



Pros and Cons of Topical Patches: An Analysis of Precision3's Products

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Introduction

Since they were first approved in 1979, transdermal patches have increasingly been singled out as an important advancement in drug delivery technology with many medical benefits. Dr. Karen Vieira has recently written a “White Paper” summarizing the pros and cons of the technology of Precision3’s 100% Topical Patches. With a PhD in Molecular Biology and extensive experience in research, laboratory, and field work, Dr. Vieira has become a professional whom many major companies look to for assistance and development of new technology and scrutiny of existing technology. Her review of the Matrix Technology in Precision3’s Topical Patches comes with great insight and experience in the supplement industry; and as a third-party scientist, her independent analysis reinforces the credibility of Precision3’s technological approach and standing in the field of nutritional supplementation.

Benefits of the Patch Technology

Traditionally, medications and supplements have only been available via three routes: oral, intravenous and injection. Until recently, pills and tablets were the only choices for home administration of medications, except for patients trained to give themselves insulin injections. However, there is a promising new alternative.

Since they were first approved in 1979, transdermal patches have increasingly been singled out as an important advancement in drug delivery technology with many medical benefits. Currently transdermal patches are available for a wide variety of treatments, including hormone replacement therapy, contraception, nicotine addiction therapy, motion sickness and pain relief. And now Precision3 has utilized a similar technology to produce their topical patches to deliver dietary supplements and weight-loss aids.

Topical patches offer many advantages over traditional delivery systems like pills, liquids and injections:

1. Topical patches are a painless, non-invasive way to deliver substances directly into the body.

Topical patches utilize the painless process of diffusion (moving molecules from areas of high concentration to low concentration) to move substances from outside the body, through the skin. Before topical patches became available, the only way to transport substances through the skin into the body was via painful injections or an IV, making it almost impossible to use a direct delivery at home.

2. Topical patches are a better way to deliver substances that are broken down by the stomach acids, not well-absorbed from the gut, or extensively degraded by the liver.

When pills and tablets are ingested, they first enter the stomach where they are partially digested by stomach acids and enzymes before being absorbed into the bloodstream. The blood first transports the drugs or nutrients to the liver, where the components are broken down even further, leaving only a small amount of active drug or nutrient to reach the rest of the body. However, topical patches bypass this process so their active components can begin working before they reach the liver, leading to higher concentrations in the body.¹

To demonstrate this, unpublished studies with one commonly prescribed transdermal contraceptive showed that women using the patch had approximately 60% more total estrogen in their blood than those taking a typical oral contraceptive.² Although in this case, the higher concentration of active components was considered a risk, for many nutrient supplements, higher active concentrations can enhance the effectiveness of the product.

3. Topical patches offer a controlled, steady delivery of medication over long periods of time.

The vast majority of pills and tablets are what the industry calls “immediate release preparations.” This means they are designed to break apart or dissolve in 5 or 10 minutes, quickly dumping the drug or supplement into the bloodstream. Patches, however, were designed to control the release of substances into the body. They work very simply. A drug or supplement is put in a relatively high dose either into a “reservoir” inside of the patch or in the patch’s adhesive. The patch is then applied to the skin and worn for an extended period of time. During this time, the active substance diffuses through the skin directly into the body. Since there is a high concentration of the drugs or nutrients in the patch and low concentrations in the body, the substances will continue to diffuse from the patch into the body for a long period of time, ranging from 24 hours up to a week.

This controlled release actually improves the effectiveness of many drugs and supplements. Substances that are rapidly released into the blood, as is the case with pills, produce a high concentration very quickly, but it is soon followed by a sharp decline, causing what is known as a “peak and valley effect.” If a product’s active components are found in too low a concentration in the blood, the product may not be effective. If the concentration is too high, undesirable side effects and toxicities may occur. When the active components are at their optimum level for an extended period of time then the most beneficial effects are usually achieved.

Topical patches can maintain this optimum concentration for longer periods of time, avoiding the peaks and valleys of oral delivery methods. For example, in one clinical study, transdermal delivery of estradiol provided nearly constant blood concentrations, while oral estradiol delivery showed pronounced peaks and valleys.³

4. Topical patches have fewer side effects than oral medications or supplements.

In clinical studies comparing drugs administered orally versus those administered via transdermal patches, the patients using the patches usually had fewer side effects. For example, in one study with patients with urinary incontinence, the medication delivered through a patch was shown to have a significantly fewer side effects like dry mouth, constipation, dilated pupils and blurred vision.⁴ Oral medications also tend to more frequently cause nausea and other gastrointestinal side effects.⁵ This is because digesting some drugs and supplements like iron for example, can irritate the stomach, leading to nausea, vomiting and other gastrointestinal issues.

Another study looked at the use of patches versus capsules to deliver medication to Alzheimer's patients. The scientists concluded that the patches were superior to the capsules in how well the patients tolerated it, particularly with respect to nausea and vomiting. And they recommended patches as an important alternative to capsules for caregivers of those suffering with Alzheimer's disease.⁶

5. Topical patches are easier to use and remember.

Transdermal and topical patches are probably the most convenient drug and supplement delivery method in use today. It is common for people caught up in their busy lives to forget to take their vitamins or medications, especially if missing them is not life-threatening. Because of their controlled release formulation, patches only need to be applied once daily or even every few days, depending on the product. Whereas for maximum effectiveness most drugs and supplements need to be taken multiple times daily.

In a study comparing the use of a patch, a nasal spray and an inhaler for delivering nicotine to a study group hoping to stop smoking, the researchers found that the patch had the highest rate of compliance. This means that the patch group was able to get their daily dose consistently while the other groups missed doses regularly. Using the nasal spray and the inhaler proved to be inconvenient, even though both methods were effective.⁷

6. Topical patches offer an alternative to people who cannot, or prefer not to, take medications or supplements orally.

There are approximately 15 million people in the United States who are unable to swallow pills and other oral medications due to dysphagia. There are thousands, maybe even millions, more who just prefer not to swallow pills. For them, topical patches offer a vital alternative.

An area that is often overlooked, and dominated by pills and other oral administration methods, is that of nutritional supplements. Studies estimate that topical patches can deliver more than 50 mg of nutrients per day.⁸ More and more studies are showing the importance of supplementing the diet with missing vitamins and minerals, so, for this group of people who cannot take a vitamin pill, patches offer an effective alternative for nutrient supplementation.

7. Topical patches are cost-effective

Initially, the prices of topical patches might seem high relative to pills, liquids and sprays. Considering the convenient, effective dosage and the length of time spent wearing each patch, in addition to the lack of product waste, patches are actually more cost-effective than many other alternatives. Consider the cost of the nutrients lost in the digestive process and in spills or loss via vomiting with pills and liquids that do not occur when using the patch.

Researchers looked into the cost-effectiveness of the nicotine patch for quitting smoking and found it to be very cost-effective. In the study, they compared the patch to other common nicotine delivery methods, like gum, which may at first assessment seem less expensive.⁹

Of course, there are also the long-term health benefits of taking daily supplements to consider when thinking about cost. Topical supplement patches potentially save the user from expensive medical treatments in the future by improving their health.

8. People prefer topical patches

Patches are also non-invasive, painless and easy to use. In fact, in many studies comparing patches with pills, patients prefer the patches both for their effectiveness and for their ease of use.⁵

One recent study looking at the use of a transdermal patch for delivering chronic pain medication showed that a significant number of the people participating in the study elected to continue using the patch after the research was concluded because of its overall effectiveness, ease of use and improved quality of life that it offered them.¹⁰

Potential Weaknesses

Despite their numerous advantages, topical patches also may present weaknesses. Perhaps the biggest barrier to the effectiveness of this approach is the skin. The skin is the body's outer-most protection against foreign invaders and does not readily allow unfamiliar substances to pass through it. Therefore, a drug or supplement must have the right combination of physical and chemical properties to even be a candidate for this kind of delivery. This severely limits the types of substances that can be successfully delivered into the body.

Another consideration is, although patches lead to fewer systemic and gastrointestinal side effects than pills, they sometimes cause issues like irritation, itching or swelling at or near the application site. However, Precision3's system of delivering the nutrients in the adhesive has been a significant improvement, diminishing and, in many cases, eliminating these negative effects.

Another concern with patches is the potential for leaks. A leak would cause active components, which were designed to be released in a controlled manner, to enter the body too quickly and in some cases, at dangerously high levels. However, this is only a concern for patches that have a pool or "reservoir" of ingredients contained in the middle of the patch. Precision3 patches utilize the more advanced matrix system, which includes the dosage in the adhesive rather than in a reservoir, effectively eliminating the risk of leakage.

Unfortunately, by concentrating the supplements into the patch's adhesive can directly affect its stickiness. This means that matrix patches often have to be replaced more frequently than other reservoir-type patches because when they contain higher doses of active components they may not have enough adhesive to stick to the skin long enough.

Interestingly, some of topical patches' biggest benefits—their comfort and relative invisibility—can also lead to one of their biggest risks. Overdose can occur if the wearer does not remove the old patch before applying the new one. This is a significant risk for patches that are small and clear, as they can be difficult to find and easily forgotten. According to a 2003 show focused on the use of this delivery system, “although transdermal patches provide a useful alternative to oral medications, using them can lead to medication errors, resulting in patient harm and even death.”¹¹

Future Potential

Transdermal patches represent one of the most effective and user-friendly drug delivery systems in use today. Scientific studies show a wide-range of benefits from ease of use, to faster and steadier absorption, to cost effectiveness and increased safety. The disadvantages have been addressed, in large part, through the development of matrix system technology.

Demand for these products is growing at double-digit rates nearly every year. And, as more and more people begin to use this delivery system and see how effective and easy-to-use it is, transdermal patches will likely become even more sought-after. An especially important and novel area is in the use of topical patches for dietary supplements, which, until now, only could be found as pills, capsules and liquids. With an ever-expanding supplement market, it is logical to assume that the same advantages that so many people find in transdermal patches for medications will easily transfer to these important topical nutritional supplement patches.

Precision 3 Products

Precision3's topical patches specifically represent an innovation in the supplement market. The existing supplement patches mostly are centered on treating vitamin B₁₂ deficiencies and the delivery of anti-wrinkle nutrients to the skin. Hence Precision3's multivitamin/multimineral patches as well as the weight loss and energy patches are all a novel and welcomed addition to the dietary supplement market.



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