

Topical Finasteride

While Propecia (finasteride) is one of the two most popular medications for hair loss and the first line of treatment most doctors will prescribe, its use is marred by unpleasant sexual side effects. Though rare, these can discourage many men who would otherwise take Propecia for their hair loss.

Primarily for this reason, in recent years there has been an increasing trend for physicians around the world to prescribe topical finasteride for their balding patients. This article will explore topical finasteride and its use as a treatment for male pattern baldness, including how it works, a comparison with the standard oral version, and the side effects and complications to bear in mind.

Finasteride as a Treatment for Genetic Baldness

Finasteride, brand name Propecia, is an oral male-pattern baldness treatment used by millions of men worldwide since its release in 1997.

Finasteride was originally developed to treat Benign Prostatic Hyperplasia, or BPH. This refers to the non-cancerous enlargement of the prostate and is very common in older men. Though not life-threatening, BHP can lead to unpleasant symptoms like frequent urination, difficulty urinating, and poor sleep.

What BHP and male pattern baldness share is they are both thought to be caused – or at least mediated – by the male hormone dihydrotestosterone (DHT) (3). Finasteride can dramatically lower DHT levels in the blood and, as a result, alleviate symptoms of both conditions.

How Does It Work?

DHT is one of the four major male hormones (androgens), the others being testosterone, androstenedione, and dehydroepiandrosterone. By far the most powerful of these is DHT, with a potency estimated to be three times that of testosterone.

The human body synthesizes DHT from testosterone through an enzyme called 5-alpha-reductase. Though this is not the only way our body makes DHT, it is easily the most important one, accounting for the large majority of DHT circulating in our system at any given time.

Finasteride works by binding to free 5-alpha-reductase molecules which renders them incapable of binding to their intended target, namely testosterone. The freely circulating testosterone is then unable to convert to DHT, and the DHT levels in the body fall to near zero.

This systemic reduction of DHT levels is also reflected in the two parts of the body where DHT exerts its most unpleasant effects: the prostate and scalp. This explains why finasteride is an effective treatment for both male pattern baldness and BPH.

Being a naturally occurring hormone, DHT is present in all men. However, for reasons that are not clear, men who are predisposed to male pattern baldness have a sensitivity to DHT. The DHT binds to androgen receptors in the hair follicles and sebaceous glands of the scalp, and through poorly understood mechanisms mediates the so-called hair follicle miniaturization. This refers to the process whereby the hair follicles become progressively feebler, their hair growth cycle becomes stunted, and they are eventually unable to grow a viable hair shaft.

By blocking the production of DHT, finasteride prevents the process of hair follicle miniaturization and delays the progression of male pattern baldness.

The Effectiveness and Safety of Oral Finasteride

There is little doubt finasteride can be an effective treatment for hair loss, especially if begun in the early stages of hair loss. Between 80 to 90% of men on finasteride will stop losing further hair, meaning they will not progress to the next stage of baldness.

Hair regrowth is modest, typically in the 10% range for regions of the scalp undergoing the hair follicle miniaturization process. For most men, the fact that they will be able to preserve their remaining hair by taking a pill once a day makes finasteride a very attractive proposition.

The major problem with oral finasteride involves its non-specificity. To lower DHT levels in the scalp, users of Propecia will take a pill that devastates DHT all over the body. While it is true that DHT has no discernible function in adulthood, such a drastic reduction in one male hormone is bound to have repercussions on other hormones. For example, the testosterone molecules that would normally bind to 5-alpha-reductase and convert to DHT are now free, with the result that testosterone levels in the blood rise. Other hormones are affected to various degrees.

It is to be expected, therefore, that the most common side effects of Propecia are hormonal and sexual in nature: loss of libido, erectile dysfunction, impotence, and gynecomastia being the most common ones. The frequency of these side effects ranges from under 1% for gynecomastia to 3% or more for those involving sexual dysfunction, though some studies place these far higher at eight to 15%.

On a psychological level, these are extremely distressing side effects, and it is no wonder that many men with hair loss who would otherwise be happy to start finasteride treatment will not even consider it. This is where the topical version of finasteride comes in.

Efficacy of Topical Finasteride

When it comes to the efficacy of topical finasteride, the two major questions are a) does it work compared to placebo, and b) how does it compare against Propecia?

With regards to the first question, the literature leaves little doubt that topical finasteride is effective against hair loss. For example, a 1997 study found that after 6 months, 73% of patients treated with topical finasteride reported “high effectiveness,” while 60% of patients who received a placebo solution reported “no effect”. It is worth noting that during the first three months of treatment there were no differences between the groups, but after that point the difference started to become apparent, eventually plateauing after a year.

That topical finasteride works is no surprise. Far more interesting is comparing its efficacy to oral finasteride. The one study to date that looked into this was published in 2009 and split a

sample of 45 men with pattern hair loss into two groups: the first group was treated with topical finasteride gel and placebo finasteride tablets, while the second group was given real finasteride tablets and an inactive topical gel solution. The end result was that one group of men were treated with topical finasteride only, and the other with oral finasteride only, but neither the men nor the researchers knew to which group any one man belonged.

The small differences between the two groups were non-statistically significant, leading the researchers to conclude that the “finasteride gel and finasteride tablet were relatively similar to each other.”

While encouraging, the data on the efficacy of topical finasteride is extremely limited compared to that of Propecia, which is to be expected considering the relative popularity of the two treatments. Nevertheless, the data that is available, in combination with abundant anecdotal evidence, as well as the increasing popularity of topical finasteride among prescribing physicians, all point to topical finasteride being almost as effective as Propecia.

Is Topical Finasteride Systemically Absorbed?

While topical finasteride works, equally as important for potential users are the side effects. The presence of side effects hinges on the degree to which topical finasteride passes through the skin and is absorbed into the bloodstream.

According to a 2014 research paper out of Italy, a 0.25% topical formulation results in a blood concentration of finasteride that is roughly 15 times lower compared to taking the standard 1mg pill. Be that as it may, even this relatively low absorption is sufficient to dramatically impact blood DHT levels: these drop between 68 to 75% in the topical group, compared to 62 to 72% for the oral group.

The same team of researchers published a follow-up study where they split participants into three groups: the men in one group were given standard oral finasteride, in the second group topical finasteride once daily, and in the third group topical finasteride twice daily. After one week of

treatment, twice daily application of the solution resulted in approximately the same scalp and blood serum DHT reductions as the 1mg oral tablet. Surprisingly, the men who were treated with the once daily topical finasteride had larger scalp DHT decreases compared to the other two groups.

The once daily (od) topical finasteride group gave the largest scalp DHT decreases.

Taken together, these studies present a mixed picture. On the one hand, topical finasteride is absorbed systemically at a fraction of the oral dose, and the best estimate is 1/15th absorption. On the other hand, even at these very low absorption rates, it is still enough to cause a large decline in blood DHT levels.

This last observation makes sense considering the standard 1mg daily oral finasteride is probably excessive, and that a much lower oral dosage, closer to 0.2mg should have been approved against baldness. Such a five times lower oral dosage results in nearly equivalent reduction of DHT levels and efficacy against male pattern baldness.

Side Effects and Considerations

DHT levels and systemic absorption are useful proxies, but nothing can replace the actual side-effects observed in clinical studies.

In the first Italian study that compared finasteride to placebo, the researchers noted that no patients experienced local or systemic side effects. And they added:

“In particular, in the finasteride group laboratory data revealed no relevant change in plasma levels of total testosterone, free testosterone or dihydrotestosterone.”

This last statement does not fit well with what is known from other studies and is difficult to explain.

The follow-up report also states that:

“Tolerability of the topical formulation was excellent, with no signs or symptoms detected at the scalp application site throughout the studies.”

The side effects reported by 11 to 15% of subjects included conjunctivitis, headache, and pain, but none of the sexual side effects associated with Propecia.

A source of confusion lies in the fact that topical finasteride is usually mixed with minoxidil. This is to be expected: since the patient is already taking the trouble of applying a topical, a minoxidil-containing solution is an obvious vehicle. While this results in superior hair growth, it can also contribute to more side effects, making it difficult to know whether the minoxidil or finasteride is the culprit.

Common side effects from minoxidil solutions that contain propylene glycol include skin irritation, itching, and redness. Other minoxidil side effects include unwanted facial hair growth, headaches, swelling and, on rare occasions, cardiac problems like tachycardia.

A study out of Thailand that looked at the clinical results of 3% minoxidil in combination with 0.1% finasteride lotion found that approximately 23% of subjects experienced contact dermatitis, which is almost certainly due to the propylene glycol in the minoxidil solution. There were no sexual side effects.

In summary, the literature does not report instances of sexual dysfunction with topical finasteride, though it is worth repeating it consists of a handful of studies with relatively small sample sizes. Still, it is a near certainty that to the extent that sexual dysfunction happens at all with topical finasteride, its incidence will be far lower compared to that of Propecia (3 to 8%). A baseline test of hormone function prior to treatment is advisable.

Conclusion

The patent on finasteride has long expired, meaning there is no incentive for Merck (or any other company) to market it as a topical medication. That has not stopped thousands of dermatologists

around the world from prescribing it off-label to their balding patients, and by all indications, its popularity is now higher than ever.

The topical version is probably nearly as effective as Propecia, while systemic absorption is dramatically lowered, along with the incidence of side effects. When it comes to sexual side effects, in particular, the incidence is likely close to zero, but it is worth considering that even a placebo finasteride pill will produce sexual side effects for a small minority of men.

All this makes topical finasteride a worthwhile consideration for any man with male pattern baldness who is either deterred by the potential side effects of Propecia, or who had to stop treatment due to actually developing them.

Like with all topical medications, the one major drawback of topical finasteride involves the time, effort, and inconvenience that comes with applying it daily for an indefinite period of time. As is the case with minoxidil, results with topical finasteride will only last as long as treatment; so if you are not ready to commit to it for the long run, it is probably best to avoid it altogether.