

## GENETIC INHERITANCE OF PALM LINE PATTERN (PLP) IN HUMAN (*HOMO SAPIENS*) BY PEDIGREE ANALYSIS-IN PURVANCHAL (UP-NE) INDIA

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**ABSTRACT** – Palm Line pattern from 100 families were studied belonging to different community society and living status. Average inheritance was recorded as 15%, maximum inheritance as 18.73%, while minimum inheritance as 8.57%. Maximum inheritance was recorded from a Muslim family compared to other communities. The Inheritance of Palm Line pattern in opposite sex offspring i.e. father to daughter and mother to son is reported maximum. The maximum affinity of palm line pattern have been recorded as 23.25% in case of opposite sex inheritance of PLP, while minimum case in male to male as 12.67% and female to female as 10.46% have been reported in same sex inheritance. The correlation test have been conducted to measure the closeness between same and opposite sex PLP inheritance data, which have been estimated as 0.712 showing low correlation. The data was Biostatistically analyzed by F- Test (A nova) which have been calculated as 1.1360 at  $p=0.5$  and 9 degree of freedom is less than tabulated value 3.48, indicating the data to be significant.

**Key words** : PLP= Palm Line Pattern, DFC= Heart Line, PFC= Brain Line, TOC= life line, VFC= luck line, VLC-I=Sun Line, VLC-II=Mercury line, Palm line=Flexion crease.

### INTRODUCTION

Human Palm is consist of flexion creases (Palm lines) in different types of patterns called flexion crease pattern or Palm Line Pattern (PLP) differing from person to person. Palm Line pattern have been classified under five categories on the basis of DFC(Heart Line) PFC (Brain Line) TOC (Life Line) VFC (Luck Line), VLC-I(Sun Line) and VLC-II (Mercury Line) as 3 FxC, 4 FxC, 5 FxC, 6 FxC and 7 FxC (Priyadarshi and Gupta 2007). Studies on Palm Line Pattern is an important tool for diagnosis of diseases (Douglas and Compton 1996). Fatty Palm darker DFC with Iceland and star over it in Saturn Zone with breaky VLC-II and a vertical line from venous region to Jupiter region are indicator of cardio vascular diseases (Priyadarshi, 2009). Our chromosomal blue print are responsible for the shape of our Palm, for the skin ridge pattern and even for the types of palm lines across palm. Our Palm line pattern inheritance is nowhere more evident than our finger print Pattern which may be traced through a family by pedigree analysis (Reid, 1999). Presence of 6 FxC pattern, Iceland pinpoint, breaks, Teaseling in one end, downwards branching in PFC till moon region are indicator of mental retardation. Furthermore "S" shaped PFC or coalescence of (PFC) with VLC-II and intersection of PFC by few vertical creases at more than one point can be considered as sign of mental retardation (Priyadarshi 2010). Present paper has been focused on genetic inheritance of palm lines and it's pattern by pedigree analysis is genetically pure

families possessing at least four generations. Fetal finger tip pad are observable around sixth week of gestation period and reach their maximum size by 12<sup>th</sup> to 13<sup>th</sup> week after which they regress and give rise an elevated dermal ridges (Moore, 1987). In 15<sup>th</sup> week all palm line are clearly seen (Campbel, 1998 and Reid, 1996). The particular markings in our palm in form of island, crosses, stars, diamonds, triangle etc. have associated with certain medical conditions, some inherit and some develops as environmental factor which affect our health (Reid, 1996). Presence of simian crease in the palm of down's syndrome indicates its regulation by gene(s) out of which some resides on 21<sup>th</sup> chromosome. Inheritable diseases viz. accidental communicational etc may be diagnose by study of the palm line pattern (Xavier, 2002) and can give clinical constitutional and endocrinal buildup information (Eugene, 1998). Palm lines shows retirement replacement and track change generally seen in Verticolateral as well as in the end of thumb opposition crease (TOC). The lines and its branches in palm can be linked to river and their tributaries affecting the other areas of palm (Reid, 1996). Palm Line Pattern of 910 people belonging to 100 families including 470 male and 440 females from different community and society was observed to inheritance of palm line pattern by pedigree analysis. Obtained data was tabulated and statistically analysed.

### MATERIALS AND METHODS

The Palm line Pattern of 100 families have been recorded, possessing at least four generations with the

help of of PLP personnel's Bio data Sheet including details of Name, Age, Sex, PFC, DFC, TOC, VFC, and Palm Line Pattern (PLP) details. Furthermore, Palm details have been recorded in several interesting cases in which Palm has applied by water soluble ink and its imprint was taken on glazy paper of the all family members. During the awarding of the percentage of inheritance of Palm line Pattern, DFC, PFC, TOC and VFC has been given 15% consideration for each crease and 20% to Palm Line Pattern inheritance. During observations of palm line pattern inheritance, families were selected from District Jaunpur and Azamgarh. Sketch diagram of palm line pattern was prepared with information of age, sex, generation, working hand (Left/Right). For pedigree analysis, 4 generation families were selected possessing interesting palm line pattern. The percentage of inheritance was calculated by calculating the inheritance between two successive generation followed by average value of it (viz.  $F_0 - F_1, F_1 - F_2, F_2 - F_3, F_3 - F_4$ ), an according to position in pedigree chart.

#### PLP Variation measuring Scale :

PLP variation measuring scale is the formation of graph paper or transparent sheet, its x-axis have the points as  $x_a, x_b, x_c, x_d, \dots, x_j$  at the interval of 10 m.m. while y-axis as  $y_a, y_b, \dots, y_j$  having the interval of 10 m.m. from each other for studying the pathway dimension i.e. pathway of creases, line is divided into four parts and dimension is reported from each four points giving rise the pathway of line.

#### Cheirotype :

A cheirotype sums up the comparative length and width of the palm and the length of the fingers, expressing these as percentages : Two related factors are involved, P the percentage by which the palm is narrower or broader than its length and F the percentage by which the fingers are longer or shorter than the width of the palm.

The diagram shows the necessary measurement as X, Y and Z. The factors may be calculated using the following simple equations

$$P = \frac{X}{X + Y} \times 100$$

$$F = \frac{Z}{Z + X} \times 100$$

Population shows five type of cheirotype represented as follows and related with finger tip shape.

#### Parameters of Inheritance :

Study of palm line pattern inheritance was observed by path way and length of line shape of line (viz DFC

twisted hairy, ending between finger or on Jupiter region or finger, TOC united with PFC or open, forked, chained end, PFC, straight semicircular, Sidney wavy and VFC, length origin). Palm line pattern (3 Fxc, 4 Fxc, 5 Fxc, 6 Fxc and 7 Fxc) and special sign (viz. star triangle diamond etc.) Cheirotype, (i.e sum of the comparative length and width of the palm and the length of the fingers) was considered as significant factor with 20% consideration.

Before confirming the percentage of inheritance of PLP, the pedigree was prepared of all the families. The observed data have been analyzed biostatistically by "F" test (ANOVAs) and correlation between inheritance percentage of same sex and opposite sex.

### RESULT AND DISCUSSION

The palm line pattern was studied for 100 families belonging to different communities and society, showed that average inheritance percentage was 15%, maximum inheritance was 18.73% while minimum as 8.57% shown by 01 and 05 families respectively; 15.83%, 13.25%, 13.10%, 16.10%, 16.66%, 16.08, 18.73, 15.76, 15.94% inheritance was shown by 15, 20, 20, 05, 10, 06, 01, 08 and 10 families respectively (Table – 1). Maximum inheritance % i.e. 18.73 was reported from a muslim family with more percentage of inheritance compared to other communities. The inheritance of palm line pattern is greater in opposite sex offspring compared to same sex i.e. palm line pattern of a son was showing greater affinity from palm line pattern of his mother and vice versa (Table – 1). The maximum affinity of palm line pattern was reported 23.25% in opposite sex while the average value for same is 13.787, and male to male as 12.675% and female to female as 10.46% i.e. palm line pattern of mother have least affinity to her daughter. Family no. 1 was showing the inheritance of UTF (universal transverse crease) in which father and son were belonging to 7 Fxc pattern. Except, this family no. 3 and family no 8 was showing one palm with father another with mother. Family no. 1 was showing similarity in  $F_1$  and  $F_3$  generation in palm line pattern but completely absent in  $F_2$  generation. Inheritance of major lines were followed by secondary lines (viz above DFC marriage line, near jupiter region (marriage line)) with palmer ridge pattern. During study period of inheritance, a palm line pattern PLP in 100 families resulted 8.57%, 15.83%, 13.25%, 13.10%, 16.10%, 16.66%, 16.08%, 18.73%, 15.76% and 15.94% type of inheritance was recorded from 05, 15, 20, 20, 05, 10, 06, 01, 08 and 10 families respectively. The affinity in male to male inheritance recorded as 17.5%, 19.83%, 12.4%, 10.75%, 10.25%, 11.86%, 6.0% 11.6%, 14.16%, 12.4% respectively, while in the case of female to female as 6.75%, 0.0%, 9.0%, 15.0%, 15.16%, 14.0%, 8.53%,



Fig : Palm Imprint showing four major Flexion creases (Palm Lines)

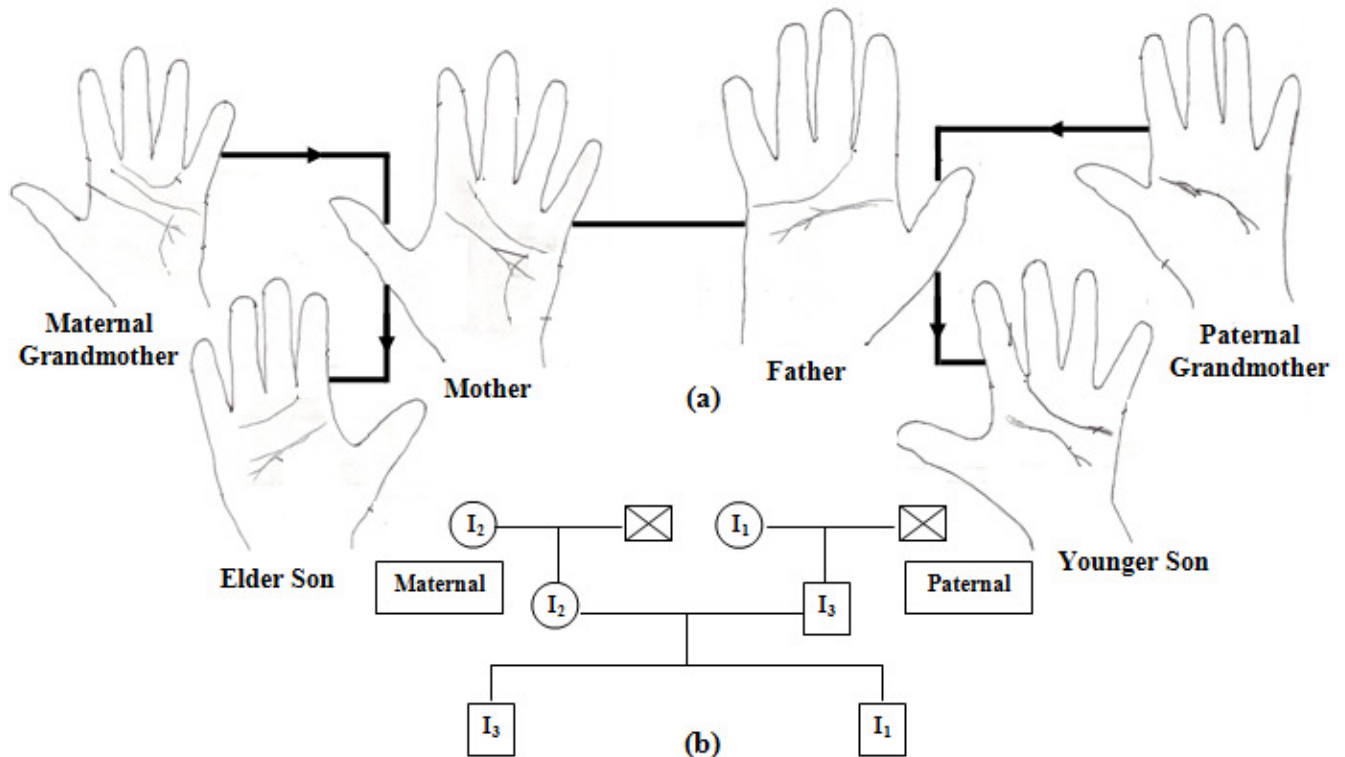


Fig. 1 (a) : Inheritance of Palm Line Pattern (PLP) in a Family (b) : Pedigree

**Figure Cheiro type basic measurement**

Cheirotype	P Factor	F Factor	Finger Tip
1. RuggedAA	More than 48	Less than 45	Square
2. Practical A	48 – 46	45 – 48	Blunt
3. Normal	46 – 45	49 – 45	Rounded
3. Artistic B	45 – 44	51 – 52	Conical
4. Sensitive BB	43 or Less	53 or more	Pointed

0.0%, 16.75% and 13.87%. But in the case of opposite sex (i.e. male to female or vice versa) 7.75%, 8.5%, 14.12%, 15.0%, 16.66%, 15.67%, 11.6%, 23.25%, 16.64% and 18.62% inheritance was recorded including average value as 13.78%. In the case of same sex the inheritance affinity between male to male was having average value as 12.675% while in female to female as 10.46% (Table – 1).

Palm line pattern in human was being used to predict the fortune of person. Palm lines are categories into two categories major line i.e. digital palmer flexion crease DFC (heart line), Proximal flexion crease PFC (brain line) thumb opposition crease TOC (life line) and vertical palmer flexion crease VFC (luck line) and secondary lines, viz mars line, verticolateral crease I and II etc. Palm line pattern (PLP) are of five types 3 Fxc, 4 Fxc, 5 Fxc, 6 Fxc and 7 Fxc having the distribution as 27.0%, 38%, 11.4%, 2.8% and 0.4% in population. In the case of down's syndrome, a single transverse crease is present (simian crease) but it's frequency is 30 – 32% while 2 – 3% in normal population simian crease is reported formed by

coalescence of PFC and DFC. Palm line pattern is seen to be affected by environmental factors. In Trebles of India 3 Fxc or 4 Fxc type of palm line pattern is seen, while those who do the official works generally have 4 Fxc or 5 Fxc type of palm line pattern. Palm line pattern show the inheritance maximum as 18.73% and minimum as 8.57% while the average inheritance is 15.0%. Family No. 1 showing a specific feature (i.e. universal transverse crease uFT) in  $F_0$  and  $F_2$  generation but this feature was absent in  $F_1$  members. This fact is supported by opposite sex affinity in palm line pattern inheritance. Average affinity percentage 13.78% in opposite sex while 12.675% (male to male) and 10.46 (female to female) in same sex, may be role of sex chromosomes in palm line pattern regulation. Maximum inheritance (18.73%) was reported in a muslim family. The secondary lines also can to be inherited. Palm line pattern are used as diagnosis of genetic and accidental disease and studied as the branch named medical palmistry. (Reid, 1996 and Doglus, 1994. Palm lines are not simple crease formed by repeated movement of our palm but are regulated by body physiology and biochemistry and are regulated by nervous system. Environment and conditions both play role for influencing the Palm (Campton, 1994). Similar characteristics passed down from one generation to another because the Palm shape fingerprint and other specific markings occur within the families. However line change discrepancies occur between the Palm and markings reveal predisposition rather than irrevocable out come. As our genes determine the colour of our eyes, length and ridges on skin, in same way the palmer creases (lines) are also determined by DNA blue print (Reid, 1996). Palmistry dates back to very ancient time and modern biological

**Table 1 : Showing Data of Inheritance of Palm Line Pattern in Different Families with Different Aspect.**

S. No.	Frequency(f)	Generation	Members	Male	Female	% Inheritance	Affinity in Same Sex		Opposite Sex %
							Male %	Female %	
1	5	4	7	3	4	8.57	17.5	6.75	7.75
2	15	4	7	4	3	15.83	19.83	Absent	8.5
3	20	4	12	7	5	13.25	12.4	9.0	14.12
4	20	4	13	7	6	13.10	10.75	15.0	15.00
5	5	4	8	3	5	16.10	10.25	15.16	16.66
6	10	4	8	5	3	16.66	11.86	14.0	15.67
7	6	3	10	4	6	16.08	6.0	8.33	11.60
8	1	3	7	5	2	18.73	11.6	Absent	23.25
9	8	3	8	4	4	15.76	14.16	16.75	16.64
10	10	4	11	5	6	15.94	12.4	13.87	18.62

science does not exclude the possibility that Palm provide interpretive expression of influence of heredity (Campton, 1996). Mostly TOC (life line) and VFC (luck line) is seen to change its route. In the age of 60 years or above the topmost section of the fate and appolo lines and the ends of life line starts to be retired i.e. removes (Reid, 1996). Mostly TOC (life line) and VFC (luck line) seen to change its route. Furthermore the life line is expected to radiate smaller and thinner creases in various directions according to body composition (Douglas, 1995). The line collectively represents that dimension which describe how information is absorbed, processed and made meaning full to the individual. The radial or thumb side of the hand represents that area of psyche which exposes the individual. The radial or thumb side of the hand represents that area of psyche which exposes the individual (through conscious awareness) to the world (Holtzman, 1983) external to himself. Lines such as the lower transverse line (PFC) and thinner line (TOC) have some origin point. Lines such as the upper transverse line begin at the ulnar or percussion, side of the hand. PFC (Brain Line) may originate in the dimension of objective reality but it delivers its information to the hypothenar eminence where very subjective chemistries will ultimately make the information on meaningful to the individual. The point of origin, termination of path and quality of lines are the important parameter to forecast (Holtzman, 1983). Human belong to the order of mammals called primates which also includes Tarsiers, Lorises, Lemurs, Monkeys and Apes. Many of the characteristics of this order are adaptation to the life in a forest environment and it was these requirement for arboreal (tree dwelling) existence which were essential for the latter evolutionary development of human ancestors. They enabled them to exploit the new ecological niches which appeared as lush forest of the Miocene period gave way to the drier grassland. Savannahs of the Pliocene period with in the order primates three group of animals exists : 1. Anthropoids, 2. Hominidae and (3). Pongidae. It is accepted that the ape/human stock probably diverged from that of monkeys about 25 – 30 million years ago, during oligocene period and the subsequent separation of apes and human ancestors took place between 5 to 10 million years ago in the middle of the Miocene period. From that time on words the family pongidae (fossil form and present days Gibbon i.e. Orangutan). Gorilla and Chimpanzee and the family Homonidae (fossil form of modern human) have evolve along different lines. The human hand has more in common with the nearest relative apes than the hand of other mammals (Reid, 1996). The one out standing feature that human and other primates such as monkeys and apes

have in common is a thumb that is set in opposite to the fingers and thumb gives our hand its unique gripping capability and allows the most precise manipulative actions to take place. Although the human thumb has developed into a highly sophisticated digit that of the apes has remained relatively rudimentary. The data has been analysed by “F” test, to find the significance in the data. The “F” value has been calculated 1.1360 at  $p=0.5$  and nine degree of freedom which has been found less than the tabulated value 3.48, resulting the significance in data of Palm Line Pattern inheritance.

### Conclusion

The Palm line Pattern inheritance has been found 18.73% and greater in opposite sex i.e mother to son and father to daughter. The regulation of Palm Line Pattern (PLP) suspected to greatly influenced by environment compared to genes. Average inheritance was recorded as 15%, maximum inheritance as 18.73%, while minimum inheritance as 8.57%. Maximum inheritance was recorded from a Muslim family compared to other communities. As our genes determine the colour of our eyes, length and ridges on skin, in same way the palmer creases (lines) are also determined by DNA blue print (Reid, 1996).

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