study of early biochemical or immunological changes in the skin, before lesions become clinically observable. As an aid in evaluating phototherapy, a reduced sensitivity to both UVA and UVB was demonstrated in psoriasis plaques as compared to uninvolved skin, using the same instrument (10). The method also showed an improved response to PUVA treatment when calcipotriol was topically applied (76). Laser Doppler imaging was further used to demonstrate an abnormal thermal sensory response in psoriasis (77).

The application of LDF for the study of psoriasis, including evaluation of therapy has been extensively reviewed (78).

54.4.1.5 Atopic Dermatitis

In a study of dermographism, a significant reduction in the intensity of hyperemia was found in atopic dermatitis patients following pressure on the skin (79). The role of acetylcholine in the etiology of pruritus in atopic dermatitis was studied by injecting acetylcholine and monitoring the vascular reaction. The reaction in the patients started earlier and was longer than the control group, suggesting an etiological role (80).

54.4.1.6 Age, Chronic Venous Insufficiency, and Cutaneous Ulcers

In comparison to the skin of adults (average age 34.6 years), the skin of small children (average age 3.5 years) demonstrated an increased cutaneous blood perfusion as measured by LDF (81).

Differences between elderly and younger individuals and between the forehead and cheek were found utilizing LDF during cooling from 30°C to 10°C. In the forehead, the decrease in skin blood flow during cooling showed no marked quantitative change with age, but with aging, the rate of this decrease was reduced. In the cheek, on the other hand, the skin blood flow decreased markedly with aging, but no clear change was observed in the rate of this decrease (82).

Skin blood flow to the dorsum of the foot reduces with age, which might contribute to the attenuated cutaneous vasoreactivity to heat and ischemia in elderly people (83). Moreover, the response to heat is attenuated in the aged (84).

Laser Doppler flux is a product of the concentration of moving blood cells and the blood cell velocity. In an attempt to obtain more information about the cutaneous microcirculation in legs with venous ulcers and in healthy legs, the dynamics of the curves of the LDF, the concentration of moving blood cells, and the blood cell velocity were analyzed in patients with venous leg ulcers and in healthy subjects. The curves of the concentration of moving blood cells and the blood cell velocity were in opposite phase, reflecting the capillary blood flow. The greater amplitude of the LDF and the concentration of moving blood cells in legs with venous ulcers reflect the blood flow in anatomically altered capillaries in those legs (85).

The ability of the skin blood vessels to dilate in response to pilocarpine electrophoresis was assessed in patients with chronic venous insufficiency, but the microvasculature showed a normal capacity to vasodilate (86). The effect of external compression was also studied: compression increased the microcirculatory flow, which might be its mode of action in treating venous insufficiency (87).

In patients with venous ulcers, erythematous ulcer edges exhibited higher blood flow values than nonerythematous edges (88). Postural vasoregulation caused relative ischemia and reperfusion in venous leg ulcers, but the known mediators of reperfusion injury were not released, and therefore were not associated with the process (89). LDF was also used to monitor the effect of prostanoids on ischemic ulcers (90) and the effect of Crystacide on chronic venous insufficiency and venous hypertension associated with ulcerations (91). It was also utilized to monitor the effect of Venoruton on the prevention and control of flight microangiopathy and edema in subjects with varicose veins flying for more than 7 hours (92).

To evaluate different types of alternating pressure air mattresses for the prevention and treatment of pressure ulcers, LDF was used on the sacrum, heels, trochanters, and buttock over at least two alternating cycles. Results indicated significant differences between the products (93).