



Universiteit  
Leiden  
The Netherlands

## **A sense of society: enthesal change as an indicator of physical activity in the Post-Medieval Low Countries: potential and limitations**

Palmer, J.L.A.

### **Citation**

Palmer, J. L. A. (2019, March 20). *A sense of society: enthesal change as an indicator of physical activity in the Post-Medieval Low Countries: potential and limitations*. Retrieved from <https://hdl.handle.net/1887/69814>

Version: Not Applicable (or Unknown)

License: [Licence agreement concerning inclusion of doctoral thesis in the Institutional Repository of the University of Leiden](#)

Downloaded from: <https://hdl.handle.net/1887/69814>

**Note:** To cite this publication please use the final published version (if applicable).

Cover Page



Universiteit Leiden



The following handle holds various files of this Leiden University dissertation:

<http://hdl.handle.net/1887/69814>

**Author:** Palmer, J.L.A.

**Title:** A sense of society: enthesal change as an indicator of physical activity in the Post-Medieval Low Countries: potential and limitations

**Issue Date:** 2019-03-20

# **A SENSE OF SOCIETY**

ENTHESEAL CHANGE AS AN INDICATOR OF PHYSICAL  
ACTIVITY IN THE POST-MEDIEVAL LOW COUNTRIES:  
POTENTIAL AND LIMITATIONS



# A SENSE OF SOCIETY

ENTHESEAL CHANGE AS AN INDICATOR OF PHYSICAL  
ACTIVITY IN THE POST-MEDIEVAL LOW COUNTRIES:  
POTENTIAL AND LIMITATIONS

Proefschrift

ter verkrijging van  
de graad van Doctor aan de Universiteit Leiden,  
op gezag van Rector Magnificus prof. mr. C.J.J.M. Stolker,  
volgens besluit van het College voor Promoties  
te verdedigen op woensdag 20 maart 2018  
klokke 11.15 uur

door

Jessica Lisbeth Antonia Palmer

geboren te Gent  
in 1988

**Promotor**

Dr. M. L. P. Hoogland

**Co-promotor**

Dr. A. Waters-Rist

**Committee**

Prof. dr. J. Kolen (voorzitter, Universiteit Leiden)

Prof. dr. M. Soressi (secretaris, Universiteit Leiden)

Prof. dr. W. De Clercq (Universiteit Gent)

Prof. dr. E. Weiss (San Jose State University)

Dr. A. E. van der Merwe (Universiteit van Amsterdam)

Dr. S. A. Schrader (Universiteit Leiden)

Dr. L. Llorente Rodriguez (Universiteit Leiden)

Prof. dr. M.C. de Ruyter (Universiteit Leiden)

Imprint: Krijn Boom

Layout and cover design: Krijn Boom

Illustration cover: Map of Aalst (Belgium) by Braun and Hogenberg

Humerus by Krijn Boom

*“The story is in the soil keep your ear to the ground”*

- Conor Oberst





# Acknowledgements

A PhD is a strange journey. It twists, turns, rattles, and, occasionally, derails, to finally culminate in a body of work which bears one individual name. However, behind this individualistic-looking book hides a small army of people who have, in some way or another, made it all possible. I will try to do them justice.

I want to thank my supervisors, Dr. Menno Hoogland and Dr. Andrea Waters-Rist. Andrea, your support and enthusiasm have guided me ever since I started my MSc in 2011. Without you I would never have realized there were academic options for me past a master's degree. I'm still not sure whether that was a blessing or a curse, but it led me to do what I love these past five years and for that I am forever grateful. Menno, you have helped me and fought for me at every turn. Without you none of this would have been possible.

I'd also like to thank the colleagues and friends who have been with me through these years. My osteocrew; Sarah Inskip, Rachel Schats, Sarah Schrader, Felicia Fricke, Femke Reidsma, and Esther 't Gilde. I'm sorry for all the puns. Well, a little. Well, I know I should be sorry. Still, our office lunches, emergency whisky breaks, and occasional exasperated ranting sessions have added so much fun to my daily life. My climbing crew; for giving me a way to spend all the pent-up energy desk work gives me- I've thought long and hard about this. The Johnfoxes, for being amazing housemates.

To the friends back home- thanks for never feeling far away. I can't list all of you without filling too many pages but, to use a worn-out cliché: you know who you are. A few special mentions. Valerie, from now on you can tease me for being *Doctor Bones*. Hah! Elke, your common sense perspective on life has helped me keep my priorities straight more often than you know.

My parents, of course, deserve a place of honor in this list. Ingrid and Albert, you were in the acknowledgements of my BA, MA, and MSc theses, and now you're in the acknowledgements of my PhD. I think we can take this as evidence of some pretty solid (and enduring) parenting. I'd like to add my grandparents, as well, Antoine and Agnes, for always supporting me, and asking about my work, no matter how weird it may seem to you. Merci.

Maria Walgraeve, you have run this mental marathon with me, start to finish. I truly could not have done any of this without you.

And finally, Krijn; now we're both doctors! I'm so happy we found each other in time to share this experience, and I can't wait to continue to level up together.



# Contents

<b>1. Introduction and outline</b>	<b>13</b>
1.1 Archaeological context	17
1.2 Thesis outline	21
<b>2. Activity Reconstruction of Post-Medieval Dutch Rural Villagers from Upper Limb Osteoarthritis and Enteseal Changes</b>	<b>25</b>
Abstract	26
2.1 Introduction	27
2.2 Materials	28
2.3 Methods	29
2.4 Results	31
2.4.1 OA	31
2.4.2 EC	32
2.4.3 Correlation of OA and EC data	34
2.5 Discussion	35
2.6 Conclusions	39
Acknowledgements	39
<b>3. A comparison of two methods for recording enteseal change on a post-medieval urban skeletal collection from Aalst (Belgium)</b>	<b>41</b>
Abstract	42
3.1 Introduction	42
3.2 Materials and methods	43
3.3 Results	46
3.3.1 Left and right side	46
3.3.2 Comparing the methods	48
3.3.3 Upper and lower limb	49
3.3.4 Age	49
3.3.5 Sex	50
3.4 Discussion	50
3.4.1 Concordance of results between methods	50
3.4.2 Implications for inter-study comparison	51
3.4.3 Advantages and limitations of each method	52
3.4.4 Further findings	53
3.5 Conclusion	53
Acknowledgements	54

<b>4. A recording method for sixteen nonadult muscle entheses</b>	<b>55</b>
Abstract	56
4.1 Introduction	57
4.2 Materials	58
4.4 Method creation	60
4.4.1 Enteseal selection	60
4.4.2 Observation	60
4.4.3 Draft method creation	61
4.4.4 Revised method creation	61
4.5 Terminology and scoring of traits	62
4.5.1 Enteseal delineation	62
4.5.2 Porosity	62
4.5.3 Surface irregularity/rugosity	62
4.5.4 Ridges	62
4.5.5 Depression/sulcus	62
4.5.6 Presence of a distinct tubercle	62
4.5.7 Enthesophytes	63
4.5.8 Scoring classification	63
4.6 Method testing	63
4.7 Results	64
4.7.1 Trait expression per entheses	64
4.7.2 Enteseal changes, sex, and age	66
4.7.3 Inter-and intra-observer agreement	68
4.7.3.1 Intra-observer agreement	68
4.7.3.2 Inter-observer agreement	70
4.7.3.3 Inter-observer agreement general	74
4.7.4 Method amelioration based on testing	75
4.8 Final method creation	77
4.9 Discussion and conclusion	78
Acknowledgements	79
<b>5. Diversity in death: skeletal evidence of burial preferences in a late to post-medieval convent in Aalst (Belgium)</b>	<b>81</b>
Abstract	82
5.1 Introduction and historical context	83
5.2 Archaeological and socio-historical context	84
5.2.1 Louis D'haeseleerstraat	84
5.2.2 Hopmarkt and Saint Martin's church	85
5.2.3 Socio-economic context	87

5.3 Physical anthropological methods	87
5.4 Results	87
5.4.1 Demography	87
5.4.2 Pathology	88
5.4.3 Dietary isotopes	91
5.5 Conclusion	95
Acknowledgements	96
<b>6. Acts of Life: assessing the use of enthesal change as an indicator of social differentiation in post-medieval Aalst (Belgium)</b>	<b>97</b>
Abstract	98
6.1 Introduction	99
6.2 Materials	99
6.3 Methods	102
6.4 Results	103
6.4.1 Status	103
6.4.2 Sex	105
6.4.3 Age	106
6.5 Discussion	106
6.6 Conclusion	109
Acknowledgements	109
<b>7. Enthesal change in osteoarchaeology: uses, limitations, and future perspectives</b>	<b>111</b>
7.1 Activity marker research	111
7.2 EC and other activity markers	112
7.3 Study comparability	112
7.4 EC in nonadults	113
7.5 EC as an indicator of social differentiation	113
7.6 Osteoarchaeological contribution	113
7.7 Future research	114
7.8 In conclusion	115
<b>References</b>	<b>117</b>
<b>Appendices</b>	<b>135</b>
Appendix A: appendix to chapter 2	135
Appendix A1: tables listing OA and EC occurrence per joint surface and per age and sex category.	135
Appendix A2: tables listing EC occurrence per entheses and per age and sex category	137

Appendix B: appendix to chapter 4	142
Appendix B1: muscle marking score gradation as it was envisioned in the first version of the recording method.	142
Appendix B2: inter-observer agreement test data	146
Appendix B3: ec data on all individuals per side, entheses and trait	152
Appendix B4: scoring guide	162
Appendix B5: recording form	168
Appendix C: appendix to chapter 6	169
Appendix D: appendix to chapters 3, 5, and 6	170
Appendix D1: kort Rapport: Aalst-Hopmarkt 2011: fysisch antropologische analyse	170
Appendix D2: fysisch antropologische analyse Aalst-Louis D'haeseleerstraat	177
Appendix D3: Fysisch antropologische analyse Aalst-Sint Martinuskerk	201
Appendix E: additional literature	202
<b>Affiliations of co-authors</b>	<b>207</b>
<b>Summary</b>	<b>209</b>
<b>Nederlandse samenvatting</b>	<b>213</b>
<b>Samenvatting voor niet-specialisten</b>	<b>217</b>
<b>Curriculum vitae</b>	<b>219</b>