Narmada Man

The discovery in 1982 of a fossilized skull in the central Narmada valley in Madhya Pradesh, provides the first scientifically recorded evidence of human skeletal remains from the Indian subcontinent dating to the late Middle Pleistocene of 250,000 to 200,000 years ago.

A partial right portion of the skullcap (calvaria) Narmada Man was discovered from Hathnora in Central Narmada valley during 1982 by Arun Sonakia of the Geological Survey of India, who reported the finding in **1984 in the *Records of the* Geological Survey of India**. Detailed studies on it were conducted by M.A. de Lumley in France during 1985, and in USA during 1991 by Kenneth A.R. Kennedy. The **calvaria show a mosaic of *H. erectus* and "archaic" H. *sapiens* characters.**

The main *Homo erectus* characters include:

1. Small mastoid process
2. Narrow post-orbital constriction
3. Maximum breadth across the mastoid
4. Prominent *torus angularis*
5. Forehead gently sloping

Main *Homo sapiens* characters traits include

1. A relatively high elevation of the cranial vault
2. The most posterior point in the instrumental calibration of maximum cranial length falls superior to the landmark *inion (*where it lies in *erectus* skulls)
3. The estimated cranial capacity is between 1155 and 1421 cubic centimetres. This on the contrary averages at about 1000 cubic centimeters in erectus.

Terms:

The **calvaria** is the top part of the skull. It is the upper part of the neurocranium and covers the cranial cavity containing the brain. It forms the main component of the skull roof

The **mastoid process** is a smooth conical projection of **bone** located at the base of the **mastoid** area of the temporal **bone**.

Torus Angularis: A raised and thickened ridge at the back of the posterior temporalis muscle

Important "unique features" in Narmada Cavaria infrequent/absent in er*ectus* and modern *sapiens* are:

1. The furrowing of the sagittal ridge along the top of the Cranial Vault.
2. A large external auditory meatus (ear hole)
3. An unusually long temporal bone.

But, scholars remained divided on the status of Narmada calvaria as either "evolved" *H. erectus* or "archaic" *H. sapiens,* but, recently many favour it as H. heidlebergensis

Another discovery of Narmada Man was made by A. R. Sankhyan of the Anthropological Survey of India, reported in January 1997 in Journal of Human Evolution from the vicinity of the Calvaria site of Hathnora but slightly younger bed to it. It was of three postcranial fossils, namely right and left clavicles and a partial 9th left rib. **These fossils revealed very short, robust and stocky archaic hominin, with a stature (134 cm) and shoulder width (30 cm) found in the shortest female Andaman Pygmy.**

Culture: They were found associated with Late Acheulian handaxes, cleavers and choppers of the Middle Pleistocene. Local materials were used for making different stone implements

Environment: Rich Flora and Fauna. Thick forest- Small and large animal.

The importance of the Narmada calvaria is that it demonstrates that the Acheulian tool tradition was practiced by early sapiens in a part of the world that lies between the richer hominid fossil sites in Africa and in southeast Asia and the Far East.

Phylogenetic status:

Main issue: Scholars remained divided on the status of Narmada calvaria as either "evolved" *H. erectus* or "archaic" *H. sapiens,* but, recently many favour it as H. heidlebergensis. This is because it show a mosaic of *H. erectus* and "archaic" H. *sapiens* characters

In 1997, an announcement was made of the finding of a hominid right clavicle from Middle Pleistocene deposits in the Hathnora region during field explorations between 1983 and 1992, a bone that Dr. A. A. Sankhyan of the Anthropological Survey of India, Calcutta, associates with the Narmada Man calvaria and describes as having **belonged to a female the size of a modern adult pygmy of "stocky" build**.

Dr. Arun Sonakia of the Geological Survey of India found the fossil exposed on the ground surface of a thick Quaternary sediment of fluvial origin and embedded in a fossiliferous gravel conglomerate on the north bank of the Narmada river.

Preserved parts of **the specimen are the left side of the cranial vault**, most of the base of the skull, and the left half of the brow ridges and orbit. **Hence, it is a calvaria, not a complete skull with a full face including upper and lower jaws**. Teeth are absent.

In Sonakia's description, published in 1984 in the Records of the Geological Survey of India, **he assigned "Narmada Man" to the hominid taxon Homo erectus narmadensis**. Its antiquity is based upon the direct association of the calvaria with stone tools, mainly handaxes and cleavers, typical of the prehistoric Acheulian technological tradition that was dominant in Middle Pleistocene times in India. The fossilized animal remains in the deposit—cattle, buffalo, elephant—include some species that are now extinct, but they are reliable **"index fossils"** of the late Middle Pleistocene. Radiometric dating methods are not feasible, so the age of the specimen is a relative dating estimate **based upon its lithic and faunal associations.**

By 1988, reexaminations of the calvaria had been undertaken independently by biological anthropologists from the Laboratory of Human Paleontology and Prehistory at Marseille in France and from the Human Biology Laboratory at Cornell University at Ithaca in the United States.

The French investigator, Dr. Marie-Antoinette de Lumley, recognized that **some physical features of the calvaria were not typically those found in Homo erectus fossils** from southeast Asia, China, and Africa. For example, the cranial capacity of these Early and Middle Pleistocene specimens averages 1,000 cm^3, but estimates for the **Narmada cranial vault fell between 1,155 and 1,421 cm^3, values within the range of anatomically archaic Homo sapiens.**

Dr. de Lumley christened Narmada Man as an "evolved Homo erectus." This label is acceptable to those biological anthropologists who profess that anatomically modern humans have a lineage that includes Homo erectus as an ancestral species, the anatomically **archaic hominids of the Middle and Late Pleistocene (called Homo heidelbergensis) having an intermediate status in this evolutionary progression**.

Aside from learned debates over this matter, the American investigator, Dr. Kenneth A. R. Kennedy, broadened de Lumley's observations by an extensive examination of the calvaria using measurements, morphological analyses, and statistical procedures that support the thesis that Narmada Man (actually a young adult female) merited **reassignment as an early Homo sapiens**. The specimen was compared with crania of other hominid fossils of the Middle Pleistocene (Bodo, Kabwe, Petralona, Dali, Ngandong, Saldanha, Sambungmachen, and those from other sites in Africa, Asia, and Europe), with which it exhibited a significant number of anatomical similarities.

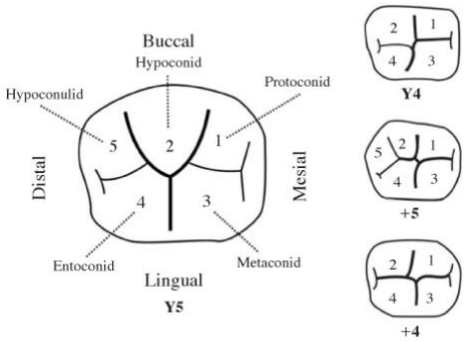
The archaeological data do not rule out the possibility that Homo erectus had inhabited the Indian subcontinent, but fossil remains of this species have not been recovered.

Q. What is the Phylogenetic status of Narmadaman in the broad Old World perspective of early human evolution?

Fossil Primates

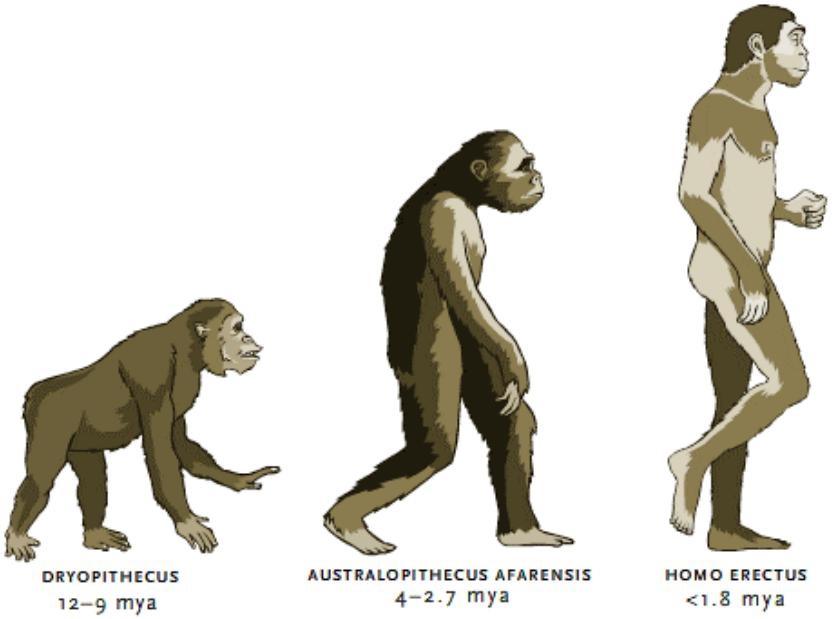
Dryopithecus

- Dryopithecus was genus of extinct apes that lived during the Miocene (22.5 to 5.5 million years ago).
- The fossils of Dryopithecus have been found in the region ranging from Spain to the Republic of Georgia.
- Dryopithecus fontani was the first fossil great ape discovered.
- It was discovered in Saint Gaudens, France, by Edouard Lartet in 1856.
- During miocene epoch the family Hominoidea **diverged into two sub-families the Pongidae (apes) and the Hominidae (humans).** The exact point of divergence between ape line and the human line is debatable. In general Dryopithecus is considered to be ancestor of both apes and human
- Dryopithecus species (referred to as dryopithecines) flourished in Europe between 13 and 7 million years ago.
- About 9 million years ago, the climate became cooler and dryer, causing a disappearance of tropical regions in Europe.
- Many of the Miocene apes became extinct at this time. Dryopithecus was one of two lineages (Sivapithecus and Dryopithecus) that survived this climatic change.
- Dryopithecines presumably survived by migrating with their preferred ecological zones to Africa.
- Many dryopithecine fossils have been discovered, and much of the skeleton is represented.
- Like all living apes, dryopithecines possessed relatively large brains. They also show apelike characteristics associated with a reduced reliance on smell and an increased emphasis on vision: they had shortened snouts and forward-facing eye sockets with overlapping fields of vision.
- Like all living apes, dryopithecines also lacked a tail.
- The skeletal remains indicate that dryopithecines were quadrupeds, walking on four legs.
- They also possessed adaptations to suspensory locomotion: Their stable yet fully extendable elbow joint allowed them hang and swing below branches.
- In addition, remains of the hands and feet show that they possessed powerful grasping capabilities.



- All of these characteristics suggest that Dryopithecus moved about the forest canopy in a way that is similar to modern great apes.
- The lower molar teeth of Dryopithecus have long had significance for paleoanthropologists. Their five cusps are arranged in a pattern that is observed in all fossil and recent apes as well as humans. It is known as the Y-5 pattern, because the fissures separating the five cusps form a "Y." This is one of many characters that are used to distinguish apes from monkeys. The size and shape of the other teeth, including large incisors and bladelike canine teeth, suggest that dryopithecines were adapted to a diet of soft, ripe fruits.
- Aspects of the skeleton that reflect life history variables, including tooth microstructure and brain size, suggest similarities to living apes.
- Drypothecines apparently lived relatively long lives, matured relatively slowly, and gave birth to one large offspring at a time.

The place of Dryopithecus in human and ape evolution is still debated. A recent

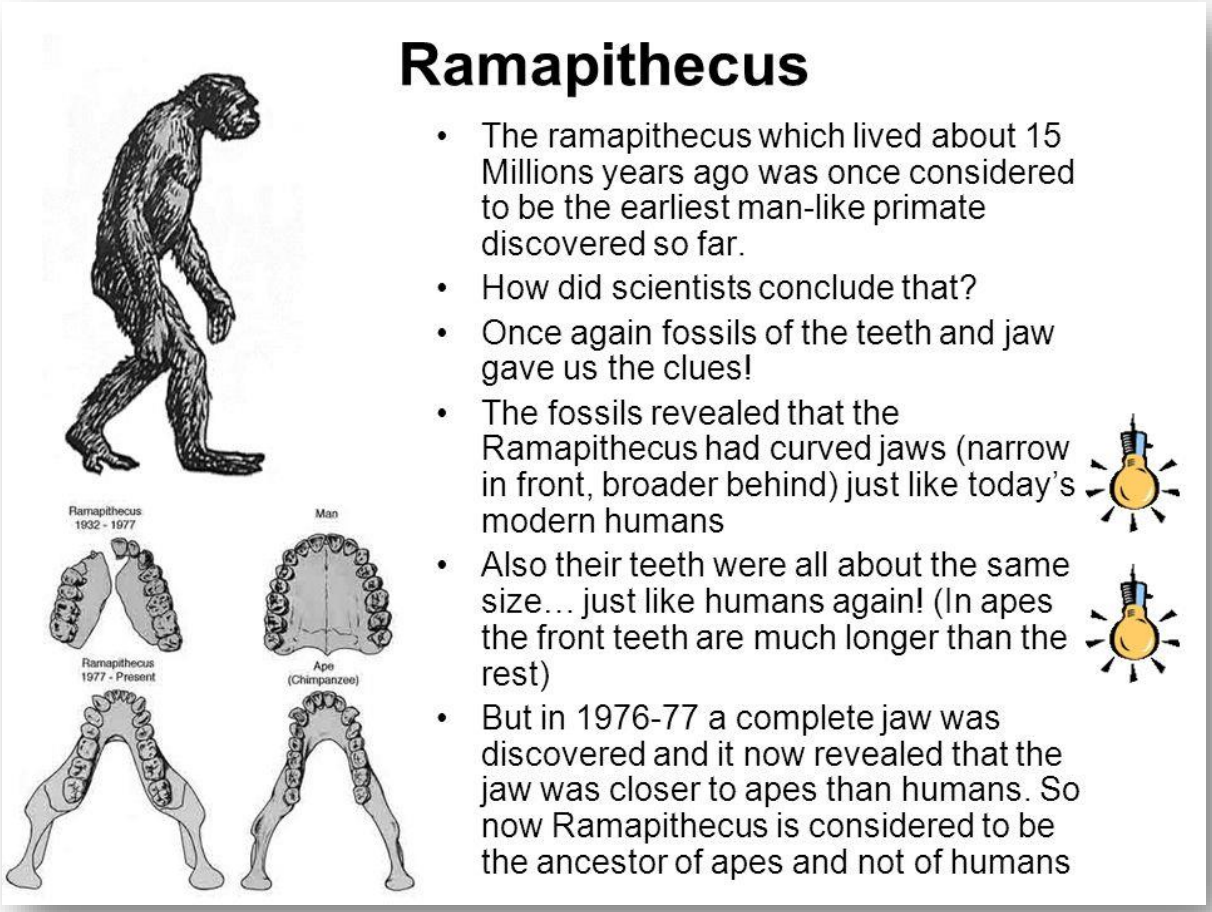


discovery (1999) of a new Dryopithecus skull from Hungary shows that the cranium is more similar to that of African apes and early fossil humans than to Asian apes. Thus, scientists suggest that Dryopithecus (or its close relative Ouranopithecus) was the likely ancestor of African apes and humans. If this were the case, the common ancestor of African apes and humans would have originated in Eurasia and later migrated to African to establish separate African ape and human lineages sometime during the late Miocene.

Ramapithecus

- Ramapithecus, fossil primate dating from the Middle and Late Miocene epochs (about 16.6 million to 5.3 million years ago).
- For a time in the 1960s and ’70s, Ramapithecus was thought to be a distinct genus that was the first direct ancestor of modern humans (Homo sapiens) before it became regarded as that of the orangutan ancestor Sivapithecus.
- The first Ramapithecus fossils (fragments of an upper jaw and some teeth) were discovered in 1932 in fossil deposits in the Siwālik hills of northern India.
- No significance was attached to those fossils until 1960, when American anthropologist Elwyn Simons of Yale University began studying them and fit the jaw fragments together. On the basis of his observations of the shape of the jaw and of the morphology of the teeth—which he thought were transitional between those of apes and humans—Simons advanced the theory that Ramapithecus represented the first step in the evolutionary divergence of humans from the common hominoid stock that produced modern apes and humans.
- Simons’s theory was strongly supported by his student English-born American anthropologist David Pilbeam and soon gained wide acceptance among anthropologists.
- The age of the fossils (about 14 million years) fit well with the then-prevailing notion that the ape-human split had occurred at least 15 million years ago.
- The **first challenge to the theory** came in the late 1960s from American **biochemist** Allan Wilson and American anthropologist Vincent Sarich, who, at the University of California, Berkeley, had been comparing the molecular chemistry of albumins (blood proteins) among various animal species.
- They concluded that the ape-human divergence must have occurred much later than Ramapithecus. **(It is now thought that the final split took place some 6 million to 8 million years ago.)**
- Wilson and Sarich’s argument was initially dismissed by anthropologists, but biochemical and fossil evidence mounted in favour of it.
- Finally, in 1976, Pilbeam discovered a complete Ramapithecus jaw, not far from the initial fossil find, that had a distinctive V shape and thus differed markedly from the parabolic shape of the jaws of members of the human lineage.
- He **soon repudiated his belief in Ramapithecus as a human ancestor**, and the theory **was largely abandoned by the early 1980s**.
- Ramapithecus fossils subsequently were found to resemble those of the fossil primate genus Sivapithecus, which is now regarded as ancestral to the orangutan; the belief also grew that Ramapithecus probably should be included in the Sivapithecus genus.

- Recent paleontological analysis of the Higher Primate subfamily Dryopithecinae shows that fossils in this group can be referred to two genera, Ramapithecus and Dryopithecus.
- Dryopithecus is a pongid and contains as subgenera (Dryopithecus), (Proconsul), and (Sivapithecus).



Q1. Write a short note on Ramapithecus.

In the year 1934, G.E. Lewis discovered the fossilized remains of Ramapithecus in the Siwalik hills of India. Later in 1930s, Lewis assigned an upper jaw from Haritalyangar (Siwalik hills, India) to a new genus Ramapithecus brevirostris i.e. Lord Rama's ape. The specimen includes first two molars, both premolars and the root of the lateral incisor.

- The fossil finds of Ramapithecus are regarded as the most important addition to the knowledge relating to human evolutionary development.

- Most of the Ramapithecus fossil specimen consists of teeth and jaws and they principally come from two areas – the Siwalik hills in India and Fort Ternan in Kennya.
- A mandible is also found from Pakistan and this may be the most complete fossil yet found known as Ramapithecus. Other specimens have been found from Turkey, Hungary and Greece.
- The Fort Ternan fossil have been absolutely dated to 14 million years ago, while the Siwalik hill specimens are younger being dated to about 10-12 million years ago.
- The striking feature of this Miocene fossil is that the dental arcade was rounded, the canines small and, probably, the incisors small and spatulate. It can be deduced from these features that the front teeth were no longer used for tearing the food and that this was a function of the hands freed by bipedalism for the task.
- Ramapithecus certainly provides a possible link between the definitely ape like Dryopithecus and the later Pliocene and Pleistocene hominids.
- The molar teeth of the Ramapithecus are relatively much larger than those of Homo, but are smaller than those of Dryopithecus.
- The whole animal was gibbon size.

Write some important anatomical features of Ramapithecus.

1. Incisors and canine are inserted vertically and not in slight procumbent position as in apes.
2. Little or no canine diastema.
3. The canines of the Ramapithecus are not projected and they possess narrow faces.
4. The dental arcade was rounded.
5. The palate of the Ramapithecus is arched as in man.
6. Flattened and thick enameled premolars and molars that appear to be adapted for heavy chewing and processing of hard food stuffs.
7. The molars possess the Dryopithecus Y-5 cusps pattern.
8. The ratio between the sizes of front tooth (incisors and canine) and those of cheek teeth (premolars and molars) is roughly the same which indicates the human position.
9. Shelf like ridges are present inside the lower jaw of Ramapithecus.
10. Large inferior torus on mandiblde.
11. Facial profile is orthognathus.

Sivapithecus

- Sivapithecus, fossil primate genus dating from the Miocene Epoch (23.7 to 5.3 million years ago) and thought to be the direct ancestor of the orangutan.
- Sivapithecus is closely related to Ramapithecus, and fossils of the two primates have often been recovered from the same deposits in the Siwālik Hills of northern Pakistan.
- Other Sivapithecus remains have been found at sites in Turkey, Pakistan, China, Greece, and Kenya.

- Some authorities maintain that Sivapithecus and Ramapithecus are in fact the same species.
- Though Sivapithecus was slightly larger than Ramapithecus, it was only a small-to-medium-sized ape about the size of a modern chimpanzee.
- The fossil remains of Sivapithecus reveal that it shared many of the same specialized facial features of the orangutan—i.e., eyes set narrowly apart, a concave face, a smooth nasal floor, large zygomatic bones, and enlarged central incisors.
- Sivapithecus' place in primate evolution was poorly understood until the 1980s.

- ***Prior to this, the genus, along with Ramapithecus, was interpreted as having both apelike and humanlike features and thus was presumed to be a possible first step in the evolutionary divergence of humans from the common hominoid stock of the apes***. But new Sivapithecus finds and the reinterpretation of existing remains convinced most authorities in the 1980s that Sivapithecus was the ancestor of the modern orangutan and diverged from the common lineage of the African apes (i.e., chimpanzees and gorillas) and humans more than 13 million years ago.

Features:

- Sivapithecus was about 1.5 metres (4.9 ft) in body length, similar in size to a modern orangutan.

- In most respects, it would have resembled a chimpanzee, but its face was closer to that of an orangutan.
- The shape of its wrists and general body proportions suggest that it spent a significant amount of its time on the ground, as well as in trees.
- It had large canine teeth, and heavy molars, suggesting a diet of relatively tough food, such as seeds and savannah grasses.