

## Short Communication

# Visio Scan® VC98, Corneometer MPA 5 and Tewameter MPA 5

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**Human skin is the largest exposed area of our body. There are number of physiological changes which may occur in response to internal or external sources. Biophysical techniques have been extensively employed to study any changes in human skin physiology. Usually these bioengineering techniques are equipped with non-invasive probes. Visioscan, Corneometer and Tewameter are the most widely used techniques in the characterization parameters of skin physiology, like skin hydration, transepidermal water loss and skin wrinkles. This research covers all aspects of these parameters, in skin analysis.**

**Key words:** Skin, corneometer, tewameter, visioscan, skin hydration, transepidermal water loss (TEWL).

## INTRODUCTION

Human skin shows variety of situations like simple dryness, severe erythema and scaling. These indications are often escorted by pruritis, inflammation and sometimes associated with edema that further boosts the distress. Skin aging is a complex process induced by constant exposure to ultraviolet (UV) irradiation and damages human skin. UV generates reactive oxygen species leading to collagen deficiency and eventually skin wrinkling (Fischer and Zeng, 1997).

It is very important to maintain a certain level of skin hydration and prevent excessive loss of water from the skin so as to prevent skin aging and keep it young as nobody wants to be aged. Various techniques like Visioscan® VC98, Corneometer MPA 5 and Tewameter MPA 5 have been introduced to measure skin hydration and/or skin surface characteristics means, is the central

of the application of cosmetic products. Until now, profilometry has been the only method which uses skin replica for its calculations to determine the condition of the skin surface.

A measurement, where the skin can be monitored optically using an image-digitalization process without using replica is a great progress in the scientific research. This new method is called surface evaluation of the living skin (SELS). The main advantages of Visioscan VC98 are:

1. Its cost effectiveness in comparison to visiometer which utilizes blue dyed silicones
2. Less time consumption

## Mechanism of Visioscan VC98

Visioscan VC98 is based on a graphic depiction of the living skin under special illumination and evaluation of this image according to four clinical parameters (Figure 1) (SEr, SEsm, SEsc and SEw). The parameters correspond to the state of the skin surface (Courage and Kazaka, 2004). Visioscan is equipped with special UV-A light video camera which captures high resolution (HR) image of the skin/hair (Figure 2).

## VISIOSCAN® VC98

The improvement of the skin surface, using different aim

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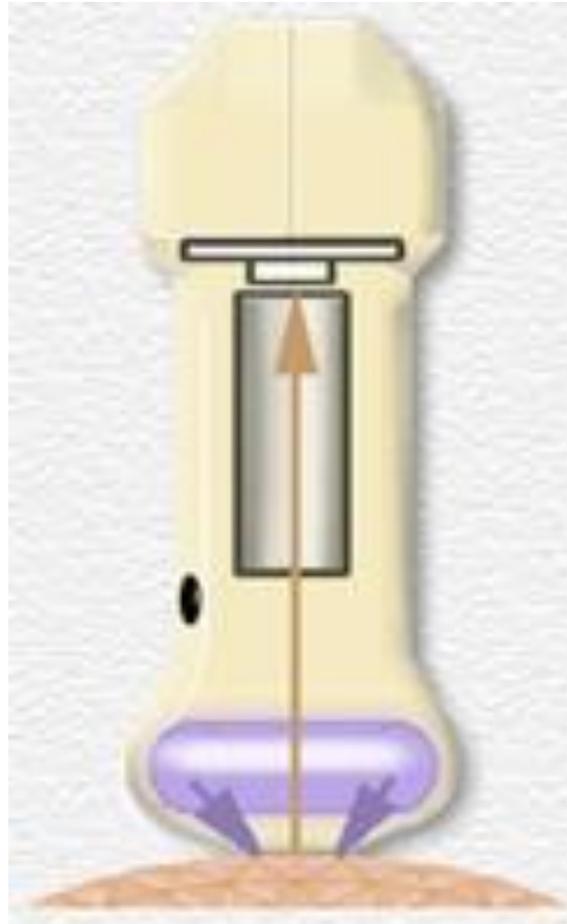


Figure 1. Diagram of Visioscan camera.

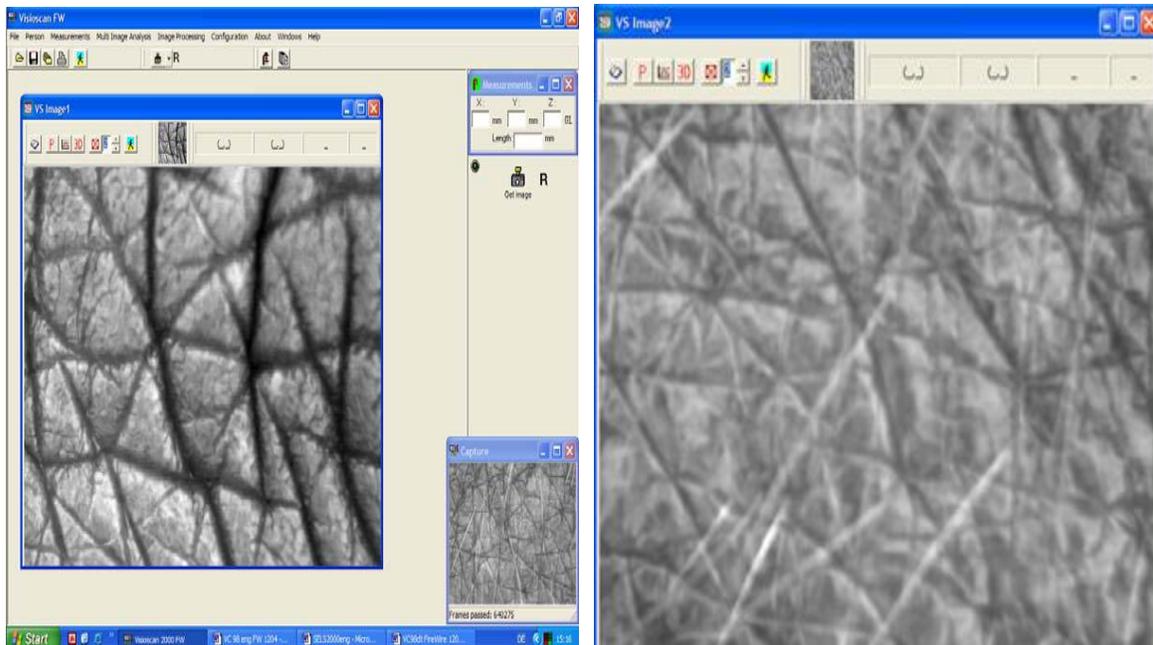


Figure 2. Typical example of image taken by Visioscan camera.

## Uses of Visioscan

1. To clarify connective tissue/skin surface (skin roughness; depth, width and number of surface fine lines and wrinkles) improvement after the use of certain medications (Alain, 2005).
2. To calculate additional interesting texture parameters like variance and volume.
3. To study the non glossy image of the skin and hair.
4. It can also be used to analyze the skin sebum content and skin moisture content with the help of the special foils Sebifix® F 16 and Corneofix® F 20.
5. To assess the effects of oral micronutrients for skin aging and skin dryness very impressively.
6. To assess the comparative effects of two cosmetic actives intended for the treatment of skin dryness.
7. To assess treatment effects in atrophic acne scars (Manuskiatti et al., 2010).
8. Visioscan VC98 can be applied to study the human nail surface and may be a useful method to provide data about nail surface conditions, that is, to evaluate variations of nail surfaces (Manuskiatti et al., 2010).
9. To be used for systematic investigation of different formulations for drug delivery through the human skin.

## CORNEOMETER MPA 5

Corneometer is used to evaluate the hydration effect of a cosmetic treatment on the subcutaneous moisture content of human skin (Imhof and Xiao, 1998). The technique using Corneometer is known as corneometry which determines the capacitance of the skin as it behaves as a dielectric medium. Corneometer measures a depth of 10 to 20  $\mu\text{m}$  of the stratum corneum of epidermis (Shaleah et al., 2005). A glass lamina in the probe separates the two gold metallic tracks from the skin, so as to prevent current conduction in the sample. During the measurement of dielectric constant, an electric field is generated. One track of the gold provides negative charge, whereas the other provides positive charge. In this way a complete dielectric constant of water and another substance is measured (Courage and Kazaka, 2004).

## TEWAMETER MPA 5

Transepidermal water loss (TEWL) is used to assess water flux out of the skin (Imhof and Xiao, 1998). TEWL is used to assess the integrity of human skin barrier for the insensible water loss. The value of TEWL is determined in  $\text{g/h.m}^2$  which is an estimation of the skin, that is, how much water it retains. Tewameter has a handled probe which measures the water evaporation that occurs from skin surface. It is based on the Nilson's vapor pressure-gradient estimation method (Shaleah et al., 2005).

**Abbreviation:** **Ser**, Skin roughness; **SEsm**, skin smoothness; **SEsc**, skin scaliness; **Sew**, skin wrinkles.

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