Dupilumab Treatment Normalizes Skin Barrier Function in Children Aged 6 to 11 Years With Moderate-to-Severe Atopic Dermatitis

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BACKGROUND

- Atopic dermatitis (AD) is associated with significant disruption in skin barrier function, mediated by type 2 inflammatory cytokines interleukin (IL)-4 and IL-13
- Previous studies show that dupilumab treatment in patients over 12 years of age with moderate-to-severe AD improves skin barrier function[1,2]

OBJECTIVE

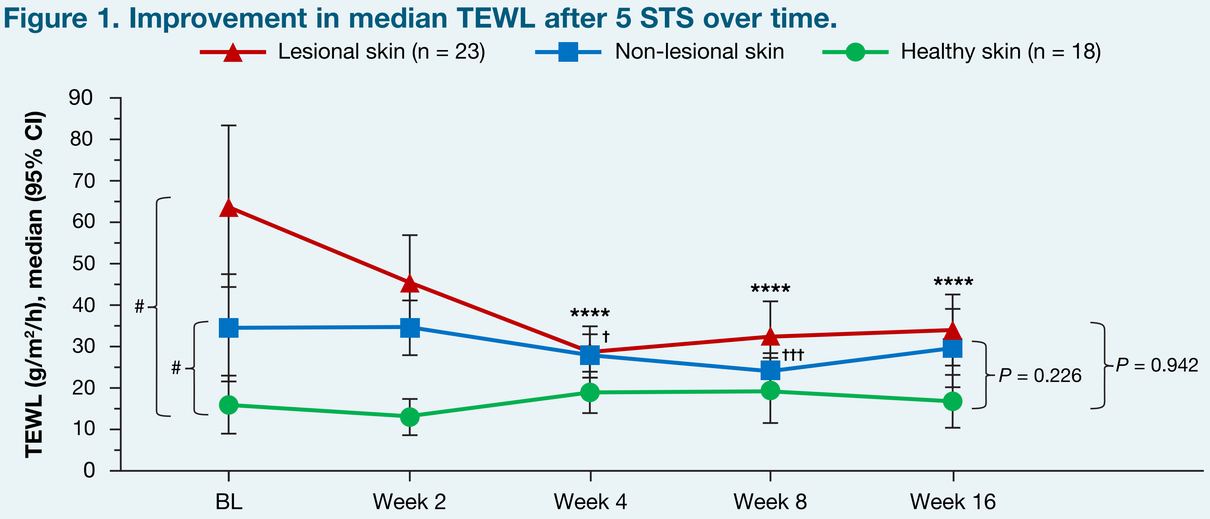
- **To report the effect of dupilumab treatment in pediatric patients aged 6–11 years with moderate-to-severe AD on skin barrier function, clinician-, and patient-reported outcomes**

METHODS

- PEdiatric skin barrier function and LIpidomics STudy in patients with Atopic Dermatitis (PELISTAD) was an open-label, exploratory study with matched healthy controls on skin barrier function in pediatric patients aged 6–11 years with moderate-to-severe AD
- Patients were treated with dupilumab for 16 weeks based on baseline weight (300 mg every 4 weeks: ≥ 15 kg to < 30 kg; 200 mg every 2 weeks: ≥ 30 kg to < 60 kg)
- Transepidermal water loss (TEWL) (g/m^2/h) was assessed longitudinally after skin tape strippings (STS) from lesional and non-lesional skin of AD patients treated with dupilumab and from healthy skin of matched healthy volunteers
- Eczema Area and Severity Index (EASI) and Children's Dermatology Life Quality Index (CDLQI) were assessed during the same time periods
- For baseline comparisons, *P* values were derived using either independent sample t-tests or non-parametric Wilcoxon Mann Whitney U tests
- For difference from baseline comparisons, *P* values were derived using either paired t-tests or non-parametric Wilcoxon signed rank tests
- Least squares (LS) means were obtained based on mixed models for repeated measures with absolute values as the response variable and baseline values, age, sex, visit, and visit-by-skin type interaction as covariates

RESULTS

Figure 1. Improvement in median TEWL after 5 STS over time.



At baseline, the median TEWL after 5 STS was significantly higher in lesional and non-lesional AD skin compared with healthy skin ($P < 0.0001$ for both skin types). Median TEWL after 5 STS significantly improved in lesional skin after 16 weeks of dupilumab treatment ($P < 0.0001$, vs baseline). At Week 16, LS mean TEWL after 5 STS in AD lesional and non-lesional skin reached levels comparable with those of healthy skin ($P = 0.942$ and $P = 0.226$, respectively). ****$P < 0.0001$ vs baseline, for lesional AD skin; †$P < 0.05$, †††$P < 0.001$ vs baseline, for non-lesional AD skin. #$P < 0.0001$ for lesional and non-lesional AD skin vs healthy skin. BL, baseline; CI, confidence interval.

Table. Treatment-emergent adverse events during the treatment period.

n (%)	Dupilumab (n = 23)	Healthy volunteers (n = 18)
Participants with any TEAE	21 (91.3)	6 (33.3)
Participants with any severe TEAE	0	0
Participants with any treatment-emergent SAE	0	0
Participants with any TEAE leading to permanent study intervention discontinuation	0	0
Participants with any TEAE leading to permanent study discontinuation	0	0
Participants with any treatment-emergent AESI	0	0

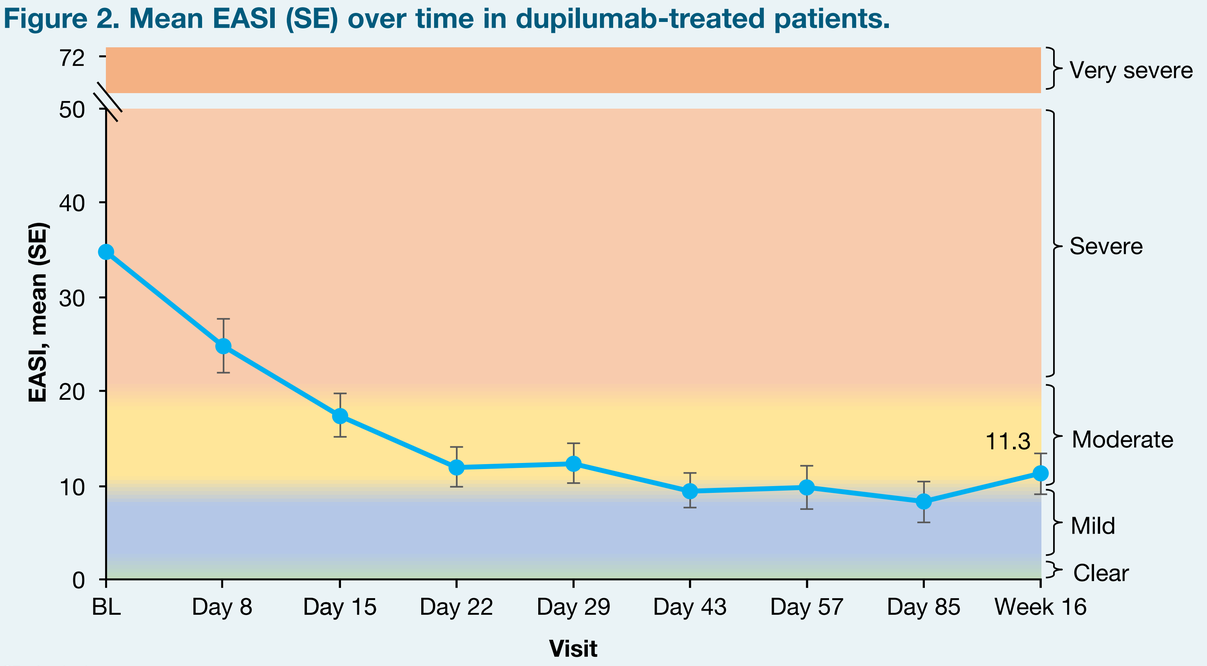
AESIs include: anaphylactic reactions, systemic hypersensitivity reactions, helminthic infections, any severe type of conjunctivitis or blepharitis, keratitis, clinically symptomatic eosinophilia (or eosinophilia associated with clinical symptoms). AESI, adverse event of special interest; SAE, serious adverse event; TEAE, treatment-emergent adverse event.

CONCLUSION

- **Dupilumab treatment normalizes skin barrier function, as assessed by decreased TEWL, and improves clinician- and patient- reported outcomes in pediatric patients aged 6–11 years with moderate-to-severe AD**

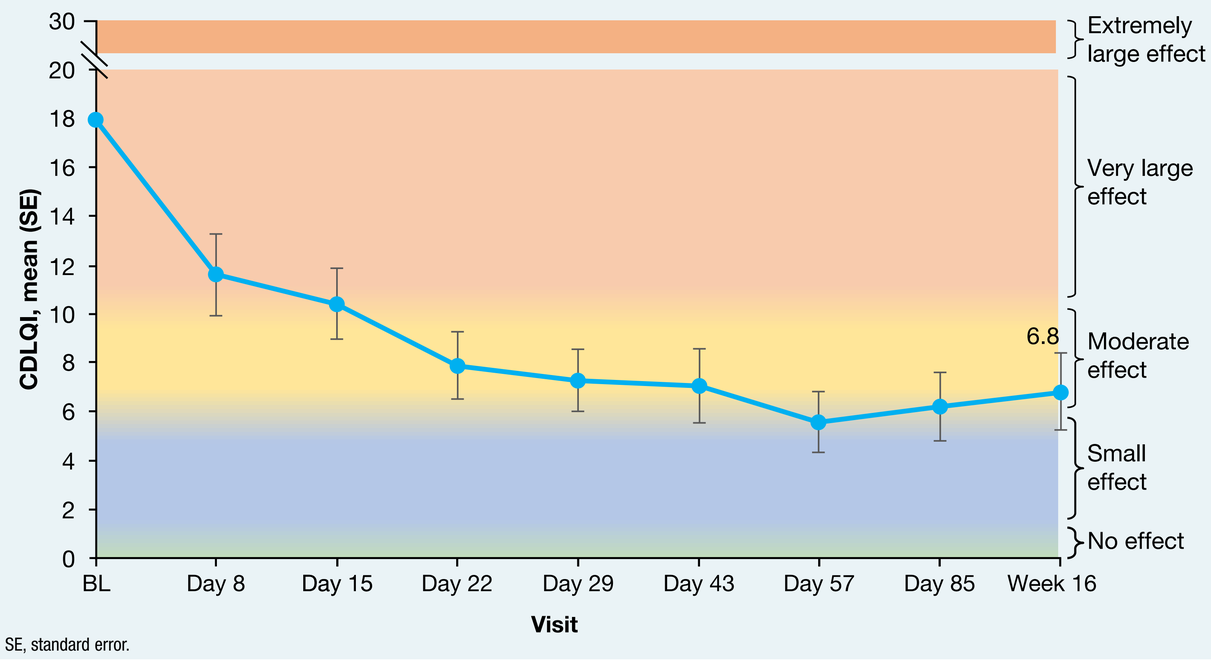
RESULTS (CONT.)

Figure 2. Mean EASI (SE) over time in dupilumab-treated patients.



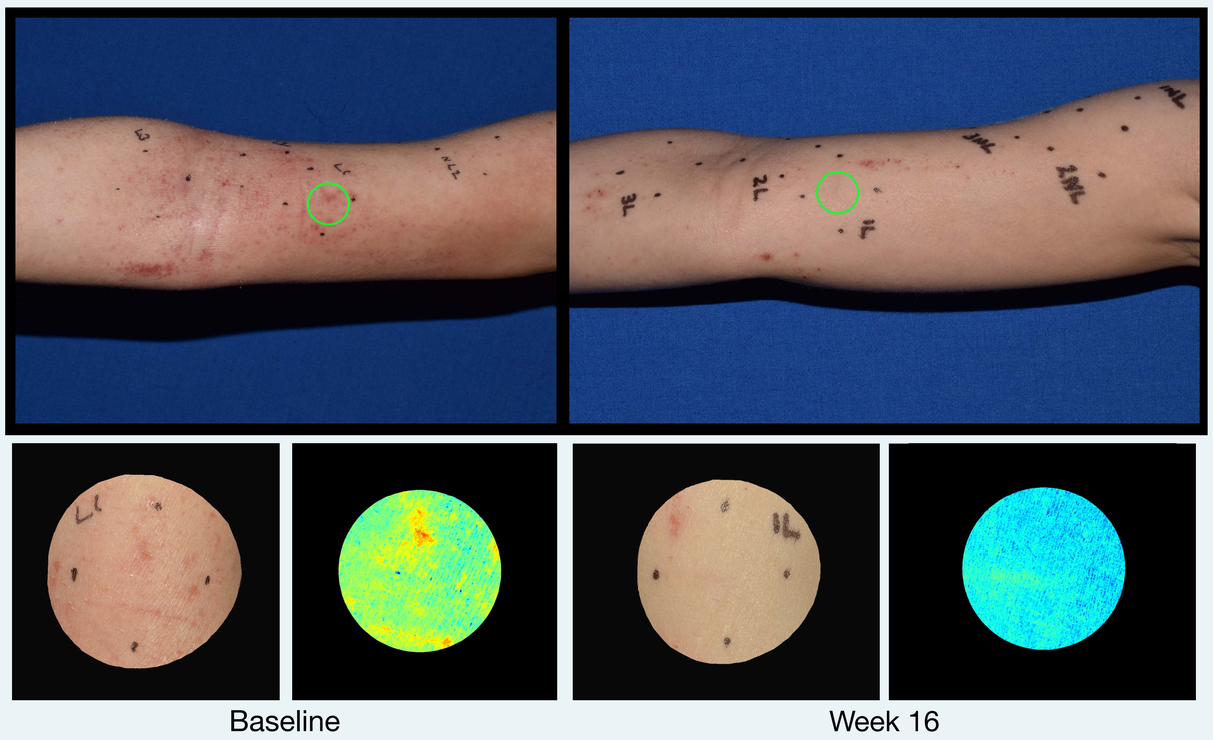
SE, standard error.

Figure 3. Mean CDLQI (SE) over time in dupilumab-treated patients.



SE, standard error.

Figure 4. Improvement in a patient's assessed AD lesional skin at baseline and Week 16.



Target lesion photos (left) at baseline and Week 16 were analyzed using the TiVi index (right). TiVi is a colorimetric measurement of the skin, linearly linked to the RBC concentration within the skin, which allows the quantification of skin erythema (vasodilatation). The red/yellow hues represent a high concentration of RBC, associated with increased erythema, and the blue/green hues represent low concentration of RBC, associated with decreased erythema.[3,4] RBC, red blood cells; TiVi, tissue viability imaging.

References: 1. Bissonnette R, et al. Poster presented at EADV 2022. 2. Bissonnette R, et al. Poster presented at EADV 2022. 3. McNamara PM, et al. Proc SPIE. 2010;7563:75630W. 4. Zhai H et al. Skin Res Technol. 2009;15:14-9.

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