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Quantitative Analysis of Digitopalmar Dermatoglyphics in Fifty Male Psoriatic Monoarthritis Patient

TO JEHOVAH

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Abstract

By the quantitative dermatoglyphic analysis, one the genetic method, we have made research 25 variable in number of epidermal ridge on palm and finger in fifty male psoriatic monoarthritis patient: on all ten finger, on five finger separately and their sum all together, between triradii a-b, b-c and c-d on both palm, their sum on one and both palm, atd angle on one and both hand and their sum all together in degree. Obtained were compared with control group of 200 healthy men from the Zagreb area, in Croatia. Statistically significant to control by the Student's t-test in 20 variable in the sense of increasing number of epidermal ridges on each of ten finger, their sum on five and all together, between triradii a-b both palm, in decreasing number of ridge between c-d triradii on both palm, and finally in increasing atd angle on both palm in degree. Accordingly a polygenetic system identical in some loci to polygenic system predisposing to male psoriatic mono-arthritis susceptibility, might be found responsible for a change dermatoglyphic pattern development simultaneously, because of their common ectodermal origin.

Keywords: psoriatic monoarthritis, separate subgroup of psoriatic arthritis, genetics, dermatoglyphics, quantitative dermatoglyphic analysis, males, prevention

1. Introduction

Psoriatic arthritis (PsA) is a rheumatologic disease, associated with psoriasis. Distinctive and diverse unmatched. There are a eleven or more sets of classification (diagnostic) criteria, which probably is not the case for any other disease (1). How approximatly 70% of psoriasis patient precedes the arthritis, and 15% occur simultaneously, the remainging 15% of the arthritis occurs before psoriasis, in the latter case, the diagnosis psoriatic arthritis without psoriasis is (psoriatic arthritis sine psoriasis). Jones, Armas et al, in their paper divided 100 PsA patient in six subgroups: 1. monoarthritis, 2. classical, (dystal phalangeal joint disease only), 3.oligoarthritis, 4. polyarthritis, 5. spondylitic type and 6. arthritis mutlians (2). It is just the same like we have did, to Moll and Wright, who divided psoriatic athritis in five, we added the sixth subgroup, just as Jones and Armas. Monoarthrits is a separate subgroup according to fifty female psoriatic monoarthritis patients of which we have publish an article (3). Now we presented, by the same genetic analysis, fifty male psoriatic monoarthritis, Picture 1-4 (second left metacarpophalageal, right knee, right ankle and fifth left metatarsophalangeal joint, from top to bottom (4). Monoarthritis joint appears because of processes occuring in any component structures around the joint, as well

as being refered from atraumatic pain monoarthritis at other sites (5). Inflammatory pain can be caused with microcrytals (gout) and (pseudogout), microroganisms (septic arthrits) and inflammatory rheumatic diseases (rheumatoid arthritis, reactive arthritis, spondyloarthritis). Mechanical pain can be caused by cartilage degeneration and asscociated bony reaction (osteoarthritis / osteoarthrosis) or by local effets on ligaments, tendons and bursae (6).

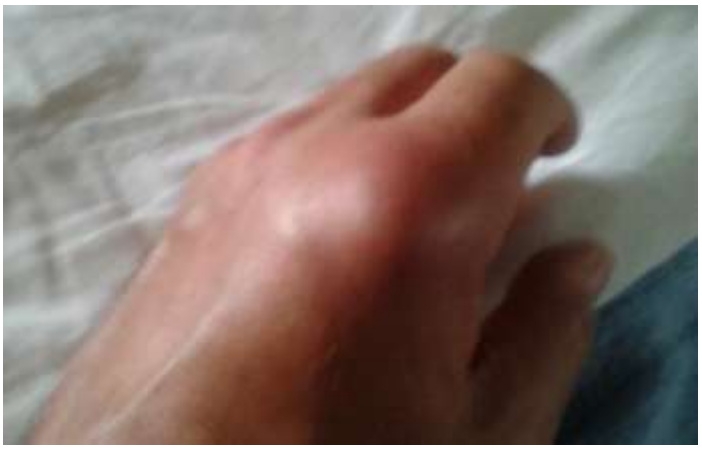
2. Methodology

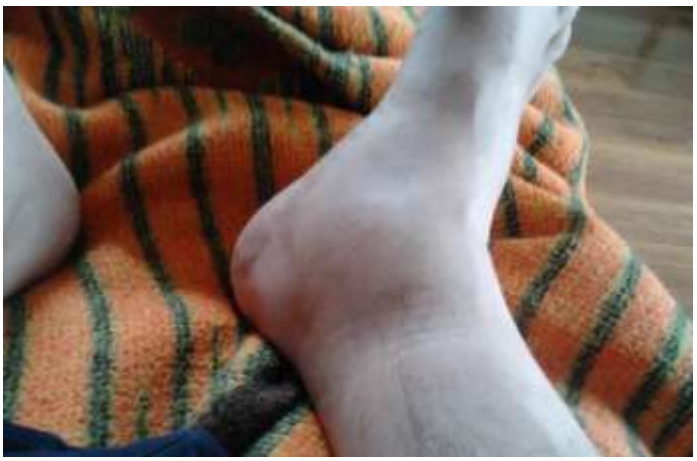
Dermograms of fifty male psoriatic monoarthritis patient were analysed according to Taylor classification (diagnostic) criteria (7). Quantitative analysis has conducted in keeping with instructions by Miličić, Rudan, Schmutzer, et al (8). Results were compared with 200 phenotypically normal men from the Zagreb area, obtained from the Zagreb Anthropology Institute in Croatia (9). Palmar and finger prints were taken by HSW finelly granulated, silver-gray powder used in criminalistics, onto transparent, adhesive tape by a brush made of squirrel tail (10). Dermatoglyphic analysis should be strictly separated according to sex, because of the great impact of sex choromosome and sex hormones on dermatoglyphic traits (11, 12). Even significant sex differences have been found within control group (9). Student's t-test was used to test statistically significant difference group. The following 25 traits were examined by the quantitative dermatoglyphic analysis, as it shown on Picture 5 and tables 1-3, in the ridge count between the patient and control.

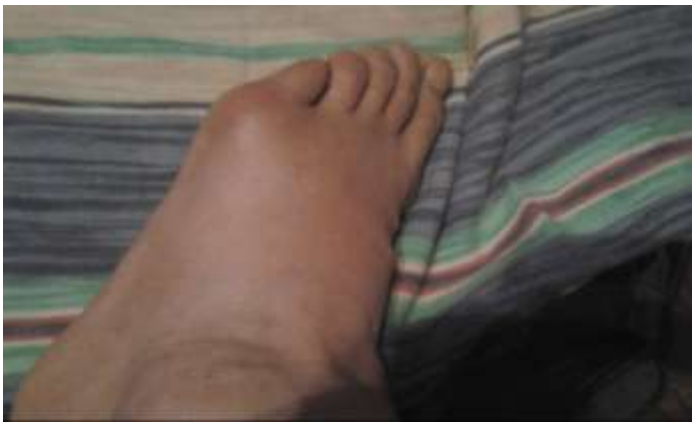
1. FRD1 ridge count on the first finger of the right hand, **2. FRD2** ridge count on the second finger of the right hand, **3. FRD3** ridge count on the third finger of the right hand, **4. FRD4.** ridge count on the fourth finger of the right hand, **5. FRD5** ridge count on the fifth finger of the right hand, **6. TFRCD** total ridge count on the the all five fingers of the right hand, **7. a-b rcD** ridge count between triradii a-b of the right hand, **8. b-c. rcD** ridge count between triradii b-c of the right hand, **9. c-d rcD** ridge count between triradii c-d of the right hand.**10. TPRCD** ridge count between a-b triradii of the right hand, a-b, b-c and c-d all together,**11. AtdD** angle on the right palm in degrees.**12. FRL1.** ridge count on the first finger the left hand, **13. FRL2.** ridge count on the second finger the left hand, **14. FRL3** ridge count of the third finger the left hand **15. FRL4** ridge count on the fourth finger the left hand, **16. FRL5** ridge count on the fifth finger the left hand, **17. TFRCL** ridge count on all five fingers left hand, **18. a-b rcL** ridge count between triradii a-b the left hand, **19. b-c rcL** ridge count between triradii b-c the left hand, **20. c-d rcL** ridge count between triradii c-d the left hand, **21. TPRL** ridge count between triradii a-b, b-c, c-d all together, the left palm, **22. Atd L** angle on the left palm in degree. **23. TFRC** total ridge count on on all ten finger on both hand, **24. TPRC** bilateral ridge count between all triradii a-b, c-d and c-d on the palm, **25. ATDDL** bilateral sum of atd angles in degree.

3. Results

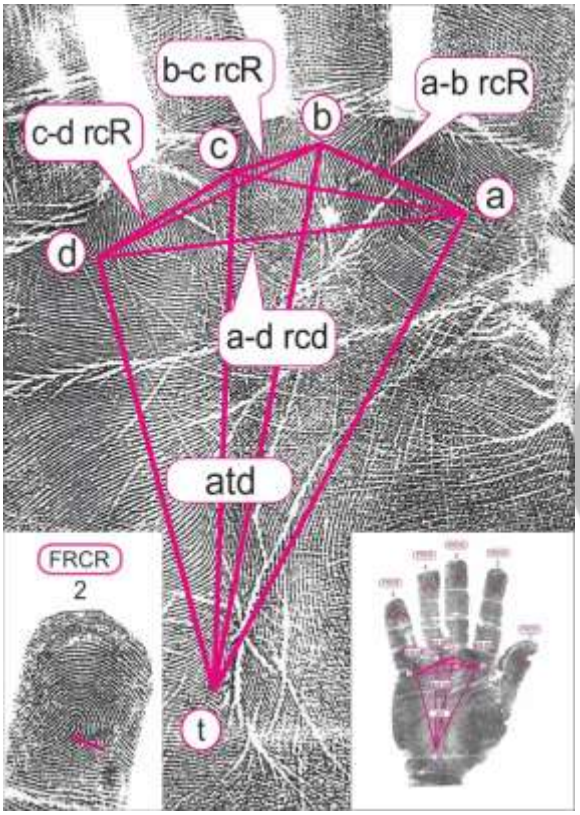
Results are tabularly presented in Tables 1-3.







Picture 1-4



Picture 5

The areas of quantitative analysis on palm and finger dermatoglyphics

Statistically siginificant differences to control by the Student's t-test were found in 20 variables, in the sense of increasing number of epidermal ridge on the finger, right hand nine: first, second, third, fourth and fifth, then on all five finger, between triradii a-b, c-d (decreasing number) and atd variable all at the risk level 0,000, what is presented by FRD1, FRD2, FRD3, FRD4, FRD5, TFRC, a-b rcD, c-d rcD and Atd D respectively in Table 1. Further, on the left hand nine: first, second, third, fourth and fifth, then on all five finger, between triradii a-b, c-d (decreas ed) and Atd L angle, all at risk level 0,000, what is presented by FRL1, FRL2, FRL3, FRL4, FRL5, TFRCL, a-b rcL, c-d and Atd L angle, all at risk level 0,000, what is presented in Table 2. Then, ridge count on both hand finger, and both Atd palm angles were statistically significant at risk level 0,000 too, what is presented by TPRC and ATDDL variables respectively in Table 3.

4. Discussion

There is no any research, to the best of our knowledge, of dermato- glyphics and (PsA), except ours (13-26). Another problem is diagnostic.

For example, **Algic form**, have described Vilanova and Pinol, 1951: Here it is worth while considering the so-called algic form of arthropathic psoriasis. We have catalogued 22 cases of this type of psoriasis. The pains were in these cases articular, muscular and neuralgic, in this same order of frequency. The first limited only to one or several joints with varied intensity, at time manifest only after a search in interrogation: others so pronounced that the patient must remain in bed and in the mayority of cases coinciding with psoriasis outbreaks, either

diffused or localized. These latter, persistent even rest, and aggravated by

Table 1. Quantitative properties of right hand digito-palmar dermatoglyphics in patients and controls

Variable	Patient group			Control Group			Risk
	n	x	SD	n	x	SD	p
FRD1	50	22,68	5,80	200	19,38	5,63	0,000
FRD2	50	15,24	6,34	200	11,42	7,27	0,000
FRD3	50	16,04	4,17	200	11,99	6,58	0,000
FRD4	50	19,88	5,15	200	16,16	6,15	0,000
FRD5	50	17.08	4,38	200	13,64	5,16	0,000
TFRCD	50	90,92	17,02	200	72,57	24,7	0,000
a-b rcD	50	43,18	6,37	194	37,94	6,07	0,000
b-c rcD	50	29,02	7,05	200	28,58	5,87	0,591
c-d rcD	50	36,88	7,51	200	41,85	6,86	0,000
TPRCD	50	109,0	15,8	194	108,4	13,3	0,723
Atd D	50	42,66	4,86	200	47,43	8,27	0,000

Table 2. Quantitative properties of left hand digitopalmar dermatoglyphics in patients and controls

Variable	Patient group			Control group			Risk
	n	x	SD	n	x	SD	p
FRL1	50	19,96	6,17	200	16,20	6,14	0,000
FRL2	50	14.94	5,78	200	10,76	6,78	0,000
FRL3	50	16,78	3,71	200	11,78	6,37	0,000
FRL4	50	19,52	4,61	200	16,25	6,17	0,000
FRL5	50	16,96	2,73	200	13,50	4,60	0,000
TFRCL	50	88,16	14,33	200	68,47	23,9	0,000
a-b rcL	50	43,22	6,11	194	36,60	7,00	0,000
b-c rcL	50	28,56	6,57	200	28,71	5,85	0,965
c-d rcL	50	36,52	7,06	200	43,58	7,05	0,000
TPR cL	50	108,5	16,64	194	109,0	14,8	0,948

Variable	Patient group			Control group			Risk
	n	x	SD	n	x	SD	p
Atd L	50	42,80	4,67	200	47,86	7,70	0,000

Table 3. Quantitative properties of digitopalmar complex both hand in patients and controls

Variable	Patient group			Control group			Risk
	n	x	SD	n	x	SD	p
TFRC	50	179,1	30,25	200	141,0	47,4	0,000
TPRC	50	217,6	31,01	200	217,1	27,2	0,984
ATDDL	50	85,46	8,13	200	95,28	14,3	0,000

atmospheric changes, are more troublesome during the early morning and are at times accompanied by very slight articular swelling. They may be located in the large joint and in some caeses precisely in the disatal phalanges" (27). Excellent description until today, which in the most cases, for rheumatologist is simple osteoarthritis because of neat inflammatory parameters, but no neat patient's pains at all. Indomethacin up to maximal daily dose 200 mg (100 mg fits to 5 mg Decortin) could help with 2-3 intraarticular Triamcinolon a 40 mg (depot) injection per year (28). Next, the very interesting rermark has made Dafna Gladman, about connection psoriasis and psoriatic arthritis comment 2006, Tylor's CASPAR classification criteria: **The CASPAR are recognized to be sensitive and specific in both early and established psoriatic arthritis**. **The criteria are simple and easy to applay to data collected retrospectively. Moreover, using the criteria, it is possible to classify patients as having psoriatic arthrithis even when they do not have a current, past, or family history of psoriasis**" (29). But who is paying attention to it? It seems very small number of specialist. If you don't have psoriasis you have not psoriatic arthritis, their motto is. And what to do? Genetics is the answer, because who could whole epigenetic factors figure it out. The French rheumatologist Jean Roudier, on the web page of the first author title, Researchgate Discussion, asked the question: can HLA-typing help to diagnosis of (PsA)? It seems that is the only way to find out in doubtful cases (arthritis without visible psoriasis). That is vhy, like in the previous article, about 50 female psoriatic monoarthritis, we have made HLA typing loci in the sixth chromosome, Table 4. As it seen, seven time is present B13, and six B17 (B57) antigen. We have 50% knee affected patients. Psoriatic knee monoarthritis is very resistant for treatment, and it is necessssary start with Otezla (Apremilast), after dose for beginners, 2x30 mg daily spaced twelve hours, according to opinion of the first author (30).

Table 4. Psoriatic monoarthritis affected joint and HLA in

No	Sixth human chromosome	
	Patient's Joint	HLA loci
1	Left knee	A2, B5, **B17(B57), DR7**
2	Right knee	A3, A32, **B18**, B21
3	MCP III right hand	--
4	Right wrist	--
5	Left knee	A1, **B8, B13, Cw6, Cw7,** DR2, **DR7**
6	PIP III right hand	A1, **B18, B35,** DR52, DR5
7	Dactylitis II left hand	A9, Ax, **B16, B18**
8	Right knee	A2, B5, **B13,** DR5, **DR7**
9	Right clavicula	A1, A2, **B13, B17(B57)**
10	Left knee	**B13, Cw6**
11	PIP III right hand	Aw19, Ax, **B16, B18**
12	DIP III right hand	A1, Ax, **B8,** Bx
13	Right knee	A2, A9, B5, **B12**
14	PIP II left hand	Ax, A28, **B12, B13**
15	Right knee	A3, Ax, **B7, B27**
16	Left knee	A2, Ax, **B13,** Bx
17	Right knee	A2, B5, **B17(B57),** DR1, DR11, **DQ1,** DQ3
18	Left knee	A2, **B7, B13,** DR2, DR5
19	Right ankle	A3, **A26, Bw16, Bw18,** DR2
20	Right hip	A2,A11, **Bw35,** DR2, **DR4**
21	Right knee	A1, Ax, **B17(B57),** Bx
22	Right knee	--
23	PIP IV right hand	--
24	DIP right foot	A1, A3, **B17(B57),** B40
25	Right wrist	--
26	PIP III left hand	--
27	Left knee	A32, **B7, B38, DR4,** DR11
28	Right knee	--
29	Right sternoclavicular	--
30	Left knee	A2, **B35,** Cw4, DR3, DR12
31	Dactylitis II right hand	A3, A31, **B35, B39,** Cw4
32	Right knee	--
33	Left knee	--
34	Dactylitis IV right foot	--
35	Right knee	A2, A3, **B7,** Bx
36	Right knee	--
37	Right knee	--
38	Right knee	--
39	Left knee	--
40	DIP IV right hand	A2, Ax, **B12, B18,** DR2, DR5
41	Dactylitis II left foot	A1, Ax, **B17(B57),** B35
42	MCP left hand	--
43	Right knee	--
44	PIP II right hand	--
45	Right knee	A2, A26, **B8, DR4,** DR11
46	Left knee	--
47	MCP II left hand	--
48	Right wrist	--
49	Dactylitis II right hand	A3, Ax, **B12, B39,** DR5
50	Right wrist	A3, A28, **B16,** Bx

Abrreviations:

PIP proximal interphalangeal joint,

MTP metacarpophalangeal joint,

Dactylitis whole digit, but reckon as one joint

In the last research in 731 psoriatic arthritis patients (385 male and 346 female), in males HLA typing, we have found HLA B27 antigen in 106 (31,02%), B8 in 73 (21,1%), B13 in 48 (14,1%), B17(B57) in 31 (9,3%), DR4 in 37 ((11,1%), DR7 in 68 (21%), B38 in 22 (18,07 %) In females, B27 antigen has found in 62 (19%), B8 in 53 (16,4%), B13 in 40 (12,4%), B17(B57) in 53 (16,4%), DR4 in 48 (14,8%), DR7 in 68 (21%), B38 in 22 (7%), (31). The next interesting chromosome is the fourth, at the picture 6. It is not possible to typing loci routinely at this moment in this parts. But it is known, that Wolf Hirschhorn syndrome, part of fourth chromosome is deleted due to abnormally cells division during reproduction (unpublished first author case report), 4p16.3 is in (32), rheumatoid arthritis 4p15 (RBPJ gene) (33), complex regional pain syndrome type I and II is in locus 4p12, very often in connection with PsA due trauma (34), 4q21 for ankylosing spondylitis (35), SMARCAD1 gene 4p22-23, cardinal gene which deletes dermatoglyphic drawings on surface palms, soles and fingers (adermatoglyphia), what might be important to dermatoglyphic research in the future (36), PsA locus in choromosome 4q27 harbours the IL2 and IL21 genes (37). Then, 4q 28-q31 for in psoriasis (38), 4q34 for primary hypertrophic osteoarthropathy (39). In his doctoral thesis (1), in five hundred subjects (360 psoriatic arthritis patient, 130 male, and 130 female), 140 psoriatcs (70 male and 70 female and 100 relatives, parents, brothers and sisters), by dermatoglypic research, both quantitative and qualitative analysis, the first author has found that there are two groups of psoriatic arthritis, Type I and Type 2. In the first Type are three subgroup: polyarticular (rheumatoid like), oligoarticular and spondylitic, and to second Type belong classical and mutilans subgroup. Namely, in the number of epidermal ridges, there is statistically significant difference between two types, first lower and in second increased number of epidermal ridges. It seems the psoriatic monoarthritis is the separate, the sixth, additionaly to Moll and Wright five, according to mentioned genetic research. Because of increased number of epidermal ridges, psoriatic monoarthritis belongs to Type II of psoriatic arthritis. Additionaly, it seems, that psoriasis Type I (earlier appearance in life) correspondence to psoriatic arthritis Type I, (polyarticular, oligoarticular and spondylitic subgorup), and psoriasis Type II (later appearance in life) to psoriatic arthritis Type II. In additon there is statistically significant difference between hyperuricaemia in psoriatic monoarthritis and the genuine gout patient (40). Namely, we have found in 20 of the first group decreasing number of epidermal ridges in five out 22 variables to control group: on the second finger both hand FRD2, FRL2, and total ridge count on the one and both hand TFRCD, TFRCL, then both hand together TFRC. But, in a second group, 40 patients, all of five above mentioned variables were increasing in number of epidermal ridges to (unpublished data). That is why, the first group we have termed The sixth Jajić subgroup of psoriatic arthritis (**now the seventh**) (13). Because of decresasing number of epidermal ridges, belongs to the first group of above mentioned first author's findings. The next important thing is differential diagnostics to other rheumatological disease, between psoriatic and ankylosing spondylitis (14) psoriatic arthritis and Reiter syndrome, for example (15).

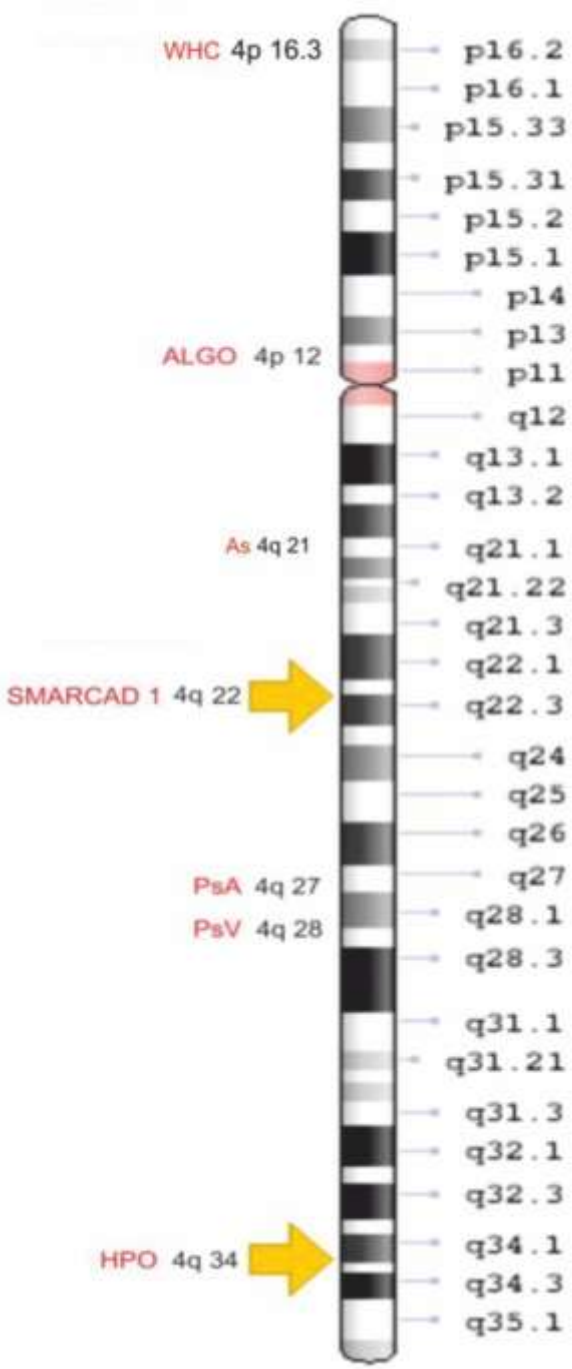
5. Conclusion

It seems that polygenic system, by a few main and greater number of modification genes responsible for intrauterine dermatoglyphics development (between seventh a twenty fifth week), is identical in some loci with polygenic system for liability to psoriatic monoarthrits male patient. That is quite possible to take a reading from dermatoglyphic drawings, because they have unchangeable traits for whole person life span. This very cheap genetic method may be used to diagnostic, preventive and even the prognostic purpose.

6. Ethics

There is not any danger for the patients from this kind of research, which is one of genetic method, is without any harmful consequence for sick persons. The procedure is in accordance with ethical standard in scientific research at Croatian Medical Association of Medical Ethic and deontolgy, and Helsinki Declaration of World Medical Association, Edinburg 2000.

The Fourth Chromosome



Picture 6

Genetic loci: Wolf Hirchhorn syndrome 4p16. (32), complex regional pain syndrome type I and II (algodystrophy) 4p-12 (34), ankylosing spondylitis 4q 4q21 (35), SMARCAD1, 4q22-23, deletes epidermal ridges (36), psoriatic arthritis 4q27 (37), psoriasis 4q28 (38), primary hypertrophic osteoarthropathy (39), in the fourth chromosome

7. **Conflicts of Interest**

There is no conflicts of interest among the authors.

8. Acknowledgments

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