

sume such enormous quantities of food in such short periods of time.”

In the study, a world-class eater and a control subject were asked to eat as many hot dogs (without buns) as possible. Both ingested barium and were placed on a fluoroscopy table, in a semiupright position, to allow the capture of x-ray images of their stomachs in real time. The control subject ate seven hot dogs before stopping. The competitive eater ate 36 hot dogs in 10 minutes and still didn't feel bloated or full, only stopping at the insistence of the researchers, who observed his massively distended abdomen and worried he would suffer a gastric perforation.

There are several theories about how people such as Czerwinski are able to eat so much, so quickly. It has been attributed to factors such as a strong jaw, extreme mental focus, high pain tolerance and a deadened gag reflex. Some competitors seem able to com-

pletely relax all the muscles in their esophagus, creating a hollow tube, in effect, that can be crammed with food.

But it is the unusual stomachs of gustatory athletes that seem to hold the most potential for helping people with dyspepsia. A normal stomach is around the size of two fists and can hold 2–4 litres of food. When someone eats, the brain informs the muscles in the stomach to relax to accommodate the food. The stomach contracts when full, pushing food into the intestine, and sends a signal of discomfort to the brain to stop the consumption. In people with dyspepsia, this signal is sent prematurely. In competitive eaters, on the other hand, the signal is delayed. Or perhaps it isn't sent at all.

“People usually feel full after 20 minutes,” says Czerwinski. “I never really get that sensation.”

In Metz's study, the stomach of the competitive eater was described as an “enormous flaccid sac.” Some competi-

tors increase the capacity of their stomachs through training, such as chugging gallons of water. This can be dangerous, though, posing risks such as water intoxication, a potentially deadly dilution of electrolytes in the body. Then there are people like Czerwinski, who don't need to train.

“Part of it is natural, being born with a big stomach and the ability to fill it up, to relax and expand it,” says Metz.

A better understanding of the ability of a competitive eater to consume such large quantities of food without experiencing pain, however that comes about, may be the key to helping those for whom eating regular-sized meals are discomforting experiences, suggests Metz. “Our hope is that for people with dyspepsia, we could potentially train them to take bigger volumes of food.”

— Roger Collier, *CMAJ*

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## Competitive consumption: Ten minutes. 20 000 calories. Long-term trouble?

It all started, according to legend, as an argument between four immigrants about who loved their adopted homeland the most. The heated discussion took place in 1916 at Nathan's Famous, a hot dog stand that had recently opened on Coney Island in New York City. The establishment's owner, Nathan Handwerker, feared fisticuffs might ensue, so he proposed a contest.

Whoever could eat the most hot dogs in 12 minutes would be declared the most patriotic of the bunch. James Mullen, a native of Ireland, claimed the title by downing 13 hot dogs, buns included. That contest continues to this day. Held annually on July 4, it is considered the top dog of all eating competitions, with US\$10 000 going to the champ.

Do today's winners eat more than 13 hot dogs? Ah, yeah, a few more. Let's just say masticating a baker's dozen of sodium-rich beef tubes isn't much to brag about anymore. Reigning six-time champion Joey Chestnut took Nathan's coveted Mustard Belt in 2012 by laying waste to a record-tying 68 hot dogs in

10 minutes. Mullen had eaten just over one hot dog per minute. Chestnut ate one every nine seconds.

The annual contest at Nathan's Famous is but one of dozens of events sanctioned by Major League Eating, the franchise behind the professional competitive eating circuit. Other competitions include Ben's Chilli Bowl's World Chilli Eating Championship (total cash purse: US\$3000), Western Days Festival World Tamale Eating Championship (total cash purse: US\$3500) and the Oktoberfest Zinzinnati World Bratwurst-Eating Championship (total cash purse: US\$2000).

If an item is edible, there is probably somebody somewhere eating a whole lot of them in hopes of winning a prize.

Reactions to the rise in popularity of the “sport” of extreme eating generally fall into two categories. There are those who marvel at the ability of these rubber-bellied gurgitators to wolf down (and keep down) mountains of food. The Nathan's Famous contest draws about 40 000 spectators and is broadcast inter-

nationally on ESPN. Then there are those who find the whole affair grotesque. Celebrating overconsumption in a nation suffering an obesity epidemic, they argue, is just plain wrong, and competitive eaters are setting themselves up for a lifetime of health problems.

But are participants in speed-eating contests really putting their health at risk? And if so, to what extent?

“The bottom line is, there is such minimal data that we are doing a lot of conjecture,” says Dr. David Metz, professor of medicine at the University of Pennsylvania in Philadelphia, who contributed to a study of competitive eating (*Am J Roentgenol* 2007;189:681-6).

That said, physicians do know enough about how the human body works to take some educated guesses about the possible effects of repeatedly bingeing on massive quantities of food. According to the study, these risks include gastroparesis (slowing of food movement out of the stomach), intractable nausea, vomiting, gastric perforation, Mallory-Weiss tear (tear in



Reuters/Eric Thayer

Joey Chestnut (centre) ate 68 hot dogs in 10 minutes to win the 2012 Nathan's Famous Fourth of July International Eating Contest.

the lining of the lower esophagus), Boerhaave syndrome (rupture of esophageal wall) and morbid obesity (due to loss of ability to feel satiated). The repetitive stretching of the stomach may also damage its muscles.

“My concern is if they do this for years and years and years, this long-term chronic overeating may lead to some kind of muscular dysfunction,” says Metz.

The risks posed to world-class masticators are likely different than those faced by average individuals who try their hand (and mouth) at speed eating. The stomachs of competitive eaters appear to have unique properties, including the ability to expand by an incredible amount. A typical eater simply could not put away the same amount of food in one sitting.

“In our opinion, average eaters have as much chance of ingesting 50 hot

dogs in 12 minutes as executing a triple axel on the ice or running a 4-minute mile,” states the study.

One of the greatest risks to average individuals who enter eating contests appears to be choking. In 2002, a 14-year-old in Japan choked to death during a competition against friends at his school. In 2004, a 36-year-old man from Canada choked to death after a chicken wing-eating contest in Regina, Saskatchewan. In late 2012, a Florida man choked and died following a bug-eating contest.

The professionals who compete in many contests put themselves at risk of becoming obese. Or at least you would think so, considering the amount of calories they consume during an event. The recommended daily caloric intake for the average man is 2000–2500. A

typical hot dog has around 300 calories. So eating 68 at the Nathan's Famous contest works out to more than 20 000 calories — in 10 minutes. Then again, perhaps the body doesn't actually use all those calories.

“There are only so many calories you can consume in 10 minutes,” says Peter Czerwinski, a professional eater known as Furious Pete. “A lot of stuff goes through undigested.”

Like many of the top eaters, Czerwinski remains fit through exercise and controlling calories when not competing. Many competitive eaters fast before and after an event. In fact, being thin allows you to eat more during a contest, according to the “belt of fat” theory, which posits that belly fat restricts the stomach's ability to expand.

The part of competitive eating that may be most risky isn't the competition. “It's a very dangerous thing to train for,” says Czerwinski, who is something of a natural and never really took to training to expand his already-pliable belly.

One common technique used to stretch the stomach, for example, is called water loading. It involves chugging one or two gallons of water, which could dilute the electrolytes in the body enough to cause death.

Despite finding a way to stay fit while gorging on high-calorie foods, though, Czerwinski acknowledges that the lifestyles of professional eaters are somewhat crazy. “I think it's stupid for anyone to do, to be frank, though I'm having fun with it,” says Czerwinski. “I don't encourage anyone to do it.” — Roger Collier, *CMAJ*

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## Limited options for redress

When Douglas Fraser's back pain became acute in April 2011, he asked to see a doctor at the Bath Institution, a medium-security federal prison in southern Ontario where he'd been incarcerated for four years. But it was two months before the 58-year-old got his wish, and another four months of searing pain and weight loss, as well as constant demands from family and

friends that prison officials escalate his health services, before Fraser was finally taken to Kingston General Hospital for assessment. He was soon diagnosed with pancreatic cancer. In the remaining three months of his life, Fraser contended the delay in providing him access to external care, constituted a death warrant.

Fraser's mother, Muriel, a softspoken native of Tillsonburg, Ontario, is

convinced the Correctional Service of Canada (CSC) issued just such a decree. “My son was clearly denied his right to health care equal to what non-prisoners expect.”

Dr. Ivan Stewart, the palliative care physician who treated Fraser in the final months of his life, doesn't go quite that far. But Stewart does believe CSC failed to provide equitable health care