

# **Prevalence of Various Dental Morphological Variations among Jatapu Tribe. A Study an Approach of Dental Anthropology**

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**ABSTRACT** Dental morphology, as the term is generally used in Anthropology, considers observations of minor structures of the tooth crown and root, including grooves, ridges, shape, arrangement, and cusps. Most practitioners of forensic anthropology are aware that shovel-shaped incisors are more often seen in persons of Asian or Native American heritage. Many may believe, perhaps erroneously, that the presence of Carabellis cusp trait indicates European ancestry. Dental Anthropologists usually utilize many characteristics of the tooth and relatively complex statistics to describe how much variation exists within and between populations in order to learn how the populations may be related, especially ancestor descendant relationships. The current study reveals that the prevalence and their percentage of various Dental morphological variations among Jatapu tribal people, such as the shovel-shaped incisors (3.3%), supernumerary teeth(1.8%), Carabellis cusp(2.8%), Diastema(1.7%), Crowding(3.6%), Missing third molar (7.7%), are curiosities in clinical practice, but are very useful to the dental anthropologist in tracing population movements.

**KEYWORDS:** Super numerary teeth, Shovel shape, Carabellis, Diastema, Missing third molar.

## **I.INTRODUCTION**

Anthropology as a science of man particularly deals with the bio-social aspects of man. Physical Anthropology as one of the chief branches of anthropology primarily concerns the biological variation of man and also interested in unraveling the causative factors for the variation. The contemporary physical anthropologists are trying to shape the subject in a more applied manner in different sub-fields of Physical Anthropology.

Some of the researchers in this field are concentrated to study the nutritional status of different populations and contributing their knowledge to the pediatrics, a branch in medical science, similarly by setting up the normal ranges in physiological variables such as hemoglobin levels, blood pressure etc. They are exploring the etiological aspects some of the cardiovascular diseases and thus contributing their knowledge to the epidemiology of certain disorders/diseases. By studying the different aspects of circulatory and pulmonary functions in relation to the work environment, they are throwing light on a new branch of science i.e. ergonomics. They are also successful in shaping the traditional aspects of physical anthropology in to a more effective sense (Dermatoglyphic, serological aspects and osteology) to deal with the medico-legal cases.

During the process of applying the subject in different angles, various specialized fields were emerged in physical anthropology. The new specializations under the subject are physical anthropology, kine anthropology, and forensic anthropology. The subject forensic anthropology. The subject forensic anthropology primarily deals with the skeletal material to identify the dead. Even classical anthropologists have done a good amount work to determine the sex and also to estimate the age stature. They also concentrated on the ethnicity of dead basing on the study of bones.

In most of the instances, one has to rely on teeth to estimate the age and stature. It gives relatively more accurate results among the children. Basing on the crown pattern, tooth size and histological aspects we can identify the person

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and the contributing the subject to forensic odontology. Further studies in this line expand the horizon of the field to emerge in to a new subject i.e. dental anthropology.

Even though the term dental anthropology was officially used as 1900, gained recognition only in recent decades. The pioneers in this are Hardlica, Dahlberg, Campbell, Gregory, Barrett, jelliffe, Leslie, Lee, Nelson, Lasker, Goldstein, Pedersen, Moorrees, Krogman, turner and others till recently in many of the countries, the studies in dental anthropology were devoted to throw light on phenotypic trait frequencies and their distributional pattern. Basing on this attempt was made to contemplate on the question of relationship between different populations. However in recent times emphasis has been shifted to the study of dental genetics and development to deduce conceptual models explaining the ways in which the genes operate in bringing about dental variations and their adaptive nature as reflected the cultural and behavioral changes occurring in different populations, space and time (Rami Reddy 1986). After summing up the work of the earlier researchers namely Hellman, Butler, Garn and Leviscadien (1972) came to the opinion that the entire dentition was definitely influenced by genetic factors effect certain groups of teeth only and others act upon individual teeth. Further he stressed that these must be sorted out much before the differences between populations can be fully understood.

Physical anthropologists are interested to study dentition to know about racial origins and also comparing the present human beings with the palaeo populations to draw conclusions about human origin and evolution. The most durable and hardest parts of the body are the teeth and hence they give us clues about prehuman fossils and also about the present man. The teeth of the fossil forms of the primates known as one of the anatomical system also help in understanding the relationship between the different groups of primates and they are readily accessible in the living populations. They incorporate limited and recognizable environmental effects (Scott 1973; Turner 1967; Harris 1977) and therefore, have proved to be the best epigenetic tool in the study of the genetic admixture, dental morphology and in establishing biological relationship between the living and fossilized human and non-human primates.

They are the least biased to subjectivity unlike the anthroposcopic traits regularly studied (Rami Reddy 1986). These special qualities make them regular for many biocultural studies as well as evolutionary studies. The teeth have been occupied a special place in the subject of physical anthropology and a separate way called Dental Anthropology. The various aspects that can be studied under this subject are of interdisciplinary and of international character. It includes morphology, metrics, health, evolution, growth, genetics forensic aspects and ethnographic treatment. All these serve as tools for research and areas of academic and applied studies. The direct examination of radiography, photography, dental impression and cast which form a permanent record for observation and the study of dental morphology have more anthropological interest.

These different techniques can be applied not only to the individuals of living populations but also to those represented by skeletons of individuals of the past ranging in antiquity from recent years to historic, protohistoric, prehistoric periods (Rami Reddy 1986 ). Ales Hardlica, the founder of American Physical Anthropology, who contributed to many divisions of dental anthropology besides other areas of physical anthropology (Turner 1978). other than U.S.A, in a number of countries such as U.K, Australia, Japan, New Zealand, Finland, New Guinea, Korea, and India. The dental Anthropological researches have been made on the south East Asian, East Asian and pacific populations.

These studies demonstrate the occurrence of significant variations in different dental traits among different populations like in other biological markers. Some of the pioneers who contributed to this branch of human science besides Hardlica are Dahlberg, Campbell, Hellman, Pedersen, Krogman, Kraus, Moorrees, Lasker, and some others. The most notable and a good amount of work have been contributed by Rami Reddy in India. He is the only person who covered a good number of populations to study the various aspects of dental anthropology and has become a pioneer in this subject in Indian context. The large genetic component and high heritability of dentition have been demonstrated by number of genetic studies which facilitated the postulation of the modes of inheritance for various dental traits (Kraus 1951 and Turner 1967). However, such work is necessary to substantiate these hypotheses. The present study attempts to estimate the dental morphology and pathology of males and females subjects of Jatapu Tribe of Seethampeta

# International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 6, June 2016

Mandal, Srikakulam District, and Andhra Pradesh. Random sampling method is followed in the selection of the sample. The present data is compared with the available data on other tribal population of Andhra Pradesh.

## II.METHODS AND MATERIALS

The present study deals with the collection and analysis of data on dental morphology variations on Jatapu Tribe of Seethampeta Mandal Srikakulam District. A total of 501 subjects were selected randomly from the study villages. Which include 239 males and 262 females the subjects are in the age group between 20 to 60 years the villages wise distribution of subjects (sex wise) in Seethampeta Mandal, Srikakulam District. Materials are Probe, Mouth caliper, torch and probe lens were used to examine the teeth in each individual. After collecting the information about the age educational qualifications income sources and awareness towards the actual variations in dental morphology related information was recorded. Data was collected at domiciliary condition. The subjects were selected by a random method. Close relatives were excluded from the sample. The subjects were asked to sit and Observed the dental conditions while their mouth were opened. In the present study, the morphological characters including Shovel shape incisors, Crowding, Supernumerary teeth, Diastema, Missing of third molar, Carabellis cusp, etc. The identifications of morphological characters in the present sample are followed.

## III.RESULTS AND DISCUSSION DENTAL MORPHOLOGY

**1. SHOVEL SHAPED INCISORS:** Maxillary incisors with vertical ridges at the mesial and distal margins on their lingual surfaces enclosing a central fossa in the upper and lower incisors teeth are known as shovel shaped incisors. Incidence of shovel shaped incisors in maxillary teeth by sex among Jatapu Tribe population are presented in Table – 1. JATAPU population shows 3.3 percent of total shovel shaped incisors. Among the males and females of in this population the trait was more frequently found on the central incisors JATAPU males 5.4 percent and JATAPU females 3.1 percent than lateral incisors, 4.6 percent and 0.4 percent respectively.

Male	No. of examined teeth	No. of Shovel teeth	percentage
CI	478	26	5.4
LI	478	22	4.6
Total	956	48	5.0
Female			
CI	524	16	3.1
LI	524	2	0.4
Total	1048	18	1.7
Combined (M+F)	2004	66	3.3

Compared to other populations like Pattusalis (males 46 percent and females 51.5 percent ) studied by Rami Reddy et.al (1982), Jhones (91.7 percent ) by Bhasin et.al (1979), Nicobarese (58.5 percent) by Ganguly and the populations such as Ho-munda 22 percent Manchati (55 percent ), Kanawari (33 percent ), Gotia (75 percent ), Khasi (82 percent ), studied by Bowlas (1943) and many of the Asian, European and American populations studied by various researches the present study lower prevalence of shovel shaped incisors. However, the present results are in agreement with Muslims and Lingayats of Karnataka studied by Rami Reddy (1986). When compared with the present study results, the Muslims of Andhra Pradesh (RamiReddy et.al 1981), Brahmins, Hindus of Karnataka (Rami Reddy 1986) show lower incidence.

The frequency of shovel shaped incisors in different populations show a wide range of variation. The frequency differences are found between the populations of the same geographical area, as between those of different geographical areas, but these assume, much less significance as compared to the populations of different racial

## International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 6, June 2016

admixture, irrespective of geographical closeness or proximity (Rami Reddy 1986). Shovel shaped development with additional tooth mass giving greater structural strength to the incisors have been viewed, as a selective advantage to their increasing functional capacity in mastication (Hardlika, 1920:Dahlberg, 1951). According to another school of thought there is a strong correlation between structural strength and incisor root length, the frequency of shovel shaped incisors may be higher than in those with longer incisor root length (Cadien, 1972).

**2. SUPERNUMERARY TEETH:** Supernumerary teeth or Hyperdontia are extra teeth beyond the normal number are found in any location in the dental arch but are generally observed outside the dental arch. The supernumerary teeth are either peg shaped or have a larger crown. They are found in all ethnic groups in varying populations. Prevalence of supernumerary teeth among Jatapu Tribe is presented sex wise in the table – 2. It is present among 1.8 percent of JATAPU Tribal people. The affected male individuals of JATAPU 1.3 percent are less proportion than the females (2.3%).

<b>TABLE: 2. Prevalence of supernumerary teeth among Jatapu Tribe</b>					
<b>Males</b>		<b>Females</b>		<b>Total</b>	
<b>NO.</b>	<b>%</b>	<b>NO.</b>	<b>%</b>	<b>NO.</b>	<b>%</b>
3	1.3	6	2.3	9	1.8

The published data on the incidence of supernumerary teeth is very limited. JATAPU TRIBE population show markedly normal frequency of supernumerary teeth . The population studied in India and also in other countries by other researchers. Only Barksdale (1972) has reported higher prevalence of supernumerary teeth among Eastern island natives of Nuw Guinea (3.60). From Andhra Pradesh, Muslims show next higher prevalence of about 2.35 percent (Rami Reddy et .al 1982) than the populations studied in Andhra Pradesh and Karnataka. Rami Reddy and Vijkay kumar (1978) reported the lowest prevalence of supernumerary teeth of about 0.25 percent among vysya of Andhra Pradesh. The present study populations show higher frequency in females than males.

**3. CARABELLIS CUSP:** Carabellis cusp is a small tubercle i.e sometimes present on the mesio-lingual to molars. The frequency distribution of Carabellis cusp among JATAPU both males and females are 2.8 percent. The Carabellis cusp in males 3.3 percent and females 2.3 percent observed from available data.

<b>TABLE: 3. Frequency distribution of Carabellis cusp among Jatapu Tribe</b>					
<b>Males</b>		<b>Females</b>		<b>Total</b>	
<b>NO.</b>	<b>%</b>	<b>NO.</b>	<b>%</b>	<b>NO.</b>	<b>%</b>
8	3.3	6	2.3	14	2.8

The frequency of Carabellis cusp pattern of the present study JATAPU is 2.8 percent result compared to those reported by Rami Reddy (1983) on Gulburga on populations (27.1 percent), Rami Reddy et.al.(1982) on Muslims of south eastern Andhra Pradesh (15.11percent) Balijas of Andhra Pradesh (13.02percent) by Rami Reddy (1985). The lowest frequency of the pattern is reported only in the present study compared to other Indian, Asian, European and American populations. Next lowest is reported among Japanese population (10.7percent) by Carbonell (1960).

**4. DIASTEMA:** Diastema is a space present between the central incisors or between the lateral incisors and canines. The prevalence of Diastema in both maxilla and mandible are presented sex wise among JATAPU TRIBE (table -4). The prevalence of maxillary Diastema among JATAPU males is higher (3.1 percent) than in females (1.5 percent) while in the case of mandible the prevalence of Diastema among the both sexes are more or less same males 1.3 percent and females 1.1 percent . In the both sexes the maxillary Diastema is more than that of the mandibular Diastema. Among Jatapus higher prevalence of Diastema is noticed between the central incisors in maxilla between both sexes .While in the case of mandibular Diastema found that in males between central incisors and lateral incisor Diastema is higher percentage and in females between central incisors is higher percent.

## International Journal of Innovative Research in Science, Engineering and Technology

(An ISO 3297: 2007 Certified Organization)

Vol. 5, Issue 6, June 2016

**TABLE: 4. Prevalence of Diastema in both maxilla and mandible sex wise among Jatapu Tribe.**

Maxilla				Mandible				Total	
Male		Female		Male		Female		Male+ Female	
No.	%	No.	%	No.	%	No.	%	No.	%
7	3	4	1.5	3	1.3	3	1.1	17	1.7

Compared to other populations, both the present study populations show the lowest percentage of diastema unlike the populations of Karnataka studied by Rami Reddy (1986) and also Pattusalis of Andhra (Rami Reddy et.al. 1982). Only one published study is available on the frequency of diastema other than Indian populations which is study by Boyd (1972) on Eastern highlanders of New Guinea (2.84 percent). The present study results show affinity with the results achieved by Rami Reddy et al. (1981, 1982 and 1986) on Muslims and Brahmins of Andhra Pradesh.

**5. CROWDING:** Crowding is one of the non metric traits of a complex nature which exhibits lack of sufficient space for the teeth in the jaws. The particulars regarding the prevalence of crowding of teeth in Jatapu Tribe population are presented sex wise in table – 5. The frequency of the condition is more among Jatapu males 5.0 percent and in females 2.3 percent. The Jatapu males showing the higher frequency and percentage then the females.

Jatapu Tribe population of these present study show lower frequency distribution of tooth crowding compared to the different populations studied in Karnataka by Rami Reddy (1986) and the eastern highlanders of New Guinea by Boyd (1972).

**TABLE: 5. prevalence of crowding of teeth in sex wise among Jatapu Tribe.**

Male		Female		Total	
NO.	%	NO.	%	NO.	%
12	5.0	6	2.3	18	3.6

**6. MISSING OF THIRD MOLAR:** Congenital absence of one or more number of third molar teeth is common in any of the population. The prevalence of congenitally missing third molar teeth among the Jatapu Tribe is presented in the table – 6. about 7.7 percent is found with congenitally missing third molar in this tribe. The frequency is significantly higher in maxilla 8.8 percent rather than in mandible 6.6 percent. Further, it is also found from the analysis that both sides of the jaws affected categories show higher proportions than single side affected categories. This trend is noticed in Jatapu Tribe population. The proportion of missing left molar is more than the right side is found both in Jatapu Tribe population.

**TABLE: 6. Prevalence of congenitally Missing Third Molar teeth among the Jatapu Tribe.**

Maxilla (No. of examined 501)				Mandible (No. of examined 501)				Total (No. of examined 1002)	
Left	Right	Total		Left	Right	Total		NO.	%
		NO.	%			NO.	%		
24	20	44	8.8	18	15	33	6.6	77	7.7

The Jatapu Tribe population shows high percentage of missing third molar (7.7 percent), the Vysyas (5.25 percent) studied by Rami Reddy and vijay Kumar (1978) and Balijas (14 percent) by Rami Reddy et .al .(1985), but low percentage to the Bengali population (18.4 percent) studied by Pal (1964). The third molar is the most frequently missing tooth while incisors are also absent occasionally.

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