What structures form the carpal tunnel?

Floor & Sides:

8 carpal bones (scaphoid, lunate, triquetrum, pisiform, trapezium, trapezoid, capitate, hamate)

Roof:

Transverse carpal ligament (flexor retinaculum)

Contents:

Median nerve + 9 flexor tendons (4 FDS, 4 FDP, 1 FPL)

Pathophysiology of CTS nerve damage progression?

Early:Demyelination due to ischemia

Late:Axonal degeneration

End-stage:Fibrosis of Perineurium /epineurium

Common cause: Synovial hypertrophy of flexor tendons

CTS etiology

1. Idiopathic: most common - smaller tunnel, familial

2. Mechanical/Occupational: repetitive motions, vibrating tools

3. Systemic conditions: DM, hypothyroidism, RA

4. Anatomic anomalies: ganglion, persistent median artery

5. Demographics: women 3x, >40 years, obesity

What is the normal carpal tunnel pressure?

Normal: 2-10 mmHg

Wrist flexion: Increases 8x

Wrist extension: Increases 10x

Pathological pressure leads to ischemia and nerve damage

systemic conditions associated with CTS

Inflammatory: Rheumatoid Arthritis, Gout

Metabolic: Amyloidosis

Hormonal: Pregnancy

Endocrine: Diabetes, Hypothyroidism, Acromegaly

Other: Psoriatic arthritis, mucopolysaccharidoses

classic triad of CTS symptoms?

1.Paresthesias/Numbness : median nerve distribution (thumb, index, middle, radial half ring finger)

2. Pain: wrist/hand, radiating to forearm/elbow

3. Weakness/Clumsiness: fine motor tasks, dropping objects