

## Painting Medicines on the Nail

While nail cosmetics abound, medicines that are applied to the nail are few and far between, even though nail diseases are not uncommon. And because the nail (at least the fingernails) is part of our physical appearance, nail diseases affect not only their function, but also our day-to-day interaction with others. A remarkably wide range of afflictions can affect the nail and alter its size, shape, colour, integrity, mechanical strength, growth, its attachment to the underlying tissue, as well as cause inflammation of the skin surrounding the nail. Some of these only pose minor cosmetic concerns such as white spots on the nail which grow out with the nail, while others, e.g. infections caused by ingrown toenails cause considerable distress. Still, other nail disorders are not limited to the nail, but are symptoms of more serious, internal disease. For example, nail clubbing where the nail is excessively overcurved and the fingertip mass is increased, can be a sign of problems with the lungs. Changes in the nail can also be caused by medication (taken for other diseases). Obviously, in the latter two instances, treatment of the other disease or a change in the nail-altering medication should alleviate the nail problem.

The most common nail disease is fungal infection, which affects between 10 to 40% of the population. It follows therefore that most nail medicines that are applied to the nail are for this indication. In the UK, the most recent is Curanail (also called Loceryl®) which is a nail varnish containing drug. Once applied onto the nail, Curanail dries within a few minutes and a transparent film is formed on the nail. The anti-fungal drug then moves out of the film and into the nail. Unfortunately, because the nail is not very permeable, only a very small percentage of the drug that is present in the film penetrates into the nail, and Curanail is only recommended in early or mild infection in up to 2 nails, or when only the nail surface is affected or when the patient cannot take other antifungal drugs by mouth. Curanail is applied 1-2 times weekly, for 6 months for fingernails and 9-12 months for toenails. In addition to Curanail, Trosyl® and Phytex® are also available in the UK, though Trosyl® can only be obtained on prescription and Phytex® is thought to be less suitable. Like Curanail, these liquids are only recommended in mild disease and are applied on the nail for a very long time. Unlike Curanail however, they are applied twice a day, as they are easily removed during normal daily activities such as washing.

I mentioned earlier that medicines for application to the nail are few and far between. This situation may soon change as many more pharmaceutical scientists and companies are now working in this field. The nail varnish remains a popular choice as a drug carrier, although other types of formulations, such as, patches and films, are also under investigation. The major challenge is to substantially increase the amount of drug that enters the nail, so that treatments can be shorter and more successful than existing medicines. To this end, scientists are exploring using electricity, sound waves, lasers, acid and other chemicals, as well as drilling holes into the nail. Electricity pushes more drug into the nail, while the other techniques damage the nail to certain extents, allowing more drug to enter. Obviously, the level of these enhancers would be sufficiently low so that the patient suffers no discomfort. Research into these avenues is exciting, although much more funding is needed to bring new and more effective nail medicines to patients.

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