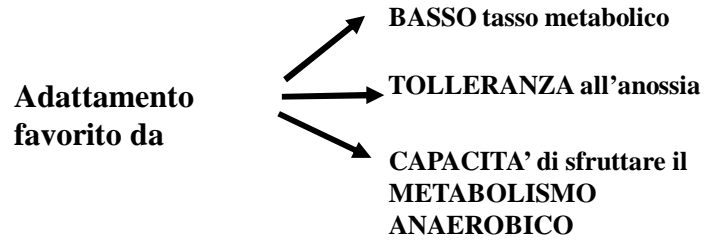
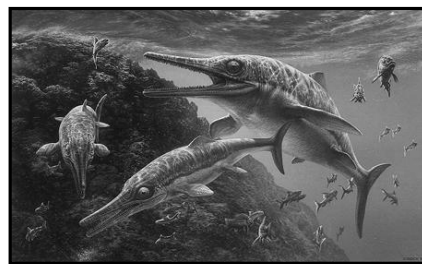


## Rettili Marini Mesozoici

Se la pressione selettiva è favorevole, i Rettili ritornano all'acqua.



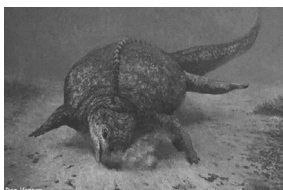
I gruppi di Rettili marini Mesozoici più importanti sono due:



Ichthyosauria

### Sauropterygia

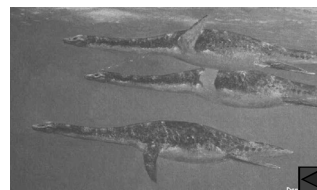
Placodontia

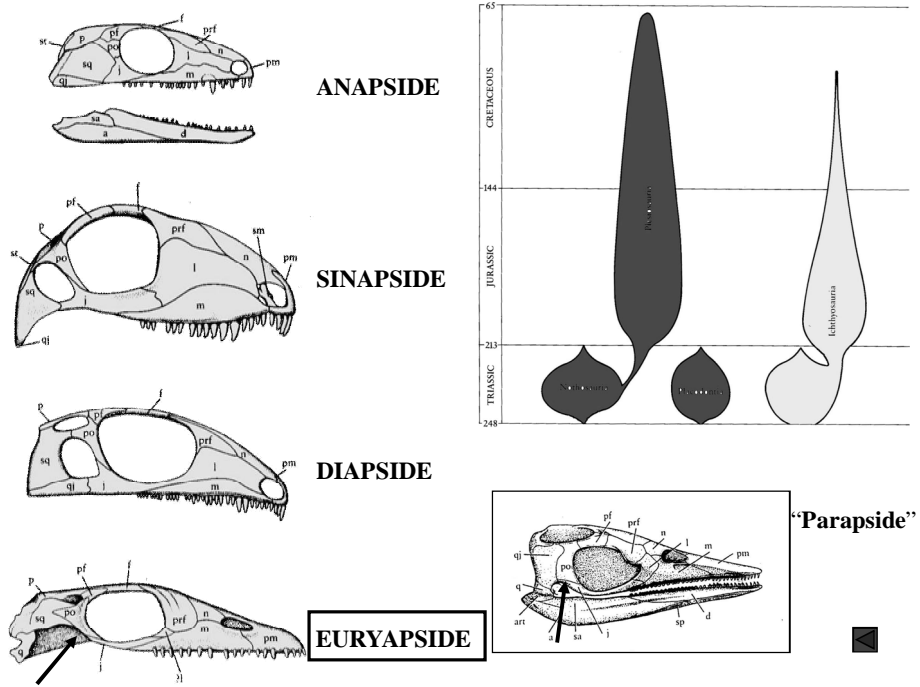


“Nothosauria”



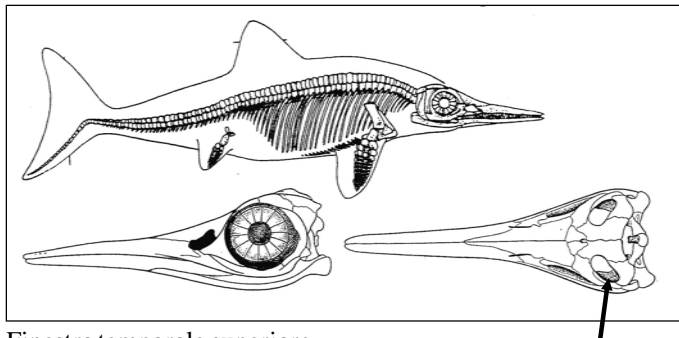
Plesiosauria





**ICHTHYOSAURIA**

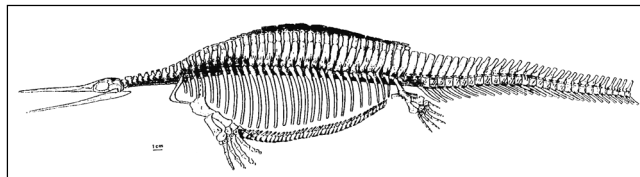
Dal Triassico Inferiore al Cretacico Medio-Superiore



Derivazione diapside?  
Cranio simile a quello euryapside, evolutosi indipendentemente?

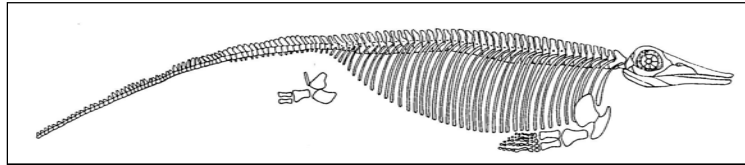
Finestra temporale superiore

Ittiosauro primitivo?  
Diapside primitivo?  
Difficile stabilire l'entità delle convergenze



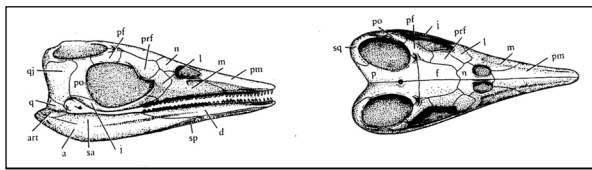
*Nanchangosaurus (Hupehsucus)* Triassico, Cina

*Utatusaurus* Triassico inferiore, Giappone

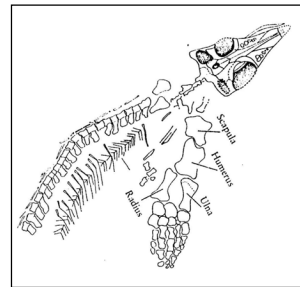


Archi neurali ancora connessi con i centri  
no processi trasversi  
"mano simile a pinna ma struttura da tetrapode terrestre.

*Grippia* Triassico inferiore, Spitzbergen



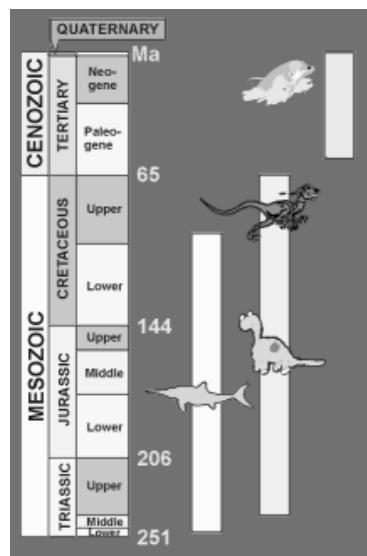
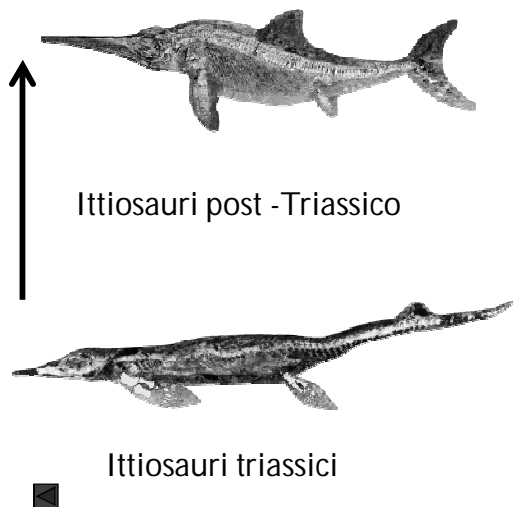
Contatto prefrontale-postfrontale  
Dentatura eterodonte  
Denti su due file

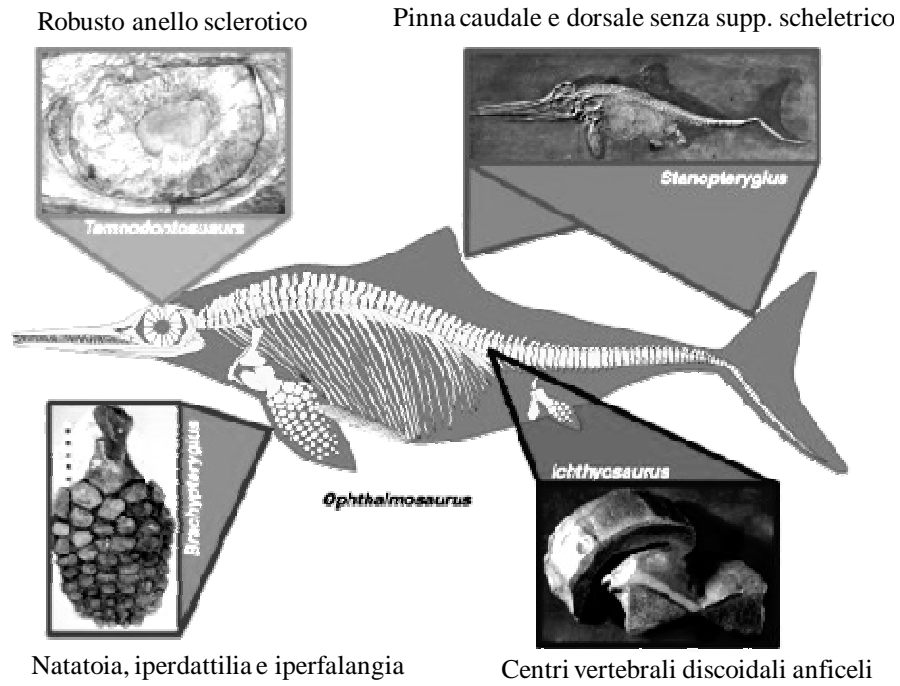


*Chaohusaurus* Triassico inferiore, Cina

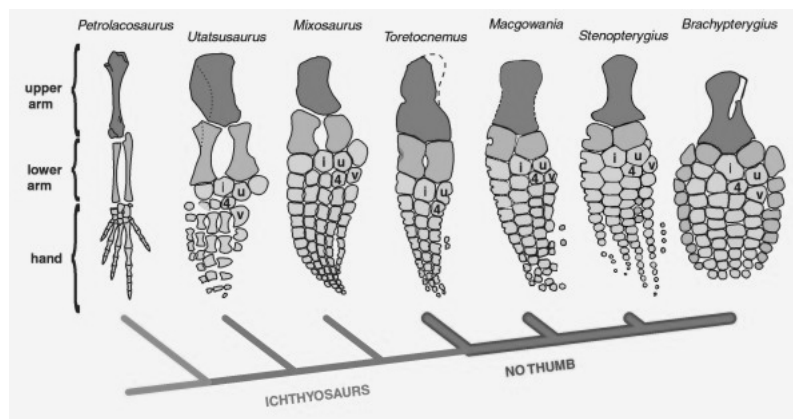
<http://www.ucmp.berkeley.edu/people/motani/ichthyo/>

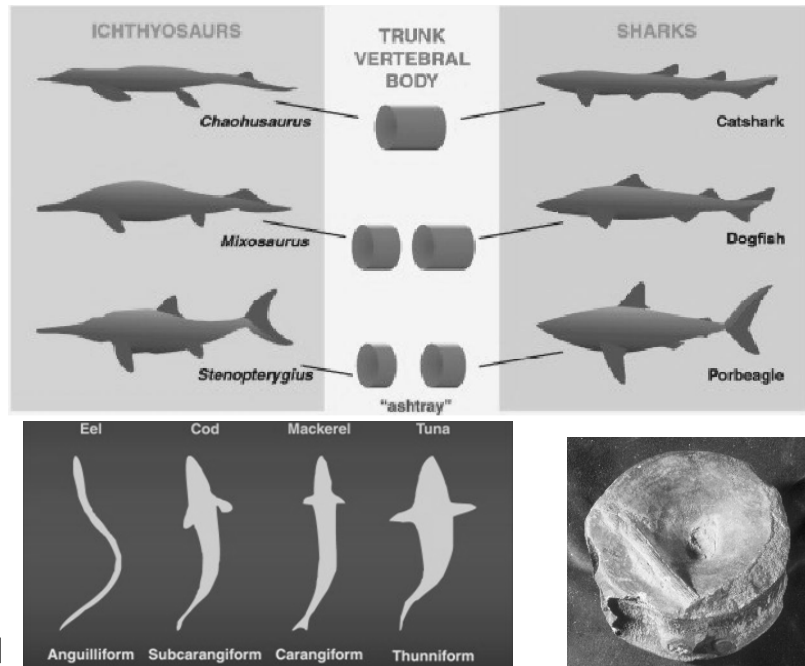
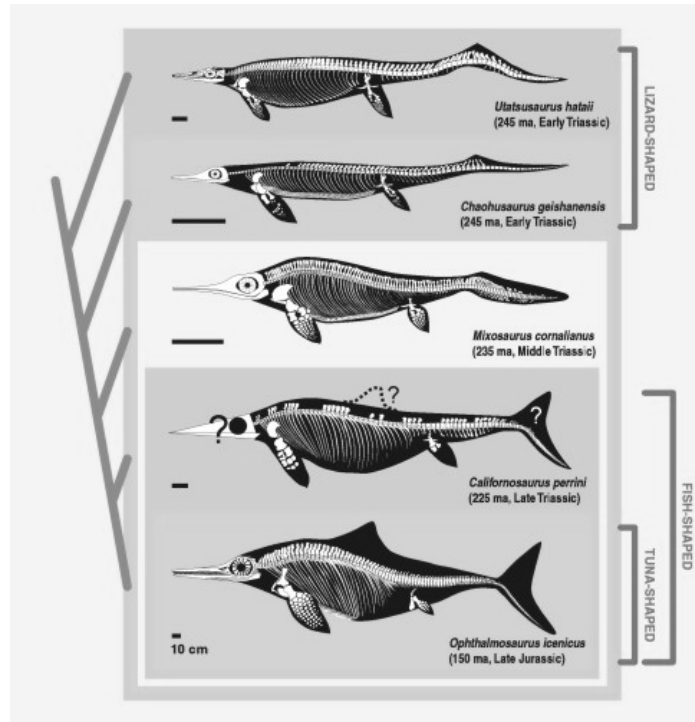
Ichthyosauria

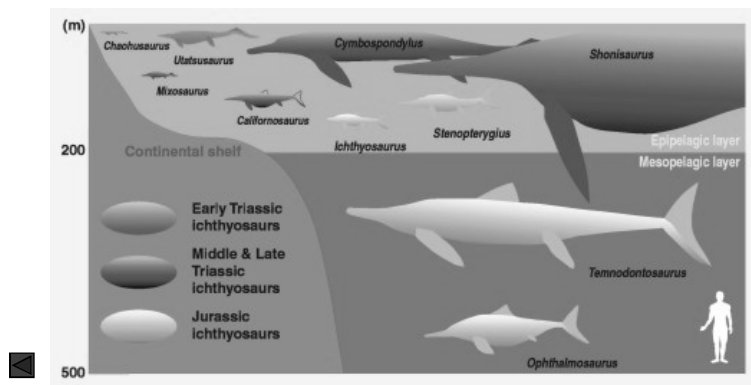
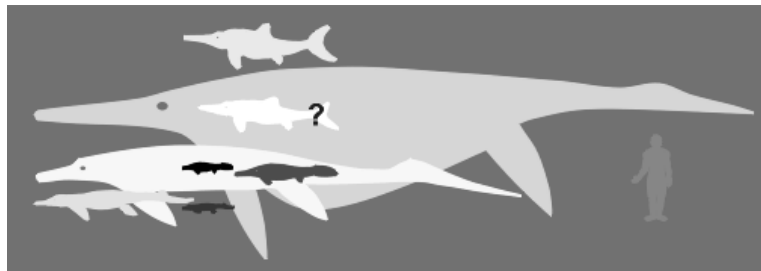
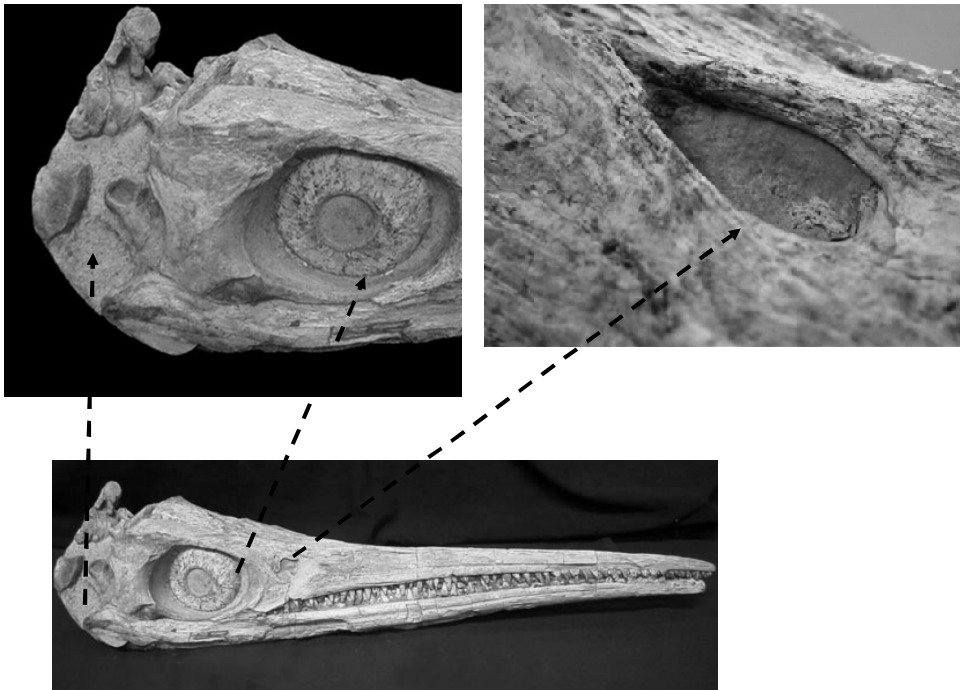


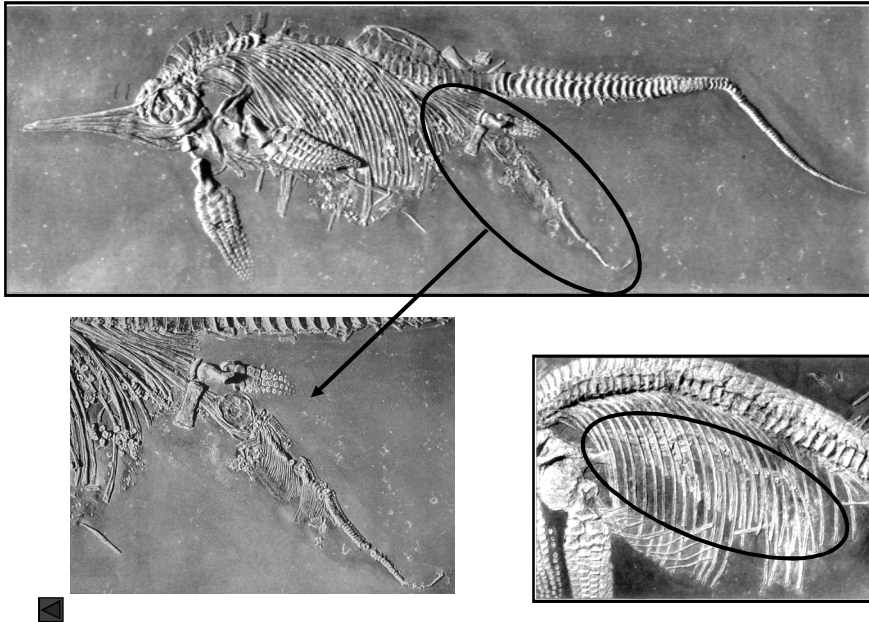


- Accorciamento porzioni prossimali dell'arto
- Perdita di identità elementi carpo metacarpo
- Iperfalangia ed iperdattilia
- Perdita mobilità articolare fra le diverse sezioni dell'arto

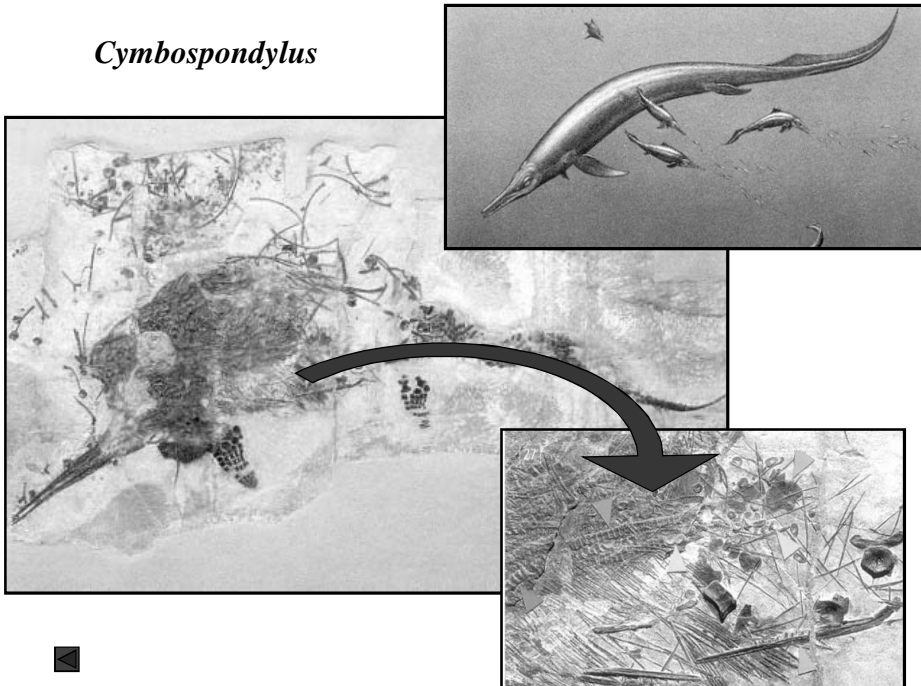






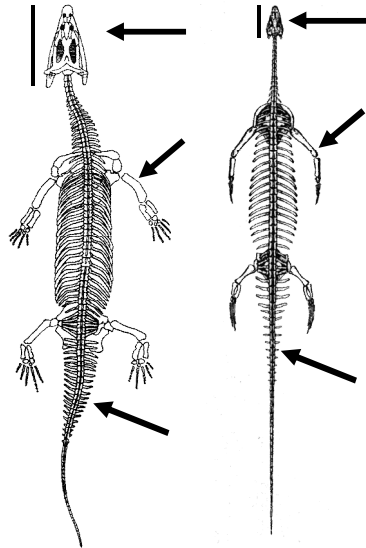


*Cymbospondylus*

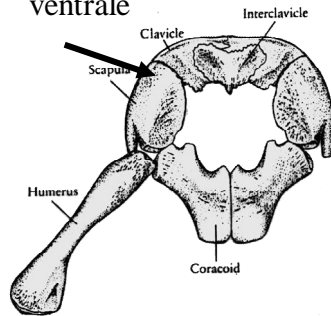


**SAUROPTERYGIA: Nothosauria (Triassico)**

**Nothosauroida      Pachypleurosauroida**

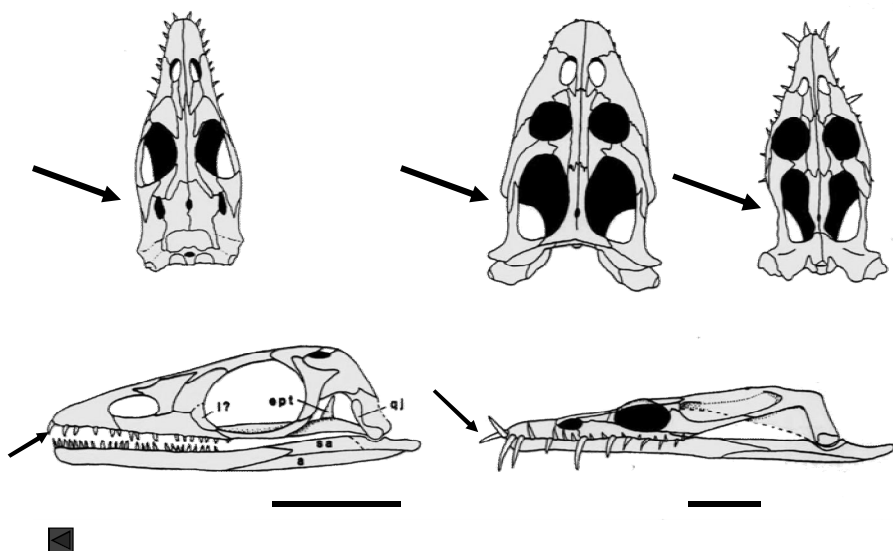


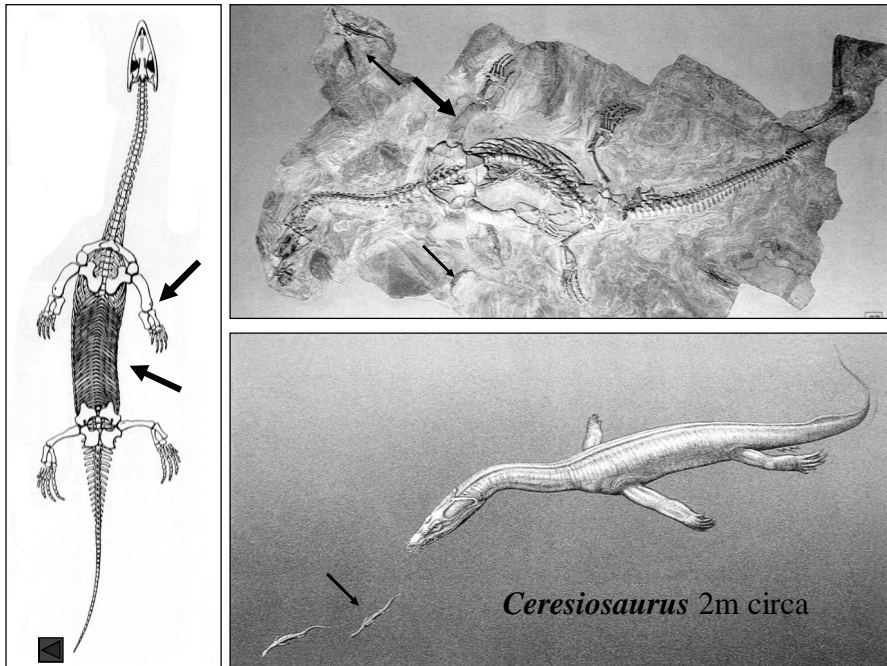
La scapola si infila ventralmente alla clavicola  
Il cinto forma un anello ventrale



**Pachypleurosauroida**

**Nothosauroida**



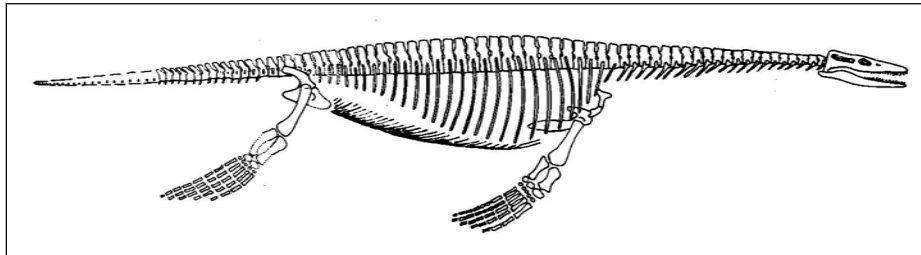


**I Nothosauroida presentano un trend evolutivo che va verso un progressivo irrigidimento del tronco ed un passaggio del nuoto da assiale ondulatorio verso un nuoto parassiale simmetrico che si riscontrerà nei Plesiosauria.**

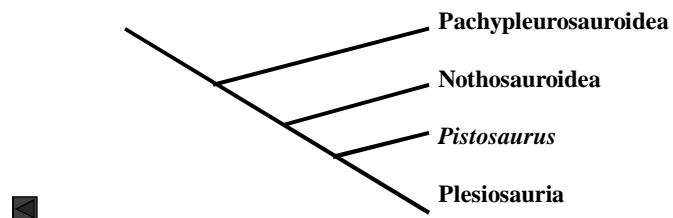
**Numerosi caratteri anatomici ne farebbero gli antenati diretti dei Plesiosauria, ma un carattere morfologico, costituisce un ostacolo.**

**I Nothosauria presentano nel palato un carattere derivato assente nei Plesiosauria: le finestre interpterigoidee sono *chiuse*, mentre nei Plesiosauria rimane la condizione plesiomorfica, ossia le finestre interpterigoidee sono aperte.**

## Pistosaurus

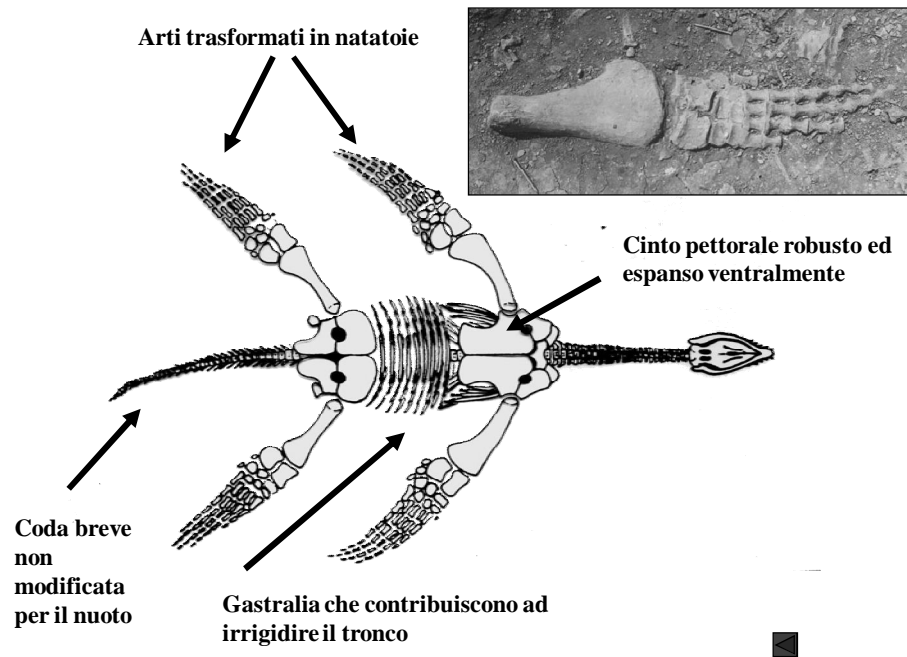


Questo problema è stato risolto con il ritrovamento di *Pistosaurus*, un Sauropterigio che mostra uno scheletro postcraniale da Nothosauroida con un cranio da plesiosauro, con finestre interpterigoidee aperte.



## PLESIOSAURIA (?Triassico Sup. -Cretacico)

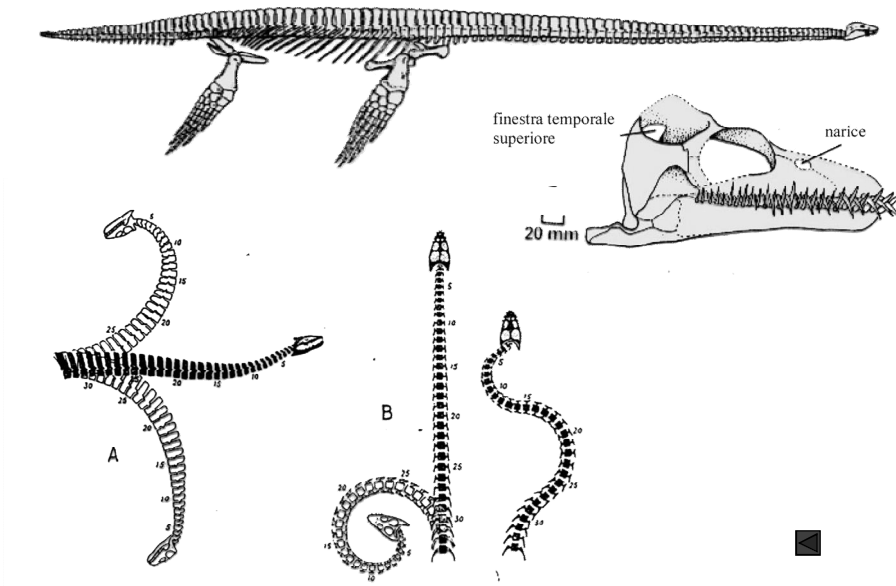




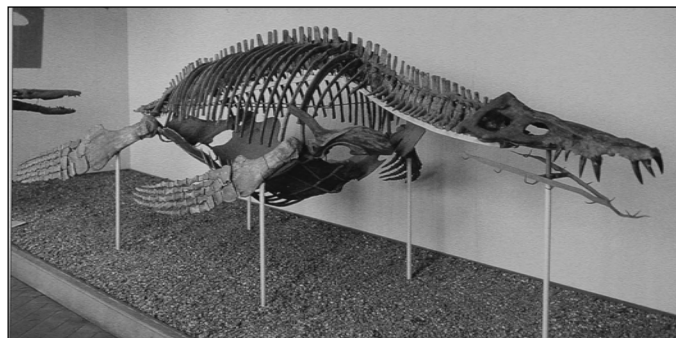
### ELASMOSAUROIDEA

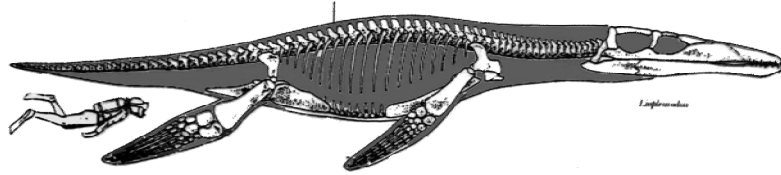


Estremo allungamento del collo, oltre 70 vertebre cervicali

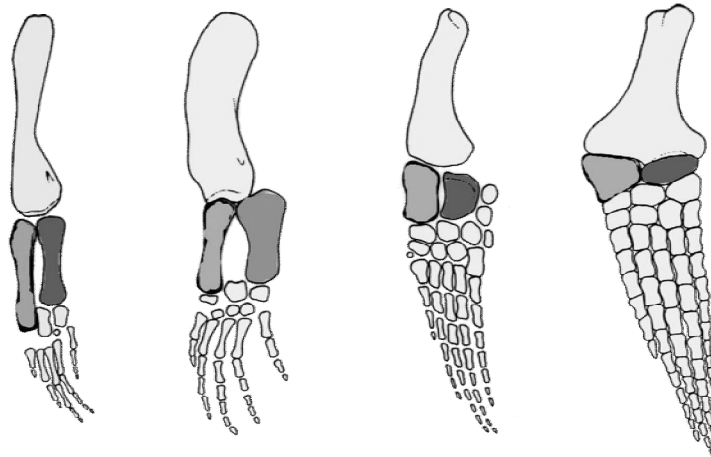


### Pliosauroida





Cranio molto grande con fauci allungate ed armate di robusti denti conici, situati all'estremità anteriori delle mascelle. Lunghezza da due a oltre venti metri.  
 Probabilmente veloci (e voraci) predatori di mare aperto.



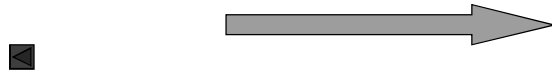
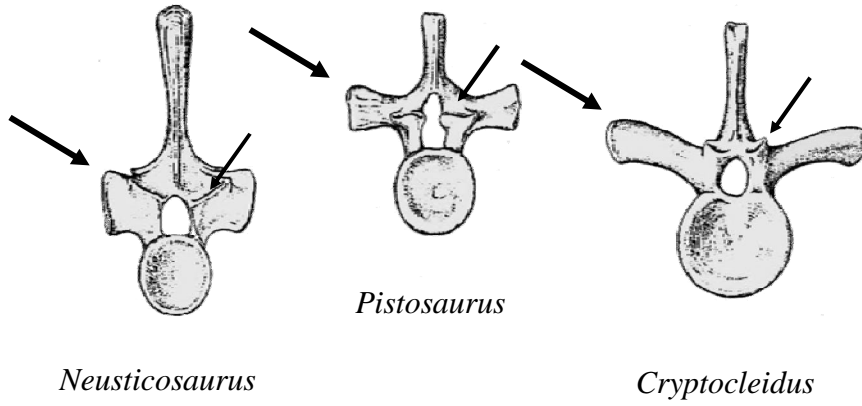
*Neusticosaurus* "Notosauro"

Plesiosauro  
Giurassico Inferiore

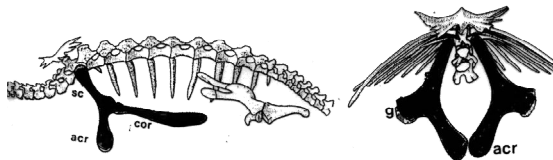
Plesiosauro  
Giurassico Superiore



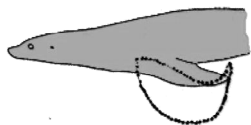
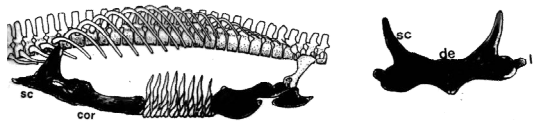
**Vertebre:**  
 •Incremento dimensioni processi trasversi  
 •Avvicinamento e riduzione zigapofisi



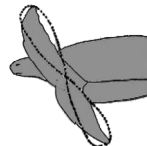
Tartaruga



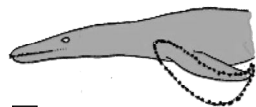
Plesiosauro



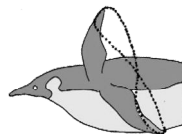
Otaria



Tartaruga



Plesiosauro

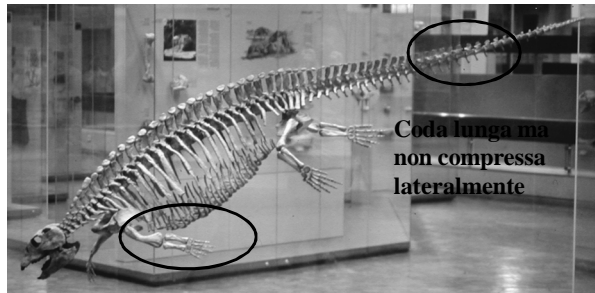


Pinguino

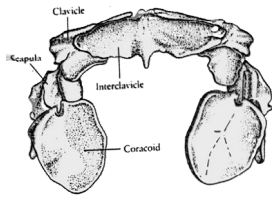


**PLACODONTIA**  
Triassico Medio-Superiore

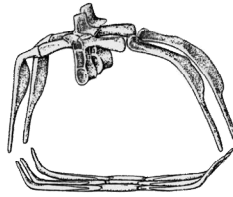
Placodontia { Placodontoidea  
Cyamodontoidea



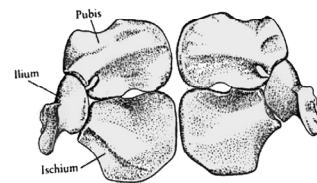
Arti non modificati per il nuoto



Cinto pettorale, vista ventrale



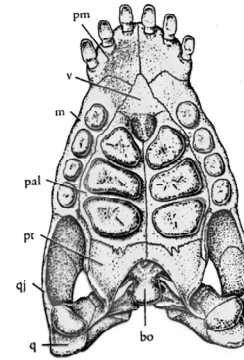
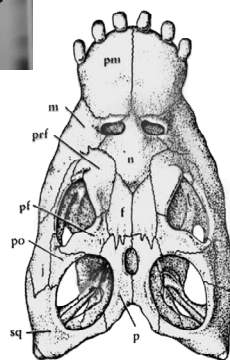
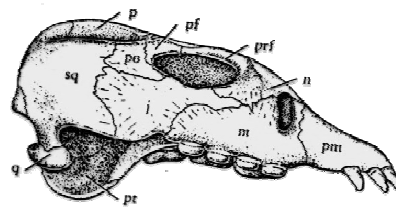
Sezione frontale tronco



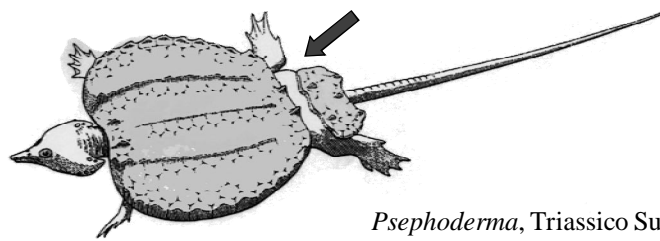
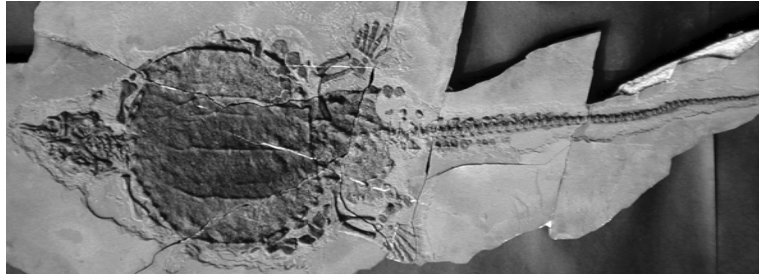
Cinto pelvico vista ventrale



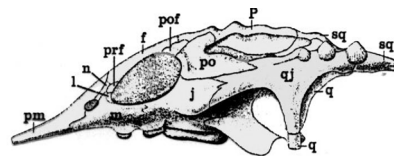
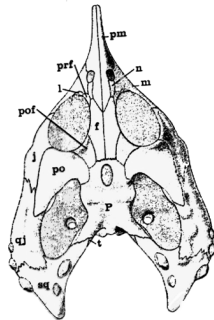
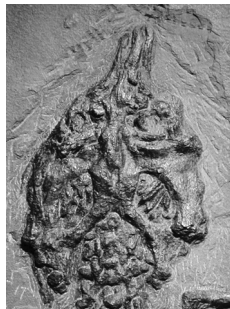
- Ampia finestra temporale
- Robusta barra sq-j-po (muscolatura mandibolare)
- Denti trituranti



### Cyamodontoidea

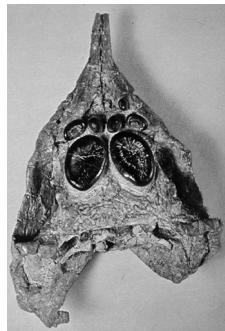
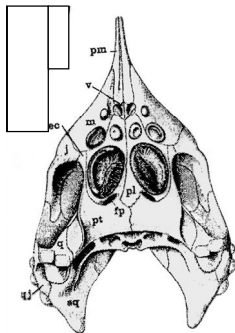


*Psephoderma*, Triassico Superiore



*Psephoderma*

Nei ciamodontoidi evoluti si ha scomparsa dei denti premascellari durante l'ontogenesi



*Henodus*, Triassico Superiore

