Topic: Evolution of Horse

Part III

By Dr. V. Kumar
R.N. College Hajipur

* Evolution of Horse *

- The modern horse belongs to- (order)

Order- Perissodactyla

Sub-order- Hippomorpha

Family - Equidae

Genus- Equus

- The scientific name of our domestic horse is Equus cabalus.

* Place and time of Origin:

- Eosine period of coenozoic era, a period of about 60 million years ago.
- Primary centre of their evolution was great Plains regions in North America, from where some of species have spread out to Europe and Asia from time to time.
- The first known fossil of horse from Europe was Hydracontherium, where as contemporary fossil of horse from America was Eohippus.

⊛ Evolutionary trends:

- The first known ancestors of horse were fox like, living on moist ground and browsing soft

leafy vegetation.

- with the change in climatic and physical conditions, nature of food, they were exposed to various challenges and passed through different evolutionary (changes) phases.

- The history of evolution of horse present definite changes in certain organs in a particular direction. These directional changes are known as evolutionary trends.

* The following evolutionary trends are shown in Phylogeny of horse:

1. Overall increase in size
2. Lengthening of limbs.
3. Gradual enlargement and elongation of their digits.
4. Perfection of hoof on third digits.
5. Reduction in the no. of digits from 4 or 5 digit to one in each foot.
6. Development of Spring mechanism.
7. Change of foot posture from Plantigrade to Unguligrade.

8. Elongation of preorbital region of skull.

9. Elongation of neck.

10. Development of high crons on molar and premolar.

11. Conversion of Premolars and Molars into continuously growing grinders which are more suitable for grazing.

- Thus Brachyodent dentation was replaced by hypsodent dentation.

12. Premolars becomes molariforms.

13. Appearance and increase of Diastema.

14. Increase in size and complexity of Brain.

✱ Phylogeny of Horse

1. Horses in Eocene:

(a) Hycotherium and Eohippus:

- Copper 1932, suggested that Hyracotherium and Eohippus were very similar to each other, and called it Hyracotherium.

- It was small, browsing animal of size of fox.

- Skull and neck were short.
- Back was arched and flexible.
- The Ulna and fibula were stout and well built and were free from Radius and Tibia.
- The Hind limb were moderately longer. The limbs were digitigrade.
- The forelimb poseses 4 digits (2, 3, 4 and 5) and hind limbs (2, 3 & 4).
- The first and 5th digits in hind limb were represented by splints.
- The characteristics springing mechanism was absent.

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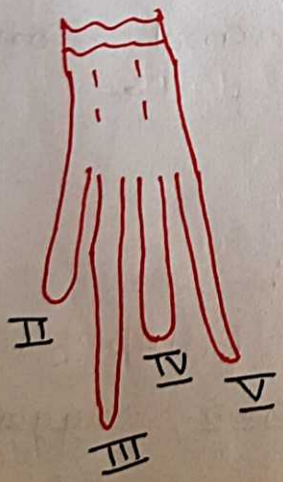

forelimb

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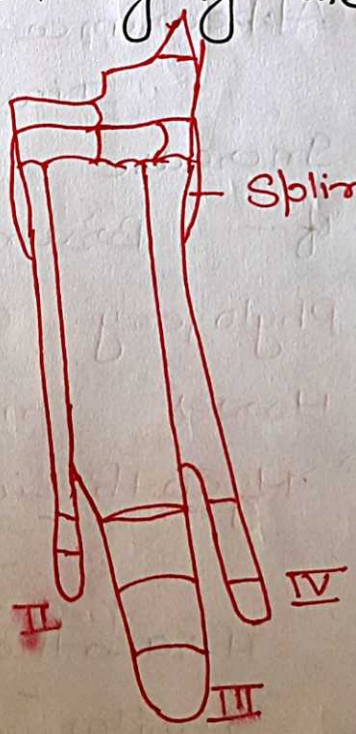

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b) Orohippus (mountain horse):

- Its fossils were recovered from Bridger beds, New mexico in the middle Eocene.
- It was little higher than Eohippus.
- Its forelimbs retains 4 toes, hind limbs had 3 toes but tiny vestiges of two toes in hindlimbs were lost.
- The middle digits in both the limbs way dominant.

c) Eohippus:

- Slightly longer than Orohippus.
- Fore limbs were with 4 and hind limbs ~~with~~ 3 digits.
- The vestigens were totally absent.
- These forms become extinct by the end of Eocene and replaced by mesohippus.

* Horses in Oligocene:

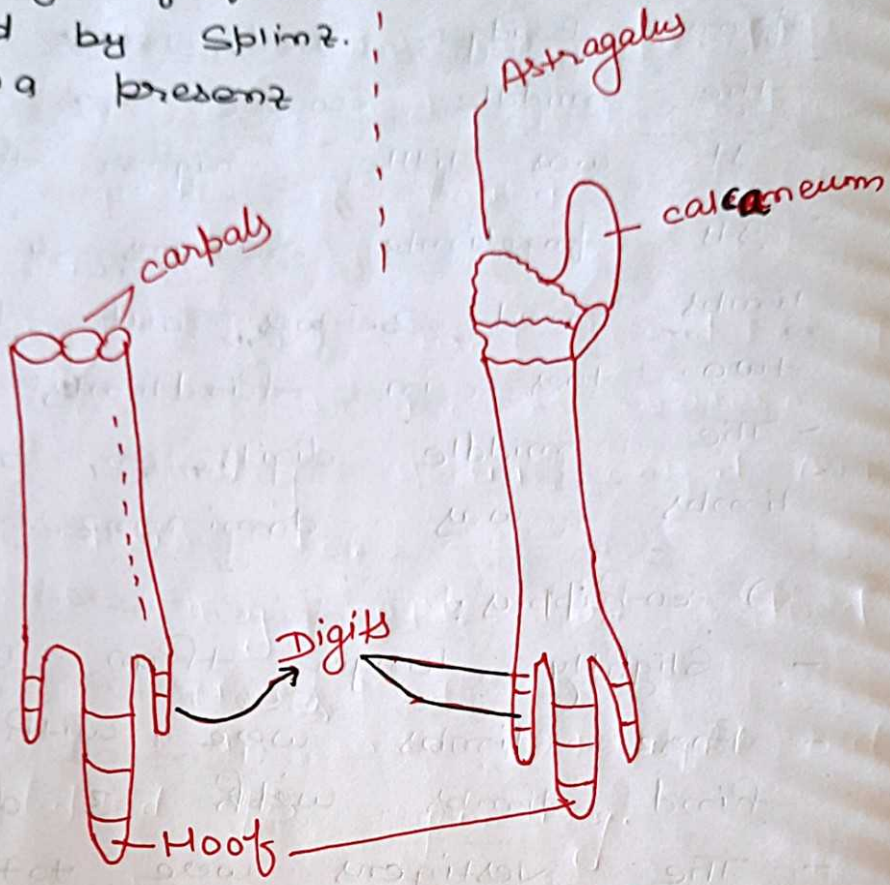
Mesohippus (Intermediate horse)

- Size of Sheep
- Neck short, flexible
- Trunk was long, slender and back arched.
- No of toes in forelimb

Miohippus

- Similar to mesohippus
- Both forelimb and Hindlimb were 3 toed, but they were broad & spreading.

and hindlimb is 3.
- 5th digit of forelimb represented by splint.
- Diastema present



Forelimb

Hind limb

⊕ Horses in miocene :

- They appeared in North America but soon migrated to old world (Europe and Asia).

Parahippus

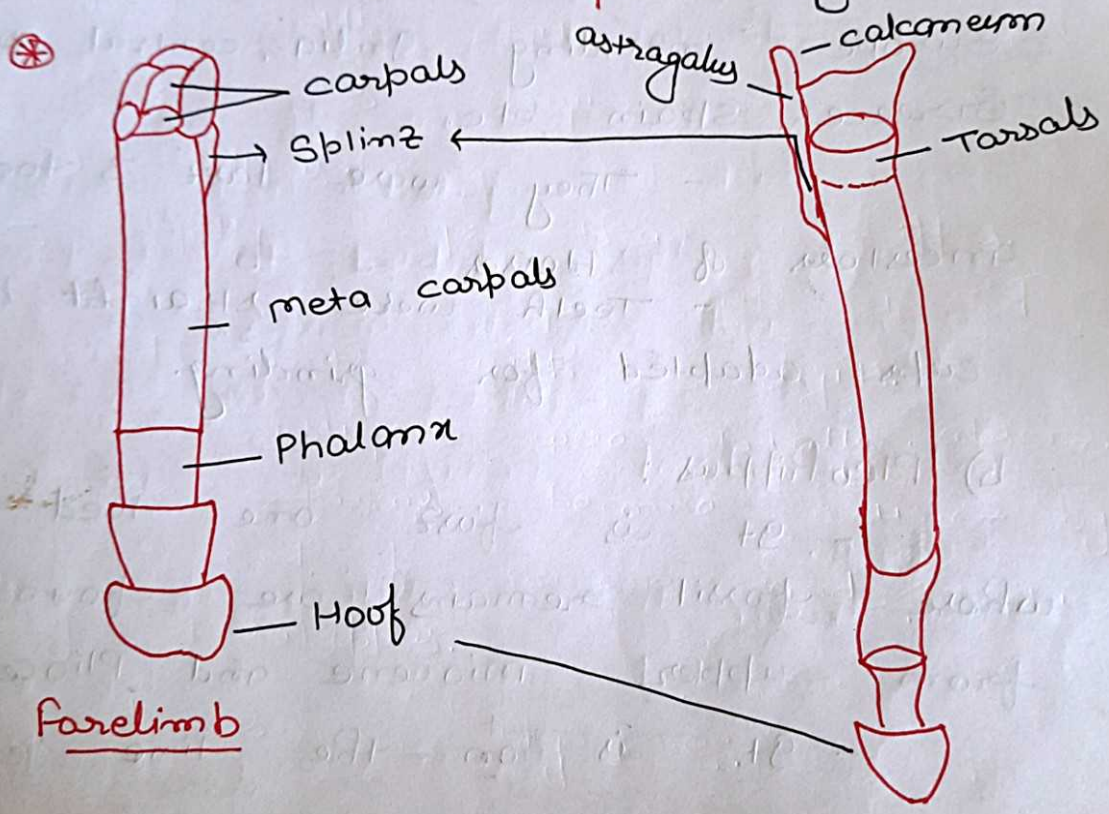
- They were descented from miohippus
- Its legs were three toed but exhibited

Merychippus
(Ruminent horse)

- It lived in middle and upper miocene and

marked elongation;
- 3rd digit in forelimb become more predominent than their ancestors.
- Although but all three digits touched the ground only median was effective in locomotion.

became extinct in Pliocene.
- It represent first 3 toed grazer feeding on grass thus they are transition from Primitive browsing horse to modern grazing horse.



(Parahippus)

* Horses in Pliocene:

- In Pliocene conditions become more drastic and land bridges were formed, resulting in

b) Pleohippus :

- It is first one toed horse whose fossil remains are found from upper Miocene and

the migration of fauna.

a) Hipparion :

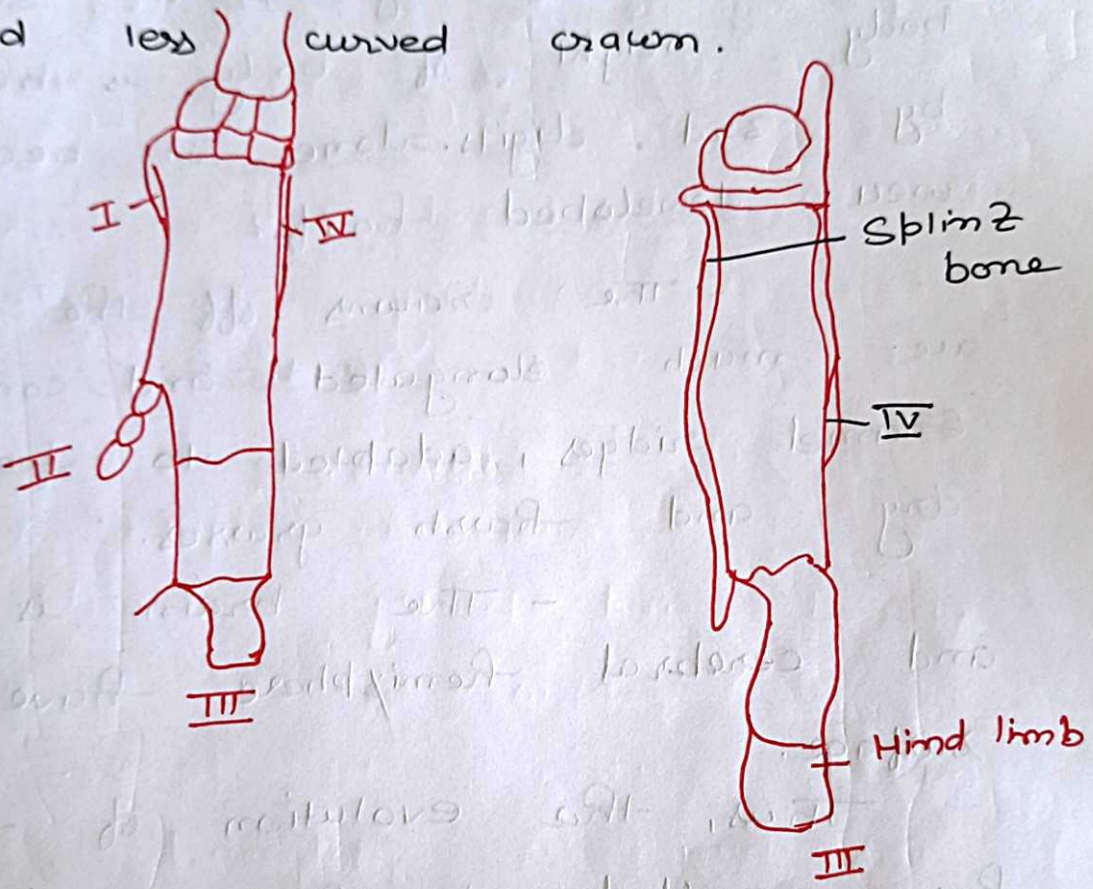
- fossils remains are found in Pliocene from china to western Europe including India, central Asia, Greece, Spain etc.
- They were last 3 toed ancestors of Horses
- Teeth were straight but cups adapted for grinding.

b) Pleohippus :

- It is first one toed horse whose fossil remains are found from upper miocene and Pliocene.
- It is on the line leading to Equus.
- The most striking change was the reduction of side toes 2nd & 4th.

c) Plesihippus:

- Fossils of Plesihippus have recovered from Texas. They are more or less like modern horse and of size of Arabian horse.
- Their teeth had long and less curved crown.



Pliohippus

* Horses in Pleistocone:

Equus (modern horse)

- Equus includes the modern horse which occured towards the end of Pliocene.
- The first representative of Equus appeared in late Pliocene

and achieved word wide distribution during Pleistocene.

- It was about 60 inches in hight and last first and 5th digits entirely and 2nd & 4th are represented by splint, So entire body weight of body is balanced by 3rd digits alone. It bears well developed hoofs.

- The crowns off the molar are much elongated and complicated enamel ridges, adapted to feed on dry and harsh grasses.

- The brain is enlarged and cerebral hemisphere have grooved surface.

Thus, the evolution of horse has resulted in the development of an intelligent, long legged, swift running animal, which is suited to live and feed in open grasslands.

- Although, North America was the stage of equine evolution,

continent on the close of Pleistocene due to certain unknown region.

- The species of horse found there are secondarily introduced by man.

⊛ True wild types of horses present are:

1. Only in Asia
   - Asiatic wild ass (Equus hemionus)
2. Africa
   - E. Przewalski
   - E. asinus