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Cracking knuckles: Is it bad? What makes that sound?

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Snap, crackle, pop. If you're a knuckle cracker, that familiar sound when you consciously pop your joints is like comfort food. You know it might not be so healthy for your hands or ankles, but it feels oh-so-good.

Robert G. Cook knows that feeling. The 55-year-old Sacramentan said he's been popping his knuckles daily for decades. Typically, it's when he first sits down to work at his computer keyboard. "It's like a concert pianist or baseball player warming up," he said. "It's a ritual."

And like many habitual knuckle crackers, he's always been told that it's bad for his joints, leading to arthritis or enlarged knuckles.

That's why Cook jumped at the chance to be one of 40 volunteers in a recent study by UC Davis radiology professor Dr. Robert Boutin and orthopedic surgery professor Dr. Robert Szabo, who also see patients clinically. The pair wanted to resolve two persistent questions about knuckle cracking: What causes that popping sound, and is it bad for your joints?

"Patients do come in all the time and want to know if knuckle cracking is bad (for their joints)," Boutin said. "It's a real-world question that a lot of patients ask."

Although popping knuckles is arguably the most common kind of joint cracking, it can also occur in the ankles, knees, back or neck. Some say it's a way to release tension or limber up. For others, it's simply a habit.

Boutin said the study's inspiration came from an unexpected source: his 11-year-old daughter, who noticed classmates at school - mainly boys - loudly cracking their knuckles. Her curiosity prompted Boutin to craft the study.

The 40 participants included 30 with a history of habitual knuckle cracking and 10 without. Some said they had never intentionally cracked their knuckles; others were habitual, cracking them up to 20 times a day for the past 40 years.

Ranging in age from 18 to 63, the volunteers were invited to sit and methodically crack their knuckles. Techniques varied: Some pulled their fingers, others flexed or bent them back.

To determine what causes the crackle 'n' pop, a tiny ultrasound device was hovered over their joints, capturing the sound effects of knuckles being cracked. More than 400 ultrasound images were taken. The results were startling.

"It looked like a tiny Fourth of July explosion inside the hand," said Boutin, who presented his study last month at the Radiological Society of North America in Chicago.

That flash, he explained, is caused by dissolved gas that sits in joint fluid. When you pull or bend a joint, it creates negative pressure, which releases the gas, forming tiny micro-bubbles. When released quickly (i.e. in knuckle cracking), the escaping gas causes a bright flash that shows up in imaging. "It has a distinctive appearance on an ultrasound. Every single case, we heard the crack before we saw the physical flash."

The UC Davis findings appear to contradict traditional explanations that the knuckle cracking sound is caused when the gas bubbles burst, like a balloon being popped.

Last April, a study by Canadian researchers using MRI imaging came to a similar conclusion: The knuckle cracking sound is created by the bubble's formation itself.

Until that joint fluid pressure builds up again, it can take up to 20 minutes before someone can re-crack their knuckle.

In an email, study co-author Szabo, chief of the UC Davis hand, upper extremity and microvascular surgery department, said, "What are gratifying about our results are the questions raised about bubbles in human systems, particularly in joints. We were able to actually visualize the bubbles and correlate them with the sounds of cracking, supporting the theory of cavitation," or the formation of a void or bubble inside liquid. The formation of bubbles, he said, "is somewhat mysterious and still not full understood, but we got to see it in action in the joints of live people. That's exciting!"

The second part of the UC Davis study was to assess the potential harm from knuckle cracking. Each participant was tested before and after each ultrasound by two hand/wrist orthopedic surgeons who checked for range of motion, grip strength and laxity (overextension of ligaments). The surgeons examined the hands without knowing who was or wasn't a knuckle cracker, and were not told which joints had successfully been cracked.

The physical examinations by the hand-injury specialists found no problems in the joints of knuckle crackers. "We did not find any swelling or adverse results like decreased grip strength," said Boutin.

His conclusion: There's no short-term harm in knuckle cracking. And there might even be a benefit: After a joint was cracked, it showed a "significantly increased range of motion" compared to joints that did not crack, Boutin said.

The UC Davis study appears to contradict a 1990 study that suggested knuckle cracking can cause joint swelling and weaken the grip and "should be discouraged."

Given the prevalence of knuckle crackers — it's estimated that 25 percent or more people do so — scholars have paid attention to the topic in recent years. Most studies have debunked the warnings that knuckle cracking causes arthritis in joints.

Back in 1975, a study in the then-Western Journal of Medicine comparing 28 seniors and 28 schoolchildren found there was no evidence "that knuckle cracking leads to degenerative changes in the (hand) joints in old age." But, the study noted wryly, "The chief morbid consequence of knuckle cracking would appear to be its annoying effect on the observer."

In a more humorous vein, Dr. Donald Unger, a California allergist and longtime knuckle cracker in Thousand Oaks, was lauded in 2009 for his own self-styled research. For more than 60 years, Unger had habitually cracked the knuckles of his left hand, but not his right. Using his own hands as a test case, he compared them for arthritis and found no difference. That "research," originally published in 1998 as a letter in the *Arthritis & Rheumatism* journal, earned him the Ig Nobel prize for medicine, a Harvard University-based parody of the Nobel Prize given to "improbable" or humorous scientific research.

The next step for the UC Davis researchers is to look at long-term effects of joint cracking on other areas besides hands. Boutin is in the midst of analyzing results from a global questionnaire of 1,800 individuals to determine if there are age, cultural or geographic differences among knuckle crackers.

Despite all the research, Boutin knows that some things don't change

about knuckle cracking: "Many people are really quite fond of knuckle cracking and find it hard to image life without its existence," he said. "For other people, it's like fingernails on a blackboard."