University of Victoria | Graduate Studies

Notice of the Final Oral Examination
for the Degree of Master of Arts

of

JULIA LUBA MEYERS

BA (University of Guelph, 2014)

"The Relationship between Proximal Long Bone Shape and Activity among Four Hunter-Gatherer Populations"

Department of Anthropology

August 11, 2017
11:00 A.M.
David Turpin Building
Room A137

Supervisory Committee:
Dr. Helen Kurki, Department of Anthropology, University of Victoria (Supervisor)
Dr. Lisa Gould, Department of Anthropology, UVic (Member)
Dr. Lesley Harrington, Department of Anthropology, UVic (Member)

External Examiner:
Dr. Hugo Cardoso, Department of Archaeology, Simon Fraser University

Chair of Oral Examination:
Dr. Donna Feir, Department of Economics, UVic

Dr. David Capson, Dean, Faculty of Graduate Studies

Abstract

There is an understanding among biological anthropologists that long bone epiphyseal shape is highly regulated by genetic and biomechanical factors. Conversely, long bone diaphyseal geometry and robusticity have been shown to respond to activity in life. The current study examined the assumption of epiphyseal consistency by exploring the relationship between a well-established boney response to activity (Cross-Sectional Geometry) and shape change among the proximal humerus and femur. Long bone samples were taken from four hunter-gatherer populations: the Andaman Islanders, the Indian Knoll, Point Hope Alaskans, and the Sadlermiut. Shape was measured through landmark configurations placed on the proximal end of a total of 91 humeri and 84 femora. Cross-sectional Geometry measures (J) were taken from each specimen, as well. Principal Component Analyses were conducted on the landmark shape data to determine where the shape variation was occurring among the sample. These Principal Components were then compared via Bivariate Regression to the J values taken from the diaphysis.

Significant relationships occurred between the development of the lesser tubercle and an increase in J among the humeri sample. Significant relationships were also found among the femora sample; as when J increased the proximal epiphyses were more likely to be more gracile, the angle of the superior femoral neck smaller, and the space between the femoral head and the greater trochanter. The humeri results indicated a more robust proximal epiphysis in groups with activities that rely heavily on the upper body, such as rowing, swimming, and harpooning. The femora results were more complex, as the relationship between activity and proximal shape is likely heavily influenced by a genetically predetermined body shape. These results indicated that there is a relationship between activity and proximal epiphyseal shape, but that it, like all relationships, is complex, and comprised of multiple factors. Ultimately, proximal long bone shape is the result of multiple influences including, activity, genetics, population adaptation, health, and many more. Future research should focus on determining if the relationship between activity and shape exists among other populations, and when and where it begins during growth and development.