

Of moose and men: 50-year study into moose arthritis reveals link with early malnutrition

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This is a moose from Isle Royale. Credit: All photos should be attributed to George Desort.

It's seen as a sign of getting old, but scientists have discovered that arthritis is not just a human problem as a study lasting 50 years reveals how moose suffer from an identical form of the condition. The research, published in *Ecology Letters*, also casts new light on how malnutrition early in life can lead to the disorder in both moose and humans.

The study, which began in 1958, was carried out on Isle Royale, a wilderness island National Park in lake superior, with only one large predator, the wolf and one large prey species, the moose. The research has involved three generations of scientists who have studied the skeletal remains of over 4000 moose, mostly killed by wolves or harsh winters.

"As the study entered its second decade there was increasing evidence of [Osteoarthritis](#) (OA) in the moose population," said lead author Rolf Peterson from Michigan Technological University. "OA is a crippling disease and is identical to that found in humans. It is commonly believed to be caused by 'wear and tear,' but the complex causes have remained poorly understood."

In the Isle Royale population OA is especially deadly as it prevents a moose from being able to kick or avoid a lunging wolf, meaning OA is highly linked with moose survival rates.

Over the course of the study the team discovered a rise in OA as the moose population increased, and a decrease when the population fell, leading to the idea that OA is linked to moose [malnutrition](#) when food is scarcer. The team found moose that were malnourished when young would develop OA in older age.

"We have shown how malnutrition early in life increased the risk of OA later in life, but this also applies to humans as much as to a herd of moose in the wild," said Peterson.

"These findings cast new light on how early humans first developed OA," said co-author Dr Clark Spencer Larsen, an anthropology expert from Ohio University. "The study of human remains from archaeological contexts reveals OA increased where societies changed from foraging plants and animals to an increased dependency on farming."

Such changes were documented in a mid-continental population of Native Americans 1000 years ago. In this group arthritis increased by 65% as society turned from foraging and hunting to agriculture and the cultivation of maize.

"Initially the increase in OA was put down to increased joint stress due to the labour of agriculture. However research now shows that, like the moose in Isle Royale, nutritional deficiencies early in life may have been the main cause. Early malnutrition was certainly a part of existence for many pre-historic human societies, and remains a fact of life for millions of people across the world, so this study is also relevant for modern human society."

"This remarkable study offers us a unique insight into the complex causes of OA," concluded Peterson. "The link between early nutrition and arthritis, in both people and [moose](#), reveal that OA is more complex than commonly assumed and involves connections between physiology, life histories, populations and communities, while highlighting the importance of the disorder for past and present humans."

Provided by Wiley

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