Comparative Anatomy
Changes in vertebrate body with the passage of time

SIGNIFICANCE OF THOSE CHANGES

a) Functional Significance

Water → Land

Biomechanics

b) Evolutionary significance

Remodel

Preadaptation

Sarcopterygians

Early tetrapods

Skeletal System

Cranial

Post-cranial

Splanchnocranium, Dermatocranium, Chondrocranium

Axial

Notochord, Vertebral column

Appendicular

limbs, girdles

Remodeling

Triple evolutionary sources
**Chondrocranium**

trabeculae  
parachordals  
occipitals  
sensory capsules  

**CHONDROCRANIUM**

sphenoids  
ethmissoids  
occipitals  
otic, optic, nasals  

**CENTERS OF OSSIFICATION**

---

**CHONDROCRANIUM**

General Functions

1) Adult braincase  
   (chondrichthyes)

2) Scaffold  
   \[\rightarrow\]  
   Neurocranium

---

**SPLANCHNOCRANIUM**  

(= Visceral Skeleton)
**SPLANCHNOCRANIUM**

(=Visceral Skeleton)

1) support respiration
2) support feeding apparatus
3) later, jaws

---

**SPLANCHNOCRANIUM**

⇒ **JAWS**

General Functions

1) Prey Traps
2) Crushing

---

Romer

Jarvik

---

Jaw Suspension

Amphistyly

Autostyly

Hyostyly
Figure 7.56
Quadrate → Incus
Articular → Malleus
(Hyomandibula) → (stapes)
FUNCTION
1) Secondary

FUNCTION
1) Secondary
2) Primary
   - respiration
   - feeding
   - prey traps
   - swallowing

Water vs. Land

FUNCTION
(feeding)
Aquatic
Suspension feeders
(cilia-mucus)

Agnathans

Suction Feeders
(gape ’n suck; inertial)
aquatic

Bass

Hog sucker
FUNCTION

(feeding)

Air

Tongue
**FUNCTION**

Swallowing
- suspension
- whole (gizzard)
- mastication

**Swallowing**

**Mastication**
Swallowing
Mastication

- precise occlusion
- specialized teeth
  (polyphyodont)
- diphyodont
- akinetic

CRANIAL KINESIS

Relative motion of two or more parts of the skull room.
(joint through skull roof)

Cranial Kinesis

- Kinetic
- Akinetic

CRANIAL KINESIS

Rapid change in size and configuration of buccal cavity.

Tooth position
Strike Kinematics

- braincase
- supratemporal
- quadrate
- pterygoid
- ectopterygoid
- maxilla
- mandible
- fang
- prefrontal

Strike Kinematics