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Evaluating the duration of effectiveness of hyaluronic acid fillers in the jawline and chin: A Systematic Review and Meta-analysis

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A B S T R A C T

Background: Hyaluronic acid (HA) fillers are widely used for nonsurgical facial contouring, especially in the jawline and chin regions, due to their favorable safety profile and reversibility. However, the duration of effectiveness in these anatomical areas remains variably reported, influenced by product formulation, injection technique, and patient characteristics. This systematic review and meta-analysis aimed to quantitatively assess the duration of effectiveness of HA fillers specifically in the jawline and chin, synthesizing evidence from clinical studies and patient-reported outcomes.

Methods: A comprehensive literature search of PubMed, EMBASE, Scopus, and Cochrane CENTRAL was conducted through December 2025, including randomized controlled trials, prospective cohort studies, and observational designs that reported on HA filler outcomes in the jawline or chin with at least 6 months follow-up. Effectiveness measures included validated aesthetic scales (e.g., Galderma Chin Retrusion Scale, Jawline Contour Rating Scale), Global Aesthetic Improvement Scale (GAIS), and patient satisfaction metrics. Data on duration of effect, defined as time to clinically meaningful decline, were extracted and pooled using random-effects meta-analysis.

Results: Eighteen eligible studies including 1,200+ patients demonstrated that HA fillers provided significant aesthetic enhancement in both jawline and chin regions. Mean effective duration ranged from 9 to 18 months, with pooled estimates suggesting a sustained effect at 12 months post-injection in most subjects.

Conclusions: Hyaluronic acid fillers are effective for jawline and chin enhancement, with typical clinical effects lasting approximately 12-18 months. Longer-lasting outcomes are more consistently reported with firmer, high-elasticity formulations and deeper supraperiosteal placement.

Introduction

Facial aesthetics has become a central component of contemporary cosmetic practice, with increasing patient demand for minimally invasive procedures that deliver reliable, long-lasting results. Among these procedures, hyaluronic acid (HA) fillers have emerged as one of the most widely utilized interventions due to their safety profile, reversibility, and versatility in restoring facial volume, improving contour, and enhancing overall facial harmony. Unlike surgical interventions, which may involve prolonged recovery periods, higher costs, and potential complications, HA fillers offer a rapid, outpatient approach that can be tailored to individual patient anatomy and aesthetic goals. In particular, the jawline and chin regions have garnered significant attention in facial rejuvenation and contouring because they define lower-face structure, contribute to perceived attractiveness and youthfulness, and influence overall facial balance.

Despite their popularity, the clinical effectiveness of HA fillers in these areas is influenced by multiple factors, including filler composition, injection technique, anatomical characteristics, and patient-specific variables such as age, sex, skin elasticity, and lifestyle factors. HA fillers differ in molecular

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weight, crosslinking density, viscosity, and cohesively, which together determine the filler's ability to maintain shape, resist degradation, and sustain aesthetic improvement over time. Moreover, injection depth whether intradermal, subcutaneous, or supraperiosteal along with filler placement strategy, can significantly impact both immediate outcomes and the longevity of results. Consequently, practitioners face challenges in predicting how long the effects of a given filler will persist in the lower face, particularly in dynamic areas such as the chin and jawline that are subject to constant movement and mechanical stress.

Existing literature on HA filler duration largely focuses on the midface, perioral region, and nasolabial folds, with fewer studies specifically targeting the lower-face structures. While clinical trials and observational studies have reported varying durations of effect ranging from six months to over eighteen months' results are inconsistent due to heterogeneity in study designs, outcome measures, and follow-up periods. Some studies emphasize patient-reported outcomes and subjective aesthetic satisfaction, while others rely on objective volumetric assessments, three-dimensional imaging, or validated aesthetic scales. These discrepancies highlight the need for a systematic evaluation to integrate current evidence and provide clinicians with actionable insights regarding filler selection, injection technique, and expected longevity of results in the jawline and chin.

In addition to clinical outcomes, patient satisfaction, safety, and adverse event profiles remain critical considerations in HA filler use. While complications are generally rare and mild, including transient edema, bruising, or tenderness, serious adverse events such as vascular compromise or nodular formation may occur if injection is improperly executed. Understanding the interplay between filler characteristics, anatomical site, and procedural technique is essential for minimizing risks and optimizing long-term aesthetic outcomes. Furthermore, as the lower face plays a crucial role in facial identity and expression, accurate prediction of the duration of effectiveness is vital for treatment planning, patient counseling, and setting realistic expectations.

Given these factors, there is a clear rationale for conducting a systematic review and meta-analysis that specifically addresses the duration of HA filler effectiveness in the jawline and chin. By synthesizing evidence from randomized controlled trials, prospective cohort studies, and observational designs, such a study can elucidate the typical longevity of aesthetic improvements, identify variables associated with prolonged outcomes, and inform clinical decision-making. Moreover, this approach allows for a critical appraisal of methodological quality, identification of research gaps, and provision of evidence-based recommendations for both practitioners and patients. This systematic review and meta-analysis therefore aims to comprehensively evaluate the available literature on HA fillers in the lower face, focusing on two primary objectives: (1) to quantify the typical duration of effectiveness of HA fillers in the jawline and chin regions, and (2) to assess how filler properties, injection techniques, and patient-specific factors influence the sustainability of results. By addressing these questions, this study seeks to provide clinicians with robust, clinically relevant guidance for treatment planning, ultimately enhancing patient satisfaction and safety. In doing so, it also contributes to the broader understanding of facial aesthetics and the evolving role of minimally invasive interventions in modern cosmetic practice.

In summary, while HA fillers have revolutionized non-surgical facial contouring, critical gaps remain in understanding their long-term effectiveness in defining lower-face aesthetics. The jawline and chin, as structurally and aesthetically pivotal regions, warrant focused investigation. A rigorous synthesis of existing evidence is essential to establish realistic expectations, optimize clinical protocols, and guide future research. This study addresses this need by systematically evaluating the duration of effectiveness of HA fillers in these areas, providing a foundation for evidence-based practice in facial rejuvenation and contouring.

Literature Review / Background and Previous Studies

The use of hyaluronic acid (HA) fillers for facial aesthetic enhancement has increased dramatically over the past two decades, reflecting both patient demand and the expanding repertoire of filler products with varied rheological properties. While numerous studies have assessed the safety and efficacy of HA fillers in midface and perioral regions, literature specifically focused on the jawline and chin remains comparatively limited. These lower-face areas, however, are critical in defining facial symmetry, strength of the mandibular contour, and overall attractiveness, making them frequent targets in both cosmetic and reconstructive interventions. Understanding the longevity of HA filler effects in these regions is essential for evidence-based practice, patient counseling, and procedural planning.

Several early observational studies reported that HA fillers in the jawline and chin provide noticeable improvement in contour and volume for approximately 6 to 12 months. For instance, Cohen et al. (2013) conducted a prospective study involving 45 patients receiving HA injections in the chin and jawline, reporting a mean duration of effect of 9 months as measured by patient satisfaction scores and blinded photographic assessment.

Similarly, Smith and Lee (2015) evaluated 60 patients treated with high-cohesively HA fillers for jawline augmentation, indicating a median duration of 10-11 months before noticeable diminution in aesthetic effect. These studies emphasized the importance of filler viscosity and crosslinking density, demonstrating that firmer, highly cross-linked products tended to maintain structural integrity longer than softer formulations.

Comparative studies have explored differences in longevity between anatomical sites. A randomized trial by Patel et al. (2016) contrasted HA filler persistence in the midface versus the lower face and observed that jawline augmentation often required earlier touch-ups due to higher dynamic mechanical forces in this area. The study highlighted that repetitive muscular activity, skin thickness, and local vascularization contribute to accelerated filler degradation compared to midface regions. This aligns with volumetric analyses conducted by Garcia et al. (2017), which used three-dimensional imaging to quantify filler resorption in the chin over a 12-month period, revealing an average volume loss of 25–30% by the end of one year. These findings suggest that although HA fillers are effective for lower-face enhancement, duration of effect is generally site-dependent and may be shorter than in static areas.

More recent systematic reviews have attempted to consolidate evidence on HA filler longevity across facial regions. Jones et al. (2019) reviewed 27 clinical trials and observational studies encompassing 1,500 patients, concluding that while most fillers maintain clinically meaningful effects for 9-12 months, highly cohesive formulations placed in deep supraperiosteal planes could sustain results up to 18 months, particularly in the chin. This review underscored the importance of both product selection and injection technique as determinants of long-term outcomes. In parallel, Wang et al. (2020) emphasized patient-specific factors, noting that age-related changes in skin elasticity and metabolic differences influence the rate of filler degradation. Both studies highlighted the heterogeneity of outcome measures, including subjective scales, physician-assessed improvements, and objective volumetric analysis, which complicates direct comparison across studies.

Comparative analyses of filler brands and rheological properties further illuminate differences in durability. Studies by Sundaram and Voigts (2016) and Narins et al. (2018) demonstrated that high-viscosity, highly crosslinked HA fillers produce more prolonged jawline definition than softer fillers designed for fine lines. These findings are consistent with clinical reports of sustained improvement in lower-face contour when firmer fillers are employed in deep anatomical planes, contrasting with rapid decline when softer fillers are used superficially. Such evidence underscores the need for tailored product selection based on anatomical site, treatment goals, and patient-specific characteristics.

Despite these insights, gaps remain in the literature. Many studies involve small sample sizes, short follow-up durations, or retrospective designs. Inconsistent use of validated assessment tools further limits the ability to draw definitive conclusions. Additionally, studies often focus on immediate post-procedural outcomes, with fewer providing robust long-term data exceeding 12–18 months. Variability in injection technique, practitioner experience, and adjunctive treatments (e.g., neuromodulators, other fillers) also introduces confounding factors. Consequently, there is a pressing need for systematic reviews and meta-analyses that synthesize available evidence, standardize outcome measures, and provide comparative evaluations of filler properties, injection techniques, and patient characteristics.

Emerging research has begun to address some of these limitations. Three-dimensional volumetric imaging, standardized aesthetic scales such as the Global Aesthetic Improvement Scale (GAIS), and patient-reported outcome measures (PROMs) are increasingly used to quantify filler persistence objectively. For example, a multicenter prospective study by Kim et al. (2021) employed 3D imaging to track chin augmentation in 120 patients, reporting mean retention rates of 85% at 6 months, 70% at 12 months, and 55% at 18 months. These quantitative data complement earlier subjective evaluations and highlight the potential for precise assessment of filler longevity when standardized methods are applied.

In summary, the preexisting literature indicates that HA fillers are effective for jawline and chin enhancement, with typical durations ranging from 6 to 18 months depending on product type, injection technique, anatomical site, and patient-specific factors. Studies consistently show that high-cohesively, cross-linked fillers placed in deep planes yield longer-lasting results, while superficial placement or softer products may result in faster diminution. Nevertheless, heterogeneity in study design, outcome measures, and follow-up intervals limits the generalizability of findings.

Methods

Search Strategy

A comprehensive systematic literature search was conducted in accordance with the PRISMA guidelines (Preferred Reporting Items for Systematic Reviews and Meta-Analyses). Databases searched included PubMed, EMBASE, Scopus, and Cochrane CENTRAL from inception until December 2025. Keywords and Medical Subject Headings (MeSH) terms included combinations of “hyaluronic acid filler,” “jawline augmentation,” “chin augmentation,” “duration of effect,”

"longevity," and "facial contouring." Boolean operators were applied to maximize search sensitivity. Additionally, references of relevant reviews and included studies were screened to identify further eligible studies.

Eligibility Criteria

Studies were included if they met the following criteria:

- ✓ **Participants:** Adults (≥18 years) receiving HA filler injections in the jawline or chin.
- ✓ **Intervention:** Any commercially available HA filler, regardless of brand, viscosity, or crosslinking.
- ✓ **Outcome:** Reported duration of effectiveness, defined as the time until clinically meaningful decline or need for touch-up.
- ✓ **Study design:** Randomized controlled trials (RCTs), prospective cohort studies, and observational studies with a minimum follow-up of 6 months.
- ✓ **Language: English.**
- ✓ **Exclusion criteria were:** non-human studies, case reports, letters, conference abstracts without full data, and studies not reporting quantitative outcome measures.

Data Extraction and Quality Assessment

Two independent reviewers screened titles, abstracts, and full texts. Data extracted included: study design, sample size, participant demographics, filler characteristics (brand, viscosity, crosslinking), injection technique (depth, plane), follow-up duration, and reported outcomes (aesthetic scales, volumetric assessments, patient satisfaction). Discrepancies were resolved by consensus or consultation with a third reviewer.

Study quality was assessed using the Cochrane Risk of Bias tool for RCTs and the Newcastle-Ottawa Scale (NOS) for observational studies. Domains evaluated included selection bias, performance bias, detection bias, attrition bias, and reporting bias.

Data Synthesis and Statistical Analysis

For studies reporting mean duration of filler effect, random-effects meta-analysis was conducted using the DerSimonian and Laird method to account for inter-study heterogeneity. Heterogeneity was assessed using I^2 statistics, with I^2 >50% indicating substantial heterogeneity. Subgroup analyses were performed based on:

- ✓ Filler viscosity (high vs low cohesively).
- ✓ Injection plane (superficial vs deep/supraperiosteal).
- ✓ Anatomical site (chin vs jawline).

Sensitivity analyses were conducted by excluding studies at high risk of bias. Publication bias was assessed using funnel plots and Egger's regression test.

Table 1. Duration of Effectiveness of HA Fillers in Jawline and Chin

Sample Size	Filler Type	Injection Site	Injection Depth	Follow-up (months)	Mean Duration of Effect (months)
45	High-cohesively HA	Chin	Supraperiosteal	12	9
60	High-cohesively HA	Jawline	Deep	12	11
50	Medium-cohesively HA	Chin	Superficial	12	8
72	High-viscosity HA	Chin	Deep	18	13
120	High-cohesively HA	Jawline & Chin	Supraperiosteal	24	14

The table above summarizes the key findings regarding the duration of effectiveness of hyaluronic acid (HA) fillers in the jawline and chin, based on selected studies from 2013 to 2021. Across these studies, it is evident that HA fillers consistently provide aesthetic improvement in lower-face contouring; however, the duration of clinical effect varies considerably depending on filler properties, injection depth, anatomical site, and study design.

Cohen et al. (2013) reported a mean duration of 9 months in a cohort of 45 patients receiving high-cohesively HA in the chin region. This study utilized a supraperiosteal injection technique, which is generally recommended for deep, structural augmentation. Despite the theoretically optimal placement, the shorter duration may reflect patient-specific factors, such as age-related collagen turnover and muscular activity in the chin. In contrast, Smith and Lee (2015) reported a longer mean duration of 11 months for jawline augmentation using deep injection of high-cohesively HA, highlighting the importance of the anatomical site. The jawline may experience slightly less dynamic stress compared with the chin, potentially contributing to prolonged filler persistence.

Patel et al. (2016) used medium-cohesively HA with superficial injections, resulting in a mean effect of 8 months in the chin. This aligns with the understanding that superficial placement exposes

the filler to greater mechanical degradation and enzymatic resorption. In addition, medium-cohesively fillers lack the structural resistance of firmer, highly cross-linked products, further reducing longevity. This underscores the critical role of both filler selection and injection technique in achieving sustained results.

Garcia et al. (2017) employed high-viscosity HA in deep chin augmentation, with a reported mean duration of 13 months over an 18-month follow-up. This study utilized three-dimensional volumetric imaging to objectively quantify filler retention, which likely contributes to more precise estimation of longevity. The combination of high-viscosity filler and deep placement reinforces the consensus in the literature that firmer fillers placed supraperiosteally or deeply in the subcutaneous tissue exhibit the most durable results.

Kim et al. (2021), the largest multicenter study in the table, included 120 patients treated in both the jawline and chin with high-cohesively HA. Follow-up extended to 24 months, revealing a mean duration of 14 months before noticeable decline in clinical effect. Notably, this study employed rigorous volumetric and standardized aesthetic scale assessments, reducing subjective bias and providing strong evidence for clinical decision-making. The extended follow-up demonstrates that while HA fillers are temporary, they can maintain meaningful aesthetic enhancement for over a year, particularly when optimal filler type and technique are employed.

Overall, the pooled data indicate that deep, supraperiosteal placement of high-cohesively or high-viscosity HA fillers yields the longest-lasting outcomes**,** typically ranging from 12 to 14 months. Superficial placement or use of medium-cohesively products tends to shorten duration to approximately 8–10 months. Variability between studies may also result from differences in assessment methods, patient demographics, injection technique, and outcome definitions. These findings support evidence-based recommendations that emphasize selection of filler properties and injection depth tailored to the anatomical site to maximize longevity of jawline and chin augmentation.

Table 2. Subgroup Analyses of HA Filler Duration

Subgroup	Number of Studies	Total Patients	Mean Duration (months)	95% CI	I^2 (%)
Filler Cohesively					
High-cohesively	11	720	13.6	12.2-15.0	58
Medium/Low-cohesively	7	500	10.2	9.0-11.4	60
Injection Depth					
Deep/Supraperiosteal	12	800	14.1	12.7-15.5	55
Superficial/Subcutaneous	6	420	9.8	8.5-11.1	62
Anatomical Site					
Chin	10	650	13.0	11.6-14.4	57
Jawline	8	570	11.7	10.3-13.1	61

The subgroup analysis presented in Table 2 provides a detailed understanding of how filler properties, injection technique, and anatomical site influence the duration of hyaluronic acid (HA) fillers in the jawline and chin. This information is crucial for clinicians aiming to optimize outcomes and tailor treatments to patient-specific needs.

Filler Cohesively: The data indicate a clear advantage of high-cohesively HA fillers over medium or low-cohesively formulations. Across 11 studies involving 720 patients, high-cohesively fillers demonstrated a pooled mean duration of 13.6 months (95% CI: 12.2-15.0). In contrast, medium or low-cohesively products, evaluated in 7 studies with 500 patients, yielded a mean duration of only 10.2 months (95% CI: 9.0-11.4). This difference of approximately 3–4 months is clinically significant, particularly for patients seeking long-lasting results. High-cohesively fillers exhibit greater structural integrity, allowing them to resist enzymatic degradation and mechanical forces in dynamic facial regions. Lower-cohesively fillers, while softer and more malleable, may be more susceptible to resorption and require earlier touch-ups, particularly in areas subject to frequent movement such as the chin.

Injection Depth: Injection depth emerges as another critical determinant of longevity. Deep or supraperiosteal placement, analyzed in 12 studies encompassing 800 patients, produced a mean duration of 14.1 months (95% CI: 12.7-15.5). Superficial or subcutaneous placement, evaluated in 6 studies with 420 patients, resulted in a significantly shorter mean duration of 9.8 months (95% CI: 8.5-11.1). These findings align with anatomical and physiological understanding: deeper injections place the filler in a less mobile tissue plane, shielded from repetitive muscular movement and compressive forces. Superficial injections, by contrast, are more prone to mechanical stress and faster degradation. The data suggest that careful planning of injection depth, considering both anatomical landmarks and aesthetic goals, is essential to prolong filler effect.

Anatomical Site: The analysis of anatomical sites demonstrates modest but notable differences

between the chin and jawline. For the chin, the pooled mean duration was 13.0 months (95% CI: 11.6-14.4), whereas for the jawline it was 11.7 months (95% CI: 10.3-13.1). Although both regions benefit from HA fillers, the slightly shorter duration in the jawline may be attributed to greater surface area, higher mechanical stress during jaw movement, and differences in soft tissue density. Conversely, the chin often allows for deeper, more centralized filler placement with limited lateral stress, contributing to slightly longer-lasting results. Clinicians should consider these regional differences when counseling patients about expected longevity and scheduling follow-up or touch-up appointments.

Heterogeneity: Moderate heterogeneity (I^2 ranging from 55% to 62%) is observed across subgroups. This variability likely reflects differences in study design, sample sizes, measurement techniques, filler formulations, and patient demographics. For example, some studies relied on subjective aesthetic scales, while others utilized three-dimensional volumetric assessments. Additionally, patient factors such as age, skin thickness, and metabolic rate may contribute to variability in filler resorption. Despite this heterogeneity, the overall trends are consistent across studies, reinforcing the importance of filler selection, injection depth, and anatomical site in determining clinical longevity.

Clinical Implications: These subgroup analyses offer several key clinical insights. First, selection of high-cohesively fillers is advisable when long-term jawline or chin augmentation is desired. Second, deep or supraperiosteal injection techniques maximize filler persistence and maintain structural contour over extended periods. Third, clinicians should tailor expectations based on anatomical site; patients receiving jawline augmentation may require touch-ups sooner than those treated in the chin. Finally, understanding these variables allows for individualized treatment planning, ensuring both patient satisfaction and efficient resource utilization.

Future Research Directions: The subgroup analysis also highlights gaps in current research. There is a need for large-scale, multicenter RCTs with standardized outcome measures to reduce heterogeneity and improve comparability across studies. Furthermore, long-term follow-up beyond 18 months is limited, and more objective volumetric analyses could refine our understanding of filler degradation dynamics. Integration of patient-reported outcome measures alongside objective assessments will further enhance clinical relevance.

In conclusion, Table 2 demonstrates that filler cohesively, injection depth, and anatomical site are primary determinants of HA filler duration in the lower face. High-cohesively fillers placed deeply in the supraperiosteal plane yield the longest-lasting results, particularly in the chin. Superficial injections and lower-cohesively products are associated with earlier decline, necessitating earlier touch-ups. These findings support evidence-based treatment strategies and provide practical guidance for optimizing outcomes in jawline and chin augmentation.

Table 3. Patient Satisfaction and Safety Outcomes

Sample Size	Patient Satisfaction (GAIS Score, mean)	Duration of High Satisfaction (months)	Adverse Events	Severity / Notes
45	3.2 / 4	9	Edema, bruising	Mild, transient
60	3.4 / 4	11	Tenderness, ecchymosis	Mild, resolved within 7 days
50	3.0 / 4	8	Edema, mild erythema	Mild, no sequelae
72	3.5 / 4	13	Bruising, localized swelling	Mild to moderate, resolved spontaneously
120	3.6 / 4	14	Edema, ecchymosis, nodules	Mild, transient; no serious complications

Table 3 provides a comprehensive overview of patient satisfaction and safety outcomes associated with the use of hyaluronic acid (HA) fillers in jawline and chin augmentation. Patient-reported outcomes, quantified via the Global Aesthetic Improvement Scale (GAIS), and documented adverse events offer critical insights into both the effectiveness and the tolerability of HA filler treatments.

Patient Satisfaction: Across all included studies, GAIS scores ranged from 3.0 to 3.6 on a 4-point scale, indicating a high level of patient-reported satisfaction with treatment outcomes. Cohen et al. (2013) reported a mean GAIS score of 3.2 at 9 months' follow-up, which reflects sustained satisfaction coinciding with the duration of clinical effect. Smith and Lee (2015) observed slightly higher satisfaction (3.4/4) over 11 months, suggesting that improved contouring and filler placement techniques in the jawline can enhance patient perception of aesthetic improvement. Patel et al. (2016), using medium-cohesively HA in superficial injections, reported a lower mean

satisfaction of 3.0, paralleling the shorter duration of effect noted in their study.

Garcia et al. (2017) and Kim et al. (2021), which utilized high-viscosity and high-cohesively fillers with deep placement, demonstrated the highest GAIS scores (3.5-3.6) sustained over 13-14 months. These findings support the principle that filler selection and injection technique significantly influence not only clinical longevity but also patient satisfaction. Deep supraperiosteal placement of structurally robust fillers likely provides more stable contours, minimizing visible resorption and preserving natural aesthetic outcomes. Importantly, these results highlight that patient satisfaction generally tracks the duration of clinical effect; as filler volume diminishes, perceived improvement may decline, reinforcing the importance of evidence-based counseling regarding expected longevity.

Duration of High Satisfaction: High satisfaction was sustained for a duration closely aligned with mean filler effect. For example, Kim et al. (2021) reported sustained satisfaction for approximately 14 months, consistent with their volumetric analysis of filler retention. This parallel indicates that objective and subjective outcomes are largely congruent, strengthening confidence in both volumetric assessment and patient-reported outcome measures. Across studies, the duration of high satisfaction was shortest in superficial injections or lower-cohesively fillers (Patel et al., 8 months) and longest with high-cohesively, deep injections (Kim et al., 14 months). Such consistency underscores the critical influence of technical and product variables on patient experience.

Safety and Adverse Events: Reported adverse events across the studies were predominantly mild and transient, including edema, ecchymosis (bruising), tenderness, erythema, and localized swelling. Cohen et al. (2013) reported edema and bruising as the most common reactions, all resolving spontaneously. Smith and Lee (2015) and Garcia et al. (2017) observed similar patterns, with symptoms resolving within 7-14 days. Importantly, no study reported severe vascular complications, tissue necrosis, or long-term sequelae, highlighting the overall safety of HA fillers in the lower face when performed by trained clinicians.

A few studies noted transient nodular formation or localized swelling (Kim et al., 2021), which resolved with conservative management. These minor complications are well-documented in HA filler literature and are generally associated with injection technique, product placement, or post-procedural care. The consistency of mild adverse events across multiple studies reinforces the notion that HA fillers are safe and predictable interventions for jawline and chin augmentation.

Clinical Implications: From a clinical perspective, these findings have several practical implications. First, patient satisfaction is closely linked to filler type, injection depth, and anatomical placement, emphasizing the need for careful treatment planning. Second, clinicians can reassure patients that adverse events are typically mild, transient, and self-limiting, which supports HA fillers as a low-risk, minimally invasive alternative to surgical augmentation. Third, understanding the expected duration of high satisfaction helps clinicians schedule touch-ups and manage patient expectations effectively, enhancing overall treatment experience.

Limitations and Future Directions: While the data demonstrate high satisfaction and favorable safety profiles, several limitations exist. Most studies rely on subjective assessment scales, which may introduce bias. Standardization of outcome measures, including combining objective volumetric data with validated patient-reported scales, would enhance reliability. Additionally, long-term follow-up beyond 24 months is scarce, limiting insights into very late resorption and satisfaction trajectories. Future research should also explore variations in patient-specific factors such as age, metabolism, and lifestyle, which may influence both aesthetic outcomes and complication rates. Table 3 clearly indicates that HA fillers in the jawline and chin provide high patient satisfaction for approximately 12-14 months, particularly when high-cohesively fillers are placed in deep planes. Mild and transient adverse events are common but manageable, affirming the overall safety of the procedure. These findings provide strong evidence for the efficacy, durability, and tolerability of HA fillers in lower-face augmentation and guide clinicians in optimizing patient outcomes.

Table 4. Comparison of Key Studies on HA Filler Duration in Jawline and Chin

Sample Size	Filler Type	Injection Site & Depth	Follow-up (months)	Mean Duration of Effect	Key Findings / Notes
45	High-cohesively HA	Chin, Supraperiosteal	12	9	Filler effective; mild transient edema & bruising
60	High-cohesively HA	Jawline, Deep	12	11	High satisfaction; tenderness/ecchymosis resolved quickly
50	Medium-cohesively HA	Chin, Superficial	12	8	Shorter duration; mild erythema & edema

72	High-viscosity HA	Chin, Deep	18	13	3D volumetric assessment; sustained improvement; mild bruising
1500	Various HA	Various	6-18	9-12	Longer-lasting results with high-cohesively fillers; heterogeneity noted
200	High-cohesively HA	Chin & Jawline, Deep	12	12	Patient-specific factors affect longevity; consistent satisfaction
120	High-cohesively HA	Jawline & Chin, Supraperiosteal	24	14	Largest multicenter study; volumetric & GAIS data; mild transient adverse events

Table 4 provides a synthesized comparison of the most relevant studies examining the duration of effectiveness of hyaluronic acid (HA) fillers in the jawline and chin. This comparative framework offers insights into methodological approaches, treatment outcomes, and gaps in prior research, serving as a foundation for contextualizing the present systematic review and meta-analysis.

Sample Sizes and Study Designs: The studies range from relatively small prospective cohorts, such as Cohen et al. (45 patients) and Patel et al. (50 patients), to larger multicenter investigations like Kim et al. (120 patients) and systematic reviews including Jones et al. (1,500 patients). Smaller studies often provide granular insights into injection techniques and filler types but may lack generalizability due to limited sample sizes. Conversely, larger studies, while broader in scope, sometimes report more generalized outcomes with reduced granularity. The combination of small-scale prospective studies and comprehensive reviews enables a balanced understanding of both mechanistic and population-level effects.

Filler Type and Injection Characteristics: Across studies, high-cohesively HA fillers dominate, particularly in interventions aiming for jawline or chin contouring. High-cohesively fillers are consistently associated with longer duration (9-14 months) and higher patient satisfaction. In contrast, medium-cohesively fillers (e.g., Patel et al.) exhibit shorter clinical effectiveness (8 months), underscoring the impact of filler rheology on outcomes. Injection depth also emerges as a critical determinant; deep or supraperiosteal placement provides greater longevity and structural support, whereas superficial injections result in faster resorption and earlier need for touch-ups.

Follow-up Duration and Outcome Assessment: Follow-up periods vary from 6 months to 24 months. Studies with longer follow-up, such as Kim et al. (24 months) and Garcia et al. (18 months), employed objective volumetric assessments alongside subjective scales like GAIS, allowing for more precise measurement of filler persistence. Earlier studies often relied solely on physician-assessed or patient-reported outcomes, which, while valuable, are subject to perceptual bias. This evolution in methodology reflects an increased emphasis on integrating quantitative imaging with validated subjective scales to better capture both clinical and patient-centered outcomes.

Consistency of Findings: Despite differences in study design, the results are remarkably consistent. All studies report clinically meaningful aesthetic improvements in jawline and chin regions, with mean duration ranging from 8 to 14 months, depending on filler type and injection depth. High-cohesively, deep injections achieve the longest persistence, while superficial or medium-cohesively fillers degrade more rapidly. Patient satisfaction aligns closely with measured duration of effect, suggesting that clinical outcomes and patient perception are largely congruent.

Safety Profiles: Safety outcomes across studies are uniformly favorable. Mild, transient adverse events primarily edema, bruising, erythema, and tenderness are commonly reported but resolve without sequelae. No study documented serious vascular complications, supporting the established safety profile of HA fillers when administered by experienced clinicians. Kim et al. (2021) and Garcia et al. (2017) further highlight that advanced volumetric techniques can help minimize over- or under-filling, reducing complication risks.

Implications for Clinical Practice: The comparative analysis emphasizes that both filler characteristics and injection technique are crucial for optimizing durability and patient satisfaction. Deep, high-cohesively fillers in the jawline and chin provide the most predictable and long-lasting outcomes. Clinicians should use this evidence to tailor individualized treatment plans, counsel patients on expected duration, and schedule touch-ups appropriately. Moreover, objective volumetric measurements are increasingly recommended to monitor filler degradation and guide retreatment decisions.

Gaps and Future Research: Despite consistent findings, gaps remain. Variation in study design, small sample sizes, heterogeneity in outcome measures, and short follow-up in many studies limit direct comparability. Long-term (>24 months) outcomes are rarely reported, and there is limited evaluation of patient-specific factors (e.g., metabolic rate, lifestyle, age) that may influence filler longevity. Future research should focus on large-

scale, multicenter, standardized studies incorporating both objective and subjective outcome measures to establish more precise guidelines for filler selection and injection techniques. Table 4 contextualizes the present systematic review within the existing literature, highlighting that HA fillers provide effective jawline and chin augmentation, with mean duration of 8-14 months. High-cohesively, deeply injected fillers yield the longest-lasting results, and adverse events are predominantly mild and transient. This comparative analysis reinforces the value of careful filler selection and technique optimization, providing an evidence-based framework for clinical practice and informing future research directions in lower-face aesthetic enhancement.

Discussion

The present systematic review and meta-analysis provide a comprehensive evaluation of the duration of effectiveness, patient satisfaction, and safety of hyaluronic acid (HA) fillers in jawline and chin augmentation. By synthesizing data from 18 studies encompassing over 1,200 patients, this review elucidates the key factors influencing filler longevity and outcomes, including filler cohesively, injection depth, anatomical site, and patient-specific variables**.**

Duration of Effectiveness and Key Determinants: Our findings indicate that HA fillers provide clinically meaningful enhancement of the jawline and chin for an average of 12.4 months. This aligns with previous reports by Cohen et al. (2013), Smith & Lee (2015), and Garcia et al. (2017), who reported durations ranging from 9 to 13 months depending on filler properties and injection technique. The meta-analytic results demonstrate that high-cohesively, high-viscosity fillers, when placed in deep or supraperiosteal planes, yield the longest-lasting outcomes, with mean durations exceeding 14 months in select studies (Kim et al.,2021). Conversely, medium- or low-cohesively fillers, particularly when injected superficially, exhibited shorter persistence, averaging 8-10 months. These findings reinforce the principle that filler rheology and anatomical placement are primary determinants of durability, consistent with prior evidence (Jones et al.,2019; Wang et al.,2020).

Subgroup analyses (Table 2) further clarify these relationships. Deep/supraperiosteal injections provide structural support against mechanical forces, minimizing early resorption, whereas superficial injections are more susceptible to enzymatic degradation and dynamic stress. Moreover, anatomical site influences longevity: chin augmentations generally sustain longer effect (13.0 months) than jawline treatments (11.7 months), likely due to reduced lateral stress and the ability to place filler in a concentrated, deep plane. This site-specific difference underscores the need for tailored treatment planning based on facial anatomy.

Patient Satisfaction and Safety: Patient satisfaction, as measured by GAIS scores, was consistently high across studies, ranging from 3.0 to 3.6 on a 4-point scale (Table 3). Satisfaction largely mirrored the objective duration of filler effect, demonstrating a strong correlation between clinical persistence and perceived aesthetic improvement. Notably, high-cohesively fillers in deep placements maintained the highest levels of satisfaction over extended follow-up periods, confirming that technical optimization enhances patient experience. The sustained satisfaction over 12-14 months in studies such as Kim et al. (2021) supports the clinical utility of HA fillers for long-term lower-face augmentation.

Adverse events were predominantly mild and transient, including edema, ecchymosis, tenderness, and localized swelling, resolving spontaneously within 7-14 days. No serious vascular complications or long-term sequelae were reported. These safety outcomes are consistent with the broader HA filler literature, indicating that when performed by trained clinicians, jawline and chin augmentation is minimally invasive and low-risk.

Comparison with Previous Literature: Table 4 situates our findings within the context of prior research. Studies consistently demonstrate the advantage of high-cohesively, deep-injected fillers in prolonging clinical effect and patient satisfaction. For example, Garcia et al. (2017) utilized three-dimensional volumetric imaging to confirm that high-viscosity HA in deep chin augmentation sustained volume for 13 months, paralleling the pooled mean in our meta-analysis. Similarly, Wang et al. (2020) highlighted patient-specific factors such as metabolic rate and age, which may explain interindividual variability in filler persistence. The alignment between our meta-analytic results and prior systematic reviews (Jones et al.,2019) reinforces the robustness of these conclusions.

Clinical Implications: Several practical insights emerge from this analysis.

First, product selection is paramount**:** clinicians should favor high-cohesively or high-viscosity fillers for jawline and chin augmentation when longevity is a priority.

Second, injection depth should be carefully planned; deep or supraperiosteal placement optimizes durability and aesthetic outcome.

Third, patient counseling should incorporate realistic expectations regarding duration of effect, anatomical site differences, and potential minor adverse events.

Fourth, objective monitoring through volumetric assessment and standardized aesthetic scales is recommended for precision and documentation of treatment outcomes. Collectively, these strategies

can enhance both clinical effectiveness and patient satisfaction**.**

Limitations and Sources of Heterogeneity: Despite the strength of the meta-analysis, several limitations warrant consideration. Moderate heterogeneity (I^2=55-62%) was observed across analyses, reflecting variability in study design, filler types, injection techniques, follow-up duration, and outcome measurement methods. Most studies utilized small to moderate sample sizes, and a minority relied solely on subjective aesthetic scales rather than objective volumetric measures. Additionally, follow-up beyond 24 months remains limited, constraining our ability to assess very long-term filler persistence. Confounding factors such as patient age, metabolic rate, lifestyle, and concomitant aesthetic treatments (e.g., neuromodulators) may also influence outcomes.

Future Research Directions: To address these gaps, future studies should prioritize large-scale, multicenter trials with standardized, validated outcome measures, combining volumetric imaging with patient-reported satisfaction scales. Extended follow-up beyond 24 months is essential to capture long-term filler degradation patterns. Furthermore, exploring patient-specific predictors of longevity such as tissue metabolism, skin elasticity, and lifestyle factors will facilitate personalized treatment planning. Comparative studies of emerging filler formulations, including hybrid or mixed HA products, may also refine clinical strategies for lower-face augmentation.

In summary, this systematic review and meta-analysis confirms that HA fillers provide effective, long-lasting augmentation of the jawline and chin, with mean duration of 12-14 months depending on filler type, injection depth, and anatomical site. High-cohesively fillers injected deeply yield the most durable outcomes, maintain high patient satisfaction, and are associated with low incidence of mild, transient adverse events. Our findings align with and extend prior research, offering evidence-based guidance for clinical practice and highlighting areas for future investigation.

Conclusion

This systematic review and meta-analysis provides a comprehensive evaluation of hyaluronic acid (HA) fillers for jawline and chin augmentation, integrating evidence from 18 studies with over 1,200 patients. Our findings demonstrate that HA fillers are a safe, effective, and minimally invasive option for lower-face enhancement, with clinically meaningful aesthetic results sustained for an average of 12-14 months. Key determinants of longevity include filler cohesively, injection depth, and anatomical site. High-cohesively or high-viscosity fillers, when injected deeply in the supraperiosteal plane, consistently provide the longest-lasting outcomes, particularly in the chin. Superficial placement or the use of medium- or low-cohesively fillers is associated with shorter duration of effect. These results align with prior studies (Cohen et al.,2013; Garcia et al.,2017; Kim et al.,2021) and confirm the importance of careful product selection and technique optimization in clinical practice. Patient satisfaction, measured by the Global Aesthetic Improvement Scale (GAIS), remained high throughout follow-up, closely paralleling the duration of clinical effect. Adverse events were predominantly mild and transient, including edema, ecchymosis, tenderness, and localized swelling, with no serious vascular or long-term complications reported. This emphasizes the favorable safety profile of HA fillers when administered by trained clinicians. Our review also highlights gaps in the literature. Variability in study design, filler characteristics, outcome measures, and follow-up duration contributes to moderate heterogeneity. Limited long-term data (>24 months) and insufficient evaluation of patient-specific factors such as age, metabolic rate, and lifestyle restrict precise prediction of individual outcomes. Future research should prioritize large-scale, multicenter trials, standardized objective and subjective outcome measures, and extended follow-up to enhance evidence-based guidance.

In conclusion, HA fillers are an effective and durable solution for jawline and chin augmentation, offering high patient satisfaction with minimal adverse events. Optimal outcomes are achieved by selecting high-cohesively fillers and employing deep or supraperiosteal injection techniques, with consideration of anatomical site and patient characteristics. This evidence supports informed clinical decision-making, allowing practitioners to provide personalized, predictable, and safe lower-face aesthetic enhancement.

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Authors' Contributions

All authors contributed to data analysis, drafting, and revising of the paper and agreed to be responsible for all the aspects of this work.

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