SNS COLLEGE OF ALLIED HEALTH SCIENCE

Affiliated to The Tamil Nadu Dr MGR Medical University, Chennai

DEPARTMENT OF CARDIOPULMONARY PERFUSION CARE TECHNOLOGY

COURSE NAME: Anatomy

UNIT II – Thorax & Lungs

TOPIC: Atypical and Typical Thoracic Vertebra

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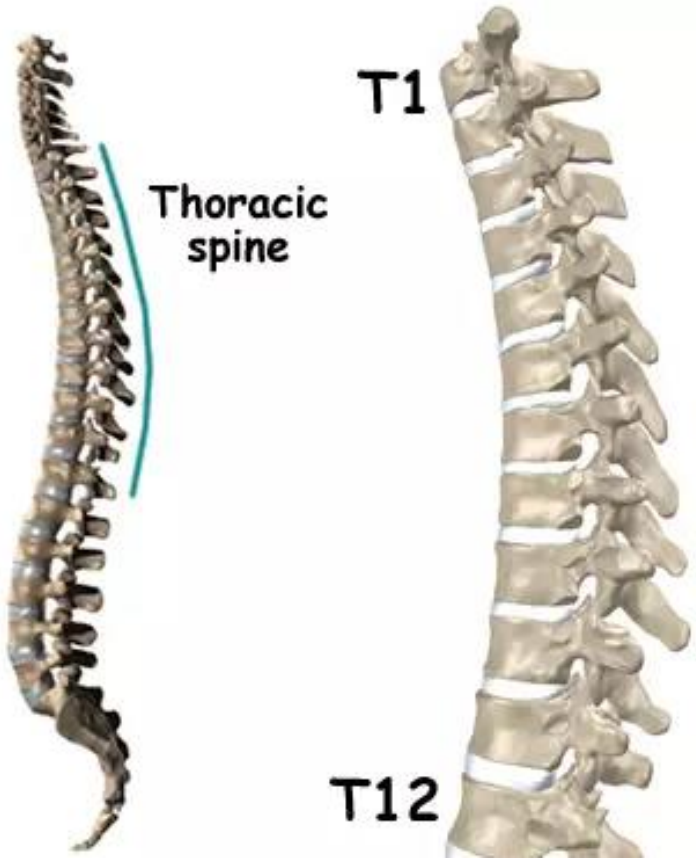
EMPATHIZE: Thoracic Spine Overview

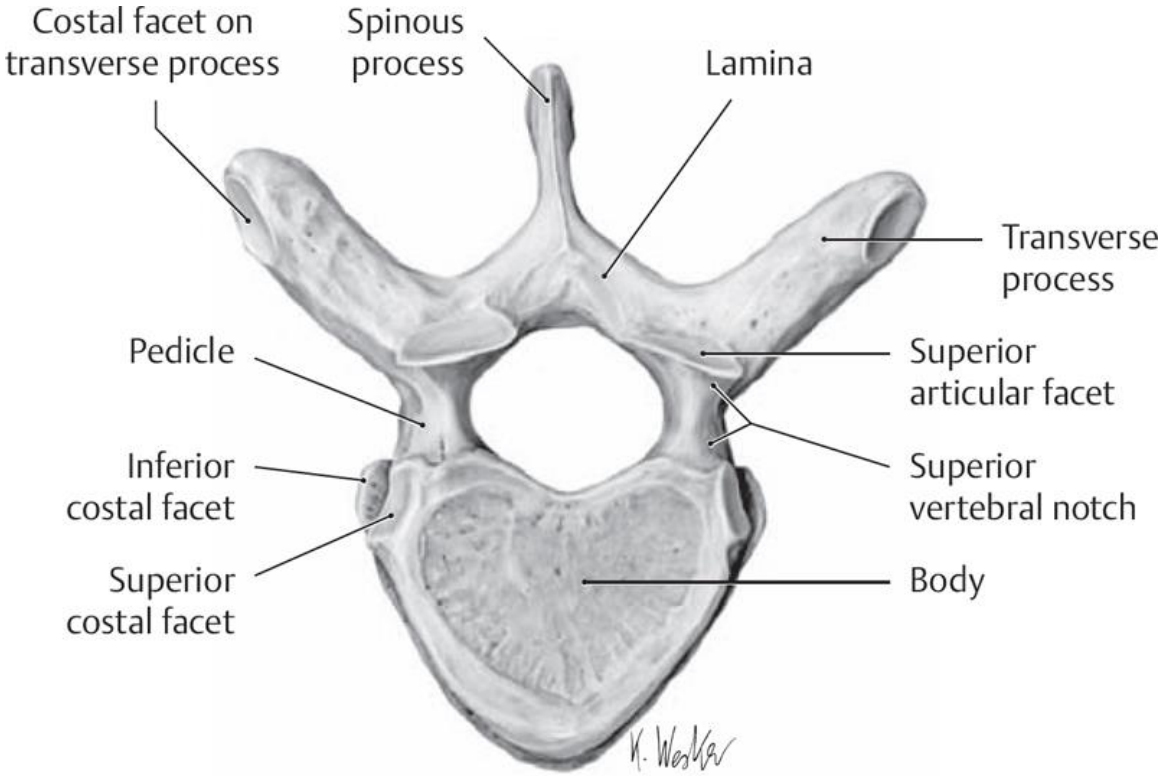
- **12 thoracic vertebrae** (T1-T12) form middle spinal region
- **Primary function:** Rib cage support, protection of thoracic organs
- **Defining feature:** Presence of costal facets for rib articulation
- **Kyphotic curvature:** Natural forward curve creates thoracic kyphosis
- **Structural variants:** T5-T8 most typical; T1, T10-T12 atypical



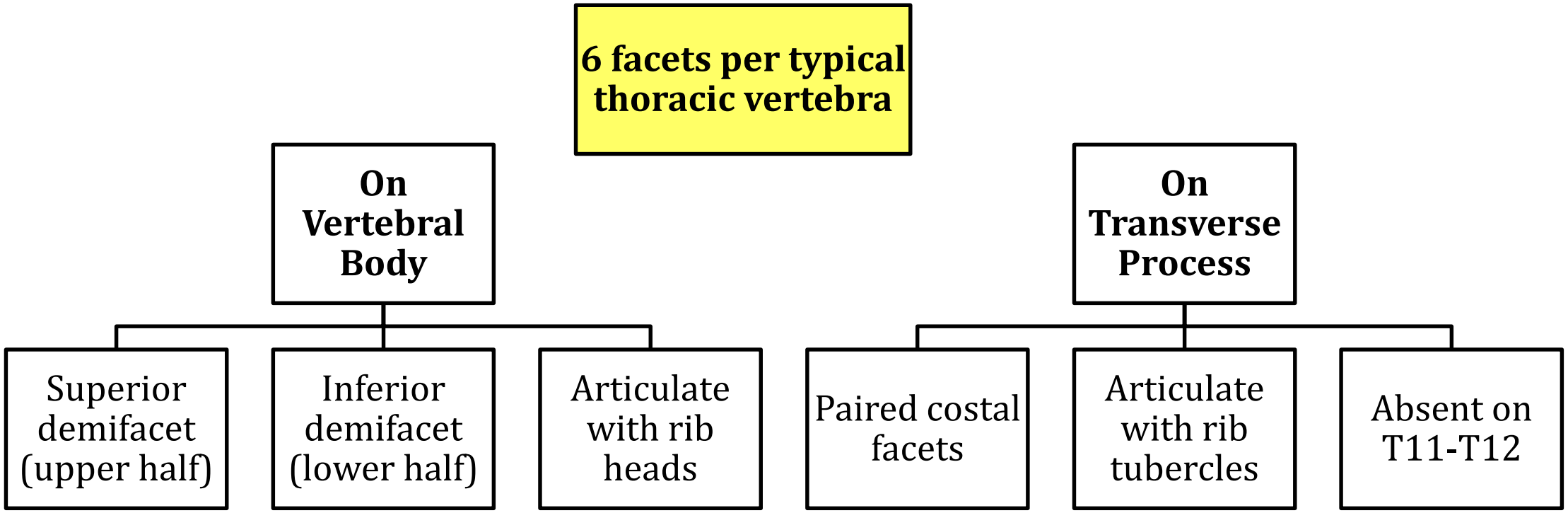
DEFINE: Typical Thoracic Vertebra (T5-T8)

Most representative of all thoracic vertebrae

- **Vertebral Body:** Heart-shaped, medium size, medium density
- **Vertebral Canal:** Relatively small and round (smaller than cervical)
- **Pedicles:** Strong, directed posteriorly, deep vertebral notches
- **Laminae:** Thick, broad, overlap in descending manner
- **Spinous Process:** Long, slender, triangular, angles sharply downward

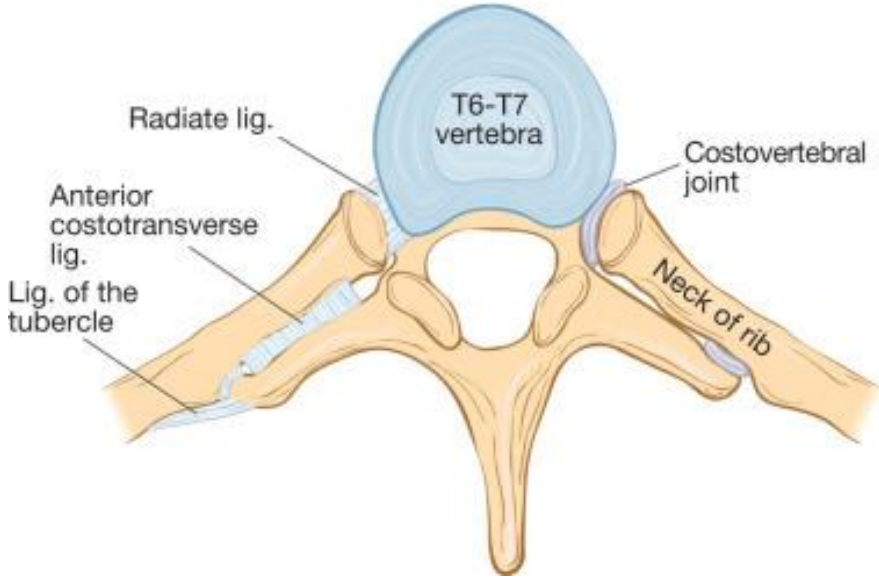


DEFINE: Costal Facets - Unique to Thoracic



IDEATE: Rib Articulation Mechanism

- **Costotransverse Joint:** Rib tubercle articulates with transverse process facet (T1-T10)
- **Costovertebral Joint:** Rib head articulates with demifacets between two adjacent vertebrae
- **Demifacet Function:** Two demifacets from adjacent vertebrae + intervertebral disc = elliptical cavity for rib head
- **Radiate Ligament:** Connects rib head to vertebral bodies, anterior longitudinal ligament
- **Result:** Slight rotation and gliding movement (pump-handle & bucket-handle mechanics)



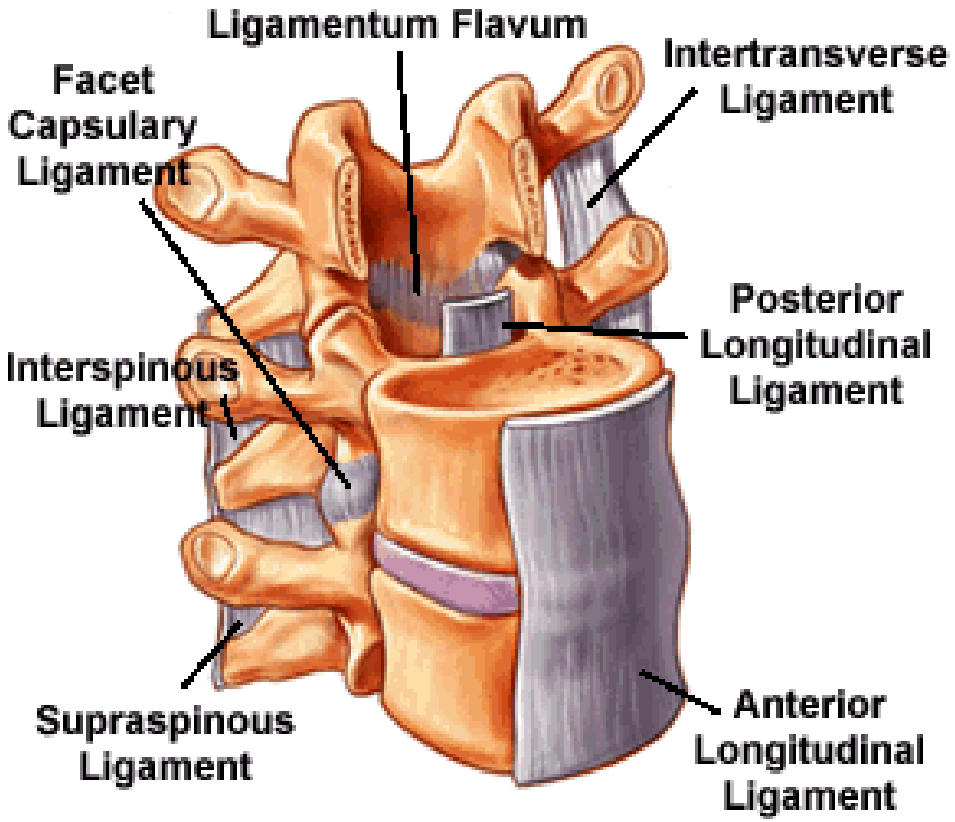
PROTOTYPE: Thoracic Ligaments & Attachments

Vertebral Level

- Anterior/posterior longitudinal
- Ligamenta flava
- Interspinous
- Supraspinous

Rib-Related

- Radiate ligament
- Costotransverse ligament



IDEATE: Atypical T1 - First Thoracic Vertebra

Whole Superior Costal Facet:

Complete facet for first rib articulation

Inferior Demi facet:

For upper portion of second rib head

Spinous Process:

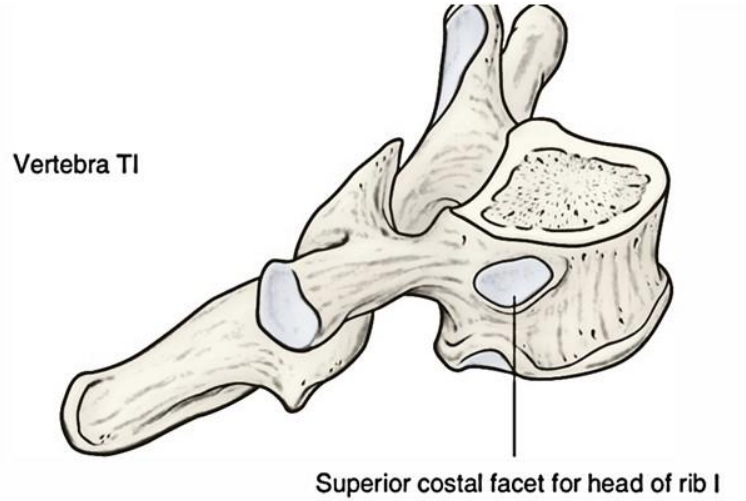
Long, thick, almost horizontal

Large Transverse Processes:

With deep vertebral notches

Transverse Costal Facet:

Present for first rib tubercle



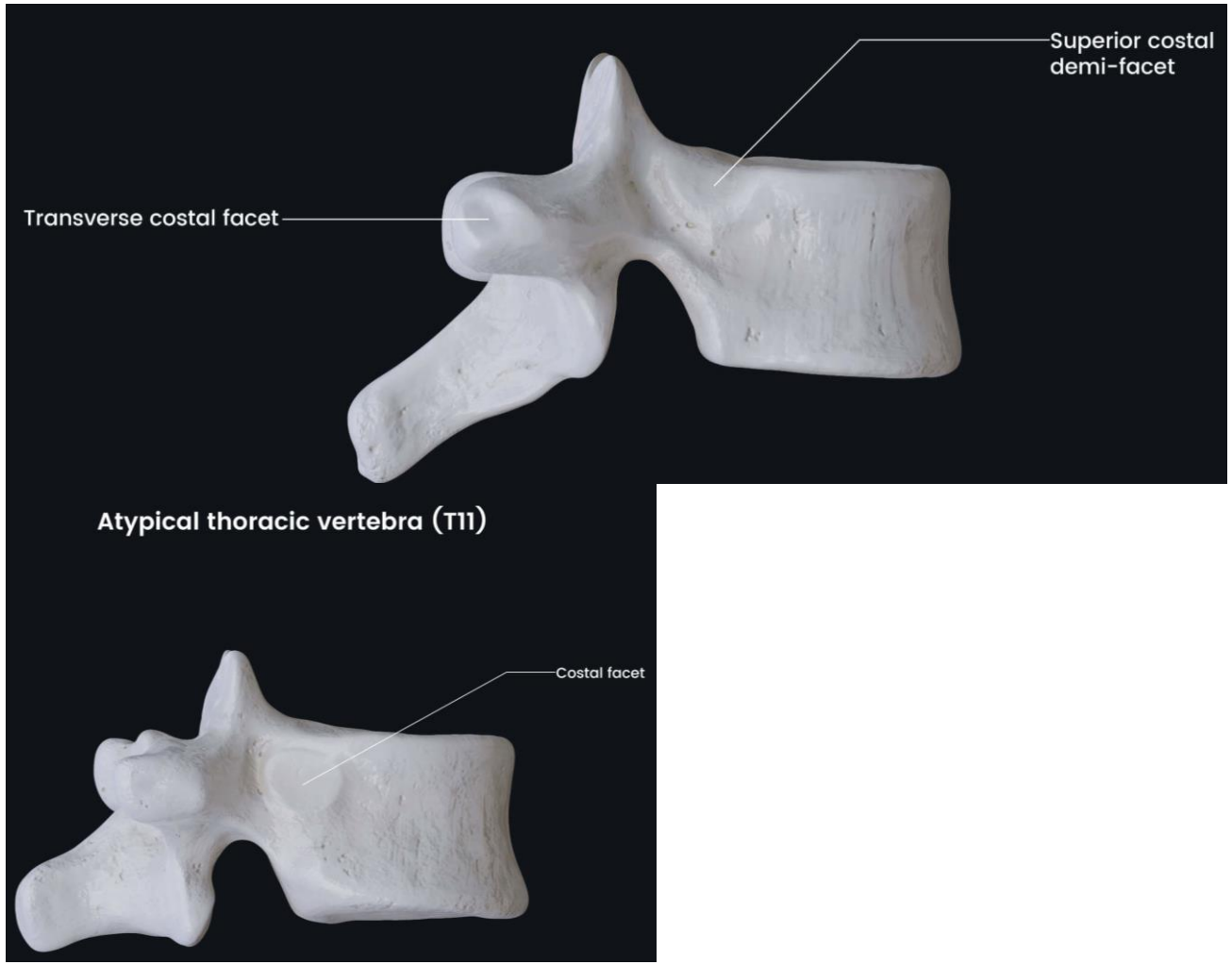
IDEATE: Atypical T10, T11

T10

- Superior whole facet
- NO inferior demifacet
- Transverse facet present
- May transition toward T11

T11

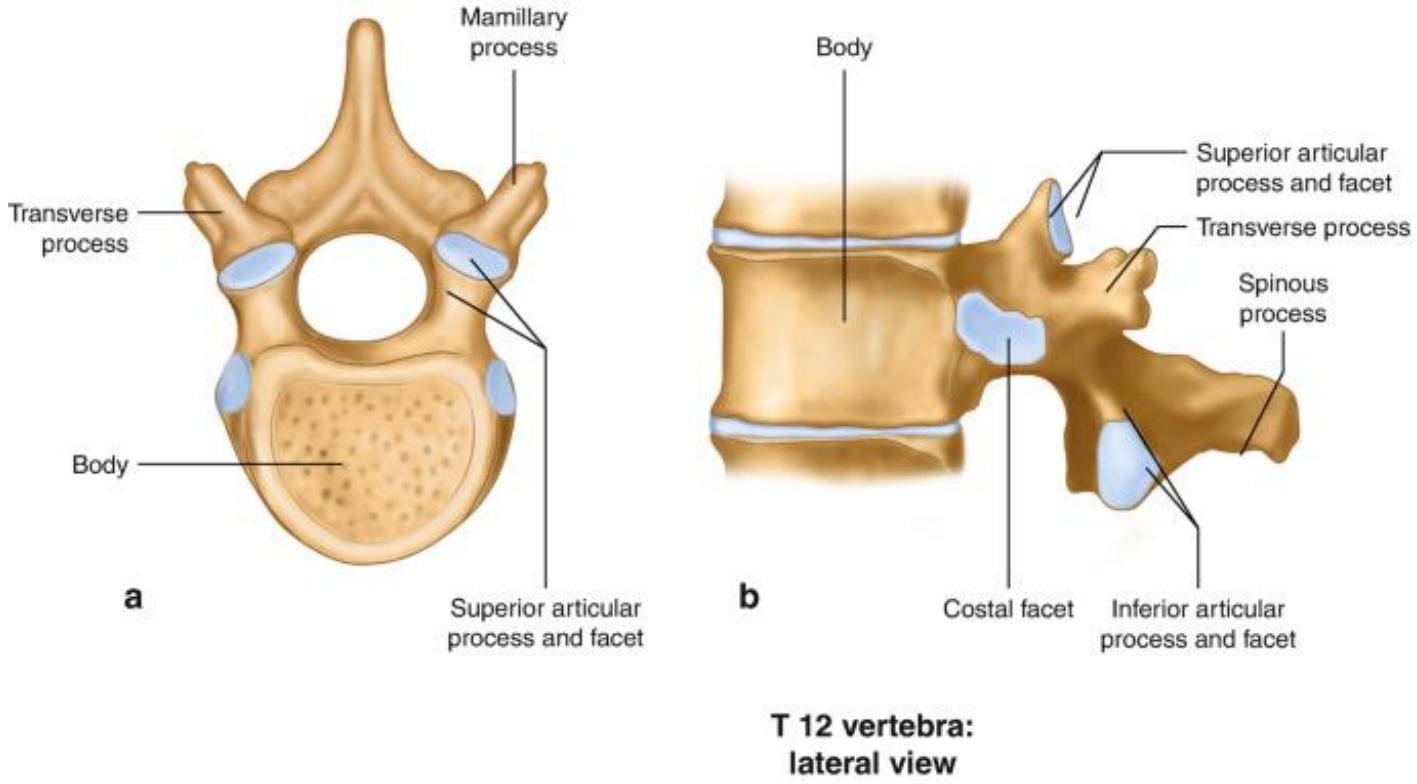
- Single whole costal facet
- NO transverse facet
- Floating rib (11th)
- Spinous process shorter



PROTOTYPE: T12 - Thoracolumbar Junction

Unique transitional vertebra with dual characteristics

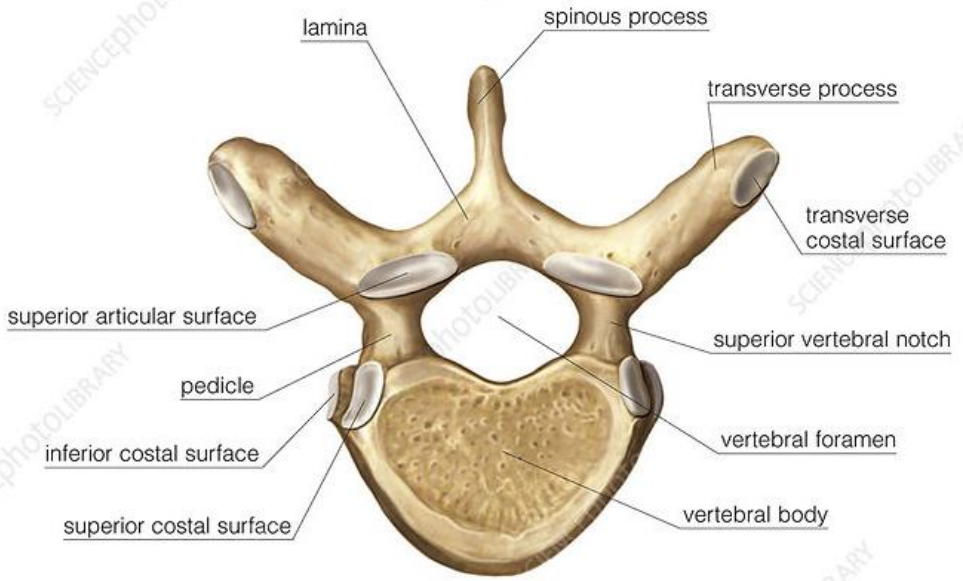
Thoracic Features	Lumbar Features
Single costal facet	Mammillary processes
Rotational articular facets	Accessory processes
Kyphotic orientation	Convex articular surfaces
	Lateral-facing facets



T 12 vertebra: lateral view

TEST: Key Distinguishing Features

- **Costal Facets:** Only thoracic vertebrae have them (T1-T12), fundamental rib connection
- **Spinous Process Angle:** Sharp downward projection
- **Rotational Capacity:** Greater rotation than lumbar due to articular facet orientation
- **Vertebral Canal:** Smaller, rounder than cervical
- **Heart-Shaped Body:** Distinctive shape supports rib cage architecture



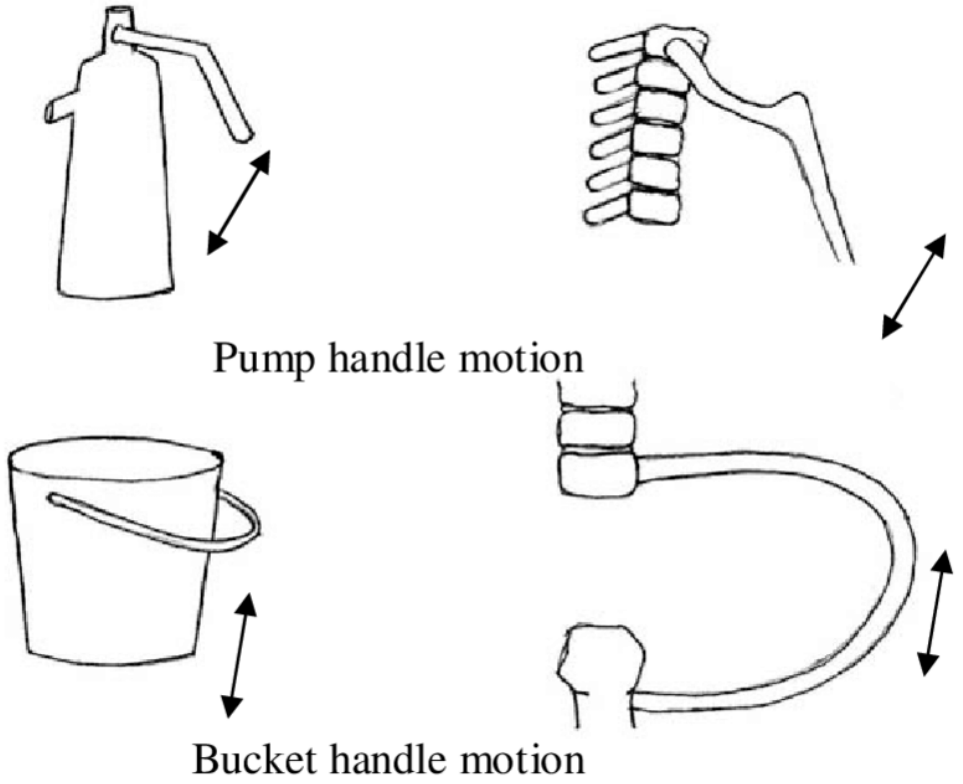
APPLY: Movement & Biomechanics

Rib Movement

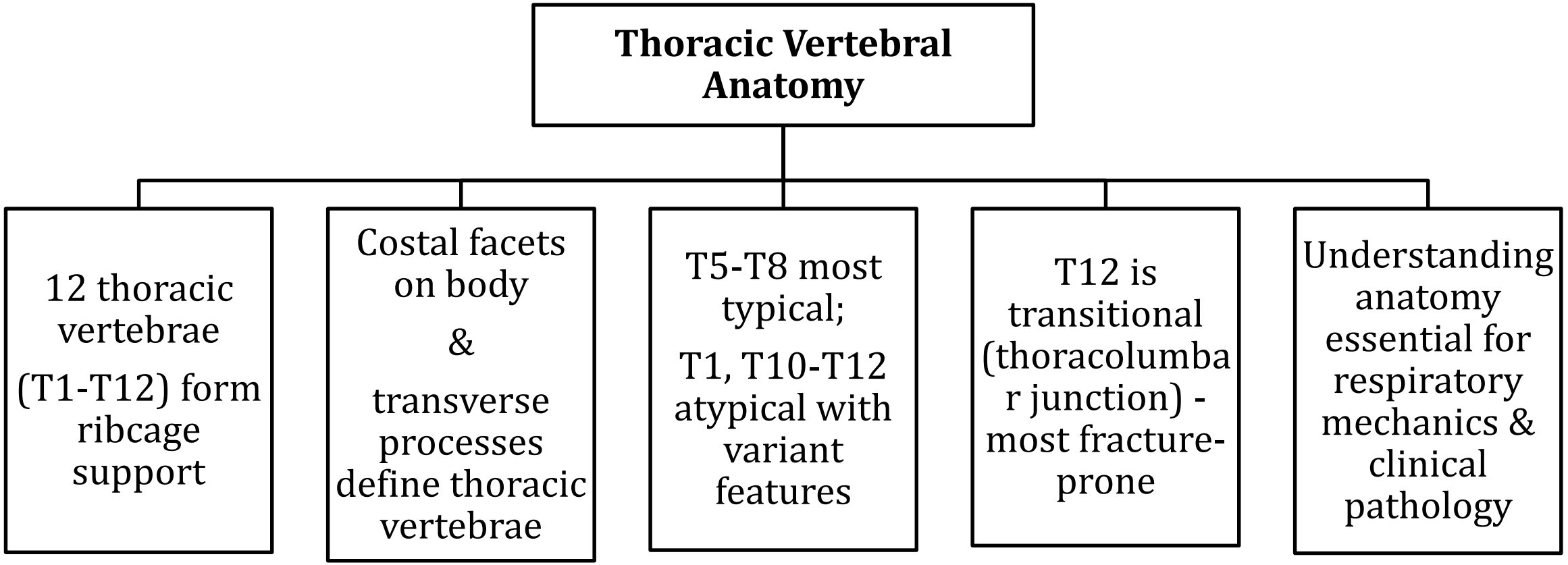
- **Pump-handle:** Upper ribs (elevation)
- **Bucket-handle:** Lower ribs (lateral)
- Increases thoracic volume

Spinal Movement

- Moderate rotation capacity
- Limited flexion-extension
- Rigid cage protection



Summary


Thoracic Vertebral Anatomy
12 thoracic vertebrae
(T1-T12) form ribcage support
Costal facets on body
&
transverse processes define thoracic vertebrae
T5-T8 most typical;
T1, T10-T12 atypical with variant features
T12 is transitional (thoracolumbar junction) - most fracture-prone
Understanding anatomy essential for respiratory mechanics & clinical pathology

References

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- https://www.kenhub.com/en/library/anatomy/thoracic-vertebrae
- https://www.sciencedirect.com/topics/medicine-and-dentistry/thoracic-vertebra

THANK YOU