

*Silonie Sachdeva***INTRODUCTION**

Fitzpatrick skin phototypes were developed by Thomas B. Fitzpatrick in 1975 based on a person's skin color and responses to sun exposure in terms of degree of burning and tanning. Though subjective, Fitzpatrick skin typing has a proven diagnostic and therapeutic value. It has been most commonly used to analyze the sun sensitivity in population-based and case-control studies related to cause of skin cancer, exposure to UV radiation, tanning, and protective behaviors.<sup>[1,2]</sup> The Fitzpatrick scale has been applied as a standard for self-assessment of sun sensitivity in self-administered questionnaires and has been shown to correlate well for white skin as compared to brown skin.<sup>[3]</sup> Skin phototype typing is widely used for estimating UV, PUVA, and laser treatment doses.

**HISTORY OF SKIN PHOTOTYPING**

Fitzpatrick first classified skin types I–III based on his outdoor sunscreen study<sup>[4]</sup> in Brisbane, Australia in 1972. He distributed skin responses of fair-skinned Australians who participated in his study of midday sun exposure into three main sun reactive categories: skin phototype I: those who burn easily and do not tan at all; skin phototype II: those who burn easily and tan with difficulty (freckled and often red-haired individuals); and skin phototype III: those who burn moderately, show immediate pigment darkening reactions, and tan moderately after about 60 minutes of midday sun exposure. Fitzpatrick's skin phototypes I, II, and III became well accepted and popular in dermatology for phototherapy of skin diseases. In 1972, the US FDA adopted this classification for the

evaluation of sun protection factor (SPF) values of sunscreens.

**CLASSIFICATION**

The current Fitzpatrick skin type classification<sup>[4]</sup> denotes six different skin types, skin color, and reaction to sun exposure which ranges from very fair (skin type I) to very dark (skin type VI) depending upon whether the patient burns at the first average sun exposure or tans at the first average sun exposure [Table 1]. The two main factors that influence skin type are:

1. Genetic disposition
2. Reaction to sun exposure and tanning habits

Skin type is determined genetically and is one of the many aspects of the overall appearance, which also includes color of eyes and hair. The way skin reacts to sun exposure is another important factor in correctly assessing the skin type. Recent tanning (sun bathing, artificial tanning, or tanning creams) has a major impact on the evaluation of the skin color. The Fitzpatrick scale is a numerical classification scheme for determining the skin color based on a questionnaire related to an individual's genetic constitution, reaction to sun exposure, and tanning habits.<sup>[5]</sup> The response to each question is measured on a scale of zero to four. The response for all the questions is added to get the final score corresponding to the Fitzpatrick skin type [Tables 2–5]. Fitzpatrick scale is widely accepted to assess the patient's skin type.

The objective assessment of Fitzpatrick skin types can be done by a device Dermatone Skin Analyzer™, which gives accurate analysis of skin tones based on the skin's concentrations of melanin, hemoglobin, and skin reflection properties.<sup>[6]</sup> It has been developed by Dr. Kambiz Youabian at the Cosmetic Laser Center of Los Angeles. The device is portable and simple to use. To measure the skin tone, the tip of the device is gently placed over the skin and a button is pressed. The skin tone results are displayed on the device's LCD screen.

---

International fellow Moh Surgery, Laser surgery and Cosmetic Dermatology, Dallas, Texas, USA

**Address for correspondence:**

Dr. Silonie Sachdeva, 610 Heather trail, Arlington, Texas-760 11, USA. E-mail: siloniederm@yahoo.com

**How to cite this article:** Sachdeva S. Fitzpatrick skin typing: Applications in dermatology. Indian J Dermatol Venereol Leprol 2009;75:93-6.

**Received:** February, 2008. **Accepted:** April, 2008. **Source of Support:** Nil. **Conflict of Interest:** None declared.

The Dermatone skin tone readings have a scale varying from 35–127 corresponding to various Fitzpatrick skin types [Table 6].

**USES OF SKIN TYPING**

**Photoaging and risk of skin cancer**

The role of melanin in the skin is to absorb and scatter energy from UV light to protect the epidermal cells from damage. Melanin provides considerable protection from sun damage, and the degree of protection corresponds directly to the degree of pigmentation.

This sun protection offers significant prevention of photoaging in skin types IV–V. The skin types I–III are at increased risk of sun damage, photoaging, and risk of melanoma and nonmelanoma skin cancers.<sup>[1,2]</sup> Fitzpatrick skin typing helps to predict the risk of photodamage and skin cancer.

**Minimal erythema dose for UV phototherapy**

Skin typing has been used to estimate the minimal erythema dose (MED) for initial dose in phototherapy.<sup>[7]</sup> Fitzpatrick skin types I–III have been shown to have lower MED compared to type IV–VI.

**Table 1: Fitzpatrick’s skin phototypes**

Phototype	Sunburn and tanning history (defines the phototype)	Immediate pigment darkening	Delayed tanning	Constitutive color (unexposed buttock skin)	UV-A MED (mJ/cm <sup>2</sup> )	UV-B MED (mJ/cm <sup>2</sup> )
I	Burns easily, never tans	None (-)	None (-)	Ivory white	20–35	15–30
II	Burns easily, tans minimally with difficulty	Weak (± to +)	Minimal to weak (± to +)	White	30–45	25–40
III	Burns moderately, tans moderately and uniformly	Definite +	Low +	White	40–55	30–50
IV	Burns minimally, tans moderately and easily	Moderate ++	Moderate ++	Beige-olive, lightly tanned	50–80	40–60
V	Rarely burns, tans profusely	Intense (brown) +++	Strong, intense brown +++	Moderate brown or tanned	70–100	60–90
VI	Never burns, tans profusely	Intense (dark brown)+++	Strong intense Brown +++	Dark brown or black	100	90–150

Adapted from Fitzpatrick’s Dermatology in General Medicine. McGraw-Hill Professional; 5<sup>th</sup> edition.<sup>[4]</sup>

**Table 2: Genetic disposition**

Score	0	1	2	3	4
What is the Colour of your eyes?	Light blue, grey, or green	Blue, grey, or green	Blue	Dark brown	Brownish black
What is the natural colour of your eyes?	Sandy red	Blond	Chestnut/dark blond	Dark brown	Black
What is the colour of your skin in the nonexposed areas?	Reddish	Very pale	Pale with beige tint	Light brown	Dark brown
Do you have freckles in the nonexposed areas?	Many	Several	Few	Incidental	None

Total score for genetic disposition<sup>[5]</sup> (0–16)

**Table 3: Reaction to sun exposure**

Score	0	1	2	3	4
What happens when you stay in sun too long?	Painful redness, blistering, peeling	Blistering followed by peeling	Burns sometimes followed by peeling	Rare burns	Never had burns
To what degree do you turn brown?	Hardly or not at all	Light color tan	Reasonable tan	Tan very easy	Turn dark brown quickly
Do you turn brown within several hours after sun exposure?	Never	Seldom	Sometimes	Often	Always
How does your face react to the sun?	Very sensitive	Sensitive	Normal	Very resistant	Never had a problem

Total score for reaction to sun exposure<sup>[5]</sup> (0–16)

**Table 4: Tanning habits**

Score	0	1	2	3	4
When did you last expose the body to sun (or artificial sunlamp/tanning cream)?	More than 3 months ago	2–3 months ago	1–2 months ago	Less than a month ago	Less than 2 weeks ago
Did you expose the area to be treated to the sun?	Never	Hardly ever	Sometimes	Often	Always

Total score for tanning habits<sup>[5]</sup> (0–8)

**Table 5: Total score\* corresponding to Fitzpatrick skin type<sup>[5]</sup>**

Skin type score	Fitzpatrick skin type
0-7	I
8-16	II
17-25	III
25-30	IV
over 30	V–VI

\*[Table 2-4]

**Table 6: Correlation of dermatone skin tone readings and Fitzpatrick skin types<sup>[6]</sup>**

Fitzpatrick skin type	Dermatone skin tone readings
Type I	35–50
Type II	50–60
Type III	60–75
Type IV	70–85
Type V	80–100
Type VI	95–127

The most common Indian skin type<sup>[8]</sup> has been found to be of type V followed by type IV and the estimated MED for UVB for Indian skin is  $61.5 \pm 17.25$  J/cm.<sup>[2]</sup>

#### Laser hair removal

Evaluation of facial skin pigmentation before laser hair removal/ laser resurfacing is paramount to successful results. Pigment can be inherited ethnically or acquired as in melasma or Addison's disease. A higher degree of preablative pigmentation increases the risk of hyperpigmentation and hypopigmentation after treatment. Thus, Fitzpatrick skin types IV–VI run a greater risk of potential epidermal adverse events, such as dyspigmentation, blistering, crusting, edema, and subsequent scarring with laser hair removal.<sup>[9]</sup> Since, the energy fluence dose (J/cm<sup>2</sup>) used per pulse varies for different skin types, skin typing before the start of procedure can help to determine the safe and effective energy dose for laser hair removal in a particular skin type and can be useful in preventing complications. Also, to reduce epidermal melanin absorption of energy, longer wavelengths are considered safer for

use on Fitzpatrick skin types IV–VI.

#### Chemical peeling and dermabrasion

Patients with Fitzpatrick skin types I–III tolerate resurfacing procedures with minimal risk of pigmentary complications. They may develop prolonged postoperative erythema but are less likely to develop the pigmentary sequelae. In patients with Fitzpatrick skin types IV–VI, the risk of pigmentary change is higher with the deeper wounding that can be achieved with dermabrasion and chemical peeling.<sup>[10]</sup> The higher the type and the degree of pigmentation, the greater the risk of postinflammatory hyperpigmentation.

#### Tolerance to topical bleaching agents

In Fitzpatrick skin types I–III, if any reaction to topical depigmenting agent occurs, the skin usually returns to normal on discontinuation of the product. In darker skin, frequent dryness and irritation are followed by postinflammatory hyperpigmentation. In predisposed individuals, hyperpigmentation usually develops within one to two weeks and can last for several months.

## CONCLUSION

Fitzpatrick skin typing helps to predict the possible sun damage in a person and the risk of skin cancer. It can also be used to evaluate the response of different skin types to commonly used cosmetic procedures and is therefore a useful tool in cosmetic dermatology.

## ACKNOWLEDGMENT

Dr. Kambiz Youabian, Cosmetic Laser Center of Los Angeles, Los Angeles, California, USA for letting use the information about Dermatone skin analyzer from his website

## REFERENCES

1. Beral V, Evans S, Shaw H, Milton G. Cutaneous factors related to the risk of malignant melanoma. *Br J Dermatol*

- 1983;109:165-72.
2. Weinstock MA. Assessment of sun sensitivity by questionnaire: Validity of item and formulation of a prediction rule. *J Clin Epidemiol* 1992;45:547-52.
  3. Youn JI, Oh JK, Kim BK, Suh DH, Chung JH, Oh SJ, *et al*. Relationship between skin phototype and MED in Korean, brown skin. *Photodermatol Photoimmunol Photomed* 1997;13:208-11.
  4. Pathak MA. In memory of Thomas Bernhard Fitzpatrick. *J Invest Dermatol* 2004;122:20-1.
  5. Fitzpatrick scale. Wikipedia. Available from: [http://en.wikipedia.org/wiki/Fitzpatrick\\_scale](http://en.wikipedia.org/wiki/Fitzpatrick_scale). [last updated on 2007 Aug 12]. [last accessed on 2008 Feb 12].
  6. Youabian K. Dermatome Skin Analyzer. Available from: <http://www.cosmeticlasercenter.net/Dermatome.html>. [last updated on 2007 Jan 1]. [last accessed on 2008 Feb 15].
  7. Andreassi L, Simoni S, Fiorini P, Fimiani M. Phenotypic characters related to skin type and minimal erythema dose. *Photodermatol* 1987;4:43-6.
  8. Pai GS, Vinod V, Krishna V. MED estimation for narrow band UV-B on type IV and type V skin in India. *Indian J Dermatol Venereol Leprol* 2002;3:140-1.
  9. Breadon JY, Barnes CA. Comparison of adverse events of laser and light-assisted hair removal systems in skin types IV-VI. *J Drugs Dermatol* 2007;6:40-6.
  10. Grimes PE. Skin and hair cosmetic issues in women of color. *Dermatol Clin* 2000;18:659-65.