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NEWS

RSNA Press Release

Imaging Technology Solves 400-Year-Old Mystery

Released: November 29, 2004

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At A Glance

- MDCT, an advanced form of computed tomography, confirmed that scurvy killed the settlers on St. Croix Island near Maine in 1604.
- The MDCT images, which helped physicians determine the ages of the deceased, will constitute a digital archive of the remains.
- Evidence of the first autopsy performed in the United States was also discovered by the study of the St. Croix remains.

CHICAGO - Using multi-detector computed tomography (MDCT), scientists have confirmed that scurvy killed nearly half of America's first colonists on Saint Croix Island 400 years ago, according to research presented today at the annual meeting of the Radiological Society of North America (RSNA).

"MDCT images are extremely important to anthropologists because we can obtain bone measurements without destroying the artifact," said the study's lead author, John Benson, M.D., director of medical imaging at Mount Desert Island Hospital in Bar Harbor, Maine. "Using MDCT, we were able to visualize the entire skull from every angle, inside and out. Scans of the skull and leg bones revealed a thick hard palate in the mouth and an extra layer of bony tissue on the femur and tibia, which we believe resulted from the internal bleeding associated with scurvy."

Saint Croix Island International Historic Site is administered by the National Park Service through Acadia National Park. The settlement was established in 1604 by French settlers looking to colonize the North Atlantic coast of North America. But the island, located in the river that today divides the United States and Canada, proved to be a poor choice. Isolation and harsh winter conditions claimed the lives of nearly half of the 79 colonists.

Dr. Benson and colleagues analyzed remains from seven burial sites using MDCT, an advanced form of CT technology that supports faster, higher-quality image acquisition. Subsequently, the remains were re-interred on the island.

"Because the remains are no longer available to researchers, our MDCT study has created a digital archive of the skulls and bones that can be continually viewed and studied," Dr. Benson said.

In addition to confirming the ages of the deceased, the MDCT images revealed evidence of scurvy, a fatal disease characterized by general weakness, anemia, gum disease and internal bleeding. Based on cut marks found in one of the skulls, researchers also believe the

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surviving colonists on Saint Croix Island initiated the first autopsy to better understand the disorder that was killing their compatriots.

"This is one of the first MDCT investigations of the skeletal remains of early colonists," Dr. Benson said. "But, because MDCT is such a robust tool for the anthropological analysis of human remains, we're beginning to see more forensic medical examiners and anthropologists incorporating CT and magnetic resonance imaging (MRI) into their work."

Co-authors of the study are Marcella Sorg, Ph.D., D-AFBA, and Lisa Hunter, M.Sc. Co-principal investigators of the project were Steven Pendery, Ph.D., of the National Park Service and Thomas Crist, Ph.D., of Utica College in New York. The forensic investigation at St. Croix Island was supported by the National Park Service in partnership with researchers from Utica College, the University of Maine and Mount Desert Island Hospital.

Abstract:	• Multidetector Computerized Tomography (MDCT) Analysis of Skeletal Remains of Members of Samuel de Champlain's 1604 Settlement on Isle de Ste Croix

MDCT video clips of Saint Croix skulls

- .AVI format
  1. St. Croix 1 (18 Mbyte)
  2. St. Croix 2 (14 Mbyte)
  3. St. Croix 3 (30 Mbyte)
  4. St. Croix 4 (21 Mbyte)
  5. St. Croix 5 (59 Mbyte)
  6. St. Croix 6 (34 Mbyte)
  7. St. Croix 7 (14 Mbyte)
  8. St. Croix 8 (38 Mbyte)

Images (.JPG format)

Samuel de Champlaign (1567–1636), "Father of Canada"	Aerial view of Saint Croix Island	Old Map of Saint Croix Island	New Map of Saint Croix Island
1969 Saint Croix excavation site (courtesy of D. Sanger)	1969 Saint Croix excavation site (courtesy of D. Sanger)	Perform Multidetector CT scan of skeleton	St. Croix settler's skull
Photos of skull (left) and MDCT view (right)	3-D CT manipulations used for morphological information	MDCT scans reveal detailed internal structures	MDCT scans reveal biological profile: age (stage of epiphyseal union)
MDCT scans reveal biological profile: age dental development	MDCT scans identify pathology: intracortical lacuna in femoral shaft	St. Croix 15	St. Croix 16

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MDCT scans identify pathology: periostitis

Preparing for multidetector CT scan of skeletal remains

Results show trabecular detail/physeal scar

Results show maxilla-prominent torus

Results evaluate dentition

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RSNA is an association of more than 37,000 radiologists, radiation oncologists and related scientists committed to promoting excellence in radiology through education and by fostering research, with the ultimate goal of improving patient care. The Society is based in Oak Brook, Ill.

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