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REDUCING RISK OF TREATMENT COMPLICATIONS

Madi Myers asks what difference can we make through diet.

It is often said that "*you are what you eat*"; this applies explicitly to our skin as it's the largest organ in the body and is often what we notice first about others. What we eat can have huge effects on our skin and dietary intake is correlated with increased (meat, dairy, butter) and decreased (fruit, vegetables) risk of skin ageing and damage (*Purba et al. 2001; Cosgrove et al. 2007*). There may be a difference though between adequate nutrition to support healthy skin and optimal nutrition for best possible skin appearance, healing and reducing risk of complications.

Essential nutrients

Deficiency of many essential nutrients can result in skin-specific symptoms; below are some of the key players that are the most important to support good nutritional status and subsequently normal skin function and appearance.

Micronutrients

All vitamins have roles in maintaining normal skin health and function to a certain extent. Vitamin A supports integrity of the immune system, which supports skin health so that it can sustain resistance to infection. Vitamin C is found in relatively high concentrations in the skin where it acts as a cofactor for enzymes involved in collagen synthesis, as an antioxidant and has been reported to protect against environmental pollutant and UV damage (*Pullar et al. 2017*). Vitamin E is a fat-soluble antioxidant that acts to prevent oxidation of membrane lipids. Deficiency is rare in humans but in animals has been shown to lead to cell membrane damage. The liver preferentially absorbs α-tocopherol over other isoforms and is the only form recognised to be biologically active in humans (*Niki & Traber 2012*). We get most Vitamin D from skin exposure (without sunblock) to sunlight and it is thought that in the summer months, for most, a few minutes sunlight will do (*Holick 2004; MacDonald 2013*). Deficiency symptoms can have detrimental effects on health with knock-on consequences for the skin. As dietary sources are scarce, a supplement is recommended for at risk populations and the entire population during Autumn and Winter months (*PHE 2016; Tripkovic et al. 2017*). Our bodies have limited ability to store Vitamin K so continual dietary intake is required for normal blood clotting, bone metabolism and inhibiting vascular calcification, but emerging research suggests an important anti-inflammatory role (*DiNicolantonio et al. 2015; Fujii et al. 2015*). The B vitamins riboflavin (B2), niacin (B3) and biotin (B7) have European Food Safety Authority (EFSA) authorised health claims for food products that are sources of them; relating to adequate intake contributing to normal skin maintenance. Many trace

Vitamins	Dietary sources	Deficiency complications	UK Recommendations*	Upper Safe Levels of Intake
A	Fruits, vegetables and dairy products	Keratinisation of epithelia, increased susceptibility to infections	600-700µg/day	3000µg/day
B2 (Riboflavin)	Dairy products, liver, eggs, meat some green leafy vegetables	Mucocutaneous lesions	1.1-1.3mg/day	40mg/day
B3 (Niacin)	Meat, poultry, fish, eggs, yeast extract, coffee, bran	Dermatitis and pigmented rash on exposure to sunlight	13.2-16.5mg/day	17mg/day
B7 (Biotin)	Widely distributed in food	Red, itchy skin	30µg/day	0.9mg/day
C	Citrus fruits, berries, green leafy vegetables	Subcutaneous haemorrhage, impaired wound healing, distorted nails	40mg/day	1000mg/day
D	Oily fish, eggs, fortified cereal products	Skeletal pain, muscle weakness, increased susceptibility to infection, impaired wound healing	10µg/day	100µg/day
E (alpha-tocopherol)	Nuts, seeds, green leafy vegetables and cereal products	Muscle weakness, disruption of cellular processes in the neuromuscular and vascular systems	3-4mg/day	540mg/day
K	Green leafy vegetables, soybean/olive oils, meat, eggs and cheese	Bleeding disorders	65-80µg/day	1mg/day

* For the general, healthy UK adult population – requirements may differ for individuals, pregnant and lactating women and in disease states (EVM 2003).

Minerals	Dietary sources	Deficiency complications	UK Recommendations*	Upper Safe Levels of Intake
Copper	Crustaceans, shellfish, legumes, brazil nuts and cashews, cocoa, liver	Anaemia, hypopigmentation of hair, increased susceptibility to infection	10mg/day	1.2mg/day
Iodine	Shellfish, seaweeds, milk, some cereal products	Hypothyroidisim-related symptoms including dry, itchy skin	140µg/day	500µg/day
Zinc	Shellfish, meat, poultry, legumes, cereals, milk and dairy products	Parakeratosis, skin lesions, hair loss, susceptibility to infection, reduced wound healing	7-9.5mg/day	25mg/day
Selenium	Brazil nuts, some alliums, cereals and fish	Fatigue, hair loss, susceptibility to infection, muscle weakness	60-75µg/day	350µg/day

* For the general, healthy UK adult population – requirements may differ for individuals, pregnant and lactating women and in disease states (EVM 2003).

elements and minerals are required in tiny quantities in our diet but have highly important effects throughout the body. The skin contains the third highest concentration of zinc of all body tissues. Zinc plays an integral role in pathogen destruction, forms part of many enzymes and is involved in intracellular signalling. Copper acts as a free radical scavenger, in healing and repair of tissues (collagen and elastin cross-linking) and in the formation of red blood cells. In relation to skin iodine is essential for formation of thyroid hormones which are involved in maintenance of the integrity of connective tissue. Selenium is incorporated into many essential proteins which have functions in metabolism, as antioxidants and in redox reactions (*Spiro, Lockyer 2018*).

Fats

Although often vilified, dietary fat intake is essential as they are components of the cell plasma membrane and the essential polyunsaturated fatty acids (omega-3 & 6) are important for skin structure, wound healing and providing anti-inflammatory functions (*Nagata et al. 2010; Theilla 2013*). Dietary sources of omega-3 include oily fish, flaxseed, chia seed and certain oils; omega-6 is more ubiquitous, found in safflower, sunflower and sesame oils as well as some nuts. Fats also aid absorption of the fat-soluble vitamins and there is some evidence that long chain omega-3s (EPA & DHA) can be effective at reducing UV damage (*Storey et al. 2005*).

Protein

We need dietary protein to live; it's essential for normal skin and body structure, wound healing and damage repair. Although true deficiency is uncommon in the UK, protein requirements increase during tissue repair, so it's important to be aware of with treatments causing tissue damage (*Russell 2001*).

Hydration

Sufficient hydration can sometimes get overlooked; water is essential for all processes in our body to perform correctly. We lose water constantly and even small levels of dehydration can result in dry, tight skin that is less resilient and more prone to damage (*Verdier-Sévrain and Bonté 2007*). Excessive alcohol consumption can have negative effects on the skin. Indeed, alcohol intake correlates highly with skin inflammation; partly as it leads to increased systemic inflammation but can also have a drastic impact on the functioning of the liver, needed to detoxify the blood and extremely important in times of fat-loss and tissue damage (*Farkas and Kemény 2013*).

It is possible to get sufficient levels of all the above nutrients from a balanced and varied diet. A food first approach is always recommended as adding supplements to an already poor diet is not the correct approach.

Fad diets and skin

Whether it's to lose weight or to 'cleanse the body of toxins' many of your clients are likely to be on, previously tried or be thinking about trying a 'fad diet'; characterised by being restrictive with foods for a short (or long) period (*BDA 2014*). However, following fad food trends can result in sub-optimal intake of many nutrients if not appropriately managed. Here are a few examples of popular fad-type diets:

Vegan - although if followed properly a vegan diet is high in fruit, vegetables and wholegrains providing micronutrients that can help maintain and protect the skin it can be easy to become deficient in vitamin B12, vitamin D, zinc, iodine and iron if not well planned.

Gluten-free - many people mistakenly believe that gluten is the root cause of a range of sins such as bloat, constipation and fatigue. However, unless a client has diagnosed intolerance or allergy there is no need to remove gluten-containing foods from the diet. In fact, a recent study found that gluten-free alternatives often contain higher amounts of saturated fat, sugar and salt (*Fry et al. 2018*).

Ketogenic – this diet involves a very low carbohydrate intake (<5% of total energy) and therefore excludes grains, dairy, legumes, most fruits and starchy vegetables. Lack of diversity can therefore lead to nutrient deficiencies in the long-term. Low fibre diets are likely to cause changes in gut microbiota composition and a reduction in beneficial metabolic products necessary for optimal health (*Maukonen & Saarela 2015*). Being aware of the types of diet that are popular and some of the common pitfalls can be in your best interest – if clients are unwilling or unable to make dietary changes supplementation may be a good step.

Nutraceuticals...optimal skin health?

In the UK there is evidence to suggest there may be populations and times throughout life where nutrient deficiencies occur. For most of us these can be corrected with diet but in certain cases supplementation is essential (mal-absorptive conditions, pregnancy/lactation etc.). Once we have achieved sufficient nutrient intake though is there anything we can do to optimise our skin health through additional nutrient intake? The range of nutraceuticals (orally consumed nutrition products that provide health benefits) available can be baffling, meaning knowing what is best to recommend clients is not easy. This is a very active area of research, but when looking at the evidence there is still a way to go to determine long-term benefits; much marketing of products goes beyond the evidence, termed 'belief beyond the evidence'. I shall discuss some popular supplements and where the evidence in relation to skin health currently sits.

Phytochemicals

Although we can get phytochemicals from many food sources - tea, coffee, fruits, vegetables - there is much research investigating supplementation. Particularly as many factors can affect bioavailability from foods including storage and cooking methods which can destroy or inactivate phytochemicals. For example, evidence

shows high green tea intake (1 litre/day) can potentially acutely increase blood flow to the skin and enhance free radical scavenging ability. High dose of catechins (active component of green tea) can more easily be achieved with oral supplements and has been shown to reach skin (*Megow et al. 2017*). However, only one placebo-controlled trial has shown beneficial effects of catechins for photoprotection (*Heinrich et al. 2011*). Curcumin, found in turmeric, has been shown to have powerful anti-inflammatory effects and a recent systematic review indicates a potential therapeutic benefit in skin health (*Thangapazham et al. 2013; Vaughn et al. 2016*). Authors are cautionary however as human clinical studies with curcumin are limited.

Antioxidants

The epidermis is approximately 25% unsaturated fats which are highly susceptible to oxidative damage, meaning in theory, increasing levels of antioxidants in the skin should protect it. However, at high doses antioxidants may have oxidant effects and current evidence is not as promising as hoped. E.g., carotenoid supplementation has been shown to increase skin concentration; although a diet high in fruit and vegetables can also achieve this. There has been much research into their benefits for photoprotection and skin health although there isn't enough good quality evidence for tangible benefits (*Lademann et al. 2011; Meinke et al. 2017*).

Fatty acids

In certain populations it may be hard to achieve the appropriate polyunsaturated fatty acid (PUFA) intake. Vegetarian and vegan diets for example can have very low intakes of EPA and DHA, which have the potential to reduce skin inflammation in response to UV exposure (*Calder 2017*). Supplementary PUFAs have been purported to help reduce skin inflammation, increase blood flow and reduce skin redness – all of which would help improve treatment results and healing. There is some evidence to support this, although large-scale RCTs are needed to determine mechanism of action, dose and interactions with diet.

Collagen drinks

There have been several successful studies completed in animals, and although oral collagen peptides have been shown to be present in human blood after ingestion of collagen drinks, the measurable benefits beyond adequate dietary protein intake are still being debated by the scientific community (*Yazaki et al. 2017*). However, general improvement in skin hydration and collagen density has been noted (*Boruman & Sibilla 2014; Asserin et al. 2015*). These effects appear to be dependent on the preparation and dose of the collagen used; evidence suggests that hydrolysed collagen in a 4000–10000mg daily dose range may be required to see any beneficial effects (*Sibbila & Godfrey et al. 2015*).

IV micronutrient infusion

Nutrient intake should ideally come from food first and then oral tablets/drops/gums (to make use of the body's natural methods of absorption) if sufficient dietary intake is not manageable. Intravenous (IV) vitamin infusions have become increasingly popular in recent years however; proclaimed to help with everything from hangovers to skin lightening. There have been no clinical trials supporting these claims and we know very little about safe doses of micronutrients delivered straight into the bloodstream. As there is currently no regulation for IV treatments in the UK, it can safely be said that opening a vein and by-passing the body's natural defence systems is unnecessarily extreme and faddy.

Probiotics

Probiotics are being heralded as the 'cure' for a host of disorders and conditions. However, the European Food Safety Authority (EFSA) have not approved any health claims using probiotics; some of which are related to skin health. Dysbiosis of the gut microbiota has been associated with chronic skin conditions and there is emerging research that probiotics may protect against UV damage (*Friedrich et al. 2017*). Although probiotics have been shown to increase gut microbiota diversity, which is thought to be beneficial to general health, more studies building on current knowledge are warranted for accurate recommendations (*Jeong et al. 2016*).

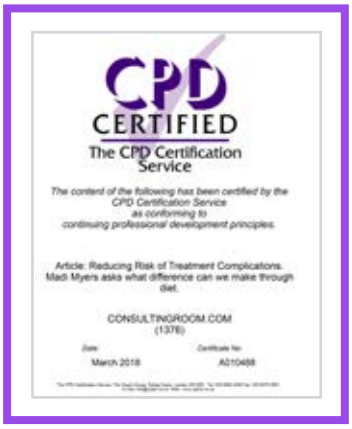
As the addition of supplements to our diet is a relatively new phenomenon bioavailability, the long-term effects on health and interactions with the food matrix and gut microbiome are not well understood. Human studies in this area are lacking so overall there just aren't enough quality RCTs to draw firm conclusions. Care must also be taken not to induce toxicity as any supplement taken in excess can be damaging in the short- and long-term. Practice of 'overages' by manufacturers can lead to amounts in oral supplements being 20-100% that stated on packaging – this is done to ensure levels stay above those stated throughout shelf-life (*EVM 2003*). It's important to remember that caution is always advised, and medical advice should be sought before beginning supplementation. It is not simply a case of the more of the 'good stuff' you take the better your health.

Consultations

Questions about diet should be part of any aesthetic consultation. Ensuring that your patient isn't likely to be excessively nutrient deficient is essential for how the body copes with treatments - healing, optimal results and client satisfaction. There are some basic markers for skin health such as sufficient fruit and vegetable intake, diet diversity, no excessive or unnecessary restrictions and drinking enough water. It may even be useful to enquire not just about 'what', but 'how' they eat; i.e. do they cook, consume lots of takeaways, drink alcohol etc.? A holistic, whole-body approach can help build a better picture of tailored dietary tweaks likely to be most beneficial. Once the basics are in place, you can progress to suggestions for optimal micronutrition; although they should be made aware that once sufficient nutrient intake is achieved supplementation may not be necessary or beneficial.

Conclusion

Diet is never going to be the sole answer, but can be a powerful way to improve results and reduce complications of aesthetic treatments. When consulting patients, diet should be included - it's also an important opportunity for you to have a positive impact on someone's health.



A full list of references in available on request from the Editor (lorna@consultingroom.com). To download a CPD Reflective Learning Form, produced in association with the British Association of Cosmetic Nurses (BACN), please visit bit.ly/CR-CPD

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