

Review Article

Molluscum contagiosum in the pediatric population: Clinical approach and controversies in therapeutic management

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Abstract

Molluscum contagiosum in the pediatric population is a common viral skin infection caused by a deoxyribonucleic acid virus of the *Poxviridae* family with marked tropism for keratinocytes, leading to the development of localized, dome-shaped, umbilicated papules. It is highly prevalent in childhood and spreads through direct skin-to-skin contact, autoinoculation, and contaminated fomites, especially in schools and daycare settings. The condition is more frequent in younger children, and risk factors such as atopic dermatitis, skin barrier dysfunction, and immunosuppression contribute to increased susceptibility, greater lesion burden, and atypical presentations. Clinically, diagnosis is usually based on characteristic lesion morphology and distribution, while dermoscopy or biopsy may be useful in uncertain or atypical cases. Although the disease is generally self-limited and often resolves spontaneously, lesions may persist for months or even years, which frequently generates

parental concern and requests for treatment. The management of molluscum contagiosum remains controversial because the benign and self-limited nature of the disease must be balanced against the risk of transmission, cosmetic concerns, psychosocial burden, and treatment-related adverse effects. Observation is often appropriate for asymptomatic cases, but active treatment may be considered depending on lesion number, anatomic site, associated symptoms, and family preference. Available therapies include physical methods such as curettage and cryotherapy, as well as topical agents including cantharidin formulations, potassium hydroxide, retinoids, and berdazimer gel. However, no single treatment is universally ideal, and current evidence remains heterogeneous. Special attention is required in children with atopic dermatitis, immunocompromised patients, and those with periocular, genital, extensive, persistent, or recurrent disease. Overall, individualized care, family education, and shared decision-making are central to appropriate clinical management.

Key words

Molluscum contagiosum, pediatric dermatology, atopic dermatitis, watchful waiting, therapeutic management, viral skin infection.

Introduction

Molluscum contagiosum is a viral infection caused by the molluscum contagiosum virus, resulting in small, raised, and usually painless lesions on the skin. It predominantly affects children, with a prevalence of about 3% in this population [1]. In this context, facial lesions, although less inflammatory, can have a greater psychosocial impact due to their visibility [2].

Molluscum contagiosum is also a frequent reason for dermatologic consultations, with parents often seeking treatment because of cosmetic concerns and fear of lesion spread [3]. Although general practitioners typically adopt a “wait and see” approach, many parents prefer active treatment. This contrast between the usual clinical approach and parental expectations reflects one of the main practical challenges in everyday care [4].

At the same time, molluscum contagiosum lesions typically resolve spontaneously within 6 to 24 months without treatment [1]. Therefore, the disease is generally benign, although complications such as periorbital abscesses can occur, albeit rarely. This benign and self-limited nature supports conservative management in many cases, but it does not eliminate the need for clinical judgment [5]. For this reason,

management should be individualized, since treatment decisions often depend on lesion location, patient age, and parental preference. Among procedural options, curettage is preferred over electrodesiccation because of better aesthetic outcomes and faster recovery, although both methods have similar recurrence rates [3].

Nevertheless, therapeutic management remains controversial. There is no Food and Drug Administration-approved treatment for molluscum contagiosum, and the efficacy of various interventions remains unclear. In this setting, experimental treatments such as VP-102 and SB206 show promise, although they are not yet widely available [6]. Likewise, nonthermal atmospheric plasma has emerged as a novel and well-tolerated treatment option under investigation [7].

The objective of this review article is to analyze molluscum contagiosum in the pediatric population from a clinical and therapeutic perspective, integrating its clinical relevance, burden in dermatologic and primary care practice, benign and self-limited course, and the main controversies surrounding its management in order to support an individualized approach to treatment.

Methodology

This manuscript was developed as a structured narrative review aimed at providing an updated and clinically integrated analysis of molluscum contagiosum in the pediatric population, with particular emphasis on its clinical presentation, natural history, diagnostic approach, and current controversies in therapeutic management. A predefined methodological protocol was established prior to literature screening. Given the generally benign and self-limited nature of this infection, the variability in lesion distribution, symptom burden, psychosocial impact, and treatment preferences, a narrative interpretative synthesis was selected over quantitative pooling in order to integrate clinical, dermatologic, and therapeutic considerations into a coherent and clinically applicable framework. Special attention was given to the burden of disease in dermatologic and primary care practice, the rationale for watchful waiting, the indications for active treatment, and the limitations and emerging role of currently available and investigational therapies. The objective was to provide a structured synthesis capable of supporting individualized clinical decision-making in pediatric patients with molluscum contagiosum.

A comprehensive literature search was conducted in PubMed, Scopus, and Web of Science, including peer-reviewed articles published in English or Spanish between January 2020 and December 2025. The final search was performed in April 2026. This timeframe was selected to capture contemporary evidence on the epidemiology, clinical relevance, spontaneous resolution, therapeutic options, and ongoing controversies in the management of molluscum contagiosum in children. Foundational studies were incorporated when necessary to contextualize virologic mechanisms, disease behavior, or the historical evolution of treatment strategies. The search strategy combined MeSH and free-text terms using Boolean operators related to molluscum contagiosum, pediatric population, children, clinical manifestations,

diagnosis, watchful waiting, curettage, cryotherapy, topical therapy, therapeutic management, and treatment outcomes. Searches were conducted in titles and abstracts as well as indexed subject headings to maximize sensitivity.

The initial search yielded 132 records. After removal of duplicates, 108 articles remained for title and abstract screening. Of these, 57 underwent full-text evaluation, and 25 studies were included in the final synthesis. Selection was performed independently by two authors, with disagreements resolved through discussion and consensus. Exclusion criteria comprised non-peer-reviewed publications, isolated case reports, editorials without clinical outcome data, redundant datasets, studies not focused on pediatric populations, and articles not directly addressing clinical relevance, diagnostic evaluation, natural history, or therapeutic outcomes in molluscum contagiosum.

Eligible studies included randomized controlled trials, observational cohorts, systematic reviews, meta-analyses, expert consensus statements, and contemporary clinical guidelines from dermatology and pediatric societies. Priority was assigned to studies with pediatric-specific data, multicenter investigations, and research evaluating lesion resolution, recurrence, treatment tolerability, adverse effects, psychosocial burden, and quality-of-life implications. Extracted variables included study design, patient age, lesion location and extent, associated conditions such as atopic dermatitis or immunosuppression, diagnostic approach, treatment modality, lesion clearance, recurrence, adverse events, and reported complications. Methodological quality and internal validity were assessed narratively, considering risk of bias, sample size, follow-up duration, consistency in diagnostic criteria, and reproducibility of reported outcomes. In cases of conflicting evidence, greater interpretative weight was assigned to higher-level evidence and guideline-supported recommendations.

Reference lists of included studies were manually screened to identify additional relevant publications. Given its narrative design, this review is subject to potential selection bias and does not provide pooled quantitative estimates. Artificial intelligence-based tools were used exclusively to assist in literature organization and structural coherence, whereas critical appraisal, synthesis, and final interpretation were conducted independently by the authors to preserve methodological rigor.

Molluscum contagiosum in the pediatric population

Molluscum contagiosum is caused by the molluscum contagiosum virus, a DNA virus belonging to the *Poxviridae* family. This virus is characterized by its ability to produce localized skin infections and to form distinctive lesions with eosinophilic inclusion bodies in keratinocytes. In keeping with this pattern, the virus exhibits a strong tropism for the epidermis, specifically targeting keratinocytes and inducing hyperplasia of the squamous epithelium, which ultimately leads to the formation of the characteristic lesions of the disease [8].

From an epidemiological perspective, molluscum contagiosum is highly prevalent among children, with a cumulative incidence of 47.1% by age 8 in certain populations [9]. The infection is more common in younger children, and facial lesions are particularly prevalent in this age group [2]. This distribution is closely related to the recognized modes of transmission, since molluscum contagiosum spreads through direct skin-to-skin contact, autoinoculation, and contact with contaminated objects, such as towels or swimming pool surfaces [8]. Accordingly, the virus can spread easily in environments where children remain in close contact, including schools and daycare centers [1].

Several risk factors have been associated with the development and spread of molluscum contagiosum in pediatric patients. Atopic dermatitis represents a significant predisposing

condition, as affected children tend to exhibit higher lesion counts and greater itchiness [2]. Likewise, skin barrier dysfunction plays an important role, and mutations in the filaggrin gene, which impair barrier integrity, have been associated with an increased risk of molluscum contagiosum [9]. Although the infection most commonly affects immunocompetent children, immunosuppression may lead to atypical clinical presentations, including giant lesions [8]. In addition, close physical contact and autoinoculation remain common transmission routes that facilitate viral spread among children [9].

At the tissue level, the virus infects keratinocytes and promotes the development of cup-shaped lesions with central umbilication. Replication occurs within the epidermis, producing localized hyperplasia and the progressive formation of the characteristic lesions of molluscum contagiosum. Clinically, these lesions are typically small, dome-shaped, and flesh-colored, with a central dimple, although they may vary in size and number depending on the host immune response and the presence of associated risk factors [8]. The host immune response plays a crucial role in the spontaneous resolution of molluscum contagiosum lesions. Although the exact mechanisms have not been fully elucidated, it is believed that cell-mediated immunity is involved in clearing the infection [1].

Clinical manifestations and diagnosis

Molluscum contagiosum lesions are typically small, firm, dome-shaped papules with a central umbilication, appearing pearly white or pink. They are usually 2 to 6 mm in diameter and may become crusted or develop surrounding dermatitis as they resolve [10, 11]. Lesions can appear anywhere on the body, but they are most commonly distributed on the trunk, limbs, and face [2, 12]. In children, they are often autoinoculated to the anogenital region [10].

The number of lesions can vary widely, with some children presenting only a few lesions

while others may develop numerous papules [1]. Their size and distribution may also change over time, and lesions may resolve spontaneously over months to years, sometimes leaving atrophic scars or hyperpigmentation. As the disease progresses, several clinical variants may be observed. Older lesions may become inflamed as the immune system responds to the virus. In immunocompromised children, the disease may be more extensive, with larger and more widespread lesions [10]. In addition, children with atopic dermatitis may present with a greater number of lesions and increased itchiness, although the severity of inflammation is not significantly different [2]. Atypical presentations have also been described, including erythematous or pedunculated lesions, as well as lesions located in unusual body areas [13, 14].

The diagnosis of molluscum contagiosum is primarily clinical and is based on the characteristic appearance of the lesions. In uncertain cases, dermoscopy or histopathology can aid in confirming the diagnosis [15]. Dermoscopic evaluation typically reveals central white-yellow amorphous structures accompanied by peripheral vascular patterns [11, 16]. Biopsy is generally reserved for lesions that are atypical, do not respond to treatment, or when diagnostic uncertainty persists [14].

The differential diagnosis includes several papular dermatoses of childhood. Viral warts differ from molluscum contagiosum in that they are typically rough and lack central umbilication. Varicella lesions are vesicular and are often accompanied by systemic symptoms [13]. Folliculitis presents as pustules centered on hair follicles, in contrast to the smooth papules of molluscum contagiosum [11]. Milia are small white cysts without umbilication and are often located on the face. Other papular dermatoses of childhood that may enter into the differential diagnosis include Fordyce's spots, syringoma, and angiokeratoma, each of which has distinct clinical features [13].

Natural history, prognosis, and complications

Molluscum contagiosum is typically a self-limited condition, meaning that it resolves without treatment in most cases. The lesions are caused by a poxvirus and can persist for extended periods, often leading to parental concern and requests for intervention [3, 17]. In immunocompetent children, the infection is generally localized and does not cause systemic illness [5].

The time to spontaneous resolution can vary considerably. Some cases resolve within a few months, whereas others may persist for more than two years [17]. This variability appears to depend in part on the child's immune response and on the presence of underlying skin conditions such as atopic dermatitis. In this context, predictors of persistence include a higher number of lesions and the coexistence of atopic dermatitis, both of which are associated with increased lesion counts and greater itchiness. In addition, facial lesions, although not necessarily more severe, are often perceived as more concerning because of their visibility and potential psychosocial impact [2].

Overall, the prognosis in immunocompetent children is favorable, with eventual resolution of lesions and without major complications in most cases. Even when the disease presents with unusual manifestations, such as periorbital abscesses, it generally remains manageable with appropriate intervention [5].

Despite its benign course, molluscum contagiosum may be associated with several complications. Autoinoculation is common, as scratching or manipulating lesions can facilitate viral spread to adjacent areas of skin [18]. Eczematous reactions are also frequent, particularly in children with atopic dermatitis, contributing to increased itchiness and the risk of secondary inflammation [2]. In addition, secondary bacterial infection may occur, especially when lesions are repeatedly scratched

or manipulated, which makes careful monitoring necessary and may occasionally require antibiotic treatment [5].

Scarring may result both from lesion manipulation and from certain treatment modalities, such as curettage or electrodesiccation, although these approaches are generally considered safe and effective [3]. Beyond the physical manifestations, the visibility of lesions, particularly on the face, may also generate psychosocial distress and negatively affect quality of life, reinforcing the importance of supportive care and reassurance in the management of affected children [2].

General management principles and watchful waiting

The primary goal in the management of molluscum contagiosum is to alleviate symptoms and prevent lesion spread while minimizing discomfort and the risk of scarring. In addition, treatment seeks to improve cosmetic appearance and reduce psychosocial effects, such as embarrassment or self-consciousness, which represent important concerns for both patients and caregivers [19].

Clinical decision-making is guided by several factors, including lesion location, lesion number, and associated symptoms such as itchiness or pain. The presence of atopic dermatitis may increase both lesion count and itchiness, although it does not significantly modify treatment outcomes [1, 2]. At the same time, parental preference and the child's psychosocial well-being are also critical considerations in selecting the most appropriate management strategy [4].

Observation alone is often recommended for asymptomatic lesions or in situations in which the child is not distressed by the condition [4]. Likewise, facial lesions, despite their potential psychosocial impact, are not inherently more severe and may also be managed conservatively [2]. This approach is supported by the self-limiting nature of molluscum contagiosum, since

lesions typically resolve within 6 to 18 months without intervention [17]. In this sense, watchful waiting avoids unnecessary treatments that may cause pain or scarring [3].

Conservative management also offers additional advantages, including avoidance of the side effects and discomfort associated with invasive treatments such as curettage or electrodesiccation [3]. It may also reduce healthcare costs and resource utilization [4]. However, expectant management is not without limitations. The prolonged persistence of lesions may lead to psychosocial distress and parental dissatisfaction [19]. Furthermore, there is an ongoing risk of transmission to others, particularly in communal settings such as schools [17].

For this reason, regular follow-up is important to monitor lesion progression and to address any emerging concerns [4]. Follow-up should also include education on hygiene practices aimed at preventing spread and managing symptoms [1]. In parallel, counseling of parents and caregivers remains an essential component of care. Parents should be informed about the benign nature of molluscum contagiosum and the expected course of the disease [4]. It is also important to discuss the potential psychosocial effects of visible lesions and to provide strategies that support the child's self-esteem [19]. Finally, reassurance and clear guidance should be provided regarding when to seek further medical evaluation, particularly if lesions persist or complications develop [5].

Available therapeutic options

Physical and destructive therapies remain among the main treatment options for molluscum contagiosum. Curettage involves the physical removal of lesions and has been associated with fewer remnants and greater aesthetic satisfaction compared with electrodesiccation. In addition, it offers faster recovery and lower post-procedural pain, which makes it a preferred option in many pediatric cases [3]. Cryotherapy represents another physical modality, although it usually

requires repeated sessions and can be painful, factors that may limit its use in children. Mechanical extraction is similar to curettage, but it is less commonly used because of the potential for discomfort and scarring [6].

Topical therapies have also been used as alternatives to procedural interventions. Among these, keratolytic agents such as salicylic acid are employed to soften and remove lesions, although their efficacy in molluscum contagiosum has not been well documented. Vesicant agents have also attracted attention, particularly cantharidin, which has shown promise in clinical trials, especially in a new formulation known as VP-102 that remains under investigation for Food and Drug Administration approval [6]. Caustic agents such as potassium hydroxide have likewise been used in the treatment of molluscum contagiosum, but their benefits remain unclear and further research is required to establish their efficacy [20]. Topical retinoids are sometimes used because of their keratolytic properties, although they are not considered a primary treatment option for this condition [6].

Immunomodulatory therapies are intended to enhance the host immune response against the virus. However, specific immunomodulatory treatments for molluscum contagiosum in children are not well documented in the available contexts [6]. In contrast, berdazimer gel, a topical nitric oxide-releasing medication, has demonstrated superior efficacy compared with placebo, with higher rates of complete clearance in clinical trials [19, 21]. At the same time, curettage continues to be favored over electrodesiccation because of its better aesthetic outcomes and shorter recovery time, even though both methods show similar recurrence rates [3].

The tolerability and adverse-effect profile of available treatments are also important considerations in pediatric patients. Berdazimer gel has been associated with mild to moderate application-site pain and erythema, although these effects are generally well tolerated [19, 21].

By contrast, physical therapies such as curettage and cryotherapy may be painful and can result in scarring or pigmentation changes. For this reason, treatment selection should take into account the child's age, with less invasive options generally preferred for younger children [6]. Lesion burden and anatomic site also influence the choice of therapy, and facial lesions are often managed differently because of cosmetic concerns [2].

Controversies in therapeutic management

One of the main controversies in the management of molluscum contagiosum is whether lesions should be actively treated or simply observed. Molluscum contagiosum is generally a self-limiting condition, with lesions resolving spontaneously over time. However, this process may extend beyond 24 months, which often leads to consideration of active intervention in order to prevent transmission and address cosmetic concerns. In this context, although a "wait and see" approach is commonly recommended by guidelines, many parents prefer active treatment because of concerns regarding lesion spread and cosmetic appearance [4].

This tension reflects the broader dilemma between the self-limited nature of the disease and the pressure for active intervention. Even though spontaneous resolution is expected in most cases, the desire to shorten the duration of infection and prevent autoinoculation or spread to others frequently motivates therapeutic intervention [18]. Parental requests for treatment often contrast with the conservative approach favored by many general practitioners, thereby creating an important challenge in routine clinical practice [4].

Another relevant controversy involves the balance between efficacy and tolerability. Several treatments, including curettage, electrodesiccation, and topical agents such as berdazimer gel, have been evaluated in terms of both effectiveness and safety. Curettage has demonstrated superior aesthetic outcomes and

faster recovery when compared with electrodesiccation, although both methods show similar recurrence rates [3]. Berdazimer gel has also shown favorable efficacy and safety, with mild to moderate local skin reactions being the most commonly reported adverse events [19, 21].

Nevertheless, pain, irritation, and the risk of scarring remain major concerns, particularly in pediatric patients. Physical treatments such as curettage and electrodesiccation may be painful and can lead to scarring, which limits their acceptability in children. For this reason, newer topical therapies aim to reduce these adverse effects while still achieving effective lesion clearance [3, 6].

The heterogeneity of available therapeutic approaches is further compounded by the limitations of the current evidence. The lack of high-level data and the absence of Food and Drug Administration-approved treatments contribute to variability in management strategies and hinder the development of clear recommendations [5]. Systematic reviews and meta-analyses have emphasized the need for more rigorous studies to better define treatment guidelines [17].

As a result, there is a notable gap between clinical practice and evidence-based recommendations. In daily practice, treatment is frequently sought, whereas the available evidence often supports observation as a reasonable strategy. This discrepancy is strongly influenced by parental expectations and the perceived need for intervention. In parallel, variability across guidelines and expert opinions further reflects the lack of consensus regarding the optimal management strategy, with some sources favoring conservative management and others supporting intervention under specific circumstances [4, 6].

Within this context, parental expectations play a central role in therapeutic decision-making and often drive the demand for treatment despite

medical advice in favor of observation. Therefore, shared decision-making is essential in order to align treatment plans with parental concerns while remaining consistent with the available clinical evidence [4].

These dilemmas become even more pronounced in younger children and in those with extensive disease. In such cases, management may be particularly challenging because of the greater psychosocial impact of visible or widespread lesions and the practical difficulty of performing certain procedures in younger patients. Although the presence of atopic dermatitis does not significantly alter treatment outcomes, it may increase lesion count and itchiness, further complicating management decisions [2].

Special situations and family education

Children with atopic dermatitis are more susceptible to molluscum contagiosum and often present with more widespread lesions because of compromised skin barrier function [22]. Although these children tend to have higher lesion counts and greater itchiness, treatment outcomes for molluscum contagiosum are similar to those observed in children without atopic dermatitis [2]. In this setting, berdazimer gel has shown efficacy in the management of molluscum contagiosum in children with atopic dermatitis, offering a safe therapeutic option [23].

Molluscum contagiosum may also present differently in immunocompromised patients. In these children, including those with human immunodeficiency virus infection, lesions can be extensive and may require more aggressive treatment, such as trichloroacetic acid application [24]. Moreover, atypical presentations in immunosuppressed individuals require careful diagnosis and management, often with histopathological evaluation when necessary [14].

Certain anatomic locations deserve particular attention because of their clinical implications. Periocular molluscum contagiosum may lead to

ocular surface disorders and therefore requires prompt antiviral therapy and lesion removal in order to prevent complications. Genital molluscum contagiosum, although less common, may mimic other conditions and thus requires accurate diagnosis and appropriate treatment [14].

Extensive, persistent, or recurrent disease may suggest underlying immunosuppression or inadequate initial treatment, and in such cases referral to dermatology is often necessary for specialized care [24]. More broadly, referral is recommended for extensive, atypical, or treatment-resistant cases, particularly in immunocompromised patients or in those experiencing significant psychosocial impact [2].

In parallel, measures to reduce transmission remain an important part of management. Families should be educated about hygiene practices, including avoidance of sharing towels and personal items, in order to reduce the spread of molluscum contagiosum [25]. Regular moisturizing and gentle skin care may also help maintain skin integrity, especially in children with atopic dermatitis, thereby reducing susceptibility to infection [22]. At the same time, preventing scratching is essential, since this may reduce autoinoculation and secondary infection; in this regard, behavioral interventions and topical treatments aimed at reducing itchiness may be beneficial [2]. Regarding daily activities, children with molluscum contagiosum may attend school and participate in sports, provided that lesions are covered in order to minimize transmission risk. In addition, household contacts should receive education on preventive measures to limit spread within the home [25].

Conclusions

Molluscum contagiosum in children is a common, generally benign, and self-limited viral skin infection, but its clinical relevance lies in its prolonged course, potential for autoinoculation, psychosocial impact, and frequent parental

concern, all of which make it a recurring issue in pediatric and dermatologic practice.

Although watchful waiting remains a valid approach in many cases because spontaneous resolution is common, treatment decisions must be individualized according to lesion burden, anatomic location, symptoms, associated conditions such as atopic dermatitis or immunosuppression, and the psychosocial needs of the child and family.

The therapeutic management of molluscum contagiosum continues to be controversial because available options differ in efficacy, tolerability, pain, and risk of scarring, while current evidence remains heterogeneous; therefore, shared decision-making and family education are essential to guide appropriate care.

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