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# THE FUTURE OF LASERS IN PLASTIC SURGERY AND DERMATOLOGY IN THE NEXT DECADE

The advancement of our specialty goes hand-in-hand with the use of medical technologies in daily practice to achieve better and more comprehensive results.

One of the most widely used technologies in medicine in general is the laser.

Today, plastic surgeons can treat a multitude of pathologies and aesthetic conditions in both the office and surgery room, such as congenital and acquired pigmented and vascular lesions (lentigo, ephelides, melasma, Nevus of Ota, birthmarks, telangiectasias, varicose veins, rosacea, port wine stain, angiomas, etc.), tattoo removal, skin lesion removal (warts, moles, keratoses, etc.), skin quality improvements (photobiostimulation, laser peels, acne scar treatment, etc.), stretch mark and scar improvement, and transdermal or subdermal fat removal.

In addition to the above, it is worth mentioning an advancement within the last six years that is not known to most colleagues: a nanosecond Q-switched laser device that can evaluate nevus lesions and keratosis by spectroscopy has already been developed in Korea and was presented at the American Society for Laser Medicine and Surgery (ASLMS) Congress in 2019, allowing the diagnosis of all types of skin cancer with a minimal margin of error and avoiding skin biopsies (Speclipse).

The cytophone is another device that uses laser technology and sound waves to scan circulating blood for melanoma cells. Scientists have designed a noninvasive device that can not only detect melanoma cells circulating in the bloodstream but also eliminate them.

Part of the increase in the number of indications in the next decade and the improvement in results has been attributed to advancements in laser equipment.

One of the ways to improve results in our specialty is to avoid human error. This would be achieved by developing diode laser and intense pulsed light (multilaser) equipment that can diagnose a patient's skin phototype or the extent of skin tanning by evaluating the amount of melanin, thus avoiding complications such as burns or subtherapeutic agents. Another advantage that plastic surgeons will find as a benefit and in turn avoid human error is with the development of a temperature reading system of the skin, subdermal, and around the end of the laser fiber in endolaser treatments for fatty tissue removal, thus avoiding burns again.

Knowing that Gérard Mourou and Donna Strickland won the Nobel Prize in Physics in 2018 for the discovery of femtoseconds, a unit of time equal to one quadrillionth ($10^{-15}$) of a second, and that it is already used in ophthalmic surgery, tattoo removal, and in 2023 the winners of the Nobel Prize in Physics were Pierre Agostini, Ferenc Krausz and Anne L'Huillier ***(Figure 1)*** for the discovery of attoseconds, a unit of time equal to one quintillionth of a second ($10^{-18}$) and that it still has no clinical applications, it is only a matter of time before laser equipment development companies design fentosecond and attosecond equipment for cutaneous and subdermal applications.





*Figure 1: Pierre Agostini, Ferenc Krausz and Anne L'Huillier.*