THE HONG KONG POLYTECHNIC UNIVERSITY 香港理工大學
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Technology Frontier

News Bite on PolyU's Innovation

Detachable bandages on the horizon

A new adhesive technology to advance the management of joint and muscle pains

Nature is a fantastic source of inspiration for new solutions. Scientists from the Department of Rehabilitation Sciences have mimicked the biology of octopus in their creation of a new type of elastic tape for the management of muscle and joint pain. Featuring a sucker-based design, the new plaster is detachable, meaning that it can hold strongly to the skin, and yet can be reapplied repeatedly without any loss of adherence. This allows the dressing to remain in place for extended periods without the need to return to clinics for replacements. It is also comfortable and guarantees optimal mobility throughout the day.

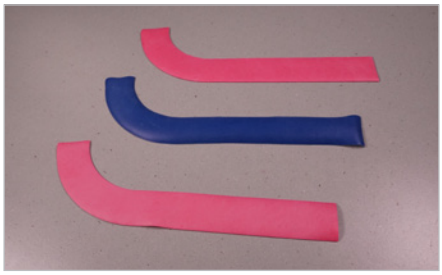
Dr Xia Guo and her team have developed a silicon-based adhesive technology for producing medical tapes.

Removing a band-aid is painful, let alone a long strap of sticky bandage. Finally, a new kind of medical tape is on the horizon to ease the pain.

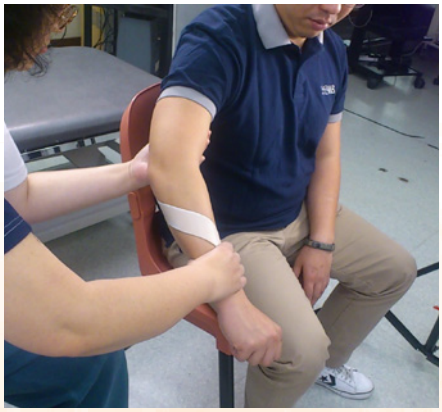
Researchers from The Hong Kong Polytechnic University have developed a silicon-based adhesive technology for producing medical tapes.

The technology is specially designed for a unique kind of physiotherapy called taping, which treats muscle and joint pains with therapeutic tapes. "Elastic tapes when wrapped around an injured joint hold it in place for protection. The wraps provide dynamic support while allowing a safe range of motion. This type of non-restrictive taping should be worn for 4 or 5 days at least. Unfortunately, conventional taping materials with acrylic adhesive would lose adhesion in warm water or after baths. We need an alternative that would stay good throughout the therapy," explained Dr Xia Guo, Associate Professor of the Department of Rehabilitation Sciences, leader of the research project.

Their solution comprises a new concept in taping: a suction technology. Adherence is enhanced with rows after rows of sucking cups made from silicon. When the tape is pressed, the air in the sucking cups is squeezed out, creating a negative pressure that holds the silicon surface firmly to the skin. On a microscopic scale, the suckers can literally fit between pores.



The innovative adhesive tape sticks firmly on the skin and removes easily without causing pain.



The new technology provides a reliable solution for taping therapy in treating muscle or joint pains.

The breakthrough has recently won a Gold Medal at the 42nd International Exhibition of Inventions of Geneva in Switzerland.

The outcome is a detachable plaster that can stick on and off for repeated use. Unlike its chemical counterparts, this physical solution would not lose adhesion even after repeated use or washing. And it causes no irritations to the skin.

By design, individual suckers come together to give good sticking power. And yet each works independently, meaning that the shear forces applied to any one of them would not affect the surroundings. With little motion transfer, the adhesive tape would not come loose easily. Moreover, individual suckers contour perfectly to the body making this design especially suitable for body parts that are constantly moving.

And the best of all is that it would not hurt when being removed. Upon removal, individual suckers will come off easily one by one and therefore a gentle force will suffice. In particular, ouch-free removal is excellent for kids. It is often difficult to remove a sticky bandage without causing pain, and children are a lot less tolerant to this kind of pain than adults are.

In the future, pain management can be improved. At the moment, returning to physiotherapists for a replacement is necessary when the therapeutic tapes come off. But that is going to change. With the innovative technology, reapplication of treatments can be managed without the help of physiotherapists. Due to the strong adhesion of these novel tapes, patients can pull them off, move and reuse them again and again. They can also be thrown into washing machines and worn again. As a result, the dressing can remain in place for an extended period up to four weeks, according to Dr Guo. In this way, sticking to treatments becomes easier than ever.

Beyond medical applications, it is also possible to use the technology in other aspects of everyday life. Ladies' lingerie could be one of them. In the form of invisible bra strap holders, miniature sucking cups would keep the lingerie in place, giving girls a care-free day. It can also be used to produce non-slip lining of athletic socks to prevent bunching or sliding. Such small changes could mean big for the wearer.

Being highly responsive to patient needs, the breakthrough has recently won a Gold Medal at the 42nd International Exhibition of Inventions of Geneva in Switzerland.