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# Children's clothing and funeral attire in the 10th to 12th centuries in Finland

## Abstract

Four Late Iron Age (900 to 1200 CE) child burials with textile remains were examined to deepen knowledge about child clothing during the Viking Age and Crusade period in Finland. As child burials are rare, an examination of the textile fragments enriches current understandings of children's outfits. The textiles are made of wool and have survived attached to copper alloy jewellery and copper alloy spiral wire ornaments. Twills, a tabby, braids, tablet-woven bands, as well as dyes and evidence of furs were recognised. The textiles contained many elements that are known in the adult graves, but the thread counts are higher and the wool type softer, possibly made of lambswool.

**Keywords:** Children's clothing, Late Iron Age, jewellery, wool, dyes

## Introduction

### *Child graves from the Late Iron Age*

Children have long been underrepresented in archaeological studies (Kamp 2001). This study focuses on the remains of textiles and funeral attire found in four Finnish child graves to better understand the similarities and differences in the material culture of children and adults. Finnish researchers have called attention to the very small number of recognised child burials compared to the probable high child mortality rates during the Late Iron Age (Söyrinki-Harmo 1992a; 1992b; Ylönen 1999, 20–21; Pihlman 2003). Children may therefore not have been buried in cemeteries (Welinder 1998, 185; Wileman 2005, 75, 78–80), or the absence of child burials may be explained by shortcomings in existing research methods (Moilanen 2021, 63).

Due to the acidity of the soil in Finland, bone material is typically not well preserved at burial sites, making it challenging to identify the remains of humans during the Late Iron Age (Moilanen 2021, 62). Children's remains tend to decompose even faster than adults' because of their smaller body mass and lower mineral content (Moilanen 2021, 63). Accordingly, child graves

are mainly identified based on the size of the burial pit or coffin. In other cases, the size of the organic layer left in the ground by the decomposed body has been viewed as an indication of a child burial, even though the overall size of the burial pit would have been large enough for an adult (Söyrinki-Harmo 1992a; 1992b; Ylönen 1999; Lehtosalo-Hilander 2000, 225).

Further, the exceptionally small size of ring ornaments, such as bracelets and finger and toe rings, has been seen as typical indicators of child burials (Lehtosalo-Hilander 2000, 225; Moilanen 2021, 65). It is well-accepted that jewellery was intentionally fashioned in smaller sizes for children, using the same artefact types as for adults. Axes, spearheads, and swords were also made in smaller sizes for children (Hirviluoto 1992, 88, 91; Söyrinki-Harmo 1992a, 581; 1992b, 151; Asplund and Riikonen 2007, 30–31).

The aim in analysing the textiles of the four selected child burials Pöytyä (formerly Yläne) Anivehmaanmäki grave 13, Masku Humikkala grave 15, Salo (formerly Halikko) Rikala grave 22, and Turku (formerly Kaarina) Kirkkomäki grave 35 (fig. 1; table 1), is not only to shed light on the clothing of the children, but also to consider the role of textiles and furs as grave furnishings, and discuss their ritual



Fig. 1: Map of the sites (Image: Krista Wright)

and social meanings. An aspect to consider is what kind of textiles children wore in everyday life. Besides textiles, metal objects such as jewellery, bronze spiral ornaments, and knives belonging to Finnish Late Iron Age attire were also included in this study.

#### *Burial goods and archaeology of death*

During a person's lifetime, different aspects of identity are expressed through the choice of clothing. Presumably such choices were also made in the Late Iron Age to express gender, age, marital status, kin, regional identities, occupation, status, and wealth of the individual (Sørensen 1997). Scholars have also suggested that sometimes grave goods could reflect the identity and status of the deceased in a very direct way. For example, burial goods like jewellery and textile remains have been used to learn about the composition and complexity of society at Eura based on the finds of the Luistari inhumation cemetery (Lehtosalo-Hilander 1982a; 1982b; 1982c; 2000, 225–226).

This socio-economic view of the past has been challenged, though, when the focus of burial studies shifted from making deductions about the way of life to realising that graves primarily provide information about how a society might have viewed death (Nilsson Stutz and Tarlow 2013, 5). Burial goods, burial textiles and accessories may have been part of a dead person's possessions during their lifetime — but they were selected, deposited, and arranged by one or more persons at the time of the funeral (Mäntylä 2007, 302; Ekengren 2013, 177, 179, 181–182). A grave

was thus the outcome of a sequence of actions that had social, spiritual, and emotional meaning for the people performing the rituals (Ekengren 2013, 176–178; Nilsson Stutz and Tarlow 2013, 5).

Focusing on childhood can help researchers to see the archaeological material from a different perspective. Such a focus, connected to questions of identity and agency, can broaden interpretations of societies previously based on studies of adults (Lucy 2005, 50; Vehkalahti 2022, 17). It further enriches scholarly understandings of the past, even though the archaeological record contains only limited material on Late Iron Age children in Finland.

#### **Archaeological background**

The textiles and accessories selected for this study come from Late Iron Age and Early Medieval (10th to 13th centuries CE) inhumation cemeteries. The longest period of activity occurred in Pöytyä Anivehmaanmäki, a cemetery used for six to seven generations (Hirviluoto 1996, 3). Salo Rikala, Masku Humikkala, and Turku Kirkkomäki cemeteries were used by one household or family, each consisting of eight to ten persons, for several generations (Mäntylä 2006, 61; Asplund and Riikonen 2007, 40). The four child burials were selected because organic material had survived better in comparison to other contemporary child burials (Söyrinki-Harmo 1992b; Asplund and Riikonen 2007). They also lacked proper textile analysis and had never undergone any chemical treatments that could harm sampling or identification of dyes.

#### *Pöytyä Anivehmaanmäki*

Pöytyä Anivehmaanmäki cemetery was excavated from 1954 to 1957. The artefacts reveal that the site was in use between the 8th to 11th centuries (Hirviluoto 1996, 3). Altogether, 83 inhumation graves were identified. Only three were child burials, determined on the presence of small ring ornaments and osteological analysis (Söyrinki-Harmo 1992b, 145–146; Salo 2019, 7; Moilanen 2021, 64–66). The graves were marked by stone settings.

In grave 13 (fig. 2; table 1) the length of the burial pit was approximately 170 cm, but the finds were concentrated in an area approximately 60 cm long, indicating a child's burial (Hirviluoto 1955, 15–16; 1996, 3). However, based on the double burial, Anivehmaanmäki grave 47, which had similar features (Moilanen 2021, 64–66), it cannot be excluded that grave 13 is also a double burial.

A few finger bones and some fragments of hand bones were found together with a broken copper



Child burial	Cemetery data	Spiral ornaments	Brooches	Bracelets Finger rings	Other jewellery	Other findings
Pöytyä Anivehmaanmäki						
Grave 13: NM 13839: 363–370. Baby. Grave pit 170 cm long, finds at 60 cm long area.	8th–11th centuries CE. 83 burials, three children  Excavated 1954–57	:364 three braids with spiral tubes	:367 copper alloy penannular brooch, Ø 3.5 cm  :369 copper alloy penannular brooch, Ø 4.9 cm	:365 copper alloy bracelet, Ø 4 cm  :366 pieces of copper alloy spiral finger ring, Ø 1.3 cm	:368 pieces of copper alloy rings, Ø 1.8 cm.  :368 pendant with spiral-formed arms	:363 ceramic pot  :370 iron knife  :366 three finger bones
Masku Humikkala						
Grave 15: NM 8656: 15H:1–5. 1–2 years old child. Grave pit 120 x 25–28 cm.	11th–13th centuries CE, 56 burials, eight children  Excavated 1925	:4 spiral tubes and fan-like ornaments from apron	:1 copper alloy penannular brooch, Ø 3.35 cm	:2 and :3 copper alloy bracelets, Ø 3.95 cm	-	:3a twill piece  :5 iron knife
Salo Rikala						
Grave 22: NM 12690: 349–355. Baby. Grave pit 80 cm long.	11th–12th centuries CE, 40 burials, at least four children.  Excavated 1950–1953, 1976–1978	:351 and :352 spiral rosettes	-	-	:349 copper-alloy ring (from belt?)  :354 top half of a copper-alloy sleigh bell  :355 pieces of a copper-alloy chain	:350 iron knife
Turku Kirkkomäki						
Grave 35: NM 27196: 35001–35079. Child 0.5–3 years old. Buried in pine coffin 123 x 30 cm	11th–12th centuries CE, 43 burials, 11 children.  Excavated 1950, 1962, 1983, 1984, 1991, 1992	:35002, :35003, :35033, :35034, :35035, :35037, :35038, :35039, :35041, :35042, :35060, :35061, :35064	:35005: silver alloy penannular brooch, Ø 3.8 cm  :35029: copper alloy penannular brooch, Ø 2.1 cm	-	:35006–35028, :35043–35057, :35065–35079 glass beads of necklace :35031: necklace's silver coin from Byzantium (977–989 CE) :35032 and :35059 sleigh bells	:35001 and :35040: ceramic pots  :35004: iron knife  :35041: linden mat, birch bark box  :35030: three teeth

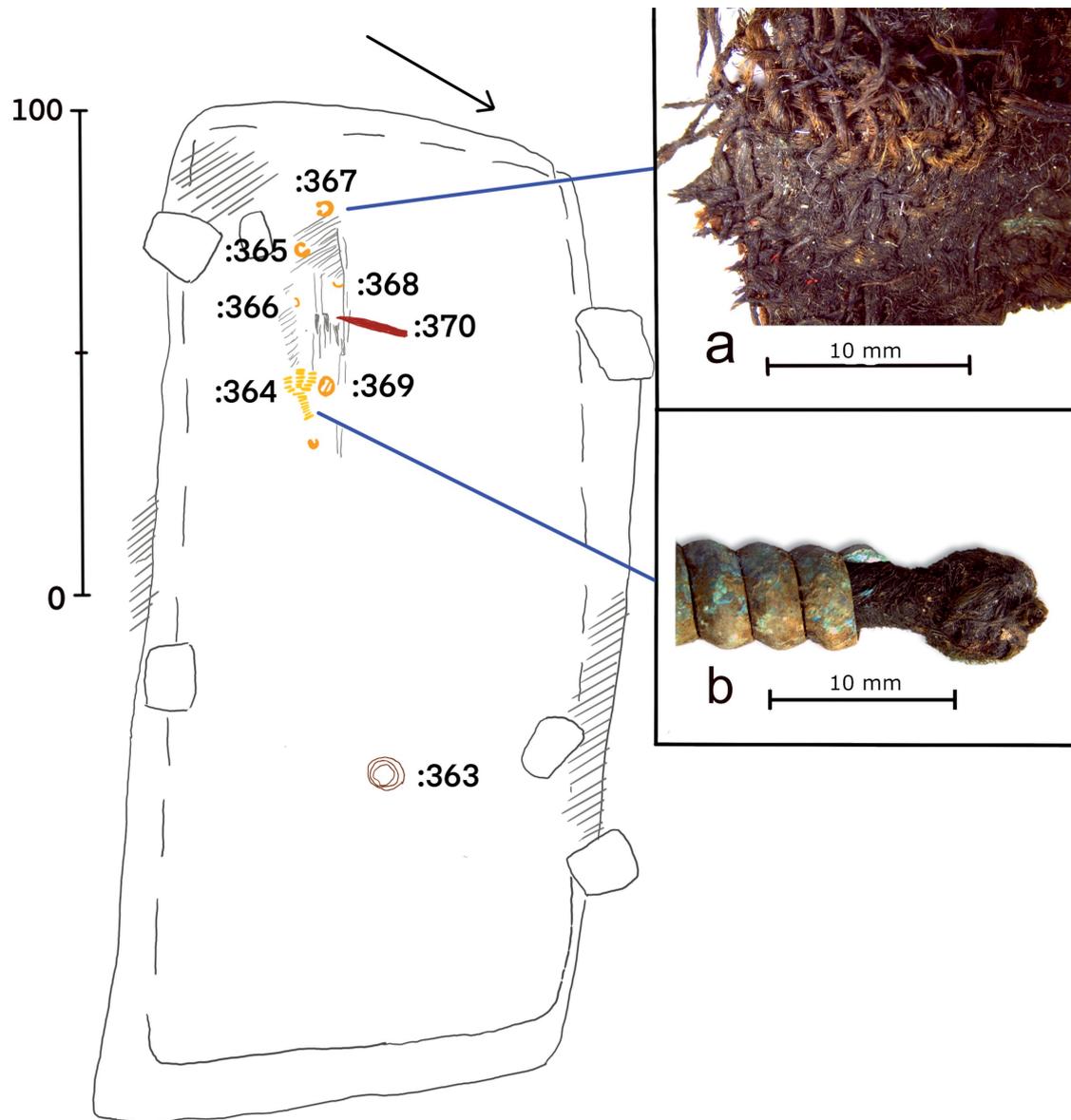
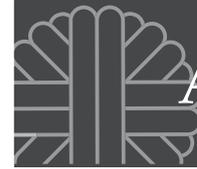


Fig. 2: Schematic map of Pöytyä Anivehmaanmäki grave 13: a – 2/2 twill fragment under penannular brooch NM 13839:367; b – a piece of the three-element braid (NM 13839:364) with spiral ornaments from Pöytyä Anivehmaanmäki (Images: Jenni Sahramaa, after Hirviluoto 1955)

alloy spiral ring (NM 13839:366). A copper alloy bracelet (NM 13839:365), with V-ornaments of a type common in Scandinavia and the Baltic region during the Viking Age, had probably been worn on the right hand (Hirviluoto 1955, 15; Kivikoski 1973, 102). Of the two penannular brooches (NM 13839:369 and NM 13839:367) also common during the Viking Age

(Kivikoski 1973, 95–96), the smallest was attached to a textile fragment. Based on the size of the ring ornaments, the deceased was probably a small child (Hirviluoto 1955, 16; Söyrinki-Harmo 1992b, 145). Inside the grave three braids with copper alloy spiral tubes (NM 13839:368) were also found. Other objects were an iron knife (NM 13839:370) and an unidentified small copper alloy object with two spiral-shaped arms (NM 13839:368) with no exact parallels. A small ceramic pot (NM 13839:363) covered with a hide was discovered in the central part of the grave pit.

Table 1 (left side): Archaeological data and materials from the examined graves. NM refers to the collections at the National Museum of Finland

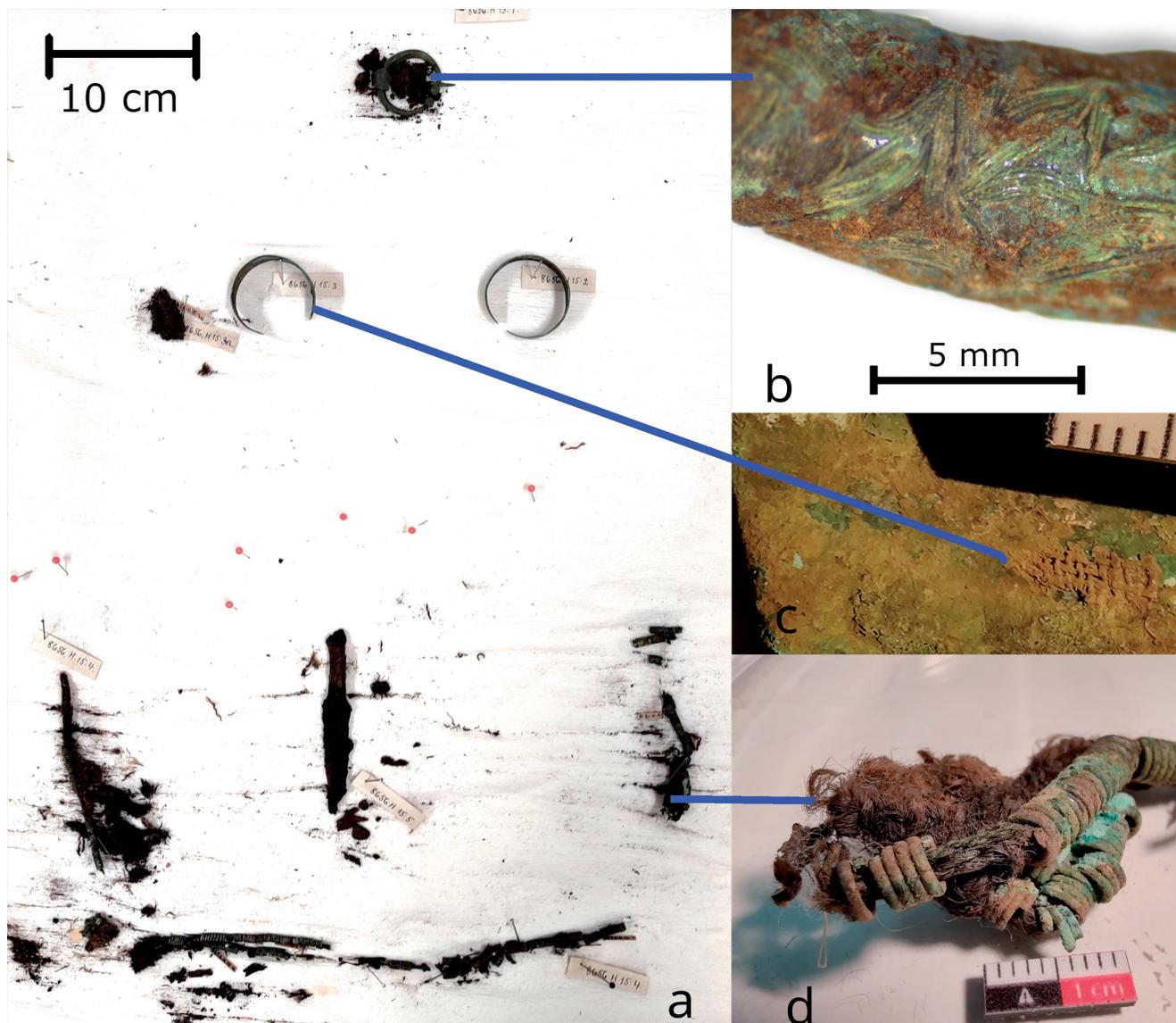


Fig. 3: Masku Humikkala grave 15: a – items archived according to their location in the grave; b – the penannular brooch NM 8656:15H:1 with hair pseudomorphs; c – the bracelet NM 8656:H15:3 with plant fibre tabby; d – an apron spiral ornament (NM 8656:H15:4) (Images: Krista Wright)

### *Masku Humikkala*

Masku Humikkala cemetery was excavated in 1925, when 56 inhumation graves were found. Eight were possibly child graves. The site has been dated to the 11th to 12th centuries based on coins found in the graves and the general typology of the grave goods (Pälsi 1928, 73; Salmo 1956, 59–63; Kivikoski 1973, 103, 135–136). A recent radiocarbon 14 dating from grave 32 suggests continued use until the 13th century (Saari 2022, 80–81).

In grave 15 (fig. 3; table 1), the burial pit was 120 x 25–28 cm in size, and it possibly belonged to a child of two years of age or younger. Based on the dark

shade of the soil in the grave pit, the deceased was less than 90 cm tall. No preserved bones were found. The burial contained small copper alloy bracelets (NM 8656:15H:2 and :3), found near the chest area of the grave (Pälsi 1925, 36; Söyrinki-Harmo 1992b, 151). It is the only grave in the Masku Humikkala cemetery that contains bracelets (Söyrinki-Harmo 1992b, 151). The textile remains were found near a small penannular brooch (NM 8656:15H:2), bracelet (NM 8656:3), and tubular and fan-like spiral decorations (NM 8656:4). Organic material had survived due to direct contact with the copper alloys of the jewellery. The burial also contained a small iron knife (NM 8656:5).



**Salo Rikala**

At least two separate burial grounds have been identified at the Salo Rikala site, excavated from 1950 to 1953 and 1976 to 1978 (Leppäaho 1953; Mäntylä-Asplund and Storå 2010). Of the more than 40 excavated inhumation graves, at least four have been identified as child graves (Mäntylä 2006, 58).

In grave 22 (fig. 4, table 1), all the burial goods (NM 12690:349–355) were found in the presumed head area of the burial pit, which was only 80 cm long (Leppäaho 1953, 29–30). No bone remains were found in the burial pit, but the size of the pit suggests that it belonged to a baby. The burial contained pieces of a chain (NM 12690:355), fragments of the top part of a pellet bell (NM 12690:354) and a ring (NM 12690:349), all made of copper alloys. Textile fragments were attached to

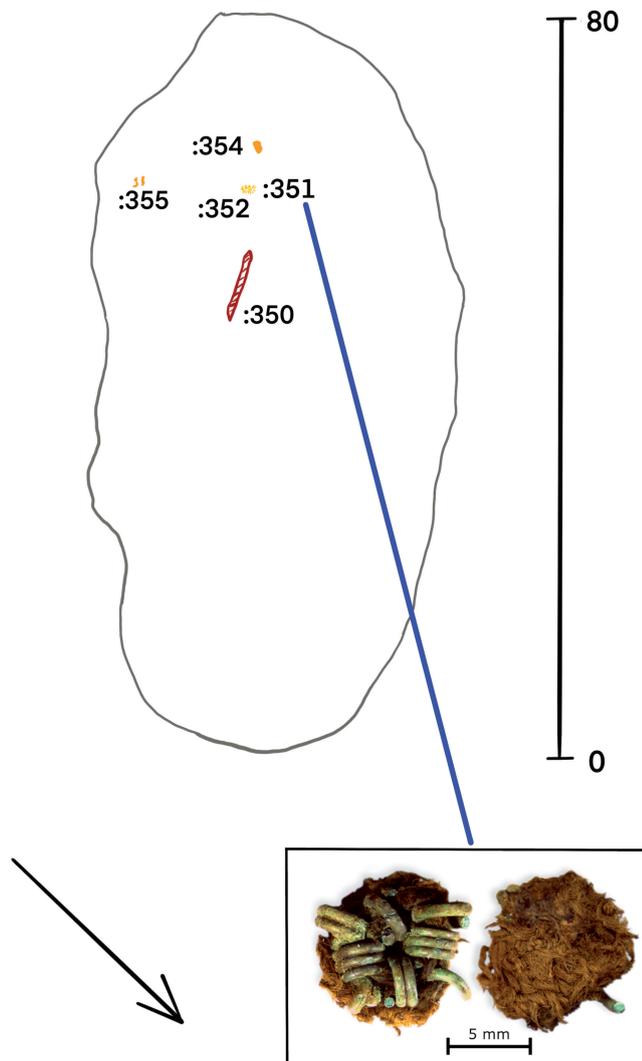


Fig. 4: Schematic map of Salo Rikala grave 22, with spiral ornament (NM 12690:351) (Images: Jenni Sahramaa, after Leppäaho 1953)

the back of two tiny spiral decorations (NM 12690:352 and :352). In addition, a small iron knife (NM 12690:350) was discovered.

**Turku Kirkkomäki**

Turku Kirkkomäki cemetery has been excavated several times, mostly in the 1980s and 1990s, with 43 inhumation graves having been identified. Eight of which are child burials (Asplund and Riikonen 2007, 21; Riikonen 2011a). The site was in use during the 11th to 12th centuries (Katiskoski 1992, 84; Talvio 1992; Asplund and Riikonen 2007, 31–34).

The deceased person buried in Turku Kirkkomäki grave 35 (fig. 5; table 1) was a child approximately six months to three years of age. The age was confirmed based on the condition of three milk teeth (NM 27196:35060). The child was buried in a 123 x 30 cm pine tree coffin. A mat made of linden bark (*Tilia cordata*) (NM 27196:35041) lay at the bottom of the grave pit (Asplund and Riikonen 2007, 25). The metal jewellery found in the grave consisted of two penannular brooches, one of silver (NM 27196:35005) and another of copper alloy (:35029), and several very small copper alloy spirals (NM 27196:35002, 35003, 35033, 35034, 35035, 35037, 35038, 35039, 35041, 35042, 35060, 35061, 35064) with textile remains. An iron knife (:35004) contained the remains of a leather sheath with a bronze ring.

The necklace found in the grave consisted of at least 54 coloured glass beads (NM 27196:35006–35028, 35043–35057, 35065–35079) (fig. 6), and some broken ones. The beads included several monocoloured, white, yellow, blue, and red beads, striped beads as well as nine beads with an eye motif. The necklace also contained a silver coin from Byzantium (dating to 977 to 989 CE) (:35031). Other artefacts discovered include two copper alloy pellet bells (NM 27196:35032, 35059), two ceramic pots (NM 27196:35001, 35040) and the remains of a birchbark container (NM 27196:35041) with several copper alloy spiral ornaments found inside (Asplund 1992).

**Methodology**

**Microscopy**

Textile materials and jewellery were documented in detail by imaging them with a OnePlus 7T mobile phone, a Leica S6D microscope with a Leica EC6 camera and Las EZ 3.4.0 software. The imaging made it possible to take a micro-archaeological approach to studying the archaeological materials in detail, resulting in the discovery of several tiny textile remains that had previously not been recognised. When recording the finds, only the largest objects had

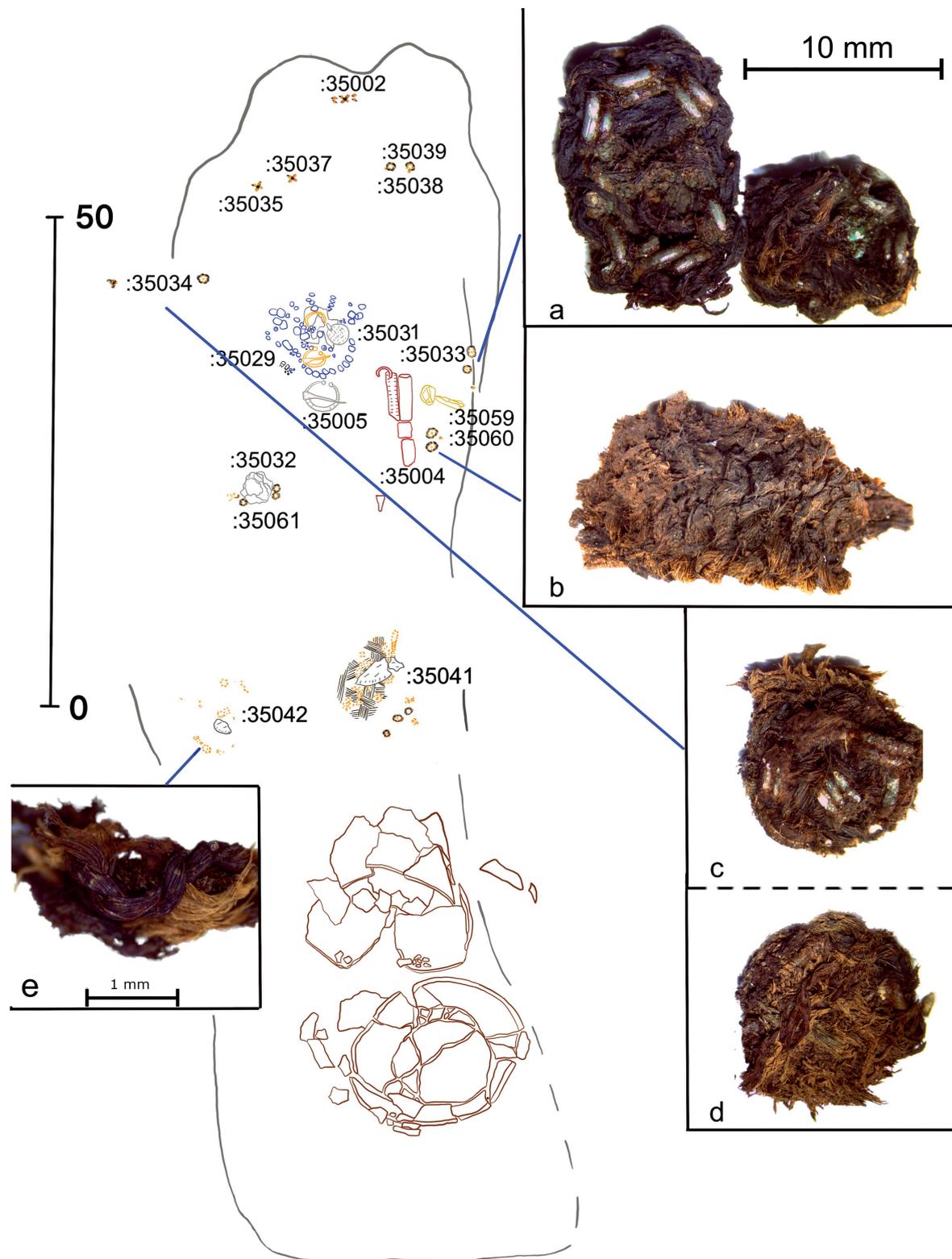


Fig. 5: Schematic map of Turku Kirkkomäki grave 35 with textile finds: a – flower-like ornaments (NM 27196:35033); b – blueish twill behind one ornament (NM 27196:35060) with small remains of other textiles on the left; c and d – both sides of an ornament (NM 27196:35034) with colourful yarns on the backside; e – colourful tablet-woven band (NM 27196:35042) (Images: Jenni Sahramaa, after unpublished materials of Jaana Riikonen)



Fig. 6: Glass beads from Turku Kirkkomäki grave 35 (Image: Jenni Sahramaa)

been labelled. Thus, several tiny textile pieces had not received an individual catalogue number and were only labelled according to the object number of the main item.

Since the textile remains were quite small, material characterisation and dye analysis were performed on samples only 5 mm in length. To acquire information about the wool fibres and their natural pigmentation, one-millimetre-long sample cuts were placed on objective glasses, mounted with Entellan New rapid™ and covered with coverslips, and then examined using a Leica 2500 transmitted light microscope with a Leica MC190HD camera and measured with LAS V4.13.0 software. The wool fineness was examined by measuring approximately 100 fibres according to standard methods (Kirjavainen and Riikonen 2007, 135). Since measurements obtained with different instruments may differ (Skals et al. 2018), all measurements were taken with only a single instrument throughout the process.

#### HPLC-PDA analysis

Altogether, 13 samples with a length of 0.4 mm were analysed using high-performance liquid

chromatography and a photo diode array detection system (HPLC-PDA). Prior to the analysis, the samples were examined under a binocular microscope to avoid any visible surface contamination. The colourants were recovered from the fibres using hydrochloric acid extraction, followed by a purification step with ethyl acetate to detect mordant and indigoid colourants. Analysis was done using Arc HPLC equipment (Waters, USA) and interpreted using the Empower software system from Waters (Vanden Berghe et al. 2009). If the sample size made it possible to divide the initial sample in two parts, a second extract was created using dimethylsulfoxide (Vanden Berghe and Coudray 2022a; 2022b).

#### X-ray

A small and still intact organic block (NM27196:35042) from Turku Kirkkomäki burial 35 was x-rayed using a stereoscopic x-ray imaging technique. The digital radiographic images were produced with an Eresco 42 MF4 x-ray tube at 50 kV, at 6.5 mA for 60 seconds, and with a computed radiography (CR) system consisting of IPU phosphor imaging plates, a CRxVision high resolution scanner and Rhythm RT and Review



Find	Weave Yarns	Material, size (mm)	Thread count/cm	Yarn diameter (mm)	Spin/ply angle °	HPLC result	Visual colour
<b>Grave 13 Pöytyä Anivehmaanmäki NM 13839:</b>							
367	2/2 twill, z/z	White wool, 30 x 30	10/10	1–2	30–45	Indigoids and a trace of U(19,5)	Blue
364	Braiding, z	White wool, 10 pieces, á 50–70	-	0.7	30	Indigoids	Dark blue
<b>Grave 15 Masku Humikkala NM 8658:</b>							
H15:1	2/2 twill, Sz/z	Brown wool, 10 x 10	8/8	Sz: 1.5 z: 0.7	20/45	-	Light brown
H15:3a, H15:4 dress	2/2 twill, Sz/z	Black wool, 25 x 18, 21 x 10, 20 x 20	16/12	Sz: 1.5 z: 0.7	20/45	No dyes detected	Dark brown
H15:4 apron	2/2 twill, Sz/z	Black + white wool fibres, 70 x 0.50, 30 x 10, 30 x 150	10/10	Sz: 1 z: 0.5	20/45	No dyes detected	Grey, blue fibres in TLM
H15:4, apron	Threading yarn of spirals, Sz	Black wool, 8 cm long	-	Sz: 0.5, z: 0.25	Sz 20/45	-	Dark
H15:4, apron	Threading yarn spirals, Z (Sz+Sz)	White wool, 4 cm long	-	Z: 2.2	20/50	Indigoids, U(16,4)	Light blue
H15:4, apron	Sewing yarn of spirals, Sz	Black wool, 4 cm long	-	Sz: 1.5	20/30	No dyes detected	Black
H15:4, apron hem	Threading yarn of spirals, S/zzz	Black wool, 20 cm long, several pieces	-	S: 2	20	-	Black
H15:4, apron hem	Sewing yarn, Sz	Brown? wool, Few mm visible	-	Sz: 1.5	Indet.	Indigoids	Red
H15:3	Tabby, z/z	Plant fibre, 6.8 x 2.7	20/17	z: 0.5	45	-	White
<b>Grave 22 Salo Rikala NM 12960:</b>							
351, 352	2/2 twill in spiral rosette, Sz/z	White wool, 10 x 10	8/8	Sz: 1 z: 0.5	20/45	No dyes detected	White
351 352	Thread inside spirals, Sz	Wool	-	Sz: 1.5	20/45	-	Blueish
<b>Grave 35 Turku Kirkkomäki NM 27196:</b>							
35060	2/2 twill, Sz/z	White wool, 12 x 8	10/8	1	25/45	-	Blue
35032	2/2 twill, Sz/z	Pseudomorphe, 20 x 20	6/6	1–1.5	30/45	-	-
35042	Tablet woven band, spiral shred, round braids, Sz	Wool, Band: 8 x 4 Braid: 2 x 4	-	0.7	25/40	Blue: Indigoids, U(16,4), U(9,6), U(19,5) Red yarn: a trace of Luteolin, U(20,9) Light warp: a trace of indigoids	Blue, red and white yarns
35041	Diagonally plaited band, Sz	White wool, 10 x 4	-	0.7	Indet.	-	Blue Red
35003 35033 35034 35038 35039 35061	Spiral rosettes, band endings, Sz	White wool in white yarn, brown in red yarn, white + black in blue yarn. ca 1 cm <sup>2</sup>	-	1	20/40	-	Blue Red White
35002 35033 35038 35060 35061 35064	Thread inside spirals, Sz	White wool, ca 1 cm <sup>2</sup>	-	1.1–1.3	20/30	-	Dark blue
35011	Threading yarn of glass beads, z	Black wool	-	0.5	20	-	Dark

Table 2: Remains of textiles found in the graves with results of microscopic investigation and HPLC-DAD analyses. NM refers to the collections at the National Museum of Finland

software. To create a 3D view of the object, two x-ray images were exposed at slightly different angles, one for each eye.

## Results

### *Pöytyä Anivehmaanmäki grave 13*

This grave contained a twill fragment, pieces of broken braids with spiral ornaments and fur pseudomorphs (table 2). The 2/2 twill was woven using z/z-twisted yarns (fig. 2a). This weave is not common among Finnish Late Iron Age textile finds, since the predominant structure is Sz/z twisted 2/2 twill (Bender Jørgensen 1992, 140). On the surface of this textile was an imprint of the smallest penannular brooch. The bracelets had small areas with pseudomorphs of animal hairs.

Braids (NM 13839:368), originally three in number, had broken into ten short pieces. Each braid ended with a spherical knot. The braids had been threaded with spirals with a diameter of 7 mm and a wire 2 mm wide. The precise structure of the braids was not determined (fig. 2b).

### *Masku Humikkala grave 15*

The textiles of this grave were wool twills, a plant fibre tabby, and fur pseudomorphs (table 2). The twill remains (fig. 3a) all measure a few square cm. On the penannular brooch the textile preservation is poor. With careful observation, it was possible to identify a 2/2 twill with a thread count of 8/8 threads/cm. The fibres appear reddish brown in the TLM examination. A piece of 2/2 twill had a distinct woolly surface with a fluffy appearance of intorted fibres, and it was interpreted as carded. The thread count of this textile was 16/22 threads/cm and it was found in the chest area (NM 8656:15H:3a), near the right-hand bracelet (NM 8656:15H:3), and close to the preserved hem. Samples taken from these textiles contained naturally pigmented black wool.

Pseudomorphs of animal hairs (fig. 3b) were found on the penannular brooch and the bracelets. A tabby in z/z-twisted yarns was discovered inside one of the bracelets (NM 8656:15H:4), presumably made of plant fibre (fig. 3c). The thread count is 20/17 threads/cm. It was not possible to take any samples for further investigation. Some tiny organic particles were identified as lichen and moss.

The spiral-bordered 2/2 twill (NM 8656:15H:4) found in the feet area contained black and white wool fibres (fig. 3d). Microscopic observation revealed a weak blue hue at the tubular selvages. The fabric was bordered at its lower part with 3.7–4 mm wide spiral tubes,

made of wire 0.7–0.8 mm in diameter. The spirals were threaded and sewn to the edge of the fabric with black and light blue yarns. The hem was stitched with a visually reddish yarn, spun of brown wool.

### *Salo Rikala grave 22*

The textiles of this grave were wool twill and found in two spiral rosettes (table 2).

The spiral rosettes (NM 12690:351 and :352) had 4 mm wide spirals made of a wire 1 mm in diameter. A 2/2 twill woven in Sz/z twisted yarns was discovered on the reverse side (fig. 4). It is made of white wool and has a thread count of 10/10 threads/cm.

### *Turku Kirkkomäki grave 35*

Two different twills derive from this grave, several spirals, a textile pseudomorph and a linden bast mat (table 2). The 2/2 twill weaves had slightly different thread counts and twist directions. One, with the thread count of 10/8 threads/cm, was found with the spiral decoration (fig. 5b). The other piece with a thread count of 6/6 threads/cm, appeared as a pseudomorph on the pellet bell (NM 27196:35032). Badly degraded textiles were also found as a three-layer piece (blue-white-blue) with the pellet bell.

The spiral decorations in this burial are quite tiny, with the tubes only 2.5–3.2 mm in diameter and the wire 0.5–0.7 mm in diameter (fig. 5a, 5c; table 2). Some of the flower-like spiral rosettes (NM 27196:35003, 35033, 35034, 35038, 35039, 35061) (fig. 5c, 5d) were probably

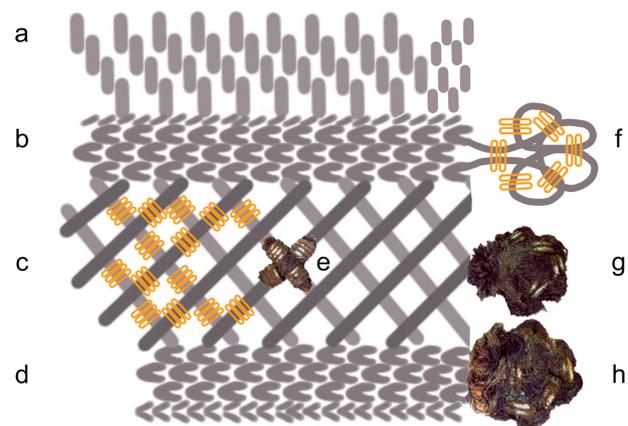


Fig. 7: Interpretation of the finishing decoration on a shawl from Turku Kirkkomäki grave 35: a to d – wool warp yarns of the twill serve first as wefts of the tablet-woven finishing band, continue then to spiral-decorated cross-work of braids and end up as wefts of another tablet-woven band; e – piece of cross-work (NM 27196:35002); f – the warps of tablet-woven bands finishing in flower-like spiral ornaments; g and h – band endings (NM 27196:35038 and NM 27196:35039) (Image: Jenni Sahrmaa)

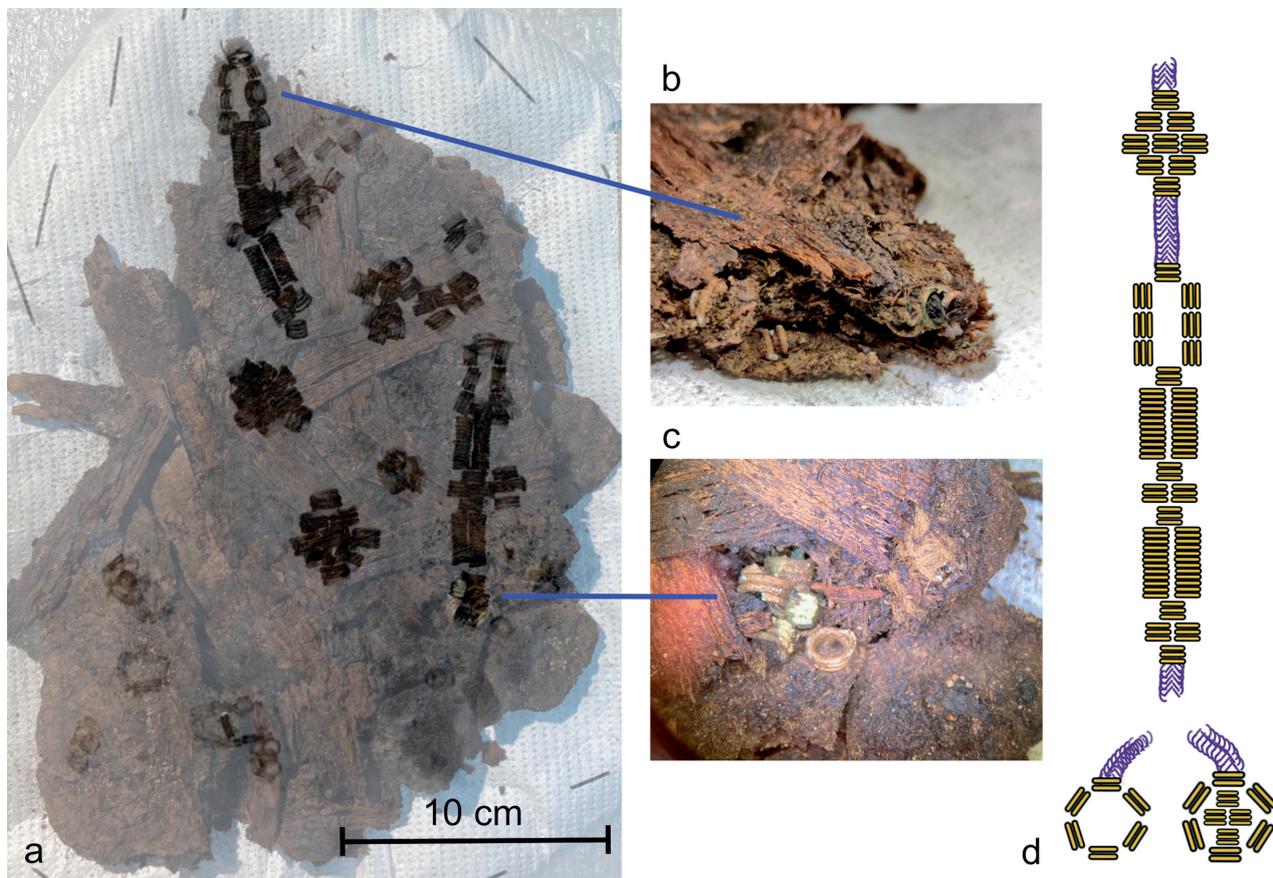


Fig. 8: Block (NM 27196:35041) from Turku Kirkkomäki grave 35: a – the spiral ornaments seen in x-ray images laid over it; b and c – parts of a spiral-ornamented, diagonally plaited band visible under the linden mat; d – interpretation of the spiral-ornamented band with two different possible end structures (Images: Jenni Sahramaa)

the endings of colourful bands, while some originated from a cross-work finishing of the blue textile (NM 27196:35002, 35003, 35033, 35035, 35037, 35060, 35061) (fig. 5a and 7). Among the broken spirals were very small pieces of blue braids of the cross-work and a colourful tablet-woven band (NM 27196:35042) (fig. 5e). A few spirals and a diagonally woven band (NM 27196:35041) were partially visible under the linden mat (fig. 8), which consisted of three finger-woven and interlacing elements (Seiler-Baldinger 1994, 45, fig. 85), each approximately 1 cm wide.

### Dyes

Of the 13 samples sent for dye analysis, five contained dyes (table 2). Indigoids (indigotin, indirubin, isatin) were most often detected. They most likely originated from woad (*Isatis tinctoria*), native to Europe. Other indigotin-rich species (such as *Indigofera tinctoria* and *Persicaria tinctoria*) are less likely (Cardon 2007, 367–368). Evidence of blue dyeing was found in the 2/2 twill fabric and spiral-decorated braid from Pöytyä

Anivehmaanmäki grave 13. In Masku Humikkala grave 15, traces of blue were found in the reddish sewing yarn in the hem as well as in the light blue threading yarn of the apron's spirals. Indigoids were also present in the weft yarn of the tablet-woven band from Turku Kirkkomäki grave 35, and at trace level in this band's light-coloured warp, probably a contamination from the blue weft.

Unknown colourants appeared together with the indigoids. They were labelled as U(9.6), U(16.4), and U(19.5) by their retention time in the HPLC analysis (Vanden Berghe and Coudray 2022a; 2022b). These compounds appeared with a maximum absorbance at 390 and 415 nm, at reddish wavelengths. They were detected in the blue twill from Pöytyä Anivehmaanmäki grave 13, and in the light blue yarn used in the spiral decorations of the apron of Masku Humikkala grave 15, and in the blue weft yarn from Turku Kirkkomäki grave 35. The same unknown compounds have also been found in several Late Iron Age Finnish textiles (Wright et al. 2023). It is not clear



at this time whether these are degradation products of dyes (lichens or other), or whether these components are more likely related to local dyeing traditions or specific burial or preservation conditions. In the Northeastern Baltic Sea area, for example, lichen and woad were possibly dyed together in a single vat to create a blue dye (Rammo et al. 2023).

The visually reddish warp yarns from the Turku Kirkkomäki band contained no red colourants, but a trace of luteolin yellow (Vanden Berghe and Coudray 2022b). The detection of luteolin alone doesn't allow to refine among many luteolin containing dye plants. The same was also the case with the visually red yarns from grave 86 of the Lieto Ristinpelto burial site (Wright et al. 2023). As Finnish tablet-woven bands typically have complicated patterns with contrasting colours (Karisto and Pasanen 2021), the combination of natural white and luteolin yellow yarns in a tablet-woven band seems unlikely. In addition, in the acidic phase (HCl analysis) of the red warp from Turku Kirkkomäki grave 35, an unidentified compound was detected at a retention time of 20.9 min, with maximum absorbances of 430 and 465 nm, corresponding to a red range. Overall, the results of the analysis suggest a red dye that cannot be properly detected via the HPLC method, so unfortunately characterisation of this dye has not yet been successful.

No evidence of organic dyes was detected in the visually light-coloured twill fabric from Salo Rikala grave 22, nor in the warp and the weft yarns of the 2/2 twills from Masku Humikkala grave 15. The visually dark hue of the latter fabrics resulted from the use of naturally pigmented wool in both garments.

### *X-ray*

The x-ray images allowed stereoscopic viewing of the organic block from Turku Kirkkomäki grave 35, which was combined into a 3D image (fig. 9). The x-ray images revealed several hidden spiral decorations. Their shape and position suggest a headband with temple ornaments. The wool band was only visible for a few millimetres on the surface, but was identified as diagonally plaited, and made with seven visually blue and red yarns. Possibly two identical headband-ornaments had been hanging on either side of the head (fig. 8, 9).

### **Discussion**

#### *Fabrics*

Most threads used in the recorded textiles are thin with relatively high thread counts. For example, in the Masku Humikkala grave 15 twill textile (NM 8658:3a),

the thread count was 16/22 threads/cm, which is finer than seen in many adults' graves. These have typically a thread count between 10 and 15 threads/cm (Lehtosalo-Hilander 2001, 14–15). Extra softness for the Masku Humikkala textile was gained by carding the wool fibres. This feature has previously only been recorded in a few textiles placed in adult graves (Riikonen 2005b, 231; Kirjavainen and Riikonen 2007, 136). The plant fibre tabby weave from Masku Humikkala grave 15, however, which has a thread count of 17/20 threads/cm, could be defined as roughly fine. In Finnish Late Iron Age plant fibre textile finds, a very fine quality has more than 30 threads/cm, a fine quality 20–30 threads/cm and a coarse quality less than 20 threads/cm (Riikonen 2011b, 213).

Pigmented wool was used in the textiles of Masku Humikkala grave 15, while white wool was found in the twills of Pöytyä Anivehmaanmäki grave 13 and Salo Rikala grave 22. Possibly brown naturally pigmented wool was used in the visually red warp in the band in Turku Kirkkomäki grave 35, while black wool was found in a blue yarn from the same context. The necklace cord holding the glass beads together consisted of naturally pigmented wool (table 2).

The maximum diameter of the fibres is 70 µm, with a continuous distribution of fibre diameters, including medullated fibres of 3–20%. This does not match with any fibre distribution found in the textiles in adult graves. In these contexts, the outer coat hairs often measure more than 100 µm in diameter (Ryder 1978; Kirjavainen 2005, 249; Kirjavainen and Riikonen 2007, 135; Vajanto 2013). As an interesting point of comparison, many archaic fleece features have been found among Jaalashoop (a variant of Finnsheep) and their lambs with medullated hairs at 28 µm and coarser fibres at 80 µm (Vajanto 2013). Although it is not entirely clear how well these wool histograms represent the wool types of the past (Ryder 1969; 2000; Christiansen 2004, 11–16; Kirjavainen and Riikonen 2007, 2; Rast-Eicher 2008, 153–155; Rast-Eicher and Bender Jørgensen 2013, 1227), it seems possible that wool used in the garments of children was made of lambswool from unsorted or only slightly sorted intact staples.

#### *Garments and funeral attire*

The excavation reports and maps from the Pöytyä Anivehmaanmäki, Masku Humikkala, and Salo Rikala sites, excavated 70 to 100 years ago, were made quite schematically with very little documentation (fig. 2, 3, 4, 5). More detailed information about the placement of textiles and spiral ornaments was available from the Turku Kirkkomäki burial site, but in that case the

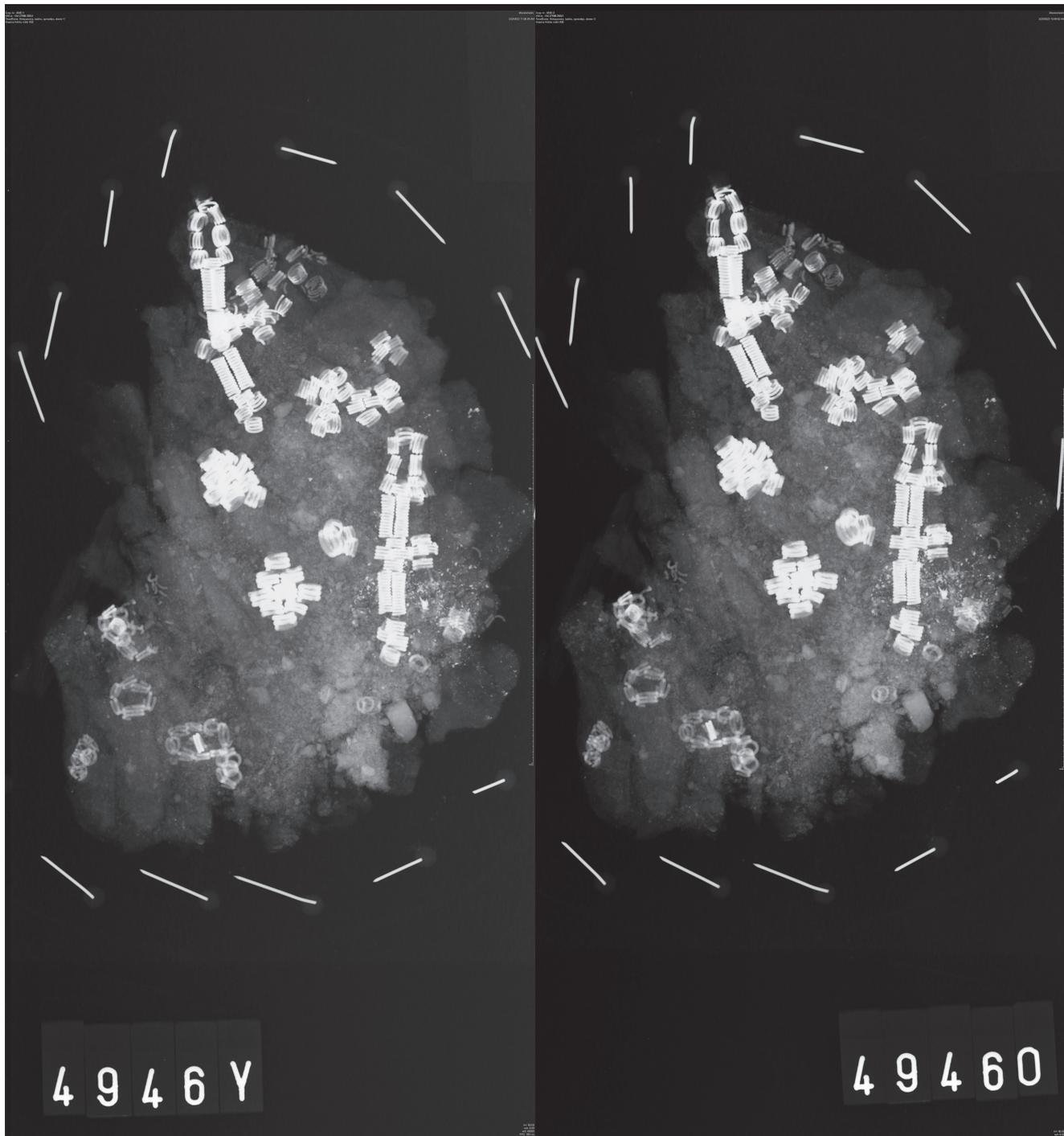
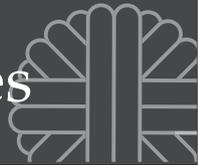


Fig. 9: Stereoscopic x-rays of NM 27196:35041 from Turku Kirkkomäki revealing several bronze spirals (Image: Pia Klaavu)

poor preservation has made it difficult to come to more precise interpretations about the exact use of the textiles and the clothing. In many cases, the distinction between clothing textiles and furnishing textiles was not straightforward, but it is assumed that textiles placed in children's graves follow the same patterns as

for adult clothing. Secondary use, repairs or altering of adult clothes for children could not be excluded due to the small size of the fragments.

The fragments from Masku Humikkala grave 15 were interpreted as the remains of a brown and a naturally black, long wool dress or tunic as well as a



long-sleeved plant fibre shirt. A linen shirt and wool dress were the most common type of garments still being worn by children in Medieval Europe and rural Finland at the end of the 19th century (Talve 1979, 169; Ewing 1986, 23). The same type of clothing might also have comprised the attire of small children during the Late Iron Age. Remains of a wool dress and linen underdress have been found in child graves at Eura Luistari and amongst the Finno-Ugrian Livs of Latvia, which also contain spiral-wire ornaments (Zariņa 1988, 55–56; Lehtosalo-Hilander 2000, 225–226; Žeiere 2017, 101).

The spiral-decorated 2/2 twill with a tubular selvedge (NM 8656:4) found in Masku Humikkala grave 15 (fig. 3d) was interpreted as the remains of an apron. A spiral-decorated apron tied at the waist was common in burials of adult women (Lehtosalo-Hilander 2000, 214, 228; Riikonen 2005a, 33), with some having also previously been recognised in child burials (Lehtosalo-Hilander 2000, 225). The tubular selvedges, corner and hem spirals indicate the size of the apron with a hem width of approximately 25 cm. Since a tubular selvedge is a structure created when weaving the fabric, it indicates a garment made intentionally in a child's size and not cut from a larger piece of fabric, such as from adult's apron.

The placement of the tiny spirals, spiral rosettes and blue 2/2 twill (fig. 5 and 7) found in Turku Kirkkomäki grave 35 suggest a shawl with cross-work of spirals – either for use in lifetime or to cover the body in the coffin (table 2). The fabric and cross-work were possibly both bordered with colourful tablet-woven bands, as in the shawl found in Masku Humikkala grave 31 (Pasanen and Sahramaa 2021, 246), which had endings decorated with spiral rosettes. Spiral-decorated shawls have been identified in several adult burials (Hirviluoto 1973; Tomanterä 1984, 39–41), and were often used to cover the deceased (Pälsi 1928, 76; Mäntylä 2006, 39, 45–46; Asplund and Riikonen 2007, 26). Remains of spiral decorations indicating the presence of a shawl were also found in child graves 10 and 41 at Turku Kirkkomäki (Asplund and Riikonen 2007, 26).

Penannular brooches in child burials appear to be the same types of brooches found in adult graves, and likely had the same use. The penannular brooch (NM 8658:1) found in Masku Humikkala grave 15 probably held the neck-opening of a dress or shirt together. Similarly, the placement of the silver penannular brooch (NM 27196:35005) in the neck area in Kirkkomäki grave 35 suggests a similar use, although no textile remains are preserved. During the child's lifetime, it could also have held a shawl in place. The smaller brooch (NM 27196:35029) from Turku Kirkkomäki grave 35, made

of copper alloys, is quite small and delicate, and it was probably used at the neck opening of a linen shirt.

No exact parallels have been found for the blue braids (NM 13839: 364) from Pöytyä Anivehmaanmäki grave 13 (fig. 2). Similar finds include belts from male graves and headbands in female graves (Appelgren-Kivalo 1907, 8–10; Hirviluoto 1963, 57; Lehtosalo-Hilander 2001, 77–79).

#### *Soft sleeping places*

Some of the examined textile findings were interpreted as the remains of grave furnishings instead of clothing. For example, the remains of a relatively coarse light-coloured fabric were found at the bottom of Turku Kirkkomäki grave 35, with a pellet bell on the right-hand side and attached to some spiral ornaments of cross-work endings (table 2). The fabric might be the remains of a blanket placed underneath or wrapped around the child. Undecorated fabrics have been used as shrouds and were possibly specifically made for this purpose (Appelgren-Kivalo 1907, 43; Riikonen 2011b, 210–212).

One or both brooches from Pöytyä Anivehmaanmäki 13 were possibly used to wrap the child in some sort of textile covering. The smaller penannular brooch (NM 13839:367) was found near the head of the child in the dark soil area of the grave (Hirviluoto 1955). The imprint of this brooch was visible in a blue 2/2 twill textile, possibly a shroud or an upper body wool garment. A larger brooch (NM 13839:369) was found at the feet of the child, which is quite an illogical place for clothing. It is possible that the child was wrapped in some sort of covering, which is supported by the fact that all artefacts were found close together.

Infants were possibly buried in their swaddling bands, as has been suggested for the burial of a baby found in Turku Kirkkomäki grave 20 (Asplund and Riikonen 2007, 26). This burial contained a ribbon, pieces of iron, and a chain made of copper alloy. Accordingly, the spiral-decorated fabric pieces from Salo Rikala grave 22 might have originated from a baby's swaddling bands or a miniature shawl used to wrap the child.

Late Iron Age burials have often been interpreted as resting places, or beds that were meant to be soft and comfortable (Jäkärä 1998, 3; Moilanen 2021, 56–57). For instance, the finger-woven linden mat (NM 27196:35041, fig. 8) found in Kirkkomäki grave 35 had been placed at the bottom of the grave (Lempiäinen 2002, 165). Micro-archaeological research and analysis of soil samples has resulted in the identification of various plant materials used as grave furnishings (Moilanen et al. 2022). Small pieces of moss and lichen found in Masku Humikkala grave 15 might indicate



a desire to make the grave a soft resting place for the child.

The bracelets and knobs of the penannular brooch from Masku Humikkala grave 15 had pseudomorphic remains of fur (fig. 3b). Hair pseudomorphs were also found in the spirals and the penannular brooches as well as in the bracelet from Pöytyä Anivehmaanmäki grave 13, originating possibly from the hide that had covered this burial (Hirviluoto 1955, 15–16). The practice of wrapping children in lynx and wolf pelts has been identified in graves 118 and 139 at Eura Luistari (Kirkinen 2019, 63), reflecting a widespread tradition of wrapping bodies in animal skins throughout Northern Europe; a tradition also practised in Finland during the Late Iron Age (Kirkinen et al. 2020, 53). Possibly the children buried in Masku Humikkala grave 15 and Pöytyä Anivehmaanmäki grave 13 had also been interred following this tradition.

#### *Protective aspects of clothing*

Grave finds like textiles and jewellery quite likely represented the status or role of the deceased in the community. Traditionally, the finds have been interpreted in a very direct manner: weapons belonged to a warrior, rich furnishings indicated an elite person, and tools indicated a craftsperson. Presumably, artefacts and textiles also had ritual and symbolic values. For instance, all the child graves studied here contained a knife, a typical item found in Late Iron Age and Early Medieval graves (Lehtosalo-Hilander 1982b, 43; Asplund and Riikonen 2007, 31). Knives were perhaps not given to small children as a practical tool for chopping food or crafting. They may instead have been part of the outfit. Knives and other sharp objects in graves have also been interpreted as symbolic or magical items meant to protect the deceased on the journey to the afterlife (Asplund and Riikonen 2007, 30; Mäntylä 2007, 307; Mäntylä-Asplund 2011, 230).

Pellet bells were clothing accessories that have frequently been found in both adult and child graves (Lehtosalo-Hilander 2000, 226; Rainio 2010, 110–126). The pellet bells from Turku Kirkkomäki grave 35 had been cut and bent from a copper alloy plate. They were found near the waist area of the deceased and might have hung from a belt (Rainio 2010, 123). At Salo Rikala grave 22, only the eyelet of a cast pellet bell was found near the head area. It might originally have been worn as part of a headband (Rainio 2010, 110). A similar use has been suggested for the pellet bells found in the graves at Eura Luistari (Lehtosalo-Hilander 2000, 226). In addition, pellet bells might have been used as toys or provided magical protection through their sound (Gräslund 1973, 169; Lehtosalo-Hilander 2000,

226; Rainio 2010, 133).

In Late Iron Age Finland, beads were worn around the neck, not fastened to shoulder fibulas as in Scandinavian fashion at the time. Beads were more common in female than male burials, but quite rare in girl and very rare in boy burials (Ranta 1998, 106–113). In the female burials at Turku Kirkkomäki beads were found in all except one burial (Asplund and Riikonen 2007, 30). A necklace with 54 glass beads found in Turku Kirkkomäki grave 35 (fig. 6, table 2) is exceptional, since no other child burial in this cemetery contained beads. The beads with eyes may have been a protective symbol, an attempt to ward off the curse of the evil eye (Dubin 2015, 309–314). Due to the presence of nine beads with an eye motif, the necklace from grave 35 can thus be interpreted as a talisman.

#### *Textiles reflecting a child's gender and status*

In the case of child burials containing little or no bone material, artefact analysis is the only method to determine the sex of the individuals. Presumably, penannular brooches were used by both sexes in the Late Iron Age. Riveted belts and cloaks with cross-formed spirals have been considered male accessories, while bracelets, headbands, necklaces with glass beads, shawls with spiral rosettes and spiral laces, and spiral-decorated aprons have been considered female artefacts. This kind of sexing can be very misleading, however, since weapons like swords have been found together with female skeletons (Price et al. 2019) and with female-type jewellery (Moilanen 2021, 77–78; Moilanen et al. 2021).

In Turku Kirkkomäki grave 35, the knife sheath (NM 27196:35004) was placed in an upright position, resembling the knives found in men's graves at Turku Kirkkomäki and in some women's graves at Masku Humikkala and Eura Luistari (Riikonen 2009, 276, 288–289). It differs from the women's large copper alloy-plaited sheaths (Riikonen, 2003b, 236–237; 2009), which were carried in a horizontal position in a belt. Here, the knife suggests the burial of a boy, while the spiral-decorated shawl and headband suggest that of a girl. The jewellery found in Pöytyä Anivehmaanmäki grave 13 and Masku Humikkala grave 15 suggest that the deceased were girls. The remains of the baby in Salo Rikala grave 22 contained no gender-specific artefacts.

In adult burials, the grave goods have been interpreted as representing the status or occupation of the deceased (Lehtosalo-Hilander 1982c, 20–21; Mäntylä 2005b, 125–126; 2007, 306; Riikonen 2006, 368, 379; Asplund and Riikonen 2007, 30). Presumably, some



children too were born with high status, which is also reflected in the burial goods (Söyrinki-Harmo 1992a, 589). Compared to other child burials found in the cemeteries, the children found in Pöytyä Anivehmaanmäki grave 13, Masku Humikkala grave 15 and Turku Kirkkomäki grave 35 had received more grave goods than other children buried in the same cemeteries, possibly indicating an inherited social status. Coffins, wrappings, and gravestones, however, were practices that seem to be similar throughout all cemeteries in child and adult burials (Söyrinki-Harmo 1992b, 152; Ylönen 1999, 21; Lehtosalo-Hilander 2000, 225–226; Asplund and Riikonen 2007, 21).

### *Funeral attire for the afterlife*

Caring and emotions were most likely an important part of the Late Iron Age burial rituals. Grave goods, including decorated garments, thus reflect a society's way of commemorating the deceased (Mäntylä 2005a, 147–149). During historical times, communities had rich burial practices that helped family members prepare the child in a ritualistic manner and deal with the strong emotions awakened by such actions (Lipkin et al. 2021; 2022). The Late Iron Age burial practices and beliefs of people in Southwest Finland were mostly replaced by Christian beliefs and practices during the 11th and 12th centuries (Hiekkanen 2010, 328–335; Ruohonen 2016, 231–233), but pre-Christian beliefs in the afterlife may still have been reflected in how children were prepared for burial. Evidence of belief in an afterlife can be found in, for example, ceramic pots placed in the graves, originally probably filled with food and drink (Söyrinki-Harmo 1992a, 152; Ylönen 1999, 21; Lehtosalo-Hilander 2000, 226). Finnish folklore concerning death and the afterlife, collected mainly in the 19th century, has been interpreted as containing several layers of beliefs originating from different historical periods and cultures (Koski and Moilanen 2019, 63, 66). For example, in White Karelia it was believed that in the afterlife the deceased would wear the dress that he or she had been buried in (Paulaharju 1924, 80–81). Many rituals were connected to food, like feasts held by the grave and the need of a grieving mother to nurse living babies for the dead baby to receive milk in the afterlife (Paulaharju 1924, 136–137). Accordingly, the grave goods prepared the deceased either for the journey to the afterlife or the time spent there (Koski and Moilanen 2019, 65–66, 68).

Funeral attire and goods placed in the grave were a result of careful selection made by the bereaved (Ekengren 2013, 182). In female graves, the textiles have often been interpreted as handicraft items made

by the woman herself or items acquired through trade (Vahter 1945, 219; Riikonen 2003a, 13, 16–17). In the case of children buried with textiles and jewellery, since a baby or child a few years of age obviously had not made the fabrics or the spiral decorations, they were made by someone else, like the child's mother or other relatives.

Some of the textiles were probably not worn by the children in everyday situations, but rather as a funeral attire reflecting the role that deceased child would assume in the afterlife. Aprons decorated with copper alloy spirals have been interpreted as important parts of adult female clothing, loaded with protective and fertility magic (Riikonen 2005a, 62–63). The apron found in Masku Humikkala grave 15, and the shawl found in Turku Kirkkomäki grave 35 were probably not intended for everyday use because they would have been impractical when the child was crawling or learning to walk. Perhaps an adult-like textile, such as a spiral-decorated shawl, served as a ritual item of clothing when worn by a child or placed on the grave of a small child. Possibly it was done in anticipation of small girls becoming adult women, thus equipping them in the afterlife with textiles that imitated adult clothing.

Probably some textiles were connected to the different social roles performed by females at different life stages, as girls, young maidens, unmarried women, married women, mothers, widows, grandmothers, and so forth. A headband with spiral ornaments, for example, has been interpreted as an accessory of young women (Vahter 1928, 65; Lehtosalo-Hilander 1984, 58; Riikonen 2003a, 17). Such headbands have been discovered in several adult female graves (Appelgren-Kivalo 1907, 32; Sarkki 1979, 53–55, 76–77; Riikonen 2023, 81–82). In Turku Kirkkomäki grave 35 a headband with temple ornaments was placed in a birchbark container (NM 27196:35041) near the feet. The location of the blue braids in Pöytyä Anivehmaanmäki grave 13 found in the central area of grave, suggest either a belt placed at the waist, or a headband placed at the feet (Hirviluoto 1955; 1963, 57). The practice of placing headbands in the grave may represent the hope that the child could achieve a certain status in the afterlife, a social role that had not been fulfilled due to their early death. In some beliefs, although recorded from later periods, a child was expected to grow up and even get married in the afterlife (Paulaharju 1924, 173; Lipkin et al. 2022, 192).

### **Conclusions**

The material analysis of the textile remains from four Finnish Late Iron Age child burials, Pöytyä Anivehmaanmäki grave 13, Masku Humikkala grave 15, Salo Rikala grave 22, and Turku Kirkkomäki grave



35 revealed several different textiles. Most textiles were twill weaves made of wool, possibly lambswool. The textiles had survived in direct contact with jewellery or spiral wire ornaments made of copper alloys. In most cases, secondary use, repairs, or altering of adult clothes for children could not be excluded due to the small size of the textile fragments.

The textiles from Pöytyä Anivehmaanmäki grave 13 might be the remains of a blue wool twill upper body garment or a burial shroud and a spiral-decorated blue belt or headband. The child found in Masku Humikkala grave 15 possibly had a long wool twill dress and a long-sleeved plant fibre shirt. She also had a grey or slightly blue spiral-decorated apron specifically woven in child size. The light-coloured wool twill fragments from Salo Rikala grave 22 might represent swaddling or be the remains of a miniature-sized, spiral-decorated shawl used to wrap the baby. The textiles from Turku Kirkkomäki grave 35 are likely the remains of a blue miniature shawl and spiral-decorated headband with temple ornaments. In general, children's textiles with spiral decoration represent a textile tradition that lasted for many centuries in Finnish Late Iron Age adult graves.

The coarser twill and the linden mat from Kirkkomäki 35 were possibly used for wrapping, while the moss from Masku Humikkala 15 was used to create a soft sleeping place. In addition, children were equipped with protective accessories, like knives, eye beads, and pellet bells. The accessories were part of the outfit, embedded with magical and symbolic meanings and essential items for protecting the deceased on the journey to the afterlife. Fertility aspects of the clothing, protective abilities and food offerings reflect a belief in an afterlife, while the goods placed in the grave during the burial ritual reflect the status of the child, and the emotions of the family and community.

### Acknowledgements

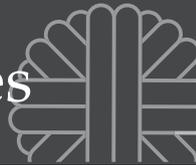
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### Bibliography

- Appelgren-Kivalo, H. (1907) *Suomalaisia pukuja myöhemmältä rautakaudelta – Finnische Trachten aus der jüngeren Eisenzeit*. Helsinki: Tilgmann.
- Asplund, H. (1992) *Turku (ent. Kaarina) Kirkkomäki. Rautakautisen muinaisjäännösalueen kaivaus 4.5.–30.6.1992. Kaivausraportti osa 1 (3) yleiskatsaus*. Unpublished excavation report and find catalogue. The Finnish Heritage Agency.
- Asplund, H. and Riikonen, J. (2007) Kirkkomäki. In M. Söderström (ed), *Arkeologisia kaivauksia Turussa 1990-luvulla*. Turun maakuntamuseo Raportteja 20. Turku: Turun maakuntamuseo.
- Bender Jørgensen, L. (1992) *North European textiles until 1000 AD*. Aarhus: Aarhus University Press.
- Cardon, D. (2007) *Natural Dyes. Sources, Tradition, Technology and Science*. London: Archetype Publications.
- Christiansen, C. (2004) A Reanalysis of Fleece Evolution Studies. In J. Maik (ed), *Priceless Invention of Humanity – Textiles*. NESAT VIII. *Acta Archaeologica Lodzienia* 50 (1), 11–17.
- Dubin, L. S. (2015) *The worldwide history of beads. Ancient, ethnic, contemporary*. London: Thames and Hudson.
- Ekengren, F. (2013) Contextualizing Grave Goods: Theoretical Perspectives and Methodological Implications. In L. Nilsson Stutz and S. Tarlow (eds), *The Oxford Handbook of the Archaeology of Death and Burial*. Oxford: Oxford University Press, 173–192. <https://doi.org/10.1093/oxfordhb/9780199569069.013.0010>
- Ewing, E. (1986) *History of Children's Costume*. London: Batsford.
- Gräslund, A-S. (1973) Barn i Birka. *TOR: tidskrift för arkeologi* 15, 161–179.
- Hiekkanen, M. (2010) Burial Practices in Finland from Bronze Age to the Early Middle Ages. In B. Nilsson (ed), *Från hedniskt till kristet: Förändringar i begravningsbruk och gravskick i Skandinavien c:a 800–1200*. Stockholm: Sällskapet Runica et Mediaevalia, 271–379.
- Hirviluoto, A-L. (1955) *Yläne Anivehmaanmäki viikinkiaikaisen ruumiskalmiston kaivaus 1955*. Unpublished excavation report. The Finnish Heritage Agency.
- Hirviluoto, A-L. (1963) *Yläneen Anivehmaan vuoden 1955 kaivaukset*. Master's thesis, University of Helsinki.
- Hirviluoto, A-L. (1973) Raison lhalan vaskivaipat. In P. Sarvas and A. Siiriäinen (eds), *Honos Ella Kivikoski. Suomen Muinaismuistoyhdistyksen Aikakauskirja 75*. Helsinki: Suomen muinaismuistoyhdistys, 60–67.
- Hirviluoto, A-L. (1992) *Halikon historia 1*. Halikon kunta: Halikko.
- Hirviluoto, A-L. (1996) *Yläneen Anivehmaanmäen ja Varsinais-Suomen rannikkoalueen yhteydet viikinkiajalla*. *Muinaistutkija* 1996 (2), 2–7.
- Jäkärä, T. (1998) Tutkimuskohteena hautarakenteet:



- esimerkkinä kaksi varsinaissuomalaista kalmistoa ristiretkiajalta. *Muinaistutkija* 1998 (2), 2–5.
- Kamp, K. A. (2001) Where Have All the Children Gone? The Archaeology of Childhood. *Journal of Archaeological Method and Theory* 8 (1), 1–34.
- Karisto, M. and Pasanen, M. (2021) *Tablet-woven treasures: Archaeological bands from the Finnish Iron Age*. Helsinki: Salakirjat.
- Katiskoski, K. (1992) The Kirkkomäki Cemetery at Kaarina. *Fennoscandia Archaeologica* 9, 75–89.
- Kirjavainen, H. (2005) Miniä Gotlannista? Kuituanalyttinen näkökulma eläinsoljen tekstiileihin. In V. Immonen and M. Haimila (eds), *Mustaa valkoisella: Ystäväkirja arkeologian lehtori Kristiina Korkeakoski-Väisäselle*. Turku: University of Turku, 247–251.
- Kirjavainen, H. and Riikonen, J. (2007) Some Finnish Archaeological Twill Weaves from the 11th to the 15th Century. In A. Rast-Eicher and R. Windler (eds), *Archäologische Textilfunde – Archaeological Textiles. NESAT IX. Ennenda: Archo Tex*, 134–140.
- Kirkinen, T. (2019) *Between skins: Animal skins in the Iron Age and historical burials in eastern Fennoscandia*. Doctoral dissertation, University of Helsinki.
- Kirkinen, T., Riikonen, J., Dove, C. and Ruohonen, J. (2020) The identification and use of fur and feathers excavated from the Late Iron Age and Early Medieval (12th–13th centuries) Ravattula Ristimäki cemetery in Kaarina, Southwest Finland. *Fennoscandia Archaeologica* 37, 45–59.
- Kivikoski, E. (1973) *Die Eisenzeit Finnlands: Bildwerk und Text*. Helsinki: Suomen muinaismuistoyhdistys.
- Koski, K. and Moilanen, U. (2019) Kuolema ja tuonpuoleinen. In I. Pajari, J. Jalonen, R. Miettinen and K. Kanerva (eds), *Suomalaisen kuoleman historia*. Helsinki: Gaudeamus, 61–98.
- Lehtosalo-Hilander, P-L. (1982a) Luistari I – The Graves. *Suomen Muinaismuistoyhdistyksen Aikakauskirja* 82 (1).
- Lehtosalo-Hilander, P-L. (1982b) Luistari II – The Artefacts. *Suomen Muinaismuistoyhdistyksen Aikakauskirja* 82 (3).
- Lehtosalo-Hilander, P-L. (1982c) Luistari III – A Burial-Ground reflecting the Finnish Viking Age Society. *Suomen Muinaismuistoyhdistyksen Aikakauskirja* 82 (3).
- Lehtosalo-Hilander, P-L. (1984) *Ancient Finnish Costumes*. Helsinki: Suomen arkeologinen seura.
- Lehtosalo-Hilander, P-L. (2000) *Luistari – A history of weapons and ornaments: Luistari IV*. Suomen Muinaismuistoyhdistyksen Aikakauskirja 107. Helsinki: Suomen muinaismuistoyhdistys.
- Lehtosalo-Hilander, P-L. (2001) *Euran puku ja muut muinaisvaatteet*. Eura: Euran Muinaispukutoimikunta.
- Lempiäinen, T. (2002) Plant macrofossils from graves and churches. The archaeobotany of graves from the Late Iron Age and the Middle Ages and of Medieval churches in Finland and the Karelian Isthmus (Russia). In K. Viklund (ed), *Nordic Archaeobotany – NAG 2000 in Umeå*. Archaeology and Environment 15. Umeå: University of Umeå, 161–172.
- Leppäaho, J. (1953) *Halikko Rikala Ristiretkiajan kalmiston kaivaus 1950, 1951 ja 1953*. Unpublished excavation report. The Finnish Heritage Agency.
- Lipkin, S., Niinimäki, S., Tuovinen, S., Maijanen, H., Ruhl, E., Niinimäki, J. and Junno, J-A. (2021) Newborns, Infants, and Adolescents in Postmedieval Northern Finland: A Case Study from Keminmaa. *Historical Archaeology* 55, 30–48. <https://doi.org/10.1007/s41636-020-00265-1>
- Lipkin, S., Tranberg, A., Kallio-Seppä, T. and Ruhl, E. (2022) Preparing Children’s Burials in Postmedieval Finland: Emotions Awakened by Sensory Experiences. *Historical Archaeology* 56, 184–198. <https://doi.org/10.1007/s41636-022-00343-6>
- Lucy, S. (2005) The archaeology of age. In M. Díaz-Andreu García (ed), *The archaeology of identity: Approaches to gender, age, status, ethnicity and religion*. London: Routledge, 43–66.
- Moilanen, U. (2021) *Variations in Inhumation Burial Customs in Southern Finland (AD 900–1400): Case studies from Häme and Upper Satakunta*. Doctoral dissertation, University of Turku. Annales Universitatis Turkuensis, Ser. B. 555, Humaniora.
- Moilanen, U., Kirkinen, T., Saari, N. J., Rohrlach, A. B., Krause, J., Onkamo, P. and Salmela, E. (2021) A Woman with a Sword? Weapon Grave at Suontaka Vesitorninmäki, Finland. *European Journal of Archaeology* 25 (1), 42–60.
- Moilanen, U., Juhola, T., Pätsi, S., Vanhanen, S. and Alenius, T. (2022) ‘The Color of the Grave is Green’ – Moss and Juniper in Early Medieval Graves at Toppolanmäki, Finland. *Environmental Archaeology* 27, 1–11.
- Mäntylä, S. (2005a) Kuriositeetteja, lahjoja ja suojelumagiaa. Hauta-antimien tulkintaongelmia Halikon Rikalanmäen aineiston valossa. In V. Immonen and M. Haimila (eds), *Mustaa valkoisella. Ystäväkirja arkeologian lehtori Kristiina Korkeakoski-Väisäselle*. Turku: University of Turku, 134–152.
- Mäntylä, S. (2005b) Broad-Bladed Battle-Axes, Their Function and Symbolic Meaning. In S. Mäntylä (ed), *Rituals and Relations. Studies on the Society and Material Culture of the Baltic Finns*. Annales Academiae Scientiarum Fennicae, Humaniora 336. Helsinki: Finnish Academy of Science and Letters, 105–130.
- Mäntylä, S. (2006) Rikalanmäen ruumiskalmisto – näkökulmia myöhäisrautakauden yhteisöön. In S. Mäntylä (ed), *Miekka – menneisyys – maisema*. Halikko: Halikon kunta, 36–67.
- Mäntylä, S. (2007) The Meaning of weapons as grave goods: Examples from two Southwest Finnish Crusade Period



- cemeteries. In A. Bliujienė (ed), *Weapons, weaponry and man*. Archaeologica Baltica 8. Klaipėda: Klaipėda University Press, 302–309.
- Mäntylä-Asplund, S. (2011) “Gift-wrapping” in Late Iron Age graves? Grave 38 in Rikala as an Example. In J. Harjula, M. Helamaa and J. Haarala (eds), *Times, Things & Places – 36 Essays for Jussi-Pekka Taavitsainen*. Masku: J.-P. Taavitsainen Festschrift Committee, 222–255.
- Mäntylä-Asplund, S. and Storå, J. (2010) On the archaeology and osteology of the Rikala cremation cemetery in Salo, SW Finland. *Fennoscandia Archaeologica* 27, 53–68.
- Nilsson Stutz, L. and Tarlow, S. (2013) Beautiful Things and Bones of Desire: Emerging Issues in the Archaeology of Death and Burial. In L. Nilsson-Stutz and S. Tarlow (eds), *The Oxford handbook of the archaeology of death and burial*. Oxford: Oxford University Press, 1–14. <https://doi.org/10.1093/oxfordhb/9780199569069.013.0001>
- Pasanen, M. and Sahramaa, J. (2021) *Löydöstä muinaispuvuksi*. Helsinki: Salakirjat.
- Paulaharju, S. (1924) *Syntymä, lapsuus ja kuolema: Vienan Karjalan tapoja ja uskomuksia*. Porvoo: WSOY. (Reprint 1995: Suomalaisen kirjallisuuden seura)
- Pihlman, S. (2003) Väestöräjähdyksen historiallisen ajan taitteessa? Voisiko aineistoja tulkita toisinkin? In J. Kostet (ed), *Turun maakuntamuseon vuosikirja ABOA 2002–2003/ 66–67*. Turku: Turun maakuntamuseo, 47–99.
- Price, N., Hedenstierna-Jonson, C., Zachrisson, T., Kjellström, A., Storå, J., Krzewińska, M., Günther, T., Sobrado, V., Jakobsson, M. and Götherström, A. (2019) Viking Warrior Women? Reassessing Birka Chamber Grave Bj.581. *Antiquity* 93 (367), 181–198.
- Pälsi, S. (1925) *Maskun Humikkalan kalmisto*. Unpublished excavation report. The Finnish Heritage Agency.
- Pälsi, S. (1928) Puvustoaineiksia Maskun Humikkalan kalmistosta. *Suomen museo* 35, 71–79.
- Rainio, R. (2010) *Suomen rautakautiset kulkuset, kellot ja kelloriipukset – Äänimaiseman arkeologiaa*. Doctoral dissertation University of Helsinki. Suomen musiikkiyhdistyksen julkaisusarja 138.
- Rammo, R., Wright, K. and Pasanen, M. (2023) Searching for mastery in dyeing: Blackish blue on Estonian and Finnish textile finds from the 11th–15th centuries. In S. Lipkin, K. Wright and E. Ruhl (eds), *Interdisciplinary Approaches to Textile Research: Northern and Central European Textile Production and Use of Textiles and Clothing from the Neolithic to the Modern Period*. The Proceedings of NESAT XIV. The North European Symposium for Archaeological Textiles, Oulu, 23–26 August 2020. Monographs of the Archaeological Society of Finland 12. Helsinki: The Archaeological Society of Finland, 149–160.
- Ranta, H. (1998) *Helmet koruina ja symboleina – Esimerkkinä Luistarin, Anivehmaanmäen ja Köyliönsaaren kalmistolöydöt*. Licentiate thesis, University of Helsinki.
- Rast-Eicher, A. (2008) *Textilen, Wolle, Schafe Der Eisenzeit in Der Schweiz*. Antiqua 44. Basel: Archäologie Schweiz.
- Rast-Eicher, A. and Bender Jørgensen, L. (2013) Sheep wool in Bronze Age and Iron Age Europe. *Journal of Archaeological Science* 40 (2), 1224–1241.
- Riikonen, J. (2003a) Arkeologiset tekstiililöydöt: tutkimusta ja tulkintaa. In H. Luoma (ed), *Sinihameet, kultavyöt: Suomalaisia Muinaispukuja*. Tampere/Helsinki: Pirkanmaan käsi- ja taideteollisuus ry, 62–67.
- Riikonen, J. (2003b) A Message of Dress from Finland Proper – A Viking Age Grave and Costume Reconstruction. In V. Lang and Ü. Tamla. (eds), *Arheoloogiga Läänemeremaades: uurimusi Jüri Seliranna auks*. *Muinasaja teadus* 13, 229–249.
- Riikonen, J. (2005a) Iron Age aprons from southwestern Finland. In S. Mäntylä (ed), *Rituals and Relations: Studies on the Material Culture of the Baltic Finns*. *Annales Academiae Scientiarum Fennicae, Humaniora* 336. Helsinki: Finnish Academy of Science and Letters, 31–72.
- Riikonen, J. (2005b) Kirkkomäen Gotlantilainen miniä. In V. Immonen and M. Haimila (eds), *Mustaa valkoisella. Ystäväkirja arkeologian lehtori Kristiina Korkeakoski-Väisäselle*. Turku: University of Turku, 223–246.
- Riikonen, J. (2006) Mahtimiesten jäljillä – tiennäyttäjänä tekstiilit. In H. Valk (ed), *Etnos ja Kultur, Uurimusi Silvia Laulu auks*. *Muinasaja teadus* 18. Tartu: Tartu Ulikooli arheologia oppetool, 367–369.
- Riikonen, J. (2009) Valtamiehen vaimon leveä veitsentuppi. In H. M. Pellinen (ed), *Maasta, kivistä ja hengestä – earth, stone and spirit*. *Markus Hiekkänen festschrift*. Turku: University of Turku, 276–299.
- Riikonen, J. (2011a) Kokemuksia laboratiivisesta kaivauksesta. In K. Salo and M. Niukkanen (eds), *Arkeologisten hautakaivausten tutkimusmenetelmät*. *Museoviraston rakennushistorian osaston raportteja* 22. Helsinki: Museovirasto, 75–79.
- Riikonen, J. (2011b) White linen – cloth of luxury. In J. Harjula, M. Helamaa and J. Haarala (eds), *Times, Things & Places – 36 Essays for Jussi-Pekka Taavitsainen*. Masku: J.-P. Taavitsainen Festschrift Committee, 198–221.
- Riikonen, J. (2023). Hautalöytö puvun perustana. In J. Ruohonen, H. Kirjavainen, H. Honka-Hallila, H. Köngäs, M. Karisto, T. Hukkanen, K. Juvas and M. Paavola (eds), *Ravattulan muinaispuku: Tutkimukset ja valmistusohjeet*. Turku: Suomen muinaistutkimuksen tuki ry, 36–83.
- Ruohonen, J. (2016) Built of Wood and Turned to Soil: Perspectives of Research History and New Observations Concerning Finland’s Oldest Churches with Reference to Ristimäki in Ravattula. *Iskos* 21, 229–245.
- Ryder, M. L. (1969) Changes in the fleece of sheep following



- domestication. In P. J. Ucko and G. W. Dimbleby (eds), *The Domestication and Exploitation of Plants and Animals*. London: Duckworth, 495–521.
- Ryder, M. L. 1978. Vilusenharju wools. In T. Nallimaa-Luoto (ed), *Tampere-Vilusenharju: nuoremman rautakauden kalmisto Pirkanmaalla*. Karhunhammas 3. Turku: University of Turku, 29–30.
- Ryder, M. L. (2000) Issues in conserving archaeological textiles. *Archaeological Textiles Newsletter* 31, 2–8.
- Saari, N.-J. (2022). *The genetic makeup and social organisation in Early Medieval coastal Southwest Finland*. Master's thesis, University of Helsinki.
- Salo, K. (2019) Osteological analysis. Pöytyä (Yläne) Anivehmaanmäki KM 13962. Unpublished report.
- Salmo, H. (1956) *Finnische Hufeisenfibeln*. Suomen muinaismuistoyhdistyksen aikakauskirja 56. Helsinki: Suomen muinaismuistoyhdistys.
- Sarkki, S. (1979) *Suomen ristiretkiaikaiset nauhat*. Helsingin yliopiston arkeologian laitos 18. Helsinki: Helsingin yliopisto
- Seiler-Baldinger, A. (1994) *Textiles – a classification of techniques*. Washington D.C: Smithsonian Institution Press.
- Skals, I., Gleba, M., Taube, M. and Mannering, U. (2018) Wool textiles and archaeometry: testing reliability of archaeological wool fibre diameter measurements. *Danish Journal of Archaeology* 7 (2), 161–179.
- Sørensen, M. L. (1997) Reading Dress: The Construction of Social Categories and Identities in Bronze Age Europe. *Journal of European Archaeology* 5, 93–114. <https://doi.org/10.1179/096576697800703656>
- Söyrinki-Harmo, L. (1992a) Unohdetut vai kadonneet? Lapset rautakautisessa aineistossa. In K. Julku (ed), *Suomen varhaishistoria – Tornion kongressi 14.–16.6.1991*. Erikoispainossarja / Oulun yliopisto, historian laitos 326. Oulu: University of Oulu, 577–586.
- Söyrinki-Harmo, L. (1992b) Children's graves of the Viking and Crusade periods in Finland. In V. Lang and J. Selirand (eds), *Cultural Heritage of the Fenno-Ugrians and Slavs: Papers presented by the participants in the Soviet-Finnish Archaeological Symposium 10.–16. May 1990 in Tallinn*. Tallin: Eesti teaduste akadeemia, 142–155.
- Talve, I. (1979) *Suomen kansankulttuuri – historiallisia päällinjoja*. Suomalaisen kirjallisuuden seuran toimituksia 514. Helsinki: Suomalaisen Kirjallisuuden Seura.
- Tomanterä, L. (1984) Pukurekonstruktio Maskun Humikkalan haudasta 32. In P. Purhonen, L. Söyrinki-Harmo, L. Tomanterä, M. Aav, S.-L. Masala, and M. Johansson (eds), *Ken kantaa Kalevalaa: 1835 Kalevala 1985*. Helsinki: Kalevalakorju, 35–49.
- Vahter, T. (1928) Pronssikierukkakoristelun teknillisistä menetelmistä. *Suomen Museo* 35, 61–70.
- Vahter, T. (1945) Varsinais-Suomen esihistorialliset palmikkonauhat. *Suomen muinaismuistoyhdistyksen aikakauskirja* 45, 211–220.
- Vajanto, K. (2013) Fibre analysis of Late Iron Age, Early Medieval and modern Finnish wools. *Fennoscandia Archaeologica* 30, 81–94.
- Vanden Berghe, I., Gleba, M. and Mannering, U. (2009) Towards the identification of dyestuffs in Early Iron Age Scandinavian peat bog textiles. *Journal of Archaeological Science* 36, 1910–1921.
- Vanden Berghe, I. and Coudray, A. (2022a) *Finnish Late Iron Age archaeological samples, Masku Humikkala*. Unpublished analysis report. Kik-Irpa.
- Vanden Berghe, I. and Coudray, A. (2022b) *Pöytyä Anivehmaanmäki, Salo Rikala, Turku Kirkkomäki child burial finds – Finnish Late Iron Age*. Unpublished analysis report. Kik-Irpa.
- Vehkalahti, K. (2022) Lapsuuden löytämisestä toimijuuden tutkimukseen: lapsuuden historian kuusi vuosikymmentä. In K. Vehkalahti, E. Jouhki, S. Lipkin, J. Sitomaniemi-San and T. Kuokkanen (eds), *Matkaopas lapsuuden historian tutkimukseen: monitieteisiä näkökulmia ja menetelmiä*. Historiallisia tutkimuksia 288. Helsinki: Suomalaisen Kirjallisuuden Seura, 35–74.
- Welinder, S. (1998) The Cultural construction of Childhood in Scandinavia, 3500 BC–1350 AD. *Current Swedish Archaeology* 6, 185–204.
- Wileman, J. (2005) *Hide and seek: The archaeology of childhood*. Stroud: Tempus.
- Wright, K., Vanden Berghe, I., Sahramaa J. and Suomela, J. (2023) Dyed Lieto Ristinpelto textiles. *Heritage* 2023 (6), 1209–1226.
- Ylönen R. (1999) Ristiretkiaikaiset ruumishaudat lasten aseman kuvastajina. *Muinaistutkija* 1999 (1), 16–23.
- Zariņa, A. (1988) *Libiešu apgērbs 10.–13. gs*. Riga: Zinātne.
- Žeiere, I. (2017) *Arheoloģiskais tērps. Tā darināšana, valkāšana un komplektēšana mūsdienā Latvijā*. Riga: Latvijas Nacionālais kultūras centrs.

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