



# Treatment Update for Psoriasis in Children

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# OVERVIEW

- What are the unique risks for the pediatric patient with psoriasis?
- What are the currently available medications for the pediatric patient with psoriasis?
- Why are there so few medications for pediatric patients with psoriasis?

# AAD PEDIATRIC PSORIASIS GUIDELINES

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**Joint American Academy of  
Dermatology—National Psoriasis  
Foundation guidelines of care for the  
management and treatment of psoriasis  
in pediatric patients**



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# PEDIATRIC PSORIASIS

- EACH YEAR, ABOUT 20,000 CHILDREN < 10 YEARS OF AGE ARE DIAGNOSED WITH PSORIASIS

# PEDIATRIC PSORIASIS

- A CHRONIC, MULTISYSTEM INFLAMMATORY DISEASE THAT AFFECTS 1% OF CHILDREN
- MOST COMMON TIME OF ONSET: ADOLESCENCE
- ONE THIRD OF CASES OF PSORIASIS START IN CHILDHOOD
- MULTIPLE COMORBIDITIES: **PSORIATIC ARTHRITIS** HAS LARGEST EVIDENCE BASE

AAD GUIDELINES: Journal American Academy of Dermatology 2020

# PEDIATRIC PSORIASIS

- Prevalence : 0.7%
- More pruritic in children than in adults
- Majority of children have plaque psoriasis
- Family incidence of psoriasis may be as high as 89%

# OVERVIEW

- OBESITY = QUICKLY INCREASING IN PEDI POPULATION
- MAY EXPLAIN INCREASING INCIDENCE AND PREVALANCE OF CHILDHOOD PSORIASIS

# COMORBIDITIES IN PEDI PSORIASIS

- **PSORIATIC ARTHRITIS**
- OBESITY
- HYPERLIPIDEMIA
- DIABETES MELLITUS
- RHEUMATOID ARTHRITIS
- INFLAMMATORY BOWEL DISEASE



› [JAMA Dermatol. 2017 Jul 1;153\(7\):698-704. doi: 10.1001/jamadermatol.2017.0499.](#)

# Pediatric Psoriasis Comorbidity Screening Guidelines

Emily Osier<sup>1</sup>, Audrey S Wang<sup>2</sup>, Megha M Tollefson<sup>3</sup>, Kelly M Cordoro<sup>4</sup>, Stephen R Daniels<sup>5</sup>, Andrew Eichenfield<sup>6</sup>, Joel M Gelfand<sup>7</sup>, Alice B Gottlieb<sup>8</sup>, Alexa B Kimball<sup>9</sup>, Mark Lebwohl<sup>10</sup>, Nehal N Mehta<sup>11</sup>, Amy S Paller<sup>12</sup>, Jeffrey B Schwimmer<sup>13</sup>, Dennis M Styne<sup>14</sup>, Abby S Van Voorhees<sup>1</sup>, Wynniss L Tom<sup>15</sup>, Lawrence F Eichenfield<sup>15</sup>

Affiliations + expand

PMID: 28514463    PMCID: PMC5748031    DOI: [10.1001/jamadermatol.2017.0499](#)

[Free PMC article](#)

**PSORIATIC ARTHRITIS:  
SCREEN FOR UVEITIS**

# PSORIATIC ARTHRITIS IN PEDI PTS

- PSORIATIC ARTHRITIS IN ALL PTS: 5 TO 40%
- ONSET OF SKIN DISEASE TYPICALLY PRECEDES ONSET OF JOINT DISEASE BY 10 YEARS
- PEAK ONSET BETWEEN AGES 9 AND 12 YEARS
- **UP TO 20% OF ALL CHILDHOOD ARTHRITIS IS PSORIATIC ARTHRITIS**

# PSORIATIC ARTHRITIS IN PEDI PTS

- **UP TO 20 % OF ALL CHILDHOOD ARTHRITIS IS PSORIATIC ARTHRITIS**
- **IF A CHILD HAS PSORIATIC ARTHRITIS, ASSESS FOR UVEITIS**

# PREVALENCE OF THE METABOLIC SYNDROME IN CHILDREN WITH PSORIASIS

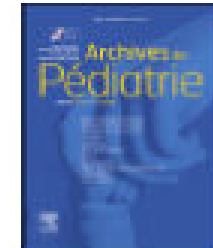
GOLMINZ AM

PEDIATR DERM VOL 30 (6); 700-705, 2013



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Research paper

## Psoriasis and metabolic and cardiovascular comorbidities in children: A systematic review

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Archives de Pediatric 2019

# PSORIASIS

**INDEPENDENT RISK FACTOR FOR THE DEVELOPMENT OF:**

- ATHEROSCLEROSIS
- CARDIOVASCULAR DISEASE

CARDIOVASCULAR RISK ASSESSMENT IS CURRENTLY ADVISED  
FOR ADULT PTS WITH MODERATE TO SEVERE PSORIASIS

AUTHORS SUGGEST: HEALTHY LIFESTYLE FOR KIDS

JENSEN P

ACTA DERM VENEREOL 2014; 94: 76-78

# PSYCHOLOGICAL IMPACT OF PSORIASIS ON PEDIATRIC PATIENTS

- CANNOT BE IGNORED

[Actas Dermosifiliogr.](#) 2018 Oct;109(8):667-669. doi: 10.1016/j.ad.2018.09.001.

## **The Importance of Measuring the Psychological Impact of Psoriasis and How We Treat Pediatric Patients With Psoriasis.**

[Article in English, Spanish]

[Pérez Ferriols A](#)<sup>1</sup>.

### **Author information**

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**Acta Dermosifiliogr Oct 2018; 109 (8): 667-669**



› [Pediatr Dermatol. 2019 May;36\(3\):290-297. doi: 10.1111/pde.13772. Epub 2019 Feb 21.](#)

# **A Retrospective Cohort Study to Evaluate the Development of Comorbidities, Including Psychiatric Comorbidities, Among a Pediatric Psoriasis Population**

Amy S Paller <sup>1</sup>, Jennifer Schenfeld <sup>2</sup>, Neil A Accortt <sup>3</sup>, Gregory Kricorian <sup>3</sup>

› [JAMA Dermatol. 2019 Nov 27;156\(1\):72-78. doi: 10.1001/jamadermatol.2019.3717.](#)

Online ahead of print.

# Association Between Quality of Life and Improvement in Psoriasis Severity and Extent in Pediatric Patients

[Finola M Bruins](#)<sup>1</sup>, [Inge M G J Bronckers](#)<sup>1</sup>, [Hans M M Groenewoud](#)<sup>2</sup>, [Peter C M van de Kerkhof](#)<sup>1</sup>, [Elke M G J de Jong](#)<sup>1</sup>, [Marieke M B Seyger](#)<sup>1</sup>

Affiliations + expand

PMID: [31774449](#) PMCID: [PMC6902114](#) DOI: [10.1001/jamadermatol.2019.3717](#)

**Conclusions and relevance:** This cohort study in a real-world setting found that the greatest improvements in QOL were associated with PASI 90 or greater, a decrease in BSA involvement of 90% or greater, and systemic treatments. These findings suggest that reaching PASI 90 or greater and decreasing BSA involvement by at least 90% may be clinically meaningful treatment goals that will help pediatric patients with psoriasis reach optimal QOL.



[Children \(Basel\)](#), 2021 Nov; 8(11): 1057.

PMCID: PMC8619705

Published online 2021 Nov 16. doi: [10.3390/children8111057](https://doi.org/10.3390/children8111057)

PMID: [34828770](https://pubmed.ncbi.nlm.nih.gov/34828770/)

## Skin Disease in Children: Effects on Quality of Life, Stigmatization, Bullying, and Suicide Risk in Pediatric Acne, Atopic Dermatitis, and Psoriasis Patients

[Katherine A. Kelly](#),<sup>1,\*</sup> [Esther A. Balogh](#),<sup>1</sup> [Sebastian G. Kaplan](#),<sup>2</sup> and [Steven R. Feldman](#)<sup>1,3,4,5</sup>

Biomedicines 2021 Aug; 9(8): 940

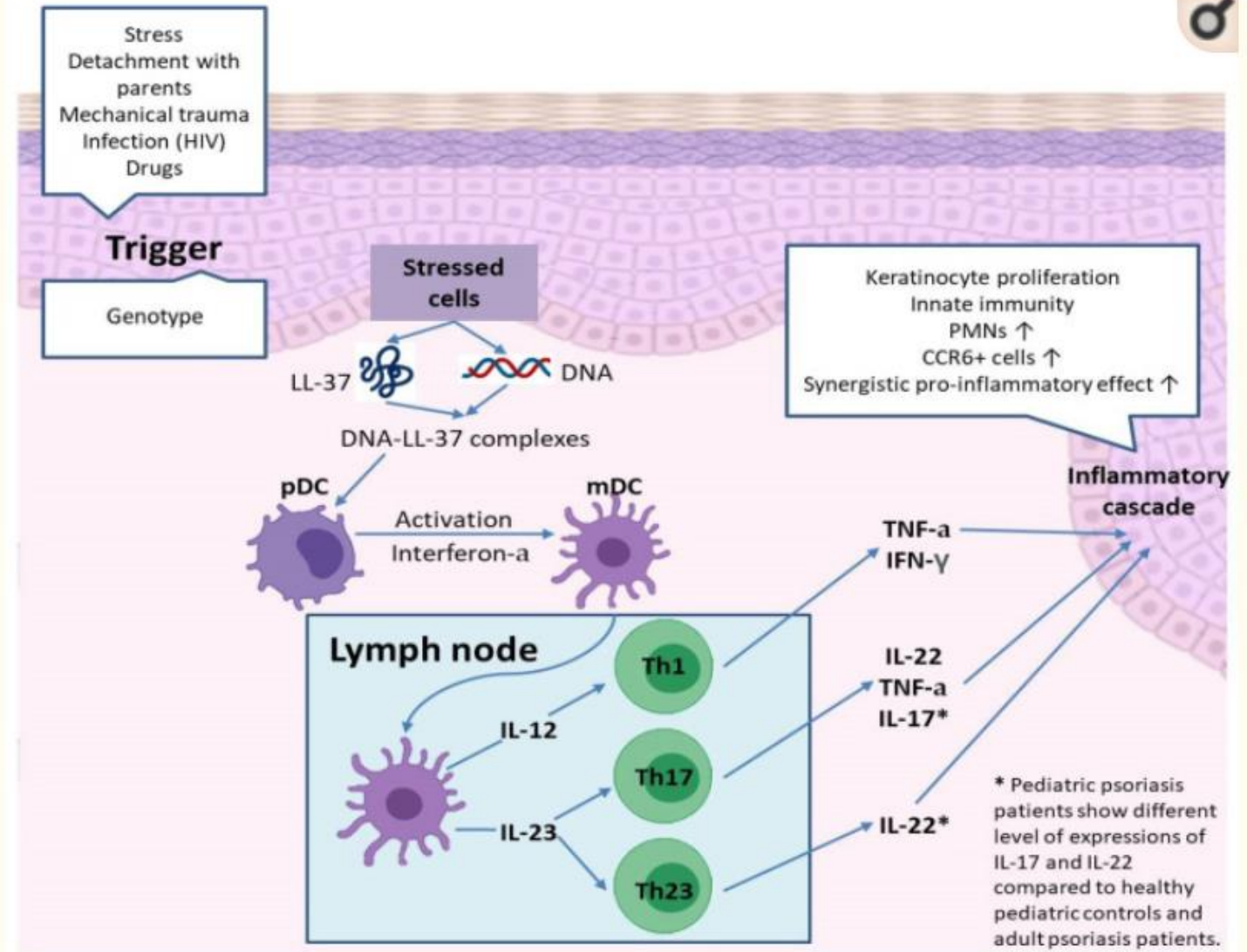


Figure 1

Pathogenesis of psoriasis focusing on the immunologic aspect.

# PEDIATRIC PSORIASIS THERAPY

- Only **6 FDA medications approved** for pediatric patients
- **Biologics:**
  - Etanercept:  $\geq 4$  years
  - Ustekinumab :  $\geq 6$  years
  - Ixekizumab:  $\geq 6$  years
  - Secukinumab:  $\geq 6$  years (May 2021)
- **Topicals:**
  - Calcipotriene Foam 0.005%:  $\geq 4$  years scalp and body
  - Calcipotriene 0.005% and betamethasone 0.064% **foam:**
    - $\geq 12$  years: mild to severe plaque psoriasis
  - Calcipotriene 0.005% and betamethasone 0.064%  
**suspension:** scalp and body:  $\geq 12$  years

# FUTURE PEDIATRIC PSORIASIS THERAPY

## **BIOLOGICS:**

Brodalumab: anti IL 17: 6 to 17 years of age

Tildrakizumab: IL 23 inhibitor : 12 to 17 years of age

Guselkumab: IL 23 inhibitor: 6 to 18 years of age

## **TOPICALS:**

Halobetasol 0.01%/ tazarotene 0.045% lotion

Roflumilast: PDE 4 inhibitor: 2 to adulthood

- used systemically in COPD in adults

# PEDIATRIC PTS WITH PSORIASIS

- INFANTS

# THERAPIES

- EDUCATION
- COAL TAR
- TOPICAL STEROIDS
- MOISTURIZERS



# YOUNG CHILDREN

- CONSIDER STREP THROAT
- TAR
- TOPICAL STEROIDS
- TOPICAL CALCINEURIN INHIBITORS (INVERSE PSORIASIS)
- PHOTOTHERAPY

# Pharmacotherapeutic management of psoriasis in adolescents and children

S. D'Adamio, D. Silvaggio, A. Massaro, P. Lombardo, L. Bianchi, M. Talamonti & M. Galluzzo

To cite this article: S. D'Adamio, D. Silvaggio, A. Massaro, P. Lombardo, L. Bianchi, M. Talamonti & M. Galluzzo (2019) Pharmacotherapeutic management of psoriasis in adolescents and children, *Expert Opinion on Pharmacotherapy*, 20:14, 1777-1785, DOI: [10.1080/14656566.2019.1636032](https://doi.org/10.1080/14656566.2019.1636032)

To link to this article: <https://doi.org/10.1080/14656566.2019.1636032>

Expert Opinion Pharmacother 2019 Oct(14):1777-1785

# OLDER CHILDREN WITH PSORIASIS

- TOPICAL STEROIDS / OTHER TOPICALS
- PHOTOTHERAPY / LASER
- METHOTREXATE
- CYCLOSPORIN
- RETINOIDS : TOPICAL / ORAL
- BIOLOGICS

# Treatment Persistence in Paediatric and Adolescent Psoriasis Patients Followed Into Young Adulthood: From Topical to Systemic Treatment – A Prospective, Longitudinal, Observational Cohort Study of 448 Patients

F M Bruins<sup>1</sup>, I M G J Bronckers<sup>1</sup>, R Cai<sup>2</sup>, H M M Groenewoud<sup>3</sup>, M Krol<sup>2</sup>, E M G J de Jong<sup>1</sup>, M M B Seyger<sup>1</sup>

Affiliations + expand

PMID: 32510578 DOI: [10.1111/bjd.19301](https://doi.org/10.1111/bjd.19301)

**Results:** Of 448 patients, 62.3% stayed on solely topical treatment until data-lock; 14.3% switched from topical to phototherapy, but not to systemic treatment; and 23.4% switched to systemic treatment. Median time from psoriasis onset until i) solely topical discontinuation was 7.3 years and ii) switch to systemics was 10.8 years. Higher Psoriasis Area and Severity Index and a (Children's) Dermatology Life Quality Index >5 were independently associated with switching to systemic treatment.

# VITAMIN D ANALOGUES

- OFTEN USED IN CONJUNCTION WITH TOPICAL STEROIDS
- AAD GUIDELINES
- USE OF UP TO 45 G/ WEEK/ M2
  - NO EFFECT ON SERUM CALCIUM LEVELS
- LOCALIZED IRRITATION OF SKIN

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**suspension:** scalp and body:  $\geq 12$  years



# METHOTREXATE

- USED FOR PSORIASIS SINCE THE 1950'S
- USED SAFELY IN AGES 2 TO 16 FOR ERYTHRODERMIC, PLAQUE, PUSTULAR PSORIASIS AND PSORIATIC ARTHRITIS
- DOSE RANGE: 0.2 TO 0.7 MG/KG/ WEEK
- I STILL GIVE A TEST DOSE AND CHECK CBC IN ONE WEEK



# METHOTREXATE

**Table XXXVII.** Recommendations for pediatric psoriasis and methotrexate therapy

Recommendation No.	Recommendation	Strength of recommendation
18.1	Methotrexate is recommended as an effective systemic therapy for moderate to severe plaque psoriasis and other psoriasis subtypes in children.	B
18.2	Methotrexate is recommended as an effective systemic therapy for pustular psoriasis in children.	B
18.3	Methotrexate weight-based dosing is recommended in younger children, ranging from 0.2 to 0.7 mg/kg/wk (maximum, 25 mg/kg/wk).	B
18.4	Folic acid supplementation daily or 6 times weekly during treatment with methotrexate is recommended.	B
18.5	Routine clinical and laboratory monitoring is recommended before and during treatment with methotrexate.	B

# AAD GUIDELINES FOR PEDIATRIC PSORIASIS:SYSTEMIC

**Table XXXVI.** Suggested monitoring for nonbiologic systemic medications for pediatric psoriasis\*

Medication <sup>1</sup>	Baseline	Follow-up	Miscellaneous	References
Methotrexate Dose range: 0.2-0.7 mg/kg/wk Maximum: 25 mg/wk (see text for details)	CBC with diff, platelets Renal function <sup>†</sup> Liver function If at risk: hepatitis A, B, C, HIV PPD or other TB tests for latent TB screening <sup>†</sup>	CBC with diff, platelets (5-7 days after initiating therapy) Renal function <sup>†</sup> LFTs (monthly for the first 3 months, then every 3 to 6 months) Annual TB test if at risk <sup>†</sup>	Liver enzymes rise after dose; check labs 4-6 days after the last dose Liver biopsy often avoided/not indicated in pediatric patients but should be individualized to clinical context Avoid in children with liver risk factors Chest radiograph for symptoms	101,133,134
Acitretin Dose range: 0.1-1 mg/kg/d (see text for details)	CBC Fasting lipids Liver function Pregnancy test (if appropriate)	Liver function and fasting lipids after 1 month of treatment and with dose increases, then every 1-3 months Monthly pregnancy test (if appropriate)	Bone imaging based on symptoms and duration of treatment (see text)	101,133,134
Cyclosporine Dose range: 2-5 mg/kg/d (see text for details)	Blood pressure CBC Renal function Liver function Fasting lipids Serum magnesium and potassium uric acid HIV if at risk	Blood pressure once a week for the first month and at follow-up visits as needed. CBC, serum creatinine, BUN, uric acid, potassium, lipids, and magnesium every 2 weeks for the first month and then at least monthly thereafter	Whole-blood cyclosporine trough level if inadequate clinical response or concomitant use of potentially interacting drugs	101,133,134

*BUN*, Blood urea nitrogen; *CBC*, complete blood count; *diff*, differential; *LFT*, liver function test; *PPD*, protein derivative test; *TB*, tuberculosis.

\*Some monitoring suggestions are not evidence-based recommendations and are expert consensus. These recommendations may vary based on patient age and specific protocols. Practicing physicians should individualize monitoring protocols according to the clinical context. For all pediatric patients receiving long-term systemic therapy, c

<sup>1</sup>Dosing is based on actual weight.

<sup>†</sup>At the discretion of the physician based on the clinical situation/individual risk factors.

JAMA Dermatol. 2020 Feb 5. doi: 10.1001/jamadermatol.2019.4835. [Epub ahead of print]

## **A Comparison of Psoriasis Severity in Pediatric Patients Treated With Methotrexate vs Biologic Agents.**

Bronckers IMGJ<sup>1</sup>, Paller AS<sup>2,3</sup>, West DP<sup>2,3</sup>, Lara-Corrales I<sup>4</sup>, Tollefson MM<sup>5</sup>, Tom WL<sup>6,7</sup>, Hogeling M<sup>8,9</sup>, Belazarian L<sup>10</sup>, Zachariae C<sup>11</sup>, Mahé E<sup>12</sup>, Siegfried E<sup>13,14</sup>, Blume-Peytavi U<sup>15</sup>, Szalai Z<sup>16</sup>, Vleugels RA<sup>17</sup>, Holland K<sup>18,19</sup>, Murphy R<sup>20</sup>, Puig L<sup>21</sup>, Cordoro KM<sup>22,23</sup>, Lambert J<sup>24</sup>, Alexopoulos A<sup>25</sup>, Mrowietz U<sup>26</sup>, Kievit W<sup>27</sup>, Seyger MMB<sup>1</sup>; Psoriasis Investigator Group, the Pediatric Dermatology Research Alliance, and the European Working Group on Pediatric Psoriasis.

**CONCLUSION: BIOLOGIC RESPONSE BETTER THAN METHOTREXATE**

**Jama Dermatol 2020 FEB**

# CYCLOSPORIN

- OFF LABEL IN PEDI PSORIASIS
- FDA APPROVAL FOR PEDI TRANSPLANT – 6 MONTHS
- EFFECTIVE AND TOLERATED FOR PSORIASIS TX IN KIDS AS YOUNG AS 11 MOS
- IN DOSES FROM 1.5 MG TO 5 MG/KG/DAY FOR 6 WEEKS TO 2 YEARS
- OFTEN USED IN COMBINATION WITH TOPICALS

# CYCLOSPORIN

- ACTS RAPIDLY
- CLINICAL IMPROVEMENT AS EARLY AS 2 WEEKS; MAY REQUIRE 4 TO 8 WEEKS FOR FULL RESPONSE
- AS KIDS HAVE HIGHER BSA TO WEIGHT RATIOS AND AGE DEPENDENT DIFFERENCES IN PHARMACOKINETICS, MAY REQUIRE HIGHER DOSES THAN ADULTS
- MAY NEED 5 MG /KG/DAY

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<sup>1</sup>Dosing is based on actual weight.

<sup>†</sup>At the discretion of the physician based on the clinical situation/individual risk factors.

# CYCLOSPORIN

## VACCINATIONS :

- MAY BE LESS EFFECTIVE DURING THERAPY
- **LIVE ATTENUATED VACCINES TO BE AVOIDED**

## METABOLISM BY P450 SYSTEM:

- ADVISE REGARDING FOOD AND DRUG INTERACTIONS

## Management of pediatric plaque psoriasis using biologics

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Irene Lara-Corrales, MSc, MD,<sup>c</sup> Danielle Marcoux, MD,<sup>f</sup> Catherine McCuaig, MD,<sup>f</sup>  
Elena Pope, MSc, MD,<sup>c</sup> Vimal H. Prajapati, MD,<sup>g</sup> Sue Z. J. Li, PhD,<sup>h</sup> and Ian Landells, MD<sup>i</sup>  
*Toronto, Ontario; Vancouver, British Columbia; Edmonton and Calgary, Alberta; Montreal, Quebec; and  
St John's, Newfoundland, Canada*

**Background:** Psoriasis is a chronic inflammatory disease with clinical manifestations of the skin that affect adults and children. In adults, biologics have revolutionized the treatment of moderate to severe plaque psoriasis where clear or almost clear is a tangible goal. Research on biologics has recently been extended to children. The introduction of these new therapeutic options has outpaced the limited guidelines in this population.

**Objective:** To provide a review of current data on biologics, with a proposal for a clinically relevant treatment algorithm on the management of moderate to severe plaque psoriasis in the pediatric population.

**Methods:** A Canadian panel with expertise in psoriasis, pediatric dermatology, and experience with consensus recommendation processes was selected to review the current landscape of pediatric psoriasis and clinical data on biologics plus identify special considerations for baseline workup and monitoring. Recommendations were reviewed and edited by each expert in an iterative process.

**Conclusion:** A treatment algorithm for moderate to severe plaque psoriasis in pediatric patients is presented, incorporating approved biologics. Guidance on baseline screening and ongoing monitoring is



# Triggers of Pediatric Psoriasis

Triggers:

Group A  $\beta$  hemolytic Streptococcal infection  
(M protein)

Beta blockers

Lithium

Biologics

Systemic steroids on cessation of therapy

# Infliximab-Induced Psoriasis and Psoriasiform Skin Lesions in Pediatric Crohn Disease and a Potential Association With IL-23 Receptor Polymorphisms

\*Mary E. Sherlock, †Thomas Walters, †Merit M. Tabbers, †Karen Frost, \*Mary Zachos, †Aleixo Muise, §Elena Pope, and †Anne M. Griffiths



**FIGURE 1.** Scaly erythematous plaque at base of toe (patient no. 10).

among patients developing psoriasis following IFX therapy in comparison with patients with CD treated with IFX, but who did not develop psoriasis. Of note, despite similar allele frequencies, only 1 of these 3 polymorphisms (rs10489628) was able to clearly distinguish subjects with CD from subjects with UC. The effects demonstrated were independent in an additive fashion, with the simultaneous homozygous carriage of both rs10489628 and rs10789229 having the highest risk of IFX-induced psoriasis (odds ratio 17.5,  $P = 0.02$ , 95% CI 1.6–196.3). Interestingly, neither of the variants previously recognized to have an independent association with psoriasis de novo (rs2201841 and rs11209026) demonstrated any association with IFX-induced psoriasis. More important, we were unable to demonstrate an association between SNP rs11209026 (R381Q), the IL-23R SNP that has the strongest independent association with both CD and psoriasis susceptibility, and the development of IFX-induced psoriasis; all (35/35) subjects were homozygous for the common (G) allele of rs11209026. Numerically, more patients with UC than CD carried the protective “A” allele for this SNP (6% vs 1.5%, NS). Results of IL-23R SNP analyses are summarized in Table 3.



**FIGURE 2.** Erythematous lesion behind ear, with surface scaling and exudates (patient no. 5).

## Infliximab Paradoxical Psoriasis in a Cohort of Children With Inflammatory Bowel Disease

*\*Olivier Courbette, \*†Camille Aupiais, \*Jerome Viala, \*‡Jean-Pierre Hugot,  
\*Baptiste Louveau, §||Lucienne Chatenoud, \*¶Emmanuelle Bourrat,  
and \*Christine Martinez-Vinson*

**Nail** Involvement as a Predictor of Disease Severity in **Paediatric Psoriasis**:  
Follow-up Data from the Dutch ChildCAPTURE Registry.

Bronckers IMGJ, Bruins FM, van Geel MJ, Groenewoud HMM, Kievit W, van de Kerkhof PCM, Pasch MC,  
de Jong EMGJ, Seyger MMB.

Acta Derm Venereol. 2019 Feb 1;99(2):152-157. doi: 10.2340/00015555-3036.

PMID: 30206638      **Free article.**      Clinical Trial.

Acta Derm Venereol 2019 Feb 1; 99(2): 152-157

Review

> *Cutis*. 2021 Nov;108(5):292-294. doi: 10.12788/cutis.0386.

# Management of Pediatric Nail Psoriasis

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PMID: 35100538 DOI: 10.12788/cutis.0386

# PEDIATRIC PSORIASIS

- EACH YEAR, ABOUT 20,000 CHILDREN < 10 YEARS OF AGE ARE DIAGNOSED WITH PSORIASIS

# PEDIATRIC PSORIASIS THERAPY

- Only **6 FDA medications approved** for pediatric patients
- **Biologics:**
  - Etanercept:  $\geq 4$  years
  - Ustekinumab :  $\geq 12$  years
  - Ixekizumab:  $\geq 6$  years
  - Secukinumab:  $\geq 6$  years (May 2021)
- **Topicals:**
  - Calcipotriene Foam 0.005%:  $\geq 4$  years scalp and body
  - Calcipotriene 0.005% and betamethasone 0.064% **foam:**
    - $\geq 12$  years: mild to severe plaque psoriasis
  - Calcipotriene 0.005% and betamethasone 0.064%  
**suspension:** scalp and body:  $\geq 12$  years

# Mimickers of Pediatric Psoriasis

Mimickers:

Sodium valproate-induced psoriasiform drug eruption

Sanitizing hand and diaper wipes containing:

- Methylchlorothiazolinone
- periorificial or perineal psoriasiform distribution



# CONCLUSION

- MANY CHILDREN DO SUFFER WITH PSORIASIS
- FEW CURRENT FDA APPROVED MEDICATIONS
- FEWER STUDIES IN CHILDREN THAN ADULTS
- RECENT LITERATURE TO GUIDE THERAPY

# PEDIATRIC PSORIASIS

