A comparison of Chrono- versus Photo-ageing
Dr Des Fernandes, Cape Town, South Africa.

A few years ago we all just thought that as time passed we aged and got wrinkles and gradually changed our lovely youthful face into an old haggard undesirable mess. Then the scientists stepped in and told us that we had two different patterns of ageing: extrinsic or photo ageing and intrinsic or chrono-ageing. In other words, what they told us was that we are either displaying the signs of ageing that are due entirely to exposure to external agents, or those inevitable signs of the bodies decay due to the passage of time.

I believe that we have to regard both of these conditions as disease processes. They may happen naturally, but they cause havoc to the body, and eventually the diseases that maim our last few years. This can, and should be treated. I believe that both photo-ageing and intrinsic ageing are in fact deficiency diseases. If you recognise that, then you will also realise that there must be a “medicine” or supplements that can correct the deficiency. As skin care therapists, I believe you have an important role in educating your clients and helping them to start early Original treatments to slow down these inexorable processes.

Photo ageing
We all know about photo ageing but very few people understand that photo ageing is in fact, almost entirely a manifestation of vitamin deficiency in the skin. The important vitamins are the light sensitive vitamins and the antioxidant vitamins. By that I mean mainly vitamins A, C, E and the caratinoids. Of course, in this category of extrinsic ageing we include things like cigarette smoking and pollution – both of which tax the skin with heavy doses of free radicals and poisons. When we go out into sunlight, our skin suddenly becomes a battlefield with free radicals exploding everywhere, and all our body can do is to watch the antioxidants in the skin leap into action and try and stop the fearsome chain reactions that may involve as many as twenty thousand chemical reactions within a fraction of a second. Can you imagine the chemical mayhem that follows when someone decides to get a nice even tan…and then that person may be so unfortunate as to want to have a “relaxing” cigarette! Our body deals with about 10 trillions free radical hits each day. In one puff of cigarette smoke it is estimated that there are three trillion free radicals. These free radicals are delivered to the mouth, pharynx, trachea and lungs and also to the facial skin. Lovely sunlight and inhalation after inhalation of smoke allow free radicals do awesome damage, which the body attempts to repair, but of course, it cannot. That’s how extrinsic ageing is induced.

What are the causative rays in sunshine that make this damage?
Everyone used to say that the terrible UV-B rays and reassure their clients that they should safely tan with UV-A rays. We know for certain that UV-A rays are the only rays that can penetrate deeply enough to make the damage that ends
up as photo ageing. So are those safe UV-A rays really something we should be playing with?

I said that photo ageing is a vitamin deficiency disease and of these vitamins, vitamin A is the most important because it’s role in cellular function is so crucial. We call it a vitamin, but in fact it is an external hormone that controls growth and other important functions of virtually every cell in the body. You may think that you can address this vitamin deficiency by increasing the amount of vitamin A in your diet. That wont work, unfortunately. When you go out into the sun you deplete your vitamin A levels down to about 10-15% of the normal levels in about 45 minutes. By diet alone, and staying in a dark room, it will take about a week to get the skin levels of vitamin A back to normal. Therefore, the supplementation must be topically on the skin.

You can test whether vitamin A is in fact crucial: lets look at the classic microscopic signs of photo ageing. Starting from the surface, you first of all notice a rough thickened surface because the horny layer is thicker, and has a wide basket weave pattern with little compaction of the cellular remnants (corneocytes). The skin tends to be dry, and there are pigmented lesions on the skin. The growth cycle is prolonged and the DNA in the keratinocytes may be atypical and may even develop into skin cancer. Collagen is poorly made and is badly organised. Scientists have established that vitamin A governs how the skin is made and, with adequate doses of vitamin A, the horny layer is compact with only the superficial corneocytes being desquamated. The granular layer is well established and the skin has normal moisture levels. Pigmented blemishes are reduced and melanin is more evenly distributed. The keratinocytes are healthy with good DNA and cancer of the skin is very unlikely. Vitamin A promotes thick layers of normal collagen. Vitamin A corrects all the main indicators of photo ageing so for me; vitamin A has a central role in preventing photo ageing. The skin care therapist should try and minimise photo ageing by advising clients to be sensible about sun exposure, and to replace or supplement the normal cutaneous levels of vitamin A, C, E everyday without fail.

Intrinsic ageing.

Intrinsic ageing is also a deficiency disease, but here we have an extremely complex picture. We have all seen someone with excellent youthful facial structure and complexion, change within a year or two into an older person. The reason is that as we get older, we secrete less of the important hormones that keep our body functioning at its optimum. The most obvious changes occur when women hit menopause. There are also definite changes in the chromosomes and shortening of the ends of each chromosome amongst many other things. On the level that we work, some of the features of intrinsic ageing look similar to photo ageing. Look at the sun-protected skin on the abdomen, or buttocks to get an impression of intrinsic ageing. The skin becomes thinner even though it is not so wrinkled because the hormones and micronutrients that are so essential for tissue to remain healthy do not longer adequately nourish it. The collagen is
degraded and thinned out, and the skin sags. However, the skin is generally much thinner than with photo ageing and fine wrinkles are less common. The skin in fact reflects a deficiency of growth hormone, of androgens and oestrogen/progesterone, and growth factors as well as many other important agents like DHEA (the mother hormone for androgens and oestrogens). Include into this deficiency melatonin, and a host of other important factors about which we know only a little.

A classic example of intrinsic ageing in a sun-exposed area is the upper and lower lips. Many people say that those ugly lines are the result of smoking but that is not true. Smoking will certainly aggravate it. The real reason is that as a woman gets near to menopause, her hormones start diminishing and oestrogen seems very important for maintaining good levels of fat in the lower dermis. As the fat disappears, there is less substance in the lip and less resistance to the deforming forces that come into action when one sleeps on one’s side on a conventional pillow. People also say that these lines are the result of pursing the lip! I don’t think so. Just press the sides of your face towards your nose and you will see the lines that will develop on the upper lip with intrinsic ageing. I believe that the way we sleep determines what lines we get on our face.

What can we do about intrinsic ageing?
The puritans will say that we must not interfere with the natural process of ageing. I disagree vehemently. We should supply the necessary “penicillin” or whatever is required, to resuscitate intrinsically aged cells. You can already do that for the lips lines: Advise your clients to ask their doctors if they may have a prescription for an oestrogen cream which they should rub on the area regularly. If you start at the very onset of the lines, then they may well disappear. Research has shown that topical vitamin A also reduces the signs of intrinsic ageing by promoting the production of collagen. Topical treatments using growth factors derived from bovine colostrum have also shown that you can thicken intrinsically aged skin. The combination with vitamin A ensures a better result.

We now live in the age where there are anti-ageing specialists. Your clients should be aware that they exist. These specialists will monitor hormones, diet and exercise and life style. In the meantime you can boost natural growth hormone by doing physical exercise regularly for at least an hour three times a week. Some people take melatonin without seeking any advice, but you should be careful about DHEA. This does need to be monitored. In some cases, growth hormone may be prescribed, but this is still a rather contentious topic. However, by increasing one’s exercise, one does automatically increase the amount of growth hormone that is released. In some people it may be too late, but we must remember that prevention is easier than cure, so start young!

One little point that fascinates me is that as we age, we absorb vitamin B12 with increasing difficulty. Intrinsic ageing results in grey hair and at the same time, if
someone develops grey hair at a young age it might be a sign of vitamin B12 deficiency causing pernicious anaemia. Maybe we will find that vitamin B12 and others may prevent grey hair…

In summary, I believe that both photo-ageing and intrinsic ageing are very largely deficiency diseases. The deficiency in photo ageing is induced by light and affects vitamin A, C, E mainly. On the other hand, intrinsically aged skin is the result of a much more complex deficiency which is slowly being revealed. We fortunately have ways to deal with these two conditions and we should start as early as possible in preventing the deficiency state from being overwhelming. The skin care therapist should be aware of what can be done and advise the client to act pre-emptively. That way, beauty will not only be skin deep.