The quest for wrinkle reduction and smoother skin using vitamin A and C acids, dermal fillers, botulinum toxin and laser resurfacing accounts for a significant portion of the minimally invasive aesthetic treatment market. However, despite the arsenal of treatments available, not all wrinkles are as effortlessly erased as they are created. Unlike the frequently accessed botulinum toxin injections used to treat ‘crow’s feet’ and ‘frown lines’, which are caused by repetitive facial expressions (Carruthers et al, 2004), the effects of tissue compression and shift, which occur with habitual sleeping on one’s side and/or stomach or dropping the face and chin down to view a computer or smartphone, are difficult to repair. The dramatic characteristics and unusual locations of these compression lines can add years to one’s appearance. These relatively avoidable wrinkles can be difficult and costly to remove and will often return disappointingly soon, unless behavioural and positional changes are made.

‘Sleep lines’ or ‘sleep wrinkles’ can be reduced, if not eliminated, by modifications in sleep position (Poljsak et al, 2012) and computer/smartphone postural ergonomics such as simply changing the angle of the head while looking at a screen (Knapton, 2015). In this article, the authors will explore factors contributing to the development of facial wrinkles (e.g. expression lines), define two common types of wrinkles, and use evidence to support why wrinkling does not result only from the ageing process. Images are used to illustrate points made throughout the article.

Abstract

Both the literature and the authors’ findings support the idea that the ageing process nor genetic disposition are reason enough to cause facial wrinkles. The tissue damage caused by ultraviolet B (UVB) exposure and an action or force, such as repeated facial expression, gravitational shift and tissue shift caused by compression, work together to create wrinkles. This suggests that stringent preventative measures beyond the recommended use of adequate sun protection factor and sun avoidance, where possible, will affect the formation of wrinkles on the face and neck. The purpose of this paper is to educate aesthetic nurses on the significance of these preventative measures. When considering facial tissue protection aesthetic nurses must not only consider UVB irradiation, but also the lesser-known damaging effects of tissue shift due to the compression exhibited in habitual, side and/or stomach sleeping positions.

Key words

► Sleep wrinkles ► Tissue shift ► Facial compression ► Ageing ► Facial expression

The wrinkle myth

The general population has been led to believe that only diet, lifestyle, sun exposure, genetics and even chronological age determine the number and severity of wrinkles that present on the face. However, the truth is that the life choices people make and their genetics merely set the stage for the number of wrinkles that develop over time. The delicate facial tissue is essentially a canvas in which individuals create the long-term results of various lifestyle choices. How the canvas is treated will directly influence types of wrinkles and their location. On a youthful face, expressions, gravity, tissue shift and tissue compression have little lasting effects; however, during the fourth and fifth decade those same actions begin to show on the face and worsen over time (Poljsak et al, 2012).

The wrinkle fact

Wrinkles are one of the earliest benchmarks and most visible signs of ageing skin (Humbert et al, 2012). Wrinkles are skin depressions that etch lines on ageing skin; over time, these depressions become deeper and the earlier fine, reducible lines slowly evolve to form more coarse, permanent wrinkles (Poljsak et al, 2012).
and photodamage (Fujimura et al, 2007). They studied the relationship between ultraviolet B (UVB) exposure and wrinkles and challenged the notion that UVB damage alone creates wrinkles. Further to this, they determined that UVB exposure degenerates elastic fibres, in turn leading to a decrease in skin elasticity. It was previously believed that this decrease in elasticity was what caused wrinkle formation.

For the study, Fujimura et al (2007) applied knowledge obtained from an experiment performed in 1996 using three groups of hairless mice (Takema et al, 1996). In the experiment, the mice were divided into three groups using UVB exposure and skin-folding techniques. Two of the three groups were exposed to UVB rays and one of the UVB mice groups had their skin bonded in a fold parallel to the backbone, as did one of the non-UVB groups. It was found that only the mice with bonded folds, having been exposed to UVB, developed wrinkles parallel to the backbone. Humbert et al (2012) agreed that wrinkling should not be considered to result only from the ageing process.

Types of wrinkles

In this paper, the authors will focus less on what happens at a cellular level to cause wrinkles, and more on what actions take place that create wrinkles and how they can be prevented.

Expression lines

Expression lines or dynamic lines (Figure 1) are well studied and documented. Crow’s feet formed from squinting, furrowed brows developed from an inquisitive look, a functional brow as a self-prescription to treat brow ptosis, or the ‘eleven’ sign between the eyes from someone who shows their concentration between their medial brows, are all referred to as expression lines or wrinkles. These wrinkles are transient in children but become permanent with age. Some may argue that these lines are preventable, but that would require that people never show emotions on their face. Treatment for these lines is routinely accomplished with botulinum toxin and the results are excellent depending on the skill and experience of the injector.
Tissue shift wrinkles (gravity)
According to Burgess (2006), ‘the culprit, generally implicated for the appearance of the aging face, is gravity’. Lower face mandibular reabsorption and tissue volume loss, coupled with a loss of skin tone and elasticity, causes a downward sag in ageing skin (Burgess, 2006).

Tissue shift and compression
In 1987, Samuel Stegman first described ‘sleep creases’ and determined that there was a relationship between the location of a sleep line and the underlying superficial musculoaponeurotic system (SMAS), as well as underlying scar tissue (Fulton and Gaminchi, 1999). Figures 3, 4a and 4b demonstrate the degree of tissue shift seen when side-sleeping on a regular pillow. Stegman (1987) realised that the hand test (Figure 5) could assist in demonstrating and determining the origin of some lines on his patients’ faces. The hand test would replicate the compression action a pillow creates by shifting and compressing delicate facial tissue, where the end result is a sleep line.

Stegman (1987) also went further to say that the only way to treat a sleep line would be to change sleeping
habits to avoid their formation. In youth, facial compression would not create sleep lines or wrinkles, however, as described earlier in the article, disruption to the facial canvas with age and photodamage, as well as tissue shifting and compression, creates facial lines (Humbert et al, 2012; Poljsak et al, 2012).

**Conclusion**

For years, aesthetic nurses have been somewhat effective in educating patients on the harmful effects of the sun’s rays on unprotected skin. Furthermore, aesthetic nurses realise that repeated facial expressions, such as frowning or squinting, in the presence of photodamage, causes wrinkles.

With the development of neurotoxins, aesthetic nurses can provide very effective early treatment of these expression lines; however, research needs to be expanded to bring more attention to the ageing and wrinkling effects of facial tissue compression, shearing and shifting actions caused by sleeping habits (e.g. side-sleeping), and poor forward postural positioning when using technology. As people spend more than 30% of their lives sleeping (Poljsak et al, 2012) and around 2 hours per day on their smartphones (Daily Mail, 2013), it is paramount that individuals take action in the prevention of this premature ageing by changing their behaviour and altering their posture.

Educating aesthetic patients on the negative impact these activities have on wrinkle formation is only prudent and will encourage smart choices and more diligent sunscreen application.

**References**


Daily Mail (2013) To have and to hold: we now spend more time looking at our PHONE than with our partner. http://tinyurl.com/n34zwgm (Accessed 19 February 2015)


**Key points**

- Exposure to ultraviolet B (UVB) and an action or force, such as repeated facial expression, gravitational shift and tissue shift caused by compression, work together to create wrinkles
- Facial wrinkles should not be considered to result only from the ageing process
- The effects of tissue compression and shift, which occur with habitual sleeping on one’s side and/or stomach or dropping the face and chin down to view a computer or smartphone, are difficult to repair
- Prevention of tissue compression wrinkles is achieved with behavioural and positional changes

---

**Figure 5:** The hand test replicates the compression action a pillow creates by shifting and compressing delicate facial tissue

---