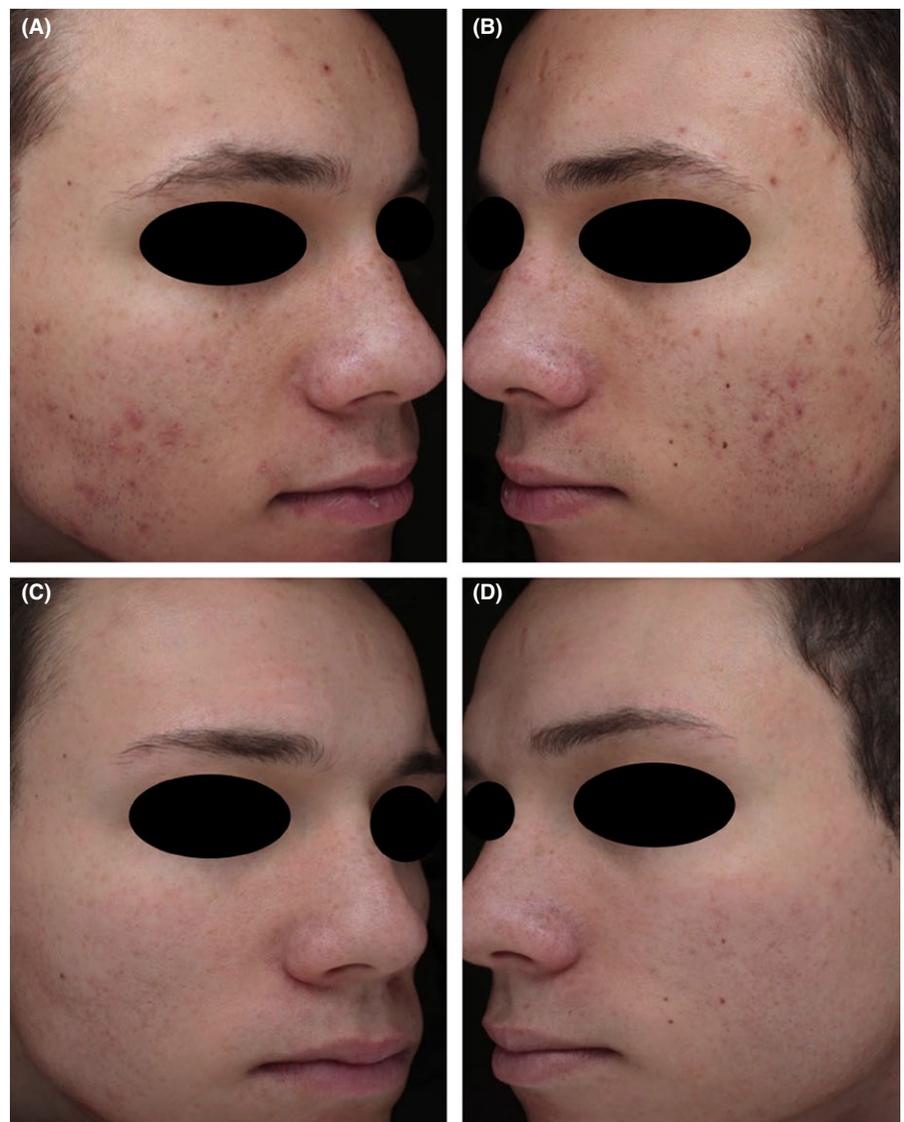


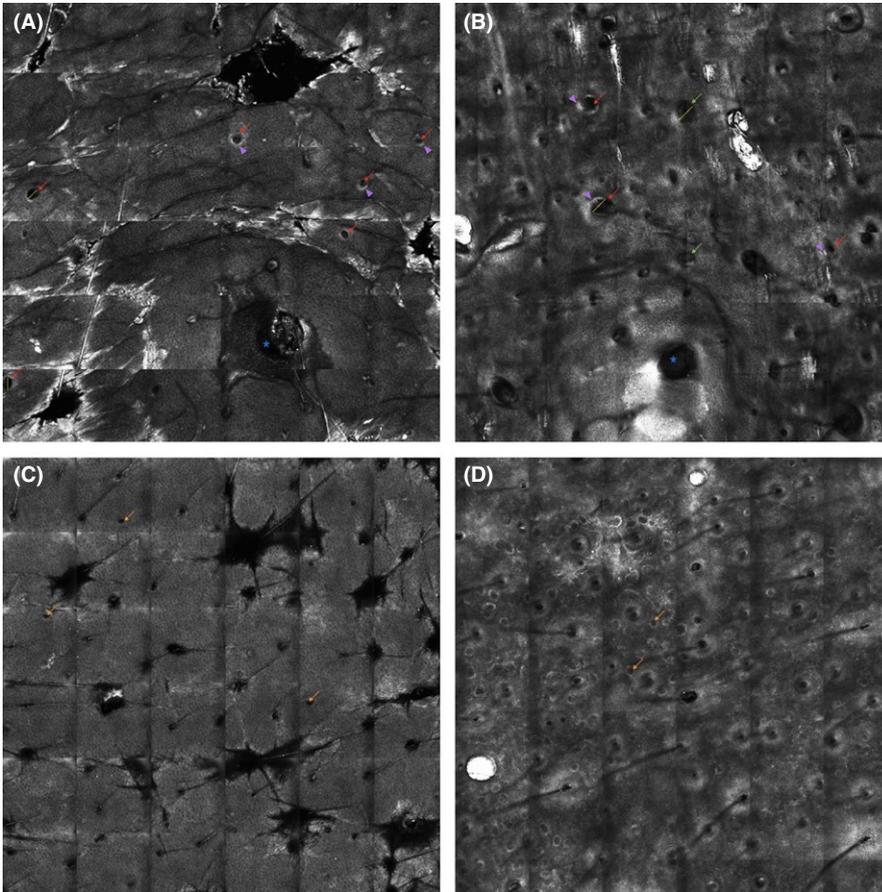
## Plasma exeresis for active acne vulgaris: Clinical and in vivo microscopic documentation of treatment efficacy by means of reflectance confocal microscopy

Acne vulgaris is a common disease of the pilosebaceous unit with a pleomorphic clinical presentation.<sup>1</sup> Acne often leads to significant physical (permanent scarring) and psychological morbidity (poor self-image, depression, anxiety, social isolation and suicidal ideation).<sup>2,3</sup> While there are a variety of available topical and systemic treatments, the development of scarring is a common and undesirable outcome

with a prevalence estimated to be up to 11%-14%.<sup>4</sup> Oral antibiotics are routinely prescribed for the treatment of moderate-severe acne, while oral isotretinoin is recommended for severe nodular acne.<sup>2,3</sup> Topical therapy is used as monotherapy in mild comedonal acne or in association with systemic treatment for better results and to combat antibiotic resistance.<sup>5</sup> Long-term maintenance with topical



**FIGURE 1** Clinical pictures of the face of a patient affected by acne before (A,B) and 6 months after the final treatment (C,D)



**FIGURE 2** RCM images acquired at an average depth of 30  $\mu\text{m}$  (A,C) and 60  $\mu\text{m}$  (B,D) from the skin surface. (A, B) Baseline RCM images (T0) showing presence of closed (red arrows) and open (green arrows) comedos, papular-pustular lesions (blue asterisks), dilated infundibula (yellow dotted lines) and infundibula with thickened bright border (purple white arrowhead). RCM images acquired 6 months after the final treatment (T1) revealing the almost complete disappearance of acne lesions and of the hyperkeratotic follicular borders, counterbalanced by the increase in the number of regular infundibula (orange arrows) with normal reflecting border

treatment is usually needed in order to prevent a quick relapse on stopping oral therapy.<sup>2,3</sup> However, many studies have demonstrated that adherence with prescribed acne regimens generally is poor, with many patients either not using medications.<sup>6</sup> Physical modalities, such as laser and photodynamic therapy, offer an alternative approach for active acne in patients who refuse, cannot tolerate or fail medical treatments.<sup>7,8</sup>

Plasma exeresis is a fast and safe non-invasive solution for treatment of many skin conditions.<sup>9</sup> Reflectance confocal microscopy (RCM) allows defining the morphology of pilosebaceous infundibular alterations occurring in acne and can represent a useful tool for an objective evaluation of acne treatment efficacy.<sup>1</sup>

We describe the first 2 patients with active acne of the face successfully treated with plasma exeresis (Plexr<sup>®</sup>: GMV, Rome, Italy), in which we performed a clinical and *in vivo* microscopic documentation of treatment efficacy by means of RCM (VivaScope<sup>®</sup> 1500: Mavig GmbH, Munich, Germany). Instruments and acquisition procedures have been described elsewhere.<sup>1,9,10</sup> Clinical and RCM images were acquired before (T0) and 6 months after the final treatment (T1) in order to detect any subclinical alterations (Figures 1 and 2). Plasma exeresis treatment was repeated each 2 weeks for 2 months. Before each session, an anesthetic cream was applied for 60 minutes. After every treatment, the cutis was disinfected with non-alcoholic solution, a sun protection foundation was applied on the face and a daily sunscreen was prescribed. A different technique was applied for the diverse types of acne lesions: comedones were sublimated with a single

spot mode ( $\leq 2$  seconds) on the top, pustules with single spots at periphery and papules with single spots at periphery and on the central area.

No hyperpigmentation, hypopigmentation, erythema, ecchymosis, pain, itching, outbreak of herpes, infectious processes and scarring were observed.

At T0, RCM showed the presence of comedos, papular-pustular lesions, dilated infundibula and infundibula with thickened bright border, while at T1 it revealed the almost complete disappearance of acne lesions.

We demonstrated that plasma exeresis could be an alternative approach for active acne, especially in patients who refuse, cannot tolerate or fail medical treatments. Its mechanism of action for acne is unclear, but we propose 3 hypotheses: thermal alteration of the sebaceous glands, collagen remodelling with reduction of the ostium and activity of plasma in decrease bacteria proliferation and inflammation. However, further studies are needed for confirmation.

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**CONFLICT OF INTEREST**

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