

A study of auditory torus in north Indian crania

S.H.H Zaidi, Archana Singh, Rakesh Gupta

*Professor and Head, Department of Anatomy, Rohilkhand Medical College & Hospital
Bareilly (UP)-243006, India*

*Post-Graduate Student 2nd Year, Department of Anatomy, Rohilkhand Medical College &
Hospital, Bareilly (UP)-243006, India*

Professor, Department of Anatomy, Rohilkhand Medical College & Hospital, Bareilly (UP) 243006, India

ABSTRACT

Studies of non-metric cranial variants have been a field of considerable interest to research workers especially because of their racial and regional importance.

Twenty eight north Indian skulls of U.P. were studied for the auditory torus a cranial variant in the present study. Findings are discussed and compared with other global studies and are found to be of considerable regional and racial significance.

Key-Words: *auditory torus, cranial variant*

Introduction:

Epigenetic features of the cranium are of great importance for the researchers to assess both hereditary and environmental factors when studying the ancient populations¹. This is an informative method for determining the degree of biological proximity or distance in ancient population. Auditory torus is one of the epigenetic features (non-metric cranial variants) of the human cranium, may be present on the floor of external auditory meatus. It is an osseous swelling or proliferation that present at the entrance of the auditory canal. They are round, bean like in shape.^{2,3} There are two hypothesis to explain the origin of auditory torus: According to first hypothesis auditory torus is genetically transmitted and torus has been used as one of the trait to measure genetic distance between ancient population.⁴ According to second hypothesis this torus is an acquired condition due to continuous exposure to cold water activities like diving, aquatic sports. Many clinical evidences exist to support this hypothesis.^{3,5} according to Hrdicka (1935)⁶ auditory torus is caused by genetic derangement of neurovascular control of the parts involved. The opinion in the literature favors' prolonged irritation (eg. through cold water or salt water). Likewise Brothwell think that etiology is associated with a hereditary neurovascular derangement.⁷ Infect it is now suggested that many of the non-metric epigenetic skeletal traits described in literatures may be culturally and not genetically induced like auditory torus has already has already been used to give clues to ancient activity patterns.^{8,9}

Many such variants have been observed on a racial basis also (Berry and Berry 1967)⁴ and are of considerable ethnic but lesser forensic interest. Berry (1975)¹⁰ made a special study of non-metrical human cranial variants including auditory torus.

Present study is undertaken to know the incidence of variant of auditory torus and to draw significant conclusion, if any, from this study.

Material and Methods:

28 north Indian human crania were studied for this study. Human crania of museum of Rohilkhand medical college Bareilly were studied.

Incidence of auditory torus was noted in these crania.

Results:

Out of 28 skulls studied auditory torus was not seen in any skull (0%)

Discussion:

Cranial variants have aroused the curiosity of anatomists for many decades.¹¹ It was Wood Jones (1930-1)¹² however who first proposed that the differing incidences of these minor variants which occurred in different races might be useful in anthropological studies. Laughlin & Jorgensen (1956)¹³ put this idea in practice and in Berry & Berry (1967)⁴ suggested that a wide range of these variants could be used to calculate a distance statistic between population samples.

This paper is concerned with description and racial & regional incidence of auditory torus, one of the important cranial variant.

Cranial variants like all other variants have been studied by many workers; most of them are recognized only by mention in anatomical text books, being described in terms such as rare or occasionally found; nevertheless a few of them have been utilized as anthropological markers (Broth well 1963, 1965)^{14,15}. Some variants are consequences of disease or other extrinsic influences,^{16,17,18} however most of these variants result from normal developmental processes and are genetically determined.⁴

The frequency of any particular variant is more or less constant in a given rare and is somewhat similar in related races. Chambellan (1883)¹⁹ seems to have been first to suggest the possibility of using such traits as anthropological characters.

Russel(1900)²⁰ gathered together data on a number of skull variants in American group and gave the first indication of their use in the comparison of populations. Wood jones(1930-31,1933-34)^{12,20} used data on skull variants in a more systemic comparison number of far eastern group.

Berry(1967)⁴ made a special study of non- metrical human cranial variations including auditory torus. His findings are given in the table no.1

In our study: It was observed that auditory torus was not present in any of crania.

Table 1: Incidence of auditory torus in samples from eight human population (Berry³, 1967)

	Egypt (summed)	Nigeria (Ashanti)	Palestine (Lachish)	Palestine (Modern)	India (Punjab)	Burma	North America (British Columbia)	South America (Peru)	Present Study
n	250	56	54	18	53	51	50	53	28
%	0	0	0	0	0	0	9	0	0

Vivien G. et al (1997)²¹ analyzed 1,149 prehistoric crania from northern Chile, they divide the sample according to chronology, type of economy, site elevation and sex. The coastal inhabitants had the highest prevalence of EAE with 30.7% (103/336), followed by 2.3% (6/264) for the valley people and 0% (0/549) for highlanders. Coastal and valley men were significantly more affected than their female counterparts. Contrary to expectations, there was no significant association between EAE and economy and/or chronology. In the Arica area, the early Chinchorro fishers, without agriculture, had 27.7% (26/94) EAE, the subsequent agro-pastoralists, 42.7% (32/75), and the late Arican agro-pastoral fishers had 35.6% (36/101). (Table 2)

Table 2: Incidence of auditory torus (exostosis) in the various sites of Chile:²¹

Sites	Individual studied				Individual with exostosis				%
	n	F	M	I	n	F	M	I	
Fertile coast	284	125	150	9	87	25	58	5	30.6
Dry coast	52	4	7	41	16	-	1	15	30.8

Vally sites	264	154	110	-	6	3	3	-	2.3
Highland sites	549	3	3	-	0	0	0	-	00.0

In Liaoning Province Beipiao Lama hole of three yan culture cemenry 108 Xianbei skull studied by Wei and Jin et al (2003),²² and no auditoary torus was found.

Table 3: Frequencies of occurrence of 30 non-metrical traits on the Wei-jinxianbei group:²²

Male				Difference between right and left side	Female				Difference between the left and right side
No. of cases N	On the left	To the right	Bilateral L+R	P	No. of cases N	On the left	To the right	Bilateral L+R	P
60	0	0	0	>0.05	48	0	0	0	>0.05

NatasaMiladinovic et al (2010)²³ studied 9 temporal bones excavated from ancient period dating 2nd – 3rd century from site no.80 in Sremska Mitrovica (SIRMIUM). Auditory torus was discovered in three individuals (30%).

AsumanCiraka et al (2013)¹ studied, 30 nonmetric features of 47 skeletons, dated to the Archaic and Roman periods, excavated from the Datça Peninsula between 1993 and 2003. Auditory torus was not found in any case. (Table 3)

Table 4: Auditory torus observed in the skulls of the Datca - Burgaz population:¹

General			Female			Male		
n	k	%	n	k	%	n	k	%
10	-	0	5	-	0	5	-	0

Hence the current study provides valuable data from U.P. the largest state of India, and compares the same with data of different global regions.

The findings are of considerable racial and regional global significance.

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