
CONTENTS

Contributors	xi
Figures	xiii
Tables	xix
In memoriam George Mann	xxi
In memoriam Ann Monsarrat	xxiii
Acknowledgements	xxv
Preface	xxvii
<i>Chapter 1</i> Introduction: people of early Malta and the Circle	1
CAROLINE MALONE, SIMON STODDART, JESS E. THOMPSON & NICHOLAS VELLA	
1.1. Introduction	1
1.2. The origins of work at the Circle: funerary archaeology in Malta	1
1.3. Dating early Malta and changing approaches to the past: scientific questions and approaches	5
1.4. Research goals of the Cambridge Gozo Project	5
1.5. Excavation of the Circle	7
1.6. Development of methodologies and progress of excavation (1987–94)	11
1.6.1. <i>The rock-cut tomb methodology</i>	11
1.6.2. <i>Methodology for the main caves and deposits</i>	11
1.7. The research methodologies of the Cambridge Gozo Project (1987–94)	15
1.7.1. <i>Methodologies for bioarchaeological analysis</i>	20
1.8. Recent work	21
1.9. Reflection	22
1.10. Impact of the project work, past and present	22
<i>Chapter 2</i> New approaches to the bioarchaeology of complex multiple interments	27
BERNARDETTE MERCIECA-SPITERI, RONIKA K. POWER, JESS E. THOMPSON, EÓIN W. PARKINSON, JAY T. STOCK, TAMSIN C. O'CONNELL & SIMON STODDART	
2.1. Introduction	27
2.2. The research questions of the FRAGSUS Population History Workgroup	27
2.2.1. <i>The complex multiple interments at the Circle</i>	27
2.3. Methods employed by the FRAGSUS Population History Workgroup	31
2.4. The first phase: isolation and archiving	32
2.5. The second phase: analyses of the isolated elements	34
2.6. The third phase: data analysis and interpretation	37
2.7. Other studies	37
2.7.1. <i>Funerary taphonomic analysis</i>	37
2.7.2. <i>Metric analysis of the long bones: long bone cross-sectional geometry and body size</i>	37
2.7.3. <i>GIS digitizing</i>	38
2.8. Challenges and concluding thoughts	38
<i>Chapter 3</i> The chronology, structure and stratigraphy of the Circle	39
EÓIN W. PARKINSON, ROWAN McLAUGHLIN, ROBERT BARRATT, SARA BOYLE, JOHN MENEELY, RONIKA K. POWER, BERNARDETTE MERCIECA-SPITERI, JESS E. THOMPSON, SIMON STODDART & CAROLINE MALONE	
3.1. Introduction	39
3.1.1. <i>Archaeological and environmental context</i>	39
3.1.2. <i>Digital organization of the excavation data (RMcL, SKFS)</i>	42
3.1.3. <i>The implementation of appropriate field methods (SKFS & CATM)</i>	43
3.1.4. <i>Intra-site GIS</i>	43
3.1.5. <i>3D modelling and reconstruction</i>	45

3.2. Time: dating and chronological modelling	48
3.3. Rock-cut tomb: structure and stratigraphy	50
3.4. Temple Period burial complex	52
3.4.1. <i>Structure</i>	53
3.4.2. <i>Stratigraphy</i>	54
3.5. Discussion and conclusions	60
Chapter 4 Dental pathology in the Circle: oral health, activity and intervention in Neolithic Malta	63
RONIKA K. POWER, BERNARDETTE MERCIECA-SPITERI, ROWAN McLAUGHLIN, JESS E. THOMPSON, JACINTA CARRUTHERS, SARAH MASSINGHAM, LAURA T. BUCK, JAAP SAERS, MARGERY PARDEY, JAY STOCK & JOHN MAGNUSSEN	
4.1. Introduction	63
4.2. Dental pathology	64
4.3. Materials	65
4.4. Methods	65
4.5. Results: overview	66
4.5.1. <i>Enamel hypoplasia</i>	66
4.5.2. <i>Fluorosis</i>	70
4.5.3. <i>Carious lesions</i>	70
4.5.4. <i>Hypercementosis</i>	71
4.5.5. <i>Fractures: crown and root</i>	74
4.5.6. <i>Extreme wear</i>	84
4.5.7. <i>Additional observations: case studies</i>	97
4.6. Discussion	120
4.6.1. <i>Limitations of study</i>	120
4.6.2. <i>The Circle in context</i>	120
4.7. Conclusion	124
Chapter 5 Dental modification in the Circle: shaping bodies, shaping culture in Neolithic Malta	127
RONIKA K. POWER, BERNARDETTE MERCIECA-SPITERI, JESS E. THOMPSON, ROWAN McLAUGHLIN, JACINTA CARRUTHERS, LAURA T. BUCK, JAAP SAERS, MARGERY PARDEY, JAY STOCK & JOHN MAGNUSSEN	
5.1. Introduction	127
5.2. Background	128
5.2.1. <i>'Active' versus 'passive' modifications</i>	129
5.2.2. <i>History of study in biological anthropology</i>	130
5.2.3. <i>Dental modification in prehistoric Africa and Europe</i>	131
5.3. Materials	133
5.4. Methods	133
5.5. Results: overview	134
5.5.1. <i>Modification types</i>	138
5.6. Case studies	155
5.6.1. <i>Congenital variation, cultural intervention, or both?</i>	155
5.6.2. <i>Active modification, passive alteration, or both?</i>	159
5.7. Discussion	161
5.7.1. <i>Limitations of study</i>	161
5.7.2. <i>The Circle in context</i>	162
5.7.3. <i>Demographic insights</i>	163
5.7.4. <i>Aetiologies</i>	164
5.7.5. <i>Cross-cultural insights</i>	165
5.7.6. <i>Chronological insights</i>	167
5.8. Conclusion	170

<i>Chapter 6</i>	Dental anthropology from the Circle: non-metric traits of the posterior dentition and population relationships in the Neolithic Mediterranean	173
	RONIKA K. POWER, BERNARDETTE MERCIECA-SPITERI, JAY T. STOCK & JOEL D. IRISH	
	6.1. Introduction	173
	6.2. Materials	174
	6.3. Methods	175
	6.3.1. <i>Data collection</i>	175
	6.3.2. <i>Quantitative analyses</i>	176
	6.4. Results	178
	6.5. Discussion and conclusions	181
<i>Chapter 7</i>	Physical activity and body size in Temple Period Malta: biomechanical analysis of commingled and fragmentary long bones	183
	EÓIN W. PARKINSON & JAY T. STOCK	
	7.1. Introduction	183
	7.2. Materials	184
	7.2.1. <i>Sampling strategy</i>	184
	7.2.2. <i>Comparative sample</i>	184
	7.3. Methods	184
	7.3.1. <i>Long bone cross-sectional geometry</i>	184
	7.3.2. <i>Approaches to fragmented material</i>	185
	7.3.3. <i>Statistical approach</i>	187
	7.4. Results	187
	7.4.1. <i>Upper and lower limb CSG properties</i>	187
	7.4.2. <i>Body size</i>	190
	7.5. Discussion	190
	7.6. Conclusion	192
<i>Chapter 8</i>	General pathology in the Circle: biocultural insights into population health, trauma and care in Neolithic Malta	195
	RONIKA K. POWER, BERNARDETTE MERCIECA-SPITERI, JESS E. THOMPSON, ROWAN McLAUGHLIN, JACINTA CARRUTHERS, HANNAH VOGEL, LAURA T. BUCK, JAAP SAERS, MARGERY PARDEY, JAY T. STOCK & JOHN S. MAGNUSSEN	
	8.1. Introduction	195
	8.2. Materials	195
	8.3. Methods	197
	8.4. Results: overview	198
	8.4.1. <i>Spinal pathologies</i>	199
	8.4.2. <i>Extreme extremities</i>	199
	8.4.3. <i>Notable absences</i>	199
	8.4.4. <i>Persons of interest</i>	202
	8.4.5. <i>Taphonomic considerations</i>	202
	8.5. Results: case studies	204
	8.5.1. <i>Trauma: cranium and mandible</i>	204
	8.5.2. <i>Other cranial pathology</i>	207
	8.5.3. <i>Post-cranial pathology</i>	221
	8.6. Methodology case study: periosteal lesions in Context (960)	241
	8.6.1. <i>Context (960) adult remains</i>	241
	8.6.2. <i>Context (960) non-adult remains</i>	254
	8.7. Discussion	272
	8.7.1. <i>Limitations of study</i>	272
	8.7.2. <i>The Circle in context</i>	273
	8.7.3. <i>The bioarchaeology of care</i>	274

8.7.4. Hyperostosis frontalis interna	276
8.7.5. Endocranial lesions	278
8.7.6. Nutrition	280
8.7.7. Interpersonal violence	282
8.8. Conclusion	284
<i>Chapter 9</i> An isotopic study of provenance and residential mobility at the Circle and the Xemxija tombs	287
ARGYRO NAFPLIOTI, ROWAN McLAUGHLIN, EMMA LIGHTFOOT, RONIKA K. POWER, BERNARDETTE MERCIECA-SPITERI, CATHERINE J. KNEALE, TAMSIN C. O'CONNELL, SIMON STODDART & CAROLINE MALONE	
9.1. Introduction	287
9.2. Background	287
9.2.1. Neolithic transition and population/settlement history in the Maltese Islands	287
9.3. Materials and methods	288
9.3.1. Principles of oxygen isotope ratio analysis	288
9.3.2. Principles of strontium isotope ratio analysis	288
9.3.3. The geological context	289
9.3.4. Samples	289
9.3.5. Sample preparation and analytical procedures	290
9.4. Results	291
9.5. Discussion	292
9.5.1. Variation in oxygen isotope ratio values	292
9.5.2. Variation in $^{87}\text{Sr}/^{86}\text{Sr}$ values	293
9.6. Conclusion	293
<i>Chapter 10</i> An isotopic study of palaeodiet at the Circle and the Xemxija tombs	295
ROWAN McLAUGHLIN, RONIKA K. POWER, BERNARDETTE MERCIECA-SPITERI, EÓIN W. PARKINSON, EMMA LIGHTFOOT, ALESSANDRA VARALLI, JESS E. THOMPSON, CATHERINE J. KNEALE, TAMSIN C. O'CONNELL, PAULA J. REIMER, SIMON STODDART & CAROLINE MALONE	
10.1. Introduction	295
10.2. Background: previous work	295
10.3. Food sources in prehistoric Malta	295
10.3.1. Tooth enamel samples	296
10.3.2. Bone collagen	296
10.4. Data analysis	296
10.5. Results	296
10.6. Discussion and conclusion	302
<i>Chapter 11</i> aDNA: an investigation of uniparental genetic heritage in Neolithic Malta	303
BRUNO ARIANO, VALERIA MATTIANGELI, ROWAN McLAUGHLIN, RONIKA K. POWER, JAY T. STOCK, BERNARDETTE MERCIECA-SPITERI, SIMON STODDART, CAROLINE MALONE & DAN BRADLEY	
11.1. Introduction	303
11.1.1. The genome and ancient DNA	303
11.1.2. Ancient DNA	303
11.1.3. Background: the genetic context of the Mesolithic in Europe	304
11.1.4. The genetic impact of the agricultural revolution	304
11.1.5. Arrival in Malta	305
11.2. Research questions	306
11.3. Methods	306
11.3.1. aDNA data collection and mitochondrial analysis	306
11.3.2. Contamination	306

11.3.3. <i>Y-chromosome haplogroup determination</i>	306
11.3.4. <i>Collection of publicly available data</i>	306
11.4. Results	307
11.4.1. <i>Mitochondrial contamination and history</i>	307
11.4.2. <i>Y-chromosome contamination and lineages</i>	307
11.5. Discussion	309
11.6. Conclusion	310
<i>Chapter 12</i> Reconstructing deathways at the Circle and the Xemxija tombs through funerary taphonomy	311
JESS. E. THOMPSON, RONIKA K. POWER, BERNARDETTE MERCECA-SPITERI, ROWAN McLAUGHLIN, JOHN ROBB, SIMON STODDART & CAROLINE MALONE	
12.1. Introduction	311
12.2. Funerary taphonomy	312
12.3. Materials and sampling strategy	313
12.4. Methods	314
12.5. Results	316
12.5.1. <i>Taphonomic analysis</i>	316
12.5.2. <i>Skeletal element representation</i>	320
12.5.3. <i>In situ articulation</i>	326
12.6. Deathways at the Circle and the Xemxija Tombs	328
12.7. Conclusion	331
<i>Chapter 13</i> The development of Late Neolithic burial places in Malta and Gozo: an overview	333
ANTHONY PACE	
13.1. Introduction	333
13.2. Background	333
13.3. Central Mediterranean beginnings	340
13.4. The development of burial sites in Malta and Gozo	343
13.4.1. <i>Għar Dalam and Skorba</i>	343
13.4.2. <i>Żebbuġ</i>	343
13.4.3. <i>Ġgantija</i>	346
13.4.4. <i>Tarxien</i>	350
13.5. Neolithic architecture	352
13.6. Summary	354
<i>Chapter 14</i> Conclusion: current inferences from the study of death in prehistoric Malta	355
SIMON STODDART, CAROLINE MALONE, RONIKA K. POWER, ROWAN McLAUGHLIN & JESS E. THOMPSON	
14.1. The state of death in prehistoric Malta	355
14.2. The sample	357
14.3. Who was buried?	358
14.4. When were they buried?	359
14.5. Can we identify changes in the health of the prehistoric populations?	360
14.6. Contemporary body concepts and belief in Neolithic Malta	360
14.7. Conclusion	363
14.8. Whither death studies in Malta?	363
References	365
<i>Appendix 1</i> Archive images from the 1987–94 campaign	409
<i>Appendix 2</i> Tables	451
Glossary	469
Index	471