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Detecting Genetically High Risk Individualy for Oral Submucosus Fibrosis Using Cheiloscopy And Minutiae as BIOINDICATOR

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ABSTRACT

The aim of the study was to identify the patterns of dermal palmer ridges and cheiloscopic pattern of patients suffering from the disease oral sub mucosal fibrosis. Thirty samples of the patients suffering from OSF were taken and compared with control. The palm prints were collected by kajal applicator by applying to the entire palm, including the wrist crease, the hypothenar border and digit. The lip Print was collected by Lip stick method. It was observed that six or more whorls in the finger print pattern were statistically significant among the cancer patients as compared to controls. The whorls in the right ring finger and right little finger were also found increased among the cases as compared to controls. The chelioscopy patterns between OSF patients and control shows mixed pattern as 67% of OSF and 20% of control in upper lip and 70% of OSF and 24% of control in lower lip.

Keywords : OSF, cheiloscopic, hypothenar

INTRODUCTION

DERMATOGLYPHICS

Dermatoglyphics (derma=skin) and glyphics (curve) is the scientific study of epidermal friction skin (ridges) present on the palm and the sole of human beings, great apes and also on the prehensile trail of some monkeys. Genetical studies of the dermatoglyphics especially of the finger pattern were started during 1920. The contributions of Singh (1960) and Roy Choudhary (1968) and the others are of much significance in Indian context. Finger prints are natural visible markers of the results of the thermodynamics process driving the early stages of human embryo forming [1]. Modern science has accumulated many results in genetic studies of heredity and their relations to finger print. The heredity mechanisms however, include both discrete processor i.e genetics and analogue process, namely biological or system influence. For example, identical twins have identical genetic code but differ in finger print [4].

Morphologies

Finger prints form by the friction ridges of the skin, which includes several layers, epidermis, dermis and hypodermis. Ridges are anatomically located over blood vessels and nerve fibres and the development of real skin crossing in complicated prom.

Minutiae

On careful analysis it is found that the epidermal ridges are present on the parallel lines. But it also has the number of irregularities of direction, discontinuities and branching of individual ridges [3]. This minute characteristic of the individual epidermal ridges are known as minutiae as per nomenclature given by Francis Galton (1892). The minutiae are very much variable and their size, shape, number, type, position are unique to the individuals. Following abbreviations are used to identify minutiae i.e. B for break, Cr for connecting ridge, Ir for incipient ridge, I for island, E for enclosure, F for fork, Sr for short ridges and R for ridges. In 1892 Galton divided the ridges pattern on the distal phalanges of the fingertip into three groups: arches, loops and whorls.

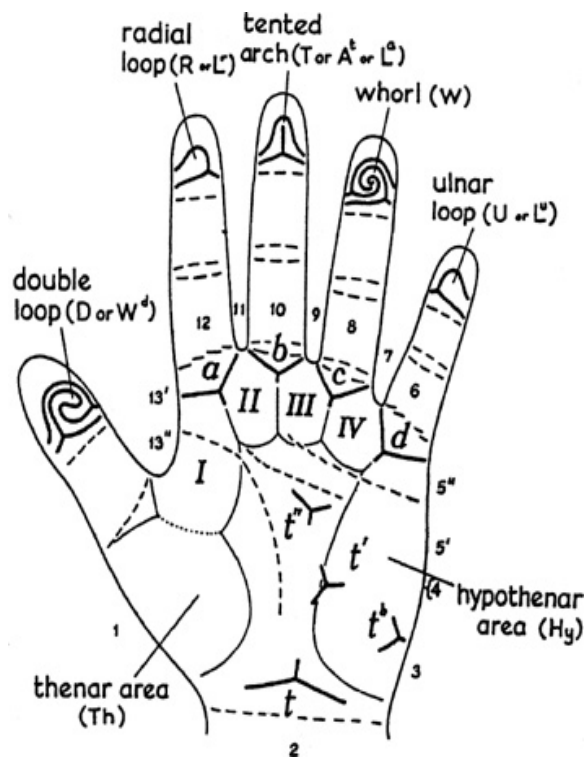


Figure 1: STANDARD FORM

CHELIOSCOPY

The study of the lip prints is called Chelioscopy [Greek: cheilo-lips skopen-probe and study] Fischer's 1902 was the first scientists to describe the biological phenomenon of a system of furrows on the human lips. The ventral mucosal is of prime importance for cheiloscopy study because this area forms print pattern [14]. Suzuki gave classification of lip prints based on the type of wrinkler or furrows which is universally accept-

ed. They are following as:

Type I: Vertical, comprising of complete [end to end] longitudinal fissures.

Type II: Comprises incomplete pattern of longitudinal fissures.

Type III: Branching, Y-shaped pattern.

Type IV: Criss cross pattern.

Type V: Reticular, typical fence like pattern.

ORAL SUBMUCOUS FIBROSIS

On the Indian subcontinent, the use of smokeless tobacco in various form is very popular. This habit which usually involve the chewing of a betel quid (combined areca nut, betel leaf, tobacco and slaked lime) has lead to the development in a large population of a unique generalized fibrosis of the oral soft tissue called oral mucosis fibrosis (OSF) (OSMF). Oral Submucous Fibrosis (OSF) is also a chronic, debilitating disease of oral cavity characterized by inflammation and progressive fibrosis of the submucosal tissues [9]. It results in marked rigidity and an eventual inability to open the mouth. The activity of lysyl oxidase is increased in fibroblast cultured from OSF patients [11]. Lysyl oxidase, an extracellular mettaloenzyme of copper secreted by fibroblast and initiate cross linking of collagen which makes it relatively resistant to digestion by mammalian collagenase [10]. Therefore, increased lysyl oxidase activity can result in collagen accumulations. The disease can be classified clinically into two phase,

1. An eruptive phase, characterized by formation of erythema, vesicles, ulceration and burning sensation in the mouth.
2. The fibrosis induction phase, characterized by the disappearance of the vesicles and healing of the ulcer by fibrosis [5]. The burning sensation decreases and branching and stiffness of the oral and oseopharyngeal mucosa occur.The two phase appear in a cyclic manner.

KARYOTYPE

A karyotype is the characteristic chromosome complement of an eukaryote species. The preparation and study of karyotypes is part of cytogenetics. Karyotypes are arranged with the short arm of the chromosome on top, and the long arm on the bottom. Some karyotypes call the short and long arms p and q, respectively. Karyotypes can be used for many purposes: such as, to study chromosomal aberrations, cellular function, taxonomic relationships, and to gather information about past evolutionary events [7]. Six different characteristics of karyotypes are usually observed and compared.

1. Differences in absolute sizes of chromosomes.
2. Differences in position of centromeres. This is brought about by translocations.
3. Differences in relative size of chromosomes can only be caused by segmental interchange of unequal lengths.
4. Differences in basic number of chromosomes may occur due to successive unequal translocations, which finally remove all essential genetic material from a chromosome, permitting loss without penalty to the organism. Humans have one pair fewer chromosomes than the great apes, but the genes have been mostly translocated to other chromosomes [6].
5. Differences in number and position of satellites, which (when they occur) are small bodies attached to a chromosome by a thin thread.
6. Differences in degree and distribution of heterochromatic regions. Heterochromatin stains darker than euchromatin, indicating tighter packing, mainly consists of genetically inactive repetitive DNA sequences [8].

MATERIALS AND METHODS

The study was conducted on thirty samples of the patients suffering from OSF. Their palm prints and lip prints were collected and one patients karyotyping was done and compare to the normal karyotype. The materials required for dermatoglyphics prints are Kajal (carbon source), A4 size data sheet and tissue paper.

Method of collecting Fingerprints

The Kajal applicator was used to cover the entire palm, including the wrist crease, the hypothenar border and digit. A sheet of paper was placed on top of the foam and rubber pad on a flat, stable surface. The foam is used to fill the concavity of the palm when pressure is applied to the back of the hand. Otherwise blank area or white space will appear in the centre of the palm. The person's wrist was placed on the bottom of the paper and then the rest of the palm was pressed onto the paper. The back of the palm is pressed firmly to make sure the center is printed. Gently each digit was pressed to make sure prints appear on the paper. The palmar prints were examined for landmarkers.

Method of collecting Lip Print

Lip Stick Method is widely used to collect the data from the volunteer patients and control. Lightly lipstick can be spread on the dry lips and press the lip on a clean slide and dry, this print can be preserved.

Method for Karyotype

The study of karyotypes is made by staining usually using a suitable dye, such as Giemsa which is applied after cells have been arrested during cell division by a solution of colchicine.

RESULTS AND DISCUSSION

In OSF Patients, the total variation in the left palm is 100%, the total variation in the right palm is 80%, comb minutiae present in the right palm = 40%, comb minutiae present in the left palm = 80%, loop present in the right palm = 23%, loop present in the left palm = 26%, the other variation like DLW in 10% and CPW is 3.3%. There was no variation in the right & left palm of control. The OSF patients has, 63% variation in the Thenar crease of right palm, 57% variation in the Thenar crease in left palm, 63% variation in the proximal crease in right hand, 63% variation in the proximal crease in left hand, 87% variation in the Distal crease in right hand,83% variation in the Distal crease in left hand. In control, 13% variation in Thenar crease of right palm ,13% variation in the Thenar crease of left palm, 43% variation in the proximal crease of right palm, 57% variation in the proximal crease of right palm, 40% variation in the Distal crease of right palm,47% variation in the distal crease of left palm. In comparative percentage of most varied Cheliosco-py patterns between OSF patients and control are, 67% of OSF and 20% of control, shows mixed pattern in upper lip; 70% and 24% showed mixed pattern in lower lip. 0% of OSF patients and 37% of control shows vertical long pattern in upper lip and 0% of OSF and 63% of control showed vertical long pattern in lower lip. The karyotype of the OSF patient did not show any abnormalities like deletion, fragile site, addition etc.

The related tables and graphs are follow as-

CONCLUSION

The observation suggests that six or more whorls in the finger print pattern were statistically significant among the cancer patients as compared to controls. It was also seen that whorls in the right ring finger and right little finger were found increased among the cases as compared to controls. The differences between mean pattern intensity index of cases and controls were found to be statistically significant. Hence, the specific pattern is recorded in both our study and so it can be used as bioindicator for the genetic counseling to reduce the high risk factor of OSF.

		TC	PC	DC	a	b	c	d	t	atd	TH	PF	MF	RF	LF	Hypothenar	Thenar
OSF PATIENTS	1	N	N	V	N	N	N	N	V	67	DLW	DLW	DLW	CPW	SLW	N	Comb t1
	2	N	V	N	N	N	N	N	N	42	UL	DLW	UL	SLN	UL	Comb	Comb
	3	N	N	V	N	N	N	N	N	39	UL	UL	UL	Cpw	UL	Two loop	N
	4	V	N	V	N	N	N	N	N	36	UL	SLW	SLW	SLW	SLW	N	Loop + arch
	5	V	V	V	N	N	V	N	N	46	DLW	SLW	SLW	CPW	SLW	Comb	N
	6	N	N	V	N	N	V	N	N	45	DLW	DLW	DLW	CPW	UL	N	N
	7	V	V	N	N	N	N	N	N	44	SA	SA	UL	UL	UL	ADLW+t1 t2	N
	8	N	N	V	N	N	N	N	N	43	DLW	SA	TA	UL	UL	ADLW+t1 t2	N
	9	V	V	N	V a1	N	V C1	N	N	42	DLW	UL	UL	SLW	UL	Loop	N
	10	V	V	V	N	N	N	N	N	42	DLW	RL	UL	CPW	SLW	Comb	N
	11	N	N	V	N	N	N	N	N	40	UL	TA	UL	UL	UL	N	Two loops
	12	N	V	V	N	N	N	N	N	38	MUL	RL	CPW	CPW	UL	DLW+Loop	N
	13	V	V	V	N	N	N	N	N	51	CPW	CPW	UL	SLW	SLW	N	N
	14	N	V	V	N	N	N	N	N	42	DLW	DLW	DLW	SLW	SLW	Comb	-
	15	V	V	V	N	N	N	N	N	44	SLW	SLW	UL	SLW	SLW	N	N
	16	V	V	V	N	N	N	N	N	38	CPW	TA	UL	UL	TA	N	Comb
	17	V	V	V	N	N	N	N	N	45	UL	TA	SA	UL	UL	N	Comb+
	18	V	V	V	N	N	N	N	N	42	UL	UL	UL	SLW	UL	N	N
	19	V	N	V	N	N	N	N	N	33	DLW	SLW	SLW	CPW	DLW	CPW+ T1	N
	20	N	N	V	N	N	N	N	N	37	SLW	DLW	UL	SLW	DLW	Loop+t1	N
	21	N	V	V	N	N	N	N	N	46	UL	UL	UL	UL	UL	N	N
	22	V	V	V	N	N	N	N	N	40	UL	RL	UL	UL	UL	N	N
	23	V	V	V	N	N	N	N	N	37	UL	DLW	UL	SLW	UL	N	Comb+
	24	V	N	N	N	N	V	N	N	38	DLW	DLW	DLW	SLW	UL	Comb	Comb
	25	V	V	V	N	N	N	N	N	43	SLW	UL	DLW	DLW	SLW	N	2 Comb
	26	V	V	V	N	N	N	N	N	46	DLW	DLW	UL	SLW	UL	Loop+Coom	
	27	V	V	V	N	N	N	N	N	40	SLW	UL	UL	UL	UL	N	N
	28	V	V	V	N	N	N	N	N	39	SLW	SLW	SLW	SLW	SLW	N	Comb
	29	V	V	V	N	N	N	N	N	41	UL	UL	UL	SLW	UL	N	N
	30	N	N	V	N a1	N b1	N c1	d	Miss	-	UL	TA	TA	UL	UL	Loop	Loop+
CONTROL	1	N	V	V	N	N	N	N	N	43	UL	UL	UL	UL	UL	N	N
	2	N	N	V	N	N	N	N	N	44	SLW	SLW	CPW	SLW	MUL	N	N
	3	V	V	N	N	N	V	N	N	50	UL	DLW	UL	CPW	SLW	N	N
	4	N	N	N	N	N	N	N	N	35	UL	DLW	UL	UL	UL	N	N
	5	N	V	N	N	N	N	N	N	45	UL	DLW	DLW	DLW	SLW	N	N
	6	N	V	N	N	N	N	N	N	45	DLW	UL	UL	SLW	UL	N	N
	7	N	N	V	N	N	N	N	N	43	UL	TA	UL	UL	UL	N	N
	8	N	V	V	N	N	N	N	N	46	DLW	DLW	UL	SLW	UL	N	N
	9	N	V	V	N	N	N	N	N	46	UL	UL	UL	UL	UL	N	N
	10	V	N	V	N	N	N	N	N	46	DLW	SLW	SLW	SLW	UL	N	N
	11	N	N	V	N	N	N	N	N	38	UL	SLW	UL	SLW	MUL	N	N
	12	N	N	N	N	N	N	N	N	40	SLW	SLW	SLW	SLW	UL	N	N
	13	N	N	V	N	N	N	N	N	48	UL	UL	UL	UL	UL	N	N
	14	N	N	N	N	N	N	N	N	48	UL	TA	UL	UL	UL	N	N
	15	N	N	N	N	N	N	N	N	43	SA	SA	SA	SA	SA	N	N
	16	N	V	N	N	N	N	N	N	40	DLW	SLW	UL	UL	UL	N	N
	17	V	N	V	N	N	N	N	N	48	UL	CPQ	UL	UL	UL	N	N
	18	N	V	N	N	N	N	N	N	43	DLW	UL	UL	UL	UL	N	N
	19	N	V	N	N	N	N	N	N	36	UL	UL	UL	UL	UL	N	N
	20	N	N	N	N	N	N	N	N	48	CPW	RL	UL	UL	UL	N	N
	21	N	N	V	N	N	N	N	N	48	SLW	SLW	UL	UL	UL	N	N
	22	N	N	V	N	N	N	N	N	37	CPW	SLW	SLW	SLW	SLW	N	N
	23	N	V	N	N	N	N	N	N	45	SLW	SLW	SLW	SLW	UL	N	N
	24	N	V	V	N	N	N	N	N	38	UL	UL	UL	SLW	SLW	N	N
	25	N	N	N	N	N	N	N	N	45	SLW	SLW	UL	SLW	SLW	N	N
	26	N	N	V	N	N	N	N	N	38	SLW	RL	UL	UL	UL	N	N
	27	N	V	N	N	N	N	N	N	43	DLW	DLW	SLW	SLW	UL	N	N
	28	V	V	N	V	N	N	N	N	53	UL	UL	UL	UL	UL	N	N
	29	N	N	V	N	N	N	N	N	47	UL	UL	UL	DLW	DL	N	N
	30	N	N	N	N	N	N	N	N	43	UL	SA	UL	UL	UL	N	N

TC- Thenar crease, PC- Proximal crease, DC- Distal crease, TH- Thumb, PF- Pointing finger, MF- Middle finger, RF- Ring finger,
LF- Little finger, N- Normal, V- Variable, DLW- Double loop whorl, UL- Ulnar loop, RL- Radial loop, SA- Simple arch, TA- Tented arch, MUL- Modified ulnar loop, CPW- Central pocket whorl, SLW- Single loop whorl, DLW- Double loop whorl, ADW- Additional distal whorl

Table 1: Right hand observation for OSF Patients and control

		TC	PC	DC	a	b	c	d	t	atd	TH	PF	MF	RF	LF	Hypothenar	Thenar
OSF PATIENTS	1	N	N	V	N	N	N	N	V	71	CPW	CPW	CPW	SLW	CPW	N	Comb
	2	N	N	N	N	N	N	N	V	42	UL	UL	UL	UL	UL	N	Comb
	3	N	N	V	N	N	V	N	N	37	DLW	UL	UL	SLW	UL	2 Loop	N
	4	V	N	V	N	N	N	N	V	38	UL	UL	UL	SLW	SLW	Comb	Comb arch
	5	V	V	N	N	N	N	N	N	45	CPW	CPW	CPW	CPW	MUL	Comb	N
	6	N	N	V	N	N	N	N	N	42	DLW	DLW	UL	PLW	UL	N	N
	7	V	V	V	V	N	N	N	N	47	SA	SA	SA	UL	TA	Loop+ t1	N
	8	V	V	V	N	N	N	N	N	42	DLW	MUL	TA	UL	UL	2 Loop + t1	N
	9	V	V	N	N	N	V C1	N	-	-	UL	SLW	UL	UL	MUL	Loop	N
	10	N	V	V	N	N	N	N	N	45	UL	CPW	UL	UL	UL	Comb	N
	11	N	N	V	N	N	N	N	N	44	UL	RL	UL	UL	UL	Comb	Loop Loop
	12	N	V	V	N	N	N	N	N	38	UL	UL	UL	UL	UL	2 Comb+t1	N
	13	V	V	V	N	N	N	N	N	45	DLW	SLW	UL	CPW	SLW	N	Comb
	14	N	V	V	N	N	N	N	N	39	UL	SLW	UL	SLW	SLW	Comb	N
	15	V	N	V	N	N	N	N	N	47	UL	PLW	CPW	SLW	PLW	N	Comb Loop
	16	V	V	V	N	N	N	N	N	38	CPW	RL	UL	UL	UL	N	N
	17	N	N	V	N	N	N	N	N	46	UL	UL	UL	UL	TA	Loop	Loop+t1
	18	N	V	V	N	N	N	N	N	38	UL	TA	UL	UL	UL	N	N
	19	N	V	V	N	N	V	N	N	33	UL	PLW	PLW	CPW	UL	N	N
	20	V	V	V	N	N	N	N	N	38	SLW	UL	DLW	DLW	SLW	Loop+ t1	N
	21	V	V	V	N	N	N	N	N	41	SLW	UL	UL	SLW	UL	N	N
	22	N	N	N	N	N	N	N	N	-	UL	UL	UL	UL	UL	Comb	N
	23	V	N	N	N	N	N	N	N	37	DLW	DLW	UL	SLW	UL	N	3 Comb+2
	24	N	N	V	N	N	V	N	N	41	DLW	DLW	DLW	SLW	UL	Comb	Comb
	25	V	V	V	N	N	N	N	N	39	SLW	DLW	DLW	CPW	CPW	Comb	Comb
	26	V	V	V	N	N	V	N	N	40	UL	UL	UL	SLW	UL	Loop+comb	N
	27	V	V	V	N	N	N	N	N	42	UL	UL	UL	SLW	UL	N	Comb
	28	V	V	V	N	N	N	N	N	41	UL	UL	UL	SLW	UL	N	Comb+2 loop
	29	V	V	V	N	N	N	N	N	44	UL	UL	UL	UL	UL	Comb	N
	30	V	V	V	N	N	V	N	N	42	UL	PLW	PLW	UL	UL	N	N
CONTROL	1	N	V	V	N	N	N	N	N	42	UL	DLW	UL	UL	UL	N	N
	2	N	V	V	N	N	N	N	N	45	CPW	DLW	MUL	SLW	UL	N	N
	3	N	V	N	V	V	V	N	N	44	UL	UL	UL	SLW	UL	N	N
	4	N	N	N	N	N	N	N	N	45	UL	UL	UL	UL	UL	N	N
	5	N	N	N	N	N	N	N	N	43	UL	SLW	UL	UL	DLW	N	N
	6	N	N	N	N	N	N	N	N	43	DLW	UL	UL	UL	UL	N	N
	7	N	V	V	N	N	N	N	N	40	DLW	MUL	UL	UL	UL	N	N
	8	N	V	V	N	N	N	N	V	64	DLW	SLW	UL	SLW	UL	N	N
	9	N	V	V	N	N	N	N	N	48	UL	SLW	TA	UL	UL	N	N
	10	N	V	V	N	N	N	N	N	41	SLW	SLW	SLW	SLW	UL	N	N
	11	V	N	N	N	N	N	N	N	35	UL	SLW	SLW	SLW	UL	N	N
	12	V	V	V	N	N	N	N	N	41	UL	UL	SLW	DLW	DLW	N	N
	13	N	N	N	N	N	V	N	N	38	UL	UL	UL	UL	UL	N	N
	14	N	V	N	N	N	N	N	N	48	UL	SA	UL	UL	UL	N	N
	15	N	N	N	N	N	N	N	N	40	SA	SA	SA	SA	SA	N	N
	16	N	V	V	N	N	N	N	N	42	UL	UL	UL	UL	UL	N	N
	17	N	V	V	N	N	N	N	N	44	UL	SLW	SLW	CPW	UL	N	N
	18	N	N	N	N	N	N	N	N	41	UL	UL	UL	UL	UL	N	N
	19	N	V	N	N	N	N	N	N	36	UL	RL	UL	UL	UL	N	N
	20	N	N	N	N	N	N	N	N	47	DLW	RL	UL	UL	UL	N	N
	21	N	N	N	N	N	N	N	N	45	UL	SLW	UL	UL	UL	N	N
	22	N	N	N	N	N	N	N	N	38	SLW	DLW	DLW	SLW	SLW	N	N
	23	N	N	N	N	N	N	N	N	46	PLW	SLW	DLW	SLW	UL	N	N
	24	N	N	N	N	N	N	N	N	37	UL	UL	SLW	SLW	SLW	N	N
	25	N	N	N	N	N	N	N	N	45	SLW	SLW	UL	SLW	UL	N	N
	26	N	N	N	N	N	N	N	N	51	SLW	RL	TA	UL	UL	N	N
	27	N	N	N	N	N	N	N	N	43	UL	SLW	UL	CPW	UL	N	N
	28	N	N	N	N	N	N	N	N	45	SLW	UL	UL	UL	UL	N	N
	29	N	N	N	N	N	N	N	N	46	SLW	DLW	UL	DLW	VL	N	N
	30	N	N	N	N	N	N	N	N	43	UL	TA	UL	UL	UL	N	N

Table 2: Left hand observation for OSF Patients and control

	OSF PATIENTS		CONTROL	
	Right hand digits	Left hand digits	Right hand digits	Left hand digits
Thumb	UL = 11 MUL = 01 RL = 00 TA = 00 SA = 01 SLW = 05 DLW = 10 CPW = 02	UL = 17 MUL = 00 RL = 0 TA = 0 SA = 01 SLW = 03 DLW = 06 CPW = 03	UL = 15 MUL = 00 RL = 00 TA = 00 SA = 01 SLW = 06 DLW = 06 CPW = 02	UL = 17 MUL = 00 RL = 00 TA = 00 SA = 01 SLW = 06 DLW = 05 CPW = 01
Pointing Finger	UL = 07 MUL = 00 RL = 03 TA = 04 SA = 02 SLW = 05 DLW = 08 CPW = 01	UL = 12 MUL = 01 RL = 02 TA = 01 SA = 01 SLW = 03 DLW = 07 CPW = 03	UL = 09 MUL = 00 RL = 02 TA = 02 SA = 02 SLW = 09 DLW = 05 CPW = 01	UL = 09 MUL = 03 RL = 01 TA = 01 SA = 02 SLW = 10 DLW = 04 CPW = 00
Middle Finger	UL = 17 MUL = 00 RL = 00 TA = 02 SA = 01 SLW = 04 DLW = 05 CPW = 01	UL = 20 MUL = 00 RL = 00 TA = 01 SA = 01 SLW = 00 DLW = 05 CPW = 03	UL = 22 MUL = 00 RL = 00 TA = 00 SA = 01 SLW = 05 DLW = 01 CPW = 01	UL = 19 MUL = 01 RL = 00 TA = 02 SA = 01 SLW = 05 DLW = 02 CPW = 00
Ring Finger	UL = 09 MUL = 00 RL = 00 TA = 00 SA = 00 SLW = 13 DLW = 01 CPW = 07	UL = 13 MUL = 00 RL = 00 TA = 00 SA = 00 SLW = 11 DLW = 02 CPW = 04	UL = 15 MUL = 00 RL = 00 TA = 00 SA = 01 SLW = 11 DLW = 02 CPW = 01	UL = 16 MUL = 00 RL = 00 TA = 00 SA = 01 SLW = 09 DLW = 02 CPW = 02
Little Finger	UL = 18 MUL = 00 RL = 00 TA = 01 SA = 00 SLW = 09 DLW = 02 CPW = 00	UL = 19 MUL = 02 RL = 00 TA = 02 SA = 00 SLW = 04 DLW = 01 CPW = 02	UL = 21 MUL = 02 RL = 00 TA = 00 SA = 01 SLW = 05 DLW = 01 CPW = 00	UL = 25 MUL = 00 RL = 00 TA = 00 SA = 01 SLW = 02 DLW = 02 CPW = 00

Table 3: Analysis of Finger Prints for OSF Patients and Control

Percentage of Creases in OSF patients and control						Comparasion of variation between OSF Patients and Control			
		OSF Patients		Control		OSF Patients		Control	
		Right Palm	Left Palm	Right Palm	Left Palm	Right Palm	Left Palm	Right Palm	Left Palm
1	Thenar Crease	19/30 x 100 =63%	17/30x100= 57%	4/30x100=1 3%	4/30x100=1 3%	Comb 12/30x100= 40%	Comb 24/30x100= 80%	No Variation	No Variation
2	Proximal Crease	19/30x100= 63%	19/30x100= 63%	13/30x100= 43%	17/30x100= 57%	Loop 8/30x100=2 6.66%	Loop 6/30x100=2 3%		
3	Ditigal Crease	26/30x100= 87%	25/30x100= 83%	12/30x100= 40%	41/30x100= 47%	Total variation in right palm is 80%	Total variation in left palm is 100%		
4	'C' Triradius variation	-	6/30x100=2 0%	-	-	DLW 3/30x100=1 00%			
5	'T' Triradius variation	-	4/30x100=1 3%	-	-	CPW1/30x1 00=3.33%			
6	Angle a+b	11/30x100= 37%	11/30x100= 37%	7/30x100=2 3%	7/30x100=2 3%				

Table 4: Percentage of Creases & Comparison of variations between OSF patients & Control

		Comparison of Lip prints patterns in OSF and Control				Percentage of the Lip print patterns in OSF and Controls			
		OSF Patients		Control		OSF Patients		Control	
	Character-istics	Upper Lip	Lower Lip	Upper Lip	Lower Lip	Upper Lip	Lower Lip	Upper Lip	Lower Lip
1	Upward branching	1	1	5	-	3%	3%	17%	-
2	Downward branching	2	6	3	3	7%	20%	10%	10%
3	Fenced	2	2	4	1	7%	7%	13%	3%
4	Vertical Long	-	-	11	19	-	-	37%	63%
5	Mixed	20	21	6	7	67%	70%	20%	24%
6	H-Shaped	2	-	-	-	7%	-	-	-
7	Spiral whorl	1	-	-	-	3%	-	-	-
8	Stellate	2	-	-	-	6%	-	-	-
9	Single Dot	-	-	1	-	-	-		-
	Total	30	30	30	30				

Table 5: Comparison& Percentage of Lip prints patterns in OSF and Control

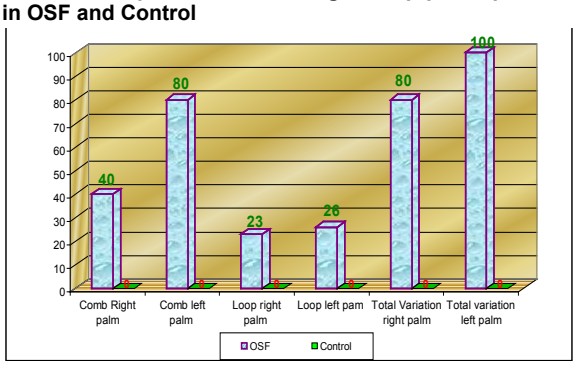


Figure 2: Graph showing exclusive minutiae pattern and total variation in right & left palm.

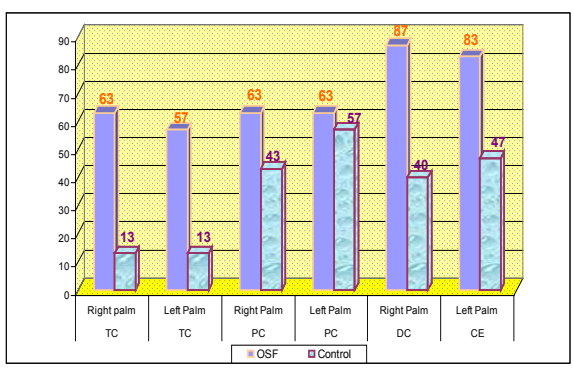


Figure 3: Graph Showing TC, PC & DC variation in OSF & Control

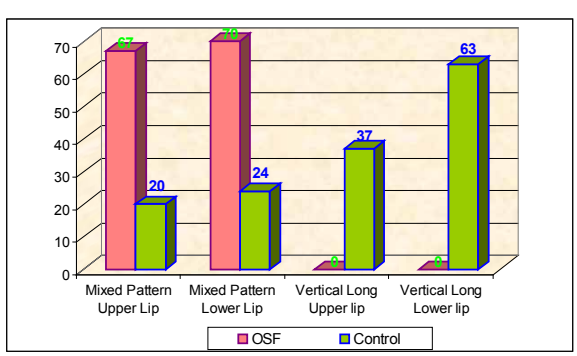


Figure 4: Comparative Graph showing the percentage of most varied chelioscopy pattern between OSF patient and control.

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