

Technology boosts Britain in pool

New gadgets to aid Paralympic swimmers will also benefit the able-bodied, Matthew Pryor reports

Paralympic sports usually prosper from being included in Olympic programmes, but *The Times* can reveal that two technological innovations developed by British Disability Swimming (BDS) could boost the performance of able-bodied swimmers such as Rebecca Adlington, as well as other Great Britain Olympians at London 2012. The BDS has helped to produce the first monitor that can measure swimmers' heart rates while they are in the water, and has also developed a computerised system for measuring stroke strength in the pool.

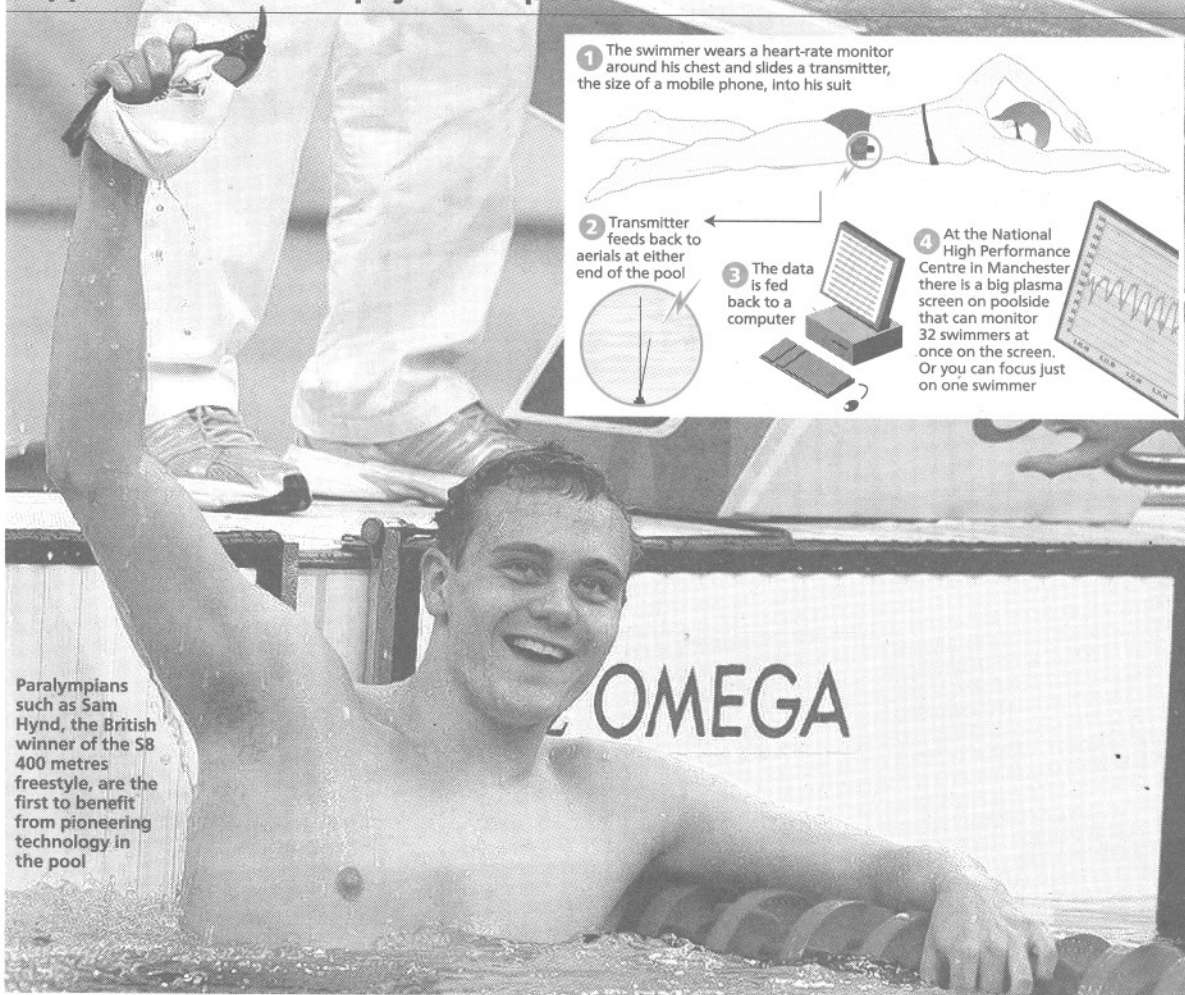
Lars Humer, the head coach of BDS since 2002, is delighted by the real-time heart-rate monitor, which is the result of work with Hosand, an Italian company. "It's a heart-rate telemetry system that's been used for some time on land, but the holy grail for [swimming] coaches has been to be able to do it in water, real-time," he said.

Paul Barrett, the North West physiology technician for the English Institute of Sport, helped to make the system waterproof and Humer sees it as a big advance. Until now, data has had to be analysed after training sessions, meaning that key work could often be delayed by two or three days. Humer said that the real-time model will allow a coach to adjust training in progress to try to achieve the optimum heart rate for a swimmer. "No one has this in swimming because the technology had not been produced to get the telemetry system to work in water," he said. "We've ordered our system and obviously a lot of countries will follow suit, but we're the people that helped develop it."

Dr Carl Payton, the BDS biomechanist based at Manchester Metropolitan University, is the man behind other inventions that the BDS has to itself. The most significant could be the first method of accurately measuring the power output of swimmers' strokes.

Again, coaches have had to adapt "dry" systems, such as a land bench, to mimic a stroke or use methods in the pool that did not generate a true picture. Humer said that while the land bench is functional and helps with strength and power, the action used on it is not specific to water. Alternatively, a coach could use weight stacks at the end of a pool, with the swimmer

Appliance of science pays off in pool



Paralympians such as Sam Hynd, the British winner of the S8 400 metres freestyle, are the first to benefit from pioneering technology in the pool

attached to a cable via a belt. But that means the swimmer has to pull against a set resistance. That can change body position, meaning that swimmers do not generate power in the same way that they do in the pool.

Payton worked on a system where swimmers have a cable attached and move through the water working against a slight resistance, with a computer at the end of the pool collecting the data. Humer said: "We can see how much force we produce over a given time, how much force drops off, power to efficiency and how long they can maintain power."

In addition, the system can measure

how much power is produced from each arm. That is important data for any swimmer, but particularly for amputee swimmers and able-bodied swimmers of freestyle and backstroke.

It could also become part of the classification testing for Paralympic swimming. "One of the key projects we've been working on over the last 1½ years is looking at our arm-amputee swimmers because we seem to have a big squad of them," Humer said. "We had a lot of questions, like what side should athletes breathe on, the small-arm or long-arm side? Is it an individual thing or is there a better way for all arm-amputee swimmers? How much

were they creating on their short-arm side?"

"We already know that athletes are a lot more propulsive on the short-arm side than we thought. The fore-arms play a bigger part than perhaps we realise. Even for some people who have an elbow amputation, with their upper arm they're creating a lot of propulsive force."

Humer believes that such a crossover between Paralympic and able-bodied sport is vital. "If we're going to stay at the top of our sport, we need to be comparing ourselves not just to other disability swimming nations, but to all sports and all nations," he said.