

Quellen zum Thema: Krebs wegen UV-Lampen

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Occurrence of Nonmelanoma Skin Cancers (E)	auslösender Bericht
Axxium UV Lampe (E/F)	OPI
UV-Delux Blue 9W (D)	Osram
UV Lamps (E)	Paul Bryson, Ph.D. ROB B Salon
Ist UVA – Strahlung von Lichthärtungsgeräten für die Nagelmodellage krebserregend (D)	<i>Stellungnahme EMAG</i>
Light curing units to cure nail resins cause cancer – really? (E)	Bericht LCN

Zusammenfassung der Quellen:
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Occurrence of Nonmelanoma Skin Cancers on the Hands After UV Nail Light Exposure

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Background: Exposure to tanning beds, which contain mostly high-dose UV-A emitters, is a known cause of photoaging. Evidence is also accumulating for an association between tanning bed use and the development of skin cancer. Another source of high-dose UV-A is UV nail lights, available for use in the home and in beauty salons.

Observations: Two healthy middle-aged women with no personal or family history of skin cancer developed nonmelanoma skin cancers on the dorsum of their

hands. Both women report previous exposure to UV nail lights.

Conclusions: It appears that exposure to UV nail lights is a risk factor for the development of skin cancer; however, this observation warrants further investigation. In addition, awareness of this possible association may help physicians identify more skin cancers and better educate their patients.

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THE VARIOUS DERMATOLOGIC hazards associated with a visit to the nail salon are well documented. Irritant contact dermatitis may occur after exposure to nail solvents, such as toluene and formaldehyde, in nail enamel and to acetone in nail polish remover.¹ The acrylates found in artificial nails and toluene sulfonamide formaldehyde resin in nail enamel are often causes of allergic contact dermatitis.^{2,3} Nail brittleness, onycholysis and paronychia, discoloration, and transverse leukonychia have been associated with salon manicures and pedicures.⁴⁻⁷ Furunculosis of the lower extremities has been observed by nail salon customers after footbaths and pedicures.⁸⁻¹² In this article, we discuss another potential dermatologic hazard associated with nail cosmetics: the development of skin cancer after exposure to UV nail light.

somedial aspect of her right index finger (**Figure 1**). The patient had Fitzpatrick skin type III, with no sign of solar damage to her face or the rest of her body. There was no preceding human papillomavirus infection at this site or elsewhere. Biopsy (hematoxylin-eosin) revealed a squamous cell carcinoma in situ, and 3 stages of Mohs surgery were required to clear the tumor. The area healed by secondary intention. The patient had a 15-year history of twice-monthly UV nail light exposure to dry her nail polish and set her acrylic nails.

CASE 2

A 48-year-old white woman, similarly in good health, not taking immunosuppressive medications, with an indoor occupation, moderate recreational UV exposure, and no personal or family history of skin cancer, had a scaly papule on the dorsum of her right hand. The patient had Fitzpatrick skin type III, with several actinic keratoses on her face and arms. There was no preceding human papillomavirus infection at this site or elsewhere. Biopsy (hematoxylin-eosin) revealed a squamous cell cancer that was later excised using 1 stage of Mohs surgery. A previous squamous cell cancer had been excised from the dorsum of the left finger of the patient 3 years earlier (**Figure 2**). During the next 4 years, the patient had 2 further squamous cell cancers on the dor-

REPORT OF CASES

CASE 1

A 55-year-old white woman in good health who was not taking immunosuppressive medications, who had an indoor occupation, little recreational UV exposure, and no personal or family history of skin cancer had an erythematous plaque on the dor-

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Figure 1. Squamous cell carcinoma in situ on the dorsal aspect of the right index finger.



Figure 2. Squamous cell carcinoma on the ulnar aspect of right dorsal hand. Note the full-thickness skin graft on the base of the left index finger from a previous squamous cell carcinoma.

sum of both hands that had been treated with Mohs surgery. Questioning revealed previous exposure to UV nail lights approximately 8 times in 1 year several years before her first skin cancer.

COMMENT

Artificial nails are an increasingly popular cosmetic augmentation to the natural nail. Nail salons brought in \$1.9 billion in 2005 according to US Census Bureau figures.¹³ Different systems available include acrylic nails, UV gel nails, fiber wraps, and preformed artificial nails.¹⁴

A common piece of equipment found in almost all nail salons is the UV nail lamp. This device is also widely available for purchase on the Internet for use at home. The UV emitted from the nail lights is predominantly UV-A, similar to tanning beds, which are, on average, 95% UV-A and 5% UV-B.¹⁵ Most nail lamps produce from 4 W to 54 W of power, depending on the model (as seen on trading sites www.alibaba.com and www.tradekey.com).¹⁶ Most home tanning beds have 12 to 28 bulbs producing 100 W per bulb, and salon beds have 24 to 60 bulbs producing 100 to 200 W per bulb.¹⁶ Most tanning beds can produce 1200 W of power or more, depending on the model. When correcting for body surface area (100% body surface area while using a tanning bed and 2% body surface area with a nail lamp), the amount of UV radiation per meter squared is approximately comparable, unless one is using a super tanning bed with 60 lamps putting out 200 W per bulb.

Internet marketing materials claim that the lamp will clean nails, kill residual bacteria, and make nails healthier.

The UV nail lamp is most commonly used to cure UV gel nails, but it is also used for UV-cured acrylic nails and nail fill-ins, and to dry traditional nail polish and, more recently, for “UV top sealers,” or topcoats formulated to protect the nail. It may also be used to dry nail polish in pedicures. Because exposure to the UV light from tanning beds may cause nails to yellow and nail polish to fade, more tanners are now using UV-protective topcoats to safeguard their nails before tanning. Such topcoats may, in turn, entail the use of UV nail lamps, and some tanning salons offer this service. There are, therefore, a variety of uses for the UV nail lamp.

The traditional acrylic nail is “glued on” via a 2-part system consisting of a liquid (the monomer) and a powder (the polymer), which are mixed together. The nail can dry with or without UV light exposure.

The UV gel system is a popular choice owing to its natural appearance, flexibility, and added high-gloss shine. In addition, the virtual lack of odor makes UV gel systems popular in beauty salons.¹⁴ The UV gel system is popular in Europe and is becoming increasingly popular in the United States. The process involves applying a premixed gel acrylic to the nails, followed by curing the nails under UV light.¹⁷ The acrylic polymer is cross-linked by the action of the UV light. This technique has been around for more than 20 years and consists of applying approximately 3 separate coats of gel, followed by curing each nail under UV light for 3 minutes after each coat. Nail fill-ins are often required every 2 to 3 weeks as the natural nail grows out, and the nails are typically replaced every 3 to 4 months.¹⁷ Other technologies in the gel market involve curing of a gel with visible light or with a brushed-on, dropper-applied, or spray catalyst.¹⁴

Exposure to UV light is a major risk factor for the development of melanoma and nonmelanoma skin cancers.¹⁸ Sunlight and the UV-A light in tanning beds have been shown to damage DNA and to cause mutations that lead to skin cancer.¹⁹ Perhaps of relevance to the described cases, studies performed with mice confirm a relationship between squamous cell carcinoma and artificial tanning,²⁰ and meta-analytic estimates suggest a significant effect of exposure to indoor tanning appliances for squamous cell cancer but not for basal cell cancer.¹⁵

In this article, we discuss another common source of artificial UV light, the UV nail lamp, as a possible carcinogen. Although no strong conclusions can be made from this limited case series, we suggest that exposure to UV nail light might also be considered when assessing potential skin cancer risks and that special attention be given to inspecting the dorsum of the fingers and hands and perhaps the feet in the exposed patient population. As we learn more about this increasingly popular technology, this may become another important point for patient education.

Extrapolating from this observation, one might also question the safety of in-home and in-salon UV light use to activate teeth whiteners or the current use of a plastic mouthpiece that is inserted by tanners into their mouths so that the UV tanning lights may activate teeth whitener while they tan. It may be prudent to further explore the potential health hazards of other UV light applications in the beauty industry.

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O·P·I

OPI PRODUCTS INC.

Report on OPI Axxium UV Lamp

Ultraviolet Radiation (UVR) readings were taken by an independent laboratory on the Axxium UV lamp consisting of two bulbs, each with 9 watts. The emission spectrum for the bulbs is limited to the UVA region. Therefore, the hazard is, as a practical matter, not an issue. Analysis of the data indicates that a client using the lamp is exposed to approximately the same UVR as a typical person walking outside on a hot sunny day for two minutes or less.

Sunil Sirdesai, PhD

Sunil Sirdesai
5/13/09

RAPPORT SUR LES LAMPES UV AXXIUM BY OPI

Les recherches sur les radiations ultra violettes (UVR) ont été menées par un laboratoire indépendant sur des lampes UV AXXIUM avec 2 bulbs de 9 watts chacun. Le spectre d'émission de ces bulbs est limité à la zone correspondant aux UVA. Ainsi, le danger, en pratique, n'est pas un problème, n'est pas significatif. Une analyse des données indique que le client utilisant cette lampe est exposé approximativement à autant d'UVR qu'une personne qui marcherait dehors durant une journée chaude et ensoleillée pendant 2 minutes voir même moins.

Sunil Sirdesai, PhD

DULUX BLUE UVA DULUX BLUE UVA

DULUX S BLUE UVA 9W/78
EAN 4008321198938

Elektrische Größen / electrical data

Leistungsaufnahme <i>lamp power</i>	(W)	9
Brennspannung <i>lamp voltage</i>	(V)	60
Lampenstrom <i>lamp current</i>	(A)	0,17

Strahlungsphysikalische Größen / spectral data

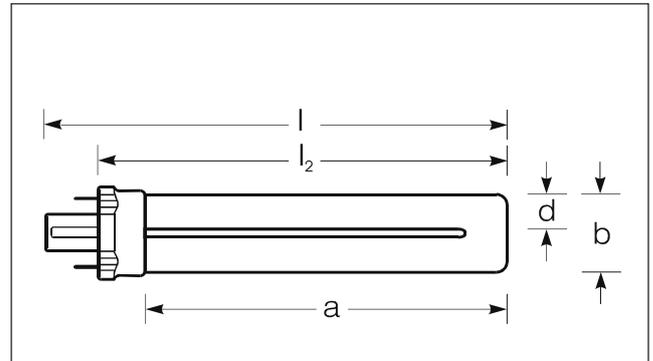
Strahlungsfluß (350-400nm) <i>radiation flux</i>	(W)	1,7
Nutzbrenndauer <i>economic life</i>	(h)	1000

Betriebsbedingungen / operating conditions

Brennlage <i>burning position</i>	beliebig <i>any</i>
Vorschaltgerät (Kompakt-Leuchtstofflampen) <i>ballast (compact fluorescent lamps)</i>	KVG 9W CCG 9W
Starter <i>starter</i>	integriert <i>integrated</i>
Kompensationskondensator <i>p.f. correction capacitor</i>	(μ F) 2,0

Bemerkung / notice

Die technischen Daten sind Nennwerte. Einzel Exemplare können Abweichungen von bis zu 10% aufweisen.
The technical data given are nominal values. Variations up to 10% with single lamps are possible.



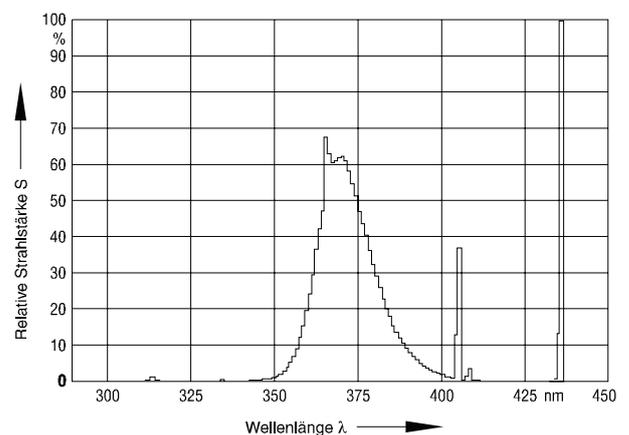
Abmessungen / geometric data

Gesamtlänge <i>overall length</i>	l (mm)	167
Strahlungskörperlänge <i>radiating length</i>	l2 (mm)	144
Strahlungskörperbreite <i>radiating width</i>	a (mm)	127
Entladungsrohrdurchmesser <i>tube diameter</i>	b (mm)	27
Entladungsrohrdurchmesser <i>tube diameter</i>	d (mm)	12
Sockel <i>base</i>		G23

Anwendungen / applications

Härtung, Polymerisation, Materialprüfung, Medizin, Medizintechnik, Elektronik, Effektbeleuchtung, Fluoreszenz, Kosmetik, Insektenfallen
Curing, Polymerization, Materials testing, Electronics, Light effects, Fluorescence, Cosmetics, Insect traps

Spektrale Strahlungsverteilung / spectral radiation distribution



IS UVA LIGHT FROM A GEL NAIL LAMP SAFE FOR THE SKIN AND EYES?

The amount of UVA exposure from a nail curing lamp is comparable to the UVA exposure a client's hands would get from a few minutes in the summer sun. Even fluorescent lights emit low levels of UVA, so during the two weeks between appointments, the client will be exposed to about the same level of UVA from fluorescent light as they receive from these services. As with the sun, it's not a good idea to stare at the lamps, but casual exposure should cause no harm.

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Stellungnahme EMAG

Ist UVA – Strahlung von Lichthärtungsgeräten für die Nagelmodellage krebserregend ?

Die klare Antwort: Bei ordnungsgemäßer Anwendung – nein.

Eine mögliche Schädigung der Haut durch UVA Strahlung hängt von der Energie der UVStrahlung

ab, von der Eindringtiefe und der Zeit der Bestrahlung des Gewebes.

Unter dem Verdacht möglicher Schädigungen stehen Hochleistungsröhren, wie sie in Bräunungsstudios verwendet werden. Insbesondere sehr häufiges und längeres Aussetzen der

Haut unter starke UVA Strahlung kann u.U. bedenklich sein.

²

Bräunungsstudios nutzen das Verlangen der Kunden, ihre Haut zu bräunen, wie es sonst nur in

der Sonne möglich ist. Die Bräunung der Haut ist allerdings – auch in der Sonne - eine Stress–

und Schutzreaktion auf einen schädigenden Einfluss.

Im Gegensatz zu den Hochleistungsröhren der Bräunungsstudios arbeiten UVA Röhren für die

Aushärtung von Nagel Gelen nur mit Bruchteilen der Strahlungsleistung der in Bräunungsstudios

verwendeten Röhren. Darüber hinaus ist die Bestrahlungszeit und die Bestrahlungsfrequenz

wesentlich niedriger. Dadurch tritt z.B. auch kein Bräunungseffekt auf.

Mit freundlichen Grüßen aus Mörfelden
EMAG AG

Light curing units to cure nail resins cause cancer – really?

Title stories of previously published newspapers discussed the risk of UVA-light emitted from light curing units to cure nail resins. Although some papers cited doctors from the sunny state Texas in the US who have seen skin cancer on the hand of one lady the readers shall keep in mind that the outer surface of the hand is always completely unprotected against strong sunlight – who is biking with gloves? Based on these yellow press publications there are many concerns in public about nail cosmetics using light curing nail resins. However, based on scientific knowledge all these concerns are absolutely not justified. Reports about the worldwide economic crisis have been stressed for many months and therefore, have now become boring. Other shocking news is needed to keep up papers' sales.

What is the situation?

UVA-light curing devices to cure nail resins are used in nail industry for approximately 25 years and millions of women are treated every year with these devices. No articles in medical literature were found reporting about one single case of tumors on women's hands caused by UVA nail resin curing devices.

As it is known to everybody UV-light is always present in our life. The risks of overexposure are widely discussed and a broad scientific knowledge is available. The effects of UV-light on human beings have been quite good investigated and standard values are defined especially with regard to tanning beds.

UV-light is differentiated in UVA- (wavelength 320 – 400 nm) and UVB-light (wavelength 290 – 320 nm). It is proven that overexposure of UV-light can cause different types of skin cancer (melanoma). Whereas UVB-light causes severe sunburn, UVA-light is responsible for pigmenting the skin and therefore, UVA-lamps are used for tanning beds. Since no sunburn is caused by UVA-light, it was considered to be rather safe for a long period of time. However, science learned that UVA-light penetrates skin to much deeper regions and therefore, it represents a high risk for the development of tumors and it is proven that fast skin aging occurs.

However, UV-light (UVA and UVB) is not only risky but also healthy – the dose is decisive. It is necessary to synthesize vitamin D in our bodies which is important for a sound bone structure. It also positively influences the immune system, the metabolism, blood pressure and other physical and psychical factors. UV-light is also widely used for many medical therapies.

What are the hard facts?

For the nail curing devices only the UVA amount is of interest. The irradiance of an LCN curing device is approximately 70 W/m² in comparison with a tanning bed performing approximately 300 W/m².

Literature reports that UVA-radiation doses of around 100.000 Ws/m² is needed to achieve an even noticeable tanning of the skin. This means you have to be in a tanning bed performing 300 W/m² for at least 6 minutes (representing a radiation dose of 108.000 Ws/m²) to see just a little pigmenting. Normally people spend around 20 minutes in a tanning bed to get a nice cosmetic appearance what represents a radiation dose of 360.000 Ws/m².

Within 2 minutes curing the LCN curing device performs a radiation dose of 8.400 Ws/m² which is approximately 40 less than 20 minutes tanning bed. It has also to be regarded that the whole body surface (2 m²) is irradiated in a tanning bed in comparison with the irradiation of hand surface 0,015 m² in a curing device.

Furthermore, literature also reports that European regulatory authorities, including those in the U.K. and Sweden, have given exposure standards for UVA. For the spectral region of 315 – 400 nm (UVA), the total irradiance incident on unprotected eyes and skin for periods of greater than 1.000 seconds (approximately 16 minutes) should not exceed 10 W/m^2 , and for exposure times of 1.000 seconds or less the total radiant exposure of unprotected eyes and skin should not exceed 10.000 J/m^2 .

Comparing the radiation of the LCN curing device with these given standards the situation is as follows:

The irradiance incident is 2 minutes (one curing cycle) and therefore, the exposure is far below the standard. Expressed in J/m^2 the LCN device performs 8.400 J/m^2 which again is below the standard. Please keep in mind that the standard is also valid for unprotected eyes meaning that the 2 minutes curing cycle does not even damage the eyes. However, LCN instructions for use claim adequate eye protection to make the process absolutely safe.

Conclusions:

Hands are normally totally unprotected against sunlight or the lights of tanning beds. Especially during biking or sunbathing the outer surfaces of hands are extremely exposed to UV-radiation. These facts elucidate why skin cancer is observed on hands.

No reports are available proving that tumors are caused by nail curing devices. Compared with tanning beds the LCN curing devices are 40 times safer. Consulting existent standards for UVA irradiance of unprotected eyes and skin the LCN devices can be considered as totally safe when properly used. Moreover, light curing nail cosmetics have crucial positive impact on human's health when compared with archaic powder/liquid technique. Therefore, it is unjustifiable to strike terror to people.

However, there is an easy way to eliminate peoples' fear completely - use disposable gloves and cut off the fingertips. This improves also hygienic.

However, it is always a concern of research and development to make safe things safer and to improve quality of life. Since 2007 LCN offers the LED curing device skyLED which emits almost no UV-light anymore and in the middle of 2009 LCN will introduce skyLED-2 performing an emission completely above 400 nm.

All customers of well-trained professionals can be sure and confident that light curing technique is the most safe and health oriented nail cosmetic known in our days.