A labour of love: Biocodicological analysis of a medieval birthing girdle

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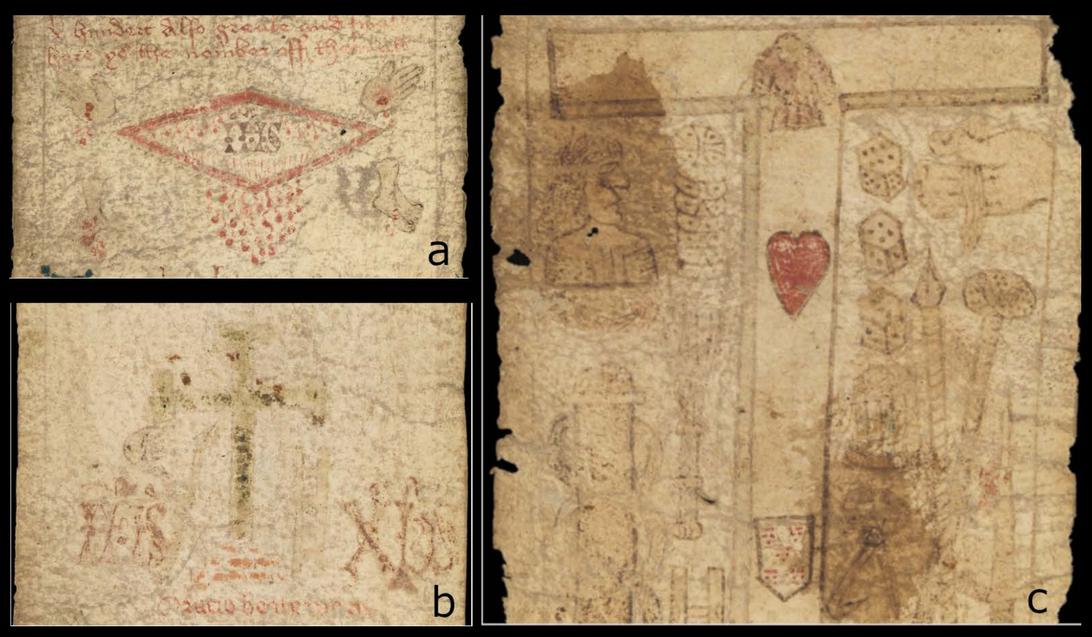
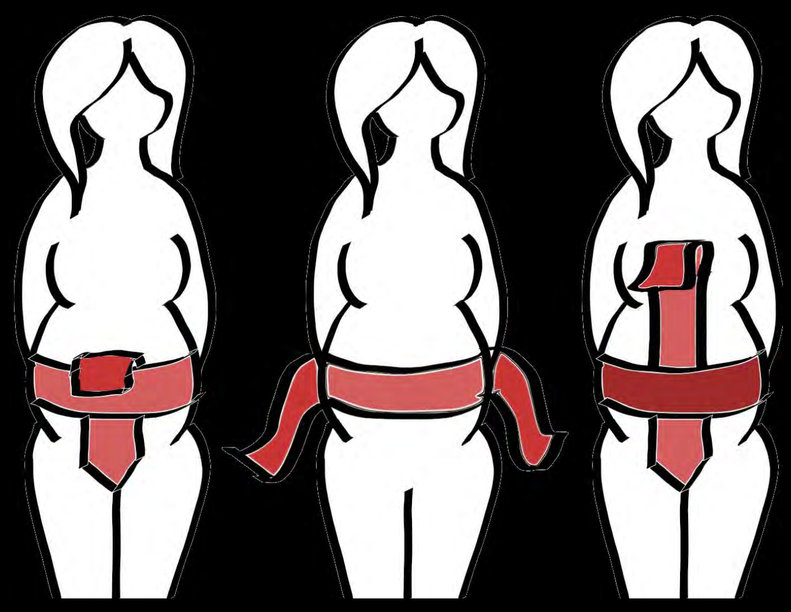
Introduction

Wellcome Trust MS. 632 is an English 15th C birth girdle written on parchment used to protect pregnant and birthing women. MS. 632 is largely unique among the remaining parchment rolls, as it has obvious signs of actual use as a birth girdle. This offers the possibility of using biocodicological methods to analysis the stains and abrasions to see whether direct biomolecular evidence could be obtained that supported the theory that the girdle was used during active pregnancy and labour and not just as a talisman.



Details taken from MS. 632. (a) MS. 632: the dripping side-wound. (b) MS. 632: rubbed away green cross or crucifix. (c) MS. 632: Tau cross with red heart and shield. Images courtesy of Wellcome Collection.

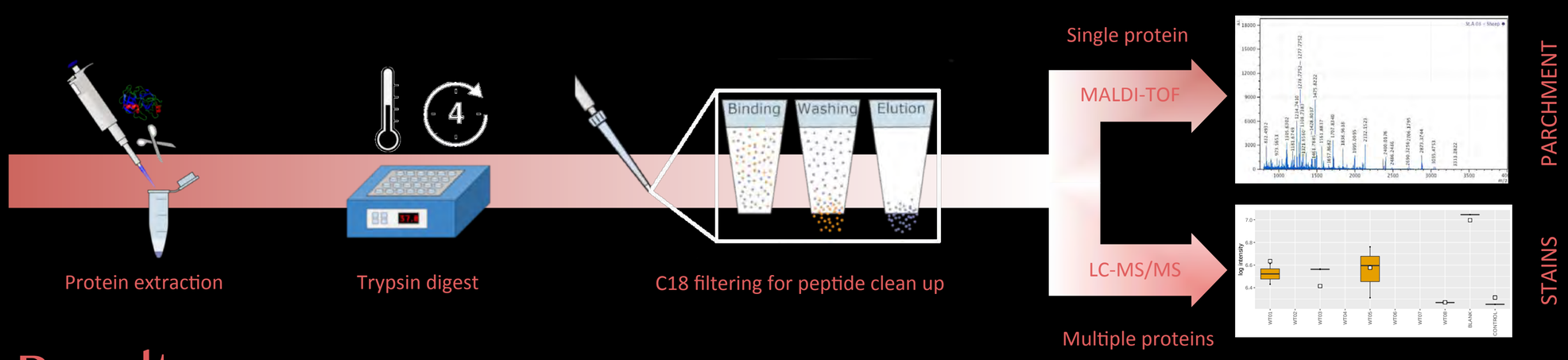


Three possible methods of tying the birth girdle when used pre and during labour.

Methodology

Initially we were approached by conservators to determine the animal origin of the girdle parchment. In further conversations we discussed the possibility of targeting some of the stained areas to see whether any biomolecules could be extracted and identified. All of the sampling was carried out using triboelectric extraction.

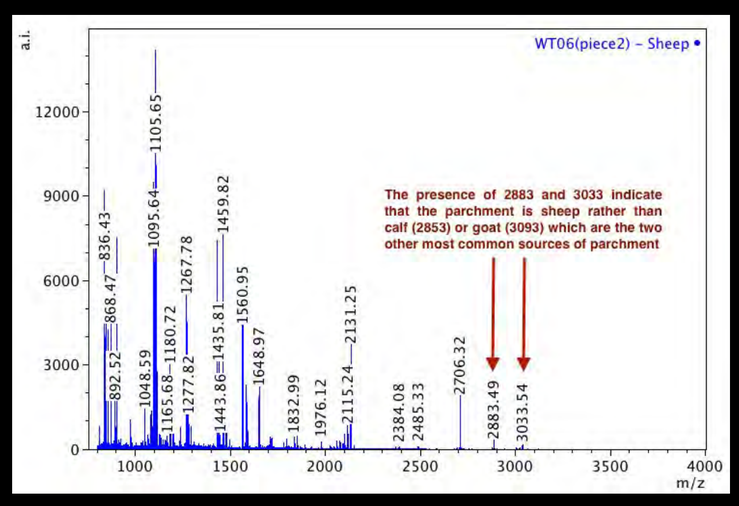
Triboelectric extraction and proteomic analysis: Eight samples were taken from stained spots (and one control) from the girdle using a PVC eraser (WT01-08, indicated on the birth scroll both left and right). Proteins were extracted from the eraser crumbs, digested with trypsin and analysed using both Matrix Assisted Laser Desorption Ionisation – Time Of Flight Mass Spectrometry (MALDI-TOF MS) for collagen identification of the parchment and Liquid Chromatography Mass Spectrometry (LC-MS/MS) for the proteomics of the stains.



Results

All four parchment sheets that make up the girdle were determined to be made from sheep skin.

Other non-human peptides were extracted from the girdle, including evidence for the use of honey, cereals, ovicaprine milk and legumes, all known as medieval remedies to aid childbrith. In addition, a large number of human peptides were also detected on the birth roll, many of which are found in cervico-vaginal fluid.



Example of MALDI-TOF spectra from one of the birth girdle samples (WT06) identified as sheep parchment.

Peptides detected on MS. 632 included honey, cereals, ovicaprine milk and legumes

Conclusion

We have provided direct biomolecular evidence that MS. 632 badly worn state attests to its use during childbirth. The use of the honey, legumes, eggs and even milk products are also common remedies in childbirth, and this study lends further support to medieval medical treatises were practices that were actively employed. The potential of proteomic analysis applied to the vast corpus of parchment documents represents a huge new avenue of exploration for the burgeoning field of biocodicology.