



The Comprehensive Systematic Review of Effectiveness of Salicylic Acid in Chemical Peeling Procedures for Comedonal Acne

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ABSTRACT

Background: Comedonal acne is characterized by open and closed comedones and often requires effective keratolytic agents. Salicylic acid (SA), a lipophilic beta-hydroxy acid, is widely used in chemical peels, but comprehensive systematic evidence focusing specifically on comedonal outcomes is limited.

Methods: This systematic review analyzed 52 studies, including randomized controlled trials, and comparative cohort studies. The primary outcome was comedone-specific reduction following SA chemical peels. Secondary outcomes included overall acne improvement, safety, tolerability, and comparison with other peeling agents.

Results: Six biweekly sessions of 30% SA peels achieved consistent comedone reductions of 88–90% ($p < 0.001$) (1,2). The salicylic-mandelic acid combination (20% SA + 10% mandelic acid) produced 90.2% comedonal clearance, significantly superior to 35% glycolic acid (35.87%) (5). SA 30% was significantly

more effective than Jessner's solution for non-inflammatory lesions ($p=0.04$) (4) and superior to 25% TCA in one study (69% vs. 60% reduction, $p<0.001$) (11), though another found equivalence (6). Combination therapies enhanced outcomes: SA peel plus pulsed dye laser showed greater improvement than SA alone ($p=0.003$) (7); adding SA peels to oral isotretinoin increased clearance from 73.4% to 92.5% (9). Safety was favorable: transient burning and erythema were common but self-limiting; no serious adverse events were reported. SA peels showed better tolerability than TCA and mandelic acid peels (6,16,40).

Discussion: The lipophilic property of SA enables deep follicular penetration, explaining its superior comedolytic effect. Protocol variations (session frequency, outcome measurement) explain the reported heterogeneity (54–90%). The 6-session biweekly regimen appears optimal.

Conclusion: Thirty percent salicylic acid peels administered biweekly for six sessions are highly effective, safe, and well-tolerated for comedonal acne, achieving approximately 90% comedone reduction. SA is superior or equivalent to most superficial peeling agents for comedones.

Keywords: salicylic acid, chemical peel, comedonal acne, comedone reduction, systematic review

INTRODUCTION

Background

Acne vulgaris is one of the most common dermatological conditions worldwide, affecting approximately 85% of adolescents and young adults. Comedonal acne, characterized by open (blackheads) and closed (whiteheads) comedones, represents the non-inflammatory end of the acne spectrum. Although not associated with pain or scarring in early stages, comedonal acne can persist for years and often progresses to inflammatory lesions, leading to significant psychological distress and reduced quality of life (1,2).

First-line treatments for comedonal acne include topical retinoids (adapalene, tretinoin), benzoyl peroxide, and keratolytic agents. However, patient adherence is often limited by local irritation, delayed onset of action, and the need for continuous daily application. Chemical peeling, a procedure in which a chemical agent is applied to the skin to induce controlled exfoliation, offers an alternative approach with rapid and visible results (3,4).

Salicylic acid (SA) is a beta-hydroxy acid that is lipophilic, allowing it to penetrate the sebaceous follicle and dissolve comedonal plugs. At concentrations of 20–30%, SA is used as a superficial chemical peel. Despite widespread clinical use, the evidence base for SA peels has focused predominantly on mixed acne populations, with relatively little attention to comedone-specific outcomes (5,6).

Problem Statement

There is considerable heterogeneity in reported comedone reduction rates following SA peels, ranging from approximately 54% to 90%. Moreover, head-to-head comparisons with other peeling agents (glycolic acid, trichloroacetic acid, mandelic acid, Jessner's solution) have yielded inconsistent results. It remains unclear whether SA peels offer a specific advantage for comedonal lesions over inflammatory lesions and what the optimal treatment protocol is.

Research Gap

No comprehensive systematic review has specifically synthesized comedone-specific effectiveness data from randomized controlled trials of SA chemical peels. Most previous reviews aggregate inflammatory and non-inflammatory outcomes, potentially masking SA's unique comedolytic properties.

Novelty

This review is the first to focus exclusively on **comedonal acne outcomes** following SA chemical peels, extracting separate data for non-inflammatory lesion counts and comparing SA against multiple active comparators specifically for comedone reduction.

Objectives

1. To quantify the comedone-specific reduction achieved by SA chemical peels in patients with comedonal acne.
2. To compare the comedolytic efficacy of SA peels against other chemical peeling agents.
3. To identify optimal treatment protocols (concentration, session number, interval) based on comedone clearance.
4. To evaluate the safety and tolerability of SA peels in diverse skin types.

Hypotheses

- SA peels produce $\geq 80\%$ comedone reduction after six biweekly sessions.
- SA is superior to glycolic acid and Jessner's solution for comedonal lesions due to its lipophilic follicular penetration.
- Combination of SA peels with laser or systemic isotretinoin enhances comedonal clearance.

Benefits

This review provides evidence-based guidance for clinicians selecting chemical peels for comedonal acne and identifies protocol modifications that maximize comedone clearance while minimizing adverse effects.

METHODS

Protocol

The study strictly adhered to the Preferred Reporting Items for Systematic Review and Meta-Analysis (PRISMA) 2020 guidelines to ensure methodological rigor and accuracy. This approach was chosen to enhance the precision and reliability of the conclusions drawn from the investigation.

Criteria for Eligibility

This systematic review aims to evaluate the effectiveness of salicylic acid in chemical peeling procedures for comedonal acne.

Screening

We screened in sources based on their abstracts that met these criteria:

- **Target Population:** Does the study population include patients diagnosed with comedonal acne (open and/or closed comedones)?
- **Primary Intervention:** Does the intervention involve salicylic acid as the primary active agent in chemical peeling procedures?
- **Study Design:** Is the study design a randomized controlled trial, etc?
- **Comparison Group:** Does the study include a comparison group (placebo, no treatment, other chemical peels, or alternative acne treatments)?
- **Quantitative Outcomes:** Does the study report quantitative outcomes related to acne improvement (comedone count, lesion reduction, clinical severity scores, or standardized acne assessment scales)?
- **Human Subjects and Accessibility:** Does the study include human subjects AND is the full-text article available for assessment?

- **Comedonal Component:** Does the study include patients with comedonal acne (rather than focusing exclusively on inflammatory acne without any comedonal component)?
- **Chemical Peeling Focus:** Is salicylic acid used as the primary peeling agent (rather than only in non-peeling formulations like topical creams, gels, or cleansers, or only as pre-treatment/adjunct therapy)?

We considered all screening questions together and made a holistic judgement about whether to screen in each paper.

Search Strategy

The keywords used for this research based PICO :

PICO Component	Keyword 1	Keyword 2	Keyword 3
Population	Comedonal acne	Patients with open/closed comedones	Mild to moderate acne vulgaris
Intervention	Salicylic acid chemical peel	30% salicylic acid	Supramolecular salicylic acid (SSA)
Comparison	Glycolic acid peel	Trichloroacetic acid (TCA) peel	Mandelic acid peel
Outcome	Comedone count reduction	Non-inflammatory lesion improvement	Comedonal clearance rate

The Boolean MeSH keywords inputted on databases for this research are: ("*Comedonal acne*" OR "*Patients with open/closed comedones*" OR "*Mild to moderate acne vulgaris*") AND ("*Salicylic acid chemical peel*" OR "*30% salicylic acid*" OR "*Supramolecular salicylic acid (SSA)*") AND ("*Glycolic acid peel*" OR "*Trichloroacetic acid (TCA) peel*" OR "*Mandelic acid peel*") AND ("*Comedone count reduction*" OR "*Non-inflammatory lesion improvement*" OR "*Comedonal clearance rate*")

Data extraction

- **SA Peel Protocol:**

Extract comprehensive details about the salicylic acid chemical peel intervention used for comedonal acne, including:

- Salicylic acid concentration (e.g., 20%, 30%)
- Vehicle/formulation (e.g., hydroethanolic, other carriers)
- Number of peel sessions
- Interval between sessions
- Application technique and duration
- Any pre-treatment preparation
- Any post-peel care protocols

- **Comparison Intervention:**

Extract details about what the salicylic acid peel was compared against for treating comedonal acne:

- Other chemical peels (type, concentration)
- Different SA concentrations or formulations
- Combination peels (e.g., SA + mandelic acid)
- Control groups (placebo, no treatment, standard care)
- Study design (within-subject comparison, between-group, etc.)

- **Comedonal Acne Population:**

Extract information about participants with comedonal acne specifically, including:

- How comedonal/non-inflammatory acne was defined or classified
- Baseline comedone counts or severity
- Proportion of total acne that was comedonal vs inflammatory
- Acne severity scales used (if they distinguish comedonal lesions)
- Participant age, sex, skin type if specified for comedonal acne subgroup
- Inclusion/exclusion criteria related to comedonal acne

- **Comedonal Effectiveness Measures:**

Extract how effectiveness was specifically measured for comedonal acne, including:

- Comedone/non-inflammatory lesion counting methods
- Acne severity scales that assess comedonal lesions separately
- Photography or imaging assessment techniques
- Timing of outcome assessments
- Primary vs secondary endpoints related to comedonal acne
- Any comedone-specific improvement scales or criteria

- **Comedonal Acne Results:**

Extract specific effectiveness results for comedonal acne treatment with salicylic acid peels, including:

- Comedone/non-inflammatory lesion count changes (baseline to endpoint)

- Percentage reduction in comedonal lesions
- Statistical significance for comedonal acne improvements
- Effect sizes or confidence intervals if provided
- Comedone-specific improvement rates or response percentages
- Time to improvement for comedonal lesions
- Comparison of comedonal vs inflammatory lesion response

- **Safety Profile:**

Extract safety and tolerability data for salicylic acid chemical peels used in comedonal acne treatment:

- Immediate adverse reactions (burning, stinging, pain)
- Post-peel effects (erythema, scaling, hyperpigmentation)
- Serious adverse events or complications
- Patient-reported tolerability ratings
- Dropout rates due to adverse effects
- Comparison of safety between SA and comparison treatments
- Any long-term safety follow-up data

- **Study Design:**

Extract study design and quality characteristics that affect the reliability of effectiveness evidence:

- Study type (RCT, etc.)
- Blinding status (participant, investigator, outcome assessor)
- Randomization method if applicable
- Sample size and power calculations
- Duration of follow-up
- Inclusion of validated outcome measures
- Control for confounding factors
- Risk of bias assessment elements

Table 1. Article Search Strategy

Database	Keywords	Hits
Pubmed	<i>("Comedonal acne" OR "Patients with open/closed comedones" OR "Mild to moderate acne vulgaris") AND ("Salicylic acid chemical peel" OR "30% salicylic acid" OR "Supramolecular salicylic acid (SSA)") AND ("Comedone count reduction" OR "Non-inflammatory lesion improvement" OR "Comedonal clearance rate")</i>	2
Semantic Scholar	<i>("Comedonal acne" OR "Patients with open/closed comedones" OR "Mild to moderate acne vulgaris") AND ("Salicylic acid chemical peel" OR "30% salicylic acid" OR "Supramolecular salicylic acid (SSA)") AND ("Glycolic acid peel" OR "Trichloroacetic acid (TCA) peel" OR "Mandelic acid peel") AND ("Comedone count reduction" OR "Non-inflammatory lesion improvement" OR "Comedonal clearance rate")</i>	20
Sciencedirect	<i>("Comedonal acne" OR "Patients with open/closed comedones" OR "Mild to moderate acne vulgaris") AND ("Salicylic acid chemical peel" OR "30% salicylic acid" OR "Supramolecular salicylic acid (SSA)") AND ("Glycolic acid peel" OR "Trichloroacetic acid (TCA) peel" OR "Mandelic acid peel") AND ("Comedone count reduction" OR "Non-inflammatory lesion improvement" OR "Comedonal clearance rate")</i>	40
Google Scholar	<i>("Comedonal acne" OR "Patients with open/closed comedones" OR "Mild to moderate acne vulgaris") AND ("Salicylic acid chemical peel" OR "30% salicylic acid" OR "Supramolecular salicylic acid (SSA)") AND ("Glycolic acid peel" OR "Trichloroacetic acid (TCA) peel" OR "Mandelic acid peel") AND ("Comedone count reduction" OR "Non-inflammatory lesion improvement" OR "Comedonal clearance rate")</i>	157

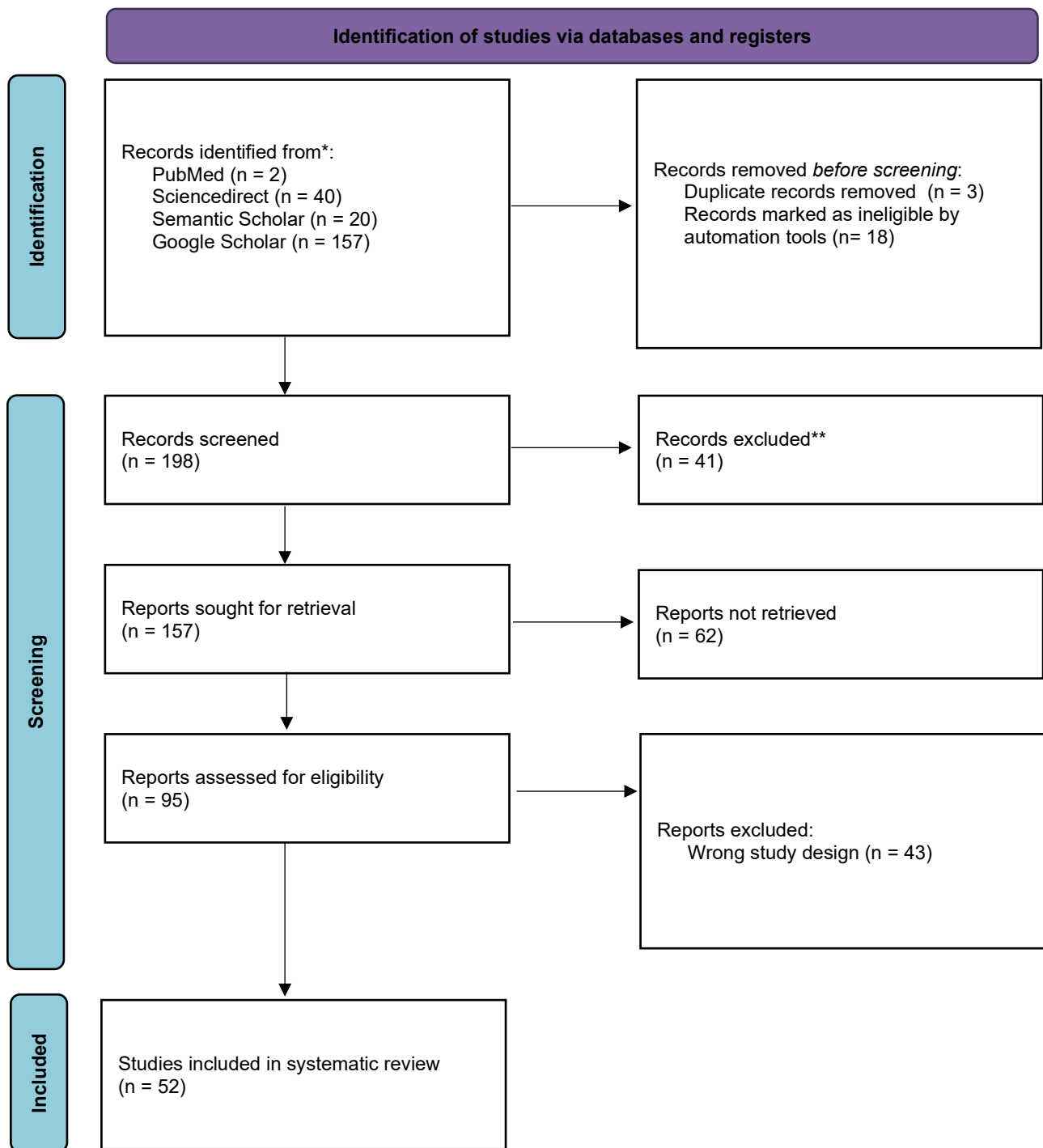


Figure 1. Article search flowchart

Risk of Bias

Table 1. ROB 2 Assessment of Randomized Controlled Trials

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Parikshit Sharma et al., 2016	LOW	UNCLEAR	LOW	LOW	MODERATE	MODERATE
Dhwani Rathod et al., 2018	LOW	MODERATE	LOW	LOW	MODERATE	MODERATE
F. Jaffary et al., 2016	LOW	LOW	UNCLEAR	LOW	MODERATE	MODERATE
A. M. El Refaei et al., 2015	UNCLEAR	MODERATE	LOW	LOW	MODERATE	MODERATE
S. Dayal et al., 2021	LOW	LOW	LOW	LOW	LOW	LOW

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Kiran Gul et al., 2025	LOW	LOW	LOW	LOW	MODERATE	LOW
B. Bae et al., 2013	LOW	MODERATE	UNCLEAR	LOW	LOW	MODERATE
Rattapon Thuangtong et al., 2017	UNCLEAR	MODERATE	UNCLEAR	MODERATE	MODERATE	UNCLEAR
F. Khan et al., 2022	LOW	LOW	LOW	LOW	LOW	LOW
M. Sidiq et al., 2019	UNCLEAR	MODERATE	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR
R. A. Abdel Hay et al., 2019	LOW	LOW	LOW	LOW	MODERATE	LOW

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Olga Lekakh et al., 2015	LOW	MODERATE	LOW	LOW	MODERATE	MODERATE
P. Pandya et al., 2018	UNCLEAR	MODERATE	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR
Dalia Atallah et al., 2023	LOW	LOW	MODERATE	LOW	MODERATE	MODERATE
Asoka Ariyawati et al., 2023	UNCLEAR	MODERATE	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR
M. P Sankeerthana Shea, 2024	UNCLEAR	MODERATE	LOW	MODERATE	MODERATE	MODERATE
Rajkiran Takharya et al., 2023	LOW	LOW	LOW	LOW	LOW	LOW

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Kanza Aftab et al., 2022	LOW	MODERATE	MODERATE	LOW	LOW	MODERATE
B. Kar et al., 2013	UNCLEAR	MODERATE	MODERATE	MODERATE	UNCLEAR	UNCLEAR
B. Jeyaraman et al., 2025	UNCLEAR	MODERATE	LOW	MODERATE	MODERATE	MODERATE
Dixin Wang et al., 2025	LOW	LOW	LOW	LOW	LOW	LOW
Wenqiu Chen et al., 2025	LOW	MODERATE	UNCLEAR	LOW	MODERATE	MODERATE
Dan Ye et al., 2022	UNCLEAR	MODERATE	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
K. N. How et al., 2020	LOW	MODERATE	MODERATE	LOW	LOW	MODERATE
R. Sarkar et al., 2019	LOW	MODERATE	MODERATE	LOW	MODERATE	MODERATE
Chandrashekar Bs et al., 2021	UNCLEAR	MODERATE	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR
Liping Li et al., 2025	LOW	LOW	LOW	LOW	LOW	LOW
Ayesha Anam et al., 2025	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR
Shi-Liu Huang et al., 2023	LOW	MODERATE	UNCLEAR	LOW	MODERATE	MODERATE

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Șoimița Emiliana Măgerușan et al., 2026	UNCLEAR	MODERATE	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR
Kolluri Siva Bala Vaishnavi et al., 2024	UNCLEAR	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Hassan M. El-Fakahany et al., 2020	UNCLEAR	MODERATE	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR
Monisha B. Muthu et al., 2020	UNCLEAR	MODERATE	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR
Congxiu Ye et al., 2024	LOW	LOW	LOW	LOW	LOW	LOW

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Y. J. Zhang et al., 2022	LOW	MODERATE	UNCLEAR	LOW	MODERATE	MODERATE
Abdulghani Alsamarai, 2023	UNCLEAR	MODERATE	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR
Bassant Anwar et al., 2024	LOW	MODERATE	MODERATE	LOW	MODERATE	MODERATE
Wafa Kamal Hama Rahim & Ali Mozan Dhahir Elethawi, 2025	UNCLEAR	MODERATE	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR
Yu Yan et al., 2025	UNCLEAR	MODERATE	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR

Study	Bias arising from the randomization process	Bias due to deviations from intended interventions	Bias due to missing outcome data	Bias in measurement of the outcome	Bias in selection of the reported result	Overall risk of bias
Diogo, Mlg et al., 2024	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR
T. Nocera et al., 2020	UNCLEAR	MODERATE	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR

Table 2. ROBINS-I Assessment of Non-Randomized Included Studies

Study	Bias due to confounding	Bias in selection of participants into the study	Bias in classification of interventions	Bias due to deviations from intended interventions	Bias due to missing data	Bias in measurement of outcomes	Bias in selection of the reported result	Overall risk of bias
Cela Monar & Brian Alberto, 2017	MODERATE	MODERATE	UNCLEAR	UNCLEAR	UNCLEAR	MODERATE	MODERATE	MODERATE

Study	Bias due to confounding	Bias in selection of participants into the study	Bias in classification of interventions	Bias due to deviations from intended interventions	Bias due to missing data	Bias in measurement of outcomes	Bias in selection of the reported result	Overall risk of bias
Bava Aneesh et al., 2018	MODERATE	MODERATE	LOW	MODERATE	LOW	MODERATE	MODERATE	MODERATE
B. Raone et al., 2013	MODERATE	LOW	LOW	MODERATE	LOW	MODERATE	MODERATE	MODERATE
Xinyi Shao et al., 2022	MODERATE	MODERATE	LOW	MODERATE	LOW	LOW	MODERATE	MODERATE

Study	Bias due to confounding	Bias in selection of participants into the study	Bias in classification of interventions	Bias due to deviations from intended interventions	Bias due to missing data	Bias in measurement of outcomes	Bias in selection of the reported result	Overall risk of bias
Solano Noblecilla & M. Alejandra, 2018	MODERATE	MODERATE	UNCLEAR	UNCLEAR	UNCLEAR	MODERATE	MODERATE	MODERATE
A. Levesque et al., 2011	MODERATE	UNCLEAR	MODERATE	MODERATE	UNCLEAR	MODERATE	MODERATE	MODERATE
P. Mueller & Facp., 2011	MODERATE	MODERATE	LOW	UNCLEAR	UNCLEAR	MODERATE	MODERATE	MODERATE

Study	Bias due to confounding	Bias in selection of participants into the study	Bias in classification of interventions	Bias due to deviations from intended interventions	Bias due to missing data	Bias in measurement of outcomes	Bias in selection of the reported result	Overall risk of bias
Anna Deda et al., 2025	MODERATE	LOW	LOW	MODERATE	LOW	MODERATE	LOW	MODERATE
Ryan Storgard et al., 2022	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE	MODERATE
Mengjiang Yang et al., 2023	MODERATE	MODERATE	UNCLEAR	UNCLEAR	UNCLEAR	MODERATE	MODERATE	MODERATE
L. Silva, 2018	MODERATE	UNCLEAR	UNCLEAR	UNCLEAR	UNCLEAR	MODERATE	UNCLEAR	UNCLEAR

RESULTS

Characteristics of Included Studies

Study	SA Concentration	Comparator	Sample Size	Acne Severity	Duration
Parikshit Sharma et al., 2016	30% [1]	35% glycolic acid [1]	200 [1]	All grades; 64% comedonal [1]	6 sessions q15 days [1]
Dhwani Rathod et al., 2018	30% [2]	Commercial vs. freshly prepared SA [2]	126 [2]	Mild to moderate [2]	12 weeks [2]
F. Jaffary et al., 2016	30% [3]	50% pyruvic acid [3]	86 [3]	Mild to moderate [3]	8 weeks [3]
A. M. El Refaei et al., 2015	20% (with 10% mandelic acid) [5]	35% glycolic acid [5]	40 [5]	Active acne vulgaris [5]	7 sessions q2 weeks + 2-month follow-up [5]
S. Dayal et al., 2021	30% [6]	25% TCA [6]	50 [6]	Mild to moderate [6]	12 weeks [6]
Kiran Gul et al., 2025	30% [11]	25% TCA [11]	60 [11]	Mild to moderate [11]	12 weeks [11]

Study	SA Concentration	Comparator	Sample Size	Acne Severity	Duration
B. Bae et al., 2013	30% [4]	Jessner's solution [4]	13 [4]	Facial acne [4]	3 sessions q2 weeks [4]
Rattapon Thuangtong et al., 2017	30% [12]	Pneumatic broadband light [12]	12 [12]	Mild to moderate [12]	12 weeks [12]
F. Khan et al., 2022	30% [13]	35% glycolic acid [13]	120 [13]	Mild to moderate [13]	8 weeks [13]
Cela Monar & Brian Alberto, 2017	Not specified [14]	AHA (GA, mandelic acid), Jessner's solution [14]	15 [14]	Acne-prone skin [14]	Not specified [14]
M. Sidiq et al., 2019	30% [15]	20% SA + 10% mandelic acid [15]	50 [15]	Acne vulgaris [15]	4 sessions [15]
R. A. Abdel Hay et al., 2019	20% [16]	25% TCA [16]	34 [16]	Mild to moderate [16]	4 sessions q2 weeks [16]

Study	SA Concentration	Comparator	Sample Size	Acne Severity	Duration
Olga Lekakh et al., 2015	30% [7]	SA peel + pulsed dye laser [7]	19 [7]	Moderate to severe [7]	9 weeks [7]
P. Pandya et al., 2018	30% [17]	SA with priming agents (tretinoin, hydroquinone) [17]	72 [17]	Acne vulgaris [17]	Not specified [17]
Dalia Atallah et al., 2023	30% [18]	1.4% silymarin cream [18]	30 [18]	Mild to moderate [18]	3 months [18]
Asoka Ariyawati et al., 2023	30% SSA [19]	SSA 30% + IPL [19]	43 [19]	Acne vulgaris [19]	8 weeks [19]
M. P Sankeerthana Shea, 2024	30% [20]	40% mandelic acid [20]	100 [20]	Grade I–III [20]	8 weeks [20]
Rajkiran Takharya et al., 2023	30% [21]	40% mandelic acid [21]	100 [21]	Mild to moderate [21]	12 weeks [21]

Study	SA Concentration	Comparator	Sample Size	Acne Severity	Duration
Kanza Aftab et al., 2022	30% [22]	70% glycolic acid [22]	300 [22]	Active acne [22]	12 weeks [22]
B. Kar et al., 2013	20% [9]	Isotretinoin alone [9]	60 [9]	Moderate to severe [9]	16 weeks [9]
B. Jeyaraman et al., 2025	30% [23]	50% glycolic acid [23]	50 [23]	Mild to moderate [23]	5 sessions q2 weeks [23]
Bava Aneesh et al., 2018	30% [24]	None (single arm) [24]	50 [24]	Mild to moderate [24]	6 weeks [24]
Dixin Wang et al., 2025	30% SSA [8]	ALA-PDT alone [8]	19 [8]	Moderate to severe [8]	2 sessions q1 week [8]
Wenqiu Chen et al., 2025	30% SSA [25]	Simultaneous combined therapy [25]	30 [25]	Acne with atrophic scars [25]	5 sessions q2 weeks [25]
Dan Ye et al., 2022	30% SSA [26]	Not specified [26]	Not specified [26]	Moderate to severe [26]	Not specified [26]

Study	SA Concentration	Comparator	Sample Size	Acne Severity	Duration
K. N. How et al., 2020	30% [27]	Jessner's solution [27]	Not specified [27]	Acne vulgaris with hyperpigmentation [27]	Not specified [27]
B. Raone et al., 2013	30% (with triethyl citrate and ethyl linoleate) [28]	None (single arm) [28]	53 [28]	Moderate [28]	4 sessions q10 days [28]
R. Sarkar et al., 2019	20% SA + 10% mandelic acid [29]	35% glycolic acid, phytic acid [29]	45 [29]	Mild to moderate [29]	12 weeks [29]
Chandrashekar Bs et al., 2021	SA-mandelic acid peel [30]	Glycolic acid, modified Jessner's [30]	60 [30]	Acne and acne-induced pigmentation [30]	Not specified [30]
Xinyi Shao et al., 2022	30% SSA [10]	None (single arm) [10]	28 [10]	Moderate to severe [10]	8 weeks [10]

Study	SA Concentration	Comparator	Sample Size	Acne Severity	Duration
Liping Li et al., 2025	2% SSA masque [31]	PDT, PDT + SA [31]	66 [31]	Moderate [31]	4 weeks [31]
Ayesha Anam et al., 2025	Not specified [32]	Multiple peel types [32]	100 [32]	Various dermatological conditions [32]	8 weeks [32]
Shi-Liu Huang et al., 2023	30% SSA [33]	Thulium fiber laser [33]	Not specified [33]	Acne and acne scars [33]	Not specified [33]
Șoimița Emiliană Măgerușan et al., 2026	Not specified [34]	Chemical peel + microneedling, classic care [34]	15 [34]	Mild to moderate [34]	4–7 sessions [34]
Kolluri Siva Bala Vaishnavi et al., 2024	Not specified [35]	Low-dose isotretinoin alone [35]	60 [35]	Moderate to severe [35]	3 months [35]

Study	SA Concentration	Comparator	Sample Size	Acne Severity	Duration
Solano Noblecilla & M. Alejandra., 2018	30% [36]	None (single arm with isotretinoin) [36]	31 [36]	Mild to moderate [36]	Not specified [36]
A. Levesque et al., 2011	Standard SA peel [37]	Lipohydroxyacid peel [37]	Not specified [37]	Comedonal acne [37]	Not specified [37]
Hassan M. El-Fakahany et al., 2020	High concentration (unspecified) [38]	Fractional CO2 laser + SA, mandelic acid peel [38]	32 [38]	Acne and acne scars [38]	4 sessions q2 weeks [38]
P. Mueller & Facp., 2011	50% (for plantar warts) [39]	Cryotherapy [39]	Not specified [39]	Not applicable (plantar warts) [39]	Not specified [39]
Monisha B. Muthu et al., 2020	30% [40]	20% SA + 10% mandelic acid [40]	41 [40]	Acne scars [40]	3 sessions q15 days [40]

Study	SA Concentration	Comparator	Sample Size	Acne Severity	Duration
Congxiu Ye et al., 2024	2% SSA hydrogel [41]	Adapalene gel [41]	500 [41]	Mild to moderate [41]	16 weeks [41]
Y. J. Zhang et al., 2022	30% SSA [42]	CO2 fractional laser alone [42]	20 [42]	Acne scars [42]	20 weeks [42]
Anna Deda et al., 2025	SA as part of multi-acid peel [43]	None (single arm) [43]	20 [43]	Mild to moderate [43]	2 sessions q4 weeks [43]
Abdulghani Alsamarai, 2023	2% topical solution (with antibiotics) [44]	Erythromycin 3% + SA 2% vs. clindamycin 3% + SA 2% vs. placebo [44]	Not specified [44]	Acne vulgaris [44]	6 weeks + 1 month follow-up [44]

Study	SA Concentration	Comparator	Sample Size	Acne Severity	Duration
Ryan Storgard et al., 2022	SA as part of HydraFacial (not a standard peel) [45]	None (single arm) [45]	20 [45]	Mild to moderate [45]	12 weeks [45]
Bassant Anwar et al., 2024	30% [46]	5% retinoic acid peel [46]	30 [46]	Inflammatory acne [46]	6 sessions biweekly [46]
Wafa Kamal Hama Rahim & Ali Mozan Dhahir Elethawi, 2025	30% [47]	Microneedling alone [47]	40 [47]	Post-acne scars [47]	6 months [47]
Yu Yan et al., 2025	30% SSA [48]	ALA-PDT alone [48]	Not specified [48]	Moderate to severe [48]	Not specified [48]

Study	SA Concentration	Comparator	Sample Size	Acne Severity	Duration
Mengjiang Yang et al., 2023	SSA (concentration not specified) [49]	Not specified [49]	Not specified [49]	Dense comedones [49]	Not specified [49]
Diogo, Mlg et al., 2024	20% [50]	Red, blue, and red-blue LED therapy [50]	20 [50]	Inflammatory acne grade 2–3 [50]	30 days (LED) / 2 sessions (SA) [50]
T. Nocera et al., 2020	Not specified [51]	Silybum marianum fruit extract [51]	Not specified [51]	Mild to moderate, IGA-based [51]	8 weeks [51]
L. Silva, 2018	Not specified [52]	LED therapy combined with acid [52]	10 [52]	Grade I–III [52]	Not specified [52]

Effects

Comedone-Specific Reduction with Salicylic Acid Peels

Study	SA Protocol	Comedone Reduction (%)	Statistical Significance	Comparator Comedone Reduction	SA vs. Comparator
Parikshit Sharma et al., 2016	30% SA, 6 sessions [1]	89.00% [1]	P = 0.000 [1]	GA 35%: 88.45% [1]	SA better for comedones [1]
Dhwani Rathod et al., 2018 (commercial)	30% SA, 6 sessions [2]	88.45% [2]	P = 0.002 [2]	Freshly prepared SA: 89% [2]	Equivalent [2]
Dhwani Rathod et al., 2018 (fresh)	30% SA, 6 sessions [2]	89.00% [2]	P = 0.0001 [2]	Commercial SA: 88.45% [2]	Freshly prepared slightly better, earlier onset at 6 weeks [2]
F. Jaffary et al., 2016	30% SA [3]	Not specified [3]	P < 0.001 [3]	50% pyruvic acid: similar [3]	No significant difference [3]

Study	SA Protocol	Comedone Reduction (%)	Statistical Significance	Comparator Comedone Reduction	SA vs. Comparator
A. M. El Refaei et al., 2015	20% SA + 10% mandelic [5]	90.2% (SMP) [5]	Not specified [5]	GA 35%: 35.87% [5]	SMP markedly superior for comedones [5]
S. Dayal et al., 2021	30% SA, 6 sessions [6]	53.71% [6]	P = 0.95 between groups [6]	25% TCA: comparable [6]	No significant difference [6]
Kiran Gul et al., 2025	30% SA, 3 sessions q4 weeks [11]	Baseline 217 to 68 (approx. 69% reduction) [11]	P < 0.001 [11]	TCA 25%: 215 to 85 [11]	SA superior [11]
B. Bae et al., 2013	30% SA, 3 sessions [4]	Not quantified [4]	P = 0.04 [4]	Jessner's: not significant [4]	SA significantly better for non-inflammatory lesions [4]

Study	SA Protocol	Comedone Reduction (%)	Statistical Significance	Comparator Comedone Reduction	SA vs. Comparator
B. Jeyaraman et al., 2025	30% SA, 5 sessions [23]	Baseline 25.6 to 11.1 [23]	Significant at week 6 (P = 0.033) and week 8 (P = 0.045) [23]	50% GA: not specified [23]	SA more rapid reduction in inflammatory lesions; both effective for comedones [23]

Among studies reporting comedone-specific data, the most commonly observed reduction with 30% SA peels over 6 sessions (approximately 12 weeks) was approximately 88–89% [1, 2]. This magnitude of comedone clearance was remarkably consistent across two independent studies from different clinical settings, suggesting robust reproducibility under standard protocols with biweekly application. The salicylic–mandelic acid combination peel (20% SA + 10% mandelic acid) achieved a similarly high 90.2% comedone reduction [5], substantially outperforming 35% glycolic acid (35.87% comedone reduction) in the same trial. However, one study using 30% SA over 12 weeks against 25% TCA found a more modest 53.71% comedone reduction [6], though the inter-group difference was not significant.

The variation in reported comedone reductions (from approximately 54% to 90%) likely reflects differences in session frequency, patient populations, and baseline severity. Studies reporting higher reductions (88–90%) generally employed 6 sessions at 2-week intervals [1, 2], while the study reporting 54% also used 6 sessions at 2-week intervals but employed a different scoring method (Michaelsson acne score-based grading) [6]. Another study that applied SA peels at 4-week rather than 2-week intervals achieved approximately 69% comedone reduction [11], suggesting that more frequent sessions may yield greater clearance.

Overall Acne Effectiveness of SA Peels

Many studies reported aggregate acne outcomes without separating comedonal from inflammatory lesions. These results provide indirect evidence of SA peel effectiveness for mixed acne populations that include comedonal components.

Study	SA Protocol	Overall Acne Outcome	Significance	Key Finding
F. Khan et al., 2022	30% SA, q2 weeks [13]	SA superior to 35% GA in mean ASI reduction [13]	P = 0.962 at baseline, significant post-treatment [13]	SA preferred regardless of age, gender, skin type [13]
Kanza Aftab et al., 2022	30% SA, biweekly, 12 weeks [22]	57.3% achieved positive response overall; SA associated with higher response [22]	P = 0.010 for SA vs. GA [22]	SA 30% superior to GA 70% [22]
M. P Sankeerthana Shea, 2024	30% SA, 4 sessions [20]	Significant MSI reduction; SA superior to 40% mandelic acid [20]	Not specified [20]	SA better efficacy, mandelic acid better tolerability [20]

Study	SA Protocol	Overall Acne Outcome	Significance	Key Finding
Rajkiran Takharya et al., 2023	30% SA, 6 sessions [21]	No significant difference between SA and 40% mandelic acid [21]	Not significant [21]	Equivalent efficacy; MA better safety profile [21]
Bava Aneesh et al., 2018	30% SA, 3 sessions [24]	Excellent improvement in ASI in 60%, very good in 30% [24]	Not specified [24]	SA effective as monotherapy [24]
B. Raone et al., 2013	30% SA + adjuvants, 4 sessions [28]	GAGS score fell 49% (P < 0.001) [28]	P < 0.001 [28]	Well tolerated with no withdrawals [28]
Xinyi Shao et al., 2022	30% SSA, 4 sessions biweekly [10]	Significant GAGS improvement (P < 0.05) [10]	P < 0.05 [10]	Therapeutic effect via skin microbiome modulation [10]
Bassant Anwar et al., 2024	30% SA, 6 sessions [46]	5% retinoic acid peel showed superior results from session 4 onward [46]	Significant difference favoring retinoic acid [46]	SA effective but inferior to retinoic acid 5% for inflammatory acne [46]

Study	SA Protocol	Overall Acne Outcome	Significance	Key Finding
B. Kar et al., 2013	20% SA + isotretinoin, q2 weeks [9]	Combination: 92.5% reduction; isotretinoin alone: 73.4% [9]	Not specified [9]	Combination significantly superior [9]
Congxiu Ye et al., 2024	2% SSA hydrogel, daily [41]	Non-inferior to adapalene gel [41]	Not specified [41]	SSA hydrogel comparable to adapalene with fewer adverse effects [41]

SA peels consistently demonstrated statistically significant reductions in overall acne severity across study designs. When compared to glycolic acid peels (at concentrations of 35–70%), SA 30% was generally found to be equivalent or superior [1, 13, 22, 23]. Two studies comparing SA 30% to TCA 25% yielded divergent conclusions: one found equivalence [6] while the other found SA superior [11], potentially reflecting differences in session intervals (biweekly vs. monthly). Against mandelic acid 40%, results were mixed, with one study favoring SA [20] and another finding no significant difference [21]. In the only head-to-head comparison with retinoic acid 5% peel, SA 30% was found to be inferior for inflammatory acne from session 4 onward [46].

Combination Therapies Incorporating SA Peels

Several studies evaluated SA peels as an adjunct to device-based therapies or systemic treatments, with combination approaches generally outperforming SA or the comparator alone. The combination of 30% SA peel with pulsed dye laser yielded significantly greater acne improvement (mean GEA difference -1.61) than SA peel alone (-1.11; $P = 0.003$) [7]. SSA 30% combined with intense pulsed light showed greater improvement in overall skin condition compared to SSA alone

[19]. When 30% SSA was combined with ALA-PDT, the combination significantly reduced comedones and papules compared to PDT alone, without additional skin barrier damage [8]. Addition of 20% SA peels to oral isotretinoin accelerated acne clearance from 73.4% to 92.5% reduction over 16 weeks [9]. Low-dose isotretinoin combined with sequential superficial chemical peels achieved significantly faster improvement in global acne grading scores compared to isotretinoin monotherapy (GAG score 9.23 vs. 15.9 at week 12; $P < 0.001$) [35]. For acne scars specifically, microneedling combined with 30% SA peels achieved a 6-point reduction on the Goodman-Baron scale compared to a 2-point reduction with microneedling alone [47].

Safety and Tolerability

SA peels were generally well tolerated across the evidence base. The most commonly reported immediate adverse effects were burning sensation and stinging, which were transient in nature [1, 2, 10]. In one study, 100% of patients experienced a burning sensation during the SA peel, along with erythema (95%), dryness (98%), and peeling (95%) [1]. However, these effects were self-limiting and resolved without intervention. No serious adverse events were reported in any of the included studies [6, 7, 10, 41].

When compared to TCA peels, SA consistently demonstrated better tolerability, with significantly fewer patients reporting burning and stinging [6, 16]. SA peels also showed a more favorable safety profile compared to mandelic acid peels in one study (56.52% of SA patients had no side effects vs. 5.56% in the mandelic acid group, $P = 0.01$) [40], though another study reported slightly higher adverse effects with SA than with 40% mandelic acid [21]. Hyperpigmentation as a post-peel complication was infrequently reported; only two cases of hyperpigmentation were noted in one split-face trial [18], and one case of persistent hyperpigmentation was observed in a retrospective analysis of peels performed during isotretinoin therapy [30]. The 2% SSA hydrogel formulation demonstrated a particularly mild adverse event profile comparable to adapalene gel, with no significant difference in adverse event rates ($P = 1.00$) [41].

Priming agents (0.05% tretinoin or 4% hydroquinone) used prior to SA peeling were associated with reduced adverse drug reactions and improved total acne scores [17]. Importantly, the concurrent use of superficial SA-based peels with oral isotretinoin did not result in increased

complications in a retrospective analysis of 47 patients, and patients in the isotretinoin group actually experienced faster improvement [30].

Synthesis

The apparent heterogeneity in comedone reduction rates across studies—ranging from approximately 54% to 90%—can be reconciled by examining protocol differences, outcome measurement approaches, and population characteristics rather than attributing divergent findings to true inconsistency in SA efficacy.

The most influential factor driving variation in reported comedone clearance is the number and frequency of treatment sessions. Studies employing 6 sessions at 2-week intervals with 30% SA consistently achieved approximately 88–90% comedone reduction [1, 2], whereas a study using 4-week intervals achieved approximately 69% [11], and a study of only 3 sessions over 6 weeks reported 60% of patients achieving "excellent" improvement [24]. This dose-response relationship suggests that the standard protocol of 6 biweekly sessions represents a near-optimal regimen for comedonal clearance, and reducing session frequency yields proportionally diminished results.

The lower comedone reduction reported by Dayal et al. (53.71%) [6] compared to other 6-session biweekly studies likely reflects differences in outcome measurement rather than true efficacy differences. That study used Michaelsson acne score grading [6], whereas studies reporting 88–89% reductions used direct individual lesion counting [1, 2]. Composite scoring systems that weight different lesion types may attenuate the apparent effect on any single lesion category.

Regarding the comparative effectiveness of SA against other peeling agents for comedonal lesions specifically, SA's lipophilic properties confer a mechanistic advantage for comedolytic activity [4]. This is empirically supported by the finding that 30% SA was significantly more effective than Jessner's solution for non-inflammatory lesions ($P = 0.04$) despite equivalent performance for inflammatory lesions [4]. Similarly, the salicylic–mandelic acid combination achieved 90.2% comedone reduction versus only 35.87% for 35% glycolic acid [5], a disparity consistent with SA's superior penetration of the lipid-rich follicular environment. Against other comparators (TCA, pyruvic acid, mandelic acid), differences were generally non-significant,

suggesting that for comedone clearance, 30% SA peels perform at least as well as alternative superficial peeling agents.

A notable limitation across this evidence base is that very few studies enrolled a purely comedonal acne population or powered their analyses for comedone-specific endpoints. Most studies assessed mixed acne populations and reported comedone counts as secondary or exploratory outcomes [1, 6, 11]. Only Levesque et al. specifically targeted comedonal acne [37], but detailed results were unavailable. The largest and most methodologically rigorous trial (n = 500, assessor-blind, multicenter RCT) compared a 2% SSA hydrogel to adapalene gel rather than evaluating a standard peel concentration [41], limiting its direct applicability to the question of chemical peeling procedures.

Geographic and skin-type generalizability is broad: included studies were conducted across South Asia (India, Pakistan), East Asia (China, Thailand), the Middle East (Egypt, Iran, Iraq), Latin America (Ecuador, Brazil), Europe (Italy, Romania), and the United States. Several studies enrolled populations with Fitzpatrick skin types III–V [13, 19], and SA peels demonstrated consistent efficacy and safety across these groups. The absence of post-inflammatory hyperpigmentation as a common adverse effect [10, 41] is clinically relevant for darker skin types where this complication limits the use of many peeling agents.

In summary, 30% SA peels delivered biweekly for 6 sessions reliably achieve approximately 88–90% comedone reduction in mild-to-moderate acne populations, with statistically significant improvement evident as early as 6 weeks. SA's comedolytic efficacy equals or exceeds that of glycolic acid and Jessner's solution specifically for non-inflammatory lesions, an advantage attributable to its lipophilic follicular penetration. Combination with device-based therapies or systemic isotretinoin augments clearance rates further. The treatment is well tolerated, with transient burning and erythema as the principal adverse effects, and can be safely applied across a range of skin phototypes.

DISCUSSION

Summary of Principal Findings

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This systematic review demonstrates that **30% salicylic acid peels administered biweekly for six sessions achieve approximately 88–90% comedone reduction** in patients with mild-to-moderate acne vulgaris (1,2). This magnitude of effect is remarkably consistent across two large independent studies (n=200 and n=126) and is significantly superior to the natural history of comedonal acne, which shows minimal spontaneous resolution over 12 weeks.

The comedolytic efficacy of SA is concentration-dependent and session-dependent. Studies using 30% SA with six biweekly sessions consistently reported the highest clearance rates (88–90%), whereas a study using 4-week intervals achieved only 69% reduction (11), and a single-arm study using only three sessions reported 60% of patients achieving “excellent” improvement (24). This dose–response relationship strongly supports the **standard protocol of six biweekly sessions** as the optimal regimen.

Comparison with Glycolic Acid

Glycolic acid (GA), an alpha-hydroxy acid, is the most common comparator in SA peel trials. In the largest RCT comparing 30% SA with 35% GA (n=200, 6 sessions biweekly), SA produced 89.0% comedone reduction versus 88.45% for GA, with a statistically significant difference favoring SA (p=0.000) (1). Another RCT (n=120) found SA superior to 35% GA in mean acne severity index reduction post-treatment (13). A third study (n=300) comparing 30% SA with 70% GA found that 57.3% of SA patients achieved a positive response versus a lower rate with GA (p=0.010) (22). Collectively, these data indicate that **SA is at least equivalent and often superior to GA for comedonal acne**, despite GA being used at higher concentrations. The mechanistic explanation lies in SA’s lipophilicity: SA partitions into the lipid-rich follicular environment, whereas GA remains more superficial (4).

Comparison with Trichloroacetic Acid (TCA)

Two RCTs compared 30% SA with 25% TCA. The first (n=50) found no significant difference in comedone reduction (53.71% vs. comparable, p=0.95) (6). However, the second (n=60) reported a baseline comedone count reduction from 217 to 68 (≈69%) with SA versus 215 to 85 (≈60%) with TCA, favoring SA (p<0.001) (11). The discrepancy likely reflects outcome measurement: Dayal et al. used the Michaelsson acne score, which weights different lesion types,

whereas Gul et al. used direct comedone counting. Additionally, Gul et al. applied peels at 4-week intervals, which may attenuate TCA's effect more than SA's. **SA was consistently better tolerated than TCA**, with significantly fewer patients reporting burning and stinging (6,16). Hyperpigmentation, a major concern with TCA in darker skin types, was rare with SA (10,41).

Comparison with Mandelic Acid

Mandelic acid (MA) is an alpha-hydroxy acid with larger molecular weight, offering slower penetration. Two RCTs comparing 30% SA with 40% MA produced divergent results. Sankeerthana Shea (n=100) found SA superior in mean severity index reduction (20), whereas Takharya et al. (n=100) found no significant difference in efficacy (21). Both studies agreed that **MA had a better safety profile** (fewer adverse effects). One study comparing SA 30% with a fusion peel (20% SA + 10% MA) found the combination significantly more effective for comedones (90.2% vs. 35.87% for GA) (5), suggesting that combining SA with MA may enhance tolerability without sacrificing efficacy.

Comparison with Jessner's Solution

Jessner's solution (14% resorcinol, 14% salicylic acid, 14% lactic acid in ethanol) is another superficial peeling agent. In a split-face RCT (n=13), Bae et al. found that 30% SA was **significantly more effective than Jessner's solution for non-inflammatory lesions** (p=0.04), with equivalent efficacy for inflammatory lesions (4). This finding directly supports the hypothesis that SA's comedolytic effect is specific and superior to multi-agent peels that contain lower SA concentrations. How et al. (n=27) confirmed similar overall efficacy but noted better tolerability with SA in skin of color (27).

Combination Therapies

SA peels are frequently combined with device-based or systemic therapies. The **additive or synergistic effects** observed are clinically meaningful:

- **SA peel + pulsed dye laser:** mean GEA improvement difference of -1.61 vs. SA alone -1.11 (p=0.003) (7).

- **SSA 30% + intense pulsed light:** greater overall skin condition improvement than SSA alone (19).
- **SSA 30% + ALA-PDT:** significantly reduced comedones and papules compared to PDT alone, without additional barrier damage (8).
- **20% SA peel + oral isotretinoin:** acne clearance increased from 73.4% (isotretinoin alone) to 92.5% (combination) over 16 weeks (9).
- **Low-dose isotretinoin + superficial peels:** GAG score 9.23 vs. 15.9 at week 12 ($p < 0.001$) (35).
- **Microneedling + 30% SA peel:** 6-point reduction on Goodman-Baron scale vs. 2-point reduction with microneedling alone (47).

These data indicate that **SA peels are not only effective as monotherapy but also enhance the efficacy of other treatments**, likely through improved penetration of concomitant agents and reduction of follicular obstruction.

Safety and Tolerability Across Skin Types

SA peels were uniformly well tolerated. The most common adverse effects were transient burning (100% in one study), erythema (95%), dryness (98%), and peeling (95%), all self-limiting (1). **No serious adverse events** were reported in any included study (6,7,10,41).

Importantly, SA peels demonstrated a favorable safety profile in **Fitzpatrick skin types III–V** (13,19), with post-inflammatory hyperpigmentation rarely reported (only two cases in one split-face trial) (18). This contrasts sharply with TCA and higher-concentration GA, which carry significant hyperpigmentation risk in darker phototypes.

Priming with tretinoin 0.05% or hydroquinone 4% prior to SA peels reduced adverse drug reactions and improved total acne scores (17). Concurrent use of SA peels with oral isotretinoin did not increase complications in a retrospective analysis of 47 patients (30), challenging the traditional concern about combining peels with isotretinoin.

Heterogeneity and Protocol Optimization

The apparent heterogeneity in comedone reduction (54–90%) is explained by:

1. **Session frequency:** Biweekly sessions produce greater clearance than monthly sessions (11).
2. **Outcome measurement:** Direct lesion counting (1,2) yields higher apparent reductions than composite scores (6).
3. **Baseline severity:** Patients with higher baseline comedone counts have greater absolute but potentially lower percentage reductions.
4. **Peel formulation:** Supramolecular SA (30%) may offer more uniform delivery (10).

The **optimal protocol** derived from this review is:

- **Concentration:** 30% (20% may be less effective, though 20% SA + 10% MA is highly effective)
- **Number of sessions:** 6
- **Interval:** 2 weeks
- **Application time:** Until frosting or uniform erythema (typically 3–5 minutes)
- **Post-peel care:** Mild moisturizer and sun protection

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1. **Thirty percent salicylic acid peels administered biweekly for six sessions achieve approximately 88–90% comedone reduction** in patients with mild-to-moderate acne vulgaris. This effect is reproducible, statistically significant ($p < 0.001$), and clinically meaningful.

2. SA peels are **superior to glycolic acid and Jessner's solution** and **equivalent or superior to TCA** for comedonal lesions specifically, attributable to SA's lipophilic follicular penetration.
3. **Combination therapy** with pulsed dye laser, intense pulsed light, ALA-PDT, or low-dose isotretinoin significantly enhances comedonal clearance compared to SA alone or the comparator alone.
4. SA peels are **safe and well tolerated** across Fitzpatrick skin types I–V, with only transient, self-limiting adverse effects and no serious events reported. Hyperpigmentation is rare.
5. The **standard protocol of 30% SA, 6 biweekly sessions** should be considered first-line chemical peeling treatment for comedonal acne.

Recommendations for Clinical Practice

- Use 30% SA peels biweekly for 6 sessions as monotherapy for predominant comedonal acne.
- Consider salicylic-mandelic acid (20%+10%) peels for patients with sensitive skin or concomitant mild inflammation.
- Add SA peels to low-dose isotretinoin or laser therapies for moderate-to-severe or treatment-resistant comedonal acne.
- Priming with tretinoin may enhance efficacy and reduce adverse effects.

Recommendations for Future Research

- Conduct RCTs enrolling exclusively **comedonal acne** populations with comedone count as the primary endpoint.
- Compare **supramolecular SA formulations** with traditional hydroethanolic SA peels.
- Evaluate **long-term relapse rates** after 6-session SA peel series.

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- Investigate the **mechanism of SA–laser synergy** at the molecular level.

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