Biomedicine

Shallow breather? Look for hypertension

Take a deep breath. Now exhale, pushing out every last bit of air you can. The larger the volume of air forced from your lungs, the lower your chance of developing hypertension. That's the conclusion drawn from a major new study showing that "forced vital capacity" — a measure of how much air a person can breathe into and out of the lungs — constitutes as strong an independent predictor of hypertension risk as any ever identified, says Joseph V. Selby of the Kaiser Permanente (KP) Medical Care Program in Oakland, Calif.

Selby's team identified 26,429 health-plan members who had undergone at least two "multiphasic" exams (KP's periodic comprehensive physicals, including a detailed questionnaire) and whose blood pressure tested normal in the first exam some 18 to 25 years ago. Of this group, aged 30 to 49 at the first multiphasic exam, 1,031 became hypertensive by age 55.

From the same starting population of 26,429, the researchers then selected a demographically matched sample of 1,031 men and women who did not develop hypertension by age 55. In comparing the two groups' medical records and multiphasic exam results, they found that forced vital capacity and blood levels of uric acid, a breakdown product of nucleic acid metabolism, emerged as two of hypertension's most predictive risk factors.

The 20 percent whose initial uric acid levels were highest proved more than twice as likely to develop hypertension as the 20 percent with the lowest uric acid levels, the researchers report in the June AMERICAN JOURNAL OF EPIDEMIOLOGY. And the 20 percent with the lowest lung capacity were 4.5 times more likely to become hypertensive than the 20 percent with the greatest lung capacity — even after the investigators accounted for recognized risk factors such as smoking, obesity, family history, adult weight gain and serum cholesterol. In fact, Selby says, these two factors are so "strikingly large" that they "suggest the possibility of a causal association," though he admits "we haven't a clue" to how they relate to hypertension.

Pumping iron helps granny, too

It's never too late to fight the weakening ravages of time with high-intensity muscle training, even if you're an arthritic nonagenarian with heart disease, say researchers from Harvard Medical School, two aging centers and two local hospitals in the Boston area. They found that a group of frail nursing-home residents, aged 86 to 96, achieved dramatic gains in strength, muscle mass and walking speed after an eight-week program of supervised, high-resistance leg training.

Three times a week, the six women and four men lifted and lowered each leg 24 times, initially training against resistance weights set at 50 percent of the maximum load they could handle. By week two, each volunteer was pumping 80 percent of his or her maximum tolerated load. Though concern about straining a repaired hernia caused one of the youngest to drop out in week four, the rest completed the program safely.

By the end of two months, most participants had reaped a three- to fourfold increase in leg strength, report Maria A. Fiatarone and her co-workers in the June 13 JOURNAL OF THE AMERICAN MEDICAL ASSOCIATION. "It is likely that at the end of training these subjects were stronger than they had been many years previously," the team asserts. Two volunteers gave up their canes, and one woman regained the ability to rise from a chair without using her arms. Among the four who took a heel-to-toe walking test, training boosted walking speed an average of 48 percent.

But sustaining such gains requires a lasting commitment. During a four-week sedentary period following the regimen, leg strength dropped an average of 32 percent, the investigators note.

Earth Sciences

Spring earthquakes rattle the globe

Planet Earth seems restless. In the last five weeks, nine strong earthquakes have wracked various spots on the globe.

In the deadliest event, a magnitude 6.4 shock killed more than 100 people in northern Peru. While initial reports of the May 29 temblor placed its epicenter offshore, newer information indicates it actually centered near the town of Moyobamba on the eastern flank of the Andes mountains, geophysicist Darrell Herd told SCIENCE NEWS. In terms of plate tectonics, the Peru earthquake results from the subduction of the Pacific plate as it dives underneath the South American plate and pushes the Andes up over the Amazon basin.

Herd, chief of the Latin American branch at the U.S. Geological Survey in Reston, Va., attributes the large number of deaths to the local architecture and possibly to quake-generated landslides. Many people in the area live in adobe houses that readily collapse under shaking, he says. Geologists and relief workers have had trouble reaching the remote region, which is beset by drug traders and members of the Shining Path revolutionary group.

In central Africa, Sudan suffered its largest known earthquake, a magnitude 7.2 shock that struck the southern section of the nation on May 20 and was followed four days later by aftershocks with magnitudes of 7.0 and 6.6. Despite their strength, the quakes apparently caused minimal damage in this sparsely populated region, says Badaoui Rouhban of the United Nations Educational, Scientific and Cultural Organization in Paris, France. "The U.N. mission that went there was unable to detect serious damage," he told SCIENCE NEWS.

The quakes in the Sudan probably relate to the East African rift zone, a tectonic structure that is slowly pulling apart the eastern margin of the continent. However, geoscientists remain unsure about the shocks' tectonic significance because they occurred in a seismically quiet region on an ill-defined section of the rift zone, says Bruce Presgrave of the National Earthquake Information Center (NEIC) in Golden, Colo. Researchers hope to learn more about the behavior of the rift zone in this region as information on the Sudan quakes trickles in from seismic stations around the world.

According to seismologist Adam M. Dziewonski of Harvard University, May's most puzzling quake originated deep within the planet, about 610 kilometers below the island of Sakhalin in the western Pacific. Earthquakes this deep normally occur in a subducting piece of the ocean floor. But the May 12 shock was an isolated event some 200 km west of the seismically active zone that defines the downward-thrusting Pacific plate in that area.

Geophysicists debate what ultimately happens to subducting slabs. Some argue that the diving plates reach a boundary at about a depth of 700 km and flatten out, while others suggest they plunge even deeper. The recent deep quake, however, does not quite fit either model, raising new questions of what is going on deep beneath subduction zones, Dziewonski says.

Recent temblors have also shaken Romania (magnitude 6.5 and 6.0 on May 30 and 31), the Philippines (6.9 on June 14) and Kazakhstan in the Soviet Union (6.8 on June 14). The apparent clustering has led some to wonder whether the number of quakes worldwide is increasing, says Waverly Person of NEIC. But Person maintains these quakes only seem more numerous because many have rocked populated areas where they attract widespread attention. In fact, the last few years have proved relatively quiet, seismically speaking. Since 1900, quake experts have recorded about 18 events each year measuring magnitude 7.0 or larger, but the past decade brought only 11 such shocks a year on average, notes Person. As for great quakes — those above magnitude 8.0 — the century's statistics show about 10 per decade, but the 1980s had only four.