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## Association between Facial Skin Tumors and Wrinkling

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### Abstract

**Background:** There are many risk factors that accentuate wrinkling like age, sex, occupation and smoking. From our clinical observation we noticed that, patient with skin malignancy are less liable to wrinkling.

**Objectives:** To test the assumption whether skin wrinkling is protective against skin cancer or not?

**Patients & Methods:** A case-control study was conducted in Department of Dermatology and Venereology in Baghdad teaching hospital in period from April 2002 through March 2003 on 54 patients with various skin tumors, and 108 patients as a control group, Socio-demographic information and full dermatological examination was done. Facial wrinkles were examined and measured according to wrinkles score in the group. Then we simplify these score into: superficial, (I, II), medium (III, IV) and deep wrinkles (V, VI).

**Result:** The frequency of skin tumors were as follow; basal cell carcinoma (74.07%), squamous cell carcinoma (11.11%), baso-squamous cell carcinoma, (5.5%) kerato-acanthoma (5.5%) and solar keratosis (3.7%). The commonest age group affected by skin tumors were from 50-79 years and the commonest skin type in cases and controls were skin type III ( $P>0.05$ ). All skin tumors were more common in males than females ( $P>0.05$ ). Outdoor activity was more in patients with tumor, while control group had nearly equal outdoor and indoor activity ( $P<0.05$ ). Patients with superficial wrinkles more commonly affected with skin tumors than those with deep wrinkles, while comparison group had more medium and deep wrinkles. So whenever there was increase in severity of wrinkle, there was decrease in frequency of malignancy.

**Conclusion:** The present work had confirmed a negative association between wrinkling score and the frequency of skin tumors. Smoking might indirectly protect against basal cell carcinoma.

**Key words:** Facial wrinkling, tumors, smoking.

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### Introduction

A wrinkle is by definition a gross anatomic structure, it is a crease or fold in the skin <sup>[1]</sup>.

Wrinkles are the most clinically apparent changes in the aging skin, both intrinsically and extrinsically in genetically determined individuals. There are many classifications to wrinkles as fine, medium and coarse wrinkles <sup>[1, 2, 3]</sup>.

Other classifications of wrinkles depending on clinical and histological finding in aged persons include: Deep wrinkles "Permanent wrinkles" Fine shallow wrinkles "temporary wrinkles" <sup>[4, 5]</sup>. So accordingly there are 2 types of skin aging as chronological and photo-aging <sup>[5]</sup>.

Photo-aging is degenerative changes caused by prolonged exposure to electro-magnetic (usually solar) radiation.

Two types are found acute and chronic photo damage <sup>[6, 7, 8]</sup>. Risk factors for extrinsic aging include; <sup>[6]</sup> cigarette smoking, continuous heat exposure, chemical exposure, skin photo-types and UV irradiation. Smoking increases the risk for facial wrinkling and elastotic changes <sup>[6]</sup>.

Therefore smoking causes premature aging and wrinkling of the face. Facial wrinkling go parallel with increasing the number of pack years smoked <sup>[7]</sup>. Skin tumor is a range of benign and malignant proliferation of skin layer cells <sup>[8]</sup>. Etiologies of skin tumors are; genetic factors, biological factors like oncogenic viruses and environmental factors like Ionizing radiation <sup>[9]</sup>

The present study has been arranged to test the assumption whether skin wrinkling is protective against skin tumor.

### Patients & Methods

This is a case control study design that had been carried out in Department of Dermatology and Venereology Baghdad Teaching Hospital from April 2002 through March 2003. It included 54 patients with skin tumors their ages ranged between 30-90 years with a mean  $\pm$ SD of  $62.37\pm 11.43$ , 39 males and 15 females. The control group included 108 patients attending the department for mild dermatological problems their ages ranged from 30-90 years with mean  $\pm$  SD  $63.50\pm 10.62$ , 59 males & 49 females.

The patients included all cases with skin tumor attending the department at that period. Socio-demographic information was taken from each patient and control group. It includes:

- 1- Age, sex, residency.
- 2- Occupation (current and past) and classified as: less than 4hrs, as Indoor occupation and equal or more than 4hrs as outdoor occupation <sup>[7]</sup>.
- 3- Smoking habit was considered positive when there was active or passive smoking habits <sup>[10]</sup>.
- 4- Skin type was assessed according to Fitzpatrick's classifications table (1) <sup>[6]</sup>. By asking the patient two questions <sup>[11]</sup>:
  - a- Do you tan easily?
  - b- Do you sunburn easily?

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Types of the lesions, site, size, duration, previous consultations, family history and any treatment used. In this study we selected the most common skin tumors related to sun exposure which included: basal cell carcinoma (40), squamous cell carcinoma (6), basaloid squamous (3), kerato acanthoma (3), solar keratosis (2), and no malignant melanoma cases were seen. Biopsy was done to all patients to establish final diagnose the tumor type. Facial wrinkling was classified and measured according to wrinkle score table (1) <sup>[7]</sup>.

**Table (1) Wrinkle score**

<b>Grade</b>	<b>Skin appearance</b>
<b>I</b>	<b>Essentially unwrinkled. Two or three shallow wrinkles usually less than 1 1/2 cm in length may be present in each crow's foot area.</b>
<b>II</b>	<b>Several wrinkles, each of which may be 3 cm long. The number of significant wrinkles on each side may be between two and six.</b>
<b>III</b>	<b>Several prominent wrinkles on each side, 3 to 4 cm long many smaller wrinkles may be present as well. Increased wrinkling may be present in the forehead skin, but little wrinkling in the cheek areas.</b>
<b>IV</b>	<b>Wrinkles extend from the crow's foot area superiorly and inferiorly, usually 5 cm or more if wrinkles are of unusual depth, they may be 4 cm long. Wrinkles extend over the cheek areas (zygomatic ridge). Men in this grade frequently exhibit prominent wrinkling of forehead and posterior nuchal region.</b>
<b>V</b>	<b>Wrinkles extend from crow's foot area and are prominent over the cheeks and forehead.</b>
<b>VI</b>	<b>Profound wrinkling extending over most of the face.</b>

We also simplified this grading by making (Grade I-II) as superficial, (Grade III- IV); medium, and grade (V-VI) as deep wrinkles.

Each subject's face wrinkles were examined closely while the subject was sitting with facial muscles relaxed in a well-illuminated room. The crow's foot area lateral to the outer cauthus of each eye was examined closely on both sides. Adjacent areas, including the forehead and cheeks were inspected. Wrinkles were examined for depth, length, and numbers by using specific materials called "Alginate impression" (figure 1) which is a powder used by dentists, by taking this powder and mix it with water and immediately put it by wood stick on the wrinkles of the person as a mask; after few minutes, it

will dry up and we remove it and measure the, number, length, and depth, of each wrinkle by tape measure. Other skin characteristics such as color, keratosis, atrophy, and pigmentation were ignored in this classification. Although the perioral and posterior nuchal areas were also inspected changes observed here were not used in assigning a wrinkle score. <sup>[7]</sup>

Statistical analysis was done by using: Chi-square ( $\chi^2$ ) which is used to assess the relation between each type of skin tumors and their sex, occupation, skin type, wrinkle severity and smoking habit. Also it was used to assess the relationship between wrinkle severity in cases and control groups and sex, occupation, skin type and smoking habit.



**Figure (1) Alginate Impression**

**Results**

The present work showed the commonest age group seen between 50-79 years, in both cases and comparison group. Also the frequency of skin tumors was seen in the same age group 50-79 years. The frequency of skin tumors were basal cell carcinoma 40 (74.07%), squamous cell carcinoma 6 (11.11%), baso-squamous cell carcinoma 3 (5.5%), kerato-acanthoma 3 (5.5%) and solar keratosis 2 (3.7%).

The frequency of skin tumors in cases, and wrinkling in cases and comparison group was more in skin type III

than others, although the difference did not reach a statistically significant level ( $P > 0.05$ ).

Regarding sex, the distribution of skin tumors in cases, and wrinkling in cases and comparison group was more frequent among males. Still this difference was not significant ( $P > 0.05$ ).

The skin tumors were more frequent in outdoor than indoor patients and this was statistically significant ( $P < 0.05$ ) table (2).

**Table 2. The frequency distribution of skin tumors by their occupation (indoor, outdoor)**

Occupation	Disease											
	SK		KA		BS		BCC		SCC		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
<b>Indoor</b>	0	0	1	33.3	0	0	15	37.9	2	33.3	18	33.3
<b>Outdoor</b>	2	100	2	66.7	3	100	25	62.5	4	66.7	36	66.7
<b>Total</b>	2	100	3	100	3	100	40	100	6	100	54	100
$\chi^2$	1.04	N.S	0.01	N.S	1.59	N.S	1.21	N.S	0.00	N.S	12	H.S

**N.S: No Significant difference at level ( $P > 0.05$ ).**

The skin wrinkling in its different (severity) grades in comparison group were more common in indoor compared to outdoor individuals, while superficial wrinkling was common in the indoor and deep wrinkling was frequent in outdoor activity ( $P < 0.05$ ).

Still wrinkling in cases was more common in outdoor than indoor but did not reach significant level ( $P > 0.05$ ), while superficial and deep wrinkling were more seen in outdoor activity but did not reach statistically significant level ( $P > 0.05$ ). In general, there were more people with outdoor activity in cases than comparison group which were statistically significant ( $P < 0.05$ ).

The severity of wrinkling among different age groups in comparison group and cases showed important findings as: superficial wrinkling was more common in cases 32 (59.25%) compared to comparison group 16 (14.8), while medium and deep wrinkling were more frequent in comparison group 49 (45.4%), 43 (39.8%) subsequently than cases 3 (5.5%), 19 (35.2%) subsequently it reaches the statistical significance in superficial and medium wrinkling ( $P < 0.01$ ) and not in deep wrinkling ( $P > 0.05$ ).

The relationship between frequency of skin tumors and wrinkling severity was clearly shown in table (3). In general there was high frequency of tumors in superficial wrinkling compared to deep wrinkling ( $P < 0.01$ ). SK, KA, BCC were significantly associated with superficial wrinkling.

Smoking habit caused significant increase in frequency of skin tumors compared to non-smoker ( $P < 0.05$ ) but more specifically, BCC was more in non-smoker ( $P > 0.05$ ) and SCC more in smoker ( $P < 0.05$ ).

Wrinkling severity was increased in smokers both in cases and controls although this difference did not reach significant level ( $P > 0.05$ ). Smokers with superficial wrinkling were more among cases compared to control. While smokers with medium and deep wrinkling were more in comparison group compared to cases this was statistically highly significant ( $P < 0.01$ ) in superficial and medium wrinkling and not in deep wrinkling ( $P > 0.05$ ) table (4).

**Table 3: The frequency distribution of skin tumor by wrinkle severity**

Wrinkle	Disease											
	SK		KA		BS		BCC		SCC		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Superficial	1	50	2	66.7	3	100	24	60	2	33.3	32	59.2
Medium	1	50	1	33.3	0	0	0	0	1	16.7	3	5.6
Deep	0	0	0	0	0	0	16	40	3	50	19	35.2
Total	2	100	3	100	3	100	40	100	6	100	54	100
$\chi^2$	8.15	H.S	5.56	S	2.18	N.S	9.60	H.S	2.69	N.S	20.03	H.S

N.S: No Significant difference at level (P>0.05).

S: Significant difference at level P<0.05.

H.S: Highly Significant difference at level (P<0.01).

**Table 4: The frequency distribution of wrinkle severity by their smoking habits in cases and comparison group**

Smoking habit	Superficial			Medium			Deep		
	Cases	control	$\chi^2$	Cases	control	$\chi^2$	Cases	control	$\chi^2$
Smoker	18	7	23.29 H.S	2	26	13.71 H.S	10	27	0.48 N.S
Non smoker	14	9	11.53 H.S	1	23	13.59 H.S	9	16	0.12 N.S

N.S: Non Significant difference at level (P>0.05).

H. S: Highly Significant difference at level (P<0.01).

### Discussion

Skin cancer is a major health problem all over the world, but fortunately it is less frequent in dark-skinned people like in Iraq. Still the commonest tumor were similar to what has been published like BCC, SCC, BS, KA and SK.<sup>[9, 12]</sup>

There are many risk factors associated with skin cancer, but the commonest are; skin color, aging, sunlight exposure and smoking.<sup>[13]</sup>

In Iraq the commonest skin type is type III, which is a dark skin and less liable to skin cancer.

In the present work we will discuss the skin cancer in relation to facial wrinkling in association with any risk factors.

The most common skin tumor is Bcc followed by SCC, BS, KA and lastly SK, the result was similar to what has been published before<sup>[12]</sup>. Skin type was mainly type III which was in agreement with previous study in Iraq<sup>(11)</sup>. Since this is the most common skin type in Mediterranean region and it seems to be protective to our population, indicated by the low incidence of malignant

melanoma and other skin malignancy compared with western countries<sup>[9]</sup>.

Solar radiation increases the incidence of all types of skin tumors. In the present study outdoor workers had more frequency of skin tumors compared with indoor workers. The results were similar to what have been published before<sup>[13, 14]</sup>.

The present study showed that people with outdoor activity had deep wrinkling than indoor, especially among comparison group. So wrinkling provides protection against skin tumor and especially deep wrinkling. These observations were not noticed before. Although wrinkles are not cosmetically acceptable feature still very useful to humans being especially people engaged with outdoor activity.

So we can conclude that there was a negative association between wrinkle score and skin cancer, deep wrinkling was less likely to be affected with skin cancer compared with superficial wrinkle cases. This indicates that a wrinkle has a protective and modifying defensive mechanism against the development of skin tumors.

Smoking in general is accepted as a carcinogenic agent and considered to be the cause of carcinoma of many systems like: lung, gastrointestinal tract, lip, oral, and genital mucosa. Whether smoking increases the number of skin tumor or not is still questioned. The present study showed increase in the frequency of skin tumors among smokers; however squamous cell carcinoma of the lips was more strongly associated with smoking. This is partly due to the direct effect of smoke on lower lips and because wrinkling is poorly affecting this area. On the contrary basal cell carcinoma of the face was negatively associated with smoking.

However the present work had shown that smoking increases the wrinkling score as in previous studies [15], so indirectly might protect against skin tumors.

In conclusion wrinkling dose protect against skin cancer and should be considered as endogenous and exogenous defensive mechanism.

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