

Multivariate Comparison of Cephalometric traits in Iranian Azeris and Persians

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Abstract

Turkic-speaking Azaris and Iranian-speaking Persians living in Iran were compared by cephalometric traits. Two multivariate statistical approaches, principal component and discriminant analyses, were applied. The populations are described by almost the same average values ($p > 0,05$) of the first two principal component variables accounting in aggregate for 73.6% of total diversity of the initial traits. The average level of correct reclassification for the objects while using the analytical recognition method is about 52%, i.e. the probability of their attribution to any of the two groups is almost equal. In whole, the two samples do not differ significantly from each other according to multivariate characteristics analysed that witnesses to the same generalized cephalometric peculiarities in the ethnic groups considered.

Key words: Iranian people, Iranian Azaris, Persians, craniofacial traits, multivariate analysis

1. Introduction

Due to its geo-strategic location in the Middle East, the Iranian plateau has served as a key crossroad for human disseminations and played a critical role in the migratory waves between the populations of the Middle East and beyond. The most important long-term factor in this process was human adaptation to the Iranian plateau and its geographical, topographical, and climatic conditions with the subsequent development of agriculture, pastoralism, and pastoral nomadism. The spread of these technological innovations, along with a series of major demographic and historical events, has resulted in a large diversity and dispersal of ethnic group and languages. Between the third and second millennia BC, the Iranian plateau became exposed to incursions of pastoral nomads from the Central Asian steppes, which were a difficult environment for agriculture but ideally suited to animal husbandry and pastoral nomadism. Presumably, via an elite-dominance process, existing Dravidian language across the region was substituted by Indo-Iranian language, which is a branch of Indo-European language (Minorsky, 1953) Also their genetic impacts were as significant as the imposition of their language, which is clearly observed in Iran, Pakistan and northern India. In the period of the eleventh to thirteenth centuries AD the Arab-Muslim, Seljuk and subsequent Turkic-Mongol invasions signaled the arrival of a new people with flocks and culture. Specifically, in a series of rapid Arab-Muslim conquests in the seventh century, the Arab armies swept through most of the Middle East, completely engulfing the Persian lands. The dominance of the Arabs came to a sudden end in the mid-eleventh century with the arrival of Seljuk Turks, a clan of the Oguz Turks. The expanding waves of these Altaic-speaking nomads from Central Asia involved regions farther to the west, such as Iran, Iraq, Anatolia, and the Caucasus, where they imposed Altaic (Turkish) languages. In these western regions, however, the genetic contribution is low or undetectable, even though the power of these invaders was sometimes strong enough to impose a language replacement, as in Turkey and Azerbaijan. (Cavalli-Sforza et al., 1994). Later, the Mongol armies also moved westward and, by the early thirteenth century, established their rule over a vast region, including Iran and advancing as far west as the Caucasus and Turkey. These waves of various invasions and subsequent migrations resulted in major demographic expansions in the region, which added new languages and culture to the mix of peoples that had pre-existed in Iran (Bosworth, 1968) In general, a considerable genetic diversity is observed in Iranian populations, which resembles to that Middle East patterns as a whole and strengthens the idea of Persia, being the main crossroad for human dissemination. This area is remarkable for its high level of ethnic and linguistic diversity, comprising the major language families (Indo-European, Altaic, and Afro-Asiatic) currently spoken by more than seventy ethnically different populations (Rafiee MR et al., 2009) This demonstrates the role of Iran, which played in population dispersal across the altitudinal belt spanning from western Anatolia to the Indus Valley. However, there have been gaps in high-resolution genetic analyses for this region to uncover population history at a fine scale, for example, for particular ethnic and linguistic groups. The principal aim of this paper is to test the existing principal hypotheses on the Azaris' origin through identification of their place on the genetic landscape of the Middle East (Saidian, 1991)

2. The race of people settled in the Iranian plateau

The primitive anthropologists tried to determine the multi types of mankind's nature by classification under the title of race based on geographical areas and physical apparent characteristics like color and others. Race is applied to a group of people who have kept the common physical or biological characteristics in successive generations (Hunter, et al., 1976) Or a group of natural people inherited a common physical feature; they have

the same race even with different languages and customs. According to this definition what makes difference between two races is physical inherent characteristics and nothing else. It means that some of them know this difference resulted from heredity and others believe in environmental effects (Fakuhi, 2006) The people of difference places in the world are so mixed and it seems unlikely to determine the exact racial location. But it is not out of ambiguity, because the most anthropologists and scientists believe that human has always exposed to immigration and racial integration. Racial integration is, not only a historical reality, but also it is more intensive than the past in this active world. The relations between nations and repetitive marriages of different races during centuries and their continuous changes have caused not to remain a fixed race. It means that we can not point to one factor only like color of skin to determine the race of a group. Other factors are considerable such as height, the form of skull, head, hair, face, forehead, eyebrows, eyes, nose, and size of cheek, jaw, and also scattering of people on the base of blood group (genetics). (Raiesniya, 2007) Asia continent as the largest and the most populous continent and the cradle of a developed civilization has different people with various races and with their special physical characteristics. On the other hand, it is the origin of different races, including yellow (Mogul), Siberia, northern and Mogul, central Mogul, Indonesia, Mediterranean, Transoxania (Kyrgyz, Turkman, Tatar, Anatolian Turk). Although there have been intercourse among these ethnical groups, but all of them have their own special characteristics on the view of color, the form of skull and face. The world is a place containing various racial and lingual groups. So that as far as this issue is concerned there is no difference between developed and developing countries. As if, among all existing countries and islands in the world, about 160 countries have an increasing situation regarding race and culture. Iran is not an exception, because it can be called a multi-national or multi-racial community. The Iranian Plateau as a special geographical place in Asia continent has had different nations with various races. The Iranian plateau has 2/600/000km² area (about 55/000 Parasangs). It is a special geographical unit of Asia continent and Iran with 1/648/195km² area, located in the south west of Asia and the Middle East. In fact, Iran covers %63 or two third of this place and the rest is for other countries. Natural, climatic and geographical conditions of Iran have caused that this country will be accounted among the primitive living places and social centers of ancient human being. Archeological and anthropological studies have approved this matter too. Although, the existing appearance of early human groups in the Iranian plateau is not clear and nobody knows that from where and which direction, primitive human have immigrated to western Asia and Iran, but it very probably seems that human collections have gradually immigrated from Africa to European areas and Western Asia and then to Mesopotamia and Iran in Piston era, about one million years ago. It is a little difficult for present anthropologists and craniologists to determine the race of Iranian plateau inhabitants, because this plateau is as a bridge between the Far East, the Middle East and Mesopotamia. Therefore, many nations with different races have entered this area and placed under a unit ceiling of language. Anthropologists who study physical features are sure that some individuals with extended heads have settled in Iran before Nordic. But the main factors related to Iran population are generally Mediterranean. (Diakunef, 2004) Given to the researches, the most important factors related to Iranian plateau inhabitants are round heads and ellipsoid faces. Now, among the present group who live in this plateau, especially in the east part, there are many people with round heads and extended faces. They are in heights and mountains more than valleys and plains. Some of them can be related to Indian Dravidians, because there are some ones with round heads and ellipsoid faces. High stature and light skin are their most important characteristics. It seems that the present residents of this plateau are more related to people in the west and northwestern of Iran. As a result of anthropological studies and measurements in Iran, a basic branch called white race has been determined as a race of Iranian plateau inhabitants. Iranians are among the oriental race called Indus European who have immigrated to this plateau from oxus and Caucasian mountains in the late of second thousand B.C. Scholars see cultural similarities between modern Persians and Azeris as evidence of an ancient Iranian influence. Archaeological evidence indicates that the Iranian religion of Zoroastrianism was prominent throughout the Caucasus before Christianity and Islam and that the influence of various Persian Empires added to the Iranian character of the area. It has also been hypothesized that the population of Iranian Azerbaijan was predominantly Persian-speaking before the Oghuz arrived. This claim is supported by the many figures of Persian literature, such as Qatran Tabrizi, Shams Tabrizi, Nezami, and Khaghani, who wrote in Persian prior to and during the Oghuz migration, as well as by Strabo, Al-Istakhri, and Al-Masudi, who all describe the language of the region as Persian. The claim is mentioned by other medieval historians, such as Al-Muqaddasi. Other common Perso-Azerbaijani features include Iranian place names such as Tabriz and the name Azerbaijan itself. The Iranian origins of the Azeris likely derive from ancient Iranic tribes, such as the Medes in Iranian. Azerbaijan, and Scythian invaders who arrived during the eighth century BCE (Saidiyan, 2004) It is believed that the Medes mixed with an indigenous population, the Caucasian Mannai, a Northeast Caucasian group related to the Urartians. However, whether originally Caucasian or Iranian, it is fairly definite and largely supported by historical accounts that Azeris are not descendants of Turkic tribes, although they have certainly been affected by them.

The historical background and anthropological origin of the Turkic-speaking Iranian Azeri population has

been a subject of numerous research works, but so far the opinions of scholars are not unanimous concerning many of the questions posed. Some sources tend to designate them as the descendants of the Turkic people, most likely due to their Turkic language (Atabaki, 1993). The majority of sources view the ethnic Azeris as having mixed ethnic origin tracing back to indigenous Caucasian populations and Iranian, who were influenced by Turkic languages throughout centuries of occupation under several Turkish dynasties (Zadokm, 2002). According to other scholars, the Iranian roots of Azeris likely trace back to ancient Persian tribes, such as the Medes, who lived on the territory of modern Iranian Azerbaijan, and Scythian invaders, who arrived during the 8th century BC (Andonian L et al., 2011). However, whether originally Caucasian or Iranian, it is fairly definite and largely supported by historical accounts that Azeris are not descendants of Turkic tribes, although they have certainly been affected by them. The principal goal of this report is to check one of the existing. The “Iranian”, hypotheses of the Azeris’ origin. We compared the Turkic-speaking Azeris (n = 400) and the Iranian-speaking Persians (n = 115) living in Iran using eight cephalometric traits. The data were collected in different, predominately rural, populations in the province of Iranian Azerbaijan. Two multivariate statistical approaches, the principal component analysis and the discriminant analysis, were applied using SPSS software package. On the basis of the first method the integrated features, principal components (PC1 and PC2), accounting together for 73.6% of total diversity of the initial cephalometric traits were separated. The mean values of these features did not significantly differ between the Azeris and Persians ($p > 0.05$). The spatial relationship between the populations considered is presented on two-dimensional plot of principal component variables.

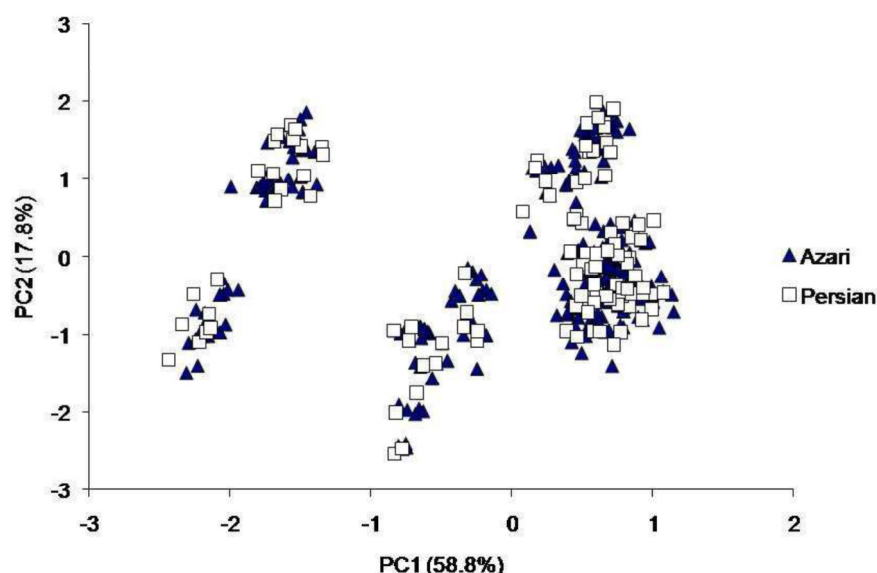


Figure 1. Spatial distribution of the objects in 2D-principal components plot (numbers in brackets represent percentage of total variation explained by each axis)

The next statistical approach, the discriminant analysis, allowed checking the rate of multivariate analytical recognition of the objects, i. e. the probability of their belonging to the corresponding sample. It was revealed that the average level of correct reclassification for the pooled sample is about 52% which means that the likelihood of the attribution of the objects to any of the groups is almost equal. In whole, the results show that Iranian Azeris and Persians do not differ significantly from each other according to multivariate morphological characteristics thus witnessing to the same generalized pattern of cephalometric peculiarities in the ethnic groups considered. These results are in good agreement with recently published data on close genetic affinity between Iranian Azeris and Persians established on the basis of Y-chromosomal markers (Renfrew, 2002). Moreover, using multivariate genetic classification methods, it was shown that Iranian Azeris and their close neighbors (Persians, Kurds and Armenians) form a rather distinct cluster of the Middle East origin. Relying on cephalometric and genetic data we can suggest that Iranian Azeris might be considered as an indigenous population of the Middle East. Their language might be imposed by the limited number of Turkic-speaking invaders from Central Asia through “elite dominance” model and the newcomers did not leave any noticeable traces on the anthropological appearance and gene pool of the local populations of the Middle East.

3. Conclusion

The Iranians display considerable genetic diversity consistent with patterns observed in populations of the Middle East overall, reinforcing the notion of Persia as a vital crossroad for human disseminations. The geographic area is remarkable for its high level of ethnic and linguistic diversity, comprising the major language

families (Indo-European, Altaic, and Afro-Asiatic) currently spoken by more than seventy ethnically different populations. This demonstrates the role Iran played in population dispersal across the latitudinal belt spanning from Western Anatolia to the Indus Valley. However, there have been gaps in high-resolution genetic analyses for this region to uncover population history at a fine scale, for example, for particular ethnic and linguistic groups. Among them, the Turkic-speaking Iranian Azari population constitutes the largest ethno-linguistic group after Persian-speakers, accounting for 24 percent of Iran's population. Some sources tend to designate them as the descendants of the Turkic ethnic groups who invaded the area from 11th century onward during several military campaigns. Still, the majority of sources view the Azaris as having mixed ethnic origin going back to indigenous Caucasian population and Iranian, who were influenced by Turkic languages throughout centuries of occupation under Turkic dynasties. The Iranian roots of Azaris, according to protagonists of this view, can likely be traced back to ancient Iranian tribes, such as the Medes, who lived on the territory of Azerbaijan (ancient Aturpatakan, roughly covering the modern Iranian provinces of Eastern Azerbaijan, Western Azerbaijan, and Ardabil), and Scythian invaders, who arrived during the 8th century B.C. Some information is also available about the Caucasian Albanians as the main ethnic constituent of the inhabitants of the modern-day Republic of Azerbaijan in the South Caucasus, called Azerbaijanis by the name of the state.

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