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Therapeutic efficacy and aesthetic outcomes of ferulic acid peel for facial rejuvenation

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Abstract
Background: Photoaging results from cumulative ultraviolet exposure and oxidative stress, leading to pigmentary changes, uneven texture, and fine wrinkles, [1, 2] Ferulic acid is a plant-derived phenolic compound with antioxidant, anti-inflammatory, depigmenting, and photoprotective properties and has emerged as a promising agent for facial rejuvenation, [3, 4] However, clinical evidence supporting its efficacy as a monotherapy remains limited, [5]
Methods: This prospective interventional study included 25 patients aged 25–50 years with clinical features of photoaging. Patients underwent 6–8 sessions of ferulic acid peel at three-week intervals. Clinical improvement was assessed using the Physician's Global Aesthetic Improvement Scale (GAIS) and patient satisfaction scores. Statistical analysis was performed using paired t-test.
Results: An overall clinical improvement of 60–70% was observed. Mean GAIS scores showed a statistically significant reduction post-treatment ($p < 0.001$). More than 80% of patients reported good to very good satisfaction. Adverse effects were mild and transient.
Conclusion: Ferulic acid peel is an effective and well-tolerated modality for facial rejuvenation with minimal downtime.

Keywords: Ferulic acid peel, facial rejuvenation, photoaging, antioxidant peel, chemical peel

Introduction
Photoaging is characterized by fine wrinkles, uneven pigmentation, dullness, and loss of skin elasticity due to chronic ultraviolet exposure and oxidative stress, [1, 2]. Chemical peels are widely used to improve these changes by enhancing epidermal turnover and dermal remodeling. However, conventional peels such as trichloroacetic acid and phenol are associated with erythema, post-inflammatory hyperpigmentation, and prolonged downtime, particularly in darker skin types, [6, 7].
Ferulic acid (4-hydroxy-3-methoxycinnamic acid) is a naturally occurring phenolic compound with potent antioxidant and photoprotective effects. It scavenges free radicals, inhibits lipid peroxidation, suppresses tyrosinase activity, and stabilizes vitamins C and E, thereby enhancing photoprotection and collagen synthesis, [3, 4] Ferulic acid peel is a non-exfoliating, technique-sensitive peel that offers rejuvenation with minimal irritation, [5] Given the limited published evidence on ferulic acid peel as a standalone treatment, this study was undertaken to evaluate its efficacy, safety, and patient satisfaction in facial rejuvenation.

Aim
To evaluate the efficacy, safety, and patient satisfaction of ferulic acid–based chemical peels in facial rejuvenation.

Materials and Methods
1. Study design and setting
A prospective interventional study was conducted in the Department of Dermatology.

2. Study population
Twenty-five patients aged 25–50 years presenting with clinical features of facial photoaging were enrolled.

3. Inclusion criteria
1. Adults aged 25–50 years
2. Fitzpatrick skin types III–V
3. Visible features of photoaging or pigmentation

4. Exclusion criteria
1. Pregnancy or lactation
2. Active facial infections or acne
3. History of keloidal tendency
4. Isotretinoin use within the previous 6 months

5. Intervention
Patients underwent 6–8 sessions of ferulic acid peel at three-week intervals. The peel formulation contained ferulic acid (8–12%) with adjunctive agents such as phloretin, alpha-hydroxy acids (malic, citric, lactic acids), and low-dose retinol. Post-procedure care included broad-spectrum sunscreen (SPF 50) and gentle skincare.

6. Outcome assessment
Clinical improvement was assessed using the Physician's Global Aesthetic Improvement Scale (GAIS). Patient satisfaction was evaluated using subjective scoring. Adverse effects were documented at each visit.

Table 1: Global Aesthetic Improvement Scale (GAIS

0	Worse
1	No change
2	Improvement
3	Much improved
4	Very much improved

7. Statistical analysis
Data were analyzed using paired t-test. A p-value < 0.05 was considered statistically significant.

Results

All 25 patients completed the study.

An overall clinical improvement of 60–70% was observed at the end of treatment. Improvement was most marked in skin luminosity, tone uniformity, and texture.

Table 2: Demographic and Clinical Characteristic

Parameter	Observation
Number of patients	25
Age range (years)	25-50
Fitzpatrick skin type	III-V
Number of sessions	6-8
Session interval	3weeks

Objective Assessment

Mean GAIS scores showed a statistically significant reduction post-treatment.

Table 3: Pre- and Post-Treatment GAIS Scores

Parameter	Pre-treatment	Post-treatment
Range	1-4	0-3
Mean ± SD	2.84 ± 0.72	1.01 ± 0.66
Median	3	1
Mean difference	-	1.83
Percentage improvement	-	65.4%
p-value	-	<0.001

Patient Satisfaction

More than 80% of patients rated outcomes as good to very good.

Table 4: Patient Satisfaction Scores

Satisfaction category	Number of patients
Highly satisfied	12
Satisfied	9
Neutral	3
Dissatisfied	1
Very dissatisfied	0

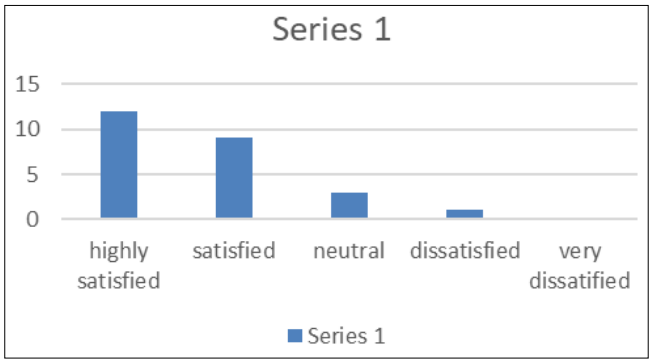

Fig 1: Bar diagram showing pre- and post-treatment

Safety Profile

Adverse effects were mild and transient.

Table 5: Adverse Effects Observed

Adverse effect	Observation
Erythema	Mild, transient
Itching	Mild
Desquamation	Minimal
Post-inflammatory hyperpigmentation	None
Scarring	None

A B C

Fig 2: A. before; B. after 3 sessions; C. after 6 sessions

Discussion

This study demonstrates that ferulic acid peel provides significant improvement in facial photoaging with excellent tolerability. Its antioxidant and photoprotective mechanisms offer rejuvenation without the risks associated with deeper chemical peels such as trichloroacetic acid and phenol, [3, 4, 6] The absence of post-inflammatory hyperpigmentation and minimal downtime make it particularly suitable for Fitzpatrick skin types III–V [5, 7].

Conclusion

Ferulic acid peel is an effective, safe, and well-tolerated option for facial rejuvenation. Serial applications result in significant improvement in skin luminosity, texture, and fine wrinkles with high patient satisfaction. Larger randomized

controlled studies are required to establish standardized treatment guidelines.

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