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Q8(c)

Explain the skeletal changes due to erect posture and their implications.

UPSC Civil Services Mains 2016 · Anthropology GS 1 · 15 marks · Characteristics of Primates

1.5 Characteristics of Primates; Evolutionary Trend and Primate Taxonomy; Primate Adaptations; (Arboreal and Terrestrial) Primate Taxonomy; Primate Behaviour; Tertiary and Quaternary fossil primates; Living Major Primates; Comparative Anatomy of Man and Apes; Skeletal changes due to erect posture and its implications.

Core demand of the question

- Explain the skeletal changes due to erect posture and their implications
- Write about 200 words for 15 marks

Revision summary

Bipedalism moved the skull balance point and curved the spine.

The pelvis became a bowl for viscera and abductor gait.

Valgus knee and arched foot make a striding platform.

Hands were freed for tools.

Back pain and tight birth are the biological bill.

Introduction

Erect bipedal posture rebuilt the skeleton from skull to foot. The same changes enable free hands and also produce human back, birth, and joint costs.

Body

Main changes

- **Foramen magnum** moves under the skull so the head sits on a vertical spine.
- **Spine:** lumbar and cervical **lordosis**; a vertebral column that springs and also slips.
- **Pelvis:** short, wide, bowl-shaped; ilium reoriented for gluteal abductors, as **Lovejoy** stressed for the Trendelenburg gait.
- **Lower limb:** valgus **knee**, long femur, stable **platform foot** with adducted hallux and arches.
- **Thorax** and shoulder free the arm from locomotion. Hands become precision tools.
- **Sacrum** and pelvic inlet-outlet twist complicate **obstetrics** with a large fetal head (**Washburn's obstetrical dilemma** debate).

Implications

- Efficiency of walking and carrying. Heat dumping on the savanna.
- **Pathology:** lumbar disc, hernia, varicose veins, haemorrhoids, fallen arches, difficult labour.
- Culture answers with midwifery, tools, and chairs-which then create new back strain.

Flow diagram

Erect posture -> Foramen magnum lordosis

Erect posture -> Bowl pelvis valgus knee

Erect posture -> Arched adducted foot

Erect posture -> Hands free obstetric cost

Conclusion

Erect posture shifted the **foramen magnum**, curved the spine, remodelled pelvis and foot, and freed the hand. Implications are locomotor success plus a lifetime of mechanical and obstetric trade-offs.

Facts & figures

Lovejoy

Pelvic and hip mechanics of bipedalism in early hominins.

Obstetrical dilemma

Washburn: bipedal pelvis versus large brain at birth; later authors qualify it.

Foramen magnum

Anterior position is a skeletal marker of upright head carriage.

Hallux adduction

The non-grasping big toe of a committed biped.

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