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ANALYSIS OF LONG BONE AND VERTEBRAL FAILURE PATTERNS
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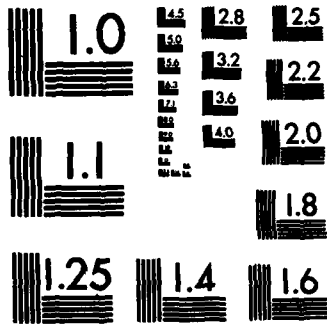
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MICROCOPY RESOLUTION TEST CHART
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) Baboons were dropped vertically from four feet above the ^{ground} ground. The vertebral columns were examined with scanning electron microscopy and light microscopy six months and six years post-impaction. The posterior articulations of the vertebrae had osteoarthritic changes which were probably related to changes previously observed in the anterior portion of the column. These changes seemed to increase in severity with time following the impaction sequence and were probably impaction related.		

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ANALYSIS OF LONG BONE AND VERTEBRAL FAILURE PATTERNS

AFOSR-80-0130

Progress Report

September 30, 1981



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Morphology of Vertebral Trabecular Arcades

Vertebral columns of four rhesus monkeys have been collected and are being processed for study with light microscopy and scanning electron microscopy. The baboon columns have yet to be acquired from Dr. Kazarian.

Bone Remodeling Parameters for the Squirrel Monkey

Squirrel monkeys are currently being labeled by Dr. Kazarian's group. Upon the completion of labeling, samples are expected.

The Effects of Vertical Impaction on the Spinal Column of Baboons

The scanning electron microscopy and light microscopy of the posterior articular processes of control, six months post-impaction, and six years post-impaction baboons has been completed.

Scanning electron microscopy. The surface of the articular cartilage of the control animal was relatively smooth compared to the impacted animal joint surfaces. Fibrillation was evident on the articular surfaces of the joints from six month post-impaction animals and it had progressed to a more extensive severe lesion of the cartilage in the six years post-impaction group. This fibrillation is indicative of osteoarthritis and is thought to be related to the impaction process.

Light microscopy. Light microscopy of the articular cartilage of the posterior articular processes further supported the findings of the scanning electron microscopy studies. In the impacted animals, the cartilage surface was eroded and cracks and clumping of chondrocytes were observed. Special staining with alcian blue van Gieson indicated changes in the proteoglycans of the cartilage matrix. In the six years post-impaction group, the articular cartilage had converted to fibrocartilage instead of normal hyaline cartilage. The abnormal changes observed

with light microscopy also indicate osteoarthritis which seems to increase in severity with time following the impaction sequence.

The osteoarthritic changes observed in the posterior articulations of the vertebral column are probably related to changes in the anterior column described in previous portions of this study.

Eleven additional spinal columns from impacted baboons in the immediate, three months, six months, and one year post-impaction groups have been received and are currently being processed for scanning electron and light microscopy.

Publications

Eurell, J.C. and L.E. Kazarian, The scanning electron microscopy of compressed vertebral bodies. Spine 7(2): 123-128, 1982.

Eurell, J.A. and L.E. Kazarian, The quantitative histochemistry of rat lumbar vertebrae following spaceflight. The Physiologist, in press.

Eurell, J.C., L.E. Kazarian, P. Gordon, and W. Blakeney, The scanning electron microscopy of compressed spinal units. In preparation for Anatomica Clinica.

Interactions

Presentation

Eurell, J. and L. Kazarian. The scanning electron microscopy of the vertebral column from baboons following vertical impaction, June 6-10, 1982, International Society for the Study of the Lumbar Spine, Toronto, Canada.

Visits to Air Force Laboratories

June 21-23, 1982 to Wright Patterson AFB, ARAMRL/BBD.

Inventions and Patents

None.

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