

Available online at http://www.journalcra.com

International Journal of Current Research Vol. 7, Issue, 07, pp.18715-18722, July, 2015 INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

DETECTING GENETICALLY HIGH RISK INDIVIDUALLY FOR ASTHMA

*Dr. Chandan Kumar Sinha, Jaita Das, Sarit Pritam Dwibedy and Sushmita Chaudhury

M S Ramaiah College of Arts, Science and Commerce, MSR Nagar, MSRIT- POST, Bangalore, 560054

ARTICLE INFO	ABSTRACT
<i>Article History:</i> Received 16 th April, 2015 Received in revised form 11 th May, 2015 Accepted 25 th June, 2015 Published online 31 st July, 2015	The dermatoglyphics is an important tool in the diagnosis of several genetic diseases. The present study is related to establish a correlation between dermatoglyphics and asthma. Asthma is a chronic inflammatory disease of the small airways of the lung. Asthma is a complex and heterogenous disease which involves different genetic and environmental factors. The fingerprints of thirty one asthma patients were compared with thirty one control cases. The prints of both hands were taken by rolling finger method with the application of kajal as it is a high source of carbon. In Asthma patients, the percentage of loops was high in all digits except IVth digit with 46.77%. The whorl of only IVth digit
<i>Key words:</i> Asthma, Expression Quantitative trait locus, Lymphoblastoid Cell lines.	(Ring finger) asthma patients was significantly high with 53.22% with respect to control. The arches of I, II, III and Vth digit of patients was high where as the IVth digit shows no significant change. Thus the various dermatoglyphics parameters represent a non-invasive genetic marker help in the early diagnosis of asthma.

Copyright © 2015 Dr. Chandan Kumar Sinha et al. This is an open access article distributed under the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Citation: Dr. Chandan Kumar Sinha, Jaita Das, Sarit Pritam Dwibedy and Sushmita Chaudhury, 2015. "Detecting genetically high risk individually for asthma", *International Journal of Current Research*, 7, (7), 18715-18722.

INTRODUCTION

Asthma

Asthma is a Greek word that has been derived from the verb 'aazein' which means to exhale with open mouth, to pant. Asthma is a chronic inflammatory disease of the small airways of the lung. It is characterized by the recurrent attacks of paroxysmal dyspnoea which leads to wheezing and shortness of breath. Asthma is a complex and heterogenous disease which involves different genetic and environmental factors. It is classified into two types as Extrinsic and Intrinsic asthma. The extrinsic asthma results from hypersensitivity reactions such as wheal and flare reaction to intradermal allergens where as intrinsic asthma thought to be non-immune and without any atopic background (Platto et al., 1973; Daniels et al., 1966). Bronchial asthma is one of the most extensively studied respiratory diseases and its genetic basis has been well established. The genetics of asthma susceptibility is mostly studied by Candidate Gene Studies (Daniels et al., 1994). The genes are selected on the basis of its function. According to Candidate gene studies 53 genes have been identified and replicated (Mahajan et al., 2011; Daniels et al., 1966). These genes are involved in different biological processes such as Th2 inflammation, T-reg cell function, HLA locus and IgE response of B cells. There is another method by which signals between asthma and novel genetic marker can be associated which is known as Linkage studies.

M S Ramaiah College of Arts, Science and Commerce, MSR Nagar, MSRIT- POST, Bangalore, 560054.

It is based on the disease locus which co-segregates with the disease in families. The 6 novel genes for asthma namely ADAM33, VDR, DPP10, PHF11, HLA-G and GRP154 were indentified in past years (Gupta et al., 1993). The first Genome wide association studies of asthma identified ORMDL3 as a novel asthma susceptibility locus on chromosome 17p21 (Mahajan et al., 2011; Blumenthal et al., 2002). The eQTL (expression quantitative trait locus) for ORMDL3 in lymphoblastoid cell lines (LCLs) indicates that at least one of (Single nucleotide po) for ORMDL3 the SNP in lymphoblastoid cell lines (LCLs) indicates that at least one of the SNP (Single nucleotide polymorphism) regulates the expression of ORMDL3 in a genotype specific manner (Galton et al., 1961). Thus the recent advances in molecular method for asthma gene discovery had defined the biological pathway of asthma related susceptibility genes. The studies of asthma gene discovery have evolved over time which had expand our horizon of knowledge and yet more to come in near future.

Dermatoglyphics

Dermatoglyphics has been derived from two greek words 'derma' = skin and 'glyphe'= carving. It is the science and art of the study of surface markings/ patterns of ridges on the skin of the fingers, palm, toes and soles. The scientific study of dermatoglyphics is based upon two major facts; firstly the ridges are slightly different for the fingers and no two individual even the identical twins show exactly similar fingerprint patterns. Secondly the complex pattern of ridges and groves are permanent throughout life as they survive superficial injuries. So, Dermatoglyphics are the reliable source

^{*}Corresponding author: Dr. Chandan Kumar Sinha,

		тн	PF	MF	RF	LF
	1	32+27=59	17	16	12+12=24	15+14=29
	2	12+8=20	9+12=21	6	10	14
	3	10	8	10	8	12
	4	0	12	14	15	12
	5	17	0	8	5	8
	6	20+40=60	12	12	12	13
	° 7	15	15	15	13	11
	8	16	13	13	20	8
	9	28+32=60	17+21=38	14+17=31	20+17=37	18+2=20
	10	16	8	13	14	12
	11	15+8=23	13+8=21	18+13=31	12+13=25	13
	12	12	12	10	10+14=24	9
STV	13	11	8	12	8	12
ASTHMA PATIENTS	14	15	12	14+21=35	16+24=40	14
PAT	15	20	14+14=28	14+15=29	18+17=35	18
Ā	16	0	5	10	15	4
₽	17	7	10	8	12	10
T SV	18	0	3+4=7	5+9=14	7+16=23	4+12=16
4	19	0	3	12	14	9
	20	14	-	9+8=17	10+11=21	7+10=17
	21	7	12	8	10+8=18	13
	22	8+9=17	7+5=12	12	18	11
	23	16	8	12	14	18
	24	18	11	8	14	15
	25	10+8=18	10+8=18	15	8+20=28	6+14=20
	26	12	2	8	13	4
	27	20	16+15=31	14+12=26	28+16=44	18
	28	10	13	10	19	15
	29	10	20	20+12=32	21+15=36	18
	30	14+18=32	24	15+23=38	15+8=23	10+12=22
	31	32+27=59	17	16	12+12=24	15+14=29
	1	14	5	7+1=8	13+3=16	8+4=12
	2	17+11=28	15+12=27	23	12+11=23	19+11=30
	3	15	8+17=25	10	6+7=13	6+19=25
	4	21+7=28	7+10=17	12+15=27	18	15+5=20
	5	6+9=15	8	4+19=23	0	2+21=23
	6	12	12+4=16	9+15=24	7+4=11	13+16=29
	7	9+15=24	12+14=26	18+15=33	9+14=23	7
	8	15+17=32	7+12=19	9	19+17=36	8+16=24
	9	5+18=23	17+11=34	19+12=31	18	16+10=26
	10	7+16=23	5+9=14	11+18=29	18+6=24	8+9=17
	11	17	11+17=28	8+12=20	18+17=35	7+15=22
	12	12+16=28	0	6+8=14	19	11+11=22
	13	17+6=23	18+15=33	12+7=19	15+14=29	12+14=26
ы С	14	10+12=22	19	8+12=20	4+8=12	15
CONTROL	15	13	12+15=27	16+12=28	12	17+9=26
Ō	16	15+18=33	19+3=22	12+19=31	17+18=35	16+11=27
-	17	18+11=29	18	16+12=28	11+16=27	7+15=22
	18	9+12=21	3+8=11	19+17=36	10+14=24	13
	19 20	6+5=11	5+16=21	14	7+7=14	14+10=24
	20	2+14=16	6+3=9 10	13+14=27	11+13=24 11+17-28	9+17=26
	21 22	21+2=23 16+12=28	10 12+8=20	19+4=23 15+16=31	11+17=28 19+13=32	15+18=33 8+6=14
	22	15+12=28	12+8=20	11+18=29	19+13=32	16+5=21
	23 24	11+14=25	17+11=28	11+18=29	20+13=33	18+13=31
	24 25	4+13=17	16+17=33	12+9=21	18+17=35	18+13-31
	26	14+11=25	15+15=30	12+9-21	15+8=23	18+0-24
	27	19	15+19=34	15+11=26	16+7=23	5+12=17
	28	17+19=36	11+10=21	17+4=21	6+13=19	19+14=33
	29	12+12=24	17+11=28	6+17=23	8+2=10	17+15=32
	30	17+6=23	17	17+12=29	12+14=26	17 17
	31	11+16=27	10+12=22	11+7=18	12+13=25	2+21=23
		aer MF Middle fing				

Table 1. Left hand observation for Asthma Patients and Controls Ridge Counts

TH- Thumb, PF- Pointing finger, MF- Middle finger, RF- Ring finger, LF- Little finger

	1	TH	PF	MF	RF	LF
	1	18+16=34	12+12=24	12	15+18=33	14
	2	12+18=30	17+18=35		18+12=30	23
	3	21+14=35	16+12=28		20+21=41	15+12=27
	4	14	13	12	12+8=20	12
	5	12	3	0		12
	6	30+28=58	14	20	13	18
	7	20	16+22=38	18	18	16
	8	18+18=36	8	10	16+17=33	15
	9	18+20=38	24+20=44	18+12=30	18+18=36	16
	10	18	0	5	14+12=26	12
	11	17+21=38	10+15=25	12+11=23	14	14
	12	17 17	5		12+9=21	5
TS				-	-	
E	13	10	8	9	11	10
E	14	20		19+14=33	17+14=31	14
ASTHMA PATIENTS	15	16	14+10=24	14+10=24	10+12=22	22+19=41
A A	16	6	0	10	16+5=21	16+5=21
£	17	18+7=25	12+13=25	13	12	0
ES	18	0	0	4	9	6
A	19	22	8	9	13	10
	20	15+10=25	0		10+14=24	14
			-	9		
	21	12	14	-		8+4=12
	22	13	8	13	16	13
	23	8	12	4		10+6=16
	24	24	18		4+13=17	12
	25	18+15=33	18+15=33	16	25+12=37	12+8=20
	26	17	3	7	5	2
	27	14	13+10=23	20+16=36	14+18=32	12
	28	18	12	8	18	8
	29	20	18+18=36	18	22+12=34	14
	30	19+12=31	21+23=44		20+12=32	16+8=24
	31	18+16=34	12+12=24	12	15+18=33	14
		10.10.01		1-	10.10.00	
	1	12	12	7	12	8
	1	12	12	7	13	8
	2	7+11=18	5+12=17	13	12	9+11=20
		7+11=18 5+15=20	5+12=17 7+8=15	13 10	12 9	9+11=20 12+8=20
	2	7+11=18 5+15=20 21	5+12=17 7+8=15 7+11=18	13 10 17	12 9 11	9+11=20 12+8=20 12+6=18
	2 3	7+11=18 5+15=20 21 12+6=18	5+12=17 7+8=15 7+11=18 10	13 10 17 11	12 9 11 10	9+11=20 12+8=20 12+6=18 8+16=24
	2 3 4	7+11=18 5+15=20 21	5+12=17 7+8=15 7+11=18	13 10 17	12 9 11	9+11=20 12+8=20 12+6=18
	2 3 4 5	7+11=18 5+15=20 21 12+6=18	5+12=17 7+8=15 7+11=18 10	13 10 17 11	12 9 11 10	9+11=20 12+8=20 12+6=18 8+16=24
	2 3 4 5 6	7+11=18 5+15=20 21 12+6=18 8+7=15	5+12=17 7+8=15 7+11=18 10 11	13 10 17 11 2	12 9 11 10 5+17=22	9+11=20 12+8=20 12+6=18 8+16=24 12+12=24
	2 3 4 5 6 7 8	7+11=18 5+15=20 21 12+6=18 8+7=15 6+9=15	5+12=17 7+8=15 7+11=18 10 11 12	13 10 17 11 2 8	12 9 11 10 5+17=22 12+8=20	9+11=20 12+8=20 12+6=18 8+16=24 12+12=24 12+17=29
	2 3 4 5 6 7 8 9	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0	5+12=17 7+8=15 7+11=18 10 11 12 18+15=33	13 10 17 11 2 8 14 12	12 9 11 5+17=22 12+8=20 13+10=23 8	9+11=20 12+8=20 12+6=18 8+16=24 12+12=24 12+17=29 15+18=33 8+4=12
	2 3 4 5 6 7 8 9 10	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8	5+12=17 $7+8=15$ $7+11=18$ 10 11 12 $18+15=33$ $18+16=34$ 9	$ \begin{array}{r} 13 \\ 10 \\ 17 \\ 11 \\ 2 \\ 8 \\ 14 \\ 12 \\ 12+6=18 \\ \end{array} $	$ \begin{array}{r} 12 \\ 9 \\ 11 \\ 10 \\ 5+17=22 \\ 12+8=20 \\ 13+10=23 \\ 8 \\ 12+8=20 \\ \end{array} $	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ \end{array}$
	2 3 4 5 7 8 9 10 11	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7	5+12=17 $7+8=15$ $7+11=18$ 10 11 12 $18+15=33$ $18+16=34$ 9 $7+12=19$	$ \begin{array}{r} 13 \\ 10 \\ 17 \\ 11 \\ 2 \\ 8 \\ 14 \\ 12 \\ 12+6=18 \\ 12+8=20 \\ \end{array} $	$ \begin{array}{r} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ \end{array} $	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\end{array}$
	2 3 4 5 6 7 8 9 10 11 12	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7 12	5+12=17 $7+8=15$ $7+11=18$ 10 11 12 $18+15=33$ $18+16=34$ 9 $7+12=19$ $15+10=25$	$ \begin{array}{r} 13 \\ 10 \\ 17 \\ 11 \\ 2 \\ 8 \\ 14 \\ 12 \\ 12+6=18 \\ 12+8=20 \\ 10+8=18 \\ \end{array} $	$ \begin{array}{r} 12 \\ 9 \\ 11 \\ 10 \\ 5+17=22 \\ 12+8=20 \\ 13+10=23 \\ 8 \\ 12+8=20 \\ 10+14=24 \\ 18 \\ \end{array} $	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\end{array}$
	2 3 4 5 6 7 8 9 10 11 12 13	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7 12 $12+8=20$	5+12=17 $7+8=15$ $7+11=18$ 10 11 12 $18+15=33$ $18+16=34$ 9 $7+12=19$ $15+10=25$ 0	$ \begin{array}{r} 13 \\ 10 \\ 17 \\ 11 \\ 2 \\ 8 \\ 14 \\ 12 \\ 12+6=18 \\ 12+8=20 \\ 10+8=18 \\ 12+8=20 \\ \end{array} $	$ \begin{array}{r} 12 \\ 9 \\ 11 \\ 10 \\ 5+17=22 \\ 12+8=20 \\ 13+10=23 \\ 8 \\ 12+8=20 \\ 10+14=24 \\ 18 \\ 14+16=30 \\ \end{array} $	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28 \end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7 12 $12+8=20$ 8	5+12=17 $7+8=15$ $7+11=18$ 10 11 12 $18+15=33$ $18+16=34$ 9 $7+12=19$ $15+10=25$ 0 $5+6=11$	$ \begin{array}{r} 13 \\ 10 \\ 17 \\ 11 \\ 2 \\ 8 \\ 14 \\ 12 \\ 12+6=18 \\ 12+8=20 \\ 10+8=18 \\ 12+8=20 \\ 7+11=18 \\ \end{array} $	$\begin{array}{r} 12 \\ 9 \\ 11 \\ 10 \\ 5+17=22 \\ 12+8=20 \\ 13+10=23 \\ 8 \\ 12+8=20 \\ 10+14=24 \\ 18 \\ 14+16=30 \\ 5 \end{array}$	$\begin{array}{c} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ \end{array}$
ROL	2 3 4 5 6 7 8 9 10 11 12 13 14 15	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7 12 $12+8=20$ 8 $9+12=21$	5+12=17 $7+8=15$ $7+11=18$ 10 11 12 $18+15=33$ $18+16=34$ 9 $7+12=19$ $15+10=25$ 0 $5+6=11$ $14+16=30$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ \end{array}$	$\begin{array}{r} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22 \end{array}$	$\begin{array}{c} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ \end{array}$
NTROL	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7 12 $12+8=20$ 8 $9+12=21$ 8	5+12=17 $7+8=15$ $7+11=18$ 10 11 12 $18+15=33$ $18+16=34$ 9 $7+12=19$ $15+10=25$ 0 $5+6=11$ $14+16=30$ $7+12=19$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27 \end{array}$	$\begin{array}{r} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ \end{array}$
CONTROL	2 3 4 5 6 7 8 9 10 11 12 13 14 15	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7 12 $12+8=20$ 8 $9+12=21$ 8 $11+13=24$	5+12=17 $7+8=15$ $7+11=18$ 10 11 12 $18+15=33$ $18+16=34$ 9 $7+12=19$ $15+10=25$ 0 $5+6=11$ $14+16=30$ $7+12=19$ $12+14=26$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28 \end{array}$	$\begin{array}{r} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35 \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ \end{array}$
CONTROL	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7 12 $12+8=20$ 8 $9+12=21$ 8	5+12=17 $7+8=15$ $7+11=18$ 10 11 12 $18+15=33$ $18+16=34$ 9 $7+12=19$ $15+10=25$ 0 $5+6=11$ $14+16=30$ $7+12=19$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ \end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ \end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7 12 $12+8=20$ 8 $9+12=21$ 8 $11+13=24$	5+12=17 $7+8=15$ $7+11=18$ 10 11 12 $18+15=33$ $18+16=34$ 9 $7+12=19$ $15+10=25$ 0 $5+6=11$ $14+16=30$ $7+12=19$ $12+14=26$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28 \end{array}$	$\begin{array}{r} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35 \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ \end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7 12 $12+8=20$ 8 $9+12=21$ 8 $11+13=24$ $9+12=21$	5+12=17 $7+8=15$ $7+11=18$ 10 11 12 $18+15=33$ $18+16=34$ 9 $7+12=19$ $15+10=25$ 0 $5+6=11$ $14+16=30$ $7+12=19$ $12+14=26$ $8+13=21$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ \end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ \end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7 12 $12+8=20$ 8 $9+12=21$ 8 $11+13=24$ $9+12=21$ 8	$\begin{array}{r} 5+12=17\\ 7+8=15\\ 7+11=18\\ 10\\ 11\\ 12\\ 18+15=33\\ 18+16=34\\ 9\\ 7+12=19\\ 15+10=25\\ 0\\ 5+6=11\\ 14+16=30\\ 7+12=19\\ 12+14=26\\ 8+13=21\\ 0\\ \end{array}$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ 12\\ \end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\\ 18+15=33\\ \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ 16+12=28\\ \end{array}$
0	2 3 4 5 6 7 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7 12 $12+8=20$ 8 $9+12=21$ 8 $11+13=24$ $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$	$\begin{array}{r} 5+12=17\\ 7+8=15\\ 7+11=18\\ 10\\ 11\\ 12\\ 18+15=33\\ 18+16=34\\ 9\\ 7+12=19\\ 15+10=25\\ 0\\ 5+6=11\\ 14+16=30\\ 7+12=19\\ 12+14=26\\ 8+13=21\\ 0\\ 18+16=34\\ 11+18=29\\ \end{array}$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ 12\\ 17\\ 15+16=31\\ \end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\\ 18+15=33\\ 15\\ \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ 16+12=28\\ 12+18=30\\ 19+18=37\\ \end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	7+11=18 $5+15=20$ 21 $12+6=18$ $8+7=15$ $6+9=15$ 13 0 8 7 12 $12+8=20$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+12=21$ 8 $9+17=26$ $8+11=19$ 7	$\begin{array}{c} 5+12=17\\ 7+8=15\\ 7+11=18\\ 10\\ 11\\ 12\\ 18+15=33\\ 18+16=34\\ 9\\ 7+12=19\\ 15+10=25\\ 0\\ 5+6=11\\ 14+16=30\\ 7+12=19\\ 12+14=26\\ 8+13=21\\ 0\\ 18+16=34\\ 11+18=29\\ 0\\ \end{array}$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ 12\\ 1^{7}\\ 15+16=31\\ 15+12=27\end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\\ 18+15=33\\ 15\\ 12+13=25\\ 19\\ \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ 16+12=28\\ 12+18=30\\ 19+18=37\\ 17\end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	$\begin{array}{c} 7+11=18\\ 5+15=20\\ 21\\ 12+6=18\\ 8+7=15\\ 6+9=15\\ 13\\ 0\\ 8\\ 7\\ 12\\ 12+8=20\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 11+13=24\\ 9+12=21\\ 8\\ 9+17=26\\ 8+11=19\\ 7\\ 12\\ \end{array}$	$\begin{array}{c} 5+12=17\\ 7+8=15\\ 7+11=18\\ 10\\ 11\\ 12\\ 18+15=33\\ 18+16=34\\ 9\\ 7+12=19\\ 15+10=25\\ 0\\ 5+6=11\\ 14+16=30\\ 7+12=19\\ 12+14=26\\ 8+13=21\\ 0\\ 18+16=34\\ 11+18=29\\ 0\\ 18\end{array}$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ 12\\ 1^{7}\\ 15+16=31\\ 15+12=27\\ 16\\ \end{array}$	$\begin{array}{r} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\\ 18+15=33\\ 15\\ 12+13=25\\ 19\\ 12+6=18\\ \end{array}$	$\begin{array}{c} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ 16+12=28\\ 12+18=30\\ 19+18=37\\ 17\\ 12\end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24	$\begin{array}{r} 7+11=18\\ 5+15=20\\ 21\\ 12+6=18\\ 8+7=15\\ 6+9=15\\ 13\\ 0\\ 8\\ 7\\ 12\\ 12+8=20\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 11+13=24\\ 9+12=21\\ 8\\ 9+17=26\\ 8+11=19\\ 7\\ 12\\ 17+16=33\\ \end{array}$	$\begin{array}{r} 5+12=17\\ 7+8=15\\ 7+11=18\\ 10\\ 11\\ 12\\ 18+15=33\\ 18+16=34\\ 9\\ 7+12=19\\ 15+10=25\\ 0\\ 7+12=19\\ 15+10=25\\ 0\\ 5+6=11\\ 14+16=30\\ 7+12=19\\ 12+14=26\\ 8+13=21\\ 0\\ 18+16=34\\ 11+18=29\\ 0\\ 18\\ 15\\ \end{array}$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ 12\\ 1^{\circ}7\\ 15+16=31\\ 15+12=27\\ 16\\ 16+17=33\\ \end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\\ 18+15=33\\ 15\\ 12+13=25\\ 19\\ 12+6=18\\ 12\\ \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ 16+12=28\\ 12+18=30\\ 19+18=37\\ 17\\ 12\\ 15+6=21\\ \end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	$\begin{array}{r} 7+11=18\\ 5+15=20\\ 21\\ 12+6=18\\ 8+7=15\\ 6+9=15\\ 13\\ 0\\ 8\\ 7\\ 12\\ 12+8=20\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 11+13=24\\ 9+12=21\\ 8\\ 9+17=26\\ 8+11=19\\ 7\\ 12\\ 17+16=33\\ 17+12=29 \end{array}$	$\begin{array}{c} 5+12=17\\ 7+8=15\\ 7+11=18\\ 10\\ 11\\ 12\\ 18+15=33\\ 18+16=34\\ 9\\ 7+12=19\\ 15+10=25\\ 0\\ 5+6=11\\ 14+16=30\\ 7+12=19\\ 12+14=26\\ 8+13=21\\ 0\\ 18+16=34\\ 11+18=29\\ 0\\ 18\\ 15\\ 11\\ \end{array}$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ 12\\ 1^{7}\\ 15+16=31\\ 15+12=27\\ 16\\ 16+17=33\\ 9+17=26\end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\\ 18+15=33\\ 15\\ 12+13=25\\ 19\\ 12+6=18\\ 12\\ 6+8=14\\ \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ 16+12=28\\ 12+18=30\\ 19+18=37\\ 17\\ 12\\ 15+6=21\\ 17+12=29\\ \end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	$\begin{array}{c} 7+11=18\\ 5+15=20\\ 21\\ 12+6=18\\ 8+7=15\\ 6+9=15\\ 13\\ 0\\ 0\\ 8\\ 7\\ 12\\ 12+8=20\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 11+13=24\\ 9+12=21\\ 8\\ 9+17=26\\ 8+11=19\\ 7\\ 12\\ 17+16=33\\ 17+12=29\\ 18\\ \end{array}$	$\begin{array}{r} 5+12=17\\ 7+8=15\\ 7+11=18\\ 10\\ 11\\ 12\\ 18+15=33\\ 18+16=34\\ 9\\ 7+12=19\\ 15+10=25\\ 0\\ 5+6=11\\ 14+16=30\\ 7+12=19\\ 12+14=26\\ 8+13=21\\ 0\\ 18+16=34\\ 11+18=29\\ 0\\ 18\\ 15\\ 11\\ 15\\ 11\\ 15\end{array}$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ 12\\ 1^{7}\\ 15+16=31\\ 15+12=27\\ 16\\ 16+17=33\\ 9+17=26\\ 16+17=33\\ \end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\\ 18+15=33\\ 15\\ 12+13=25\\ 19\\ 12+6=18\\ 12\\ 6+8=14\\ 16\\ \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ 16+12=28\\ 12+18=30\\ 19+18=37\\ 17\\ 12\\ 15+6=21\\ 17+12=29\\ 19+8=27\\ \end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	$\begin{array}{r} 7+11=18\\ 5+15=20\\ 21\\ 12+6=18\\ 8+7=15\\ 6+9=15\\ 13\\ 0\\ 8\\ 7\\ 12\\ 12+8=20\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 11+13=24\\ 9+12=21\\ 8\\ 9+17=26\\ 8+11=19\\ 7\\ 12\\ 17+16=33\\ 17+12=29\\ 18\\ 17+12=29\\ 18\\ 17+12=29\end{array}$	$\begin{array}{r} 5+12=17\\ 7+8=15\\ 7+11=18\\ 10\\ 11\\ 12\\ 18+15=33\\ 18+16=34\\ 9\\ 7+12=19\\ 15+10=25\\ 0\\ 5+6=11\\ 14+16=30\\ 7+12=19\\ 12+14=26\\ 8+13=21\\ 0\\ 18+16=34\\ 11+18=29\\ 0\\ 18\\ 15\\ 11\\ 15\\ 15\\ 15\\ 15\\ 15\\ 15\\ 15\\ 15$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ 12\\ 1^{7}\\ 15+16=31\\ 15+12=27\\ 16\\ 16+17=33\\ 9+17=26\\ 16+17=33\\ 12+8=20\\ \end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\\ 18+15=33\\ 15\\ 12+13=25\\ 19\\ 12+6=18\\ 12\\ 6+8=14\\ 16\\ 11+11=22 \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ 16+12=28\\ 12+18=30\\ 19+18=37\\ 17\\ 12\\ 15+6=21\\ 17+12=29\\ 19+8=27\\ 12+9=21\\ \end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	$\begin{array}{r} 7+11=18\\ 5+15=20\\ 21\\ 12+6=18\\ 8+7=15\\ 6+9=15\\ 13\\ 0\\ 0\\ 8\\ 7\\ 12\\ 12+8=20\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 11+13=24\\ 9+12=21\\ 8\\ 9+17=26\\ 8+11=19\\ 7\\ 12\\ 17+16=33\\ 17+12=29\\ 18\\ 17+12=29\\ 18\\ 17+12=29\\ 17+18=35\\ \end{array}$	$\begin{array}{c} 5+12=17\\ 7+8=15\\ 7+11=18\\ 10\\ 11\\ 12\\ 18+15=33\\ 18+16=34\\ 9\\ 7+12=19\\ 15+10=25\\ 0\\ 5+6=11\\ 14+16=30\\ 7+12=19\\ 12+14=26\\ 8+13=21\\ 0\\ 18+16=34\\ 11+18=29\\ 0\\ 18\\ 15\\ 11\\ 15\\ 11\\ 15\\ 15\\ 11\\ 15\\ 11\\ 15\\ 11\\ 11$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ 12\\ 1^{7}\\ 15+16=31\\ 15+12=27\\ 16\\ 16+17=33\\ 9+17=26\\ 16+17=33\\ 12+8=20\\ 9+8=17\\ \end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\\ 18+15=33\\ 15\\ 12+13=25\\ 19\\ 12+6=18\\ 12\\ 6+8=14\\ 16\\ 11+11=22\\ 6+13=19\\ \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ 16+12=28\\ 12+18=30\\ 19+18=37\\ 17\\ 12\\ 15+6=21\\ 17+12=29\\ 19+8=27\\ 12+9=21\\ 19+17=36\\ \end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27	$\begin{array}{c} 7+11=18\\ 5+15=20\\ 21\\ 12+6=18\\ 8+7=15\\ 6+9=15\\ 13\\ 0\\ 8\\ 7\\ 12\\ 12+8=20\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 9+17=26\\ 8+11=19\\ 7\\ 12\\ 17+16=33\\ 17+12=29\\ 18\\ 17+12=29\\ 18\\ 17+12=29\\ 18\\ 17+18=35\\ 18\\ \end{array}$	$\begin{array}{r} 5+12=17\\ 7+8=15\\ 7+11=18\\ 10\\ 11\\ 12\\ 18+15=33\\ 18+16=34\\ 9\\ 7+12=19\\ 15+10=25\\ 0\\ 5+6=11\\ 14+16=30\\ 7+12=19\\ 12+14=26\\ 8+13=21\\ 0\\ 18+16=34\\ 11+18=29\\ 0\\ 18+16=34\\ 11+18=29\\ 0\\ 18\\ 15\\ 11\\ 15\\ 15\\ 11\\ 15\\ 15\\ 11\\ 17+6=23\\ \end{array}$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ 12\\ 1^{7}\\ 15+16=31\\ 15+12=27\\ 16\\ 16+17=33\\ 9+17=26\\ 16+17=33\\ 12+8=20\\ 9+8=17\\ 16+15=31\\ \end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\\ 18+15=33\\ 15\\ 12+13=25\\ 19\\ 12+6=18\\ 12\\ 6+8=14\\ 16\\ 11+11=22\\ 6+13=19\\ 17\\ \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ 16+12=28\\ 12+18=30\\ 19+18=37\\ 17\\ 12\\ 15+6=21\\ 17+12=29\\ 19+8=27\\ 12+9=21\\ 19+17=36\\ 19+18=37\\ \end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	$\begin{array}{r} 7+11=18\\ 5+15=20\\ 21\\ 12+6=18\\ 8+7=15\\ 6+9=15\\ 13\\ 0\\ 0\\ 8\\ 7\\ 12\\ 12+8=20\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 11+13=24\\ 9+12=21\\ 8\\ 9+17=26\\ 8+11=19\\ 7\\ 12\\ 17+16=33\\ 17+12=29\\ 18\\ 17+12=29\\ 18\\ 17+12=29\\ 17+18=35\\ \end{array}$	$\begin{array}{c} 5+12=17\\ 7+8=15\\ 7+11=18\\ 10\\ 11\\ 12\\ 18+15=33\\ 18+16=34\\ 9\\ 7+12=19\\ 15+10=25\\ 0\\ 5+6=11\\ 14+16=30\\ 7+12=19\\ 12+14=26\\ 8+13=21\\ 0\\ 18+16=34\\ 11+18=29\\ 0\\ 18\\ 15\\ 11\\ 15\\ 11\\ 15\\ 15\\ 11\\ 15\\ 11\\ 15\\ 11\\ 11$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ 12\\ 1^{7}\\ 15+16=31\\ 15+12=27\\ 16\\ 16+17=33\\ 9+17=26\\ 16+17=33\\ 12+8=20\\ 9+8=17\\ \end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\\ 18+15=33\\ 15\\ 12+13=25\\ 19\\ 12+6=18\\ 12\\ 6+8=14\\ 16\\ 11+11=22\\ 6+13=19\\ \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ 16+12=28\\ 12+18=30\\ 19+18=37\\ 17\\ 12\\ 15+6=21\\ 17+12=29\\ 19+8=27\\ 12+9=21\\ 19+17=36\\ \end{array}$
0	2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 22 23 24 25 26 27 28 29	$\begin{array}{c} 7+11=18\\ 5+15=20\\ 21\\ 12+6=18\\ 8+7=15\\ 6+9=15\\ 13\\ 0\\ 8\\ 7\\ 12\\ 12+8=20\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 9+12=21\\ 8\\ 9+17=26\\ 8+11=19\\ 7\\ 12\\ 17+16=33\\ 17+12=29\\ 18\\ 17+12=29\\ 18\\ 17+12=29\\ 18\\ 17+18=35\\ 18\\ \end{array}$	$\begin{array}{r} 5+12=17\\ 7+8=15\\ 7+11=18\\ 10\\ 11\\ 12\\ 18+15=33\\ 18+16=34\\ 9\\ 7+12=19\\ 15+10=25\\ 0\\ 5+6=11\\ 14+16=30\\ 7+12=19\\ 12+14=26\\ 8+13=21\\ 0\\ 18+16=34\\ 11+18=29\\ 0\\ 18+16=34\\ 11+18=29\\ 0\\ 18\\ 15\\ 11\\ 15\\ 15\\ 11\\ 15\\ 15\\ 11\\ 17+6=23\\ \end{array}$	$\begin{array}{c} 13\\ 10\\ 17\\ 11\\ 2\\ 8\\ 14\\ 12\\ 12+6=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 10+8=18\\ 12+8=20\\ 7+11=18\\ 12+8=20\\ 11+16=27\\ 12+16=28\\ 12+7=19\\ 12\\ 1^{7}\\ 15+16=31\\ 15+12=27\\ 16\\ 16+17=33\\ 9+17=26\\ 16+17=33\\ 12+8=20\\ 9+8=17\\ 16+15=31\\ \end{array}$	$\begin{array}{c} 12\\ 9\\ 11\\ 10\\ 5+17=22\\ 12+8=20\\ 13+10=23\\ 8\\ 12+8=20\\ 10+14=24\\ 18\\ 14+16=30\\ 5\\ 11+11=22\\ 17\\ 19+16=35\\ 8\\ 18+15=33\\ 15\\ 12+13=25\\ 19\\ 12+6=18\\ 12\\ 6+8=14\\ 16\\ 11+11=22\\ 6+13=19\\ 17\\ \end{array}$	$\begin{array}{r} 9+11=20\\ 12+8=20\\ 12+6=18\\ 8+16=24\\ 12+12=24\\ 12+17=29\\ 15+18=33\\ 8+4=12\\ 9+10=19\\ 9+17=26\\ 17\\ 16+12=28\\ 8+12=20\\ 11+5=16\\ 18+6=24\\ 15+14=29\\ 16+14=30\\ 16+12=28\\ 12+18=30\\ 19+18=37\\ 17\\ 12\\ 15+6=21\\ 17+12=29\\ 19+8=27\\ 12+9=21\\ 19+17=36\\ 19+18=37\\ \end{array}$

Table 2. Right hand observation for Asthma Patients and Control's Ridge Counts

of information due to its uniqueness and permanence features. The fingerprints have general ridges patterns which are grouped as loops, whorls and arches. The dermal ridges differentiation takes place early in the foetal development which is established in the third month of gestation period approximately from 4th to 10th week of gestation (Gupta *et al.*, 2003). Thus the genetic make up and environmental factors are responsible to affect the total finger ridge number.

Dermatoglyphics patterns have polygenic inheritance and it is a diagnostic tool for understanding the genetics of many diseases such as Down's syndrome, Kilnfelter's syndrome as well as in several chronic diseases like Diabetes Mellitus, Lung Tuberculosis and bronchial asthma (Holt *et al.*, 1961; Platto *et al.*, 1973).

	I	тс	PC	DC	а	b	с	d	t	atd	тн	PF	MF	RF	LF
	1	V	V	V	a N	N	v	v	۲	atu	UL	RL		UL	UL
	2	Ň	Ň	v	N	N	Ň	Ň	v		DLW	DLW	SA	DLW	UL
	3	V	V	v	N	N	N	N	Ň	34°	SLW	SLW	UL	DLW	SLW
	4	Ň	v	v	N	N	N	N	N	32°	UL	UL	UL	SLW	UL
	5	V	v	v	N	N	N	N	N	42°	UL	UL	SA	UL	UL
	6	N	V	V	N	N	N	N	N	42°	DLW	RL	UL	UL	UL
	7	N	V	N	N	N	N	N	N	39°	UL	CPW	UL	UL	UL
	8	N	V	V	N	N	N	N	Ν	34°	SLW	UL	UL	SLW	UL
	9	Ν	V	N	Ν	Ν	Ν	Ν	V		CPW	SLW	DLW	CPW	CPW
	10	Ν	V	V	Ν	N	Ν	Ν	Ν	34°	UL	SA	UL	DLW	UL
	11	Ν	Ν	V	Ν	Ν	Ν	Ν	Ν	40°	SLW	DLW	SLW	DLW	UL
S	12	Ν	V	Ν	Ν	Ν	Ν	Ν	Ν	46°	UL	CPW	UL	SLW	UL
Ĭ	13	Ν	V	V	Ν	Ν	Ν	Ν	V		UL	UL	UL	UL	UL
ASTHMA PATIENTS	14	V	Ν	V	Ν	Ν	Ν	Ν	Ν	39°	UL	RL	CPW	SLW	UL
ΡĄ	15	Ν	V	V	Ν	Ν	Ν	Ν	Ν	33°	DLW	DLW	SLW	SLW	UL
٩V	16	Ν	Ν	V	Ν	Ν	Ν	Ν	Ν	41°	SA	UL	UL	UL	SA
H	17	V	N	N	Ν	Ν	Ν	Ν	Ν	36°	SA	DLW	SLW	SLW	SLW
ST	18	V	V	V	Ν	Ν	Ν	Ν	Ν	36°	SA	SA	UL	SLW	SLW
1	19	V	V	V	Ν	Ν	Ν	Ν	Ν	42°	UL	UL	UL	UL	UL
	20	Ν	V	V	Ν	Ν	Ν	Ν	Ν	41°	DLW	TA	UL	CPW	UL
	21	V	V	N	Ν	Ν	Ν	Ν	V		UL	UL	MUL	UL	DLW
	22	V	V	N	Ν	Ν	Ν	Ν	V		DLW	DLW	MUL	UL	UL
	23	V	V	V	Ν	Ν	Ν	Ν	Ν	33°	DLW	UL	UL	UL	UL
	24	V	V	V	Ν	Ν	Ν	Ν	Ν	33°	UL	RL	UL	SLW	UL
	25	N	N	V	Ν	N	N	N	N	30°	DLW	DLW	UL	SLW	DLW
	26	V	N	V	Ν	N	N	N	N	32°	UL	UL	UL	UL	UL
	27	V	V	V	N	V	N	N	N	34°	UL	DLW	DLW	DLW	CPW
	28	V	V	N	N	V	N	N	N	35°	UL	UL	UL	SLW	UL
	29	V	N	V	N	N	N	N	N	41°	UL	SLW	UL	SLW	UL
	30 31	N N	V V	V V	N N	N N	N N	N	N	39° 36°	SLW	CPW	UL	SLW SLW	SLW
	31	IN	v	v	IN	IN .	IN	N	N	30	SLW	DLW	UL	SLVV	UL
	1	N	N	v	N	N	N	N	N	40	UL	UL	UL	UL	UL
	2	N	N	v	N	N	N	N	N	40	SLW	SLW			SLW
	3	N	V	Ň	N	N	N	N	N	42	SLW	SLW		UL	SLW
	4	N	Ň	N	N	N	N	N	N	43	UL	CPW	UL	UL	SLW
	5	N	N	N	N	N	N	N	N	40	CPW	UL	UL	UL	SLW
	6	N	N	N	N	N	N	N	N	41	CPW	UL	RL	SLW	DLW
	7	N	V	N	N	N	N	N	N	42	CPW	UL	UL	SLW	CPW
	8	N	v	N	N	N	N	N	N	42	UL	DLW	UL	SLW	CPW
	9	N	N	N	N	N	N	N	N	40	SA	DLW	UL	UL	DLW
	10	N	N	V	N	N	N	N	N	43	UL	UL	SLW	DLW	SLW
	11	Ν	N	N	N	N	Ν	Ν	Ν	41					
	12	V								41	UL	SLW	SLW	DLW	SLW
	-		N	N	N	Ν	Ν	N	Ν	41		SLW SLW	SLW SLW	DLW UL	UL
	13	V	N	N V	N N	N N	N N	N N	N N		-		-		
	13 14	V V								41	UL	SLW	SLW	UL	UL
SOL		-	Ν	V	Ν	Ν	Ν	N	N	41 42	UL DLW	SLW SA	SLW SLW	UL DLW	UL SLW CPW SLW
NTROL	14	V	N N	V V	N N	N N	N N	N N N N	N N	41 42 0	UL DLW UL DLW UL	SLW SA DLW	SLW SLW SLW	UL DLW UL CPW UL	UL SLW CPW
CONTROL	14 15 16 17	V N N	N N N N	V V N N	N N N N	N N N N	N N N N N N	N N N N	N N N N	41 42 0 42 40 43	UL DLW UL DLW UL CPW	SLW SA DLW DLW DLW SLW	SLW SLW SLW CPW DLW DLW	UL DLW UL CPW UL CPW	UL SLW CPW SLW DLW DLW
CONTROL	14 15 16 17 18	V N N N	N N N N V	V N N V	N N N N N N N	N N N N N		N N N N N	N N N N N	41 42 0 42 40 43 42	UL DLW UL DLW UL CPW CPW	SLW SA DLW DLW DLW SLW CPW	SLW SLW SLW CPW DLW DLW DLW	UL DLW UL CPW UL CPW UL	UL SLW CPW SLW DLW DLW SLW
CONTROL	14 15 16 17 18 19		N N N V N	> N N N N	N N N N N	N N N N N N N	N N N N N N N N	N N N N N N	N N N N N N	41 42 0 42 40 43 42 40 40	UL DLW UL DLW UL CPW CPW RL	SLW SA DLW DLW DLW SLW CPW SA	SLW SLW SLW CPW DLW DLW DLW CPW	UL DLW UL CPW UL CPW UL SLW	UL SLW CPW SLW DLW DLW SLW CPW
CONTROL	14 15 16 17 18 19 20		N N N N V N N N	V N N V N N	N N N N N N	N N N N N N	Z Z Z Z Z Z Z	N N N N N N	N N N N N N N N N N N N N N N N N N N	41 42 0 42 40 43 42 40 40 42	UL DLW UL UL CPW CPW RL SLW	SLW SA DLW DLW SLW CPW SA CPW	SLW SLW CPW DLW DLW DLW CPW UL	UL DLW UL CPW UL CPW UL SLW UL	UL SLW CPW SLW DLW DLW SLW CPW CPW
CONTROL	14 15 16 17 18 19 20 21	V N N N V N N	N N N V V N V	V N N V N N N	N N N N N N N	N N N N N N N	Z Z Z Z Z Z Z Z	N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	41 42 0 42 40 43 42 40 42 40 42 41	UL DLW UL UL CPW CPW RL SLW SLW	SLW SA DLW DLW SLW CPW SA CPW SLW	SLW SLW CPW DLW DLW DLW CPW UL CPW	UL DLW UL CPW UL CPW UL SLW UL CPW	UL SLW CPW SLW DLW SLW CPW CPW SLW
CONTROL	14 15 16 17 18 19 20 21 22		N N N V N N V N	V N N V N N N N N N N	N N N N N N N N N	N N	Z Z Z Z Z Z Z Z Z	N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N N N N N N	41 42 0 42 40 43 42 40 42 40 42 41 40	UL DLW UL CPW CPW RL SLW SLW RL	SLW SA DLW DLW SLW CPW SA CPW SLW SA	SLW SLW CPW DLW DLW CPW UL CPW SLW	UL DLW UL CPW UL CPW UL SLW UL CPW UL	UL SLW CPW SLW DLW SLW CPW CPW SLW UL
CONTROL	14 15 16 17 18 19 20 21 22 23		N N N N V N N V N N	> N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N <t< td=""><td>2 2 2 2 2 2 2 2 2 2 2</td><td>Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z</td><td></td><td>41 42 0 42 40 43 42 40 42 41 40 0</td><td>UL DLW UL CPW CPW RL SLW SLW RL UL</td><td>SLW SA DLW DLW SLW CPW SA CPW SLW SA UL</td><td>SLW SLW CPW DLW DLW CPW UL CPW SLW UL</td><td>UL DLW UL CPW UL CPW UL SLW UL CPW UL DLW</td><td>UL SLW CPW SLW DLW SLW CPW CPW SLW UL UL</td></t<>	2 2 2 2 2 2 2 2 2 2 2	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z		41 42 0 42 40 43 42 40 42 41 40 0	UL DLW UL CPW CPW RL SLW SLW RL UL	SLW SA DLW DLW SLW CPW SA CPW SLW SA UL	SLW SLW CPW DLW DLW CPW UL CPW SLW UL	UL DLW UL CPW UL CPW UL SLW UL CPW UL DLW	UL SLW CPW SLW DLW SLW CPW CPW SLW UL UL
CONTROL	14 15 16 17 18 19 20 21 22 23 23 24	> Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	N N N N N N N N N N N N N N N N N N N	>	N N N N N N N N N N N N N N N N N N N	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	2 2 2 2 2 2 2 2 2 2 2 2			41 42 0 42 40 43 42 40 42 41 40 0 42	UL DLW UL CPW CPW RL SLW SLW RL UL CPW	SLW SA DLW DLW SLW CPW SA CPW SLW SA UL UL	SLW SLW SLW CPW DLW DLW CPW UL CPW SLW UL DLW	UL DLW UL CPW UL SLW UL CPW UL DLW UL	UL SLW CPW SLW DLW SLW CPW CPW SLW UL UL SLW
CONTROL	14 15 16 17 18 19 20 21 22 23 24 25		N N N N N N N N N N N N N N N N N N N	>	N N N N N N N N N N N N N N N N N N N	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			41 42 0 42 40 43 42 40 42 41 40 0 42 43	UL DLW UL CPW CPW RL SLW SLW RL UL CPW CPW	SLW SA DLW DLW SLW CPW SA CPW SA CPW SLW SA UL UL UL	SLW SLW SLW CPW DLW DLW CPW UL CPW SLW UL DLW SLW	UL DLW UL CPW UL SLW UL CPW UL UL DLW UL	UL SLW CPW SLW DLW SLW CPW CPW SLW UL UL SLW SLW
CONTROL	14 15 16 17 18 19 20 21 22 23 24 25 26		N N N N	>		Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	2222222222222			41 42 0 42 40 43 42 40 42 41 40 0 42 43 40	UL DLW UL CPW CPW RL SLW SLW RL UL CPW CPW UL	SLW SA DLW DLW SLW CPW SA CPW SA CPW SLW SLW UL UL UL	SLW SLW SLW CPW DLW DLW CPW UL CPW SLW UL DLW SLW SLW	UL DLW UL CPW UL SLW UL CPW UL DLW UL DLW UL	UL SLW CPW SLW DLW SLW CPW CPW CPW SLW UL UL SLW SLW SLW
CONTROL	14 15 16 17 18 19 20 21 22 23 24 25 26 27		N N N N N N N N N N N N N N N N N N N	> > z z z > z z z z z z z >	N N N N N N N N N N N N N N N N N N N	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	22222222222222			41 42 0 42 40 43 42 40 42 41 40 0 42 43 40 43	UL DLW UL CPW CPW RL SLW SLW KL UL CPW CPW UL SLW	SLW SA DLW DLW SLW CPW SA CPW SLW SLW SLW UL UL UL UL	SLW SLW SLW CPW DLW DLW CPW UL CPW SLW UL DLW SLW SLW CPW	UL DLW CPW UL SLW UL SLW UL DLW UL DLW UL DLW	UL SLW CPW SLW DLW SLW CPW CPW SLW UL SLW SLW SLW SLW SLW
CONTROL	14 15 16 17 18 19 20 21 22 23 24 25 26 27 28		N N N N N N N N N N N N N N N N N N N N N N N N N N	>	$\begin{array}{c} N \\ N $	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	N N N N N N N N N N N N N N N N N N N	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	41 42 0 42 40 43 42 40 42 41 40 0 42 43 40 43 42	UL DLW UL CPW CPW RL SLW SLW KL UL CPW CPW UL SLW SLW	SLW SA DLW DLW SLW CPW SA CPW SA CPW SLW SA UL UL UL UL UL	SLW SLW SLW CPW DLW DLW CPW UL CPW SLW UL DLW SLW SLW CPW CPW	UL DLW UL CPW UL SLW UL DLW UL DLW UL DLW SLW	UL SLW CPW SLW DLW SLW CPW CPW SLW UL SLW SLW SLW SLW SLW DLW
CONTROL	14 15 16 17 18 20 21 22 23 24 25 26 27 28 29	> z z z z > z z z > z z z z z z z z z z	N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N	> > z z z > z z z z z z z z z z z z	$\begin{array}{c} \mbox{$\Sigma$} \mbox{$X$} \mbo$	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z		Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	41 42 0 42 40 43 42 40 42 41 40 0 42 43 40 43 40 43 42 40	UL DLW UL CPW CPW RL SLW SLW RL UL CPW CPW UL SLW SLW UL	SLW SA DLW DLW SLW CPW SA CPW SA UL UL UL UL UL UL UL UL	SLW SLW SLW CPW DLW DLW CPW UL CPW SLW UL DLW SLW SLW SLW SLW	UL DLW UL CPW UL SLW UL CPW UL DLW UL DLW UL DLW UL SLW UL	UL SLW CPW DLW DLW SLW CPW CPW SLW UL UL SLW SLW SLW SLW SLW SLW
CONTROL	14 15 16 17 18 19 20 21 22 23 24 25 26 27 28		N N N N N N N N N N N N N N N N N N N N N N N N N N	>	$\begin{array}{c} N \\ N $	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	N N N N N N N N N N N N N N N N N N N	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z Z	41 42 0 42 40 43 42 40 42 41 40 0 42 43 40 43 42	UL DLW UL CPW CPW RL SLW SLW KL UL CPW CPW UL SLW SLW	SLW SA DLW DLW SLW CPW SA CPW SA CPW SLW SA UL UL UL UL UL	SLW SLW SLW CPW DLW DLW CPW UL CPW SLW UL DLW SLW SLW CPW CPW	UL DLW UL CPW UL SLW UL DLW UL DLW UL DLW SLW	UL SLW CPW SLW DLW SLW CPW CPW SLW UL SLW SLW SLW SLW SLW DLW

Table 3. Analysis of Right hand Finger Prints for Asthma Patients and Control

Dermatoglyphics in Asthma

Since atopic asthma is a genetically transmitted disease but several studies had identified that there is some correlation between asthma and dermatoglyphics. Thus the fingerprints represent a non-invasive genetic marker in early detection of bronchial asthma and its treatment. The present study is based on dermatoglyphics changes with respect to asthma patients.

		TC	PC	DC	а	b	с	d	t	atd	TH	PF	MF	RF	LF
	1	V	V	V	N	N	N	N	N	39°	UL	UL	UL	UL	UL
	2	V	V	V	Ν	N	N	N	N	45°	DLW	SLW	UL	UL	UL
	3	V	V	V	N	N	N	N	abs		DLW	UL	SLW	SLW	UL
	4	Ν	Ν	V	Ν	Ν	N	N	N	35°	UL	UL	UL	UL	UL
	5	Ν	V	V	Ν	Ν	N	N	N	38°	UL	SA	UL	UL	UL
	6	V	V	V	Ν	Ν	N	N	N	45°	DLW	RL	UL	UL	UL
	7	Ν	V	V	Ν	Ν	Ν	N	N	39°	UL	RL	UL	UL	UL
	8	Ν	V	Ν	Ν	Ν	Ν	N	N	35°	UL	UL	UL	UL	UL
	9	N	N	Ν	Ν	N	N	N	N	32°	SLW	CPW	DLW	SLW	UL
	10	Ν	V	Ν	Ν	N	N	Ν	N	32°	UL	UL	UL	UL	UL
	11	Ν	Ν	V	Ν	Ν	Ν	Ν	abs		SLW	DLW	DLW	UL	UL
	12	N	V	N	N	N	N	N	N	52°	UL	UL	UL	SLW	UL
ST	13	V	V	V	N	N	N	N	N	32°	UL	UL	UL	SLW	UL
ASTHMA PATIENTS	14	N	V	V	N	N	N	N	N	35° 32°	UL	UL	DLW	DLW	UL
AT	15	N	N	N	N	N	N	N	N	32 42°	UL	DLW	UL UL	UL SLW	SLW
ΑP	16	N V	N N	N N	N	N	N	N N	N	42 45°	RL	SA	UL		SLW
È	17 18	V	N V	V	N N	N N	N N	N	N N	45 38°	DLW DLW	DLW SLW	UL	DLW UL	UL UL
E	19	v	V	V	N	N	N	N	N	43°	UL	UL	UL	UL	UL
AS	20	Ň	v	v	N	N	N	N	N	40°	UL	UL	SLW	SLW	DLW
	21	V	v	v	N	N	N	N	N	34°	UL	UL	UL	SLW	UL
	22	N	N	N	N	N	N	N	abs	-	DLW	DLW	UL	UL	UL
	23	N	V	V	N	N	N	N	N	32°	UL	UL	UL	SLW	UL
	24	V	V	V	Ν	Ν	N	N	N	39°	UL	UL	RL	UL	UL
	25	Ν	V	V	Ν	Ν	N	N	N	38°	DLW	DLW	DLW	SLW	DLW
	26	Ν	V	V	Ν	Ν	N	N	abs		UL	UL	UL	UL	UL
	27	V	V	V	Ν	Ν	N	N	N	43°	UL	DLW	DLW	CPW	UL
	28	N	V	V	Ν	N	N	N	N	35°	UL	UL	UL	UL	UL
	29	Ν	V	V	Ν	Ν	N	N	N	49°	SLW	SLW	SLW	SLW	UL
	30	Ν	Ν	Ν	Ν	N	N	Ν	N	42°	CPW	UL	DLW	SLW	SLW
	31	Ν	V	V	Ν	Ν	Ν	N	N	42°	SLW	RL	UL	RL	DLW
-	1	v	v			N	N	N			UL	SLW		UL	
	1	v		N	N	N	N	N	abs				UL		DLW
	2	N	1/	N			N	N	N	42	111			1 1 1 1	
	2	N	V	N	N	N	N	N	N	42		SLW	SLW	UL	SLW
	3	Ν	V	Ν	Ν	Ν	N	N	N	41	SLW	UL	SLW	UL	DLW
	3 4	N V	V V	N N	N N	N N	N N	N N	N N	41 40	SLW SLW	UL CPW	SLW SLW	UL UL	DLW SLW
	3 4 5	Ν	V V N	N N N	N N N	N N N	N N N	N N N	N N N	41 40 43	SLW SLW CPW	UL CPW UL	SLW SLW DLW	UL UL UL	DLW SLW CPW
	3 4	N V V	V V	N N	N N	N N	N N	N N	N N	41 40	SLW SLW	UL CPW	SLW SLW	UL UL	DLW SLW
	3 4 5 6	N > > >	V V N N	N N N V	N N N	N N N	N N N	N N N	N N N	41 40 43 41	SLW SLW CPW DLW	UL CPW UL SLW	SLW SLW DLW DLW	UL UL CPW	DLW SLW CPW SLW
	3 4 5 6 7	Z > > > Z		N N V N	N N N N	N N N N	N N N N	N N N N	N N N N	41 40 43 41	SLW SLW CPW DLW UL	UL CPW UL SLW UL	SLW SLW DLW DLW SLW	UL UL CPW DLW	DLW SLW CPW SLW RL
	3 4 5 6 7 8	N N N <td>> > z z z z</td> <td>N N V N V</td> <td>N N N N N</td> <td>N N N N N</td> <td>N N N N N</td> <td>N N N N N</td> <td>N N N N abs</td> <td>41 40 43 41 42</td> <td>SLW SLW CPW DLW UL SLW</td> <td>UL CPW UL SLW UL CPW</td> <td>SLW SLW DLW DLW SLW UL</td> <td>UL UL CPW DLW SLW</td> <td>DLW SLW CPW SLW RL SLW</td>	> > z z z z	N N V N V	N N N N N	N N N N N	N N N N N	N N N N N	N N N N abs	41 40 43 41 42	SLW SLW CPW DLW UL SLW	UL CPW UL SLW UL CPW	SLW SLW DLW DLW SLW UL	UL UL CPW DLW SLW	DLW SLW CPW SLW RL SLW
	3 4 5 6 7 8 9	<pre>< > < <</pre>	> > > > > > > > >	N N V N V V	N N N N N	N N N N N N	N N N N N N	N N N N N N	N N N N abs N	41 40 43 41 42 42 42	SLW SLW CPW DLW UL SLW SA	UL CPW UL SLW UL CPW SLW DLW DLW	SLW SLW DLW SLW UL DLW CPW DLW	UL UL CPW DLW SLW DLW SLW UL	DLW SLW CPW SLW RL SLW UL
	3 4 5 6 7 8 9 10 11 12	z < < z < < z	> > z z z z > > z z z	N N V N V N N N	N N N N N N N N	N N N N N N N N N	N N N N N N N N	N N N N N N N N	N N N N abs N N N N	41 40 43 41 42 42 42 42 41 40	SLW SLW CPW DLW UL SLW SA UL SLW DLW	UL CPW UL SLW UL CPW SLW DLW SLW	SLW SLW DLW SLW UL DLW CPW DLW SLW	UL UL CPW DLW SLW DLW SLW UL CPW	DLW SLW CPW SLW RL SLW UL CPW UL UL DLW
	3 4 5 6 7 8 9 10 11 12 13	z > > z > > > z > > z > > z >	> > z z z z > > z z >	N N V N V V N N N V	N N N N N N N N N	N N N N N N N N N N N	N N N N N N N N N	N N N N N N N N N	N N N N abs N N N N N	41 40 43 41 42 42 42 42 41	SLW SLW CPW UL SLW SA UL SLW DLW DLW	UL CPW UL SLW UL CPW SLW DLW DLW SLW CPW	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW	UL UL CPW DLW SLW DLW SLW UL CPW DLW	DLW SLW CPW SLW SLW UL CPW UL DLW UL
	3 4 5 6 7 8 9 10 11 12 13 14	z > > z > > > z > > z > z > z > z > z >	> > z z z z > > z z > >	N N V N V N N N V V V V V V V V V V V V	N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N	N N N N N N N N N N	N N N abs N N N N N N abs	41 40 43 41 42 42 42 42 41 40 43	SLW SLW CPW UL SLW SA UL SLW DLW UL	UL CPW UL SLW UL CPW SLW DLW DLW SLW CPW SLW	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW	UL UL CPW DLW SLW DLW SLW UL CPW DLW DLW	DLW SLW CPW SLW SLW UL CPW UL DLW UL CPW
ROL	3 4 5 6 7 8 9 10 11 12 13 14 15	z > > z > > > > z > > z > > z > z > z >	> z z z z > z z > z z	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N	N N N N N N N N N N N N N	N N N abs N N N N N N abs N	41 40 43 41 42 42 42 42 41 40 43 41	SLW SLW CPW UL SLW SA UL SLW DLW UL SLW	UL CPW UL SLW UL CPW SLW DLW DLW SLW CPW SLW	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW	UL UL CPW DLW SLW DLW SLW UL CPW DLW DLW UL	DLW SLW CPW SLW SLW UL CPW UL DLW UL CPW CPW
NTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16	z > > z > > > > z > z > z > z > z > z >	>>zzz>>zzz>	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N	N N N abs N N N N abs N N	41 40 43 41 42 42 42 42 41 40 43 41 42	SLW SLW CPW UL SLW SA UL SLW DLW UL SLW DLW	UL CPW UL SLW CPW SLW DLW DLW SLW CPW SLW CPW UL	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW SLW	UL UL CPW DLW SLW DLW SLW UL CPW DLW DLW UL DLW	DLW SLW CPW SLW SLW UL CPW UL DLW UL CPW CPW SLW
CONTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17	z > > > > > > > z >	> > z z z z > > z z z > > > z z z > > z z > > z z > > z z z > > > z z z > > z z z > > z z z > > z z z > > z z z > > z z z > > z z z > > z z z z z z > > z z z z > > z z z z z z > > z	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N	N N N abs N N N abs N N N N N	41 40 43 41 42 42 42 42 41 40 43 41 42 43	SLW SLW CPW UL SLW SA UL SLW DLW UL SLW UL SLW UL	UL CPW UL SLW CPW SLW DLW DLW SLW CPW SLW CPW UL UL	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW SLW SLW CPW	UL UL CPW DLW SLW DLW SLW UL CPW DLW DLW UL UL UL SLW	DLW SLW CPW SLW UL CPW UL DLW UL CPW CPW SLW UL
CONTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18	z > > > > > > > > z > z > z > z >	> > <td></td> <td>N N N N N N N N N N N N N N N N N N N</td> <td></td> <td>N N N N N N N N N N N N N N N N N</td> <td>N N N N N N N N N N N N N N N N N N N</td> <td>N N N abs N N N abs N N N N N N</td> <td>41 40 43 41 42 42 42 41 40 43 41 41 42 43 41</td> <td>SLW SLW CPW DLW SLW SA UL SLW DLW UL SLW UL SLW UL SLW UL CPW</td> <td>UL CPW UL SLW UL CPW SLW DLW SLW CPW SLW CPW UL UL SLW</td> <td>SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW SLW SLW CPW DLW</td> <td>UL UL CPW DLW SLW DLW SLW UL CPW DLW DLW UL DLW SLW UL</td> <td>DLW SLW CPW SLW UL CPW UL DLW UL CPW CPW SLW UL DLW</td>		N N N N N N N N N N N N N N N N N N N		N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N abs N N N abs N N N N N N	41 40 43 41 42 42 42 41 40 43 41 41 42 43 41	SLW SLW CPW DLW SLW SA UL SLW DLW UL SLW UL SLW UL SLW UL CPW	UL CPW UL SLW UL CPW SLW DLW SLW CPW SLW CPW UL UL SLW	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW SLW SLW CPW DLW	UL UL CPW DLW SLW DLW SLW UL CPW DLW DLW UL DLW SLW UL	DLW SLW CPW SLW UL CPW UL DLW UL CPW CPW SLW UL DLW
CONTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19	z > > z > > > z > z > z > z > z >	> > z z z > > z z > > z z > > z	N N V N V V N N V V N N N N N N N N N	N N N N N N N N N N N N N N N N N N N		N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N abs N N N abs N N N N N N N	41 40 43 41 42 42 42 41 40 43 41 42 43 41 40	SLW SLW CPW DLW SLW SA UL SLW DLW UL SLW UL SLW UL SLW RL	UL CPW UL SLW CPW SLW DLW DLW SLW CPW UL UL SLW SA	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW SLW CPW DLW CPW	UL UL CPW DLW SLW UL CPW UL DLW DLW UL DLW SLW UL RL	DLW SLW CPW SLW SLW UL CPW UL DLW UL CPW CPW SLW UL DLW UL DLW
CONTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20	z > > z > > > > z > z > z > z > z > z >	> > z z z > > z z > > z z > > z z z > > z z > > z z > > z z > > z z > > z z z > > z z z > > z z z > > z z z > > z z z > > z z z > > z z z > > z z z > > z z z z > > z z z > > z z z > > z z z z > > z z z > > z z z z > > z z z > > z z z z > > z z z z > > z z z z > > z z z z > > z z z z > > z z z z > > z z z z z > > z z z z > > z	N N N V V V V V V N N V V V N N N N N N	N N N N N N N N N N N N N N N N N N N		N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N abs N N N N abs N N N N N N N N	41 40 43 41 42 42 42 41 40 43 41 42 43 41 40 41	SLW SLW CPW DLW SLW SA UL SLW DLW UL SLW UL SLW UL SLW SLW	UL CPW UL SLW CPW SLW DLW SLW CPW SLW CPW UL UL SLW SA CPW	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW SLW CPW DLW CPW UL	UL UL CPW DLW SLW DLW SLW UL CPW DLW UL UL UL UL UL UL SLW UL RL DLW	DLW SLW CPW SLW SLW UL CPW UL DLW UL CPW CPW SLW UL DLW UL SLW
CONTROL	3 4 5 6 7 8 9 10 11 11 12 13 14 15 16 17 17 18 19 20 21	z > > z > > > > z > z > > > > > > > > >	>>zzz>>zzz>>zzz>	N N V V V V V V V N N N N N N V V V N N V V V N V	N N N N N N N N N N N N N N N N N N N		N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N abs N N N abs N N N N N N N N N	41 40 43 41 42 42 42 41 40 43 41 42 43 41 40 41 42	SLW SLW CPW DLW SLW SA UL SLW DLW UL SLW UL CPW RL SLW SLW	UL CPW UL SLW CPW SLW DLW SLW CPW SLW CPW UL UL SLW SA CPW UL	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW SLW CPW DLW CPW UL DLW	UL UL CPW DLW SLW DLW SLW UL CPW DLW DLW UL UL SLW UL RL DLW UL	DLW SLW CPW SLW SLW UL CPW UL DLW UL CPW CPW SLW UL DLW UL SLW SLW
CONTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22	z > > > > > > > > > > > > > > > > > > >	>>zzz>>zz>>zz>>zz>>	N N N V N V V N N N V V N N N N N N N N	N N N N N N N N N N N N N N N N N N N		N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N abs N N N abs N N N N N N N N N N	41 40 43 41 42 42 42 41 40 43 41 42 43 41 40 41	SLW SLW CPW UL SLW SA UL SLW DLW UL SLW UL CPW RL SLW SLW DLW	UL CPW UL SLW CPW SLW DLW SLW CPW SLW CPW UL UL SLW SA CPW UL UL SLW	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW CPW DLW CPW UL UL UL SLW	UL UL CPW DLW SLW UL CPW DLW DLW UL DLW SLW UL RL DLW UL CPW	DLW SLW CPW SLW UL CPW UL DLW UL CPW UL CPW CPW SLW UL DLW UL SLW UL SLW
CONTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23	z > > z > < < < < < < < < < < < < < < <	>> z z z >> z z >> z z >> > z z >> >	N N N V N V V N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N		N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N abs N N N abs N N N N N N N N N N N N N N N N N N N	41 40 43 41 42 42 42 42 41 40 43 41 40 41 40 41 42 43 41 40 41 42 43	SLW SLW CPW DLW SLW SA UL SLW DLW UL SLW UL CPW RL SLW SLW SLW	UL CPW UL SLW CPW SLW DLW SLW CPW CPW UL UL SLW SA CPW UL UL SLW CPW UL CPW	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW CPW DLW CPW UL DLW SLW SLW SLW	UL UL CPW DLW SLW DLW SLW UL CPW DLW UL DLW SLW UL RL DLW UL CPW UL	DLW SLW CPW SLW UL CPW UL DLW UL CPW CPW CPW SLW UL DLW UL SLW SLW UL SLW UL
CONTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 17 18 19 20 21 22 23 24	z > > 2 < 2 < 2 < 2 < 2 < 2 < 2 < 2 < 2 <	>>zzzz>>zz>>zz>>	N N V V N V V N V V N V V N V V V V V V	N N N N N N N N N N N N N N N N N N N		N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N abs N N N abs N N N N N N N N N N N N N N N N N N N	41 40 43 41 42 42 42 41 40 43 41 40 41 42 43 41 40 41 42 43 41 40 41 42 43	SLW SLW CPW UL SLW SA UL SLW DLW UL SLW UL CPW RL SLW SLW UL UL	UL CPW UL SLW CPW DLW SLW CPW CPW CPW UL UL SLW SA CPW UL UL SLW CPW UL UL	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW CPW DLW CPW UL DLW SLW SLW SLW	UL UL CPW DLW SLW UL CPW DLW DLW UL DLW SLW UL SLW UL CPW UL CPW UL CPW	DLW SLW CPW SLW UL CPW UL DLW UL CPW CPW SLW UL DLW UL SLW SLW UL SLW
CONTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 7 8 9 9 20 21 22 23 24 25	z > > > > > > > > > > > > > > > > > > >	>>zzzz>>zz>>zz>>zz>>zzz>>zzz>>zzz>>zzz>>zzz>>zzz>>zzz>>zzz>>zzzz	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N		N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N abs N N N abs N N N N N N N N N N N N N N N N N N N	41 40 43 41 42 42 42 42 41 40 43 41 40 41 40 41 42 43 41 40 41 42 43	SLW SLW CPW UL SLW SA UL SLW DLW UL SLW UL CPW RL SLW SLW UL UL UL UL UL UL	UL CPW UL SLW UL CPW DLW SLW CPW CPW UL UL SLW SA CPW UL UL SLW SA	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW CPW DLW CPW UL DLW SLW SLW CPW UL DLW CPW	UL UL CPW DLW SLW UL CPW DLW DLW UL DLW SLW UL SLW UL RL DLW UL CPW UL DLW UL UL	DLW SLW CPW SLW UL CPW UL DLW UL CPW CPW SLW UL DLW UL SLW SLW SLW SLW
CONTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 17 18 19 20 21 22 23 24	z > > 2 < 2 < 2 < 2 < 2 < 2 < 2 < 2 < 2 <	>>zzzz>>zz>>zz>>	N N V V N V V N V V N V V N V V V V V V	N N N N N N N N N N N N N N N N N N N		N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N abs N N N abs N N N N N N N N N N N N N N N N N N N	41 40 43 41 42 42 42 41 40 43 41 40 41 42 43 41 40 41 42 43 41 40 41 42 43 40 41 40 41 40 41 40 41 40 41 40 41 42 42 42 42 42 42 42 42 42 42 42 42 42	SLW SLW CPW UL SLW SA UL SLW DLW UL SLW UL CPW RL SLW SLW UL UL	UL CPW UL SLW CPW DLW SLW CPW CPW CPW UL UL SLW SA CPW UL UL SLW CPW UL UL	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW CPW DLW CPW UL DLW SLW SLW SLW	UL UL CPW DLW SLW UL CPW DLW DLW UL DLW SLW UL SLW UL CPW UL CPW UL CPW	DLW SLW CPW SLW UL CPW UL DLW UL CPW CPW SLW UL DLW UL SLW SLW UL SLW
CONTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 7 8 9 20 21 22 23 24 25 26	z > > > < < < < < < < < < < < < < < < <	>>zzz>>zzz>>zz>>zz>>zz>>zz>>	N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N		N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N abs N N N abs N N N N N N N N N N N N N N N N N N N	41 40 43 41 42 42 42 41 40 43 41 40 41 42 43 41 40 41 42 43 41 40 41 42 43 40 41 40 41 40 41 40 41 40 41 40 41 42 42 42 42 42 42 42 42 42 42 42 42 42	SLW SLW CPW UL SLW SA UL SLW DLW UL SLW UL CPW RL SLW SLW UL UL UL SLW SLW	UL CPW UL SLW DLW SLW DLW SLW CPW CPW UL UL SLW SA CPW UL UL SLW SA CPW UL DLW	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW CPW DLW CPW UL DLW SLW CPW UL DLW SLW UL DLW SLW	UL UL CPW DLW SLW DLW SLW UL CPW DLW UL UL SLW UL RL DLW UL CPW UL CPW UL UL UL UL UL	DLW SLW CPW SLW UL CPW UL DLW UL CPW CPW SLW UL DLW UL SLW SLW SLW SLW RL
CONTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 7 8 9 20 21 22 23 24 25 26 27	z > > > < < < < < < < < < < < < < < < <	>>zzz>>zzz>>zzz>>zzz>	N N N V N V N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N		N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N abs N N N abs N N N N N N N N N N N N N N N N N N N	41 40 43 41 42 42 42 41 40 43 41 40 41 42 43 41 40 41 42 43 40 42 43	SLW SLW CPW UL SLW SA UL SLW DLW UL SLW UL CPW RL SLW SLW UL UL SLW SLW UL	UL CPW UL SLW CPW DLW SLW CPW CPW UL UL SLW SA CPW UL UL SLW CPW UL UL SLW UL UL UL UL UL UL UL UL UL	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW CPW DLW CPW UL DLW SLW SLW SLW SLW SLW SLW SLW	UL UL CPW DLW SLW DLW SLW UL CPW DLW UL UL UL UL CPW UL CPW UL UL UL UL UL UL UL UL UL	DLW SLW CPW RL SLW UL CPW UL DLW UL CPW CPW SLW UL DLW UL SLW SLW SLW SLW CL SLW SLW CL SLW
CONTROL	3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 7 8 9 9 20 21 22 23 24 25 26 27 28		>>zzz>>zz>	N N N V N V N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N		N N N N N N N N N N N N N N N N N N N	N N N N N N N N N N N N N N N N N N N	N N N abs N N N abs N N N N N N N N N N N N N N N N N N N	41 40 43 41 42 42 42 41 40 43 41 40 43 41 42 43 40 41 42 43 40 42 43 40 42 43	SLW SLW CPW UL SLW SA UL SLW DLW UL SLW UL CPW RL SLW SLW SLW UL UL SLW SLW UL DLW	UL CPW UL SLW CPW DLW SLW CPW CPW UL SLW SA CPW UL SLW SA CPW UL SLW UL DLW CPW UL DLW UL DLW UL UL UL	SLW SLW DLW SLW UL DLW CPW DLW SLW SLW SLW CPW DLW CPW UL DLW SLW SLW SLW SLW SLW SLW SLW	UL UL CPW DLW SLW DLW SLW UL CPW DLW UL UL CPW UL CPW UL CPW UL UL CPW UL CPW UL CPW	DLW SLW CPW RL SLW UL CPW UL DLW UL CPW CPW CPW SLW UL DLW UL SLW SLW SLW SLW SLW DL SLW DLW UL SLW

 Table 4. Analysis of Right hand Finger Prints for Asthma Patients and Control

MATERIALS AND METHODS

The study was conducted on 31 asthma patients and compared with 31 controls. The materials required for taking the prints

was kajal, A4 size data sheet, magnifying glass, pencil, scale and tissue paper. The fingerprints were taken by rolling finger method. The subjects were instructed to thoroughly wash their hands with soap. The kajal was applied to palm and tips of the

Digit		Control			Asthma p	atients		
		Total (Rt3	1+Lt31)= 62	2	Total (Rt31+Lt31)= 62			
		Loop	Whorl	Arch	Loop	Whorl	Arch	
I	Rt.	13	17	1	15	13	3	
	Lt.	10	20	1	19	12	0	
	Total	23	37	2	34	25	3	
Ш	Rt.	11	17	3	14	14	3	
	Lt.	10	20	1	19	10	2	
	Total	21	37	4	33	24	5	
III	Rt.	12	19	0	23	6	2	
	Lt.	5	26	0	22	9	0	
	Total	17	45	0	45	15	2	
IV	Rt.	16	15	0	11	20	0	
	Lt.	14	17	0	18	13	0	
	Total	30	32	0	29	33	0	
v	Rt.	4	27	0	22	8	1	
	Lt.	8	23	0	25	6	0	
	Total	12	50	0	47	14	1	

 Table 5. Distribution of Figertip patterns in Asthma patients and Control

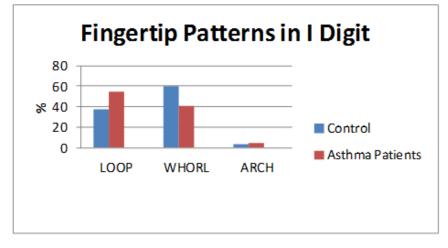


Fig. 1. Distribution of Fingertip patterns in I digit

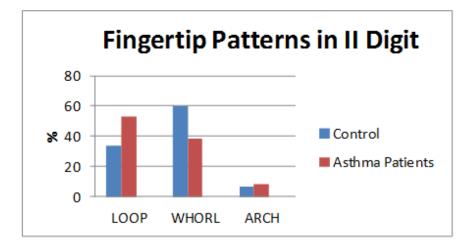


Fig. 2. Distribution of Fingertip patterns in II digit

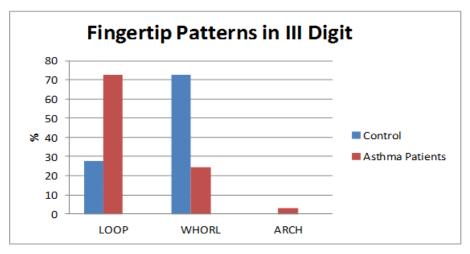


Fig 3. Distribution of Fingertip patterns in III digit

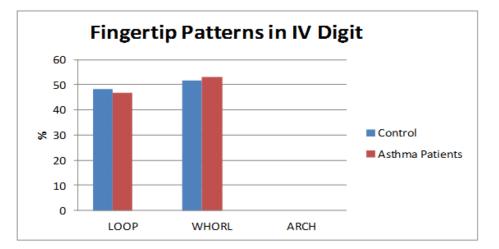


Fig. 4. Distribution of Fingertip patterns in IV digit

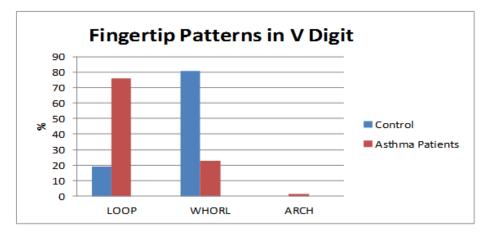


Fig. 5. Distribution of Fingertip patterns in V digit

fingers and then pressed and rolled against paper. The patterns which were studied and analyzed are simple arch(SA), ulnar loop(UL), modified ulnar loop(MUL), radial loops(RL), single loop whorl(SLW), double loop whorl(DLW), central pocket whorl(CPW) as well as variation in thenar crease(TC), proximal crase(PC) and distal crease(DC).

RESULTS AND DISCUSSION

In Asthma patients, the percentage of loops was high in all digits except IVth digit with 46.77% (Fig.4). The whorl of only IVth digit (Ring finger) asthma patients was significantly high with 53.22% with respect to control. The arches of I, II, III and

Vth digit of patients was high where as the IVth digit shows no significant change (Table 5).

Conclusion

The present study is based on various dermatoglyphics parameters which help in the early diagnosis of asthma. The prints represent as a non- invasive marker for the detection of asthma.

REFERENCES

- Blanka S, Milton A. 1976. Dermatoglyphics in medical disorders. New York: Heidelberg Berlin: Springer-Verlag.
- Blumenthal, J.B, Blumenthal, M.N. 2002. The genetics of asthma. Med Clin North Am ;86(5):937-50.
- Daniels, S.E., Bhattacharyya, S., James, A. *et al.* 1966 Agenome wide search for quantitative trait underlying asthma. *Nature*, 383, 247-250.
- Dorland's illustrated medical dictionary. 1994. Dermatoglyphics. 28th ed. Philadelphia: Saunders W B; p. 449.

- Galton, F.1961. Finger prints. London: McMillan and company; 1892. P. 197. Cited by Cummins and Midlow.
- Gupta M, soda, Bharihoke V. 1993. The dermatoglyphics pattern in patients of chronic bronchial asthma. Prpceedings of the ASI; *JASI*, 42:45.
- Gupta, U.K, Prakash, S. 2003. Dermatoglyphics: A study of the finger-tip patterns in bronchial asthma and its genetic disposition. Kathamandu University *Medical Journal*, 1(4): 167-271.
- Holt, S.B. 1961. In: The inheritance of the dermal ridges patterns; the recent advances in human genetics. Penrose LS, editor. London: Chur hill. P. 101.
- Mahajan, A.A, Goyr, K.K, Thakare, A.E. 2011. The dermatoglyphics patterns in patients of bronchial asthma-a qualitative study. *Int J Bio Med Res.*, 2(3):806-07.
- Platto CC. 1973. The variations and the distribution of the dermatoglyphics features in different populations. Berlin: Penrose Memorial Colloquium.
- The collaborative Study on the Genetics of Asthma 1977. A genome- wide search for asthma susceptibility loci in ethnically diverse populations. *Nature Genet.*, 15, 389-392.
