Don't shuffle on slippery surfaces, researchers say

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Biomechanics researchers Timothy Higham of Clemson University and Andrew Clark of the College of Charleston conclude that moving quickly in a forward, firm-footed stance across a slippery surface is less likely to lead to a fall than if you move slowly. Approaching a slippery surface slowly hinders the necessary task of shifting the center of mass forward once foot contact is made.

The researchers studied helmeted guinea fowl strutting along a six-meter runway that either had a rough-surface section (150-grit sandpaper) or a slippery one (polypropylene shelf liner). High-speed video recorded the action. The experiment is reported in the Journal of Experimental Biology, "Slipping, sliding and stability: locomotor strategies for overcoming low-friction surfaces," pages 1369-1378 (vol. 214).

Helmeted guinea fowl react to slips much in the same way humans do, making them good test subjects, according to Higham. He and Clark are interested in how animals move and avoid injury when making their way through their environments.

Finding out how animals can respond rapidly to unexpected changes in their habitat, the scientists' stated that their research would "ultimately yield important information regarding the flexibility of physiological and behavioral systems," according to their article.

"The findings can be useful in helping humans, especially older ones, make their way across surfaces that are wet, icy or oily," said Higham.

"The key to avoiding slips seems to be speed and keeping the body mass forward, slightly ahead of the ankles after the foot contacts the ground."

Slips are a major cause of falls that can cause injuries and even deaths. Slips accounted for about 44 percent of fatal and nonfatal work-related falls, according to a U.S. Bureau of Labor Statics report in 1992.

Clark and Higham not only saw that speed, foot position and body alignment made a difference, but also the slip distance. For a guinea fowl to fall, it needed to slip a minimum of 10 centimeters — just under four inches. The distance is the same for humans, said Higham.

Guinea fowl leg joints and human knees and ankles function in similar ways: the position of the knee relative to the foot can create joint angles — wide or narrow — that can cause or prevent loss of balance on slippery surfaces, the scientists said. Once the knee passes the ankle during contact with slippery ground, slipping stops.

"Our study shows that there are common limb-control strategies on slippery surfaces in helmeted guineas and humans," said Higham.

Provided by Clemson University