicative marks on the blade. All except one of them, are placed within 1 cm of another wear mark. Though one should remember that one action can produce multiple wear marks close to each other (Hermann et al. 2020, 1055-1056). In the case of the sword from Jelling, it seems likely that these clusters were not all produced from single actions, as the pattern persists on six occasions.

This blade shows less obvious groupings of wear marks compared to B154, but the fact that this sword has multiple clusters, while other parts of the blade are untouched, do point to the skill of the one who used the sword (Hermann et al. 2020, 1072). It shows a clear difference in fencing technique that is usually ascribed to chronological, geographical, temporal, or personal differences. But as this sword is from a region close to the other swords, and other swords from Northern Jutland show the same pattern, also from the same period, it seems likely that at least two different styles of fencing existed at the same time and place. Nonetheless, the sword from Jelling is a testimony of a fencing system that uses the entire blade for attack, and perhaps also defense, which includes attack with, in fencing terms, the strong of the blade (Hester 2018, 43).

The eight Swords in a European Context

As the method of MWA is applied to an increasing number of weapons from various places and time periods, regional and temporal differences in swordsmanship become increasingly evident. Kristiansen (2002, 2004) argues for a homogeneous fencing style being present throughout Europe based on wear analysis of swords from Denmark, Hungary, and Austria. Though it should be mentioned that he argues for a change in fencing style from being dominantly based around stabs, to being based around cuts in the transition from period II to III in the Nordic Bronze Age (Kristiansen 1984, 194-195). This argument is based primarily on the typological development of blade shapes as well as resharpening of the blades, rather than use marks. As the swords 13742 and B6656 are dated to period II and B3210 could be from period II as well, and the rest of the swords being from period III, one could expect this change to be visible in this study, but this is not the case. Though it might be, if a larger sample size was examined.

The detailed study by Hermann et al. (2020) on the other hand has shown temporal and spatial variations of wear marks, which they have argued to show an evolution of swordsmanship. Their study is based on swords from four periods of the British Bronze Age; Penard, Wilburton, Ewart Park and Llyn Fawr, and two periods of the longer Italian Bronze Age; the Middle and Recent Bronze Age. Most striking is the lack of clustering on the swords from Britain in the Penard period, and the wide distribution of grazes, which Hermann et al. (1072) argue is evidence of an early and immature martial tradition. Having a large amount of combat indicative marks for attacking use of the sword on the lowest part of the blade is seen on these swords, which is not unlike the sword from Jelling and B3210 mentioned in the previous section. But these swords do show clustering, which speaks in favor of them being used in a defined martial tradition.

When comparing the placement of the wear marks on the eight swords, to the Italian and British swords, there are similarities to be found (Figure 8). The swords examined in this paper are equivalent in time to the Middle and Recent Bronze Age in Italy and the Penard and Wilburton periods

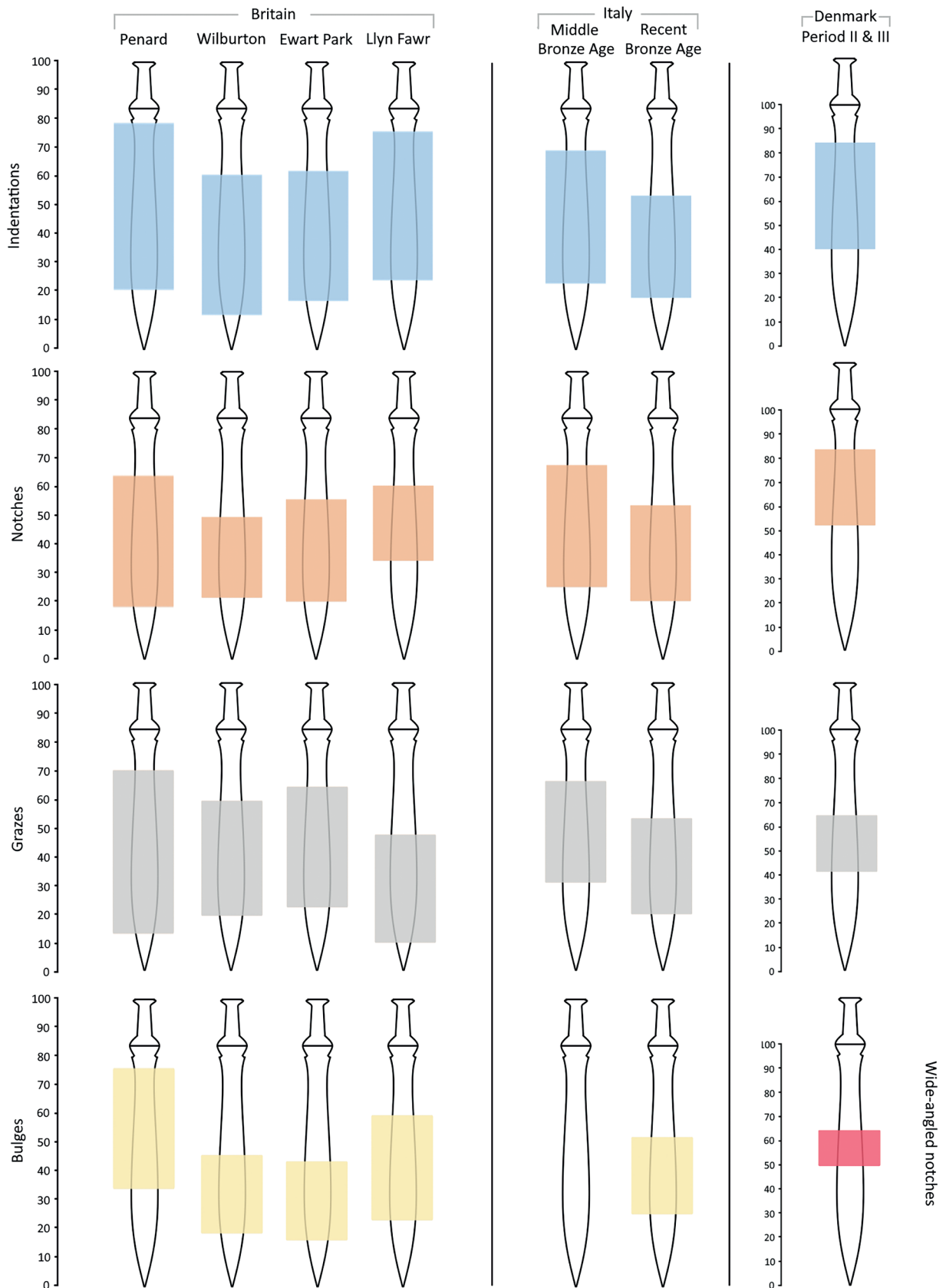


Figure 8. Schematic illustration of MWA patterns observed on material from Britain and Italy after Hermann et al. (2020). Not enough bulges were seen on the material studied for this paper, to include them in the comparison. Wide-angled notches were included as a separate category, as these were common to find in the Danish material, but rare in British and Italian material.

in Britain. It is curious then that there is an apparent likeness between the distribution of notches and indentations between the Early Bronze Age in Denmark and the later occurring Llyn Fawr period in Britain. This is the case with indentations and notches but not grazes. The fact that only eight swords have been analyzed and the fact that are 600 years between the two periods, probably suggests that the connection is only by chance. One should remember that this is based on only eight swords, which have been shown to have been used in different ways, despite their chronological and geographical similarity. More material should be analyzed to better understand the relationship between Bronze Age swordsmanship in Denmark and the rest of Europe.

A notable difference between the weapons analyzed in this study and those from Italy and Britain is the pattern of wide-angled notches found on six of the Danish swords (Table 1). This type of wear mark was rarely observed on British and Italian swords where wide-angled notches were only produced in experiments when the edge of a sword met the edge of a spear (Hermann et al. 2020, 1057). If this is the only way these marks can be produced and they are interpreted correctly, then this could point to the possibility that fencing between spears and swords was more common in the Early Bronze Age of Denmark, than it was in Britain and Italy.

Furthermore, bulges are quite common on the Italian and British swords, which have been argued to be evidence of a fencing style, where blade on blade binding is practiced (Hermann 2020, 1058). Only one bulge was found on the eight swords studied here, that being on B668. This could point to the possibility that fencing in this region was different from the ones practiced in Britain and Italy, by not being based on blade binding. Another possibility is that these swords were used to fight spears more often, as supported by the large amounts of wide-angled notches.

The general conclusion of the distribution of the wear marks on the eight swords included in this study, is that they are different to those found in Italy and Britain, indicating different martial practices. But more importantly, the detailed study of fewer examples highlights the individual vari-

ation of fencing practices. When a large amount of weapons is analyzed in a search for an all-inclusive fencing system, then this is done at the cost of understanding the variation in fencing practices that this article has highlighted. Perhaps, studies like this one will help us understand individual fencers' practices. With enough overlap between patterns of specific fencers, then we can discuss fencing styles shared between a few people. With enough weapons showing similar clustering, then perhaps different schools of fencing could be discussed. Similarities between different schools of fencing can finally point towards tendencies in overarching regional and supraregional martial practices, but only by looking at fencing practices at different levels, can we truly understand the practice. Assuming that a single fencing system exists in a given time and place should be challenged, and looking at smaller groups could improve the study of swordsmanship. If this was expanded upon, then perhaps regional perspectives could be improved, if one were to find a considerable overlap between patterning from different regions.

Conclusion

This study has provided insight into the particularities of fencing styles in Jutland in the Early Nordic Bronze Age. In the small study of eight swords, it is possible to suggest that, at least two, different styles of fencing were likely present at the same time and place. The type of sword did not have any obvious connection with the use wear patterns. One style favored the use of one edge over the other, while the other style used both edges equally. Furthermore, comparing wear marks on original swords to marks produced during controlled testing by Hermann et al. (2020), has made it possible to determine what part of the blade is used for attack, and what part is used for defense. This also varied between the swords studied here, with some showing wear marks connected to the act of attacking throughout the entirety of the blade, while others only had them at specific parts of the blade. Clustering and patterning were common on the swords studied, which show a general high level of swordsmanship, but with a difference in martial

practices. Further studies using MWA of Bronze Age weaponry are needed to better understand the variation of the Danish material, but this paper has shown that even small sample sizes can provide valuable insight into the particularities of different fencing styles.

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