RESEARCH LETTER

Injection-related Pain and the Benefit of a Syringe Pump for Dupilumab Adherence in Children with Atopic Dermatitis: A Retrospective Cross-sectional Study

Célia DELESALLE[1], Aude HUITRIC[1], Emilie BRENAUT[1,2,3], Laurent MISERY[1,2,3] and Claire ABASQ-THOMAS[1,2,3*]
[1]*Department of Pediatrics, Brest University Hospital, Brest, Brittany, France,* [2]*Department of Dermatology, Brest University Hospital, Brest, Brittany, France, and* [3]*University of Brest, LIEN, Brest, France. *Email: claire.abasq@chu-brest.fr*
Submitted Mar 29, 2026. Accepted after revision Jun 30, 2026
Published Aug 27, 2026. DOI: 10.2340/actadv.v106.adv-2026-0553 Acta Derm Venereol 2026; 106: adv-2026-0553.

Dear Editor,

Dupilumab, a monoclonal antibody targeting interleukins 4 and 13, has transformed the treatment of severe infantile atopic dermatitis (AD) and has been demonstrated to be both effective and well tolerated in paediatric patients (1). However, data regarding injection-related pain remain limited. In real-world settings, this pain is frequently observed and often compromises adherence. For instance, Lasek et al. reported 2 patients who discontinued treatment due to injection-related pain (2). The syringe pump, which allows slow infusion of the treatment over a 20-min period (**Fig. 1**), belongs to the new types of electromechanical devices used for administration of biologics and is known to diminish pain (3). This study evaluates the pain experienced by paediatric patients during dupilumab injections and identifies pain-relief strategies, with a particular focus on the clinical benefits provided by the syringe pump.

This retrospective, cross-sectional study was conducted at Brest University Hospital and included AD patients aged between 6 months and 17 years treated with dupilumab for ≥6 months between January 2019 and February 2025, with no refusals. Between October 2024 and July 2025, data were extracted from medical records, and standardized telephone interviews were conducted with all families. These included a general questionnaire for the cohort and a specific one for the syringe pump subgroup. To ensure data maturity, a minimum 5-month follow-up of the syringe pump was required prior to evaluation; no initiations after February 2025 were included. Pain was assessed as a binary variable (yes/no) based on child self-reporting or parental proxy-reporting. Pain evolution over time was categorized into decrease, stabilization or increase. Pain-relief methods were qualitatively categorized from open-ended reports. Statistical analyses used Fisher exact, Student *t*-test, and Mann–Whitney *U* tests ($p<0.05$).

Fig. 1. Photography of the syringe pump, detailing the subcutaneous injection site and the electronic unit.

Sixty-five patients were included with a median age of 13 years, and 52.3% of female). The study population was categorized into 3 age groups: over 12 years (56.9%), 6–11 years (33.8%) and 6 months to 5 years (9.2%). Mean follow-up duration was 2.5 years. Regarding the primary outcome, 84.4% of the 64 respondents (n=54/64) reported experiencing pain during injection, with no significant differences according to the age (p=0.133) or gender (p=0.504). Injections were performed by nurses (n=38), family members (n=17) or self-administration (n=9). Among the 54 patients who experienced pain (excluding 4 missing data), pain decreased over time for 66% (n=33/50), remained stable for 26% (n=13/50), and increased for 8% (n=4/50). Two patients stopped treatment due to pain. The most frequently reported pain relief methods were local analgesics (Emla®) for 40% of the patients, a trusting relationship with the person performing the procedure (30%), and a slow injection technique (30%) (**Fig. 2**). The syringe pump was offered to a subgroup of 15 children facing the most difficult situations, characterized by severe injection pain or significant apprehension. This subgroup was significantly younger than the standard administration group, (mean age 7.8 years vs 13.5 years; p<0.01). Among 13 patients with available data, 92.3% of them reported a reduction in pain, with 38.5% achieving a complete resolution. In this subgroup, home-based administration was achieved for all patients, with 46% of procedures conducted by parents and 54% by home-care nurses. The average satisfaction score was 8.7/10. Minor issues included excessive duration (n=2) and tingling sensation (n=2).

This study is the first to specifically evaluate dupilumab injection pain in paediatric patients and the use of syringe pump. Although this symptom

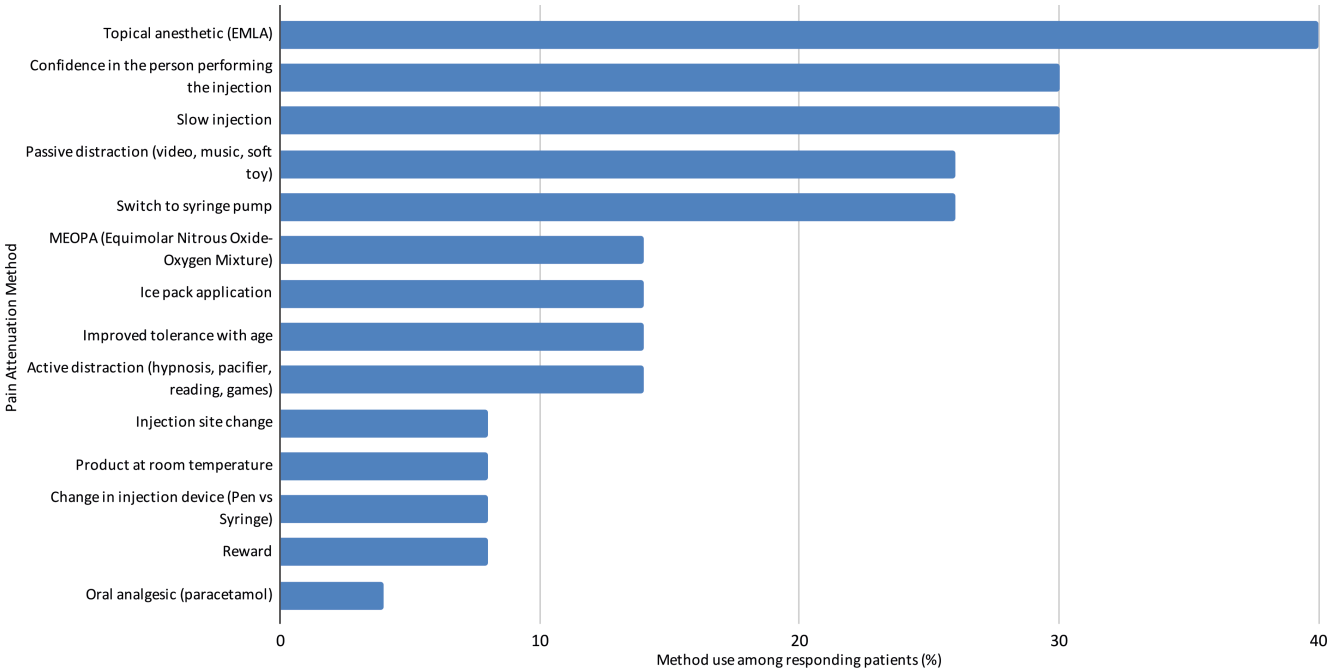

Fig. 2. Frequency of methods used to attenuate pain during dupilumab injection among respondents reporting pain (*n*=50).

is underreported in clinical trials, injection-related pain is common in real-world clinical practice (4). The pain experienced during dupilumab injections is primarily attributable to the product's viscosity (5, 6). Consequently, reducing the injection speed appears to be a reliable and effective method for alleviating this pain. The syringe pump offers several advantages, as it significantly reduces or eliminates pain and facilitates home-based administration by parents. Economically, the initial device investment may be offset by long-term cost-effectiveness compared to disposable pens, as enhanced compliance reduces broader healthcare spending (7, 8). While 66% of patients reported spontaneous pain decrease, probably due to acclimatisation, the syringe pump achieved a 92% reduction in a refractory, high-need subgroup where habituation had failed, after an average of 22 months of dupilumab treatment prior to switching. The only notable limitation identified is the duration of the injection, occasionally perceived as a burden by patients who favour a faster administration. While the study is limited by its retrospective nature, potential recall bias, a binary pain assessment and selection biais in the syringe pump subgroup, these preliminary data suggest that the syringe pump could be a potential alternative for improving dupilumab compliance and quality of life in children with AD, especially young children.

ACKNOWLEDGEMENTS

Data availability statement: The data that support the findings of this study are available from the corresponding author upon reasonable request.

Ethics committee: This study was approved by the local institutional ethics committees (reference B2024CE.56) and was conducted in accordance with the principles of the Declaration of Helsinki. All patients were provided with an information leaflet regarding their right to object; none of them expressed opposition to the use of their data for this research. All data were fully anonymized prior to analysis to ensure patient confidentiality.

Conflict of interest: CAT has received honouraria for lectures and educational events from Sanofi, AbbVie, and Almirall. EB has received honouraria for lectures and travel support from Sanofi. LM has received research grants from Sanofi, and has served as a consultant or advisory board member for Sanofi, Galderma, and Almirall. CD and AH declare no conflicts of interest.

REFERENCES

1. Simpson EL, Lockshin B, Lee LW, Chen Z, Daoud M, Korotzer A. Real-world effectiveness of dupilumab in adult and adolescent patients with atopic dermatitis: 2-year interim data from the PROSE registry. Dermatol Ther 2024; 14: 261–270. https://doi.org/10.1007/s13555-023-01061-4
2. Lasek A, Bellon N, Mallet S, Puzenat E, Bursztejn AC, Abasq C, et al. Effectiveness and safety of dupilumab in the treatment of atopic dermatitis in children (6-11 years): data from a French multicentre retrospective cohort in daily practice. J Eur Acad Dermatol Venereol 2022; 36: 2423–2429. https://doi.org/10.1111/jdv.18450
3. Antalfy A, Berman K, Everitt C, Alten R, Latymer M, Godfrey CM. The adherence and outcomes benefits of using a connected, reusable auto-injector for self-injecting biologics: a narrative review. Adv Ther 2023; 40: 4758–4776. https://doi.org/10.1007/s12325-023-02671-2
4. Paller AS, Simpson EL, Siegfried EC, Cork MJ, Wollenberg A, Arkwright PD, et al. Dupilumab in children aged 6 months to younger than 6 years with uncontrolled atopic dermatitis: a randomised, double-blind, placebo-controlled, phase 3 trial. Lancet 2022; 400: 908–919. https://doi.org/10.1016/S0140-6736(22)01539-2
5. Song J, Taraban M, Yu YB, Lu L, Guha Biswas P, Xu W, et al. *In-situ* biophysical characterization of high-concentration

protein formulations using *w* NMR. MAbs 2024; 16. https://doi.org/10.1080/19420862.2024.2304624
6. Berteau C, Filipe-Santos O, Wang T, Rojas HE, Granger C, Schwarzenbach F. Evaluation of the impact of viscosity, injection volume, and injection flow rate on subcutaneous injection tolerance. Med Devices (Auckl) 2015; 8: 473–484. https://doi.org/10.2147/MDER.S91019
7. van den Bemt BJF, Gettings L, Domańska B, Bruggraber R, Mountian I, Kristensen LE. A portfolio of biologic self-injection devices in rheumatology: how patient involvement in device design can improve treatment experience. Drug Deliv 2019; 26: 384–392. https://doi.org/10.1080/10717544.2019.1587043
8. Olsson M, Bajpai R, Wee LWY, Yew YW, Koh MJA, Thng S, et al. The cost of childhood atopic dermatitis in a multi-ethnic Asian population: a cost-of-illness study. Br J Dermatol 2020; 182: 1245–1252. https://doi.org/10.1111/bjd.18442