Belgian cycling apparel provider Bio-Racer was approached with a very specific problem back in 2005. Competitors taking part in the Deutschland Tour cycle race contacted the company complaining that they were suffering from blisters and burns on their buttocks. They were looking for a product that would help to reduce friction, a common problem within the sport; especially for female cyclists.

Blisters and beyond

The competition in Germany in 2005 presented particularly difficult circumstances for the cyclists taking part, mainly because of the weather conditions. It rained on the first day, was hot on the second day and snowed on the third. This made it difficult to regulate temperature and deal with the build-up of sweat, so many of the competitors experienced really unpleasant skin conditions as a result.

Athough the company already offered pads to go inside cycling shorts, its existing range was made from chamois leather, which gave a cushioning effect but did not provide protection against blisters caused by friction. Its research and development team started working with the University of Ghent and IWT, a Belgian government agency responsible for scientific and technological innovation, to find a new solution.

Making it stick

The problem the team initially faced was that the area of the body it needed to protect was far from straightforward. The shape of the perineum area is an awkward one, as is the shape of the saddle with which it has contact. Then there were the added problems caused by body hair and sweat.

The challenge was to come up with a patch that would stick directly onto the skin, so it would need to be sticky. However, it would also need to be easy to remove and reposition without causing any discomfort. The company chose to use a thin eyelet type of bio-elastic material containing Lycra, medical silicone and a self-adhesive medical grade polymer gel to make the pad.



American cyclist Levi Leipheimer was one of the 2005 Deutschland Tour competitors who suffered blisters and burns as a result of changing weather conditions.

Heidas/Wikipedia



The first ReSkin patch was designed to address the problem of saddle sores for professional cyclists.

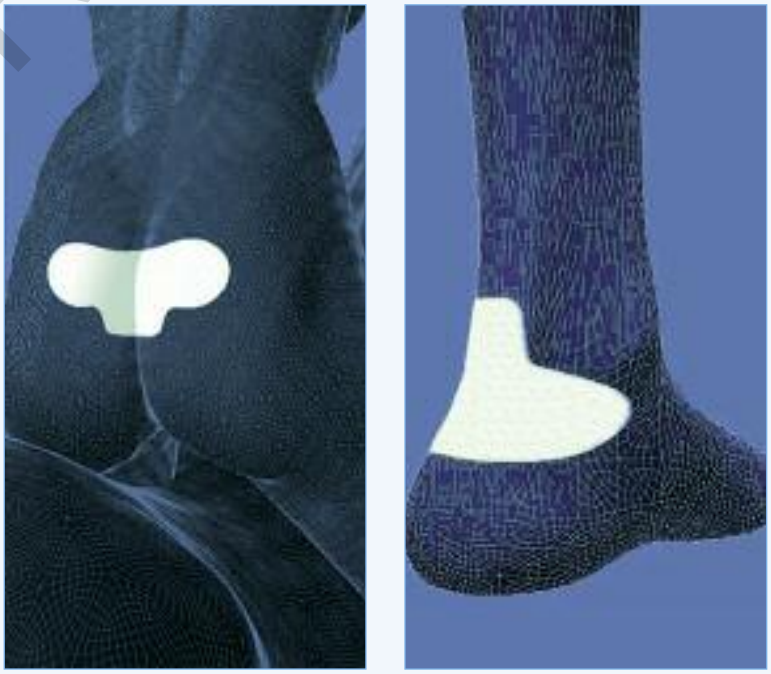
Bio-Racer

This type of silicone is usually used for wound care, which requires humid conditions to function effectively. As a result, Bio-Racer needed to incorporate apertures in the textile surface so that the skin was still able to breathe but so that the silicone could create a humid enough environment to optimise vaporisation. The product also needed to be ultrathin so that the user could continue to cycle without any feeling of restriction and also had to be skin-friendly and easy-care. The version that is now on the market, named ReSkin, is washable at 30°C.

In addition to this, the pad needed to stick firmly and directly onto the skin because if it didn't, it would move around inside the shorts and cause additional friction, as well as being less comfortable. "We needed it to have less contact with the skin so that it didn't remove the skin," explains company CEO, Peter Croonen. "It has to stick enough to stay in place in a humid environment but at the same time be removable." The problem with traditional glue, he says, is that it removes skin cells and also leaves silicone fragments behind.

The patch can be used on its own or in combination with a standard chamois for extra pressure absorption. It is designed to prevent friction between the body and the bicycle saddle as well as rough surfaces such as the seam area where the chamois is sewn onto the shorts, or in the event that sand has found its way inside the shorts.

According to the company, cyclists who have tested out the product say it really reduces friction and helps to stop skin irritation, particularly at the start of the season when the rider is breaking in a new saddle and new cycling pads. One of these users was Denis Menchov, who won the 2009 Giro d'Italia. According to Bio-Racer, Mr Menchov said that his blisters were so bad before he started using



ReSkin is now available in many different shapes and sizes so that it can be used for a range of activities such as horse riding, running and climbing.

Bio-Racer

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the patches that he would have been unable to finish the tour if he hadn't found out about them.

Broader applications

In view of this, the company started to look into other potential applications for ReSkin. Horse riders were experiencing similar saddle sores, so they were able to use the same product. But cyclists were also reporting problems with their feet when they were on the bike, with the toes pressing into each other and even overlapping slightly. So Bio-Racer started to look at ways of changing the shape of the cycling patch to produce blister pads that would sit in between the toes. Another request came in for nipple patches as abrasion often occurred during cycling and other sports such as running.

Another important market was climbing as blisters and chafing were regularly caused by contact with harnesses. The pads can also be used for sports where contact with water is common as they are waterproof and dry very quickly. The idea was that, for all of these applications, the patches could be used as a preventative measure as well as a cure.

Beyond the sport sector, the technology was beginning to attract interest from the medical sector. According to Mr Croonen the product represented a "tremendous step forward in the prevention of chronic wounds", as well as for eczema. Bio-Racer started distributing samples of the pads in hospitals and care homes.

Older people particularly benefited from using ReSkin as their skin can be extremely vulnerable. Mr Croonen claims that at least 5% of people living in care homes for older people are 'skin-at-risk' patients. Preventing wounds is hugely important, he explains, because once the skin is damaged it takes a long time to repair itself. However, should skin tears and wounds occur, the technology could also be used to speed up the healing process. The existing wound care products on the market tended to reopen these wounds when they were removed, while the ReSkin patches could easily be removed and replaced without doing so because they have less direct contact with the skin.

The company has since developed two medical product ranges. The first is for shallow wounds and blisters that can be sold over the counter at pharmacies and applied by the patient. The second was for professional skin tear and wound treatment, which is primarily applied by nursing staff or other medical professionals. The downside of these products is that, for hygiene reasons, they should not be reused while the sport pads used as a preventative measure can be used up to 15 times, even after washing, and can be left on overnight. This is helpful for outdoor activities that last several days as every extra piece of equipment takes up valuable space and adds extra weight, which then has to be carried.

Looking forward, the next step in the evolution of the product might be to add special coatings or micro-encapsulations to add further benefits. By incorporating silver, for example, or medical products, Bio-Racer believes ReSkin could be even more effective. However, the company is still looking into the possibility at the moment and is aware that this type of change could significantly increase the price of the finished product.

