

Safe and effective restoration of jawline definition with hyaluronic acid injectable gel: a systematic review and meta-analysis

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Abstract

A well-defined jawline is an important aspect of facial aesthetics, contributing to overall appearance. This feature is particularly sought after by individuals, especially older adults, who are interested in enhancing their facial contours. This systematic review and meta-analysis evaluates safety and effectiveness following use of VYC-25L, a hyaluronic acid-based injectable gel, for restoration of jawline definition. VYC-25L is a soft tissue filler designed to add volume, lift, and contour to the jawline area, providing a non-surgical solution for improving facial aesthetics. This meta-analysis included two randomized controlled trials and three cohort studies of international databases—PubMed, EMBASE, Web of Science, and Cochrane Library—from January 2015 to May 2025, using keywords aligned with the study objective. The VYC-25L group had significantly higher responder rates on the Allergan Loss of Jawline Definition Scale (ALJDS) compared to the control group (71%; $p < 0.001$; 95% confidence interval [CI] [48%, 94%]). The most common event was swelling (effect size [ES]: 81%; 95% CI [69%, 92%]), lumps/bumps (ES: 83%; 95% CI [66%, 99%]), pain after injection (ES: 79%; 95% CI [62%, 96%]), and tenderness to touch (ES: 76%; 95% CI [61%, 92%]). In summary, VYC-25L appears to be an effective treatment for jawline definition, with a predictable adverse event profile.

Keywords: jawline, hyaluronic acid, VYC-25L, injection site response

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Introduction

For a comprehensive approach to facial rejuvenation, it is important to consider the jawline and lower face (1). As people age, changes in the mandibular bone, skin laxity, and atrophy of facial soft tissue and fat cause the jawline to lose volume and prominence over time. For many years, restoring a proper jawline has been recognized as an aesthetic necessity for many patients (2).

The shape of the jawline is influenced by beauty, cultural, and sex standards. Across the world, different cultures have different preferred jawline shapes and angles. These shapes can range from a soft, graceful, yet defined jawline to a large, square jawline (3). Age-related differences also exist in the frequency and preferred treatment area of cosmetic procedures. Patients between ages 17 and 35 account for 17% of nonsurgical cosmetic procedures performed in the United States, followed by patients between ages 36 and 50 (41%), those between 51 and 70 (37%), and those over 71 (5%) (4). According to a study of facial treatment areas by age group, women between ages 60 and 65 had more jawline treatment than women between ages 30 and 35 (5). A common nonsurgical method for reshaping the jawline and enhancing soft tissue is the use of injectable fillers, such as hyaluronic acid (HA), which improve the appearance of the jawline and facial contours (6). The goal of treating younger patients with HA VYC-25L injectable gel is to improve congenital jawline defects or restore jawline shape lost with age (7). VYC-25L is a HA-based injectable gel developed by Allergan (Dublin, Ireland), utilizing Vycross™ technology to provide volume restoration and lift to the jawline, improving facial contours in a minimally invasive manner (8). According to studies, after injection, HA fillers should provide more volume, lift, moldability, and shaping in high-movement areas such as the jawline and chin, which should also be improved (9, 10).

Aesthetics play a significant role in patient satisfaction, and

improper treatments can negatively impact both quality of life and overall well-being. Therefore, it is essential to conduct comprehensive studies that provide robust evidence, critically review existing research, and establish consensus on the most effective methods for restoring jawline definition.

Methods

Literature search strategy

The following search terms were used to identify cohort studies and randomized clinical trials on the safety and effectiveness of VYC-25L published from January 2015 to May 2025 in the international databases PubMed, EMBASE, Web of Science, and Cochrane Library: ((“Hyaluronic Acid”[Mesh]) AND “Jaw”[Mesh]) AND “Face”[Mesh]) AND “Esthetics”[Mesh]) AND (“Safety”[Mesh] OR “Patient Safety”[Mesh] OR “Safety Management”[Mesh])) AND “Treatment Outcome”[Mesh].

Study inclusion and exclusion criteria

The PICOS strategy was used to design the inclusion and exclusion criteria: Population (P): participants for jawline; Intervention (I): VYC-25L hyaluronic acid injectable gel; Comparison (C): no treatment; Outcome (O): safety and effectiveness, and Study (S): randomized controlled trials (RCTs) and cohort studies. Any review studies, case studies, in-vitro studies, incomplete or unavailable literature, and articles that were not in English were excluded from this meta-analysis.

Data abstraction and quality appraisal

Studies were reviewed independently and blinded by two inves-

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tigators, and study quality was assessed using standard tools. To assess the risk of bias in cohort studies and randomized clinical trials, the Newcastle–Ottawa Scale (NOS) and Risk of Bias 2 (RoB2) were used, respectively. After this, data were extracted from the studies. The authors first read the abstract and title of the articles retrieved before reading the full text to decide whether they should be included in the article. The content of data collection included the following: first author, year of publication, type of study design, number of patients, mean age and sex, Fitzpatrick skin type, and Allergan Loss of Jawline Definition Scale (ALJDS) score.

Statistical analysis

All statistical analyses were performed using Stata/MP version 17 (StataCorp LLC, College Station, TX, USA). Effect size (ES) with corresponding 95% confidence intervals (CI) and a random effects model / fixed effects model were calculated using restricted maximum likelihood (REML) and the inverse variance method. Heterogeneity was assessed using the χ^2 and I^2 tests ($p < 0.05$ and $I^2 > 75\%$ = high heterogeneity).

Results

Search process

The first literature search found 125 relevant studies. After reviewing the study titles and relevance to the study exclusion criteria, 59 studies were excluded. The abstracts of 66 studies were selected based on the study criteria and exclusion of irrelevant articles. Two independent, blinded authors reviewed the full text of 18 studies after excluding 48 articles. Then, after excluding 13 articles, five articles were selected and met the inclusion criteria (Fig. 1).

Characteristics of the studies included

This meta-analysis included two RCTs, two prospective studies, and one retrospective study. A total of 531 patients were included in the VYC-25L treatment group and 198 were considered the control group without receiving treatment. The majority of patients were female, and the average age was calculated as 46.6 years. Demographic and baseline characteristics extracted from the studies reviewed are summarized in Table 1.

Quality of studies

The quality of the selected studies was considered high based on the risk of bias assessment tools (two RCTs: 5/6; three cohort studies: 7/9).

Primary effectiveness outcome

The experimental group had significantly higher ALJDS responder rates compared to the control group (71%; $p < 0.001$; 95% CI [48%, 94%]). The coefficient $I^2 = 0\%$ indicates low heterogeneity between studies ($p = 0.78$; Fig. 2).

Secondary effectiveness outcomes

For the experimental group, the Global Aesthetic Improvement Scale (GAIS) responder rate was 69% (ES: 69%; $p < 0.001$; 95% CI [32%, 100%]). The coefficient $I^2 = 81.67\%$ indicates high heterogeneity between studies ($p < 0.001$; Fig. 3).

The FACE-Q satisfaction scores (FACE-Q is a patient-reported outcome measure evaluating satisfaction with facial aesthetics after treatment) of 71% of participants that received VYC-25L treatment were noticeably higher (ES: 71%; $p < 0.001$; 95% CI [55%,

Table 1 | Demographic and baseline characteristics of the studies reviewed.

	Study				
	Burgess et al., 2025 (7)	Xie et al., 2025 (11)	Rivkin et al., 2024 (8)	Bertossi et al., 2021 (12)	Ogilvie et al., 2020 (13)
Study design	RCT	Prospective	RCT	Retrospective	Prospective
Sample size					
Experimental	157	97	157	30	90
Control	49	51	49	19	30
Patients: F/M, <i>n</i>					
Experimental	137/20	85/12	141/16	16/14	81/9
Control	43/6	46/5	39/10	13/6	29/1
Mean age, years	59.0	31.2	59.3	34.4	46.4
Fitzpatrick, <i>n</i> (%)					
Experimental					
I/II	4 (3.0)	Not reported	14 (28.6)	Not reported	60 (66.6)
III/IV	83 (53.4)	Not reported	29 (59.2)	Not reported	10 (9.0)
V/VI	21 (13.6)	Not reported	6 (12.2)	Not reported	20 (18.0)
Control					
I/II	1 (3.0)	Not reported	54 (34.4)	Not reported	19 (63.3)
III/IV	26 (53.4)	Not reported	81 (51.6)	Not reported	8 (26.6)
V/VI	6 (13.6)	Not reported	22 (14.0)	Not reported	3 (10.0)
ALJDS, <i>n</i> (%)					
Experimental					
G.2	35 (22.8)	Not reported	13 (26.5)	Not reported	Not reported
G.3	8 (4.4)	Not reported	36 (73.5)	Not reported	Not reported
G.4	114 (72.8)	Not reported	0 (0.0)	Not reported	Not reported
Control					
G.2	11 (22.8)	Not reported	34 (21.7)	Not reported	Not reported
G.3	3 (4.4)	Not reported	114 (72.6)	Not reported	Not reported
G.4	35 (72.8)	Not reported	9 (5.7)	Not reported	Not reported

ALJDS = Allergan Loss of Jawline Definition Scale, F = female, Fitzpatrick = Fitzpatrick skin type, G.2 = grade two (moderate), G.3 = grade three (severe), G.4 = grade four (extreme), M = male, RCT = randomized controlled trial.

87%)). The coefficient $I^2 = 0\%$ indicates low heterogeneity between studies ($p = 0.97$; Fig. 4).

Safety

At least one injection site response (ISR) was reported by 66% (ES: 66%; $p < 0.001$; 95% CI [30%, 100%]) of participants in the VYC-25L group following initial treatment (Fig. 5). The coefficient $I^2 = 78.68\%$ indicates high heterogeneity between studies ($p < 0.001$; Fig. 5). The most common event was swelling (ES: 81%; 95% CI

[69%, 92%]), lumps/bumps (ES: 83%; 95% CI [66%, 99%]), pain after injection (ES: 79%; 95% CI [62%, 96%]), and tenderness to touch (ES: 76%; 95% CI [61%, 92%]; Fig. 6).

Discussion

The jawline is an important aesthetic landmark; however, age-related changes in facial structure can lead to loss of definition and irregular contours in this area, which may in turn affect self-confidence, mental wellbeing, and overall quality of life(14). With

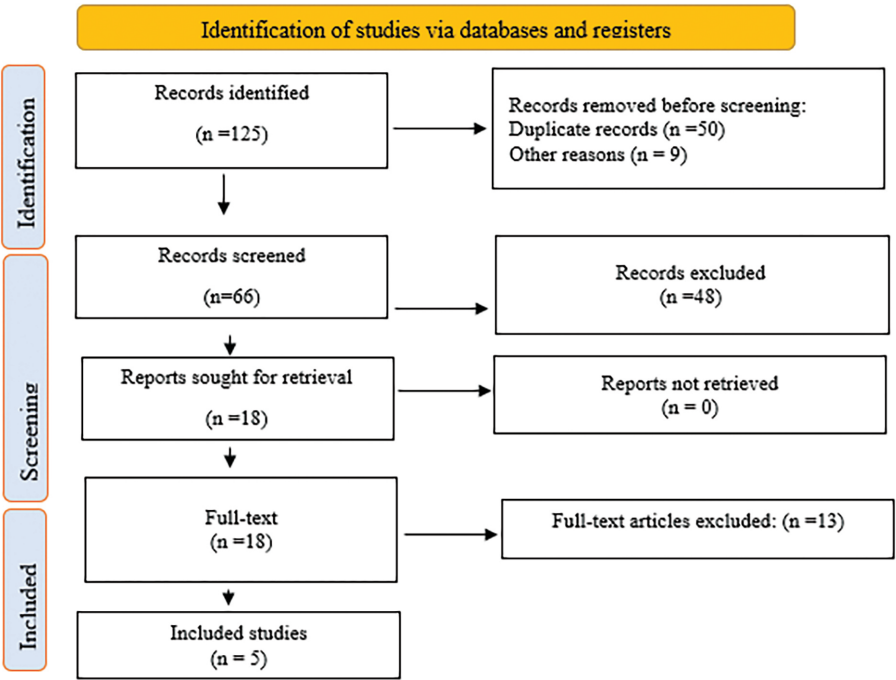


Figure 1 | Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 flow diagram.

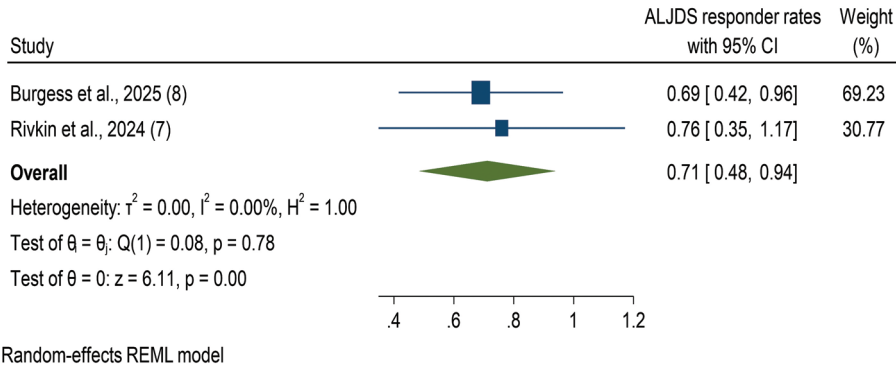


Figure 2 | Forest plot of Allergan Loss of Jawline Definition Scale (ALJDS) responder rates. REML = restricted maximum likelihood.

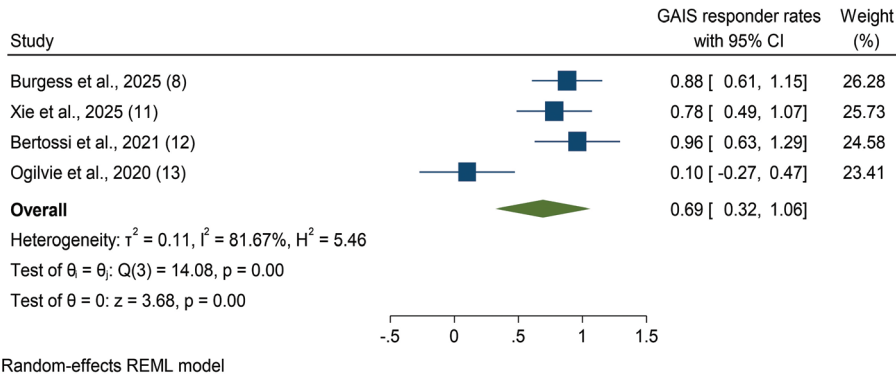


Figure 3 | Forest plot of Global Aesthetic Improvement Scale (GAIS) responder rate. REML = restricted maximum likelihood.

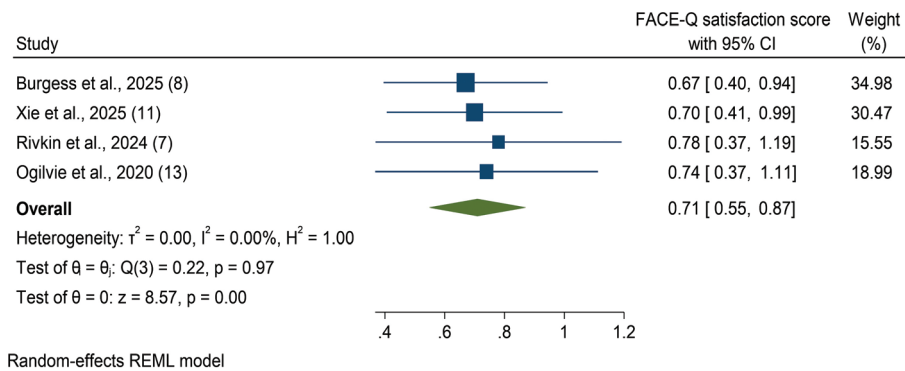


Figure 4 | Forest plot of FACE-Q satisfaction score. REML = restricted maximum likelihood.

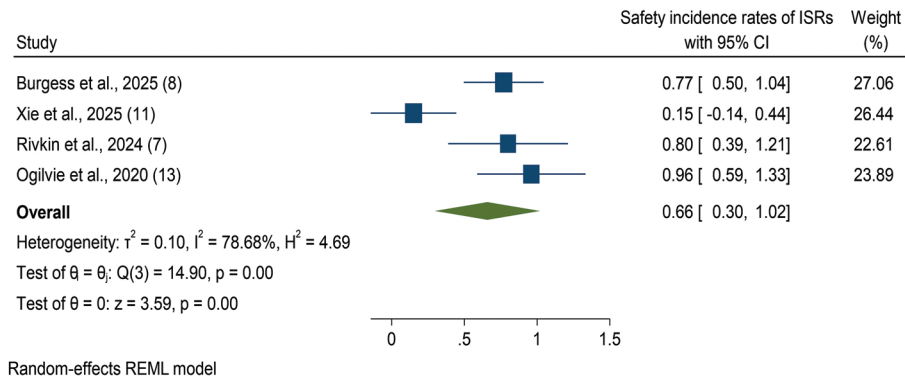


Figure 5 | Forest plot of injection site responses (ISRs) after initial treatment, as reported by over 66% of participants. REML = restricted maximum likelihood.

the advent of advertising and social media, people have become more aware of the importance of the jawline for improving beauty and having a more youthful appearance, leading to an increased demand for non-surgical jawline correction methods with high safety and better effectiveness (12).

Based on the searches conducted, this is the first meta-analysis to examine the safety and effectiveness of VYC-25L for restoration of jawline definition. Only five studies were eligible for inclusion in this meta-analysis, with a total of 531 participants using VYC-25L to restore volume and clarity of the jawline. Based on the meta-analysis, the ALJDS responder rate of the VYC-25L treatment group exceeded the statistical threshold of 50% (ALJDS responder rate = 0.71%); There was low heterogeneity between studies; therefore, this evidence can be considered. On the other hand, the meta-analysis showed that, after using VYC-25L, the FACE-Q satisfaction scores (71%) and GAIS responder rate (69%) improved in most participants. The heterogeneity between studies for the GAIS responder rate was high; therefore, these findings should be interpreted with caution. Further studies with a similar methodological burden are needed to confirm the current evidence. However, the heterogeneity between studies for the FACE-Q satisfaction scores was low; therefore, these findings provide good evidence. This study observed that 66% of subjects in the VYC-25L treatment group reported at least one ISR after treatment. It should be noted, however, that there was a high degree of heterogeneity in the reporting of ISR across studies. In this meta-analysis, in line with previous studies, safety assessments were made of participants' response to ISRs, adverse events, intraoperative pain scores, jaw function, and facial sensation in the studies included. Among the patients, 83% reported lumps/bumps as an ISR, followed by swelling, pain after injection, and tenderness to touch as the most commonly reported adverse events. Except for bruising, there was low heterogeneity between studies in the remaining ISRs reported

after initial treatment, indicating that the use of VYC-25L has approximately similar results and can be used in different populations. However, because only two RCTs were included and the sample size of the studies was small, studies with a methodology similar to that of the selected studies need to be conducted to provide stronger evidence. Needle selection also needs to be performed more carefully; however, the studies included found similar results for injection by cannula or by needle only.

The results of this meta-analysis were reported up to 6 months after VYC-25L use. The results are consistent with the findings of previous studies on jawline shaping and repair using VYC-25L (7–8). The study showed that after 6 months of VYC-25L treatment for the jawline, participants reported very high satisfaction, and after 20 days the GAIS responder rate was reported to be significantly improved for most subjects (12). In another study, subjective improvements in GAIS and FACE-Q scores were high, and no decline was observed at up to 18 months of follow-up (13). According to yet another study, most subjects reported at least one ISR after receiving VYC-25L for both initial and adjunctive treatment (15).

The small sample size, the small number of RCTs found, and the heterogeneity in some variables based on methodology are limitations of this study. The strengths of this meta-analysis were that all studies included fully reported ISRs after initial treatment and used similar tools to assess effectiveness and safety.

Conclusions

Based on this meta-analysis, VYC-25L is a safe and effective non-surgical method for restoring the volume of the jawline and improving its appearance. Treatment with VYC-25L is associated with high patient satisfaction. It is suggested that maintenance treatment be used to improve results.

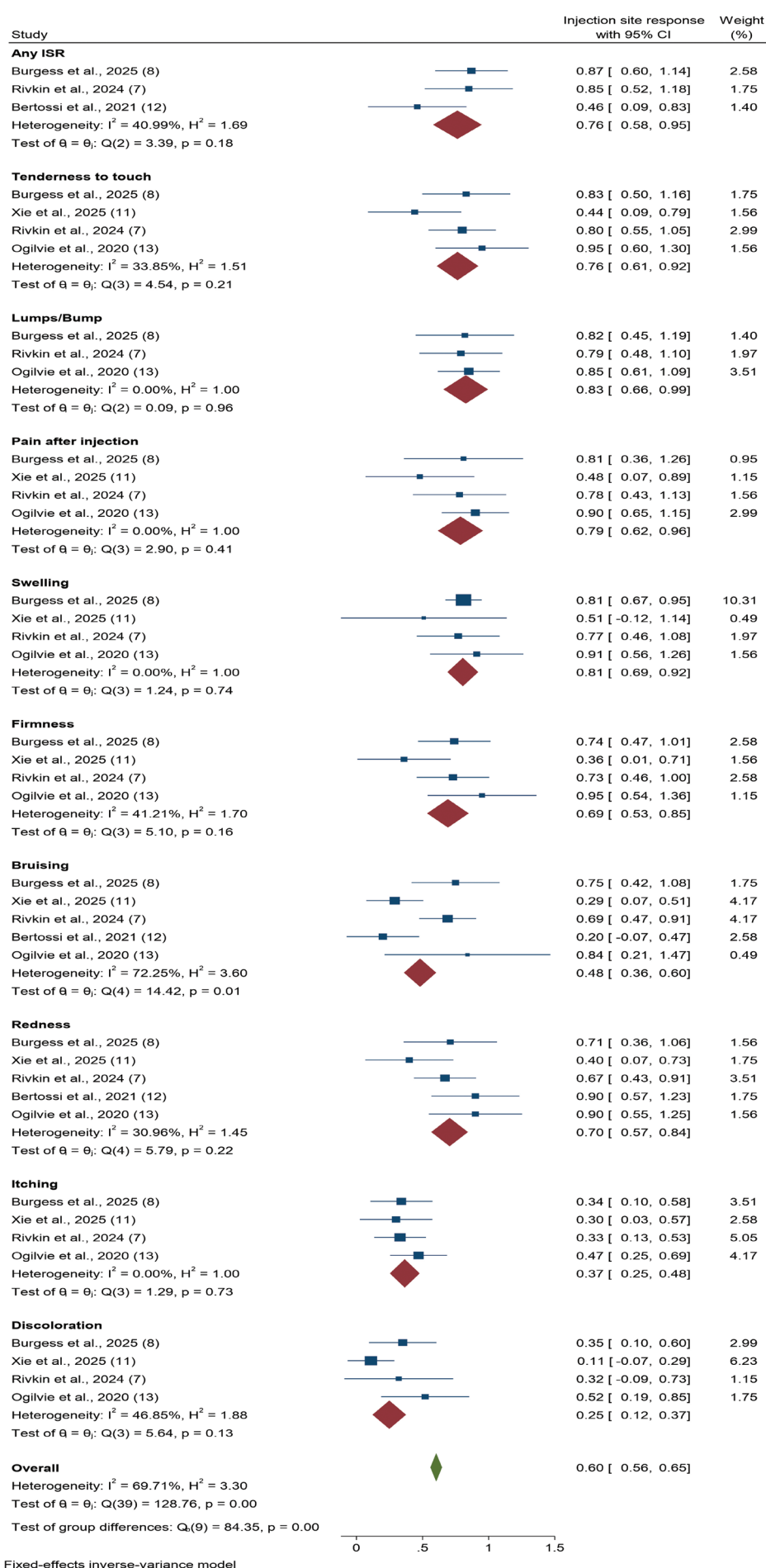


Figure 6 | Forest plot of safety assessments.

ISR = injection site response, REML = restricted maximum likelihood.

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