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# Stick on a plaster: kick the habit

**R**eluctant smokers will soon be offered a novel way to kick the habit: a skin patch the size of a sticking plaster, which delivers nicotine straight into the bloodstream. Nicotinell, already on sale in Germany and Switzerland, is expected by its manufacturers, Ciba-Geigy, to obtain a UK product licence soon.

Nicotine is the latest drug now delivered across the skin barrier. Patches are being used to treat conditions such as angina and travel sickness and to administer hormone replacement therapy.

Nicotine lends itself to this type of delivery: it seeps easily through the skin and into the bloodstream. Over three months, the patches prescribed for patients contain reducing doses, while their dependence on the drug declines, and then they can be taken off them.

Drugs taken transdermally avoid the stomach enzymes that can otherwise reduce their effect. Through the skin, smaller doses are possible — and smaller doses mean fewer side-effects. In addition, patches can easily be removed, giving the body "resting time" before the next dose. Once the angina patch is removed, for instance, the drug concerned, glyceryl trinitrate, clears from the body tissue after 20 minutes. Because the body has a rest from the drug, it continues to be effective.

## Patch therapy may help smokers to give up cigarettes, writes Elizabeth Gates

Other patches are used on a need-only basis. Scopoderm, used to prevent travel sickness by delivering hyoscine into the system, can be applied five or six hours before embarking on a journey, and gives 72 hours of protection.

The patch drug-delivery system is also a way of providing a continuous delivery where necessary.

In hormone replacement therapy, oestradiol is kept at a constant level by the twice-weekly application of an Estraderm patch.

In the United States, a patch delivering clonidine, which lowers blood pressure, is left on for a week. According to Jonathan Hadgraft, Professor of Pharmaceutical Chemistry at University of Wales College, Cardiff, researchers in the UK prefer to apply new drug patches daily, and on a clean site, although a three-day time-scale is

sometimes accepted. He explains: "The skin regenerates completely within 28 days. A patch left on for a week accumulates a quite a lot of waste beneath it. This interferes with the workings of the drug."

There are disadvantages to patch technology. Because the skin forms such an effective barrier, patches can work only with very potent drugs, says Professor Hadgraft.

To cope with this, drug companies have developed "penetration enhancers", chemicals that help the drugs pass through the skin. "Enhancers have allowed 3M Health Care, the international drug company, to produce Minitran, the smallest patch on the US market, in three different sizes and three different doses," says Professor Hadgraft.

The drugs used must be soluble in oil and water, both to penetrate

the surface of the skin barrier and then to deal with the skin enzymes that will attack them.

Microflora and fauna will proliferate under the patch, offering another threat to the drug molecules. And the patient with a sensitive skin may have an allergic reaction to the drug, the enhancer or the adhesive on the patch.

Nevertheless, patch technology continues to excite interest among researchers, who are trying out it out with different drugs. Still at the clinical trial stage in the UK — although already on the market in the US, the Fentanyl patch offers pain-killing drugs to terminal cancer patients. At Nottingham University, a successful trial has taken place using patches containing theophylline, a drug that helps premature babies to breathe.

Researchers are looking at the possibility of using dual patches, combining oestrogen and progesterone, as contraceptives. Patches are also being developed for men with low testosterone levels.

The development of a nicotine patch has led researchers to wonder if other addictions might be treated the same way.

However, caution should be exercised with some patches. One doctor was reported as feeling unwell after making love to his wife, her hormone replacement therapy patch had transferred itself to him

*Researchers are testing the method with many other drugs*

HEALTH is edited by Celia Hall

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