

## A DERMATOGLYPHIC STUDY OF JORDANIANS: MAIN-LINE INDEX AND TRANSVERSALITY

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### ABSTRACT

Data on the main-line index and R/L ratio in 2000 East- and West-Bank Jordanian subjects are presented and compared with those of other countries. In both males and females, the main-line index and R/L ratio in the East-Bank population were very close to those of the West-Bank population, which suggests that the two populations are not different genetically when dermatoglyphic features are considered. Both East- and West-Bank populations exhibited a relatively high main-line index as compared to other groups. A fairly marked degree of transversality of the general palmar configuration was indicated in the main-line index. The means of the main-line indices for males and their female counterparts showed no significant differences, but bimanual differences in both sexes were significant.

### INTRODUCTION

The potential contribution of dermatoglyphics to biological anthropology and population genetics has long been acknowledged (Cummins, 1931; Boyd, 1940; Rife, 1954; Cummins and Midlo, 1961; Neel *et al.*, 1964; Niswander, 1967). A large number of ethnic groups and populations have been studied using dermatoglyphic features (Cummins and Midlo, 1926; Steggerda *et al.*, 1936; Cummins and Setzler, 1951; Lestrage, 1954a, 1954b; Kumbnani, 1959; Newman, 1960; Bhasin, 1971; Plato *et al.*, 1975; Mehdipour and Farhud, 1978, 1979; Sunderland and Dennis, 1979; Kamali, 1981, 1982, 1984; Smit, 1987; Arrieta and Lostao, 1988; Stoney, 1988). The present study extends these investigations to a large sample of Jordanians. It represents the second of four reports on the finger (Omari, 1985) and palmar dermatoglyphics of East- and

West-Bank populations (Omari, in press) and the eighth in the series of genetic studied on these two populations. The two populations are predominately Arab in origin. They are members of several hundred tribes who have lived in the area for centuries. Some idea of the past relationship of these two populations can be inferred from pertinent portions of the archeological records and from modern linguistic analysis (Hasan, 1965; Showker, 1979). With the changed political realities in the Middle East, the future of the West-Bank is anything but clear. The present study is an attempt to direct attention to the dermatoglyphic features of the two populations studied as these could be usefully incorporated into future studies, particularly of population relationships.

## MATERIALS AND METHODS

Data on bilateral palmar prints were collected by the author from 2000 unrelated healthy adults (1000 males and 1000 females). Of these, 1000 subjects (500 males and 500 females) came from the West-Bank and the remainder from the East-Bank. All the subjects were randomly selected from among Jordan University students. The geographical origin (East- or West-Bank) of each investigated subject was determined by asking for the place of origin of his parents and grandparents. Subjects born of intermixture marriage between East- and West-Bank individuals were excluded from this study. The data were analyzed according to the method suggested by Cummins and Midlo (1943). The t-test was used for comparing the bilateral, bisexual, and population differences for the main-line indices.

## RESULTS AND DISCUSSION

Table I shows the main-line index and R/L ratio in both sexes of East- and West-Bank populations. The mean value of the main-line index in the entire series was  $9.46 \pm 0.02$ . This index was more or less the same in both sexes of East- and West-Bank populations. These two populations did not differ significantly from each other (Table II). Such findings reveal close similarities between East- and West-Bank populations, which suggest that the two populations are genetically indistinguishable with respect to dermatoglyphic traits. The similarities in dermatoglyphic traits between East- and West-Bank populations is not surprising as they are historically closely related. Omari compared the fingerprint patterns (1985), PTC (1986a), blood groups (1986b), Mid-digital hair (1986c), color vision deficiency (1987), tongue rolling and tongue folding (1988), interdigital palm patterns, Modal types, and main-line formulae (Omari, in press), and no consistent and significant differences were apparent between East- and West-Bank populations. At this point we could assume that these two populations are of essentially the same ethnic stock.

Table I - The main-line index, R/L ratio and degree of transversality in East- and West-Bank populations.

Populations	Sex	Side	M.L.I. $\pm$ S.E.	R/L ratio	Dextral excess of transversality
East-Bank	M	R	9.76 $\pm$ 0.06	104.60	4.60
		L	9.33 $\pm$ 0.05		
		R + L	9.54 $\pm$ 0.04		
	F	R	9.55 $\pm$ 0.05	101.81	1.81
		L	9.38 $\pm$ 0.06		
		R + L	9.46 $\pm$ 0.04		
	M + F	R	9.64 $\pm$ 0.04	103.10	3.10
		L	9.35 $\pm$ 0.04		
		R + L	9.49 $\pm$ 0.03		
West-Bank	M	R	9.64 $\pm$ 0.05	103.65	3.65
		L	9.30 $\pm$ 0.06		
		R + L	9.47 $\pm$ 0.04		
	F	R	9.50 $\pm$ 0.06	101.82	1.82
		L	9.33 $\pm$ 0.06		
		R + L	9.41 $\pm$ 0.04		
	M + F	R	9.56 $\pm$ 0.04	102.57	2.57
		L	9.32 $\pm$ 0.04		
		R + L	9.44 $\pm$ 0.04		
East-and West-Bank	M	R	9.70 $\pm$ 0.04	104.18	4.18
		L	9.31 $\pm$ 0.04		
		R + L	9.50 $\pm$ 0.03		
	F	R	9.53 $\pm$ 0.04	101.92	1.92
		L	9.35 $\pm$ 0.04		
		R + L	9.44 $\pm$ 0.03		
	M + F	R	9.60 $\pm$ 0.03	102.89	2.89
		L	9.33 $\pm$ 0.03		
		R + L	9.46 $\pm$ 0.02		

M.L.I. - Main-Line Index; M - Males; F - Females; R - Right; L - Left; S.E. - Standard Error.

Table II - Sex differences for the main-line index.

Populations	Sex	Value of t	Probability
East-Bank	M vs. F	1.3450	0.1 < P < 0.2
West-Bank	M vs. F	0.8502	0.3 < P < 0.4
East- vs. West-Bank	M vs. M	1.1862	0.2 < P < 0.3
	F vs. F	0.6678	0.5 < P < 0.6
	M + F vs. M + F	1.1896	0.2 < P < 0.3
East- and West-Bank	M vs. F	1.4273	0.1 < P < 0.2

M - Males; F - Females; P - Probability.

The means of the main-line indices for males and females are slightly higher in the right hand as compared to the left (Table I). The bimanual disparity is statistically for males as well as for females (Table III). On the whole the present findings conform to the bimanual difference trends observed in other populations (Shanklin and Cummins, 1937; Kumbnani, 1966; Bhasin, 1971; Flickinger and Yarbrough, 1976).

Table III - Bimanual differences for the main-line index.

Populations	Sex	Side	Value of t	Probability
East-Bank	M	R vs. L	5.2121	P < 0.01
	F	R vs. L	2.0142	P < 0.05
	M + F	R vs. L	4.8903	P < 0.01
West-Bank	M	R vs. L	4.0870	P < 0.01
	F	R vs. L	2.0408	P < 0.05
	R + L	R vs. L	4.0456	P < 0.01
East-and West-Bank	M	R vs. L	6.6124	P < 0.01
	F	R vs. L	3.0072	P < 0.01
	M + F	R vs. L	6.6666	P < 0.01

M - Males; F - Females; R - Right; L - Left; P - Probability.

Both East- and West-Bank populations (East-Bank:  $9.49 \pm 0.03$ ; West-Bank:  $9.44 \pm 0.04$ ) have relatively high palm main-line indices; a feature which they share with Kurmis (9.53) (Srivasatava, 1962), both which makes them different from the general range (6.06-8.69) of other populations: Middle American Indians (Cummins and Midlo,

1943), Guatemalan Highland Indians (Newman, 1960), Pandits (Kumbnani, 1966), Tibetans (Tiwari and Chattopadhyay, 1967), Newars of Nepal (Bhasin, 1971) and American Indians (Flickinger and Yarbrough, 1976).

Table I shows the values for the dextral excess of transversality. In all the groups cited in this table and in other series so far observed (Cummins and Midlo, 1926; 1927; Cummins and Setzler, 1951; Sharma, 1956; Kumbnani, 1959, 1966; Bhasin, 1971), the excess of transversality is greater in males than in females. However these differences were not clear in a sample of Mohammedans of Rajasthan (Kumbnani, 1962). Despite this exception, the consistency of the dextral excess of transversality in males among all of the comparisons, in the present study, together with those of other workers, leads us to conclude that the sexes do differ in the degree of transversality.

## RESUMO

Dados sobre o índice da linha principal e a razão R/L em 2.000 indivíduos da Cisjordânia e Jordânia são apresentados e comparados aos de outros países. Em ambos os sexos, o índice da linha principal e a razão R/L nas populações da Jordânia e Cisjordânia são muito similares, sugerindo que as duas populações não são geneticamente diferentes em relação a caracteres dermatoglíficos. Ambas as populações exibiram um índice da linha principal relativamente alto em comparação com outros grupos. Um grau razoavelmente marcado de transversalidade da configuração palmar geral foi indicado no índice da linha principal. As médias da linha principal para machos e fêmeas não mostraram diferenças expressivas embora as diferenças bimanuais em ambos os sexos foram significantes.

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