

# Comparison of the benefit of a selenium disulfide-based shampoo and a shampoo containing zinc pyrithione in the management of moderate to severe dandruff

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## INTRODUCTION

Seborrheic Dermatitis (SD) is a chronic and relapsing inflammatory skin condition of sebum-rich areas such as the scalp. It is characterized by erythema, mild to moderate scaling resulting in greasy and flaky scalp, and is sometimes associated with pruritus.<sup>1</sup> In the adult population its prevalence is up to 5 %, with a higher prevalence in immunocompromised patients and in patients with neurologic diseases.<sup>2,3</sup> When only mild scaling without visible inflammation is observed, scalp SD is called dandruff (D) and up to 50% of the population suffer from dandruff. Various environmental, intrinsic and host immune factors may contribute to the development of SD, leading to an alteration of the sebaceous gland activity and sebum composition, epidermal barrier function, and skin surface fungal colonization, which ultimately leads to inflammation. Among these factors, lipophilic *Malassezia* yeasts may play a key role.

Zinc pyrithione (ZPT) has been reported to be active against *Malassezia spp.* yeasts.<sup>4,5</sup> It inhibits *M. restricta* and significantly reduces the expression of lipases, whose activities contribute to the survival and virulence of *M. restricta* on human skin.<sup>6</sup> Selenium disulphide-based shampoo (SeS<sub>2</sub>) is an effective means in the treatment of dandruff, a milder form of seborrheic dermatitis.<sup>7</sup> SeS<sub>2</sub> has antifungal properties against *Malassezia spp.* and also inhibits *Staphylococcus epidermidis* growth *in vitro*.<sup>8,9</sup> Moreover, the SeS<sub>2</sub>-based shampoo contains salicylic acid, known for its keratolytic activity, allowing to reduce flakes on the scalp.<sup>10,11</sup>

## RESULTS

Data from 63 subjects were suitable for analysis (30 for SeS<sub>2</sub> and 33 subjects for ZPT). The mean age was 33±2 years. The mean *Malassezia spp.* count was 206.8±13.6 in the SeS<sub>2</sub> and 218.0±15.7 ZPT groups. Mean dandruff scores were 5.7±0.2 and 5.9±0.2 in the SeS<sub>2</sub> and the ZPT groups, respectively. As early as after one week, both shampoos induced a similar decrease of *Malassezia spp.* count (SeS<sub>2</sub>: 165.9±13.5; ZPT: 173.2±9.2) and dandruff score (SeS<sub>2</sub>: 4.7±0.2; ZPT: 5.3±0.2). At week 6, *Malassezia spp.* count values were 55.2±8.6 and 44.3±8.1 for SeS<sub>2</sub> and ZPT, respectively. At the end of the follow up period (week 10) a slight and progressive increase of the dandruff score and *Malassezia spp.* counts was observed without returning back to baseline values (*Malassezia spp.* count: 90.5±10.9 and 94.85±13.6; dandruff score: 2.2±0.22 and 3.3±0.4 for SeS<sub>2</sub> and ZPT group, respectively). Differences compared to baseline were statistically significant (p=0.05) as early as week 1 with no difference between products; differences between products were statistically not significant.

**Figure 1** shows the evolution of the *Malassezia spp.* count overtime from baseline to week 10 in both treatment groups and **Figure 2** the dandruff score.

Scaling, desquamation, and itching decreased similarly in both groups as early as after one week (p=0.05). Along the treatment period, the reduction of the intensity of scalp itching was significantly reduced as early as week 1 in both groups (p=0.05) as well as in favour of SeS<sub>2</sub> compared to ZPT.

During the follow-up period, remanence was significantly (p=0.05) better with SeS<sub>2</sub> than with ZPT.

**Figure 3 to Figure 5** provide detailed results for the evolution of severity of clinical signs and symptoms over time for both treatment groups

## OBJECTIVE

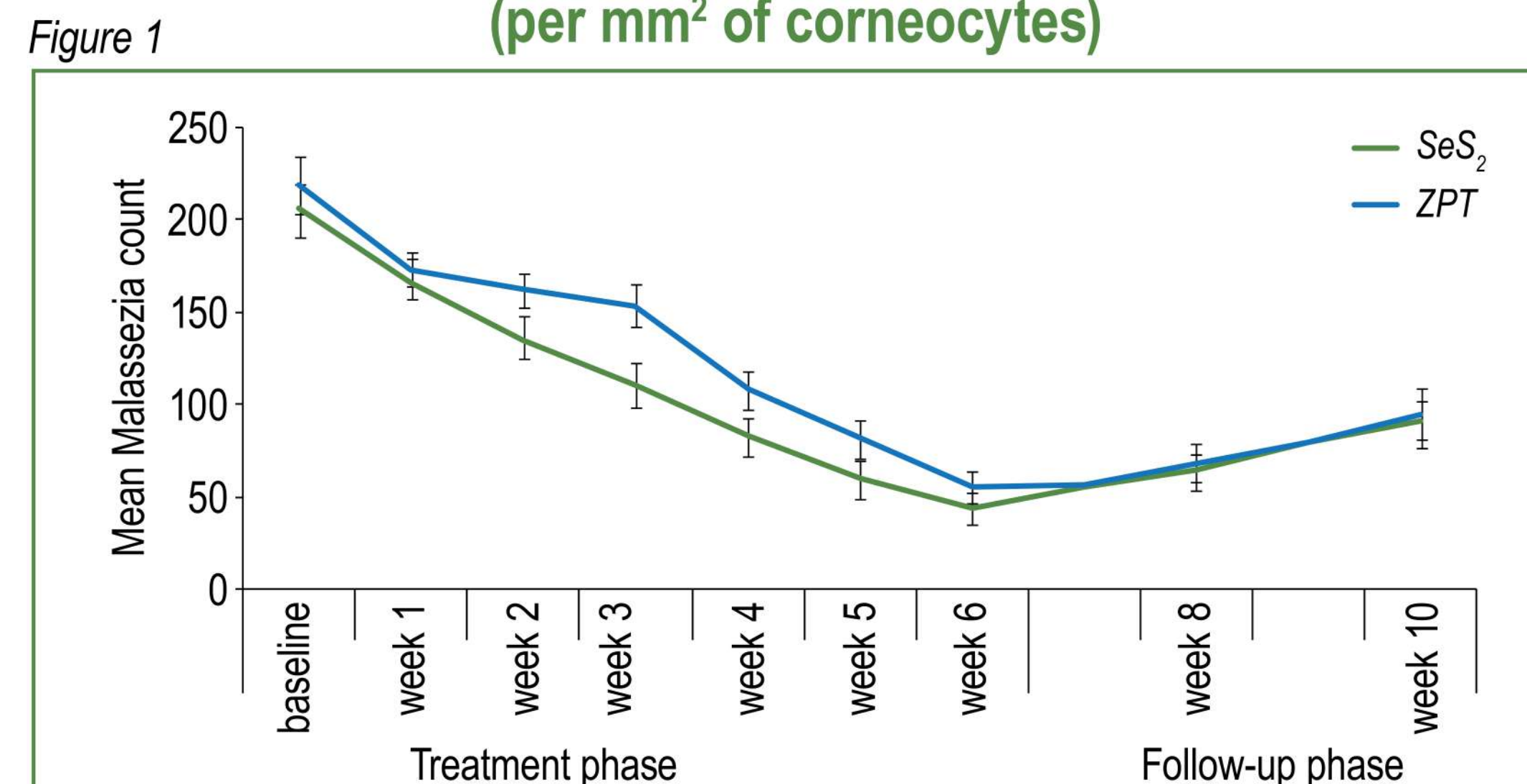
The objective of this study was to compare the efficacy of a SeS<sub>2</sub>-based shampoo versus a 2% zinc pyrithione-based shampoo (ZPT) in the treatment of dandruff.

## MATERIAL AND METHODS

This single-blind, open-label study involved 67 adult subjects with moderate to severe dandruff. Subjects received after a 3-week wash-out phase SeS<sub>2</sub>-based shampoo or a shampoo containing ZPT for a period of 6 weeks. Subjects washed their hair twice weekly leaving the shampoo on the scalp for 3 minutes before rinsing-off. After the 6 week-treatment phase, subjects entered a 4-week post treatment phase using a bland shampoo twice-weekly.

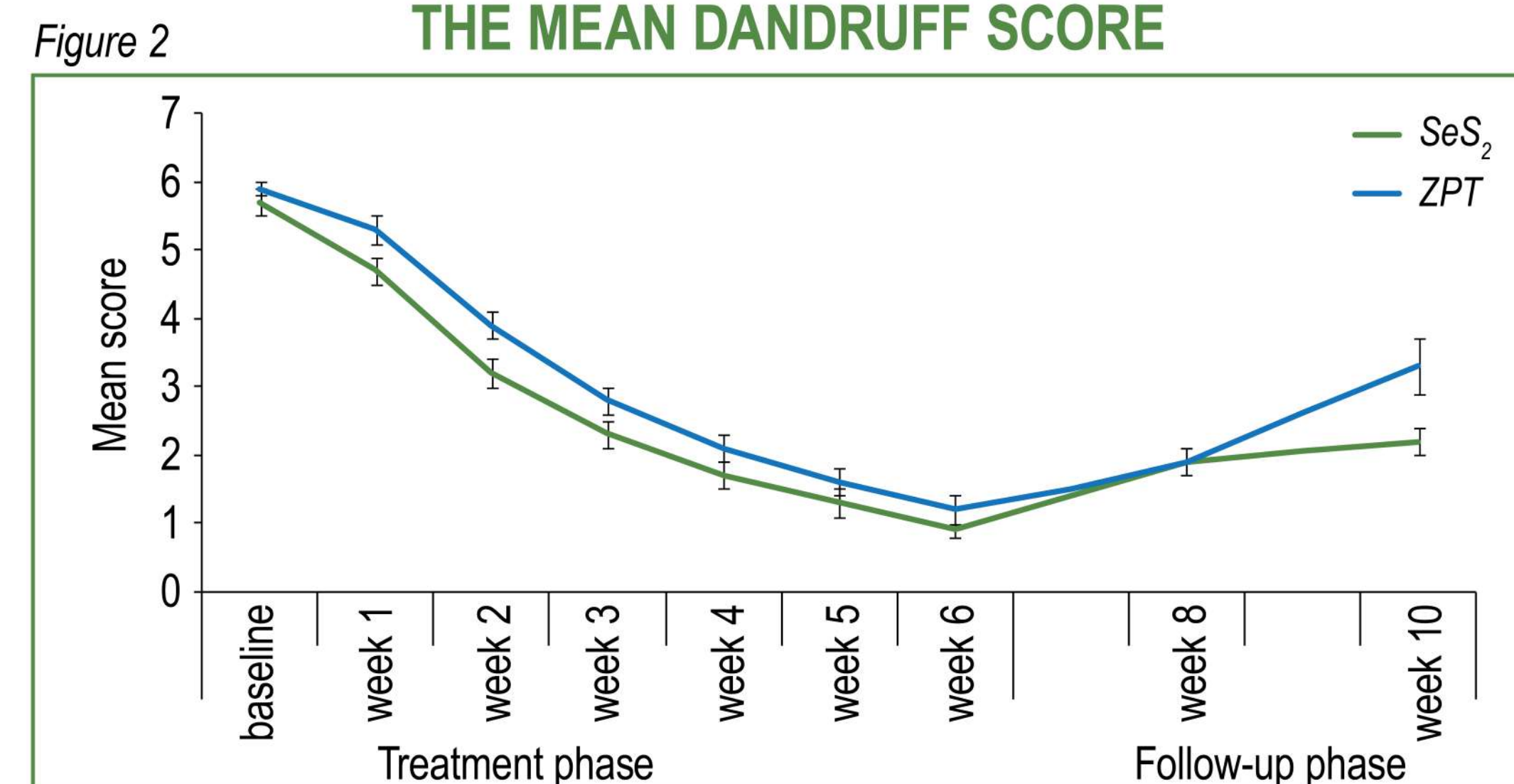
Dandruff was scored by summing up scores of adhering and free dandruff, each scored on a 0-5 grade (0=non to 5=severe). *Malassezia spp.* yeast counts per mm<sup>2</sup> of corneocytes were made from tape stripping on the scalp according to an established technique. Erythema was assessed on a scale from 0 to 5. Subjects rated on a 9-point scale scalp itching intensity. All evaluations and self-assessments were performed at baseline, every week during the 6-week treatment-phase, and 2 and 4 weeks after the end of use.

### EVOLUTION OVER TIME OF THE MEAN MALASSEZIA SPP. COUNT (per mm<sup>2</sup> of corneocytes)



Differences compared to baseline were statistically significant (p=0.05) as early as week 1 with no difference between products.

### EVOLUTION OVER TIME OF THE MEAN DANDRUFF SCORE

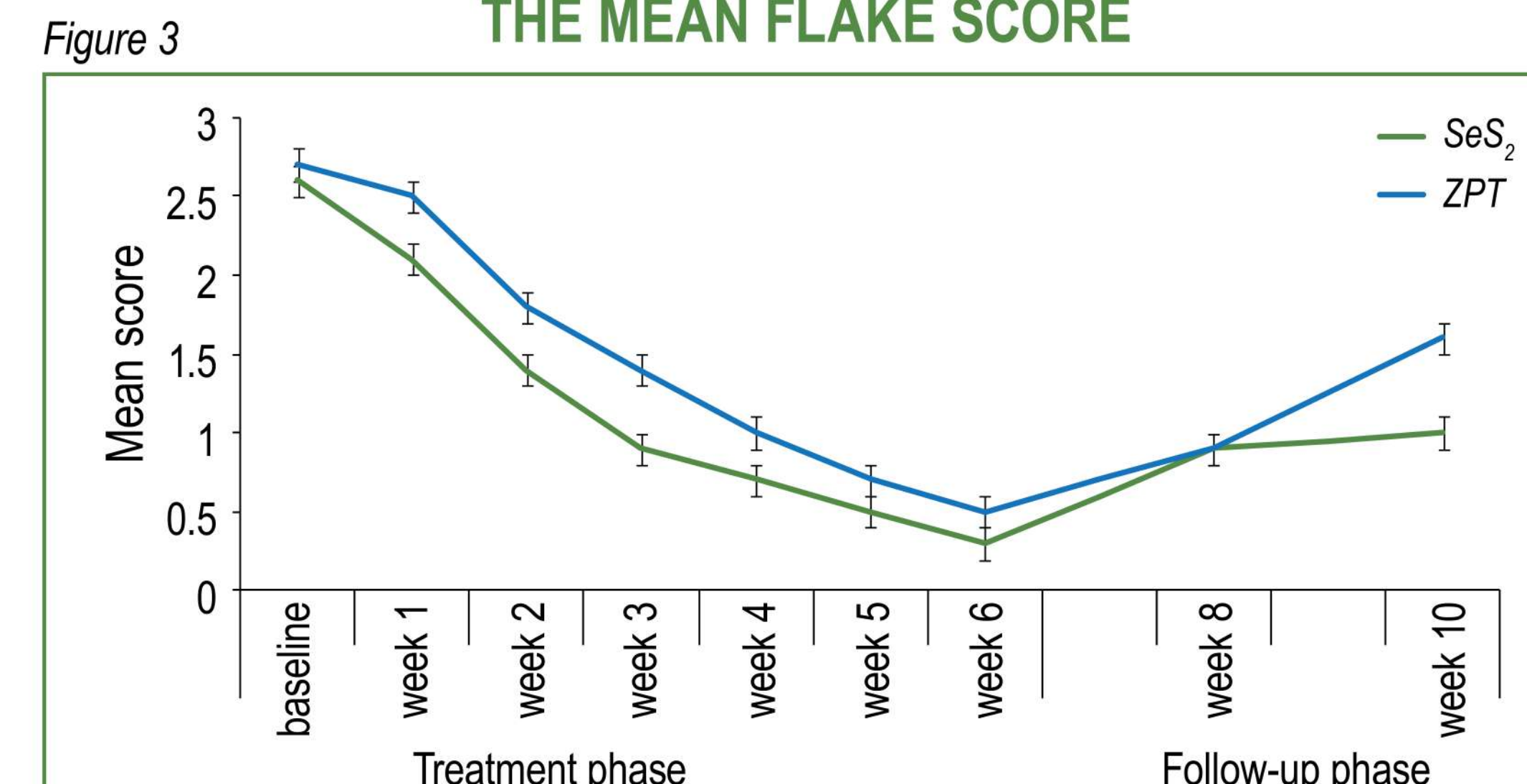


Differences compared to baseline were statistically significant (p=0.05) as early as week 1 with no difference between products.

## CONCLUSION

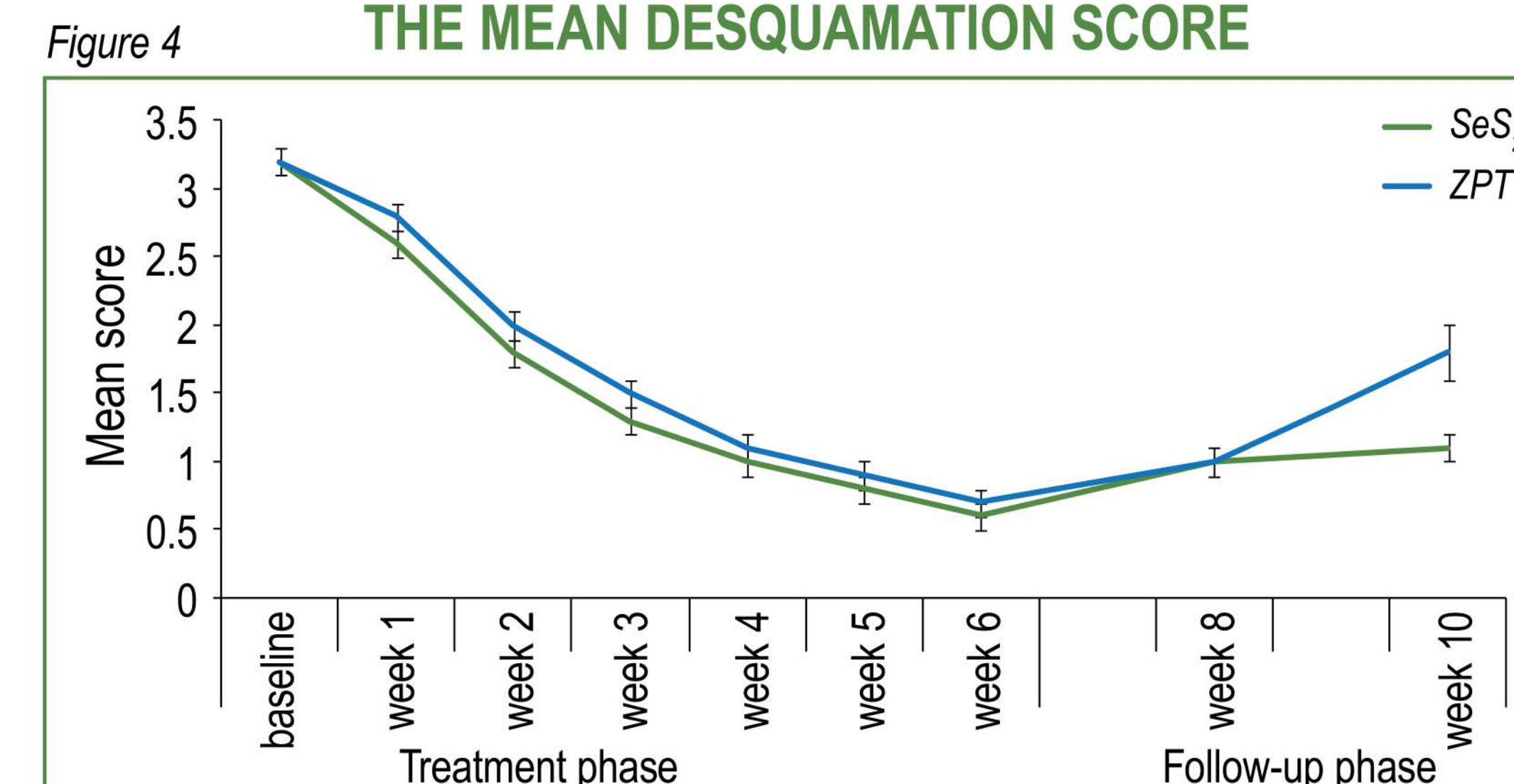
The tested SeS<sub>2</sub>-based shampoo is as effective as ZPT shampoo in treating dandruff, with a somewhat better remanence profile after 4 weeks of follow-up.

### EVOLUTION OVER TIME OF THE MEAN FLAKE SCORE



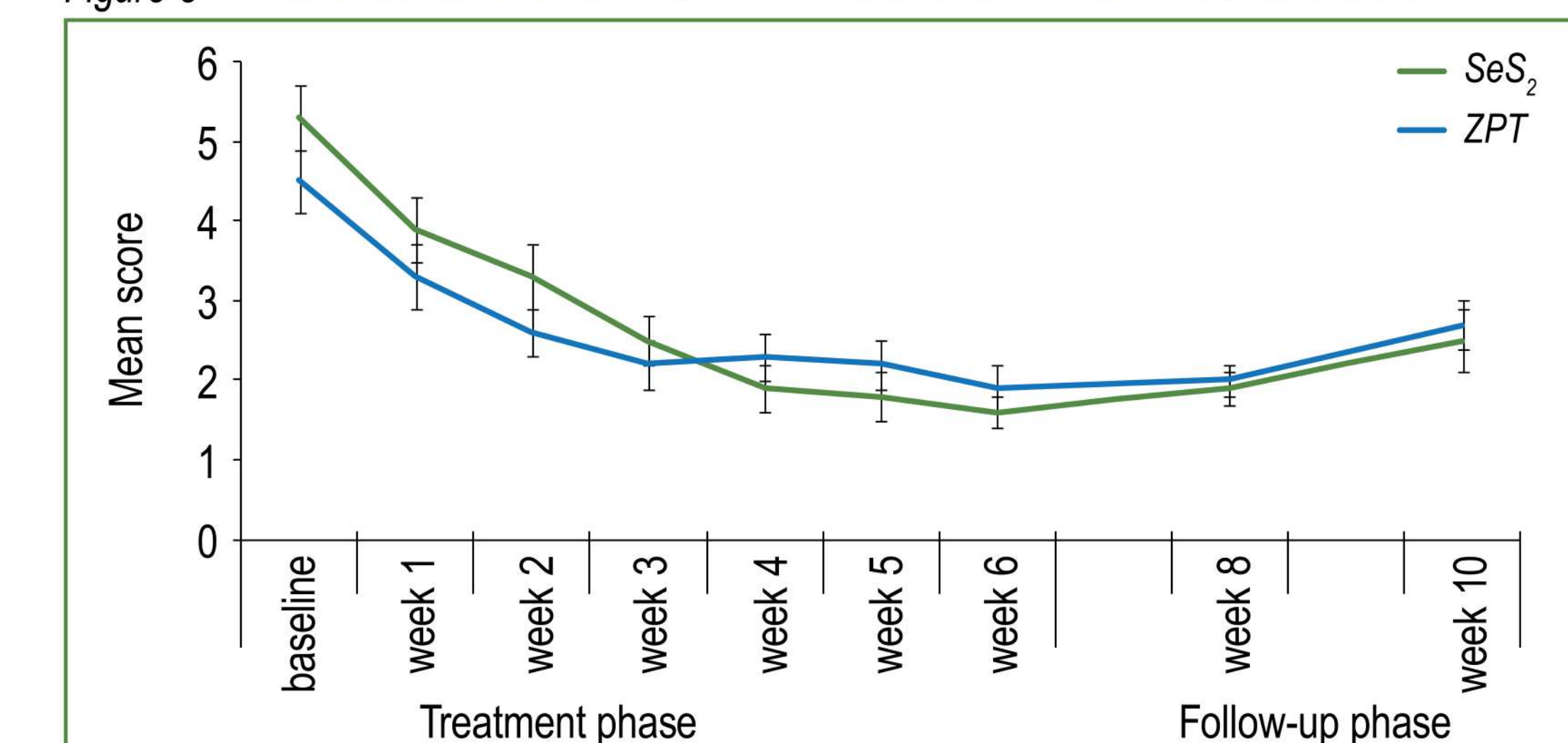
Differences compared to baseline were statistically significant (p=0.05) as early as week 1 with no difference between products.

### EVOLUTION OVER TIME OF THE MEAN DESQUAMATION SCORE



Differences compared to baseline were statistically significant (p=0.05) as early as week 1 with no difference between products.

### MEAN CHANGE OVER TIME OF ITCHING SCORE



Differences compared to baseline were statistically significant (p=0.05) as early as week 1 in both groups with a significant (p=0.05) difference in favour of SeS<sub>2</sub> compared to ZPT, during the treatment and follow-up phase starting week 3.

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## Conflict of interest

G. Loussouarn, N. Le Notre, D. Kerob and P. Massiot are employees of l'Oréal Group. G. Pierard received honoraria for conducting the study.

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