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Osteoarthritis of the anterior cruciate ligament and the medial tibial plateau: Public health considerations from a cadaveric model

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Some at-risk populations for osteoarthritis (OA) have been identified yet the literature makes little suggestion regarding precise age of disease onset or preventative strategies to reduce risk for disease onset in various groups. In 2008, the American College of Rheumatology estimated that 37.4% of 60+ years old Americans are affected by knee OA. This analysis suggests that this is largely underestimated. Morphometric analyses of the articular cartilage of the tibial plateau were performed on cadaver specimens using Image Pro software on three age populations: <70 years old, 70-79 years old and 80 years old. The articular cartilage of the medial tibial plateau in 80 years old specimens showed a 1.7-fold increase in surface area degeneration (mm²) compared to 70-79 years old specimens ($P < 0.05$). This degradation was compared to donors' reported histories. Data showed that by the 7th decade of life, when patients are in their 60s, articular cartilage degeneration on the tibial plateau had commenced in 100% of specimen. All donors that reported homemaker as an occupation displayed above average medial tibial plateau degeneration (32.33 ± 24.85%) for their age group while simultaneously reporting pathologies in their clinical history that encourage a sedentary lifestyle. This assessment identifies an occupational class that should be aware of their propensity to develop disease while considering the concept that an appropriate BMI does not guarantee joint health. This assessment also identifies a more realistic time frame than previous public health advisory committees have produced regarding age of disease onset and initiation of preventative measures. It is recommended that strength training of the hip abductors and the musculature supporting the knee joint commence early in adult life to avoid valgus collapse and shearing at the knee joint, two of the most common biomechanical reasons for the initiation of pathologies such as OA.

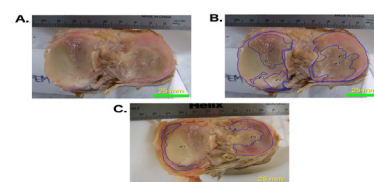


Figure 1. Photographs of the tibial plateau of a right cadaveric knee specimen. **A.** Displays the degenerative changes to the articular cartilage on the medial and lateral aspects of the plateau. **B.** Displays the primary articular surface of the medial and lateral aspects of the tibial plateau. **C.** Displays the surface area traces for the medial and lateral aspects of the tibial plateau independent of one another. **C.** Displays the surface area traces for the medial and lateral aspects of the tibial plateau independent of one another.

References

1. Jessica Immonen, Chris Siefring and Luke Sanders (2017) Osteoarthritis of the Anterior Cruciate Ligament and the Medial Tibial Plateau: A Cadaveric Study. *Cartilage*; 1: 1947603517713817.

Biography

Jessica Immonen has completed her BS in Biology at the University of Dayton, Ohio, Master's degree in Anatomy and PhD in Anatomy at Pennsylvania State University's, College of Medicine. She defended her dissertation on work in translational drug therapy for diabetic wound healing and presently, she is working as a Faculty at Rocky Mountain University of Health Professions in Provo, Utah. Her work on diabetic wound healing received the 2015 Best Clinical Paper Award from the Society of Experimental Biology and Medicine. Currently, she teaches courses in gross anatomy, neuroscience and physiology and serves as the Co-Chair of the Department of Anatomy and Physiology. Her primary research includes work on osteoarthritis of the knee using cadaveric models and earned her the 2017 Young Faculty Honorarium from the American Association of Anatomists.

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