

By PAT HAGAN

A HIGH-TECH crutch that helps broken bones heal more quickly has been developed by British scientists. The 'smart crutch' works by monitoring how much weight the patient is putting on their damaged limb.

Too much pressure can do further damage to broken bones in the leg or foot and slow down the healing process. But too little pressure can also be harmful because healing fractures need to bear a certain amount of weight in order to stimulate the growth of new bone cells.

The crutch, developed by a team at Southampton University, works by alerting the patient when they put either too much or too little weight on to the leg. When it detects a problem, it 'beeps' to warn the patient and displays a reading to tell them how they need to adjust the pressure.

The use of crutches dates back to 2330 BC, when a carving on an Egyptian tomb depicted a figure leaning on a crutch-like staff.

But modern-day crutches have changed little since 1917, when French engineer Emile Schlick first patented a walking stick that had special support for the upper arm.

While the crutch has worked to help patients move, the new intelligent crutch could actually boost the healing process.

When you fracture a bone, there are several stages of recovery. First, a blood clot immediately forms between the two shattered ends. This is a normal reaction to any injury and is to halt blood loss from damaged tissue.

After a few days, new blood vessels grow inside the clot and release cells, called fibroblasts, that make collagen — the rubbery material found in tissues throughout the body.

THE collagen holds the broken bones in place until enough new bone cells can be produced to 'bond' the fractured pieces back together. Once the new bone has started to form, it is vital that some weight is put on it as this stress actually boosts its strength.

The difficulty is that there is no accurate way of ensuring patients apply the right amount pressure.

'It's just like gluing two surfaces together — if you don't put any pressure on them they won't stick,'

Crutch with a mind of its own that helps heal bones



Picture: GETTY IMAGES

explains Dr Geoff Merrett, lecturer in the School of Electronics and Computer Science at Southampton University.

What makes this more complicated is that the amount of pressure needed varies according to the injury. Some patients are told to apply roughly 10 per cent of their body weight; for others, it can be 50 per cent.

The smart crutch could make all the difference.

First the doctor keys in the amount of pressure required. The crutch then measures how much pressure the patient is actually applying using three sensors.

A sensor in the long bit of the crutch measures the amount of force when the leg hits the ground;

another, just behind the hand grip, measures the speed and direction of the crutch, while the third, inside the hand grip itself, tracks the amount of load being carried by the upper body.

If these sensors detect that the patient is not applying the right pressure, an alarm sounds.

As well as speeding up healing, the smart crutch could also spare some patients from follow-up operations; these are sometimes needed to repair damage to fracture sites caused by improper use of crutches.

All the technology used in the smart crutch is readily available and cheap. It is estimated that it will add no

more than £20 to the price of an ordinary crutch. So far, only a prototype exists, but it is hoped the crutch will be available within two years.

■ **CEMENT** injections used to relieve the pain of spinal fractures are no better than 'sham' injections where patients simply get local anaesthetic, researchers claim.

The findings cast doubt on the effectiveness of vertebroplasty, a procedure increasingly used to reinforce crumbling vertebrae caused by osteoporosis or cancer.

Previous studies show it relieves pain, but there are complications, such as the risk of the cement being injected in the wrong place.

Researchers at the Mayo Clinic in America tested the real procedure against simulated vertebroplasty. Both groups showed similar improvements in function and pain, says a report in the *New England Journal of Medicine*.

Study leader Dr David Kallmes said: 'We aren't saying vertebroplasty doesn't work, because it somehow does. But patients experienced improvements in pain and function a month after the procedure, whether they received cement jabs or not.'

RUDE HEALTH



EVEN in the dark, we can locate our partner's lips for a kiss. U.S. researchers have identified the brain cells that deal with sensation and visual awareness, activated when viewing an object close to the face in daylight. These continue their activity even in darkness.