

Bionic soldier can control robotic arm using only his mind

HOW THE CUTTING-EDGE LIMB WORKS

1 Surgeons in Austria perform complex operation on Corporal Andrew Garthwaite, to attach nerve endings, which would have run down to his hand, to his chest muscles

2 This means that when Cpl Garthwaite imagines moving his missing limb, electronic pulses from his brain cause the chest muscles to contract

3 Electrodes on his skin pick up the pulses in his chest muscle and send signals to a micro-computer which translates them, via motorised controls in the false arm, into hand and finger movements

4 Cpl Garthwaite can pick up objects including keys, credit cards or a plastic cup as if with a real hand

Micro-computer

Graphic by John Lawson

By Ian Drury
Defence Correspondent

MAKING a cup of tea or potting a plant in the garden may sound like simple, day-to-day tasks.

But until recently, Corporal Andrew Garthwaite could barely imagine being able to complete them with ease.

Now the soldier, who lost his right arm to a Taliban rocket-propelled grenade, is able to live a normal life – after becoming Britain's first person to be fitted with a bionic limb controlled by the mind.

Incredibly, the 26-year-old has only to think of moving a hand, arm or fingers and the false arm responds accordingly. The robotic prosthetic – described as 'the stuff of science fiction' – means the married serviceman can pull on his own socks, cook, drive and use bank cards.

He said yesterday: 'The surgery has made a massive improvement

to my life. I have become a lot more independent and all the normal things I was struggling with have become so much easier.

'When I first got told about the operation I thought it was some sort of fairy tale. But here I am today with this arm that is fitted

and works off my mind.' The soldier, of South Shields, South Tyne-side, took a direct hit from a rocket in the insurgent stronghold of Nade Ali, Afghanistan, in 2010. A close friend was killed in the attack.

Cpl Garthwaite said: 'I heard a bang and within a split-second I



On duty: Cpl Garthwaite in Afghanistan before losing his arm



A life transformed: Andrew Garthwaite can now grip everyday objects

was on the floor and my arm was on fire. I stood up and thought, "Oh, God" and my arm just fell off.'

He initially received a traditional prosthetic, which allowed him to perform a limited range of tasks.

But in January last year, he was flown to the Medical University of Vienna in Austria.

There, doctors 'rewired' the severed nerve endings from his shoulder - which had controlled his hand - into his chest. Electrodes were delicately attached to his chest and connected to a tiny computer fitted on the prosthetic limb.

Now when he imagines moving his missing arm, electronic brain pulses travel through the nerve endings and the electrodes, sending messages to the micro-computer. The soldier, who serves in the Queen's Royal Lancers, can now open and close his hand, extend his fingers and rotate his wrist.

Sensors in the prosthesis will

soon let him feel different temperatures. In carefree moments, he can make his wrist can spin 360 degrees. "That is my party trick," he joked.

The Defence Ministry is paying the £60,000 cost of his bionic arm and surgery.

Steve Lambert, a lead prosthetic technician at the Headley Court military recovery centre in Surrey, said working with Cpl Garthwaite had 'put a lump in my throat'.

Defence minister Anna Soubry said: 'It's the stuff of almost science fiction coming to reality.'

Cpl Garthwaite is being medically discharged from the Army. But after spending Christmas with his wife and family, he plans to explore fresh career opportunities - bolstered by his bionic arm.

He said: 'Having lost a lot of friends through my Army career in Iraq and Afghanistan, I know I'm very lucky to be here. It makes you realise it could have been you.'