WWW.IJRPR.COM

International Journal of Research Publication and Reviews

Journal homepage: www.ijrpr.com ISSN 2582-7421

Review Article on Transdermal Patch

Sachin Zagade, Aishwarya Bhagat, Pooja Anbhavne, Mrs. Sneha Madgaonkar, Dr. Vijay Jagtap.

Yashwantrao Bhonsale College of Pharmacy

ABSTRACT :

Transdermal medication delivery has emerged as a novel approach for achieving systemic drug absorption at a controlled rate over an extended period. It can be taken less often, it doesn't go through first-pass metabolism because it goes straight into the bloodstream, older people who can't take pills can take it, and you can take it yourself with fewer side effects. The article also talks about how the transdermal drug delivery system has changed over the years and what it might look like in the future. The efficacy of all transdermal drug delivery systems (TDDS) depends on the drug's capacity to permeate the skin in sufficient quantities to produce the desired therapeutic effect. To characterize a transdermal patch, you need to look at its quality, size, start and end times of action, adhesive properties, thickness, weight, moisture content, and uniformity.

Transdermal patch, permeability, polymer matrix, permeation enhancer are some important words..

KEYWORDS: Transdermal patch, permeability, polymer matrix, permeation enhancer.

INTRODUCTION

The transdermal drug delivery system (TDDS) is a new and effective way to give drugs that has many advantages over traditional methods like oral and parenteral routes. Transdermal patches are one of the many TDDS technologies that have gotten a lot of attention in the medical and pharmaceutical fields. This is because they can deliver drugs directly through the skin and into the bloodstream in a controlled and long-lasting way. This way of giving medicine skips the first-pass metabolism, which lowers the chances of gastrointestinal side effects and makes it easier for patients to stick to their treatment, especially for long-term therapies.

Transdermal patches are simple to use, painless, and keep a steady drug plasma profile, so you don't have to take them as often and they don't hurt as much. peak-through fluctuation that happens when you take drugs by mouth. The patch goes on the skin and releases the drug at a steady rate, which lets the body absorb it over the course of hours or days. This is why they go well with drugs that need to be taken often or have short half-lives, such as nicotine, fentanyl, nitroglycerin, and hormonal therapies.

In the past few years, the range of transdermal patches has grown a lot because of new drug delivery carriers, permeation enhancers, and better formulation technologies. Researchers are looking into how transdermal patches can be used to give a wider range of drugs, such as peptides, vaccines, and herbal extracts. Transdermal systems have some good things about them, but they also have some bad things. The stratum corneum, for instance, acts as a barrier, and drug molecules must be small and lipophilic to get through it.

In 1980, the first transdermal drug delivery (TDD) system, Transdermal Scope, was made. It used the drug Scopolamine to help people who were sick from moving.

OVERVIEW OF TRANSDERMAL DLIVERY SYSTEM:

The transdermal drug delivery system is designed to send a medicine through the skin and into the body's circulation in a way that is controlled and lasts a long time. It offers a non-invasive option compared to oral and injectable methods, which can cause first-pass metabolism or irritation in the stomach. The skin is the body's biggest organ, so it's a good place to put drugs. But its barrier properties, especially the stratum corneum, make it hard for drugs to get through.

A standard transdermal patch has several layers, and each one is important for delivering the drug. This layer has

Backing layer: This layer keeps the drug safe and stops it from getting lost in the environment.

1. Drug reservoir or matrix: This is where the active pharmaceutical ingredient is kept in a way that lets it be released slowly.

2. The adhesive layer keeps the patch on the skin and, in some designs, holds the drug.

3. Release liner: A layer that comes off before use to show the adhesive layer.

The method of drug delivery Passive diffusion is the main way that TDDS does its job. The drug goes from the patch to the stratum corneum, then to the epidermis, then to the dermis, and finally to the blood vessel in the subcutaneous tissue. The rate at which a drug is absorbed depends on a number of things, including how easily it can get through the skin, the drug concentration gradient, and the drug's physicochemical properties.

For transdermal delivery to work, the drug needs to have certain characteristics, such as a low molecular weight (ideally >500 Da), a high lipophilicity, and enough potency to work in small doses. This requirement makes sure that the drug can get through the skin barrier and have the desired therapeutic effect without causing irritation or toxicity.

TYPES OF TRANSDERMAL PATCHES :

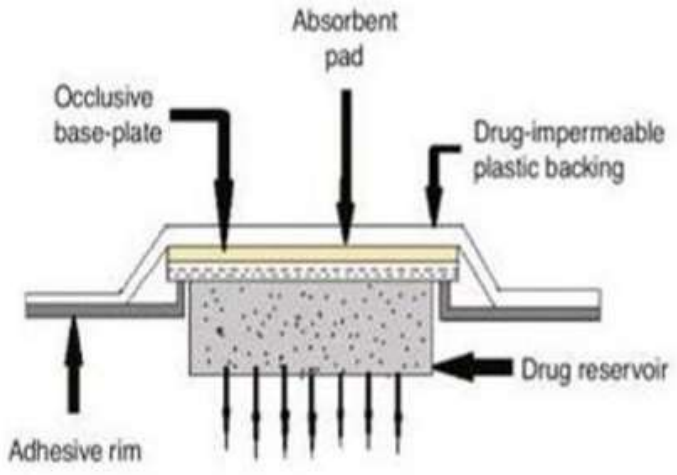

Figure 1: Transdermal Drug Delivery System Device

. Eg: menthol and camphor patch. They can be classified based on there design and mechanism of drug delivery. The major types includes :

1. **Reservoir type:**

In this design, the drug is stored in a separate compartment as a liquid or gel. The rate-controlling membrane that separates the reservoir from the skin controls how fast the drug comes out. A nitroglycerin patch, for instance.

2. **Matrix- type patch:**

The drug is evenly spread out in a polymer matrix that acts as both the drug reservoir and the thing that controls how fast the drug is released. The drug is released through diffusion as the patch touches the skin.

3. **Drug-in- adhesive patches**:

In this type, the drug is mixed right into the layer of adhesive that sticks to the skin. The permeability of the skin and the way the adhesive is made control how quickly the drug is released. Patches are thinner, more flexible, and more comfortable than other types of clothing.

4. **Micro-reservoir patches**:

: This is a combination of the reservoir and the matrix system. The drug is kept in a gel-based matrix with a tiny reservoir.

5. **Vapor patches**:

These are made to let out volatile compounds like essential oils or therapeutic vapors. People often use them to help with things like congestion, motion sickness, and mood swings.

Table 1: Polymer Matrix

Natural polymer	Synthetic elastomer	Synthetic polymer
Gelatin	Neoprene	Polyethylene
Gum Arabic	Silicon Rubber	Polystyrene
Starch	Butyl Rubber	PVC
Shellac	Chloroprene	PVP
Zein	Polysiloxane	Polyester

BASIC COMPONENTS OF TDDS:

A. Polymer matrix:

Polymer is a crucial and indispensable part of the transdermal drug delivery system. Rate- controlled medication delivery has been accomplished using a variety of polymeric material types.

The physicochemical characteristics of the drug and polymer used in the device's construction determine the drug release mechanism.

For a polymer to be employed in a transdermal system, it must meet the following requirements.

1. The polymer's chemical functionality, glass transition temperature, and molecular weight must permit the diffusion and release of the particular medication.

The polymer should make it possible to include a significant quantity of drug.

B. Penetration Enhancers:

- ✓ They are regarded as an essential component of the majority of transdermal formulations and increase skin penetration.
- ✓ They can alter the skin's resistance to penetration by reacting with the skin's surface or the applied substance.

The following qualities should be present in an ideal penetration enhancer:

1. Pharmacological inertness, Cosmetically Acceptable.
2. Nontoxic.
3. Nonirretating .
4. Nonallergenic.
5. Quick onset; predictable and appropriate duration of action for the medicine used, Chemical penetration enhancers' reversible impact on the stratum corneum's barrier properties.
6. Compatible with the delivery system both chemically and physically. 7)Easily fitted into the delivery system.

Two Types of Principles Have Been Employed to Increase Drug Permeation Through Skin;

1. Physical Enhancers.
2. Chemical Enhancers.

ADWANTAGES:

- Maintain plasma concentration of potent drug Delivery via the transdermal route is an interesting option because transdermal route is convenient and safe. The positive features of delivering drug across skin to achieve systemic effect are:
- The drugs by pass the hepatic and presystemic metabolism i.e., Avoidance of first pass metabolism thereby increasing bio availability.
- Risks and inconveniences of IV therapy are avoided.
- Self –administration is possible.
- Minimizing undesirable side effect.
- Avoiding the fluctuation in drug level.

DISADWANTAGES:

- The drug must have some desirable physicochemical properties for penetration through stratum corneum and if the drug dose required for therapeutic value is more than 10 mg/day, the transdermal delivery will be very difficult.
- Only relatively potent drugs are suitable candidates for TDDS because of the natural limits of drug entry imposed by the skin's impermeability.
- Some patients develop contact dermatitis at the site of application for one or more of the system components, necessitating discontinuation.
- Clinical need is another area that has to be examined carefully before a decision is made to develop a transdermal product.
- The barrier function of the skin changes from one site to another on the same person, from person to person and with age.

CONCLUSION:

Transdermal patches are a good way to give drugs through the skin that is easy for patients to use. They help avoid first-pass metabolism, lower side effects, and make it easier for patients to stick to their treatment plan because they are easy to use and release drugs in a controlled way. But there are still problems like drug permeability, skin irritation, and the need for drugs to have the right properties. New technologies like microneedles, iontophoresis, and new polymers are making transdermal patches more reliable and able to be used with more types of drugs. In general, transdermal patches are a promising way to give drugs that could be very useful in the future of medicine..

REFERENCE:

1. Jain, Controlled and Novel Drug Delivery, CBS Publishers, and Distributors, 2002; 107.
2. Chowdary K.P.R and Naidu R.A.S, Transdermal Drug Delivery, A Review of Current Status, Indian Drugs, 1995;32(9):414-422.
3. Hadgraft J, Guy R. H. Transdermal Drug Delivery, New York: Marcel Dekker, 2nd ed 35: 14-16.
4. Hadgraft J.W, and Somers G.F, Review Article Percutaneous absorption, International Journal of Pharmaceutics, 2005;305: 2-12.