DOI 10.23804/ejpd.2026.2760

Oral Care Management in Pediatric Patients Affected by Epidermolysis Bullosa: A Systematic Review with Narrative Synthesis and Appraisal of Guidelines



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Abstract

Background Epidermolysis Bullosa (EB) is a group of rare genetic diseases that cause extremely fragile skin and mucous membranes. In children, oral hygiene and dental procedures are challenging and require a consistent, minimally traumatic approach. Management focuses on prevention, individualized care and coordinated multidisciplinary collaboration to improve paediatric patients' quality of life.
Methods A systematic review with qualitative narrative synthesis, conducted according to PRISMA guidelines on pediatric hereditary epidermolysis bullosa (EB) was performed. The review was conducted using PubMed, Scopus, Embase and grey literature, covering the period from 2000 to 2025. Caries and gingival indices, the safety and feasibility of procedures, the success of minimally invasive restorations, orthodontic and space management, and overall oral health-related quality of life (OHRQoL) were extracted among the selected outcomes. We assessed the risk of bias using RoB 2, ROBINS-I, and JBI, and evaluated certainty with GRADE. Guidelines and consensus documents were reviewed separately and used to contextualize.
Results In terms of results, we found fifty-five studies, mostly small observational ones or series. The findings
suggested prevention strategies led to reduced risk of caries and improved gingival health. Glass ionomer cement (GIC) and atraumatic restorations showed decent performance in the short to mid-term. Anesthesia and sedation methods tailored for EB patients reported minimal adverse events, and simplified orthodontic approaches proved feasible. Additionally, OHRQoL seemed to improve with low-trauma care. Overall, we rated the certainty of evidence of these findings as very low to low.
Conclusions The available evidence was, in general, limited and heterogeneous. Therefore, any recommendations should be conditional. However, it appears reasonable to emphasize atraumatic, minimally invasive, prevention-first, and multidisciplinary care is mandatory. There is an urgent need for prospective studies with standardized outcomes and adequate follow-up studies to strengthen EB management in paediatric patients.

KEYWORDS Paediatric dentistry; hereditary epidermolysis bullosa; minimally invasive dentistry; oral health-related quality of life (OHRQoL)

INTRODUCTION

The term "epidermolysis bullosa" (abbreviated "EB") derives from the Greek words "epidermis" (surface of the skin), "lysis" (break), and "bulla" (blister). The etymology of this disease describes its main clinical feature: the formation of blisters and ulcers on the skin and mucosa, which can result from minimal trauma or even spontaneously. Overall incidence and prevalence of the disease within the United States is approximately 19 per one million live births and 8 per one million population, respectively [Esposito et al. 2015; Singh-Rambiritch n.d.]. EB comprises a heterogeneous group of rare genetic disorders, classified into four main forms: simplex, junctional, dystrophic, and Kindler. These four forms differ in the level of tissue cleavage and the severity of the clinical outcomes [Fine et al. 2014; Rodrigues N.S. et al. 2021].

Recently, the classification has been reviewed by an International Consensus Committee since the mutated genes and targeted proteins might present different clinical outcomes along with both autosomal recessive and dominant characterisation, along with similarities with other groups of genetic-related skin alteration. The Committee proposed adding also other clinical manifestations and genetic alterations causing skin fragility or peeling even when blisters are minimal or absent [Has et al. 2020]. Symptoms and signs appear in the first months of life including skin fragility, chronic pain, and recurrent infections to which these patients are at greater risk, as well as severe functional limitations. However, skin biopsy and genetic testing are necessary for a diagnosis confirmation. Generally, manifestations include blistering of the hands and feet to generalised blistering of the skin and oral cavity, and injury to many internal organs [Fine 2010].

The oral cavity is frequently affected with conditions such as microstomia, ankyloglossia, gingivitis, high prevalence of caries, and premature tooth loss are common complications. Other factors include intraoral wounds, gingivitis and periodontal disease, gingival hyperplasia, vestibular obliteration, cheilitis, angular cheilitis, chronic lip wounds, microstomia, and oral squamous cell carcinoma. A recent study in 2024 by Krämer et al. hypothesised the involvement of hypoplastic pitted amelogenesis imperfecta [Krämer et al. 2024].

These complications are often aggravated by the patient's significant difficulty performing daily oral hygiene routines, due to the limitation and difficulty opening their mouths that often characterise patients with this disease. This is also compounded by an unbalanced diet rich in soft foods, which are often processed, and with high dosage of sugar, being an option for a diet that is simple to chew and avoids pain during alimentation [Zidorio et al. 2023; Louloudiadis and Louloudiadis 2009]. In fact, Nakamura et al. proposed a nutritionally balanced melt-in-the-mouth chocolate "andew" which prevents this type of negative alimentary problems and offers a solution different from drinkable-only aliments which might improve nutritional status and reduce anaemia [Nakamura et al. 2023].

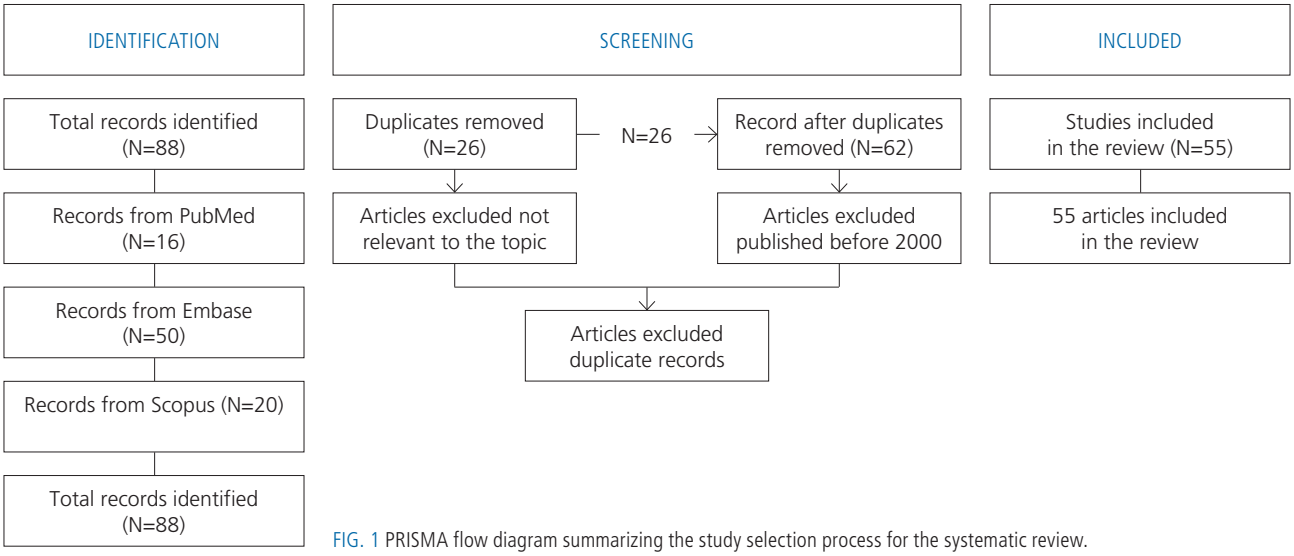


FIG. 1 PRISMA flow diagram summarizing the study selection process for the systematic review.

Clinical management of these patients has been a challenge for dentists, especially for paediatric EB patients. Indeed, the difficulty of such a delicate condition is compounded by the difficulty of managing a patient who, due to their age, may not be particularly compliant. Conventional dental treatments are often difficult to be delivered due to the fragility of dental, oral and peri-oral tissues, the high risk of mucosal trauma, and behavioural difficulties related to associated fear of pain [Hany et al. 2024]. Advances in clinical knowledge and multidisciplinary approach have allowed the development of specific preventive and therapeutic strategies, with the aim of reducing the onset of complications and improving the oral care of EB paediatric patients [Inchingolo et al. 2024; Tortora et al. 2023; Chang C. et al. 2020]. International clinical practice guidelines endorsed by DEBRA International have highlighted the need for atraumatic, prevention-focused, and multidisciplinary dental care for patients with epidermolysis bullosa, emphasising tailored protocols across different EB subtypes and throughout the lifespan [Krämer et al. 2020].

Today, the dental management of EB paediatric patients is based on an approach focused on prevention, pain control, and the adaptation of clinical procedures and requires the use of atraumatic instruments and biocompatible materials also aided with dedicated and personalised oral hygiene and nutrition protocols [Mohn et al. 2025; Cenzato et al. 2025]. At the same time, anaesthesia and sedation, as well as prosthetic and orthodontic rehabilitation, require dedicated protocols and extensive clinical experience [Retrosi et al. 2022]. However, to date, no international consensus has been reached, and an extensive revision of the current protocols is missing. Also, due to the different manifestations of EB, a multitude of multidisciplinary recommendations have to be taken into account.

In this paper, attention is focused on outlining the fundamental principles of paediatric dental management of patients with epidermolysis bullosa, highlighting the preventive, therapeutic, and rehabilitative implications, and emphasising the importance of an integrated and multidisciplinary approach, and to systematically review the current knowledge on the topic.

MATERIALS AND METHODS

Methods Summary

A systematic review with qualitative narrative synthesis was conducted in accordance with PRISMA guidelines, focusing on paediatric hereditary epidermolysis bullosa (EB), while excluding EBA (epidermolysis bullosa acquisita). The review was conducted across major scientific databases (PubMed, Scopus, Embase, MEDLINE, Cochrane), covering the years 2000 to 2025, with no language restrictions. Grey literature was subsequently checked. Caries prevalence and gingival indices, the safety and feasibility of procedures, the success of minimally invasive restorations, orthodontic and space management, and overall oral health-related quality of life (OHRQoL) outcomes were collected. Risk of bias was assessed using RoB 2, ROBINS-I, and JBI, and certainty of evidence was evaluated using GRADE. Clinical practice guidelines, consensus statements, and other sources were identified separately and used to support contextual clinical interpretation, not as part of the main evidence. The systematic review has been registered on PROSPERO with registration number CRD420251161358.

Theses

The aim of this review was to identify and collect the scientific evidence available in the literature on the dental management of paediatric patients with epidermolysis bullosa, analysing preventive approaches, restorative techniques, anaesthesiological protocols, and rehabilitation strategies tailored to the young patient with EB, with the aim of improving oral health and quality of life.

Study Selection

The systematic search was conducted on PubMed, Embase, MEDLINE, Cochrane, and Scopus using a controlled vocabulary (MeSH terms) and free-text keywords. The search strategy combined the following MeSH terms: epidermolysis bullosa, oral health, oral hygiene, preventive dentistry, dentistry, oral medicine, children, and paediatric dentistry. Boolean operators (AND/OR) were applied to ensure comprehensive coverage. Articles in the grey literature were also reviewed. Duplicates

retrieved from the databases were removed. Two reviewers independently screened the titles and abstracts to assess eligibility. Discrepancies were resolved through collective discussion among the authors. The systematic search identified 86 records across databases, with 2 additional records from grey literature. After removal of duplicates and screening, 55 studies were included in the qualitative synthesis (Figure 1). Clinical practice guidelines and consensus statements endorsed by international rare disease networks (e.g. DEBRA International) were included and analysed narratively. The study selection process is summarised in the PRISMA flow diagram.

Inclusion Criteria

This systematic review included randomised controlled trials (RCTs), case reports, case series, and observational studies evaluating preventive, restorative, anaesthetic, and rehabilitative approaches in the dental management of paediatric patients with epidermolysis bullosa. Only articles published within the time frame 2000–2025 were included. Articles involving children and adolescents (0–18 years) with hereditary (inherited) epidermolysis bullosa (EBS, JEB, DEB, Kindler) were included. Secondary literature, including narrative reviews, systematic reviews, meta-analyses, conference abstracts, and editorials, was excluded from the primary evidence synthesis.

Exclusion Criteria

Articles not focused on paediatric patients, studies not related to the dental management of epidermolysis bullosa, in vitro or animal studies, preclinical studies, and documents without full text were excluded from the systematic review. Duplicate documents retrieved from different databases were also removed. Articles published before 2000 were excluded. Epidermolysis bullosa acquisita (EBA) and other autoimmune blistering diseases were not within the scope of this review.

Review Hypotheses

This systematic review is based on the hypothesis that the adoption of preventive, minimally invasive, and personalised dental strategies in paediatric patients with EB is associated with improved control of caries and inflammatory diseases, a reduction in iatrogenic complications, and an improvement in oral health-related quality of life. Specifically, it is hypothesised that early prevention and oral hygiene education protocols reduce the incidence of caries and gingivitis; that the use of atraumatic restorative techniques and biocompatible materials improves the safety and durability of conservative treatments; that anaesthesia and sedation protocols specifically adapted to patients with EB allow dental treatments to be performed with a low risk of adverse events; and that simplified rehabilitative and orthodontic approaches, when indicated, are clinically feasible without increasing soft tissue trauma.

PICO and Pre-specified Outcomes

P – Population: children and adolescents (0–18 years) with hereditary (inherited) epidermolysis bullosa (EBS, JEB, DEB, Kindler) receiving dental care. Epidermolysis bullosa acquisita (EBA) and other autoimmune diseases were excluded.

I – Interventions: dental and oral management strategies, including preventive protocols, minimally invasive restorative care, anaesthesia/sedation protocols adapted for EB, and rehabilitative/orthodontic strategies designed to minimise mucosal trauma.

C – Comparators: when available (healthy controls or alternative dental approaches). For descriptive designs (case reports/series), no comparator was required.

O – Outcomes: Primary: due to the expected heterogeneity of the evidence, both clinical and patient-reported outcomes were included, even when not uniformly defined across studies (caries experience, gingival status, procedural safety, OHRQoL).

Secondary: oral health-related quality of life (OHRQoL), pain and functional limitations (chewing/speaking), oral lesions/blisters, impact of microstomia/ankyloglossia, treatment acceptability/adherence, and family care burden.

Study designs: randomised and non-randomised clinical studies, cohort, case–control and cross-sectional studies, case series/reports; guidelines and position statements were used narratively. Meta-analysis was not planned a priori due to expected heterogeneity.

Search Strategy

A systematic search was performed with the following string: ("epidermolysis bullosa"[MeSH Terms] OR "epidermolysis bullosa"[tiab]) AND ("oral health"[MeSH Terms] OR "oral hygiene"[MeSH Terms] OR "preventive dentistry"[MeSH Terms] OR "oral health care"[tiab] OR "preventive care"[tiab] OR "oral complications"[tiab]) AND ("dentistry"[MeSH Terms] OR dentistry[tiab] OR dentist*[tiab] OR "oral medicine"[tiab]) AND (child[MeSH Terms] OR children[tiab] OR child[tiab] OR pediatric[tiab] OR paediatric[tiab]) AND ("2000/01/01"[Date - Publication] : "3000"[Date - Publication]). In Scopus, the following string was entered: TITLE-ABS-KEY("epidermolysis bullosa") AND ("oral health" OR "oral hygiene" OR "preventive dentistry" OR "oral health care" OR "preventive care" OR "oral complications") AND (dentistry OR dentist OR "oral medicine") AND (child OR children OR pediatric* OR paediatric*), limiting the search to the time frame 2000–2025 and adapted accordingly for each database.

The search was not restricted by language.

Studies on hereditary (inherited) epidermolysis bullosa (EBS, JEB, DEB, and Kindler Syndrome) were included, while studies on epidermolysis bullosa acquisita (EBA) were excluded.

Data Selection and Coding

Two independent reviewers reviewed and selected studies based on the inclusion and exclusion criteria. Disagreements were resolved by consensus. The following information was extracted from each study and included in a summary table: subject, authors, title, year, study design, participants, and results (Table 1). To preserve methodological consistency, only primary clinical studies contributed to the structured evidence synthesis and certainty assessment.

ROB

Randomised controlled trials (RCTs), when present, were evaluated using the revised Cochrane Risk of Bias tool (RoB 2). Non-randomised interventional and observational studies were assessed using the Risk Of Bias In Non-randomised Studies of Interventions (ROBINS-I) tool. Case reports and case series were evaluated using the Joanna Briggs Institute (JBI) critical appraisal checklists specific to each study design.

Two reviewers independently performed the risk of bias assessment for each included study. Any discrepancies were resolved through discussion among the authors. The findings of the risk of bias assessment were used to inform the interpretation of results and to support the certainty of evidence evaluation using the GRADE approach.

Due to the rarity of epidermolysis bullosa and the consequent low level of evidence, a broad range of study designs was con-

Study_ ID	Authors	Title	Year	Study design	Population / Participants	Sample size (N)	Intervention / Exposure (if applicable)
1	Krämer SM et al.	Oral health care for children and adults living with epidermolysis bullosa	2020	Clinical practice guidelines	Children and adults with EB	NA	Preventive & clinical oral care protocols
2	Polizzi A et al.	Oral alterations in heritable epidermolysis bullosa	2022	Clinical observational study & review	Patients with heritable EB	N=8	Oral clinical assessment
3	Azrak B et al.	Dystrophic epidermolysis bullosa: oral findings and problems	2006	Cross-sectional clinical study	Patients with dystrophic EB	N=15	Clinical oral examination
4	Marini I et al.	Sucralfate: a help during oral management in patients with epidermolysis bullosa	2001	Clinical observational study	Patients with EB	N=10	Topical sucralfate application
5	Kummer TR et al.	Oral manifestations and challenges in dental treatment of epidermolysis bullosa dystrophica	2013	Case series	Patients with dystrophic EB	N=5	Dental treatment under precautions
6	Dağ C et al.	Dental management of patients with epidermolysis bullosa	2014	Narrative review / case series	Patients with EB	NA	Dental management strategies
7	Oliveira TM et al.	Clinical management for epidermolysis bullosa dystrophica	2008	Case report	Child with dystrophic EB	N=1	Preventive and restorative dental care
8	Torres CP et al.	Dental care management in a child with recessive dystrophic epidermolysis bullosa	2011	Case report	Child with recessive dystrophic EB	N=1	Multidisciplinary dental management
9	Momeni A, Pieper K	Junctional epidermolysis bullosa: a case report	2005	Case report	Child with junctional EB	N=1	Dental management under precautions
10	Krämer S et al.	Oral health care pathways for patients with epidermolysis bullosa: A position statement from the European reference network for rare skin diseases	2025	Position statement / Consensus	Patients with epidermolysis bullosa	NA	Oral health care pathways
11	Véliz S. et al.	Mini-implant assisted palate expansion and digital design in junctional epidermolysis bullosa and amelogenesis imperfecta: Case report	2024	Case report	Patient with junctional epidermolysis bullosa and amelogenesis imperfecta	N=1	Mini-implant assisted palate expansion
12	Marty M et al.	Perception of Oral Health-Related Quality of Life in Children with Epidermolysis Bullosa: A Quantitative and Qualitative Study	2023	Mixed-methods (quantitative + qualitative)	Children with epidermolysis bullosa	Not specified	Oral health interventions
13	Joseph C et al.	Oral health status in patients with inherited epidermolysis bullosa: a comparative multicenter study	2023	Multicenter comparative study	Patients with inherited epidermolysis bullosa	Not specified	Oral health assessment
14	Fortuna G et al.	Clinical features of gingival lesions in patients with dystrophic epidermolysis bullosa: a cross-sectional study	2015	Cross-sectional study	Patients with dystrophic epidermolysis bullosa	Not specified	Gingival lesion evaluation
15	Čolović A et al.	Oral health status in children with inherited dystrophic epidermolysis bullosa	2017	Observational	Children with inherited dystrophic epidermolysis bullosa	Not specified	Oral health assessment
16	Lindemeyer R et al.	Dental and anaesthetic management of children with dystrophic epidermolysis bullosa	2009	Case series / Clinical management	Children with dystrophic epidermolysis bullosa	Not specified	Dental and anaesthetic interventions
17	Prodinger C et al.	The natural history of laryngo-onycho-cutaneous syndrome: A case series of six pediatric patients and literature review	2021	Case series + literature review	Pediatric patients with laryngo-onycho-cutaneous syndrome	N=6	Clinical observation

TAB. 1A Summary of the selected studies.

Study_ ID	Authors	Title	Year	Study design	Population / Participants	Sample size (N)	Intervention / Exposure (if applicable)
18	Véliz S. et al.C21	Orthodontic Treatment in Patients With Epidermolysis Bullosa (EB)-Clinical Practice Guidelines (CPG)	2025	Clinical practice guidelines	Patients with EB	NA	Orthodontic interventions
19	Korolenkova MV et al.	Anesthesia for dental care management in children with dystrophic epidermolysis bullosa	2022	Clinical management / Case series	Children with dystrophic epidermolysis bullosa	Not specified	Anesthetic and dental interventions
20	EB2020 Organizers	EB2020 1st World Congress on Epidermolysis Bullosa, January 19-23, 2020, London, UK	2020	Conference proceedings	International EB stakeholders	NA	Conference presentations
21	Krämer SM et al.	Clinical practice guidelines: Oral health care for children and adults living with epidermolysis bullosa	2012	Clinical practice guidelines (systematic review + expert consensus)	Children and adults with all major EB subtypes	NA	Evidence-based recommendations for oral prevention, dental treatment, anesthesia and long-term management in EB
22	Jogendra S. et al.	Comprehensive and novel dental management of a child with epidermolysis bullosa	2014	Case report	Pediatric with EB simplex/generic EB, early childhood caries	N=1	Dental management with novel impression & treatment techniques
23	Chuang LC et al.	A fixed denture for a child with epidermolysis bullosa simplex	2015	Case report	Girl (3 years old) with EB simplex	N=1	Full mouth rehabilitation + fixed denture
24	Cruz E. et al.	Oral rehabilitation under general anesthesia of pediatric patient with diagnosis of epidermolysis bullosa. Clinical case report	2013	Case report	Pediatric child with EB undergoing rehabilitation under general anesthesia	N=!	Full oral rehabilitation under general anesthesia
25	Véliz S. et al.	Early teeth extraction in patients with generalized recessive dystrophic epidermolysis bullosa: A case series	2020	Case series	Patients with generalized recessive dystrophic EB (RDEB)	N=3	Early extraction of teeth to prevent crowding and soft-tissue trauma
26	Joanning T et al.	Correlation between measured oral health and oral health-related quality of life in people with epidermolysis bullosa: a prospective cohort study.	2024	Prospective cohort study	Adolescents and adults with different EB subtypes	N=33	Clinical oral examination and OHRQoL questionnaires (OHIP)
27	Leal SC et al.	Higher Dental Caries Prevalence and Its Association with Dietary Habits and Physical Limitation in Epidermolysis Bullosa Patients: A Case Control Study.	2016	Case-control study	Patients with EB vs healthy controls	10 EB + 10 controls	Assessment of dental caries, dietary habits and physical limitations
28	Groß T et al.	Oral health of patients with epidermolysis bullosa compared to healthy controls – a retrospective study from a specialized center	2025	Retrospective case–control study	Patients with epidermolysis bullosa treated in a specialized center	Not specified	Assessment of oral health parameters in EB patients
29	Korolenkova M.V.	Dental treatment in children with dystrophic form of epidermolysis bullosa	2015	Clinical observational study	Children with dystrophic epidermolysis bullosa	Not specified	Dental treatment adapted for dystrophic EB
30	Demir P. et al.	Prevalence of medically compromised children among dental patients: A 10-year retrospective study	2021	retrospective study	Pediatric dental patients with systemic diseases	Not specified	Epidemiological assessment of medically compromised children
31	Ivanchyshyn, V.V. et al.	Prevention of oral diseases in children with epidermolysis bullosa: a case report and literature review; Профілактика захворювань порожнини рота в дітей з бульозним епідермолізом: опис клінічного випадку та огляд стану проблеми	2023	Case report + narrative literature review	Children with epidermolysis bullosa	N=1	Preventive oral health measures adapted for EB (oral hygiene, preventive strategies)

TAB. 1B Summary of the selected studies.

Study_ ID	Authors	Title	Year	Study design	Population / Participants	Sample size (N)	Intervention / Exposure (if applicable)
32	Cadavid A.M.H et al.	Risk of oral candidiasis: profile analysis of patients admitted to the dermatology clinic of a tertiary hospital in southeast of Brazil	2025	Observational cross-sectional study	Patients admitted to dermatology clinic (including bullous and genetic skin diseases such as EB)	Not specified	Evaluation of risk factors for oral candidiasis
33	Kepisty, M. et al.	The lesions of the oral mucosa in patients of developmental age with selected diseases of genetic origin; Zmiany patologiczne błony sluzowej jamy ustnej występujące w wybranych chorobach o podłozu genetycznym u pacjentów w wieku rozwojowym - przegląd pismiennictwa	2015	Narrative literature review	Pediatric patients with genetic diseases (including epidermolysis bullosa)	NA	Review of oral mucosal lesions associated with genetic disorders
34	Rodrigues N.S. et al.	Epidermolysis bullosa – A series of 33 cases	2021	Case series	Patients with epidermolysis bullosa	N=33	Clinical and oral assessment of EB cases
35	Silveira Souza M et al.	Health challenges and importance of using photobiomodulation therapy in patients with epidermolysis bullosa	2025	Cross-sectional study	Patients with epidermolysis bullosa (age NR)	NA	Photobiomodulation therapy (PBMT)
36	Chernyshov PV et al.	Quality-of-Life Measurement in Epidermolysis Bullosa	2025	Position statement / consensus	Patients with EB (all ages)	NA	QoL measurement tools
37	Okutan AE et al.	Developmental defects of enamel and dental anomalies in children with skin diseases	2025	Observational (cross-sectional)	Children with dermatological diseases (including EB)	NR	Skin diseases (incl. EB)
38	Smith Z et al.	The dental needs of children with Epidermolysis Bullosa and service delivery	2024	Scoping review	Children and adolescents with EB	NA	Dental care systems and services
39	Krämer S et al.	Orofacial Anomalies in Kindler Epidermolysis Bullosa	2024	Observational cohort	Patients with Kindler EB (children and adults)	NR	Kindler epidermolysis bullosa
40	Hany U et al.	Heterozygous COL17A1 variants are a frequent cause of amelogenesis imperfecta	2024	Genetic observational study	Patients with amelogenesis imperfecta (with or without EB features)	NR	COL17A1 variants
41	Miyata K et al.	Single-cell RNA sequencing of dental epithelium reveals responsible genes of dental anomalies in humans	2023	Experimental / transcriptomic	Human dental epithelial tissue	NR	Single-cell RNA sequencing
42	Yavuz Y et al.	Evaluation of clinical and oral findings in patients with epidermolysis bullosa	2023	Cross-sectional clinical study	Patients with EB (mixed age groups)	NR	Epidermolysis bullosa
43	Colovic A et al.	Hereditary epidermolysis bullosa and periodontal repercussions	2022	Conference abstract	Patients with hereditary EB	NR	Epidermolysis bullosa
45	Sanjari K et al.	Conservative dental management of a patient with epidermolysis bullosa	2020	Case report	Child with EB	N=1	Conservative dental treatment
46	Chang C-C et al.	Oral care program improves quality of life of patients with epidermolysis bullosa	2020	Interventional program evaluation	Patients with EB (Taiwan)	NR	na
47	Singh-Rambiritch S et al.	Oral Medicine Case Book 48: epidermolysis bullosa	2013	Case report	Patient with EB	N=1	Clinical oral management
48	Rathna Prabhu V. et al.	Dental and anesthetic management of a child with epidermolysis bullosa	2011	Case report	Child with EB	N=1	Dental + anesthetic management
49	Krämer SM	Oral care and dental management for patients with epidermolysis bullosa	2010	Narrative review	Patient with EB	NA	Oral care protocols

TAB. 1C Summary of the selected studies.

Study_ ID	Authors	Title	Year	Study design	Population / Participants	Sample size (N)	Intervention / Exposure (if applicable)
50	Louloudiadis AK et al.	Dystrophic epidermolysis bullosa: dental management and oral health promotion	2009	Case report	Child with dystrophic EB	N=1	Preventive dental care
51	Liversidge HM et al.	Epidermolysis bullosa and dental developmental age	2005	Observational study	Children with epidermolysis bullosa	NR	Epidermolysis bullosa
52	De Benedittis M et al.	Oro-dental manifestations in Hallopeau–Siemens-type recessive dystrophic EB	2004	Observational study	Patients with severe RDEB	NR	Recessive dystrophic EB
53	Shah H et al.	A cephalometric analysis of patients with recessive dystrophic EB	2002	Cross-sectional study	Patients with RDED	NR	Recessive dystrophic EB
54	Harris JC et al.	Dental disease and caries-related microflora in children with dystrophic EB	2001	Case–control study	Children with dystrophic EB	NR	Dystrophic EB
55	Kostara A et al.	Dental maturity in children with dystrophic epidermolysis bullosa	2000	Observational study	Children with dystrophic EB	NR	Dystrophic EB

TAB. 1D Summary of the selected studies.

sidered eligible, including observational studies, case reports, case series, and clinical guidelines.

Studies providing secondary evidence (narrative reviews and guidelines) were not included in the quantitative synthesis but were used to support the contextual and clinical interpretation of findings.

This approach was adopted to comprehensively map the available evidence and to inform clinical practice in a field where higher-level studies are limited.

Statistical Analysis

Due to the heterogeneity in study designs (case reports, case series, cohort studies, comparative studies, guidelines, and position statements), patient ages, EB subtypes, and types of dental interventions, a qualitative synthesis rather than a quantitative meta-analysis was conducted, grouping findings by clinical domains (prevention, restorative care, anaesthesia/sedation, and rehabilitation). Where available, descriptive statistics reported in the included studies were extracted and summarised. The analysis focused on the distribution of study designs, clinical settings, and types of dental interventions performed in paediatric patients with EB.

RESULTS

The analysis of the studies included in this review (55) allowed us to outline a precise and comprehensive picture of the main oral health challenges and management strategies in paediatric patients with EB. The wide heterogeneity of populations and approaches employed represents both a challenge and an opportunity to evaluate the multifactorial aspects of oral hygiene in this rare condition.

Risk of Bias Within Studies

The risk of bias was evaluated based on the design of each study. For randomised controlled trials (RCTs), the RoB 2 tool was intended to be used; for non-randomised or observational studies, ROBINS-I was applied; and for case series and case reports, the Joanna Briggs Institute (JBI) checklists were used, as they are best suited for these types of studies. Two reviewers independently applied the assessment tools, and any disagreements were resolved through discussion. Key domains, including selection, outcome measurement, confounding, data completeness, and selective reporting, were summarised at both the individual study level and across bodies of evidence for each thematic area, namely prevention, restorative practices, anaesthesia/sedation, and rehabilitation. Given the heterogeneity of the included studies and the predominance of case reports and case series, the risk-of-bias assessment was primarily descriptive and not intended for quantitative synthesis (Table 2).

The overall risk of bias of the included studies was high, as the evidence was largely based on case reports and case series, with only a few observational analytical studies showing a moderate to low risk of bias.

Certainty of Evidence (GRADE)

Overall, the confidence in the evidence varied from very low to low across different outcomes. The assessments were mainly downgraded due to concerns about bias (methodological flaws in several studies), indirectness (diverse populations and interventions, along with varying definitions of outcomes), and imprecision (small sample sizes and broad confidence intervals). Inconsistency was often difficult to evaluate because of the limited number of comparable studies, which further contributed to imprecision. Therefore, effect estimates should be interpreted with caution, and any recommendations remain conditional on the need for higher-quality research. Future studies should focus on robust designs, standardised outcome measures (including patient-reported outcomes), and adequate sample sizes to enhance certainty.

The results of this assessment are summarised in Table 3.

The certainty of evidence was downgraded mainly due to methodological limitations. The predominance of case reports and small observational studies introduced a serious risk of bias. Indirectness was frequent, as several studies included both paediatric and adult patients or assessed heterogeneous interventions. Imprecision was common because of small sample sizes and, in some cases, wide variability in outcome measures. Inconsistency could not always be assessed due to the limited number of comparable studies. As a result, the overall certainty of evidence ranged from very low to low across outcomes, meaning that any recommendations should be interpreted with caution and remain conditional until stronger evidence becomes available.

Authors	Title	Year	Study design	ROB
Krämer SM et al.	Oral health care for children and adults living with epidermolysis bullosa	2020	Clinical practice guidelines	MODERATE (AGREE II)
Polizzi A et al.	Oral alterations in heritable epidermolysis bullosa	2022	Clinical observational study & review	HIGH (JBI)
Azrak B et al.	Dystrophic epidermolysis bullosa: oral findings and problems	2006	Cross-sectional clinical study	HIGH (NOS)
Marini I et al.	Sucralfate: a help during oral management in patients with epidermolysis bullosa	2001	Clinical observational study	HIGH (JBI)
Kummer TR et al.	Oral manifestations and challenges in dental treatment of epidermolysis bullosa dystrophica	2013	Case series	HIGH (JBI)
Dağ C et al.	Dental management of patients with epidermolysis bullosa	2014	Narrative review / case series	HIGH (JBI)
Oliveira TM et al.	Clinical management for epidermolysis bullosa dystrophica	2008	Case report	HIGH (JBI)
Torres CP et al.	Dental care management in a child with recessive dystrophic epidermolysis bullosa	2011	Case report	HIGH (JBI)
Momeni A, Pieper K	Junctional epidermolysis bullosa: a case report	2005	Case report	HIGH (JBI)
Krämer S et al.	Oral health care pathways for patients with epidermolysis bullosa: A position statement from the European reference network for rare skin diseases	2025	Position statement / Consensus	MODERATE (AGREE II)
Véliz S. et al.	Mini-implant assisted palate expansion and digital design in junctional epidermolysis bullosa and amelogenesis imperfecta: Case report	2024	Case report	HIGH (JBI)
Marty M et al.	Perception of Oral Health-Related Quality of Life in Children with Epidermolysis Bullosa: A Quantitative and Qualitative Study	2023	Mixed-methods (quantitative + qualitative)	Some concerns / unclear (JBI)
Joseph C et al.	Oral health status in patients with inherited epidermolysis bullosa: a comparative multicenter study	2023	Multicenter comparative study	Moderate (JBI)
Fortuna G et al.	Clinical features of gingival lesions in patients with dystrophic epidermolysis bullosa: a cross-sectional study	2015	Cross-sectional study	Low to moderate (JBI)
Čolović A et al.	Oral health status in children with inherited dystrophic epidermolysis bullosa	2017	Observational	Moderate (JBI)
Lindemeyer R et al.	Dental and anaesthetic management of children with dystrophic epidermolysis bullosa	2009	Case series / Clinical management	HIGH (JBI)
Prodinger C et al.	The natural history of laryngo-onycho-cutaneous syndrome: A case series of six pediatric patients and literature review	2021	Case series + literature review	HIGH (JBI)
Véliz S. et al.C21	Orthodontic Treatment in Patients With Epidermolysis Bullosa (EB)-Clinical Practice Guidelines (CPG)	2025	Clinical practice guidelines	MODERATE (AGREE II)
Korolenkova MV et al.	Anesthesia for dental care management in children with dystrophic epidermolysis bullosa	2022	Clinical management / Case series	HIGH (JBI)
EB2020 Organizers	EB2020 1st World Congress on Epidermolysis Bullosa, January 19-23, 2020, London, UK	2020	Conference proceedings	HIGH (JBI)
Krämer SM et al.	Clinical practice guidelines: Oral health care for children and adults living with epidermolysis bullosa	2012	Clinical practice guidelines (systematic review + expert consensus)	MODERATE (AGREE II)
Jogendra S. et al.	Comprehensive and novel dental management of a child with epidermolysis bullosa	2014	Case report	HIGH (JBI)
Chuang LC et al.	A fixed denture for a child with epidermolysis bullosa simplex	2015	Case report	HIGH (JBI)
Cruz E. et al.	Oral rehabilitation under general anesthesia of pediatric patient with diagnosis of epidermolysis bullosa. Clinical case report	2013	Case report	HIGH (JBI)
Véliz S. et al.	Early teeth extraction in patients with generalized recessive dystrophic epidermolysis bullosa: A case series	2020	Case series	HIGH (JBI)

TAB. 2A Risk of Bias.

Authors	Title	Year	Study design	ROB
Joanning T et al.	Correlation between measured oral health and oral health-related quality of life in people with epidermolysis bullosa: a prospective cohort study.	2024	Prospective cohort study	Moderate (JBI)
Leal SC et al.	Higher Dental Caries Prevalence and Its Association with Dietary Habits and Physical Limitation in Epidermolysis Bullosa Patients: A Case Control Study.	2016	Case-control study	Moderate (JBI)
Groß T et al.	Oral health of patients with epidermolysis bullosa compared to healthy controls – a retrospective study from a specialized center	2025	Retrospective case–control study	Moderate (JBI)
Korolenkova M.V.	Dental treatment in children with dystrophic form of epidermolysis bullosa	2015	Clinical observational study	HIGH (JBI)
Demir P. et al.	Prevalence of medically compromised children among dental patients: A 10-year retrospective study	2021	retrospective study	Moderate (JBI)
Ivanchyshyn, V.V. et al.	Prevention of oral diseases in children with epidermolysis bullosa: a case report and literature review; Профілактика захворювань порожнини рота в дітей з бульозним епідермолізом: опис клінічного випадку та огляд стану проблеми	2023	Case report + narrative literature review	HIGH (JBI)
Cadavid A.M.H et al.	Risk of oral candidiasis: profile analysis of patients admitted to the dermatology clinic of a tertiary hospital in southeast of Brazil	2025	Observational cross-sectional study	LOW (JBI)
Kepisty, M. et al.	The lesions of the oral mucosa in patients of developmental age with selected diseases of genetic origin; Zmiany patologiczne błony sluzowej jamy ustnej występujące w wybranych chorobach o podłozu genetycznym u pacjentów w wieku rozwojowym - przegląd pismiennictwa	2015	Narrative literature review	not applicable (not primary study)
Rodrigues N.S. et al.	Epidermolysis bullosa – A series of 33 cases	2021	Case series	HIGH (JBI)
Silveira Souza M et al.	Health challenges and importance of using photobiomodulation therapy in patients with epidermolysis bullosa	2025	Cross-sectional study	HIGH (NOS)
Chernyshov PV et al.	Quality-of-Life Measurement in Epidermolysis Bullosa	2025	Position statement / consensus	not applicable
Okutan AE et al.	Developmental defects of enamel and dental anomalies in children with skin diseases	2025	Observational (cross-sectional)	MODERATE (NOS)
Smith Z et al.	The dental needs of children with Epidermolysis Bullosa and service delivery	2024	Scoping review	not applicable
Krämer S et al.	Orofacial Anomalies in Kindler Epidermolysis Bullosa	2024	Observational cohort	MODERATE (ROBINS)
Hany U et al.	Heterozygous COL17A1 variants are a frequent cause of amelogenesis imperfecta	2024	Genetic observational study	MODERATE (ROBINS)
Miyata K et al.	Single-cell RNA sequencing of dental epithelium reveals responsible genes of dental anomalies in humans	2023	Experimental / transcriptomic	not applicable
Yavuz Y et al.	Evaluation of clinical and oral findings in patients with epidermolysis bullosa	2023	Cross-sectional clinical study	HIGH (NOS)
Colovic A et al.	Hereditary epidermolysis bullosa and periodontal repercussions	2022	Conference abstract	not applicable
Sanjari K et al.	Conservative dental management of a patient with epidermolysis bullosa	2020	Case report	not applicable
Chang C-C et al.	Oral care program improves quality of life of patients with epidermolysis bullosa	2020	Interventional program evaluation	HIGH (ROBINS)
Singh-Rambiritch S et al.	Oral Medicine Case Book 48: epidermolysis bullosa	2013	Case report	not applicable
Rathna Prabhu V. et al.	Dental and anesthetic management of a child with epidermolysis bullosa	2011	Case report	not applicable
Krämer SM	Oral care and dental management for patients with epidermolysis bullosa	2010	Narrative review	not applicable

TAB. 2B Risk of Bias.

Authors	Title	Year	Study design	ROB
Louloudiadis AK et al.	Dystrophic epidermolysis bullosa: dental management and oral health promotion	2009	Case report	not applicable
Liversidge HM et al.	Epidermolysis bullosa and dental developmental age	2005	Observational study	moderate (nos)
De Benedittis M et al.	Oro-dental manifestations in Hallopeau–Siemens-type recessive dystrophic EB	2004	Observational study	high
Shah H et al.	A cephalometric analysis of patients with recessive dystrophic EB	2002	Cross-sectional study	moderate
Harris JC et al.	Dental disease and caries-related microflora in children with dystrophic EB	2001	Case–control study	moderate (nos)
Kostara A et al.	Dental maturity in children with dystrophic epidermolysis bullosa	2000	Observational study	moderate (nos)

TAB. 2C Risk of Bias.

Clinical theme / outcome	Inconsistency	Indirectness	Imprecision	Reporting bias	GRADE
Preventive strategies (oral hygiene, dietary counselling, early dental visits)	Not serious	Serious	Serious	Some concerns	Low
Minimally invasive restorative care (e.g., glass ionomer, atraumatic techniques)	Not serious	Serious	Very serious	Some concerns	Very low – Low
Anesthetic/sedation management in EB pediatric patients	Not applicable	Serious	Very serious	Serious concerns	Very low
Management of oral complications (microstomia, ankyloglossia, mucosal lesions) and simplified orthodontics	Not serious	Serious	Very serious	Serious concerns	Very low – Low
Patient-centered outcomes (pain, function, OHRQoL)	Some concerns	Serious	Serious	Some concerns	Low

TAB. 3 Table 3 summarizes the GRADE assessment across clinical themes. Ratings of "serious" or "very serious" indicate downgrading for that specific domain, while "not serious" indicates no major concerns. Overall certainty of evidence is presented in the last column, with most outcomes graded as low or very low, reflecting the predominance of small studies, case reports, and heterogeneous populations.

Types of Included Studies

This systematic review included a total of 55 studies addressing dental management in paediatric EB:

- Clinical practice guidelines/position statements
- Comparative or cohort studies
- Case–control studies
- Case series
- Case reports
- Clinical studies (pilot/observational)

Settings of Included Studies

Most of the clinical studies and case reports included in this systematic literature review were conducted in hospital-based paediatric dental clinics or in academic settings. Expert consensus was sought for the development of guidelines and position statements, often involving international rare disease networks.

Areas of the Mouth Evaluated

The studies included in this systematic review focused on the prevalence of caries, enamel defects, gingival inflammation, microstomia, ankyloglossia, mucosal blistering, and oral pain; therefore, all areas of the mouth were evaluated. Some studies also focused on prosthetic rehabilitation, anaesthesia management, and orthodontic challenges in paediatric patients with EB.

Comparisons Used in the Included Studies

Different comparisons were used in the included studies: patients with EB versus healthy controls (evaluating caries prevalence, gingival health, and enamel defects), different management protocols (preventive strategies, restorative materials, anaesthetic approaches), or descriptive analyses without control groups (case reports/case series).

Results of Included Studies

Clinical and Microbiological Findings

Patients with epidermolysis bullosa (EB) have been found to have higher rates of dental caries than the general population, associated with marked gingival inflammation [Leal et al. 2016; Polizzi et al. 2022; Fortuna et al. 2015].

Therapeutic Management Results

In selected cases, the use of sucralfate suspensions has helped to alleviate oral lesions, while the use of atraumatic restorative materials has shown concrete advantages in conservative treatment [Marini and Vecchiet 2001].

Benefits in the relief of oral lesions have also been observed following low-intensity laser photobiomodulation therapy [Silveira Souza et al. 2025].

Dental abnormalities were reported in six patients and included delayed tooth eruption, enamel hypoplasia, hypomineralisation, microdontia, tooth discolouration, and dental caries [Okutan et al. 2025]. In the literature review, dental anomalies were described in approximately 65% of reported LOC cases [Prodinger et al. 2021].

Véliz et al. reported a case series including three paediatric patients affected by generalised forms of recessive dystrophic epidermolysis bullosa (RDEB), managed with early dental extractions during mixed dentition as an interceptive orthodontic strategy to prevent severe dental crowding [Véliz et al. 2025].

Methodological Quality of Included Studies

Guidelines and position statements offered clinically useful recommendations. The international clinical practice guidelines developed by Krämer et al. provide comprehensive, subtype-specific recommendations for oral health care in children and adults with EB, including preventive protocols, restorative strategies, orthodontic considerations, and anaesthesia/sedation management [Krämer et al. 2020; Véliz et al. 2025].

Epidermolysis Bullosa: Preventive and Therapeutic Dental Management

Many of the studies included in this article have highlighted the higher prevalence of caries and gingivitis in paediatric patients with EB compared to their peers without EB; this condition could be attributed to various factors, including dietary factors (predilection for soft and sugary foods) and anatomical factors such as microstomia and ankyloglossia [Shah, 2002].

Some comparative studies have highlighted higher DMFT values and plaque indices in paediatric EB patients compared to control groups [Leal et al. 2016; Čolović et al. 2017; Harris 2001].

Furthermore, the first international guidelines [Krämer et al. 2020] and care pathways developed at the European level [Krämer et al. 2025a] emphasise that early prevention protocols and minimally traumatic approaches should be adopted in patients with EB, with particular emphasis on the importance of multidisciplinary collaboration [Esposito et al. 2012].

Case reports and case series [Torres et al. 2011a; Oliveira et al. 2008; Dağ 2014] have shown that a conservative approach, based on the use of glass ionomer cements, antiseptic mouthrinses, and home oral hygiene education, can significantly improve the oral health of young patients, resulting in a reduced risk of new mucosal lesions [Kępisty et al. 2015; Yavuz et al. 2023].

Regarding orthodontics, Véliz et al. proposed early tooth extractions as a treatment plan to prevent dental crowding, thus reducing the need for orthodontic devices that could be potentially traumatic for these particularly vulnerable patients [Véliz et al. 2020]. In parallel, studies have been conducted on the relationship between oral health and quality of life in patients with EB [Marty et al. 2023; Joseph et al. 2023]; these articles have shown that dystrophic forms have a more severe impact on both functional and psychological aspects. Véliz et al. (2025) developed clinical practice guidelines for orthodontic and dentofacial orthopaedic management in patients with epidermolysis bullosa [Véliz et al. 2025]. The guidelines were based on a systematic literature review covering publications from 1994 to August 2024, complemented by expert input and a two-round Delphi consensus process with a predefined agreement threshold of 75%. An international multidisciplinary panel of 12 dental experts participated, and additional perspectives were provided by members of the medical team and patient representatives [Véliz et al. 2020].

Several case reports have described the feasibility of comprehensive dental rehabilitation in paediatric patients with epidermolysis bullosa when strict atraumatic principles are respected. In particular, Jogendra et al. reported the successful complete oral rehabilitation of a 7-year-old child affected by epidermolysis bullosa simplex and severe early childhood caries, emphasising the need for extreme caution during all operative procedures to avoid iatrogenic mucosal trauma [Jogendra et al. 2014]. The authors highlighted the importance of minimising pressure, avoiding sliding movements of instruments, and limiting the number of intraoral insertions during treatment, confirming the central role of technique modification in this fragile population [Jogendra et al. 2014].

Comprehensive full-mouth rehabilitation was described by Chuang and performed under general anaesthesia, including multiple pulpectomies, stainless steel crowns, composite and strip crown restorations, and extraction of non-restorable primary teeth [Chuang L C 2015]. All anaesthetic and dental procedures were carried out using atraumatic protocols, such as extensive padding, lubrication of perioral tissues, and flexible nasotracheal intubation to minimise mucosal trauma [Chuang L C 2015; Rathna Prabhu et al. 2011].

In some studies, dental procedures were carried out under deep intravenous sedation with preservation of spontaneous breathing. Sedation protocols generally included intravenous induction when venous access was available, whereas inhalation induction was used to facilitate venous catheterisation when required [García Cruz et al. 2019]. Sedation was maintained with intravenous agents, and both restorative dental treatments and tooth extractions were performed [García Cruz et al. 2019; Korolenkova et al. 2022].

Finally, a clinical study reported the efficacy of sucralfate in reducing pain and the frequency of oral blisters, with improved comfort and hygiene in paediatric patients with EB [Marini and Vecchiet 2001].

Anaesthesiological, Rehabilitative, and Multidisciplinary Aspects in Patients with Epidermolysis Bullosa

A case report documented specific protocols that have proven effective in reducing the risk of skin and mucosal trauma during airway management [Lindemeyer et al. 2009].

In the case series by Dağ et al., treatment strategies varied according to disease severity and patient cooperation and included restorative care, multiple extractions, and oral hygiene instruction. Two patients required dental treatment under general anaesthesia because of severe microstomia and extensive oral involvement, while others were managed under local anaesthesia with strict precautions to minimise soft tissue trauma [Dağ 2014].

García Cruz et al. reported the case of a 3-year-old male patient affected by dystrophic epidermolysis bullosa presenting with extensive caries involving the full primary dentition, poor oral hygiene, gingivitis, and limited mouth opening due to microstomia and vestibular obliteration secondary to scarring. Dietary history revealed prolonged bottle feeding and a carbohydrate-rich soft diet, contributing to caries development [García Cruz et al. 2019; Cadavid et al. 2025].

The consensus statements [European Reference Network 2025] also define structured clinical pathways to ensure early access to dental care, regular follow-ups, and educational programmes for families as crucial [Chernyshov et al. 2025].

DISCUSSION

Over the past 20 years, the dental management of patients with epidermolysis bullosa (EB) has received increasing attention, especially in paediatric dentistry [Smith et al. 2024]. This disease is characterised by the extreme fragility of oral tissues, which is also associated with a higher prevalence of caries and gingivitis compared to healthy paediatric patients, as well as microstomia and ankyloglossia [Leal et al. 2016]. This pathological condition makes dental care particularly complex from a purely practical standpoint [Demir and Özden 2021]. Fragile oral mucosa, functional limitations, and frequent pain contribute to the difficulty of daily oral hygiene [Prodinger et al. 2021;

Ivanchyshyn et al. 2023]. However, thanks in part to the publication of international guidelines, preventive and therapeutic strategies aimed at minimising oral trauma and, more broadly, improving the quality of life of paediatric patients with EB are now available and implemented [Groß et al. 2025].

The present review should be interpreted as a systematic synthesis of heterogeneous and predominantly low-level evidence, rather than a conventional effectiveness review. The authors of this systematic review highlighted how the dental management of paediatric patients with EB requires a preventive, minimally invasive, multidisciplinary, and above all personalised approach. Children with this rare genetic condition present specific risk factors, as mentioned above, which may explain the higher prevalence of caries and gum disease compared to healthy controls [Leal et al. 2016; Čolović et al. 2017]. Guidelines and consensus documents were considered separately and used only to contextualise the clinical implications of the findings, not as part of the primary evidence base. This approach aligns with systematic reviews conducted in rare diseases, where evidence is often limited to small observational studies and expert-based recommendations. This condition could be attributed to various factors, including dietary factors (predilection for soft and sugary foods) and anatomical factors such as microstomia and ankyloglossia.

A limitation of the current evidence is the heterogeneity of the included studies, as well as the limited sample size due to the rarity of this condition. Most studies were case reports or small case series, limiting the strength of the evidence. Comparative and cohort studies provided greater insights, although it is important to note that sample sizes were still small due to the rarity of EB. Guidelines and position statements represent the most clinically relevant contributions, outlining standardised preventive and therapeutic recommendations [Krämer et al. 2020; Krämer et al. 2025; Chernyshov et al. 2025; EB2020 1st World Congress on Epidermolysis Bullosa, January 19–23, 2020, London, UK 2020]. It is worth noting that some of the included studies considered mixed samples, including both paediatric and adult patients, which may represent a limitation in extrapolating the results exclusively to the paediatric population [Leal et al. 2016; Joanning et al. 2024; Polizzi et al. 2022].

Case study analysis is a valuable tool for identifying different clinical strategies for managing these cases. For example, restorative treatments using glass ionomer cement, combined with the use of antiseptic mouthwashes and personalised oral hygiene education, have been shown to lead to positive results in terms of reducing complications [Oliveira et al. 2008; Torres et al. 2011]. Preventive and minimally invasive strategies have emerged as the most effective for reducing the risk of trauma and complications [Fox 1973; Krämer et al. 2020; Sanjari et al. 2020]. The administration of sucralfate [Marini and Vecchiet 2001] has also been shown to be effective in reducing oral pain and the frequency of blisters, offering support for daily management. Furthermore, in selected cases, the use of sucralfate suspensions has helped to alleviate oral lesions, while the use of atraumatic restorative materials has shown concrete advantages in conservative treatment. Some studies have shown that benefits have been observed in patients with EB following the treatment of pain due to mucosal lesions with low-intensity laser photobiomodulation therapy [Silveira Souza et al. 2025]. In orthodontics, innovative strategies have been suggested, such as early extractions for the management of dental crowding; this would, in fact, avoid exposing patients to potentially highly traumatic appliances. Véliz et al. proposed early tooth extractions as a treatment plan to prevent dental crowding, thus reducing the need for orthodontic devices that could be potentially traumatic for these particularly vulnerable patients [Véliz et al. 2020].

The reviewed studies regarding oral health-related quality of life in paediatric patients with EB [Joseph et al. 2023; Čolović et al. 2017] have highlighted the profound psychosocial impact of this disease, particularly in the dystrophic forms [Korolenkova 2015; Colovic A 2022]. The quality of life of patients with EB, particularly in the more severe forms such as recessive dystrophic epidermolysis bullosa (RDEB), is compromised by chronic pain, chewing difficulties, and aesthetic and functional changes that significantly impact overall well-being, with both psychological and social repercussions [Kostara A 2000; De Benedittis et al. 2004; Azrak et al. 2006]. Oral health, therefore, represents a crucial factor in patient quality of life [Liversidge et al. 2005; Kramer 2020].

Another critical aspect concerns the management of anaesthesia in patients with EB; the particular fragility of the mucosal and cutaneous tissues that characterise these patients makes the management of the oral cavity extremely complex for the dentist, adding to the inherent challenges of managing paediatric patients when administering anaesthesia. Anaesthesia in paediatric patients with EB represents a significant clinical challenge. Therefore, some clinical cases underscore the need for personalised anaesthesia protocols [Lindemeyer et al. 2009]. The adoption of non-invasive techniques and planning with experienced anaesthetists are essential elements. At the same time, some studies [Véliz et al. 2024; Véliz et al. 2025a] have demonstrated that even more invasive rehabilitative approaches are sometimes possible (including palatal expansion assisted by mini-implants), provided they are supported by rigorous preventive strategies. Some studies have highlighted the possibility of applying advanced strategies, such as palatal expansions assisted by mini-implants or digital prosthetic protocols, provided they are preceded by a sufficiently thorough preventive phase [Véliz et al. 2024].

Clinical study results emphasise how preventive, minimally invasive, and multidisciplinary approaches are essential to ensure safe and effective care for paediatric patients with EB. Early involvement of paediatric dentists, combined with targeted educational programmes, can substantially reduce complications and improve long-term oral health outcomes. Recommendations available in the literature emphasise the importance of a preventive approach, aimed at minimising mechanical trauma and promoting early management of complications. The need for early, personalised, and multidisciplinary intervention, tailored to the severity of the disease and the individual needs of the paediatric patient, is also reiterated. The shared goal is to reduce oral complications and improve the overall, not just oral, quality of life of children with epidermolysis bullosa.

It is worth noting that this review contains several limitations that must be acknowledged. First, the heterogeneity of the included studies, which range from single case reports and small case series to comparative studies and expert guidelines, limits the overall strength of the available evidence and precludes a quantitative meta-analysis. Second, the small sample size of most studies, an inevitable consequence of the rarity of epidermolysis bullosa, reduces the generalisability of the findings. Another important limitation concerns the inclusion of articles in which the study population consisted of both paediatric and adult patients, such as the studies by Leal et al. , Polizzi et al. , and Joanning et al. . Although these contributions provide valuable information on the oral health of individu-

als with EB, the clinical manifestations, treatment needs, and preventive priorities differ substantially between children and adults. This heterogeneity risks diluting the evidence specific to the paediatric population, which was the primary focus of this review. Furthermore, many of the available studies lacked long-term follow-up and presented a variable risk of bias, further underscoring the need for more robust multicentre clinical trials specifically designed for paediatric populations.

Many publications in this field, such as the report by Jogendra et al., represent single-case experiences which, while clinically informative, provide low-level evidence. Such reports are valuable for illustrating practical solutions to real-world clinical challenges but do not allow generalisation. This further highlights the need for prospective studies and standardised outcome measures in paediatric EB dental care.

It is important to emphasise the difference between recommendations arising from case reports and small case series, and those derived from international guidelines and consensus statements. Case reports and series, while valuable for describing clinical challenges and proposing innovative solutions, provide only low-level evidence due to their anecdotal nature and limited generalisability [Kummer T R 2013; Momeni and Pieper 2005]. By contrast, international guidelines and position statements, developed through systematic literature reviews and expert consensus, offer more robust and clinically applicable recommendations. These documents synthesise the available evidence, weigh risks and benefits, and provide standardised pathways that can be implemented across different clinical settings. Therefore, while insights from case reports should not be disregarded, clinical decision-making in paediatric EB should primarily rely on guideline-based recommendations, which carry greater weight and ensure safer, more consistent patient care. These guidelines emphasise patient–clinician partnership, quality of life outcomes, and long-term follow-up.

Among the available literature, international clinical practice guidelines represent the highest level of clinically applicable evidence. The guidelines by Krämer et al. 2020, endorsed by DEBRA International, synthesise systematic literature review and expert consensus, providing structured, evidence-informed pathways for dental care in EB patients. Compared with case reports and small case series, these guidelines offer greater external validity and clinical transferability, particularly for paediatric populations. The guideline reported that routine dental treatment can generally be provided to patients with milder EB subtypes, whereas patients with severe generalised recessive dystrophic EB require extensive treatment modifications. These include systematic lubrication of oral tissues, avoidance of shear forces, careful use of suction devices, preference for relative isolation, use of paediatric-sized instruments, and drainage of bullae when they occur intraoperatively.

The predominance of descriptive and non-comparative studies limits the strength of the evidence and prevents firm conclusions.

Despite the limitations highlighted in these considerations, the authors, following their review of the literature, can conclude that paediatric dentists should not limit themselves to providing minimally invasive clinical care to young patients, but should actively participate in family education programmes and multidisciplinary teams involving dermatologists, paediatricians, and anaesthesiologists [Krämer et al. 2020]. Based on the findings from the available evidence, the key clinical principles derived from this review provide a simplified clinical pathway for the management of paediatric patients with epidermolysis bullosa during dental care (Figure 2).

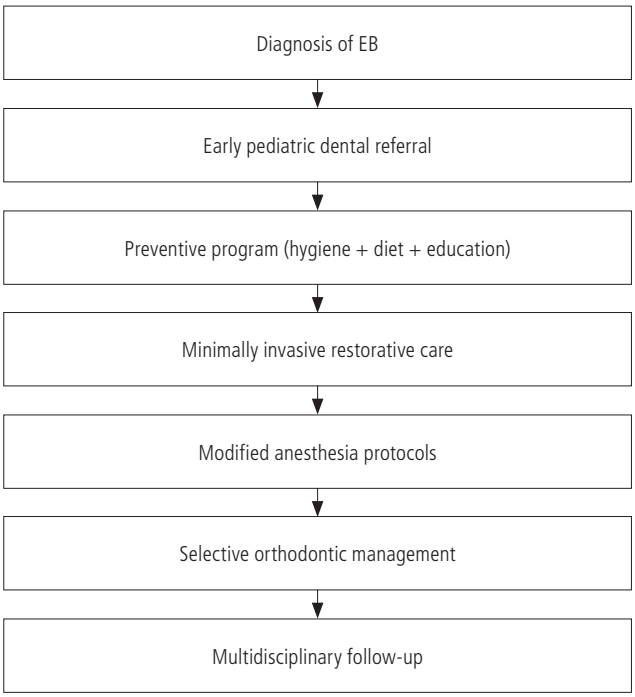


FIG. 2 Proposed clinical pathway for the dental management of pediatric patients with epidermolysis bullosa.

CONCLUSIONS

The available evidence suggests that paediatric patients with EB may have a higher prevalence of caries and gingival inflammation, although the certainty of evidence is low to very low. Complex rehabilitative and orthodontic treatments may be feasible, but only when preceded by careful planning and rigorous preventive protocols. Anaesthesia and sedation require specialised expertise to reduce the risk of iatrogenic trauma, and multidisciplinary collaboration is essential across care pathways.

Most of the evidence in this field comes from case reports, case series, and small observational studies, so prevention, early management, and minimally traumatic protocols remain the main clinical principles, but their supporting evidence is limited. Recent international guidelines and position statements focus primarily on expert-based recommendations for preventive and atraumatic dental care in patients with epidermolysis bullosa. This review also supports the potential value of minimally invasive restorative strategies, sucralfate for oral lesions, and selected interceptive orthodontic and rehabilitative approaches when these are embedded in thorough preventive planning.

Overall, the low to very low certainty of the evidence underscores the need for well-designed multicentre paediatric studies with standardised outcomes to validate these approaches and establish broadly applicable clinical protocols.

Funding: This research was partially funded by the Italian Ministry of Health—Current Research IRCCS.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki

Informed Consent Statement: Not applicable.

Data Availability Statement: The data presented in this study are available upon reasonable request, after the signature of a formal data sharing agreement in anonymous form, from the corresponding author, because they are protected by privacy.

Acknowledgments: During the preparation of this manuscript/study, the authors used ChatGPT only to check the text and table for errors. The authors reviewed and edited the results and take full responsibility for the content of this publication.

Conflicts of Interest: The authors declare no conflicts of interest.

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