Use of non-ionizing radiation in beauty care

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Introduction

- Wide range of non-ionizing radiation (NIR) is used in beauty care
- The use of non-ionizing radiation in beauty care is very popular
- Main appliances utilize radio frequencies, optical radiation or ultrasound
- Associated health risks are significant
Electromagnetic fields – radio frequencies

- Appliances utilize radiofrequencies between circa 300 kHz to 10 MHz
- Purpose is to warm or heat the subcutaneous tissue
- Main risks are associated with heat, which may cause damage to the skin or subcutaneous tissue
  - Applied power is too high
  - Treatment head is kept in one position or moved too slowly
  - Treatment time is too long
- Safe use requires proper training and experience
Optical radiation – lasers and intense pulsed light (IPL)

• Used for tattoo removal (lasers only), skin rejuvenation, various skin treatments, …
• Risks of skin burn, scarring, hyper or hypopigmentation, …

• Lasers have to be classified according to standard EN 60825-1
  – In Finland class 4 lasers (highest class) are not permitted to be used by cosmetologists
    – Exceeds the exposure limit for skin
    – Also some class 3B lasers exceed the exposure limit -> case by case evaluation

• IPLs have no classification system
• Practically all IPL appliances exceed the exposure limit, but a five year transition period
  was given for these appliances when the limit was introduced in December 2018
Ultrasound

• Various appliances ranging from skin cleansers to high intense focussed ultrasound
• Highest risks associated with appliances either focussing the beam or having the ability to generate cavitation
  – Focussing induces very high intensities causing intentional tissue damage right below skin surface
  – Cavitation is a phenomena where gas bubbles are created in liquid
  – Caused by rapid changes of pressure, eventually leading to intense shock waves
  – Usually low frequencies applied -> deep penetration into body
  – Does the operator of the application really understand what risks are involved?
  – Should these appliances be banned from cosmetologists and left to medical professionals?
• Milder intensities can be used safely
  – However, eyes are very sensitive to ultrasound

[S11-03 - Use of NIR in beauty care, Pasi Orreveläinen]
Legislation in Finland

- Radiation legislation was renewed in December 2018
  - Exposure limits are based on ICNIRP recommendations
- Beauty care applications and the use of NIR are specifically taken into account
  - Relaxations have been given to beauty care treatments
- Additional requirements
  - Customers have to be informed about the associated health risks
  - Proper contraindications shall be defined and taken into account
- Permission to exceed exposure limits
  - Requires that the safety of use is demonstrated
  - STUK evaluates whether the demonstrated safety claim is valid
  - So far no proposals have been presented
Other aspects

• Legislation is not harmonized between countries
• Lack of safety standards that takes into account the safety of use

• Manufacturers of appliances may consider the situation confusing
• Authorities may have difficulties to cope with the vast range of appliances
  – Need to follow the development, ensure the safety, propose legislative actions, participation in standardization, …