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Comprehensive Review

Gynecological Dermatology in Pediatric Age: a Comprehensive Overview

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ABSTRACT

Pediatric gynecologic dermatology encompasses non-sexually transmitted vulvar and perineal dermatoses in children and adolescents, requiring age-specific examination, diagnosis, and management approaches. This comprehensive review synthesizes epidemiology, clinical features, and evidence-based management of common conditions — nonspecific/irritant vulvovaginitis, vulvar lichen sclerosus, contact dermatitis, inflammatory and pigmentary dermatoses, infections, and anatomical variants — alongside critical but rare systemic diseases including hidradenitis suppurativa, Crohn's disease, and Behçet disease. We emphasize diagnostic challenges, safeguarding considerations, psychosocial impact, and the importance of multidisciplinary care models. Key knowledge gaps include standardizing maintenance protocols for chronic conditions, reducing diagnostic delays, and improving recognition across diverse skin tones.

Introduction

Gynecologic dermatology in the pediatric population represents a specialized intersection of dermatology and gynecology, focusing on non-sexually transmitted vulvar and perineal skin conditions affecting children and adolescents (0-18 years). The clinical presentation, differential diagnosis, and management of these conditions differ substantially from adult counterparts due to unique anatomical, physiological, hormonal, and psychosocial factors (1-3).

Epidemiological data from large pediatric series demonstrate that nonspecific/irritant vulvovaginitis accounts for the majority of presentations, followed by inflammatory dermatoses and vulvar lichen sclerosus (1, 2). However, the spectrum includes rare but clinically significant systemic conditions that may present with genital manifestations as the initial or predominant feature (3, 4). Early recognition, accurate diagnosis, and appropriate management are essential to prevent symptom chronicity, psychological distress, long-term complications such as scarring, and optimization of quality of life (5, 6).

Pediatric vulvar anatomy and physiology (why children differ)

The hypoestrogenic state characteristic of prepubertal girls results in distinct anatomical and physiological features that predispose to specific dermatological conditions. The vulvar epithelium is thinner and less keratinized, with reduced protective mucus production and fewer protective lactobacilli, resulting in a relatively alkaline pH environment (7, 8). These factors, combined with anatomical features such as the shorter anogenital distance and increased susceptibility to occlusion, friction, and chemical irritants, create a unique vulnerability profile (9).

Clinical assessment must account for variations in presentation across different skin tones, where traditional markers such as erythema may be less apparent, and alternative signs including textural changes, hypopigmentation, or hyperpigmentation may be more diagnostically significant (10).

Clinical Spectrum: common and rare dermatoses

Nonspecific/irritant vulvovaginitis

Typical in school-aged children, often seasonal (heat/sweat) and hygiene-linked. Symptoms: itch, burning, dysuria, transient discharge, behavioral changes (withholding urine/stool). Physical examination reveals erythema, excoriation, and possible maceration without systemic signs.

Management prioritizes irritant elimination and barrier repair: lukewarm water only; soap substitute for folds; pat dry; petrolatum-based emollient after bathing and after voiding/defecation for 1–2 weeks; breathable cotton underwear; avoid baby wipes, bubble baths, fragrances, and tight synthetics. Reserve antibiotics for compatible symptoms with pure or predominant pathogen growth on culture; consider a pinworm tape test in nocturnal pruritus (1, 11).

Vulvar lichen sclerosus (VLS)

Vulvar lichen sclerosus (VLS) represents a critical diagnosis due to its potential for progressive scarring, functional impairment, and long-term complications. The condition demonstrates a bimodal age distribution, with the prepubertal peak occurring around 5-7 years of age (12, 13).

Clinical: The pathognomonic “figure-8” distribution involves the vulva and perianal region (Fig.1), presenting with porcelain-white plaques, textural changes, purpura, fissures, and erosions. Associated symptoms include intense pruritus, pain, dysuria, and constipation.

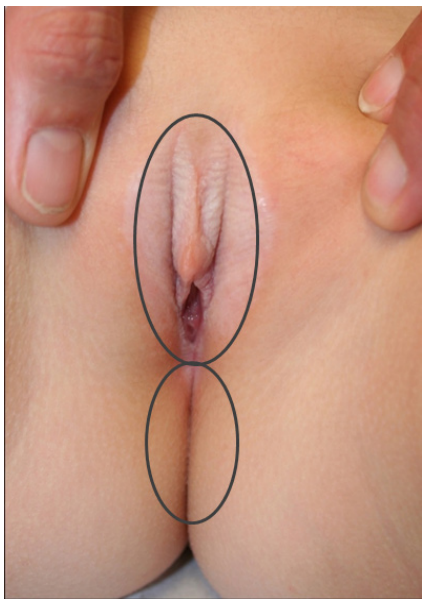

Fig. 1. *Atrophic skin with a lardaceous appearance in the vulvar and perianal regions, with the typical "figure-8" configuration.*

Management: ultrapotent topical corticosteroid (e.g., clobetasol 0.05% ointment) once daily for 4-8 weeks for induction, then individualized step-down (alternate day 2-3 times/week) with proactive maintenance in relapsing disease. Studies demonstrate 65-100% symptom resolution and 20-70% complete remission with clobetasol treatment, though 45% require maintenance therapy. Generous emollients; constipation plan; education on gentle skin care. Routine biopsy is unnecessary when presentation is classic and response is satisfactory; reserve for atypical or refractory cases. Long-term follow-up is recommended; persistence into adolescence/adulthood is common in up to 75% of cases, though remission is variable.

Alternative treatments: Topical calcineurin inhibitors (tacrolimus 0.03% ointment) show efficacy in pediatric VLS. Studies demonstrate clinical improvement in all treated children, with reduced recurrence rates when maintenance therapy (twice weekly for six months) is employed compared to shorter treatment courses. These agents are particularly useful as steroid-sparing maintenance therapy (7–12).

VLS may persist into adulthood, necessitating long-term surveillance for disease activity, treatment response, and rare malignant transformation (5, 17).

Inflammatory dermatoses

Contact dermatitis

Both irritant and allergic contact dermatitis commonly affect the vulvar region, often overlapping with non-specific vulvovaginitis. Common triggers include fragranced products (like wipes, fragranced soaps, bubble baths), wet clothing, detergents, and topical medications. Management involves trigger identification and elimination, short-course mild-to-moderate potency topical corticosteroids, and comprehensive barrier care protocols., laundry detergents, tight/occlusive clothing, wet swimsuits, chlorine without rinse-off, urine/stool.

Psoriasis

Psoriasis may present with well-demarcated erythema (often minimal scale in the vulva) (Fig. 2), fissures, and itch; look for extra-genital clues (scalp, flexures, nails). Well-demarcated erythematous plaques may be accompanied by extragenital manifestations including scalp, nail, and joint involvement (18).

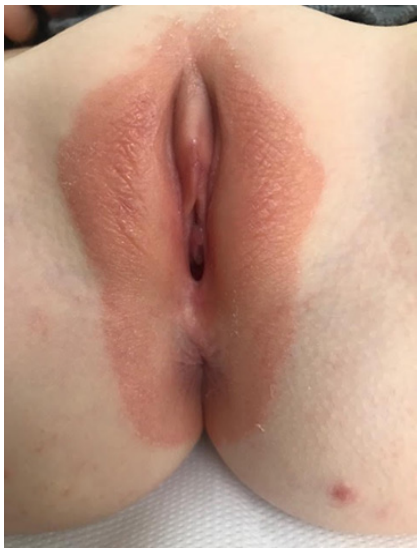

Fig. 2. *Psoriasis of the vulvar and perigenital regions. Well-demarcated erythema with minimal scale.*

Treatment considerations include mild coal tar preparations, which have shown effectiveness in clearing genital lesions in pediatric patients. Topical corticosteroids ranging from low to high potency have been successfully used, with moderate-to-high-potency steroids showing effectiveness both as monotherapy and in combination treatments. Low-potency topical corticosteroids can achieve clearance in as little as 2 weeks, while potent steroids like clobetasol 0.05% ointment may provide complete resolution within 4 weeks for severe cases.

Pediatric patients with psoriasis warrant screening for associated comorbidities including metabolic syndrome, arthritis, and inflammatory bowel disease (19).

Atopic dermatitis

Atopic dermatitis affecting the vulvar area requires gentle management with emollients and mild topical corticosteroids. Mid- to high-potency topical steroids such as triamcinolone and clobetasol are recommended for inflammatory control, though careful monitoring for skin atrophy is essential in this sensitive area. Topical calcineurin inhibitors (pimecrolimus 1% cream or tacrolimus 0.1% ointment) serve as effective steroid-sparing alternatives for maintenance therapy (18).

Pigmentary Disorders

Vitiligo presents as asymptomatic depigmentation without texture change, purpura, or fissuring and should be distinguished from VLS (Fig. 3). Childhood vitiligo represents approximately 25% of all vitiligo cases, with mean age of onset between 4-8 years in various studies (20). Congenital vitiligo, while extremely rare, does occur and has been reported in neonates present from birth. The exact prevalence of congenital vitiligo is unknown, but case reports suggest it represents a very small fraction of childhood vitiligo cases, with one Chinese study reporting only 8 children with lesions present at birth out of 541 childhood vitiligo cases (1.5%) (21). Segmental vitiligo (SV) is more common in children (17-29%) compared to adults (5%) and may present very early, sometimes soon after birth. Treatment follows standard pediatric protocols with topical corticosteroids and calcineurin inhibitors, though many cases in the genital area may be managed with observation and reassurance alone. Pediatric vitiligo warrants screening for associated autoimmune and endocrine comorbidities including thyroid dysfunction, type 1 diabetes, and adrenal insufficiency (22).

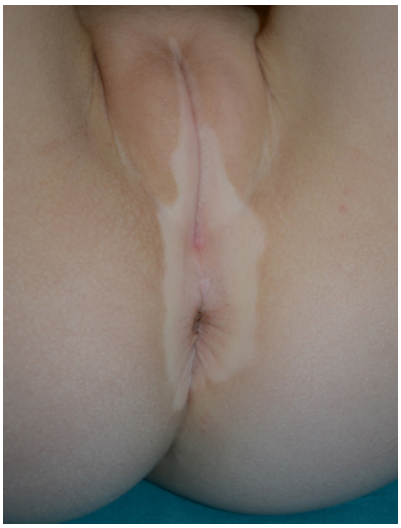

Fig. 3. *Perigenital vitiligo. Depigmentation without texture change, purpura, or fissuring.*

Infectious and Infestation Conditions

Molluscum contagiosum presents as small, flesh-colored, dome-shaped papules with central umbilication. The condition has a global prevalence of 2-8% among children, with the highest incidence in children under 5 years of age. MCV-1 accounts for 98% of cases in children, while transmission occurs through direct skin-to-skin contact or contaminated objects such as towels and bath sponges (23). Swimming pool usage has been correlated with childhood infections. In the genital area, molluscum in younger children is typically non-sexual in transmission, though safeguarding assessment may be warranted in older children. The condition is generally self-limiting, resolving spontaneously over months to years, though treatment may be considered for cosmetic reasons or to prevent spread.

Pinworm Infestation (Enterobius vermicularis) is extremely common and frequently causes nocturnal perineal and vulvar pruritus. Global prevalence studies show significant variation, with rates of 3.6-22% in different pediatric populations. The highest prevalence occurs in children aged 3-6 years (up to 5% in some studies), with school-aged children being most commonly affected. In the United States, approximately 20% of children develop pinworm infection at some point. The classic symptom is nocturnal itching due to female worms migrating to lay eggs around the anus. Diagnosis is confirmed through the cellophane tape test performed in the morning before bathing. Treatment involves anthelmintics (mebendazole, pyrantel pamoate, or albendazole) with treatment of household contacts and emphasis on hygiene measures including handwashing, daily morning bathing, and daily underwear changes (24).

Group A Streptococcal Vulvovaginitis represents with acute onset of severe pain, erythema, and purulent discharge, often with systemic symptoms. This represents one of the few true bacterial infections of the vulva in prepubertal children and requires prompt recognition and antibiotic therapy based on culture and local antimicrobial guidelines (11).

Anogenital Warts (HPV Infection) caused by human papillomavirus (HPV) can occur in childhood and are often non-sexual in transmission, particularly in younger children. Modes of transmission include vertical transmission, autoinoculation, and heteroinoculation (e.g., from caregivers).

However, careful clinical assessment is essential, particularly in older children and adolescents, where sexual transmission becomes more likely. The presence of anogenital warts should prompt a safeguarding evaluation when indicated by the clinical history, examination findings, or behavioral context.

Management typically includes watchful waiting, topical treatments (e.g., imiquimod, podophyllotoxin), or surgical options depending on lesion burden, symptoms, and parental preference. In many cases, reassurance and conservative management are appropriate.

Anatomical Variants and Adhesions

Labial Adhesions affect up to 2% of prepubertal girls, with typical presentation at 2 years of age. The condition involves fusion of the labia minora due to inflammation in a low-estrogen environment, though some studies question whether hypoestrogenism is the primary cause (25).

Clinical presentation: Most cases are asymptomatic and discovered incidentally during routine examination. The fusion typically occurs near the clitoris and consists of thin fibrotic tissue ranging from partial to complete fusion occluding the vaginal orifice. When symptomatic, patients may present with post-void dribbling, dysuria, hematuria, local inflammation, difficulty voiding, or urinary retention. Urinary tract infections are associated with labial adhesions, with successful resolution of adhesions reducing UTI risk.

Management: Asymptomatic cases require only observation and reassurance, as up to 80% resolve spontaneously within one year. When treatment is indicated (primarily for UTIs or significant symptoms), topical estrogen cream is first-line therapy with success rates up to 90%. Alternative topical treatments include betamethasone, though studies show no statistically significant difference in efficacy compared to estrogen cream. Treatment duration is typically once or twice daily for up to 6 weeks, though some authors recommend up to 3 months. Potential side effects of estrogen cream include breast tenderness and local pigmentation changes.

Surgical management is reserved for cases where topical management fails after several weeks of therapy. Surgical lysis is performed under general anesthesia using gentle traction. Recurrence rates are significant (11-14%) regardless of treatment modality, and adhesions may continue reforming until puberty. Manual separation with proper hygiene maintenance is another treatment option in select cases.

Follow-up: Regular monitoring is important as recurrences are common. In resource-limited settings, some families prefer immediate surgical management due to financial and transportation constraints for repeated clinic visits, though conservative management remains the preferred approach when feasible.

Rare Papular and Nodular Lesions. Systematic studies of pediatric anogenital papular lesions identify several important entities including perianal pseudoverrucous papules and nodules (PPPN), representing 35% of anogenital papules in children >5 years, and infantile perineal pyramidal protrusion (IPPP), accounting for 7% of cases (26).

Systemic Diseases with Genital Manifestations

Hidradenitis suppurativa (HS) demonstrates increasing recognition in pediatric populations, with estimated prevalence of 0.7-1.2% in European and US populations. Pediatric-specific data reveal mean age of onset at 12.5 years, with 80% female predominance (27).

Clinical Characteristics: Early-onset HS frequently presents with genital/groin involvement and more severe disease patterns. Common presentations include painful nodules, abscesses, sinus tracts, and progressive scarring affecting inguinal folds (47%) and genital regions.

Associated Comorbidities: Pediatric HS demonstrates significant comorbidity burden including obesity (65%), acne vulgaris (29%), and metabolic syndrome components.

Management Approach: Treatment strategies include topical antimicrobials, systemic antibiotics, and biological therapies (adalimumab) for severe cases. Early multidisciplinary intervention is essential to prevent progressive scarring and functional impairment (28).

Crohn's Disease with Vulvar Involvement. Vulvar Crohn's disease (VCD) represents a rare but clinically significant manifestation affecting the pediatric population. Systematic review data identify vulvar involvement occurring in two forms: contiguous lesions (fistulas/fissures) and metastatic/noncontiguous cutaneous manifestations (29).

Clinical Presentation: Common manifestations include vulvar erythema, swelling, edema, and ulceration, with perianal involvement documented in 45% of cases. Critically, vulvar involvement may precede gastrointestinal symptoms in up to 33% of pediatric cases, representing the initial disease manifestation (29, 30).

Treatment Outcomes: Multimodal therapy including corticosteroids, metronidazole, azathioprine, and anti-TNF inhibitors demonstrates clinical remission in approximately 50% of cases. Anti-TNF therapy shows particularly favorable responses, with 92% of patients demonstrating clinical benefit.

Pediatric Behçet Disease accounts for up to 25% of all cases, with significant genital involvement representing a major diagnostic criterion (31). Juvenile-onset disease demonstrates distinct epidemiological and clinical characteristics compared to adult presentations. Genital Manifestations: Genital ulcers occur in 55-83% of pediatric cases, representing the second most com-

mon finding after oral ulceration. Pediatric genital lesions are typically painful, deep, and irregular, though scarring is less common than in adults (31, 32).

Management Considerations: Treatment approaches include colchicine, immunosuppressive agents (azathioprine, methotrexate), corticosteroids, and biological therapies (anti-TNF inhibitors) based on disease severity and organ involvement.

Diagnostic approach

History and examination

Elicit symptoms, duration, triggers (cleansers, clothing, swimming), bowel/bladder habits, scratching, sleep disturbance, prior therapies, comorbidities, and family history of dermatoses/autoimmunity (33). Include a sensitive, non-leading screen for trauma/abuse when indicated.

Child-friendly external examination only: frog-leg on caregiver's lap or knee-chest; gentle labial separation; chaperone; assent; careful documentation and Tanner staging. Avoid speculum and intravaginal swabs in prepubertal children. Photodocumentation requires explicit consent.

Tests and procedures (when to do them)

Swabs/cultures only when there is compatible infection (bloody discharge, systemic features, acute severe pain, failure of first-line care). Consider a tape test for suspected pinworms. Biopsy is rarely needed in children; reserve for atypical or unresponsive disease and perform by an experienced clinician. Ultrasound is for masses; radiology is not routine in dermatoses.

Red flags and referral thresholds

Ulceration, necrosis, unexplained purpura/ecchymoses, severe pain, dysuria with retention, fever/systemic illness, persistent/bloody discharge, mass, suspected foreign body, STI positivity, suspected abuse, examination not tolerated, diagnostic uncertainty after first-line care, or failure of appropriate therapy warrant urgent specialist review (34).

For practical guidance, the main presenting symptoms, differential diagnoses, and first-line management strategies are summarized in Table I.

Table I. *Symptom-led diagnostic cheat-sheet (prepubertal focus).*

Lead symptom/ sign	Top differentials	First checks/tests (only if indicated)	First-line management
Itch ± burning, no systemic illness	Irritant/contact dermatitis; nonspecific vulvovaginitis; psoriasis/AD; pinworms (nocturnal)	Pinworm tape test if nocturnal pruritus; swab only if purulent/bloody discharge	Barrier routine; remove irritants; short course mild–moderate topical steroid for flares
Pain with fissures, constipation; white plaques	Vulvar lichen sclerosus	Clinical diagnosis; biopsy only if atypical or refractory	Clobetasol 0.05% ointment induction → step-down/maintenance; emollients; constipation plan
Acute severe pain, erythema, purulent discharge, fever	Bacterial vulvovaginitis (e.g., GAS)	Introital/perineal swab/culture; consider UA if dysuria	Barrier routine; targeted antibiotics per culture/local guidance
Nocturnal perineal itch	Pinworms	Tape test; assess contacts	Anthelmintic (per local protocol); treat household; hygiene measures
Smooth papules/ umbilicated papules	Molluscum contagiosum	Clinical	Reassurance; avoid irritation/autoinoculation; consider lesion-directed therapy if bothersome

Lead symptom/ sign	Top differentials	First checks/tests (only if indicated)	First-line management
Depigmented macules/patches, asymptomatic	Vitiligo	Clinical; Wood's lamp if needed	Reassurance; topical therapy per standard pediatric protocols if desired; sun protection
Post-void dribbling, partial fusion	Labial adhesions	Clinical; exclude infection/trauma	Observation ± emollient; topical estrogen if symptomatic; rare gentle separation by experienced clinician

Management principles

Universal care measures ("barrier routine")

Lukewarm water only; soap substitute for folds; avoid wipes, fragrances, bubble baths; pat dry; petrolatum-based ointment after bathing and after voiding/defecation for 1–2 weeks; breathable cotton underwear; sleep without underwear if irritated; post-sport quick rinse; barrier pre-swim for frequent swimmers.

Pharmacologic interventions (see Table II)

Short, appropriate-potency topical corticosteroids for inflammatory flares; ultrapotent induction and tailored maintenance for VLS; topical calcineurin inhibitors as steroid-sparing maintenance in selected cases; targeted antibiotics only when clear bacterial etiology; anthelmintics for confirmed/suspected pinworms; topical estrogen for symptomatic labial adhesions (7–12).

Table II. *Practical treatment regimens and follow-up (summarized).*

Condition	First-line regimen	Maintenance/step-down	Follow-up & notes
Vulvar lichen sclerosus	Clobetasol 0.05% ointment thin layer once daily for 4–8 weeks (induction)	Taper to alternate-day for 2–4 weeks → 2–3×/week; consider proactive low-frequency steroid or calcineurin inhibitor (e.g., tacrolimus 0.03% ointment) in relapsing disease	Review at ~6–12 weeks, then 6–12-monthly; reinforce emollients, bowel care; biopsy only if atypical/ non-responsive
Nonspecific/irritant vulvovaginitis	Barrier routine; remove irritants	Emollient barrier daily for 1–2 weeks; repeat during flares	No routine tests; swab only if red flags or persistent discharge
Contact dermatitis (vulvar)	Mild–moderate potency topical corticosteroid for 5–7 days; barrier routine	Emollient barrier; avoid triggers; short steroid bursts for recurrences	Educate on ointment vehicles; review if frequent relapses to reassess triggers
Psoriasis/AD (vulvar)	Low-to-moderate potency topical corticosteroid short course; consider calcineurin inhibitor	Calcineurin inhibitor for maintenance in sensitive sites	Screen for extra-genital disease; gentle care to minimize stinging
Bacterial vulvovaginitis (e.g., GAS)	Targeted oral antibiotic per culture/local guideline	None	Reassess hygiene; consider pinworm assessment if relapsing
Pinworms	Anthelmintic (per local guidance), treat contacts	Hygiene, repeat dose per protocol	Address nocturnal scratching; nail care

Condition	First-line regimen	Maintenance/step-down	Follow-up & notes
Labial adhesions	Observe if asymptomatic; topical estrogen short course if symptomatic/obstructive	Emollient to reduce recurrence	Avoid forceful separation; specialist if dense/recurrent

Long-term management

Schedule review to confirm response, reinforce skin care, and adjust maintenance. VLS requires structured long-term surveillance to monitor for relapse and scarring; counsel families on excellent symptom control with adherence (36). Coordinate with pediatric gynecology when scarring, ulceration, diagnostic uncertainty, or comorbid pelvic pathology is present.

Psychological and social considerations

Symptoms affect sleep, school participation, and self-image; caregiver anxiety can amplify distress and care-seeking. Provide clear, jargon-light explanations; normalize common conditions; teach practical routines; and offer written instructions. Consider brief screening for anxiety/constipation/sleep disturbance and refer to psychology when persistent functional impairment is present (6, 37).

Multidisciplinary care

Combined pediatric dermatology–gynecology pathways or clinics improve diagnostic accuracy, reduce time-to-treatment, streamline procedures (when needed), and support longitudinal follow-up. Include pediatrics, urology, psychology/child protection, and surgery as needed. Suggested referral triggers are summarized above (1, 38).

Prevention and health promotion

Primary: avoid irritants, adopt barrier routines, bowel/voiding habits, breathable clothing.

Secondary: early recognition of VLS and other dermatoses; prompt treatment; structured follow-up for chronic disease; family education.

Future directions

Prospective pediatric VLS cohorts with standardized induction/maintenance and relapse definitions; trials comparing proactive weekend steroid vs calcineurin maintenance; image libraries across skin tones and ages; validated genital-specific pediatric QoL tools; implementation research on multidisciplinary clinics and caregiver education (39, 40).

Conclusion

Pediatric gynecologic dermatology demands developmentally sensitive examination, disciplined diagnostic thresholds, and practical, family-centered regimens. Early, accurate diagnosis is essential to prevent chronic symptoms, psychosocial distress, and long-term complications such as scarring, especially in conditions like vulvar lichen sclerosus—which requires timely recognition, ultrapotent steroid induction, and proactive maintenance with long-term review. Interdisciplinary care models and robust psychosocial support can improve outcomes and equity.

Clinicians must remain vigilant for rare presentations,

such as congenital vitiligo or genital psoriasis, as these may signal underlying autoimmune or metabolic disease and merit additional comorbidity screening. Psoriasis, especially with extensive or genital involvement, warrants ongoing monitoring for systemic associations such as obesity, metabolic syndrome, and arthritis.

Future work should prioritize standardizing steroid maintenance protocols, further reducing diagnostic delays, and improving recognition across all skin tones to address disparities in care. Research into pediatric-specific regimens, outcome tools, and image libraries—including for children with richly pigmented skin—will be vital for equitable practice. Comprehensive, anticipatory care—grounded in clear communication, targeted surveillance, and multidisciplinary collaboration—optimizes both physical and emotional health in children and adolescents with vulvar or genital dermatoses.

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