

## Dermatoglyphic Variations Among Three Sub-Sects of Muslims of Visakhapatnam, Andhra Pradesh

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**ABSTRACT** Qualitative and quantitative aspects of finger ball patterns of three endogamous populations of Muslims from Visakhapatnam, Andhra Pradesh are studied. Loops are more frequent among the three populations followed by whorls and arches. The whorl/loop ratio has more variation in the three groups. Males of the three groups exhibited higher mean counts of URC. Shia and Sunni exhibits significant differences for ridge counts. Sunni and Dawoodi Bohra do not differ significantly. The three populations are compared with local Non-Muslim and Muslims from other parts of India.

Quantitative and qualitative variation of dermatoglyphics has been an ever interesting topic for population geneticists to study human variation (Bhasin et al., 1992, 1994). Some caste population from Andhra Pradesh were covered by different workers (Kumbanani and Dutt, 1971; Benerjee, 1981; Reddy and Anuradha, 1983; Mathew and Satyanarayana, 1983; Narahari 1983; Babu and Jaikishan, 1983; Deep Kumar and Ramachandraiah, 1985; Santhi Devi and Veerajju, 1992). Still a number of populations remained uncovered. The present study is intended to cover three sects of Muslim from Visakhapatnam of Andhra Pradesh, the Shia, Sunni and Dawood Bohra.

There are two main ethnic divisions among the Muslims, 1. Ashrafs (Sayyad, Sheikh, Moghul and Pathan) and 2. Non-Ashrafs. The Ashrafs claim to be the descendants of the early Muslim immigrants. The Non-Ashrafs are of indigenous origin whose ancestors were converted to Islam. Both these divisions belong to the religious sects, Shia and Sunni. The main difference between two major sects is on the basis of belief in successors of prophet Mohammed (Omar, Omthon, Abu Bakr and Ali). Shia Muslims believe in Ali, where as Sunni Muslims

believe in other three. The Bohars form a sub-sect of Shia arising from a dispute over the Imamath. They are mostly traders. Dawood Bohars are believed to form a separate group from the time of 21st Imam (12th century A.D). The Dawoodi Bohars in India migrated from Yemen. All these sects marry within their groups to preserve their group identity. The practice of marrying within their own sects could generated different genic combinations possibly resulting in distinctive genetical traits.

### MATERIALS AND METHODS

Finger and palm prints of 360 unrelated individuals (60 males, 60 females from each group) of Muslims comprising three sub-sects namely, Shia, Sunni and Dawood Bohra inhabiting Visakhapatnam City, Andhra Pradesh were collected and analysed for quantitative and qualitative characters of finger prints. The prints were collected and analysed after Cummins and Midlo (1961) and Holt (1968).

### RESULTS AND DISCUSSION

Frequency distribution of finger ball patterns among the three populations the Shia, Sunni, and Dawood Bohra are shown in table 1. Loops are more frequent in all the three populations followed by whorls and arches. Among the loops as usual the ulnar loops dominate the radial loops.

The three principal indices among three groups of Muslims are given in table 2. Pattern intensity index is almost uniform in all the three populations while Dankmeijers index is more or less similar among the Shia and Dawood Bohra. The Sunnis have low arch/whorl ratio has relatively more variation in the three groups. It is high among the Sunnis (71.79) followed by Shia (62.17) and Dawood Bohra (48.32).

Table 1: Distribution of finger ball patterns among Shia, Sunni and Dawood Bohra males, females (%)

| Population   | Left Hand |      |       |       |        | Right Hand |      |       |       |        |
|--------------|-----------|------|-------|-------|--------|------------|------|-------|-------|--------|
|              | Whorl     |      |       | Loops |        | Whorl      |      |       | Loops |        |
|              | TL        | CPL  | True  | Total | Arches | TL         | CPL  | True  | Total | Arches |
| Shia         |           |      |       |       |        |            |      |       |       |        |
| Male         | 2.33      | 5.67 | 27.33 | 35.33 | 57.67  | 7.0        | 4.67 | 32.0  | 40.67 | 53.00  |
| Female       | 1.33      | 5.67 | 24.67 | 31.67 | 56.00  | 12.33      | 7.00 | 22.67 | 32.00 | 58.00  |
| Total        | 1.83      | 5.67 | 26.00 | 33.5  | 56.84  | 9.67       | 5.85 | 27.34 | 36.34 | 55.5   |
| Sunni        |           |      |       |       |        |            |      |       |       |        |
| Male         | 8.67      | 7.33 | 24.33 | 40.33 | 53.00  | 6.67       | 9.00 | 26.33 | 42.33 | 51.00  |
| Female       | 5.67      | 7.67 | 25.67 | 39.01 | 48.33  | 12.66      | 5.00 | 21.67 | 31.00 | 60.33  |
| Total        | 7.17      | 7.5  | 25.0  | 39.67 | 50.67  | 9.66       | 7.00 | 24.0  | 36.67 | 56.67  |
| Dawood Bohra |           |      |       |       |        |            |      |       |       |        |
| Male         | 4.0       | 2.67 | 19.0  | 25.67 | 67.00  | 7.33       | 4.67 | 28.0  | 36.00 | 58.00  |
| Female       | 4.67      | 4.67 | 18.33 | 27.67 | 59.00  | 13.33      | 3.67 | 23.33 | 30.67 | 64.33  |
| Total        | 4.34      | 3.67 | 18.67 | 26.67 | 63.00  | 10.33      | 4.17 | 25.66 | 33.33 | 61.17  |

TL = Twin Loop, CPL = Central Pocket Loop

Table 2: Distribution of the three principal indices among Sunni, Shia and Dawood Bohra

| Population   | Principal indices |       |       |
|--------------|-------------------|-------|-------|
|              | FI                | DI    | PII   |
| Shia         |                   |       |       |
| Males        | 68.67             | 17.54 | 13.13 |
| Females      | 55.85             | 35.08 | 12.07 |
| Total        | 62.17             | 25.54 | 12.06 |
| Sunni        |                   |       |       |
| Males        | 79.49             | 16.13 | 13.47 |
| Females      | 64.42             | 30.48 | 12.43 |
| Total        | 71.79             | 22.71 | 12.95 |
| Dawood Bohra |                   |       |       |
| Males        | 49.33             | 21.62 | 12.42 |
| Females      | 47.29             | 31.43 | 12.00 |
| Total        | 48.32             | 26.39 | 12.21 |

FI = Furuhashi's Index, DI = Dankemeijers Index, PII = Pattern Intensity Index

The statistical constants of qualitative aspects of finger dermatoglyphic characters are given in table 3. The males of the three groups uniformly exhibited higher mean counts of URC. The variation of RRC is not so much as that of URC. In Shia it is almost the same in both sexes while it shows little variation among the Dawood Bohra than among the Sunnis. The TRC, ARC show little bisexual variation among the Shia while the Sunni and Dawood Bohra shown more variation.

The bisexual differences are found to be significant only among the Sunnis for RRC, TRC and ARC (t-values: RRC-2.1425; TRC-2.2941; ARC-2.1027). As for the intergroup differences are concerned, Sunni and Shia differ with regard to RRC and TRC (t-values: RRC-2.3051; TRC-2.8567) while Shia and Dawood Bohra differ significantly for all the four characteristics (t-values: URC-2.0202; RRC-2.8063; TRC-3.6772; ARC-3.1523).

The present data on finger ball patterns are compared with local populations of Andhra Pradesh and Muslims from other parts of India, which indicate that the three Muslim populations of Andhra Pradesh are within the range of Andhra Pradesh populations irrespective of religion, but stand apart from the other Muslim populations of India.

## SUMMARY AND CONCLUSION

Three Muslim populations of Andhra Pradesh were studied with regard to dermatoglyphic patterns. Loops occurred more

**Table 3: Distribution of various mean ridge counts and statistical constants of Sunni, Shia and Dawood Bohra**

| Population   | Ridge Count        |                    |                    |                    |
|--------------|--------------------|--------------------|--------------------|--------------------|
|              | URC                | RRC                | TRC                | ARC                |
|              | Mean $\pm$ S.E.    | Mean $\pm$ S.E.    | Mean $\pm$ S.E.    | Mean $\pm$ S.E.    |
| Shia         |                    |                    |                    |                    |
| Males        | 56.67 $\pm$ 6.491  | 130.42 $\pm$ 6.001 | 140.42 $\pm$ 5.982 | 177.08 $\pm$ 10.25 |
| Females      | 46.67 $\pm$ 6.066  | 130.00 $\pm$ 6.132 | 142.92 $\pm$ 6.974 | 176.25 $\pm$ 10.37 |
| Total        | 51.67 $\pm$ 6.279  | 130.21 $\pm$ 6.072 | 141.67 $\pm$ 6.478 | 176.67 $\pm$ 10.31 |
| Sunni        |                    |                    |                    |                    |
| Males        | 52.50 $\pm$ 4.256  | 125.00 $\pm$ 4.88  | 133.33 $\pm$ 5.125 | 171.25 $\pm$ 7.706 |
| Females      | 43.75 $\pm$ 4.881  | 109.58 $\pm$ 5.208 | 116.25 $\pm$ 5.33  | 146.67 $\pm$ 8.66  |
| Total        | 48.13 $\pm$ 4.567  | 117.29 $\pm$ 5.044 | 124.79 $\pm$ 5.228 | 158.96 $\pm$ 8.183 |
| Dawood Bohra |                    |                    |                    |                    |
| Males        | 46.25 $\pm$ 5.028  | 115.24 $\pm$ 7.098 | 122.50 $\pm$ 7.281 | 152.08 $\pm$ 10.66 |
| Females      | 34.58 $\pm$ 4.375  | 111.25 $\pm$ 4.711 | 114.58 $\pm$ 4.797 | 139.17 $\pm$ 7.907 |
| Total        | 40.415 $\pm$ 4.702 | 113.34 $\pm$ 5.905 | 118.54 $\pm$ 6.039 | 145.62 $\pm$ 9.284 |

frequently in all the three groups. Bisexual variation is not well evident. In general Shia and Sunni are close to each other compared to Dawood Bohras. The three groups are relatively close to non-Muslims of Andhra Pradesh than Muslims from other parts of India.

#### REFERENCES

- Babu, M.S. and Jaikishan, G.: Finger and Palmar dermatoglyphics of Vadabali of Coastal Andhra Pradesh. Vol. 2, 189-198. In: *Human Biology-Recent Advances*, I.J.S. Bansal (Ed.). Today and Tomorrow's Printers and Publishers, New Delhi (1983).
- Benerjee, M.K.: Finger patterns of Parsees. *Bull. Anth. Survey India*, 30: 51-54 (1981).
- Bhasin, M.K. and Walter, H. and Danker-Hopfe, H.: *The Distribution of Genetical, Morphological and Behavioural Traits Among the Peoples of Indian Region*, Kamla-Raj Enterprises, Delhi (1992).
- Bhasin, M.K., Walter, H. and Danker-Hopfe, H.: *People of India: An Investigation of Biological Variability in Ecological, Ethno-Economic and Linguistic Groups*, Kamla-Raj Enterprises, Delhi (1994).
- Cummins, H. and Midlo, C.: *Finger Prints, Palms and Soles. An Introduction to Dermatoglyphics*. Dover Publications, New York, (1961).
- Deep Kumar, V.S. and Ramachandraiah, T.: Palmar C-line variation among Telugu and Tamil Weaver communities of Andhra Pradesh. *Ind. J. Phy. Anth. Hum. Genet.*, 11: 71-76 (1985).
- Holt, S.E.: *A Series of Papers (1961-68) and the Genetics of Dermal Ridges*, C.C. Thomas, Springfield (1968).
- Kumbanani, H.K. and Dutt, P.K.: Finger dermatoglyphic study of Gollas, Andhra Pradesh. *Anthropologist*, 18: 33-40 (1971).
- Mathew, S. and Satyanarayana, M.: C-line polymorphism among two subsects of Vaidika Brahmins of Andhra Pradesh. *Man in India*, 63: 392-395 (1983).
- Narahari, S.: C-line polymorphism in three caste groups of Andhra Pradesh. Vol. 2, 321-328. In: *Human Biology-Recent Advances*, I.J.S. Bansal, (Ed.). Today and Tomorrow's Printers and Publishers, New Delhi (1983).
- Ramesh, M., Govindaiah, V. and Veeraju, P.: Finger dermatoglyphic study of the Relies of coastal Andhra Pradesh. (Communicated, 1997).
- Reddy, P.C. and Anuradha, M.: Palmar dermatoglyphics of Pattusali an Isolate population. *Bionature*, 3: 82-84 (1983).
- Santhi Devi, K. and Veeraju, P.: Dermatoglyphic study of Padmasalis. *Ind. J. Phy. Anth. Hum. Genet.*, 18: 95-102 (1992).
- Sarkar, D.: Digital dermatoglyphics among some Bengalees. *Man in India*, 52: 182-190 (1972).
- Sarkar, D.: A study of finger ball dermatoglyphics in West Bengal. *Man in India*, 49: 378-387 (1983).
- Sen, D.K.: Dermatoglyphics of palm and finger balls of the Kashmir Muslims. pp. 215-227 In: *Proceedings Volume of International Symposium on Dermatoglyphics*, P.C. Biswas, and A. Sharma (Eds.). Delhi (1968).
- Shobhana Joshi: A finger dermatoglyphic study of the Sayyads (Shia and Sunni) of Lucknow. *Ind. J. Phys. Anth. Hum. Genet.*, 13: 33-41 (1987).
- Singh, R.D.: Digital patterns frequency and size variation in some castes of U. P., East. *Anthropologist*, 14: 175-176 (1969).
- Vijayasree, S.: *Dermatoglyphic Study on Turpukapu*. M. Phil dissertation (Unpublished) submitted to Andhra University, Waltair (1992).