



# Safety and Efficacy of Mesotherapy in the Treatment of Androgenetic Alopecia: A Systematic Review

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## Abstract

**Background and Objectives:** The most common type of hair loss is androgenetic alopecia. Mesotherapy is considered a controversial treatment for this condition. The aim of this study was to examine the safety and efficacy of mesotherapy in the treatment of androgenetic alopecia.

**Methods:** A systematic review was conducted to identify and evaluate relevant studies on mesotherapy for the treatment of androgenetic alopecia. The Cochrane Library, PubMed, Embase, Scopus, and Web of Science were searched until November 2017. The grey literature and references of key studies were also scanned for additional citations. In addition, quality assessment of studies was conducted using the Jadad scale.

**Results:** Five studies including 344 patients were considered eligible for the review. Of five studies included in this review, three were randomized controlled trials (RCTs) and two were non-RCTs. In previous studies, mesotherapy was performed using dutasteride, minoxidil, and finasteride. As the analysis revealed, quality of retrieved studies was poor. The results showed that mesotherapy leads to the improvement of efficacy outcomes. However, in one study, mesotherapy was not shown to be effective regarding some outcomes. No significant adverse effects were reported for mesotherapy.

**Conclusions:** Although the findings of previous studies suggest that mesotherapy is a safe and effective treatment for androgenetic alopecia, further research is needed to confirm this finding.

**Keywords:** Mesotherapy, Alopecia, Hair

## 1. Background

Androgenetic alopecia (AGA) is the main cause of hair loss in men and women (1). The prevalence of AGA increases with age (1-4) and varies by race (5). Nearly 80% of men and 50% of women experience AGA in their lifetime (6). Studies have shown that this condition has a significant negative impact on the patient's quality of life (5, 7, 8). Currently, the United States food and drug administration (FDA) approves of topical minoxidil and oral finasteride for the treatment of AGA (9), as both agents have been shown to be effective in the treatment of these patients (10-17).

Patients using topical minoxidil have reported pruritus and irritation (10, 12, 17). The most common adverse events associated with finasteride include erectile dysfunction, ejaculation dysfunction, reduced ejaculate volume, and loss of libido (18). Although finasteride is generally a safe medicine, there is growing concern about its sexual side effects (19); nonetheless, this medicine is well-tolerated by patients (19).

Mesotherapy is a method in which medications are in-

jected directly into the skin (20). It is widely used in dermatology for the treatment of cellulite, local fat deposits, and facial rejuvenation. In this technique, agents, such as minoxidil, finasteride, lidocaine, multivitamins, and T3/T4, are used for the treatment of alopecia (21). Evidence regarding the efficacy and safety of mesotherapy in the treatment of hair loss is controversial (22) due to lack of comprehensive research. Therefore, the purpose of this study was to review the available evidence regarding the safety and efficacy of mesotherapy in the treatment of AGA.

## 2. Methods

### 2.1. Literature Search Strategy

A systematic review of the literature was conducted to examine the efficacy and safety of mesotherapy in the treatment of AGA. Electronic databases including Cochrane Library, PubMed, Embase, Scopus, and Web of Science were searched for relevant studies, published before November 2017. The reference lists of retrieved studies were

also scanned for additional records. In addition, Google Scholar and Clinicaltrials.gov were searched.

## 2.2. Inclusion and Exclusion Criteria

The inclusion criteria were as follows: 1) studies published in English language; 2) male and female patients with hair loss due to AGA; 3) studies with a clinical trial design (RCTs, controlled clinical trials, controlled before-and-after studies, and interrupted time series); and 4) mesotherapy indicated as a therapeutic intervention. On the other hand, studies performed on animals and healthy volunteers, as well as observational studies, were excluded from the review.

## 2.3. Study Appraisal and Selection

After removing duplicate articles, two authors (AA and AB) independently screened the studies according to the inclusion and exclusion criteria. Disagreements among authors were resolved through discussion. The quality of studies was also assessed independently by two authors according to the Jadad scale.

## 2.4. Data Extraction and Analysis

Data extraction of studies was performed independently by two authors (AA and AB) using a form. The information included the characteristics of studies (e.g., design and duration), participants (e.g., age, sex, and sample size), interventions, comparisons, and evaluation of effectiveness and safety. After completing the forms for each study, disagreements were reviewed and finalized by the reviewers. It was not possible to perform a meta-analysis of the findings due to the methodological heterogeneity of studies (differences in interventions, controls, and populations).

## 3. Results

### 3.1. Results of Study Selection

A total of 505 articles were retrieved by searching the databases. After excluding duplicates, eleven articles were examined, and the results of four articles were analyzed. The data collected from these studies are the results of clinical trials. The study selection process based on the PRISMA guidelines is shown in [Figure 1](#).

### 3.2. Study Characteristics

Among five studies included in this review, three were RCTs and two were non-RCTs. In three studies ([23-26](#)), the efficacy of mesotherapy with dutasteride in men ([23, 25](#)) and women ([24](#)) was compared with mesotherapy using placebo. In a study by Azam ([24](#)), mesotherapy was compared with 2% minoxidil topical spray, while in another study ([27](#)), mesotherapy using finasteride was compared with oral finasteride (1 mg). The quality of retrieved studies was found to be poor. The outcomes reported in the studies are presented in [Table 1](#).

### 3.3. Efficacy Outcome

The most common efficacy-related variables evaluated in the studies included patient self-assessment, percentage of anagen, catagen, and telogen, photographic improvement, and hair diameter. The results related to efficacy outcomes are presented in [Table 2](#).

#### 3.3.1. Patient Self-Assessment

The results of four studies showed significant improvements in the self-assessment index for all subscales after mesotherapy in comparison with the placebo, minoxidil spray, and finasteride. However, in another study ([23](#)), there was no significant difference between the groups.

#### 3.3.2. Percentage of Anagen, Catagen, and Telogen

After treatment, there was a significant increase and reduction in the percentage of anagen and telogen of hair, respectively in the mesotherapy group in comparison with the controls ([23, 24](#)). Catagen percentage was also measured in another study ([23](#)), and the results demonstrated no significant difference between the groups before and after treatment.

#### 3.3.3. Photographic Improvement

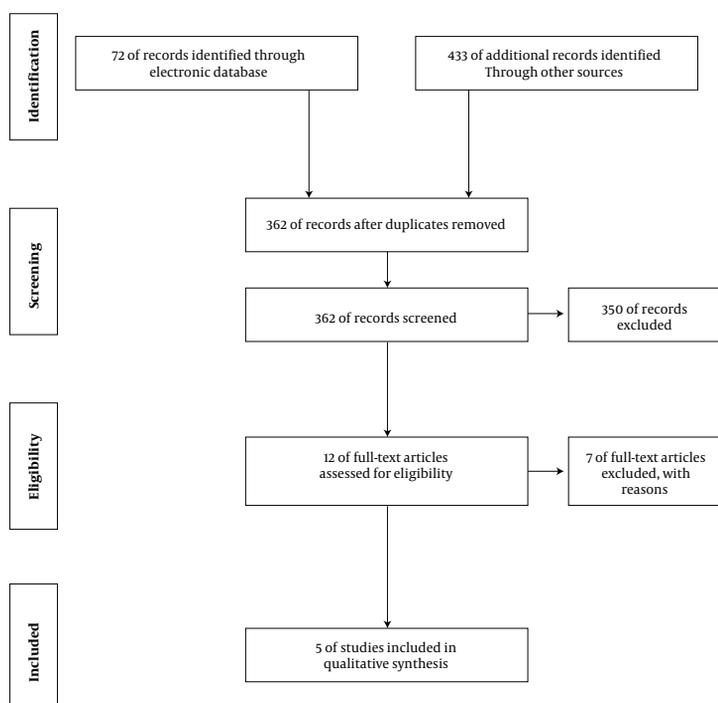
Significant photographic improvement was observed among patients, who received dutasteride via mesotherapy, compared to the placebo group ([25, 26](#)).

#### 3.3.4. Hair Diameter

In two studies ([23, 26](#)), which evaluated the mean hair diameter before and after treatment, a significant increase was observed in the mesotherapy group versus the controls.

#### 3.3.5. Other Outcomes

Other indices were only evaluated in one study. Azam et al. ([24](#)) reported a significant reduction in the mean vellus hair percentage in the treatment group. The mean percentage was lower in the mesotherapy group, compared to



**Figure 1.** The study selection process

**Table 1.** The Study Characteristics

Study	Design	N, Population	Mesotherapy Sessions	Mesotherapy Agent	Comparison	Jadad Score
Talwar et al. 2017	CCT	40, M	6	Finasteride	Oral finasteride	-
Sobhy et al. 2013	RCT	90, M	9	Dutasteride and dutasteride-containing solution	Placebo	2
Moftah et al. 2013	CCT	126, F	12	Dutasteride	Placebo	-
Azam et al. 2010	RCT	60, F	8	Minoxidil	Minoxidil spray	2
Abdallah et al. 2009	RCT	28, M	7	Dutasteride	Placebo	2

Abbreviations: CCT, controlled clinical trial; F, female; M, male; RCT, randomized controlled trial.

the minoxidil group. In another study by Moftah et al. (26) there was no significant difference between the groups, while after treatment, the mean number of epilated hair decreased with mesotherapy. Sobhy et al. (23) reported no significant difference between the groups for dystrophic hair percentage. Also, the anagen/telogen ratio was found to be significant in the mesotherapy group versus the controls. In addition, in a study by Talwar et al. (27) excellent improvement in hair growth was observed in 70% and 60% of patients from the mesotherapy and finasteride groups, respectively.

### 3.4. Safety Outcome

Adverse events were reported in two studies and included pain, headache, and itching. However, there was no significant difference between the treatment and control groups regarding the adverse events. Also, in the study by Sobhy et al. there was no significant difference in semenogram parameters between the groups (23). In the study by Talwar et al. (27), the most common side effects were loss of libido (5% vs. 10%), folliculitis (5% vs. 0%), and erectile dysfunction (0% vs. 5%) in the mesotherapy and finasteride groups, respectively.

**Table 2.** The Efficacy Outcomes of Retrieved Studies

Study	Patient Self-Assessment Subscales (Intervention vs. Control)		Hair Percentage			Photographic Assessment, %	Hair Diameter <sup>a</sup>
			Anagen <sup>a</sup>	Catagen	Telogen <sup>b</sup>		
Talwar, 2017	Marked improvement	60 vs. 40 <sup>c</sup>	NR	NR	NR	NR	NR
	Moderate improvement	30 vs. 40 <sup>c</sup>					
	Mild improvement	15 vs. 50 <sup>c</sup>					
Sobhy, 2013	Dutasteride, dutasteride-containing solution, and placebo	60, 90, 40 <sup>d</sup>	NR	NR	NR	NR	NR
Moftah, 2013	Hair density	60.5 vs. 27.5 <sup>c</sup>	NR	NR	NR	62.8 vs. 17.5 <sup>c</sup>	8.8 ± 14 vs. 1.9 ± 4.87 <sup>c</sup>
	Hair thickness	60.5 vs. 22.5 <sup>c</sup>					
	Hair fall	73.5 vs. 32.5 <sup>c</sup>					
	Changes in hair color and brightness	72.1 vs. 32.5 <sup>c</sup>					
Azam, 2010	Hair growth	80 vs. 56 <sup>c</sup>	10.34 ± 3.2 vs. 3.6 ± 3.9 <sup>c</sup>	NR	-8.4 ± 4.65 vs. -4.3 ± 5.25 <sup>c</sup>	NR	NR
	Hair loss	63 vs. 46 <sup>c</sup>					
Abdallah, 2009	Hair density or scalp covering	92.9 vs. 71 <sup>c</sup>	NR	NR	NR	92.9 vs. 28.6 <sup>c</sup>	NR
	Decreased hair fall	64.3 vs. 21.4 <sup>c</sup>					
	Increased growth rate	71.4 vs. 0 <sup>c</sup>					
	Thickness	50 vs. 71 <sup>c</sup>					
	Color and brightness	21.4 vs. 0 <sup>c</sup>					

Abbreviations: NR, not significant.

<sup>a</sup>The mean changes from baseline to endpoint in the statistical analysis (increase in mean values: improvement).

<sup>b</sup>The mean changes from baseline to endpoint in the statistical analysis (reduction in mean values: improvement).

<sup>c</sup>Significant at 5%.

<sup>d</sup>Not significant.

#### 4. Discussion

The main purpose of this systematic review was to provide evidence regarding the application of mesotherapy for patients with AGA. Only five studies examined the efficacy of mesotherapy in the treatment of AGA, and the methodological quality of retrieved studies was poor. The results showed that mesotherapy leads to improvements in hair loss indices. However, in a previous study (23), there was no difference between mesotherapy and placebo groups considering the outcomes of patient self-assessment, catagen percentage, and dystrophic hair percentage.

In a study by Ozdogan et al. (28), mesotherapy was effective and risk-free for men and women with alopecia. According to our review, there were no significant adverse events in mesotherapy. Generally, there are few studies about the adverse effects of mesotherapy in the treatment of alopecia. However, several case reports (29, 30) have shown increased hair loss following mesotherapy in patients with AGA. In another study (31), multifocal scalp abscess was reported as a complication of scalp mesotherapy; therefore, mesotherapy can cause serious adverse events.

The latest guidelines published by the European dermatology forum (18) and Asian consensus committee (9) do not recommend mesotherapy as a treatment for AGA. In addition, FDA does not approve of mesotherapy for any clinical indications (20). On the other hand, in a systematic review and meta-analysis published in 2017 (32), minoxidil, finasteride, and low-level laser therapy were suggested as effective treatments for men and women with AGA; however, there is no evidence for this technique. Overall, although mesotherapy has been used for many years by clinicians, there are few studies about its efficacy and safety in AGA treatment.

##### 4.1. Conclusions

Although previous studies have suggested mesotherapy as a safe and effective treatment for hair loss due to AGA, future high-quality studies are needed to confirm this technique.

##### 4.2. Limitations

The main limitations of this study include high heterogeneity and lack of high-quality studies.

## Footnotes

**Conflicts of Interest:** The authors declare no conflicts of interest.

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