A73 Gerdy's Tubercle Shape and Associated Biomechanical Factors

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Learning Overview: After attending this presentation, attendees will better understand the implications of how various shapes of Gerdy's Tubercle (GT) may indicate degenerative changes or habitual activity in an individual, which may contribute to identifying unknown remains.

Impact on the Forensic Science Community: This presentation will impact the forensic science community by addressing the relevance of GT shape in reference to the biological profile and pathological analysis.

The Iliotibial Tract (IT) is a longitudinal band of fascia that runs from the ilium along the lateral thigh down to the proximal tibia. It has a number of purposes, including stabilizing the knee as well as extending, abducting, and laterally rotating the hip.[1] The IT band inserts distally at GT. Because a number of pathologies due to hyperactivity, such as Osteoarthritis (OA), are associated with the IT band, this research attempted to address several questions.[2] First, is knee OA associated with shape changes of GT? Second, is Body Mass Index (BMI) associated with the shape of GT? Third, does having a physically intensive occupation (e.g., fieldworker) change the shape of GT?

Data was collected on 126 curated tibiae (63 right, 63 left) of both male and female adults from the Texas State donated skeletal collection. GT shapes were separated into four discrete categories: triangular, oval/round, irregular, and unobtrusive.

Data on GT shape, progression of arthritis on the distal femur, patella, and proximal tibia, labor intensity, and BMI were collected for each individual (N=63). Each right and left tibia was run separately as many individuals had varying GT shapes and levels of OA per side.

Arthritis was scored using Calce et al.[3] Labor was scored as either non-labor or labor by assessing the individuals' reported jobs or industries. Individuals with unknown work were removed from the dataset.

R-studio was used to analyze the collected data, utilizing a General Estimating Equation (GEE) package. This GEE test was used to analyze any possible correlations between GT shape and side and the various scored factors. A second analysis was run, including side as a factor for possible correlation.

There was no significance when GT was compared with BMI, labor, and femoral and tibial OA. When GT was compared with BMI, labor, and patellar OA, there was significance between GT shape and patellar eburnation (α=0.05, p=0.0027). However, only one individual had any indication of patellar eburnation, so these results are inaccurately significant due to a small sample size.

A major forensic goal of this research was to assess modern activity patterns and provide a further line of evidence for possible past occupational field or activity level of unidentified individuals. The results, however, provided no clues toward what significance the shape of GT might hold, if any. Future research is needed to diversify the sample and shore up some of the limitations faced with self-reporting.

Reference(s):

1. Kittl, C., Williams, A., and Amis, A. Biomechanical role of lateral structures in controlling anterolateral rotatory laxity: The iliotibial tract. *Operative Techniques in Orthopaedics* 2017; 96-101.
2. Flato, R., Passanante, G., Skalski, M., Patel, D., White, E., and Matcuk Jr., G. The iliotibial tract: Imaging, anatomy, injuries and other pathology. *Skeletal Radiology* 2017; 46:605-622.
3. Calce, S., Kurki, H., Weston, D., and Gould, L. The relationship of age, activity, and body size on osteoarthritis in weight-bearing skeletal regions. *International Journal of Paleopathology* 2018; 22:45-53.

Gerdy's Tubercle, Biological Profile, Degenerative Changes