NON INVASIVE EVALUATION OF PATIENT WITH ACNE AND ROSACEA. IMPLICATIONS IN CASE - MANAGEMENT

EVALUAREA NON-INVAZIVĂ A PACIENTULUI CU ACNEE ȘI ROZACEE. IMPLICAȚII ÎN MANAGEMENTUL DE CAZ

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Abstract

Acne and rosacea are chronic inflammatory skin diseases, with unpredictable evolution and associated with a major negative impact on quality of life.
Acne and rosacea therapeutic approach is holistic and individualized, based on complex evaluation of the patient prior to treatment and constant monitoring thereafter.
In this paper, we present non-invasive assessment of Propionibacterium acnes load on the face, both at baseline and after 3-4 weeks time using a washing gel based on piroctone olamine and white ichtiol. Also, we present an initial non invasive evaluation of parameters in patients with adult acne and rosacea, offering the possibility to an individualised treatment and better case management. Individualized approach (including digital evaluation) and holistic (diet, proper skin care, photoprotection, local and general treatment, laser intervention etc.) in adult acne and rosacea patients, and ongoing monitoring are critical elements in improving the quality of life and reducing adverse effects associated with these diseases.

Keywords:

adult acne, rosacea, Propionibacterium acnes, antibiotic resistance

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Rezumat

Cuvinte-cheie:

acnee forma tardivă a femeii adulte, rozacee, Propionibacterium acnes, rezistența la antibiotice

Acneea și rozaceea reprezintă afecțiuni inflamatorii cronice, cu evoluție ondulantă și adesea impredictibilă, asociate cu un impact negativ major asupra calității vieții pacienților. Abordarea terapeutică în acnee și rozacee este de tip holistic și individualizat și are la bază evaluarea complexă a pacientului anterior instituirii tratamentului și monitorizarea permanentă a acestuia.
În acest articol prezentăm evaluarea non-invazivă a încărcăturii cu propinibacterium acnes la nivelul feței, atât la momentul initial, cât și după utilizarea timp de 3-4 săptămâni a unui gel de spălare pe bază de piroctone olamine și ihtiol alb. De asemenea, prezentăm și evaluarea inițială non-invazivă a parametrilor feței la pacientele cu acnee – forma tardivă a femeii adulte și rozacee în vederea individualizării tratamentului și a managementului de caz.
Abordarea individualizată (inclusiv prin evaluare digitală) și holistică (dietă, îngrijirea pielii corectă, fotoprotecție, tratament local și general, intervenții laser etc.) a pacienților cu acnee și rozacee, precum și monitorizarea permanentă sunt elemente decisive în vederea îmbunătățirii calității vieții și reducerea efectelor negative asociate acestor boli.

1. Introduction

1.1 Acne, a chronic inflammatory disease, with a peak of incidence in adolescence [1,2], represents, in terms of practical activities, the most common diagnosis made by dermatologists [1,3].

More, acne vulgaris is considered now ,,epidemic,, in Western countries and affects 40-54% of population older than 25 years [4,5], especially women [1,6-8].

Acne - late form of adult women (form of acne after the age of 25 years) [9] is different from ,,classic acne,, respectively acne in adolescence through clinical aspects and therapeutic approach [7,10].

Acne in adult women is characterized by significant inflammatory lesions associated with a reduced number of comedones, and location of lesions (comedones, papules, nodules, cysts) is especially in the lower third of the face, neck and mandibular line[11-13].

The management of acne has to be holistic [14], characterized by "acute intervention" to induce clinical remission and "long-term intervention" for maintenance[1]. Unfortunately, in general population there are a lot of misconceptions about the causes of acne especially about implications of stress, diet, skin hygiene and cosmetics, infection, exercise, and sunlight [9].

Acne pathogenesis is multifactorial and complex[4], including genetic factors, and is connected with excess sebum production by the sebaceous glands, follicular occlusion, hyper proliferation of Propionibacterium acnes (P. acnes) bacteria, and inflammation[14,15].

The public health issue in acne is represented by the frequency of disease, cost for medical care and health systems, negative impact on quality of life, antibiotic resistance of P. acnes, and associated morbidity [9].

1.2 Rosacea is a chronic inflammatory[16,17] cutaneous skin disease, characterized by a fluctuant evolution, with clinical manifestations (flushing, persistant facial erythema, papules, pustules and telangiectasias), localized especially in the convex areas of the face. [18].

Elementary lesions are represented by flushing, telangiectasia, papules and pustules[16,19], with or without sebaceous gland hyperplasia, and secondary lesions include facial tenderness (burning, xerotic aspect), edema, plaques, phymas and ocular manifestations[19].

The ethyopathogenesis of rosacea remains a matter of controversies, being incompletely elucidated[20], and many factors are involved, sometimes difficult to identify. The disease occurs in genetically predisposed individuals, particularly those with 1-2 Fitzpatrick phototype, which are subject to certain environmental factors [16].

However, now it is considered that in the pathophysiology of rosacea two major factors are involved: the vascular factor and the inflammatory factor. Over the years, other etiopathogenic factors have been cited: genetic predisposition [16], gastrointestinal disorders (chronic gastritis, intestinal microbial flora imbalance, jejunal mucosal atrophy), hypertension, infection with Demodex folliculorum or Helicobacter pylori [21], vitamin B12 deficiency, endocrine disorders and neuro-psychological factors[20].

1.3 Propionibacterium acnes, which was classified as Corynebacterium parvum, has been implicated in acne for more than 100 years, respectively

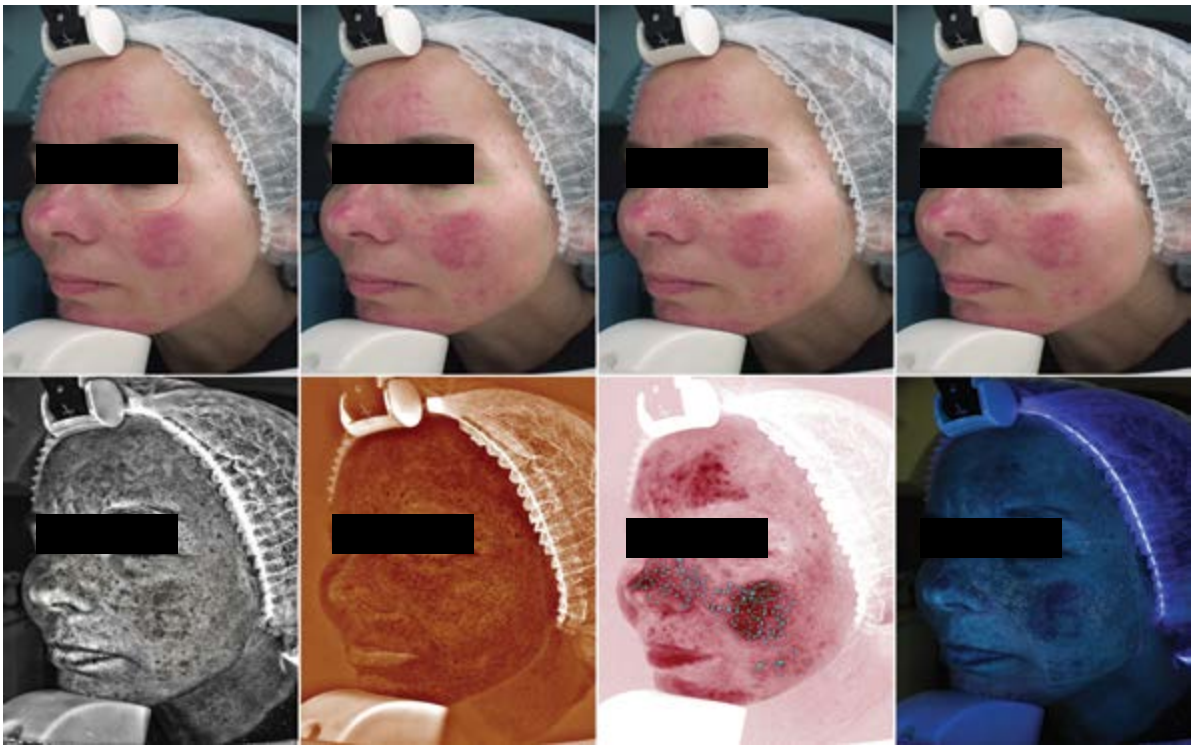

Figure 1. Overview of a patient with rosacea - Personal archive of Victor Gabriel Clatici

from 1896 [22] when P acnes was found in acne lesions and this idea was supported by other authors [23].

P. acnes is a Gram positive, anaerobic bacteria and opportunistic pathogen which is found on skin, oral cavity, gastrointestinal and genitourinary tracts [24], and represents approximately half of the total skin microbiome [25] and predominates (more than 40% of total bacteria) in facial skin [26].

P. acnes is involved in many diseases, like acne vulgaris[27], medical device[28], dental[29] and ophthalmic[30] infections, as well as synovitis-acne-pustulosis-hyperostosis-osteitis (SAPHO) syndrome [31], sarcoidosis [32,33] and prostate cancer [34].

An update about P acnes implication in acne was published recently [35] and below will summarize the main elements. P acnes is involved both in the progression of inflammation in acne vulgaris (36,37) and tissue damage by releasing various virulence factors (38). P acnes activates adaptative [39] and innate immune system, and acts as a trigger of inflammation trough proinflammatory enzymes, cytokines and chemokines [40].

P acnes releases lipases, proteases, and hyaluronidases that contribute to tissue injury and induces the production of TNF-a, IL-1a, and IL-8 [41,42]. The toll-like receptor 2 (TLR2) is important in the pathogenesis of acne, and by activation of TLR-2, P acnes may trigger inflammatory cytokine responses in acne [42] and can activated by the same way , via TLR-2, keratinocytes and sebocytes of the pilosebaceous unit [43]. Also, P acnes may be involved in the formation of the microcomedones [44,45].

An important problem in acne therapy is bacterial resistance to antibiotic, because in the last decades P acnes developed resistance to many antibiotics [46,47]. In 1976, according to Leyden [48] there was no evidence of antibiotic-resistant propionibacteria on the skin of over 1000 patients with acne, but in 1979 Crawford [49] published about first resistance of P acnes to topical therapy (erythromycin and clindamycin).

The importance of antibiotic resistance of P acnes is showed by the possibility to transfer the resistant genes from P acnes to staphylococci or streptococci [49,50].

The probability to develop resistance of P acnes is strongly connected with the patient's age, duration of acne, and duration of treatment with topical or systemic antibiotics[51].

1.4 Impact of rosacea on Quality of life (QOL)

Rosacea has been described as "the curse of the Celts", emphasizing the major handicap of facial erythema on social relationships, mainly because of its association (not very true in all cases!) with alcohol consumption[52,53] and the high prevalence of rosacea among individuals with I-II Fitzpatrick phototype[54].

Historically, facial erythema was a major cause for social stigmatization [55-57], and facial blemishes interact in negative way with the psychological, social and occupational aspects on patients' lives[52].

Rosacea is located in extremely visible places and may have a profound impact on patients' lives [58], who might suffer from anxiety, depression or social phobia QOL [53].

Rosacea patients can experience embarrassment (70%), low self-esteem (75%), frustration associated with their disease, impaired social functioning[59], all of these leading eventually to social and professional isolation [17]. Similar to

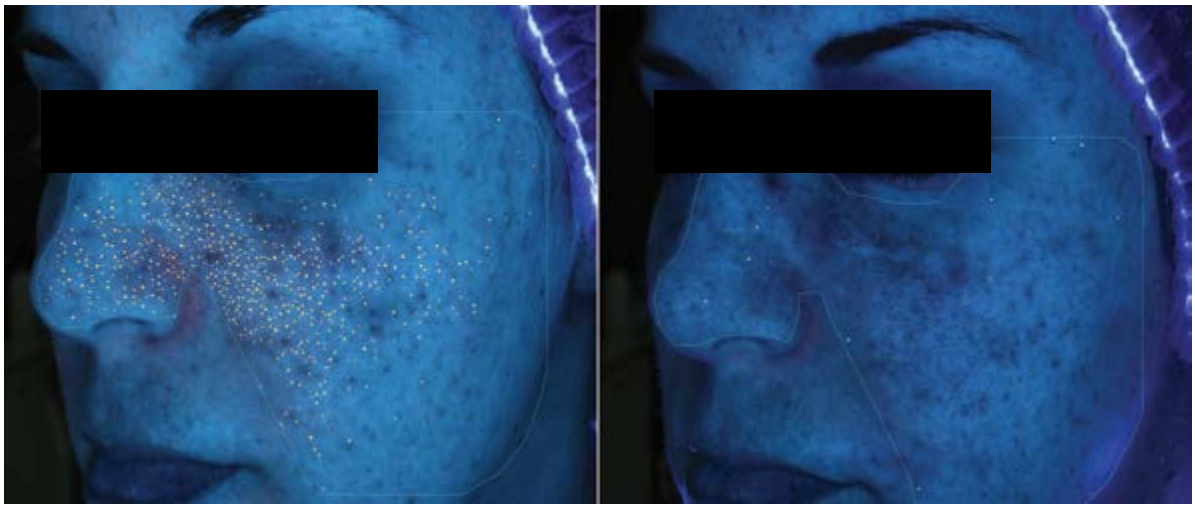

Figure 2. Patient 15: level of porphirins before and after use of cleansing gel - Personal archive of Victor Gabriel Clatici

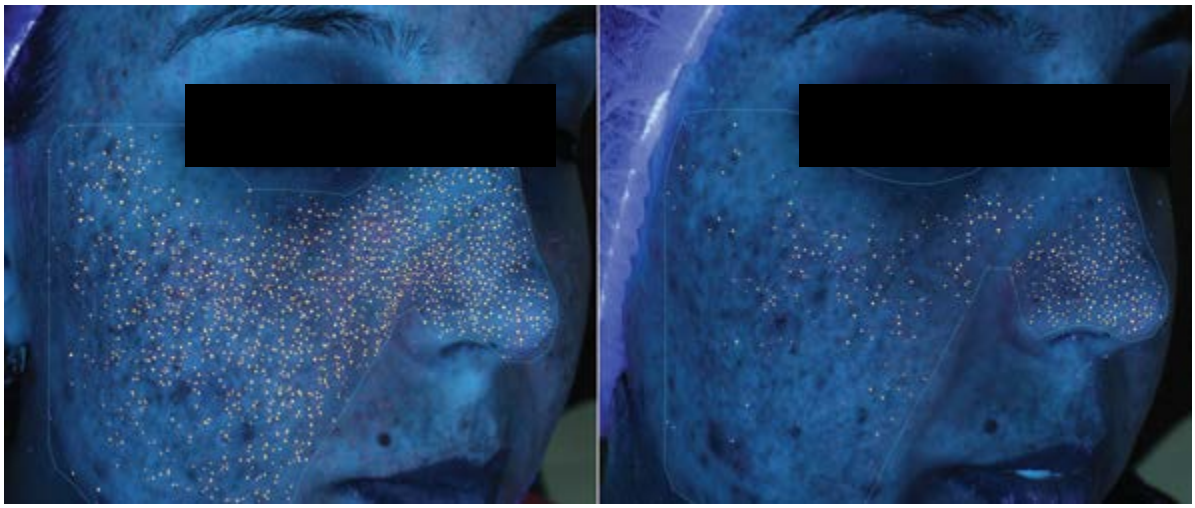

Figure 3. Patient 7: level of porphirins before and after use of cleansing gel - Personal archive of Victor Gabriel Clatici

other dermatological conditions affecting visible sites, rosacea patients suffer from mental stress [60,61] and social stigmatization, sometimes leading to psychiatric comorbidities.

Consequently, patients with rosacea may associate psychological comorbidities, such as anxiety disorders, social phobia [62,63], or even depression [17,64,65].

1.5 Impact of acne on QOL

The lesions of acne located on the face are very visible (and cannot be covered by clothes); therefore, it is understandable that Sulzberger et al came to the conclusion that: 'There is no single disease which causes more psychic trauma, more maladjustment between parents and children, more general insecurity and feelings of inferiority and greater sums of psychic suffering than does acne vulgaris.' [9,66]. Acne is not an insignificant problem [4,67] and is not a self- limiting disorder or a "cosmetic" problem [68].

Moderate to severe acne localized on the face has negative impact, including social, psychological, emotional and economic impact, and patients have great difficulties in finding a job [68] or present low self-esteem and depression [69,70]. The appearance of the skin causes changes in body image, with negative consequences as anger, fear, embarrassment, anxiety, depression or stigma [71,72].

Impact on quality of life of acne is similar with impact of epilepsy, asthma, diabetes or arthritis[73] and at least 40 % of patients with acne in adulthood present a psychiatric comorbidity [74], including suicidal thoughts [75].

The presence of acne in adult women increases the risk of anxiety, depression, and suicidal ideation [9] and has a negative effect on work or educational performance.

It is more than likely that the media's portrayal of flawless skin as an ideal is the leading cause of psychological morbidity in females [76] and unemployment rates is significantly higher among adults with acne compared with matched – controls [68].

2. Digital analysis of the face (VISIA evaluation)

Canfield VISIA Complexion Analysis System (Fairfield, NJ) is a multispectral digital analysis system that performs an in depth analysis of the skin [18,77-79] and allows taking digital photographs and analysis of the characteristics of the facial skin in a non-invasive manner. The technology uses polarized light system called RBX® Technology, for as-

Table 1. Evaluation of PA load (percentile / score) before and after intervention

Patient / Age	Left view PT1 / ST1	Left view PT2 / ST2	Left view Δ P / Δ S	Frontal view PT1 / ST1	Frontal view PT2 / ST2	Frontal view Δ P / Δ S	Right view PT1 / ST1	Right view PT2 / ST2	Right view Δ P / Δ S
1/ 32	11 / 3,461	14 / 2,754	27,27 / -20,42	5 / 4,794	8 / 3,635	60 / -24,17	11 / 3,407	13 / 2,990	18,18 / -12,23
7 / 24	13 / 2,992	96 / 0,074	638,48 / -97,52	9 / 3,143	94 / 0,103	944 / -96,98	13 / 2,987	96 / 0,065	638 / -97,82
10 / 31	42 / 1,039	94 / 0,099	123,80 / -90,47	49 / 0,836	96 / 0,080	95,91 / -92	40 / 1,110	96 / 0,080	140 / -92,79
12 / 44	14 / 2,672	32 / 1,332	128,57 / -50,14	8 / 3,685	13 / 2,819	62,5 / -23,5	22 / 1,828	26 / 1,658	18,18 / -9,2
15 / 23	3 / 8,627	27 / 1,587	800 / -81,60	3 / 6,666	38 / 1,123	1166 / -83,16	3 / 8,149	21 / 1,982	600 / -75,67
18 / 27	13 / 3,044	36 / 1,260	176,92 / -58,60	9 / 3,498	24 / 1,627	166,66 / -49,25	11 / 3,350	27 / 1,622	145 / -51,58

Legend: PT1 = percentile T1, PT2 = percentile T2, ST1 = score T1, ST2 = score T2

sessing changes in epidermal and dermal level, and a lamp emitting in the ultraviolet spectrum (UV light lamp), and analysis of the photos is done by the integrated software [18, 80-82].

The VISIA technology (VISIA - Canfield Imaging Systems, Fairfield, NJ) was used for computerized analysis of facial wrinkles in terms of density and depth [79] or for general assessment for skin tone and number of wrinkles [83], while other authors [84] describe VISIA system applicability in evaluating treatments for wrinkles type fractional photothermolysis .

The quantification of parameters, conducted by the integrated software, is percentile [85] (compared with people of the same age / sex / phototype), feature counts (no size or intensity parameter) and absolute score - evaluated the impact parameter (total size and intensity parameter).

SPOT - standard shooting - are red / brown lesions, which include freckles, acne scarring, hyperpigmentation lesions and vascular lesions. PORES - standard shooting - are circular openings in surface of sweat glands. WRINKLES - standard shooting - are cutaneous skin changes that are favored by sun exposure, and are associated with decreased skin elasticity. TEXTURE - standard shooting - is a primary analysis element of the skin and its fineness. UV SPOT - ultraviolet shooting - is induced by exposure to UV radiation and occur when the skin melanin aggregates below the surface as a result of the negative effects associated with exposure to sunlight. UV spot are invisible to normal exam and selective absorption by melanin UV helps detect these spots using VISIA. By evaluating these changes caused by UV radiation and sun exposure can estimate the lifetime risk of developing skin cancer. PORPHYRINS - shooting ultraviolet - are substances produced by the bacteria involved in the occurrence of acne and remain in the pores. Porphyrins are an accurate indicator of the load with Propionibacterium acnes, the bacterium involved in the development process of acne. RED AREAS - shooting RBX - allow the identification of areas of red, representing blood or hemoglobin. The vascular changes are pointed towards some type of vascular structures (spider veins or broken capillaries), rosacea or acne. BROWN SPOT - shooting RBX- are the result of concentration of melanin in the skin or subcutaneous level, and represent various forms of hyperpigmentation resulting from exposure to sunlight or melasma.

Using VISIA computer analysis for rosacea was presented in (18), also the use of VISIA for assessment and monitoring to individualization of treatment in patients with acne was mentioned in other papers [14,86,87].

3. Evaluation of Propionibacterium acnes bacterial load with digital technology before and after using a cleansing agent (pirocton olamine and white ihtiol)

Material and methods: we use for evaluation of Propionibacterium acnes load VISIA technology, by assessment the porphyrins (which is normally produced by P acnes and can be visualized by using Wood lamp or UV flash). We include 20 women, mean age 29,1 years, minimum = 23 years and maximum = 44 years. The evaluation was made at T1 (before intervention) and T2 (after 3-4 weeks) and using for cleansing an agent with piroctone

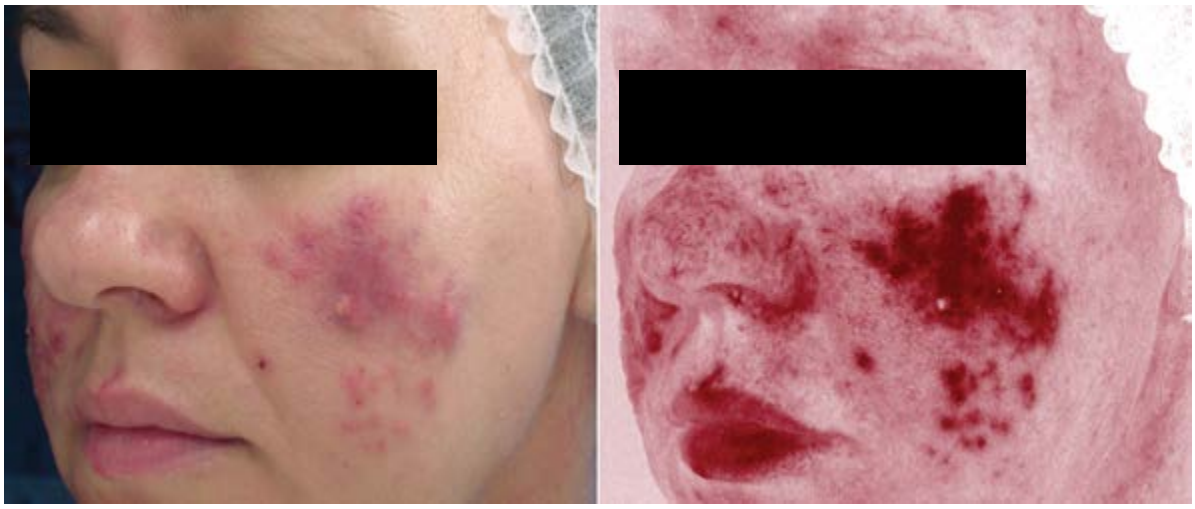

Figure 4. Patient 17 (rosacea, 43 years). Comparation spot and red areas - Personal archive of Victor Gabriel Clatici

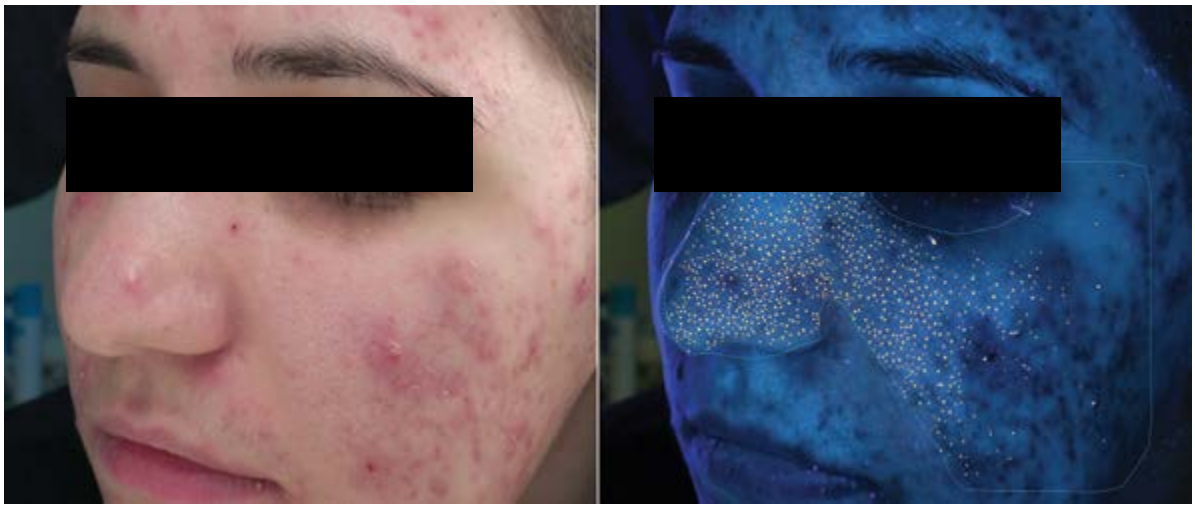

Figure 5. Patient 4 (acne, 23 years). Comparation spot and porphyrins - Personal archive of Victor Gabriel Clatici

olamine and white ihtiol (morning and evening, and allowing 3-5 minutes for action on the face). We use 2 parameters, percentiles (the higher, the better) and scores (the lower, the better).

The patients was instructed to use sunscreen products, in diet [4,9] was forbidden milk and dairy, food with high glycemic index, and the patients don't received any kind of treatment which can reduce the P acnes level (topical and / or systemic antibiotics or laser treatment).

The efficiency was evaluated trough the evolution of percentiles and scores: Δ P = Δ percentile = (PT2-PT1/ PT1) X 100 and Δ S = Δ score = (ST2-ST1/ST1) X100. The better evolution was defined as Δ P positive (the bigger, the better) and Δ S negative (the lower, the better). Patients did not present any notable adverse events.

The results for 6 patients are showed in Table 1.

Left view (LV) – for left cheek:

Mean percentile T1 = 17 / Mean score T1 = 3,8721 / Minimum T1 (percentile / score) = 3(15) / 1,039(10) / Maximum T1 (percentile / score) = 42 (10) / 8,627 (15).

Mean percentile T2 = 50,32 / Mean score T2 = 1,1927 / Minimum T2 (percentile / score) =14(1) / 0,074(7) / Maximum T2 (percentile / score)= 96 (7) / 2,754 (1)

Δ percentile (mean) = 196 / Minimum = 27,27 (1) / Maximum = 800 (15)

Δ score (mean) = - 69,19 / Minimum = -20,42(1)/ Maximum = -97,52(7).

Frontal view (FV) – include the forehead:

Mean percentile T1 = 12,87 / Mean score T1 = 3,963 / Minimum T1 (percentile / score) =3 (15)/ 0,836 (10) / Maximum T1 (percentile / score)=49 (10) / 6,6666 (15)

Mean percentile T2 = 46,9 / Mean score T2 = 1,4731 / Minimum T2 (percentile / score) = 8 (1) / 0,080 (10) / Maximum T2 (percentile / score) = 96 (10) / 3,635(1)

Δ percentile (mean) = 264,41 / Minimum = 60(1)/ Maximum = 1166(15)

Δ score (mean) = -61,67 / Minimum = -24,17 (1) / Maximum = -96,98 (7).

Right view (RV) – for right cheek:

Mean percentile T1 = 15,8 / Mean score T1 = 3,5832 / Minimum T1 (percentile / score) = 3(15)

Table 2. ROSACEA (percentile)

Patient/ age	Left view				Frontal view				Right view			
	Spot	UV spot	Red areas	Prf.	Spot	UV spot	Red areas	Prf.	Spot	UV spot	Red areas	Prf.
1 / 36	49	42	42	17	51	43	45	11	70	45	29	20
4 / 36	62	45	69	73	63	45	69	81	63	45	47	83
9 / 37	29	24	32	70	26	38	51	56	34	27	26	67
10 / 38	34	64	70	34	45	69	87	20	21	62	67	24
12 /26	33	58	56	51	29	67	69	42	33	58	56	51
14 /36	46	63	51	18	42	56	57	11	64	58	51	17
16/32	76	47	30	11	62	47	49	9	81	52	40	8
17 / 43	11	71	88	20	13	69	87	5	13	64	91	13
18 / 31	32	43	56	46	45	51	60	39	43	46	54	66
20 / 33	33	46	52	68	42	48	45	68	43	49	42	70
Mean 35,2	41,2	50,9	56,3	40,9	42,1	52,9	62,5	35,2	45,5	51,5	50,9	42,3
Min. 26	11 (17)	24(9)	30(16)	11 (16)	13 (17)	38(9)	45(20)	5 (17)	13 (17)	27(9)	26(9)	8(16)
Max.43	76 (16)	71 (17)	88 (17)	73 (4)	63(4)	69(17)	87(17)	81(4)	81 (16)	64 (17)	91(17)	83(4)

Table 3. ROSACEA (scores)

Patient/ age	Left view				Frontal view				Right view			
	Spot	UV spot	Red areas	Prf.	Spot	UV spot	Red areas	Prf.	Spot	UV spot	Red areas	Prf.
1 / 36	2,907	15,093	4,451	2,383	2,948	14,077	4,794	3,110	2,019	14,614	5,714	2,021
4 / 36	2,327	14,772	2,584	0,440	2,420	13,692	2,895	0,297	2,289	14,819	4,118	0,277
9 / 37	3,856	19,375	5,518	0,475	4,168	15,274	4,348	0,661	3,559	18,302	6,224	0,522
10 / 38	3,593	11,491	2,606	1,293	3,291	9,826	1,597	1,887	4,398	11,756	2,774	1,782
12 /26	3,168	9,827	2,975	0,824	3,601	7,689	2,487	0,969	3,168	9,827	2,795	0,824
14 /36	2,993	11,352	3,924	2,160	3,334	11,985	3,873	2,953	2,308	12,377	3,844	2,442
16/32	1,695	13,317	5,356	3,169	2,387	12,606	4,324	3,456	1,545	12,451	4,487	3,957
17 / 43	5,733	10,474	1,311	2,107	5,609	10,128	1,638	5,907	5,427	11,895	1,083	2,878
18 / 31	3,474	13,796	3,314	0,950	3,004	11,579	3,426	1,054	2,961	13,327	3,466	0,542
20 / 33	3,572	14,023	3,410	0,673	2,791	12,071	3,841	0,403	2,872	12,497	3,823	0,541
Mean 35,2	3,3871	13,473	3,5781	1,4571	3,4673	11,9123	3,3451	2,0984	3,0673	13,2783	3,7903	1,6103
Min. 26	1,695 (16)	9,827 (12)	1,311 (17)	0,440 (4)	2,387 (16)	7,689 (12)	1,638 (17)	0,297 (4)	1,545 (16)	9,827 (12)	1,083 (17)	0,277 (4)
Max. 43	5,733 (17)	19,375 (9)	5,518 (9)	3,169 (16)	5,609 (17)	15,274 (9)	4,794 (1)	5,907 (17)	5,427 (17)	18,302 (9)	6,224 (9)	3,957 (16)

Table 4. ACNE (percentile)

Patient/ age	Left view				Frontal view				Right view			
	Spot	UV spot	Red areas	Prf.	Spot	UV spot	Red areas	Prf.	Spot	UV spot	Red areas	Prf.
1/40	26	62	62	36	30	62	66	30	45	69	47	24
4/23	5	33	32	5	5	34	45	8	3	42	38	7
7/18	20	32	30	11	26	36	39	14	24	40	36	15
9/18	5	32	39	67	9	34	56	54	7	34	36	51
10/44	39	70	87	97	42	81	94	96	38	73	78	97
13/29	5	43	33	21	13	43	39	14	7	54	38	29
15/19	11	24	47	2	11	27	60	11	14	29	46	2
18/31	5	42	34	42	11	56	49	49	8	43	36	40
20/29	66	56	66	20	49	51	67	7	54	58	70	27
21/24	32	54	49	29	18	56	54	24	34	56	45	27
24/23	32	69	29	32	42	62	58	29	18	60	39	26
25 /23	27	51	40	17	40	54	56	20	26	45	36	14
28/27	39	42	39	27	45	57	47	20	39	42	39	27
29/36	27	49	40	8	26	47	45	5	29	39	45	9
30 / 32	45	51	54	7	66	66	63	13	40	52	58	7
Mean 26,82	25,2	47,8	46,2	27,5	27,9	50,5	54,9	26,7	25,2	49,61	44,9	26,9
Min18	5 (13)	24 (15)	29 (21)	2 (15)	5 (4)	27 (27)	39 (13)	5 (29)	3 (4)	29 (15)	36 (18)	2 (15)
Max 44	66 (20)	70 (10)	87 (10)	97 (10)	66 (30)	81 (10)	94 (10)	96 (10)	54 (20)	73 (10)	78 (10)	97 (10)

/ 1,110 (10)/ Maximum T1 (percentile / score)= 40(10) / 8,149 (15)

Mean percentile T2 = 44,3 / Mean score T2 = 1,4821 / Minimum T2 (percentile / score) =13 (1) / 0,065 (7) / Maximum T2 (percentile / score)= 96 (7,10) / 2,990 (1)

Δ percentile (mean) = 180,37 / Minimum = 18,18 (1) / Maximum = 638 (7)

Δ score (mean) = -58,63 / Minimum = -9,2 (12) / Maximum = -97,82 (7).

4. Initial digital evaluation of patients with acne and rosacea in order to improve the case management

Material and methods: we use for initial evaluation of patients with acne and rosacea VISIA technology, by assessment the spot (standard shooting), UV spot (UV shooting), red areas (RBX shooting) and porphyrins (UV shooting).

We include 20 women with rosacea, mean age 35,2 years, minimum = 26 years and maximum = 43 years, and 30 women with acne, mean age = 26,8 years, minimum = 18 years and maximum = 44 years. We use 2 parameters, percentiles and scores. The results for 10 patients with rosacea are patients are showed in Table 2 and 3, and the results for 15 patients with acne are showed in Table 4 and 5.

5. Discussion

5.1. Propionibacterium acnes is a germ with multiple connections in medicine, including dermatology. P acnes represent an important target of

Table 5. ACNE (score)

Patient/ age	Left view				Frontal view				Right view			
	Spot	UV spot	Red areas	Prf.	Spot	UV spot	Red areas	Prf.	Spot	UV spot	Red areas	Prf.
1/40	4,085	12,490	3,275	1,230	4,102	11,841	3,394	1,342	3,185	10,921	4,324	1,776
4/23	5,920	13,716	4,683	5,944	6,806	12,648	4,024	3,943	7,069	12,292	4,109	4,535
7/18	3,587	12,601	4,472	3,372	3,431	11,439	4,185	2,559	3,383	11,233	3,969	2,654
9/18	5,431	12,268	3,587	0,536	4,834	11,058	2,888	0,735	5,002	11,827	3,960	0,825
10/44	3,574	11,432	1,606	0,049	3,661	8,401	0,872	0,067	3,651	10,807	2,273	0,032
13/29	6,148	13,153	4,795	1,971	4,931	12,287	4,847	2,470	5,565	11,132	4,488	1,539
15/19	5,136	9,263	3,447	2,006	5,180	7,820	3,114	1,307	4,756	7,917	3,523	2,192
18/31	6,559	13,762	4,853	1,039	5,473	10,704	4,250	0,836	5,609	13,660	4,729	1,110
20/29	2,029	10,839	2,542	2,158	2,803	11,250	2,721	4,324	2,420	10,472	2,236	1,602
21/24	3,184	10,184	3,280	1,507	4,194	9,188	3,463	1,662	3,041	9,612	3,631	1,626
24/23	3,077	7,366	4,889	1,391	2,870	8,056	3,049	1,449	3,927	8,886	3,963	1,709
25 /23	3,345	10,239	3,869	2,346	2,910	9,337	3,153	1,883	3,424	11,515	4,311	2,660
28/27	2,919	12,838	4,197	1,604	2,894	9,582	4,044	1,935	2,919	12,838	4,197	1,604
29/36	3,905	11,906	4,646	4,034	4,218	13,383	4,885	5,356	3,823	15,699	4,218	3,754
30 / 32	2,907	12,543	3,484	4,390	2,169	9,075	3,134	2,655	3,079	12,175	3,135	4,547
Mean 26,82	4,1903	11,6702	3,8214	2,2415	4,1283	10,7241	3,4823	2,1891	4,0615	11,3825	3,8241	2,1612
Min18	2,029 (10)	9,263 (15)	1,606 (10)	0,049 (10)	2,169 (30)	7,820 (27)	0,872 (10)	0,067 (10)	2,420 (20)	7,917 (15)	2,236 (20)	0,032 (10)
Max 44	6,559 (13)	13,762 (18)	4,889 (21)	4,390 (30)	6,806 (4)	13,383 (29)	4,885 (29)	5,356 (29)	7,069 (4)	15,699 (29)	4,729 (18)	4,547 (30)

treatment in acne and in the last decades a lot of concerns exist about the P acnes resistance to antibiotics and the possibility to transfer the resistance to other species.

The level of P acnes depends on many factors, including sebum, diet, skin care (with emphasis on cleansing agents), local treatment and systemic treatment, and laser treatment.

A lot of literature underlined the link between the efficacy of treatment in acne and the reduction of P Acnes levels in the skin, but the treatment must not induce antibiotic resistance.

The use of cleansing agent against P acnes (like piroctone olamine combined with white ihtiol) is good in acne management but must be associated with other therapies (topical retinoid, BPO, topical and/or systemic antibiotic) in order to reduce the bacterial load, improve the acne and don't allow the selection of P acnes clones resistant to antibiotic.

About the results, globally the lower response was in patient1 (32 years) with next results : for left view Δ percentile 27,27 and Δ score - 20,42, frontal view Δ percentile 60 and Δ score -24,17, and for right view Δ percentile 18,18 and Δ score -12,23.

A dramatically response was note on patient 15 (23 years) – figure 2: left view Δ percentile = 800 , frontal view Δ percentile = 1166 , and for right view Δ percentile = 600, and for patient 7 (24 years) – figure 3: left view Δ score = -97,52 , frontal view Δ score = -96,98 , and for right view Δ score = -97,82.

Possible explanations for these results are the age of the patients, the modalities of product use and/or other unknown factors. We must underline that the P acnes is not the only target of treatment in acne patients, but the best treatment strategy is based on combination (retinoid and/or antibiotic and/or BPO and/or azelaic acid etc.) and must permanently adapt the treatment to evolution and specific condition of the patient.

Antibiotic as mono-therapy (topic and /or systemic) should be discouraged because is a huge risk to select P acnes resistant to antibiotic and the duration of antibiotic therapy must be reduced at minimum possible.

Evaluation of P acnes load with non invasive technology allow as to have a quick and reproductible image of the face, and allow both personalized treatment (including skin care) and monitoring the evolution.

5.2 Rosacea and acne represent 2 of most important chronic conditions of the skin, with a big impact on patient's quality of life. One of the most important things is to individualize the treatment according to the specific needs of the patients. In order to do this, we proposed a digital evaluation

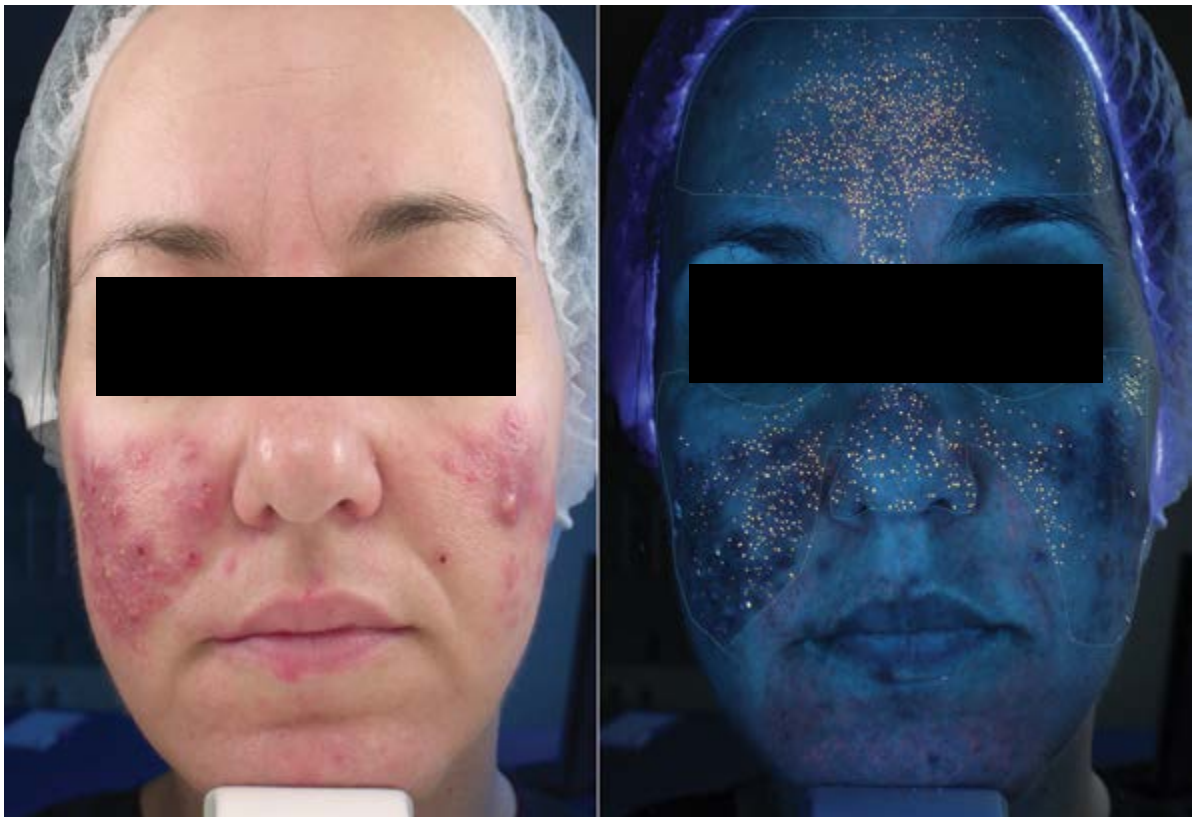

Figure 6. Comparation of spot and porphirines in a patient with rosacea (frontal view) - Personal archive of Victor Gabriel Clatici

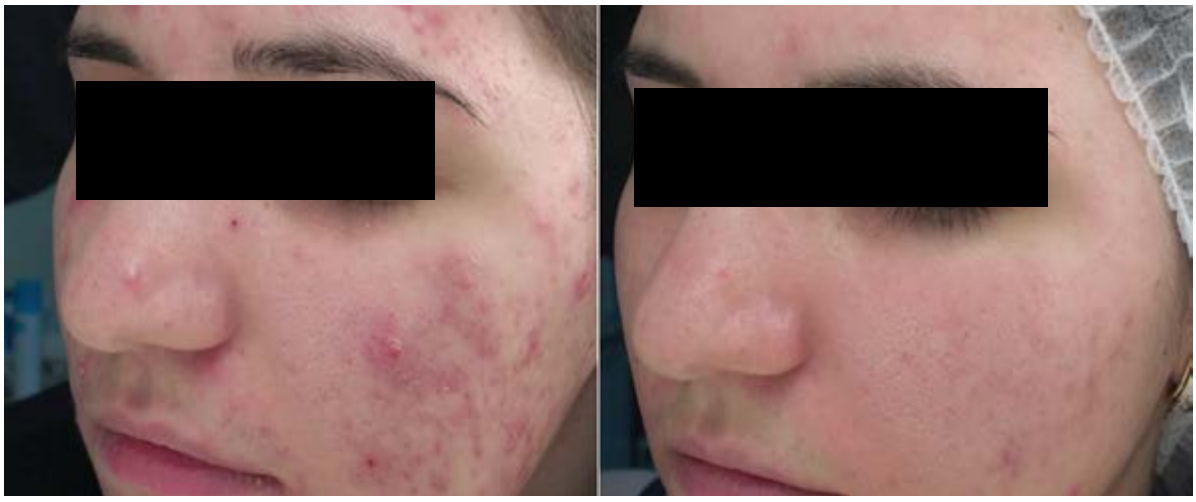

Figure 7. Digital evaluation for monitoring a patient with acne - Personal archive of Victor Gabriel Clatici

of the patient face with acne and rosacea, and focus on four features: spot, UV spot, red areas and porphyrins.

Regarding rosacea patients, we found an unexpected high values of porphyrins, especially in the FV (frontal view). A possible explanation could be

that, even if the forehead does not present many lesions in rosacea, it does have many pilosebaceous units, therefore it contains a high load of P Acnes – photo 6. Also, we found a high scores of UV spot which reflect the invisible damages on the skin due to ultraviolet exposure (and UV spot reflect life time exposure to UV). Regarding the correlations between different features we found a positive correlation UV spot / Red areas, and an inverse correlation Spot / Porphyrins and Red areas / Porphyrins.

About acne patients, we found a good correlations Spot / Porphyrins and an inverse correlation Red areas / Porphyrins. Also, we found high scores of UV spot and Red areas, and an unexpected mean scores of Red areas higher than mean scores of Porphyrins (the meaning of this feature is, at the moment, unknown).

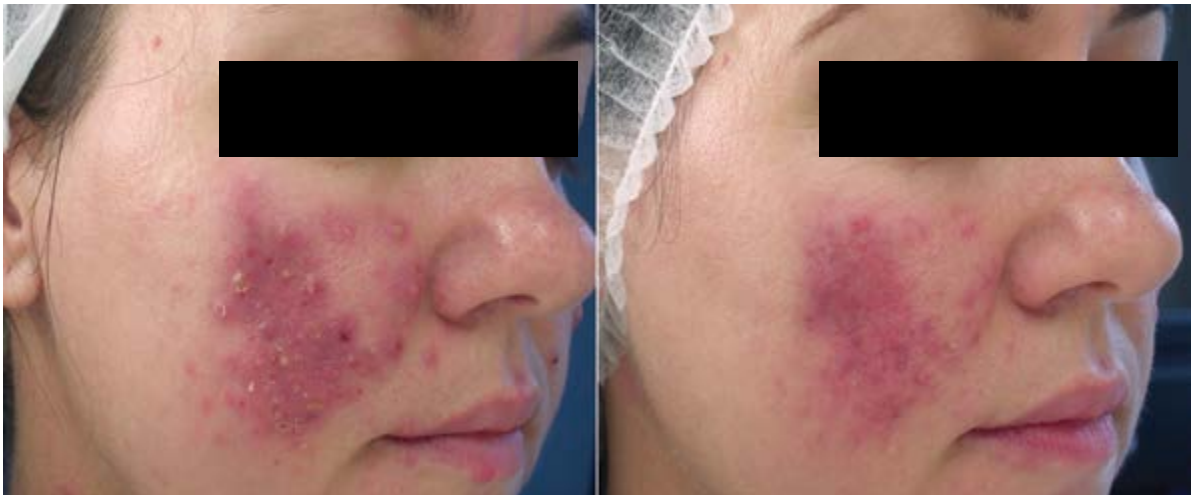

Figure 8. Digital evaluation for monitoring a patient with rosacea - Personal archive of Victor Gabriel Clatici

6. Conclusions

The digital evaluation of the patient with rosacea and acne is an important noninvasive tool both to first evaluation of the patient and for the monitoring of the treatment (photo 7, 8).

For the future, must set up new studies with a big number of patients to correlate age / skin parameters (spot, UV spot, red areas, porphyrins) / other factors (smoking, sun exposure, associated diseases etc.).

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