

# Today's children reach bone maturity earlier, study reveals

December 18 2018

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Dana Duren, PhD. Credit: University of Missouri-Columbia

Children born in the most recent century have bones that reach full maturity earlier—by nearly 10 months in girls and nearly seven months in boys—according to a new study from the University of Missouri

School of Medicine.

"Our findings show there is a "[new normal](#)" for timing when kids' skeletons will reach full maturity," said Dana Duren, Ph.D., director of orthopaedic research at the Thompson Laboratory for Regenerative Orthopaedics.

The research team, led by Duren, assessed the radiographs of more than 1,000 [children](#) born between 1915 and 2006. The team evaluated radiographs of the bones in the hands and wrists to determine the precise timing of the beginning and ending of a developmental process called epiphyseal fusion.

"We focused on epiphyseal fusion because it signals the end of the growth of the bone," said Duren, who was the principal investigator. "It begins when the growth plate, which is cartilage at the end of the bone, starts to connect the epiphysis, or bone cap, to the long bone through small calcifications. Eventually, the growth plate completely calcifies and attaches, or fuses, to the long bone. When fusion is complete, so is the growth of that [bone](#)."

The [research team](#) used radiographs gathered in the Fels Longitudinal Study, which is the world's only century-long study of human growth and development, to track when fusion started and when it was complete in children born as far back as 1915. The results showed that the skeletons of children born in the 1990s are reaching fusion completion, and thus skeletal maturity, faster and sooner than children born in the 1930s.

These findings directly impact the timing of the clinical care of certain pediatric orthopaedic conditions, such as leg-length differences, scoliosis and the timing of using growth hormone.

Mel Boeyer, MS, predoctoral orthopaedic research fellow and co-author

of the study, works closely with pediatric orthopaedic surgeons to understand how physicians time this care.

"The timing for the treatments of these conditions is a critical component to a good outcome," said Boeyer. "What this research shows us is physicians will need to start looking for the beginning of epiphyseal [fusion](#) sooner than they once thought."

The study does not address what might be the cause of this new normal. However, Duren and many of her colleagues think an increase in exposure to environmental hormones and hormone mimickers could be a contributing factor.

The study, "Early Maturity as the New Normal," was recently published by the journal *Clinical Orthopaedics and Related Research*.

Provided by University of Missouri-Columbia

Citation: Today's children reach bone maturity earlier, study reveals (2018, December 18)  
retrieved 5 May 2024 from  
<https://medicalxpress.com/news/2018-12-today-children-bone-maturity-earlier.html>

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