September 2008 | Vol 2 | No 5

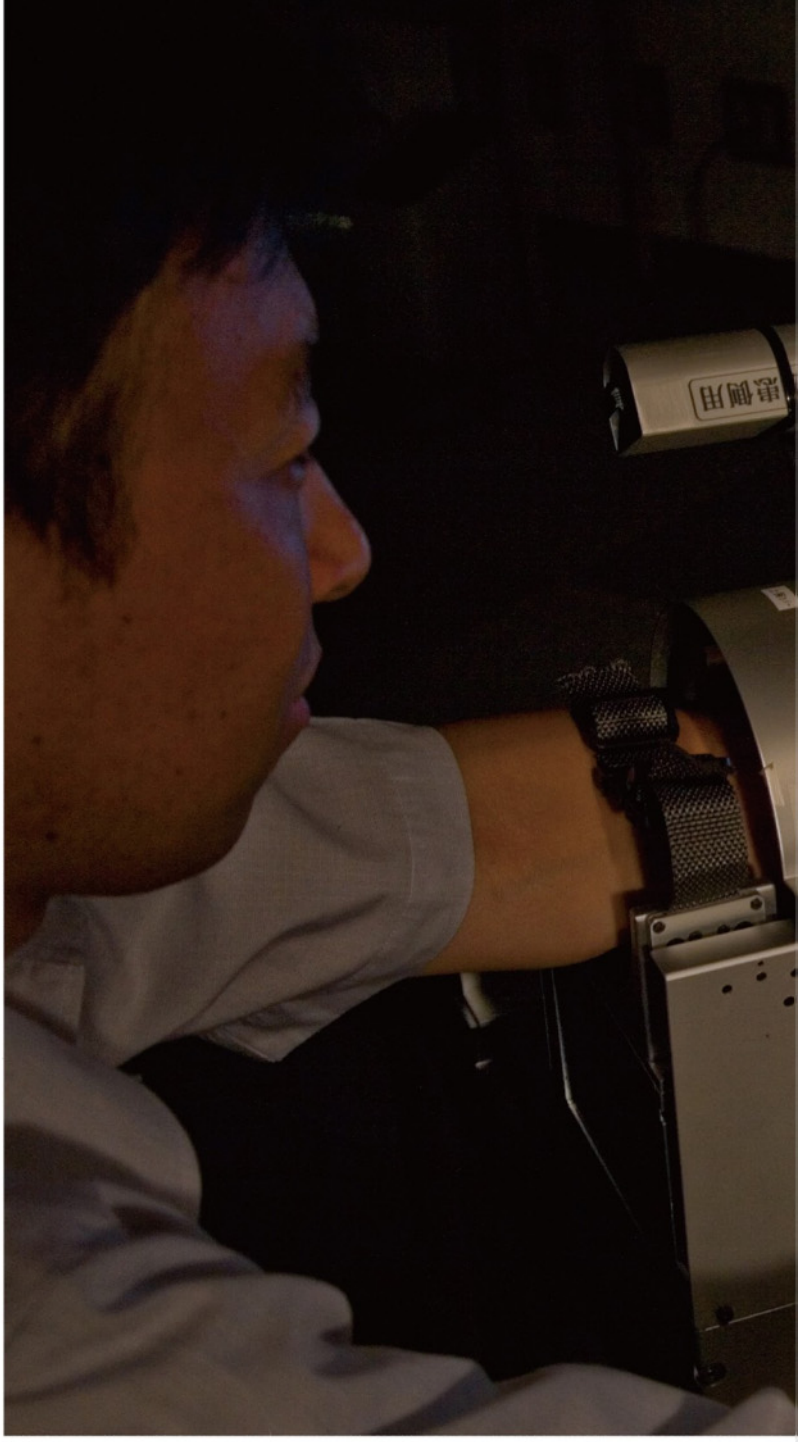
Highlighting JAPAN

through images

Innovations in Medical Technology

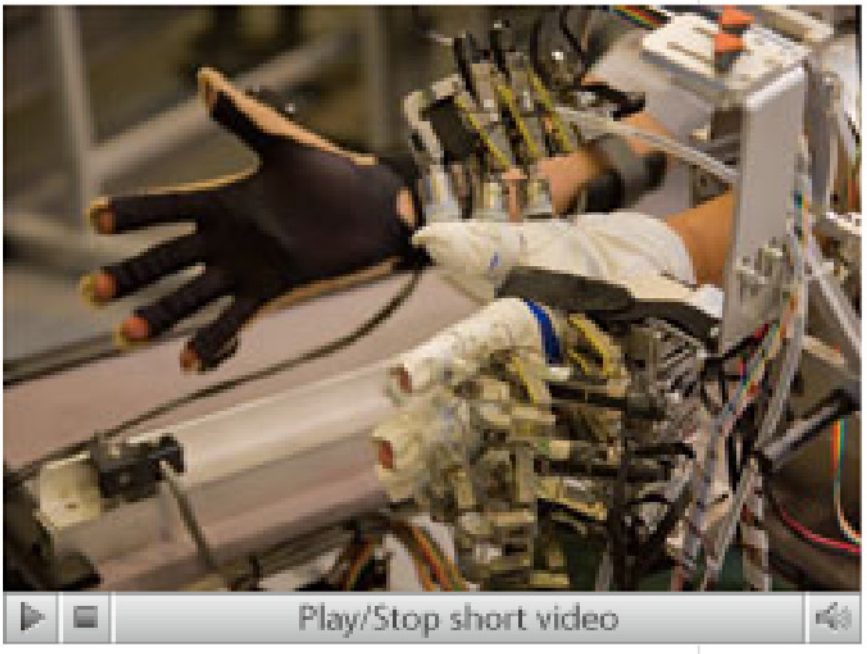
A Helping **Hand**

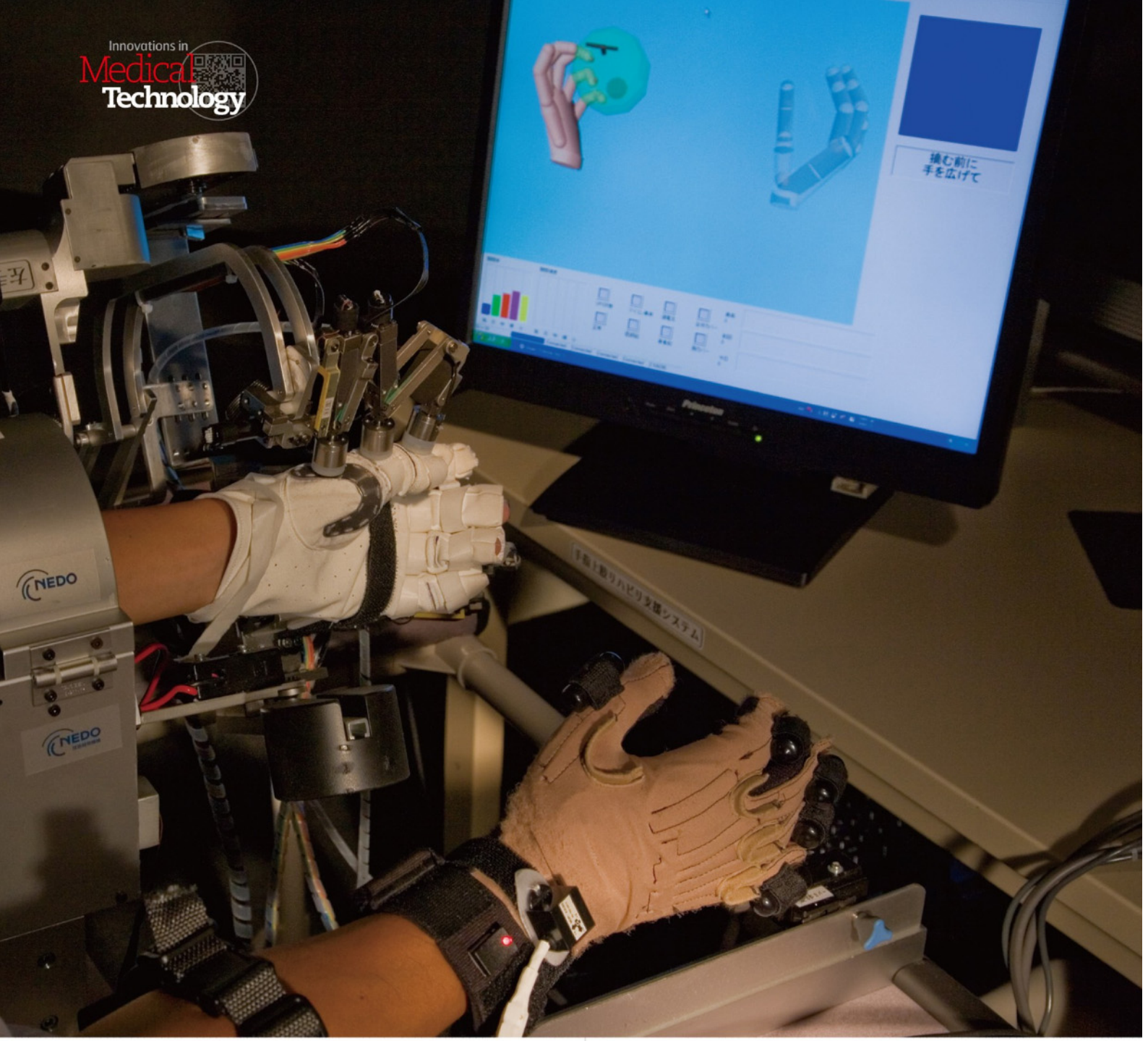
PHOTOS: NARUAKI ONISHI



AS JAPAN'S ELDERLY POPULATION increases, so too does the number of patients suffering cerebral hemorrhage or cerebrovascular disease who require care. Rehabilitation for such patients is usually carried out under a trained therapist, but with the current number of patients there is a shortage of therapists. There is a particularly desperate need for a system that will allow therapists to work one on one with patients requiring rehabilitation for their hands and fingers, which involves complex movements. In response to this need, a research team from the Faculty of Engineering at Gifu University under Professor Haruhisa Kawasaki has jointly developed the Hand Rehabilitation Support System with Marutomi Seiko Co., Ltd.

Patients who have suffered cerebrovascular disease are often left with hemiplegia, or paralysis affecting only one side of the body. The Hand Rehabilitation Support System uses a "data glove" to measure the angle of each of the 18 joints in the healthy hand. The hand that cannot move is fitted to a rehabilitation support device resembling a robot arm; when the healthy hand is moved, joint angle data is transmitted to a controlling computer and the rehabilitation support device moves the paralyzed hand in exactly the same way as the healthy hand. This is the first rehabili-





ABOVE: When the right hand is moved in accordance with the fruit-picking program shown on the screen, the rehabilitation support device moves the left hand in a mirror image of the right hand's movements.

FACING: The rehabilitation support device can perform the complex movements of the 18 finger and hand joints.

tation system in the world capable of supporting such complex movements.

The patient follows 20-minute rehabilitation programs that use computer graphics to illustrate the movements he or she should make. The programs involve repeating movements such as picking fruit, making the rock-paper-scissors signs or playing the piano, giving the patient the feeling of playing a game. The degree of recovery can be recorded numerically, so the programs can be changed to suit the patient's level of achievement.

"Conventional rehabilitation is generally carried out by the therapist, and input from the patient is minimal or else non-existent." explains Professor Kawasaki. "In contrast, this system allows rehabilitation to be carried out entirely under the volition of the patient, and so it is likely to have the effect of speeding up recovery of the brain function controlling hand movements."