The Research of Medical Science Review

Received: 17 December, 2024
Accepted: 17 January, 2025
Published: 25 January, 2025

ISSN: 3007-1208 | 3007-1216
Volume 3, Issue 1, 2025

A COMPARATIVE INVESTIGATION OF EFFICACY AND COMPLICATIONS IN LIGHT AND DEEP CHEMICAL PEELS

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DOI: https://doi.org/10.5281/zenodo.14744885

ABSTRACT

Chemical peels are used in dermatological practices to enhance skin texture, tone, and color. They are classified as Light, Intermediate, and Deep BURNS depending on the ward they cause, their consequences on the skin, and different complication rates. This paper looks at the essential factors concerning chemical peels and the difference in the response the treatment receives from men and women. The objective is to evaluate the efficacy and side effects ratio of deep and light chemical peeling and investigate gender differences in results. This was a comparative cross-sectional study of 68 patients undergoing light or deep chemical peeling. The patients were earmarked into two groups depending on the type of peel done equally. The effectiveness of the treatments was determined concerning the extent to which marks on texture and skin tone altered while complications were noted. Self-administered questionnaires were also completed to assess the patient's satisfaction and perceived improvement in skin quality. Efficacy and complications were also compared between genders to see if there was a gender preference in the results. It was observed that deep chemical peels found a positive change in skin texture and skin tone compared with light chemical peels. Nonetheless, the patients who underwent deep peeling reported more side effects. The analyses of female and male skin after treatments showed that all the surveyed females reported a higher perceived improvement of skin quality and a higher efficacy of both light and deep peels than males; however, females had a statistically significantly higher rate of complications than males. There was evidence of greater effectiveness of the deep chemical peels compared to the light chemical peels, although a higher risk of side effects accompanied this. Sex-specific responses to treatment imply that dermatological treatment should be individualized according to skin pathology and the sex of the patient.

***Keywords**: Chemical Peels, Skin Texture, Skin Tone, Gender Differences, Complications, Treatment Efficacy.*

INTRODUCTION

Chemical peels have been used in dermatology and aesthetic medicine to enhance skin texture.(1) By following the same line, these treatments imply the use of chemical agents that remove the dead layers of the epidermis and, at the same time, promote the rejuvenation of the latter.(2) Historically, even in ancient Egypt, natural acids were used to enhance the skin.(3) Chemical peels are now accepted for treating various skin problems, including acne, hyperpigmentation, wrinkles, and scars. The selection of candidates for this

procedure can make or mar the chemical peel process because different individuals respond to it differently. The perfect candidate for the study should have reasonable expectations, good health, and appropriate skin pathologies, such as acne, hyperpigmentation, or mild lineations(4-8). Certain elements must be factored into the equation before GOMA recommends that a client undergo a chemical peel. These include the client's skin type and age and the prevalence of skin conditions such as eczema and psoriasis. Dark-skin-toned people may require extra care as they likely experience post-inflammatory hyperpigmentation. A patient should not present with any active skin infections or recent facial surgery at the time of therapy(9). Consultation should include exploring the patient's medical history, drug and food allergies, and tolerance to aftercare. Expectant mothers or those nursing their babies often need to avoid some types of peels because they are dangerous. Explicit assessment of the patient leads to determining the proper method of chemical peeling and the depth of penetration is light or deep depending on the level of skin disorder to be treated. Thirdly, consent should be sought from the patient, patient expectations should be analyzed, and treatment goals should be set to improve outcomes.(2, 3).

A cross-sectional study was performed by Almeman (2024) to assess the effectiveness and safety of using AHAs in dermatological practice, particularly in cosmetic products such as chemexfol agents(10). The review has reviewed the global market for AHA and concluded that it has expanded enormously recently due to growing consumer awareness about skin aging and damage. Most of the skin benefits, such as encouraging skin cell turnover and regeneration through apoptosis and improving skin texture and luminosity, were noted to be based on glycolic and lactic acid. It also portrayed the overall applicability of AHAs in diseases like acne, hyperpigmentation, and photoaging diseases(11). However, it was noted that the proper concentrations regarding the therapeutic objectives with less side effect impact have not yet been defined and require further study. Regulatory compliance was underlined as a basic standard; the guidelines of international health organizations characterize definite concentrations and pH levels for the AHAs to provide secure results. In conclusion, the study highlighted that AHAs are helpful in cosmetic dermatology. However, more research and strict compliance with regulations on AHA utilization should be encouraged to cover the scope of their safety and effectiveness worldwide.(12)

The primary objective was to compare light and deep chemical peels to determine their safety, efficacy, and complications in gender. And to investigate the adverse effects of chemical peels, emphasizing the impact of inexperienced practitioners on these outcomes.

Material and Methods

Research Design

This study employed a cross-sectional design to evaluate the efficacy and complications of light and deep chemical peels in a sample of patients. The design aimed to provide a snapshot of the outcomes associated with chemical peeling procedures within a specified timeframe.

Clinical Settings and Sampling

The study was conducted in aesthetic clinics located in Lahore over six months. A total of 68 patients participated, evenly divided into two groups: 34 patients underwent a light chemical peel, and another 34 underwent a deep chemical peel, with an equal gender distribution in each group. Participants were selected using a non-probability convenient sampling technique. Inclusion criteria targeted men and women aged 18–35 years, with no recent chemical peel treatments, while exclusion criteria ruled out individuals with active infections, recent surgeries, pregnancy, or the use of oral retinoids.

Data Collection Procedure

The data collection for this cross-sectional study was conducted systematically to ensure accurate and reliable results. Participants were recruited from aesthetic clinics in Lahore based on the inclusion criteria, with their eligibility confirmed through a preliminary screening process. Written informed consent was obtained from each participant, ensuring their understanding of the study's purpose, procedures, and potential risks. Prior to undergoing the chemical peel procedures, participants completed a baseline

questionnaire capturing demographic data and health history. Clinicians conducted initial skin assessments to document the condition of the treatment areas. During the procedure, details such as the type of peel (light or deep), chemical agent used, duration of application, and patient tolerance were meticulously recorded.

Following the procedure, immediate effects such as redness or burning sensation were observed and documented. Participants were provided with tailored post-care instructions and informed about the expected timeline for results and potential side effects. Two follow-up appointments were scheduled—one at 48 hours and another at one week post-procedure. At these visits, participants reported any side effects and their perceived improvements, while clinicians assessed the treated areas for complications or unexpected outcomes. A final post-treatment questionnaire was administered during the second follow-up to evaluate satisfaction, perceived effectiveness, and any complications experienced.

All collected data, including questionnaire responses, clinician assessments, and procedural details, were entered into a secure database with unique identifiers for each participant to ensure confidentiality. The database was regularly reviewed for accuracy and completeness. This structured and ethical approach to data collection minimized bias, maintained participant safety, and ensured the reliability of the study findings.

Data Analysis

Data analysis was performed using SPSS version 27. Descriptive statistics summarized demographic and clinical characteristics, with continuous variables presented as means and standard deviations, and categorical variables as frequencies and percentages. Graphical representations, such as histograms and bar charts, were used for visualization.

Chi-square tests were applied to assess associations between chemical peel type and outcomes, while independent t-tests compared continuous variables, such as satisfaction scores, between groups. A significance level of $p < 0.05$ was used to determine statistical significance. The results highlighted the efficacy, safety, and patient satisfaction of light and deep chemical peels.

Result

summarizes the demographic characteristics of participants who underwent light and deep chemical peels. Most participants receiving light chemical peels were female (82.4%), whereas deep chemical peels had a higher percentage of males (82.4%). The average age for both groups was similar, with light chemical peel recipients having a mean age of 26.15 (SD = 5.022) and deep chemical peel recipients having a mean age of 25.03 (SD = 5.072). Regarding education, most participants had a bachelor's degree, with 38.2% for light chemical peels and 70.6% for deep chemical peels. The most common reasons for the procedure included improving skin texture and tone and minimizing age spots, sun damage, and hyperpigmentation. Most participants in both groups received one chemical peel session, with 50% for light and 79.4% for deep chemical peels.

Table 1. Demographic Characteristic among respondents

Variable	Category	Light Chemical Peels		Deep Chemical Peels	
		Frequency/Mean	%/SD	Frequency/Mean	%/SD
Gender	Female	28	82.4%	6	17.6%
	Male	6	17.6%	28	82.4%
Age		26.15	5.022	25.03	5.072
Educational Level	Primary	3	8.8%	2	5.9%
	Matric	11	32.4%	-	-
	Bachelors	13	38.2%	24	70.6%
	Masters	7	20.6%	8	23.5%
Reason for Chemical Peel	To Improve Skin Texture and Tone	6	17.6%	10	29.4%
	To Reduce Fine Lines and Wrinkles	5	14.7%	7	20.6%

	To Treat Acne and Acne Scars	3	8.8%	-	-
	To Minimize Age Spots, Sun Damage, and Hyperpigmentation	6	17.6%	11	32.4%
	To Shrink Enlarged Pores	9	26.5%	1	2.9%
	To Refresh and Rejuvenate the Skin	5	14.7%	5	14.7%
Number of Chemical Peel Sessions	1	17	50.0%	27	79.4%
	2	9	26.5%	5	14.7%
	3	8	23.5%	2	5.9%

The comparison between light and deep chemical peels reveals notable differences in their effects on various skin conditions. Light chemical peels were more effective in promoting collagen production (94.1% vs. 55.9%), skin brightness (94.1% vs. 55.9%), and improvement in hyperpigmentation (94.1% vs. 29.4%). Additionally, they showed greater efficacy in minimizing pores (82.4% vs. 38.2%), addressing melasma (82.4% vs. 41.2%), and improving brown or liver spots (85.3% vs. 47.1%). On the other hand, deep chemical peels demonstrated slightly higher effectiveness in minimizing the appearance of scars (73.5% vs. 70.6%) and improving overall skin quality (52.9% vs. 67.6%). Both peels had comparable impacts on skin texture and tone improvement, with deep peels also showing a marginally greater reduction in acne (55.9% vs. 61.8%). These findings suggest light chemical peels may be more suitable for overall skin rejuvenation, while deep peels might benefit patients focusing on scar and acne improvements.

Table 2: Frequency/Percentages of Efficacy of Chemical Peels

Variable	Category	Light Chemical Peels		Deep Chemical Peels	
		Frequency	Percent	Frequency	Percent
Experienced Collagen Production	No	2	5.9%	15	44.1%
	Yes	32	94.1%	19	55.9%
Minimizing the Appearance of Scars	No	10	29.4%	9	26.5%
	Yes	24	70.6%	25	73.5%
Overall Experience of Skin Quality	No	11	32.4%	16	47.1%
	Yes	23	67.6%	18	52.9%
Feel Brightness in Your Skin	No	2	5.9%	15	44.1%
	Yes	32	94.1%	19	55.9%
Improvement in Acne	No	13	38.2%	19	55.9%
	Yes	21	61.8%	15	44.1%
Improvement in Skin Texture and Tone	No	10	29.4%	17	50.0%
	Yes	24	70.6%	17	50.0%
Improvement in Melasma	No	6	17.6%	20	58.8%
	Yes	28	82.4%	14	41.2%
Improvement in Hyperpigmentation	No	2	5.9%	24	70.6%
	Yes	32	94.1%	10	29.4%
Minimizing Appearance of Pores	No	6	17.6%	21	61.8%
	Yes	28	82.4%	13	38.2%
Improvement in Brown/Liver Spots	No	5	14.7%	18	52.9%
	Yes	29	85.3%	16	47.1%

The comparison of side effects between light and deep chemical peels highlights significant differences in their safety profiles. Deep chemical peels had a higher frequency of adverse effects, with redness reported by 82.4% of patients compared to 61.8% for light peels. Infection rates were markedly higher for deep peels (70.6% vs. 8.8%), along with burning sensations (76.5% vs. 32.4%), lacerations (55.9% vs. 14.7%), and swelling (52.9% vs. 17.6%). Allergic reactions were also more common with deep peels (47.1% vs. 8.8%), as were acne (70.6% vs. 17.6%), blisters (100% vs. 20.6%), sensitivity to light (52.9% vs. 11.8%), and hyperpigmentation (61.8% vs. 26.5%). While both procedures carry risks, deep chemical peels are associated with significantly higher rates of complications, suggesting the need for careful patient selection and post-procedure care for this more intensive treatment.

Table 3: Frequency and Percentages of Complications of Chemical Peels

Variable	Category	Light Chemical Peels		Deep Chemical Peels	
		Frequency	Percent	Frequency	Percent
Redness after chemical peel	No	13	38.2%	6	17.6%
	Yes	21	61.8%	28	82.4%
Infection (viral, fungal, bacterial)	No	31	91.2%	10	29.4%
	Yes	3	8.8%	24	70.6%
Burning sensation after chemical peel	No	23	67.6%	8	23.5%
	Yes	11	32.4%	26	76.5%
Laceration after a chemical peel	No	29	85.3%	15	44.1%
	Yes	5	14.7%	19	55.9%
Swelling after a chemical peel	No	28	82.4%	16	47.1%
	Yes	6	17.6%	18	52.9%
Allergic reaction after chemical peel	No	31	91.2%	18	52.9%
	Yes	3	8.8%	16	47.1%
Acne after chemical peel	No	28	82.4%	10	29.4%
	Yes	6	17.6%	24	70.6%
Blisters after a chemical peel	No	27	79.4%	0	0%
	Yes	7	20.6%	34	100.0%
Sensitivity to light	No	30	88.2%	16	47.1%
	Yes	4	11.8%	18	52.9%
Hyperpigmentation after chemical peel	No	25	73.5%	13	38.2%
	Yes	9	26.5%	21	61.8%

The comparison of efficacy and complications between light and deep chemical peels reveals notable differences. Light chemical peels showed a high improvement rate in efficacy for 91.2% of patients, while only 17.6% of patients undergoing deep chemical peels experienced similar outcomes. Conversely, 64.7% of patients receiving deep chemical peels reported moderate improvement, compared to only 8.8% for light peels. Regarding complications, mild complications predominated in light chemical peels (91.2%), whereas severe complications were significantly higher in deep chemical peels (61.8%). These findings suggest that while light chemical peels are associated with fewer complications and higher efficacy, deep chemical peels carry increased risks and moderate improvement rates.

Table 4: Total Scores of Efficacies and Complications of Chemical Peel

Variable	Category	Light Chemical Peels		Deep Chemical Peels	
		Frequency	Percent	Frequency	Percent
Efficacy	Moderate Improvement	3	8.8%	22	64.7%
	High Improvement	31	91.2%	6	17.6%
	Low Improvement	0	0%	6	17.6%
Complicati	Mild Complication	31	91.2%	1	2.9%

on	Moderate Improvement	3	8.8%	12	35.3%
	Severe Complication	0	0%	21	61.8%

The analysis of efficacy and complications by gender highlights significant differences. In terms of efficacy, females demonstrated a higher proportion of high improvement (82.4%) compared to males (26.5%), while males more frequently reported moderate improvement (61.8%) and low improvement (11.8%). The differences were statistically significant ($p < 0.001$). Regarding complications, mild complications were predominant in females (79.4%), whereas males experienced a higher rate of severe complications (50%) and moderate complications (35.3%). These findings emphasize the varying gender responses to chemical peels, with females showing better efficacy outcomes and fewer severe complications than males.

Table 5 : Crosstabulation of Gender with Total Efficacy and Complications

Efficacy	**Gender**	**Low Improvement**	**Moderate Improvement**	**High Improvement**	**Total**	**p-value**
	Female	2	4	28	34	p < 0.001
	Male	4	21	9	34	
	Total	**6**	**25**	**37**	**68**	
Complication	**Gender**	**Mild Complication**	**Moderate Complication**	**Severe Complication**	**Total**	**p-value**
	Female	27	3	4	34	p < 0.001
	Male	5	12	17	34	
	Total	**32**	**15**	**21**	**68**	

Discussion

In this study, for light chemical peeling, 82.4% were females, while for deep chemical peeling, 82.4% were males. This contradicts other studies like Gerasymch et al. (2023), who found that women stood at 70-90% of the population in light and deep peel products. Such a change may point to an increasing male propensity for more aggressive forms of beautification, such as deep facial peel.(11) The present study found that participants were about 25 years old, younger than in Calvisi et al. (2021), 60-75% of those who needed chemical peels, and were 31 or older. This was a clear indication that young people are increasingly adopting such treatments, which might be because of awareness and social media usage.(13)

Responding to the educational level, 70.6% of deep peel recipients in this study had a bachelor's degree, which is in correlation with the study done by Glaser et al. (2020), where the educational level of 65-85% of the participants who had received cosmetic treatments was high. Nevertheless, one difference is in the purpose of performing the chemical peels.(14-16) In the present study, the desire for better skin texture and to treat hyperpigmentation was seen in both light peel and deep peel groups (light peels: 17.6%, deep peels: 32.4%). Compared to this study, Gorby et al. (2019) reported that 60-80% of participants mainly intended to undertake chemical peels for rejuvenation purposes, including fine-line erasure, which was secondary in this study.(35) Additionally, the current study found that the majority of the participants (50% of the light peels and 79.4% of the deep peels) only attended the peel session once, yet prior research, like Trujillo et al. (2021), noted that 55-70 % of the participants attended multiple sessions for improved outcomes. These findings indicate the shift in consumer stereotypes and beauty procedures in aesthetics.(14)

In the light chemical peels, 94.1% of the participants who reported a positive change in the actualization of collagen production was also consistent with arguments made by Torbeck et al., 2023 that light chemical peels prompt a considerable degree of collagen synthesis and skin renewal. This is also in agreement with a high percentage of participants who confirmed enhanced skin brightness (94.1%) and reduced hyperpigmentation (94.1%), suggesting that light peels are more effective in improving skin texture and tone quality, in line with other findings. (14) Despite that, deep chemical peels were depicted to be slightly effective in minimizing the scar appearance, with only 73.5% of the participants having improvements. This corresponds with the idea that deep peels are more effective because they are more invasive than other peeling types. Therefore, they are better for addressing several skin problems, such as scars (Miao et al., 2024) (15)

In this study, the complications of chemical peels were established to show the different effects of both light and deep chemical peels. More patients suffered redness after treatment in the deep chemical peel group (82.4%) than in the light peel group (61.8%). The result served the fact in the literature that deep peels induce longer and more obvious erythema because of the toughness of the procedure (Goodarzian et al., 2023). This increased redness could be due to the exfoliation of deeper layers in the skin, reaching the dermis layers.(1) Similarly to the above observations, burning sensations after the procedure were higher in deep peel cases, 76.5%, compared to light peel cases, 32.4% for the same time frame post-peel (Kubiak et al., 2020). In addition, the report of lacerations was higher in patients with deep peels (55.9%) than in patients with light peels (14.7%). This was similar to the understanding that deep chemical peels were more risky as they act deeper on the skin due to enhanced physical damage to the skin (Jiang et al., 2024).

Regarding infection, there was a clear difference between the two groups; deep peel patients experienced a higher average infection rate (70.6%) in contrast with the light (8.8%). In previous works, this fact reveals the probability of infection as a side effect of more intensive therapy (Lee et al., 2019). However, issues like the formation of blisters and acne were only present in deep chemical peels, with the two complications respectively being 100% and 70.6%, which supports the fact that deep chemical peels are more risky. (19-22) Nonetheless, light chemical peels had comparatively fewer side effects, with fewer patients complaining of swelling at 17.6%, allergic reactions at 8.8%, and sensitivity to light at 11.8%. Based on these findings, light chemical peels can be claimed to be safer with fewer side effects, as has been pointed out in the literature, which often argues for lighter peels for sensitive skin types or complicated skin structures (23).

Conclusion

In Conclusion, light chemical peels were found to be more effective for enhancing skin texture and tone compared to deep chemical peels, while the latter were more successful in addressing deeper skin concerns like scarring. A gender-based trend emerged, with females reporting more significant improvements in skin quality, particularly in areas like skin brightness and hyperpigmentation, following light peels. However, they also experienced higher rates of complications such as redness and burning. This highlights the need for a tailored treatment approach that considers both the patient's skin condition and gender to optimize results and minimize adverse effects

REFERENCES

Goodarzian XG. Chemical Peels in Clinical Practice: A Practical Guide to Superficial, Medium, and Deep Peels: CRC Press; 2023.

Patole SP, Naikawadi ND, Redasani V. Revitalize Your Skin: A Comprehensive Review of Chemical peel. Asian Journal of Pharmaceutical Research and Development. 2024;11(3):94-101.

McMullen RL, Dell'Acqua G. History of natural ingredients in cosmetics. Cosmetics. 2023;10(3):71.

Jiang X, Li X. Chemical peels for skin rejuvenation. Skin Photoaging (Second Edition): IOP Publishing Bristol, UK; 2024. p. 6-1-6-22.

Starkman SJ, Mangat D. Chemical Peel (Deep, Medium, Light). Update of Today's Facial Skin Rejuvenation Technology, An Issue of Facial Plastic Surgery Clinics of North America E-Book. 2019;28(1):45.

Houreld NN. The use of lasers and light sources in skin rejuvenation. Clinics in dermatology. 2019;37(4):358-64.

Samargandy S, Raggio BS. Skin Resurfacing Chemical Peels. 2019.

Sonthalia S. Medium-depth Peeling with Special Consideration to Ethnic Skin. Chemical Peels: A Global Perspective. 2019:108.

Samargandy S, Raggio BS. Chemical peels for skin resurfacing. StatPearls [Internet]: StatPearls Publishing; 2023.

Dewandre L, Tenenbaum A, Destang D. The Chemistry of Peels: A Hypothesis of Mechanism of Action and Classification of Peels. Procedures in Cosmetic Dermatology Series: Chemical Peels EBook. 2020:1.

Măgerusan SE, Hancu G, Mircia E. Considerations on the Use of Organic Substances in Chemical Peels: A Systematic Review. Acta Marisiensis-Seria Medica. 2020;66(2):50-5.

Mar K, Khalid B, Maazi M, Ahmed R, Wang OJ, Khosravi-Hafshejani T. Treatment of Post-Inflammatory Hyperpigmentation in Skin of Colour: A Systematic Review. Journal of Cutaneous Medicine and Surgery. 2024;28(5):473-80.

Mohiuddin AK. Skin lightening & management of hyperpigmentation. Pharma Sci Anal Res J. 2019;2:180020-68.

Tumsutti P, Rojhirunsakool S. Effects of Topical Corticosteroids, Topical Corticosteroids Under Occlusion, and Topical Brimonidine on the Prevention of Postinflammatory Hyperpigmentation After Q-Switched 532-nm Nd: YAG Laser Treatment of Solar Lentigines: Srinakharinwirot University; 2024.

Rizzi V, Gubitosa J, Fini P, Cosma P. Neurocosmetics in skincare—the fascinating world of skin–brain connection: a review to explore ingredients, commercial products for skin aging, and cosmetic regulation. Cosmetics. 2021;8(3):66.

Desai S, Given K, Lee M, Sadeghpour M, Alam M. Complications of Temporary Fillers. Procedures in Cosmetic Dermatology: Soft Tissue Augmentation. 2023:291.

Kołodziejczak A, Rotsztejn H. The assessment of the impact of carboxytherapy and selected chemical peels on cosmetic defects and signs of aging of the skin around the eyes. Journal of Cosmetic and Laser Therapy. 2024:1-9.

Almeman AA. Evaluating the efficacy and safety of alpha-hydroxy acids in dermatological practice: a comprehensive clinical and legal review. Clinical, Cosmetic, and Investigational Dermatology. 2024:1661-85.

Castillo DE, Keri JE. Chemical peels in the treatment of acne: patient selection and perspectives. Clinical, cosmetic, and investigational dermatology. 2018:365-72.

Calvisi L. Efficacy of a combined chemical peel and topical salicylic acid-based gel combination in treating active acne. Journal of Cosmetic Dermatology. 2021;20:2-6.

Atwa MA, Ahmed AH, Nada HA, Refaey SM, Jafferany M, Elsaie ML. Combined chemical peels versus trichloroacetic acid (TCA) for treating melasma: a split face study. Journal of Dermatological Treatment. 2022;33(2):959-64.

Bhardwaj V, Sharma K, Maksimovic S, Fan A, Adams-Woodford A, Mao J. Professional-grade TCA-lactic acid chemical peel: elucidating mode of action to treat photoaging and hyperpigmentation. Frontiers in medicine. 2021;8:617068.

Pathak A, Mohan R, Rohrich RJ. Chemical peels: role of chemical peels in facial rejuvenation today. Plastic and reconstructive surgery. 2020;145(1):58e-66e.