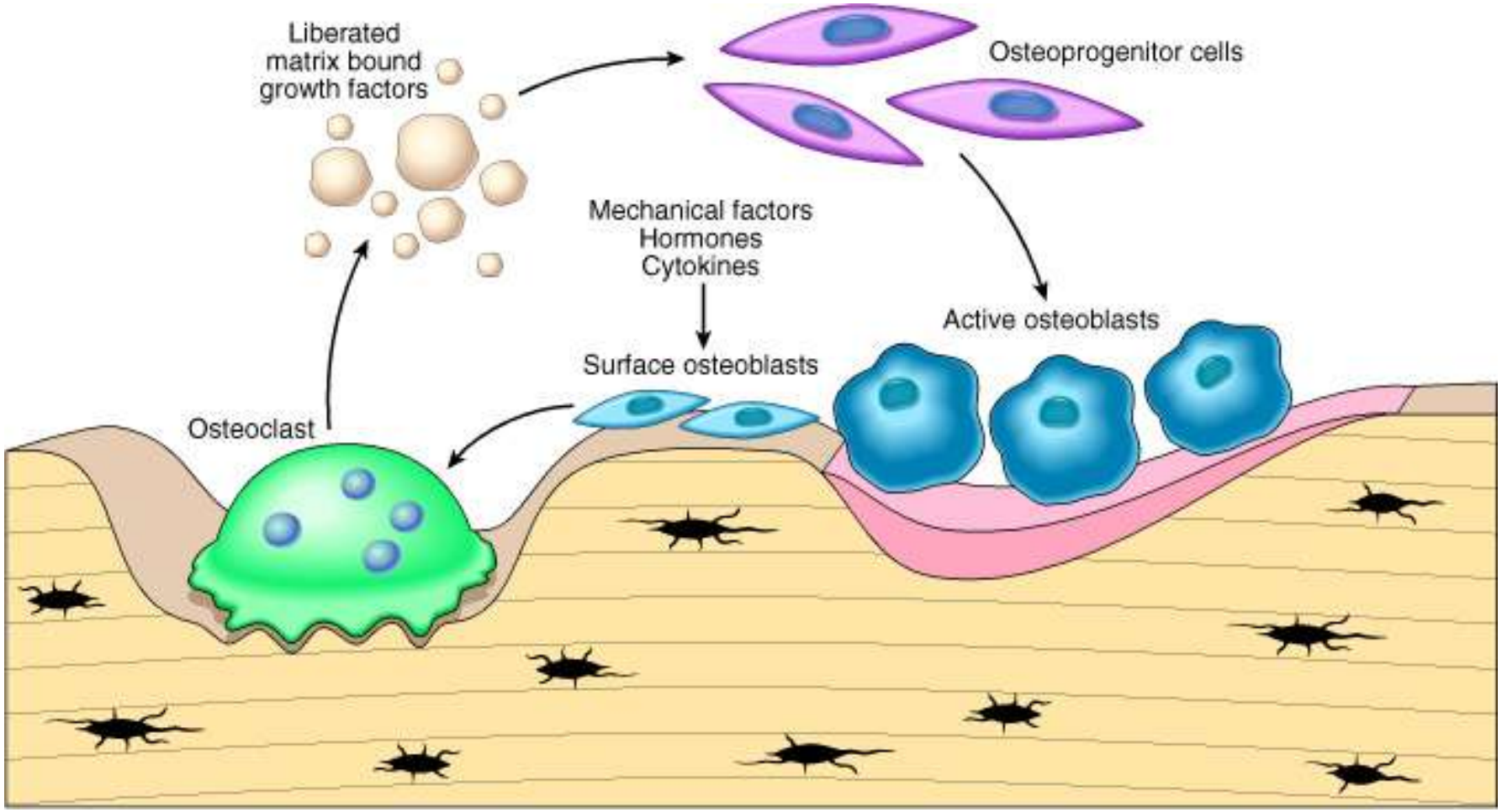

Liberated
matrix bound
growth factors
Osteoprogenitor cells
Mechanical factors
Hormones
Cytokines
Active osteoblasts
Surface osteoblasts
Osteoclast

Slide 28.5

Osteoporosis

Nutritional Osteoporosis

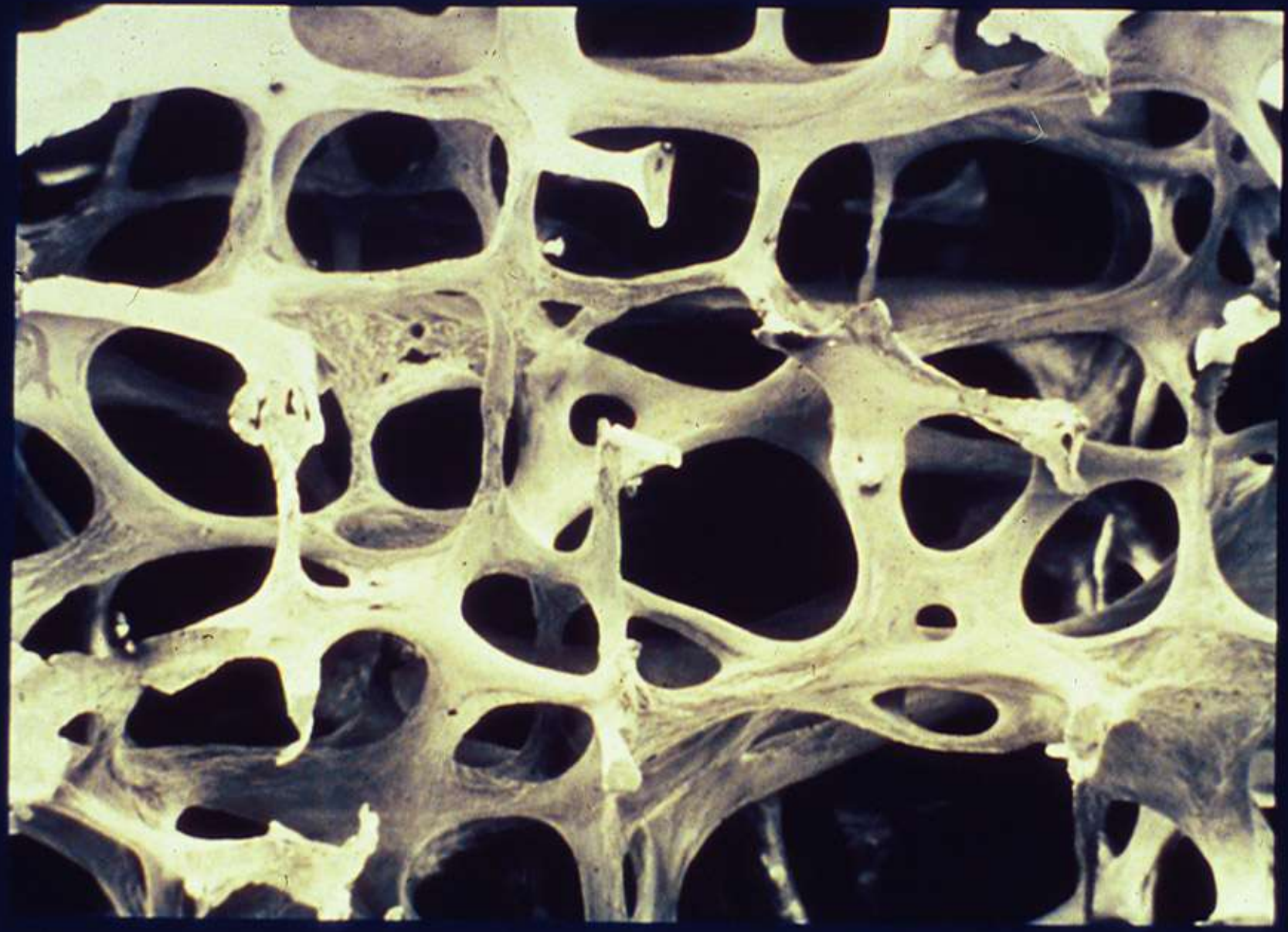
Normal AF/R with Decreased F

Osteoporosis

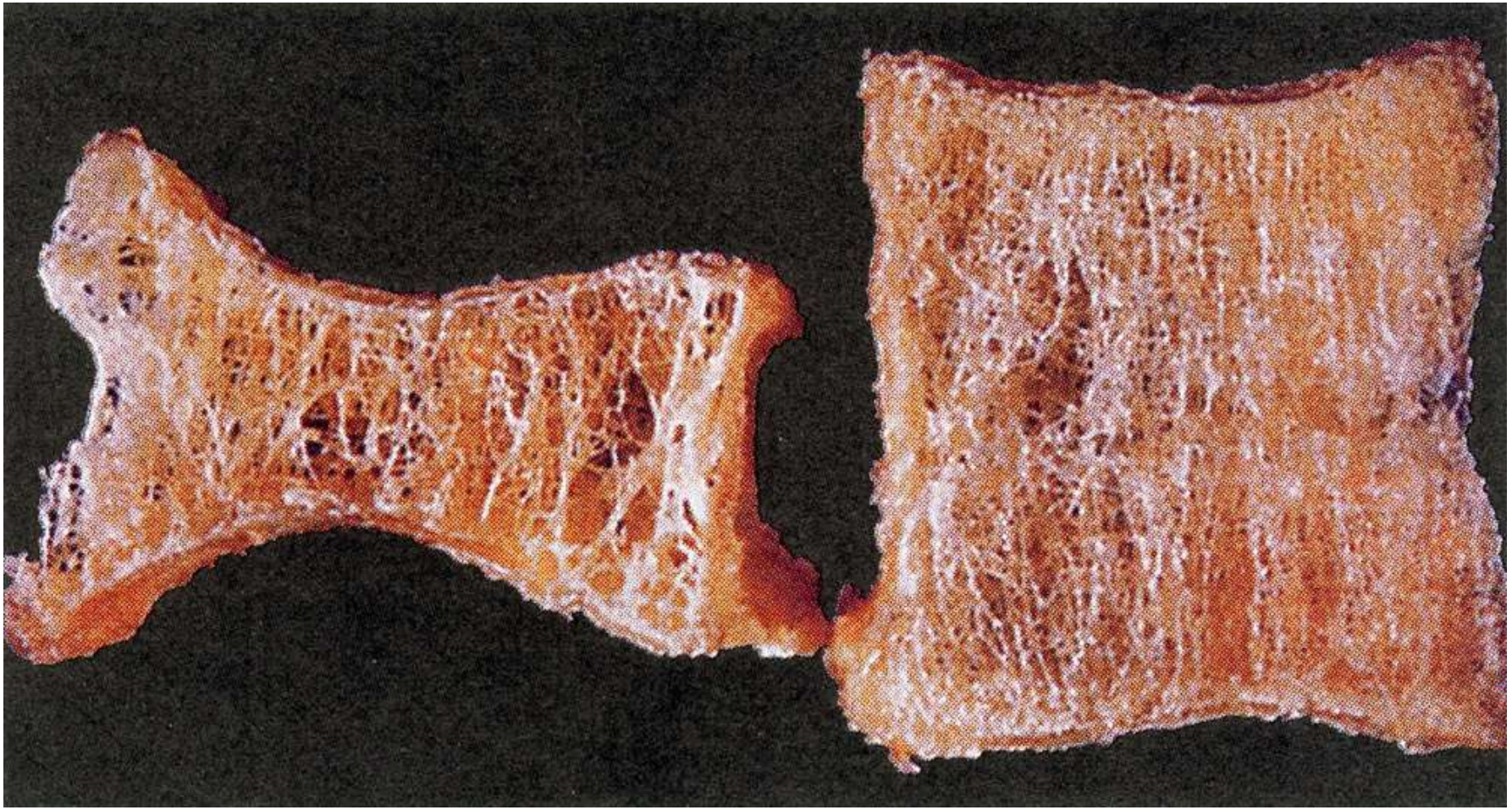
Postmenopausal Osteoporosis

Increased AF/R with normal or decreased F

Osteoporotic bone



Trabecular bone



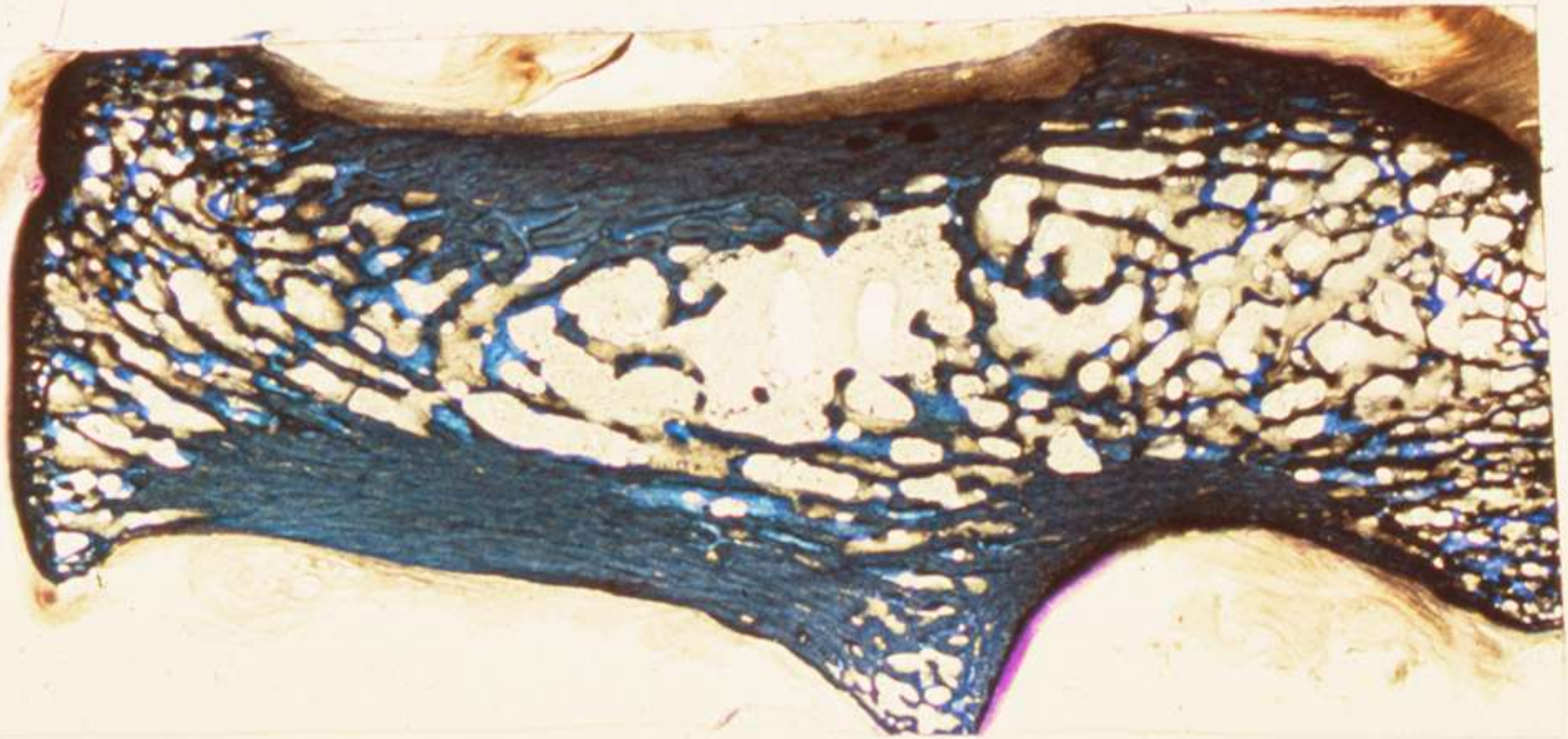
Remodeling in response to abnormal use and systemic disease

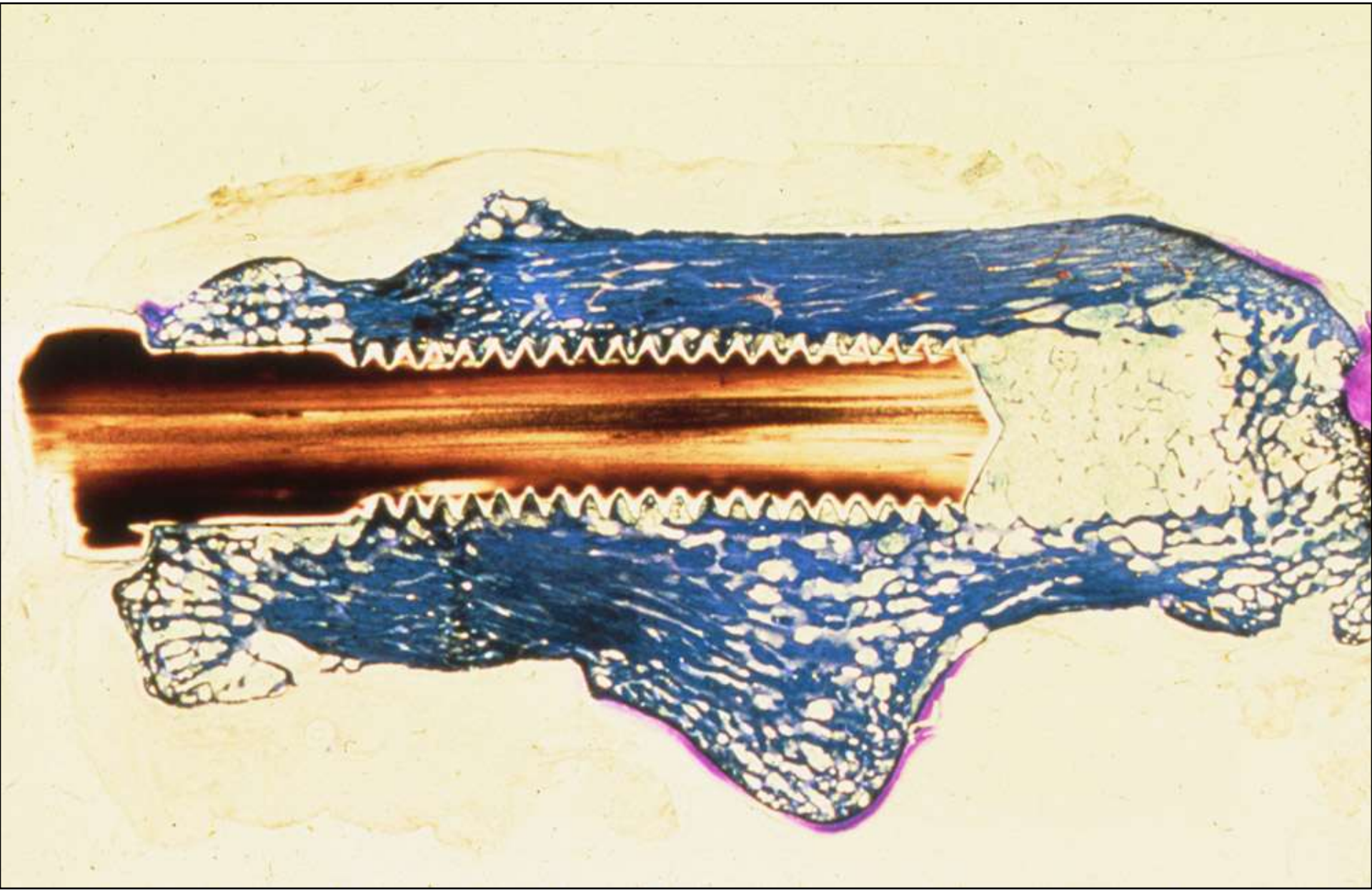
- Decreased mechanical use will activate remodeling and decrease vigor of bone formation – osteopenia
- Increased mechanical use will suppress activation of remodeling - osteosclerosis
- Effects of PTH and CT on bone turnover
- Cachexia and ability to form bone
- Systemic and regional acceleratory phenomenon

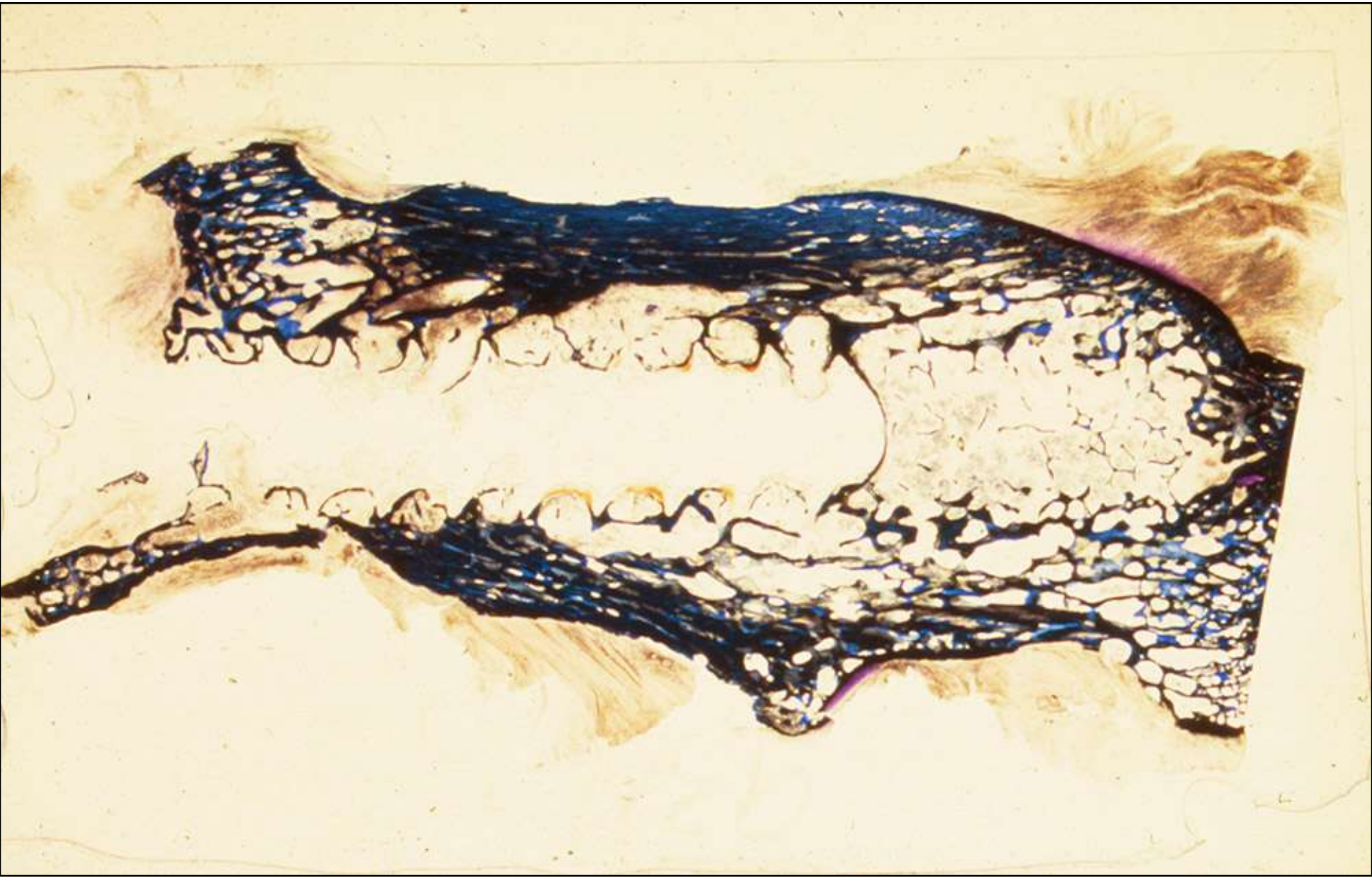
Osteopenia of Disuse

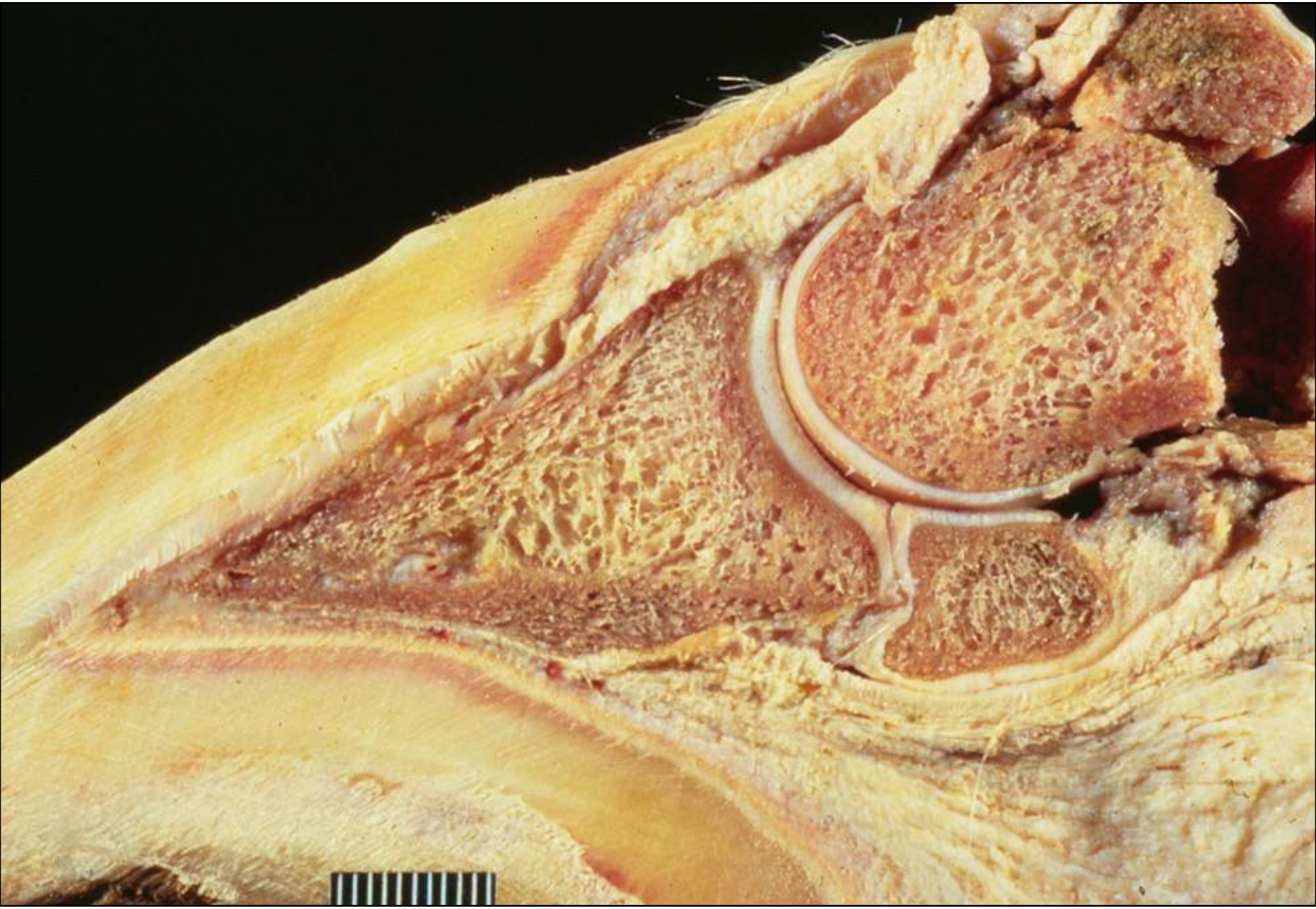
Increased AF/R and Decreased F

Modeling of Periosteum!









Forty % bone loss with one year disuse mostly at the endocortical and periosteal surfaces

RISEDRONATE ON LONG-TERM DISUSE OSTEOPOROSIS

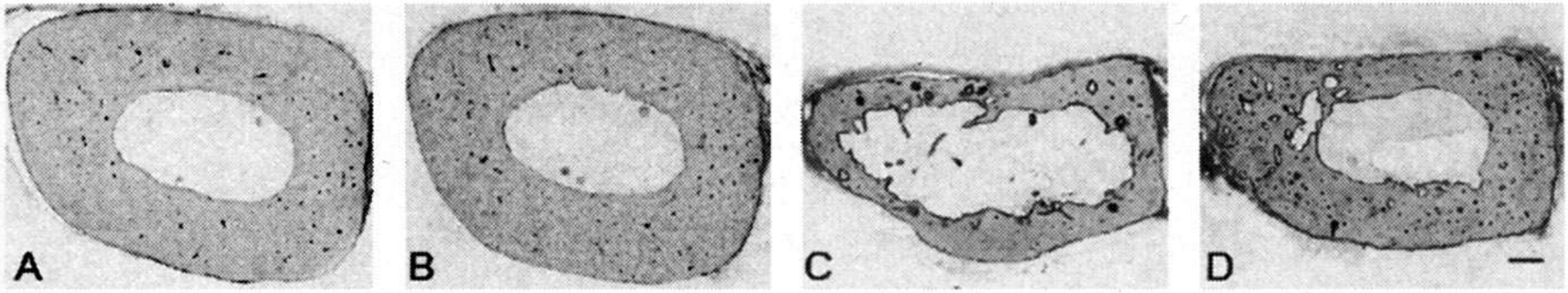
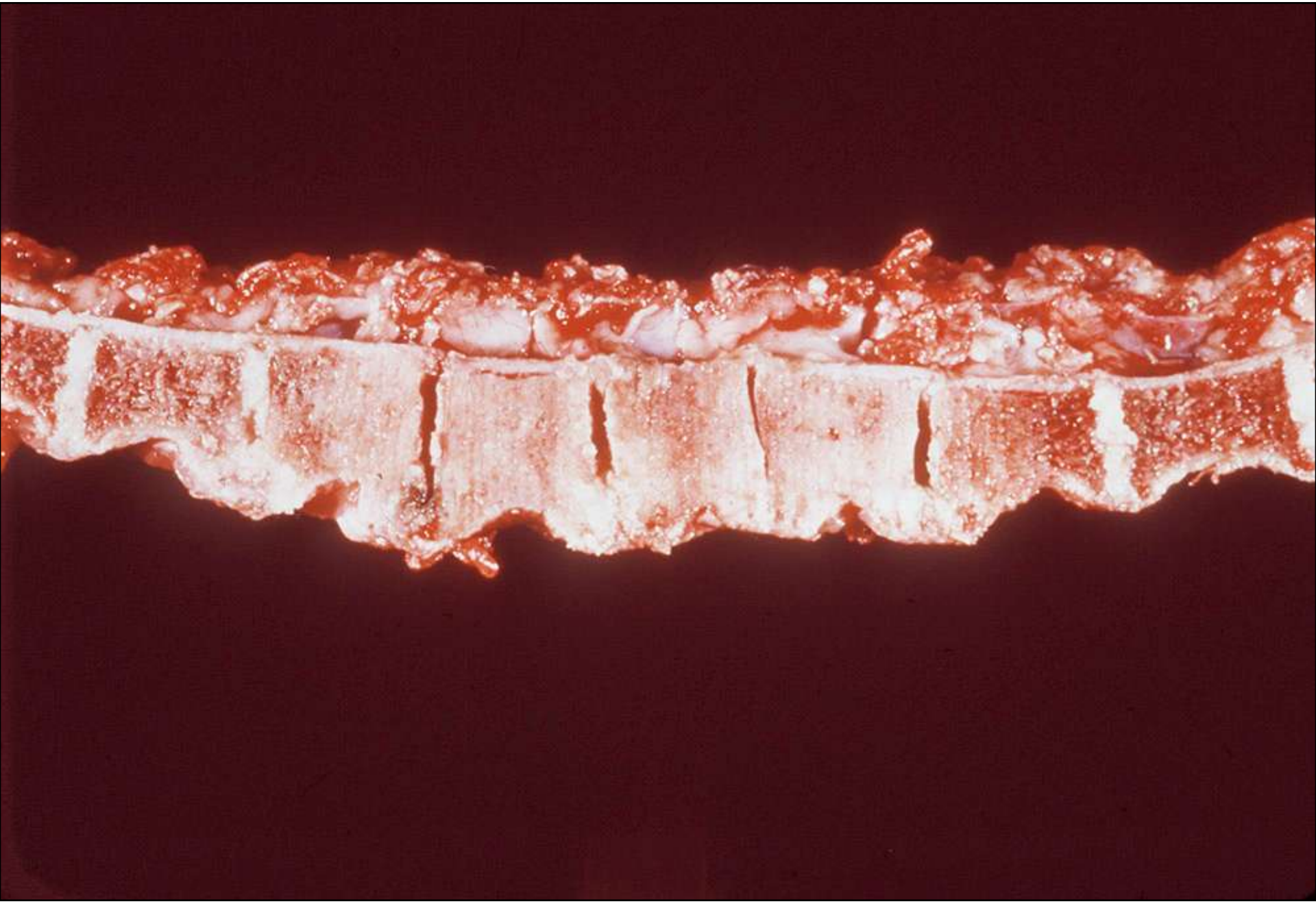


FIG. 1. Photomicrographs of metacarpal midshaft cross sections showing (A) control + vehicle, (B) control + RIS, (C) IM + vehicle, and (D) IM + RIS. (C) IM bone showed a smaller subperiosteal area, larger marrow cavity, thinner cortex, and elevated porosity compared with (A) control bone. (D) RIS-treated IM bone showed evidence of significant bone loss, but to a marked lesser degree than IM alone. Bar = 500 μm.

Osteosclerosis from Increased Mechanical Use

Decreased AF/R and Normal F?

Periosteal Modeling?

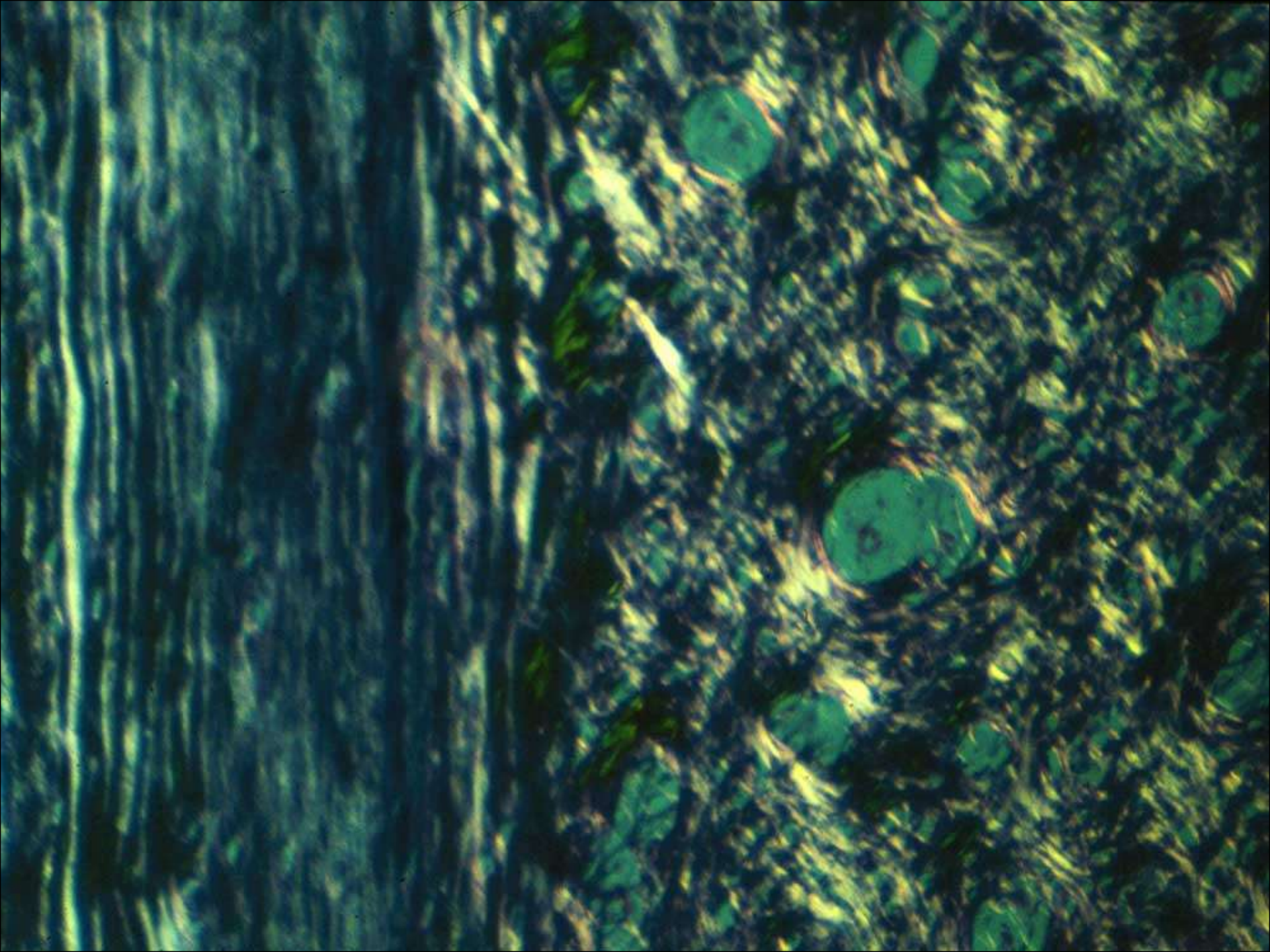


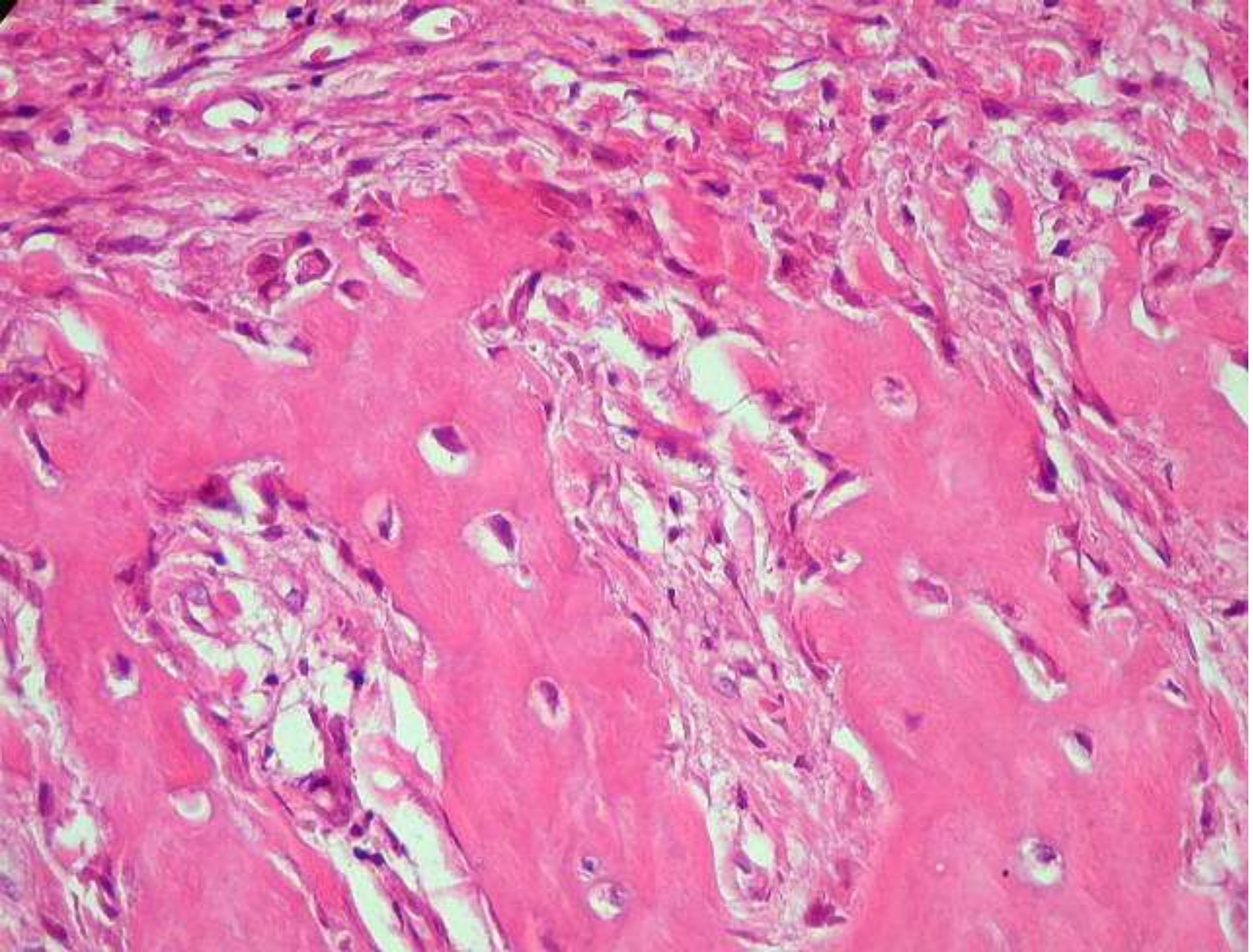
Repair bone/rapidly deposited bone is woven rather than lamellar

- Woven bone has larger haphazardly arranged osteocytes and haphazardly arranged collagen fibers
- Mineralizes more rapidly than lamellar bone

Woven Bone

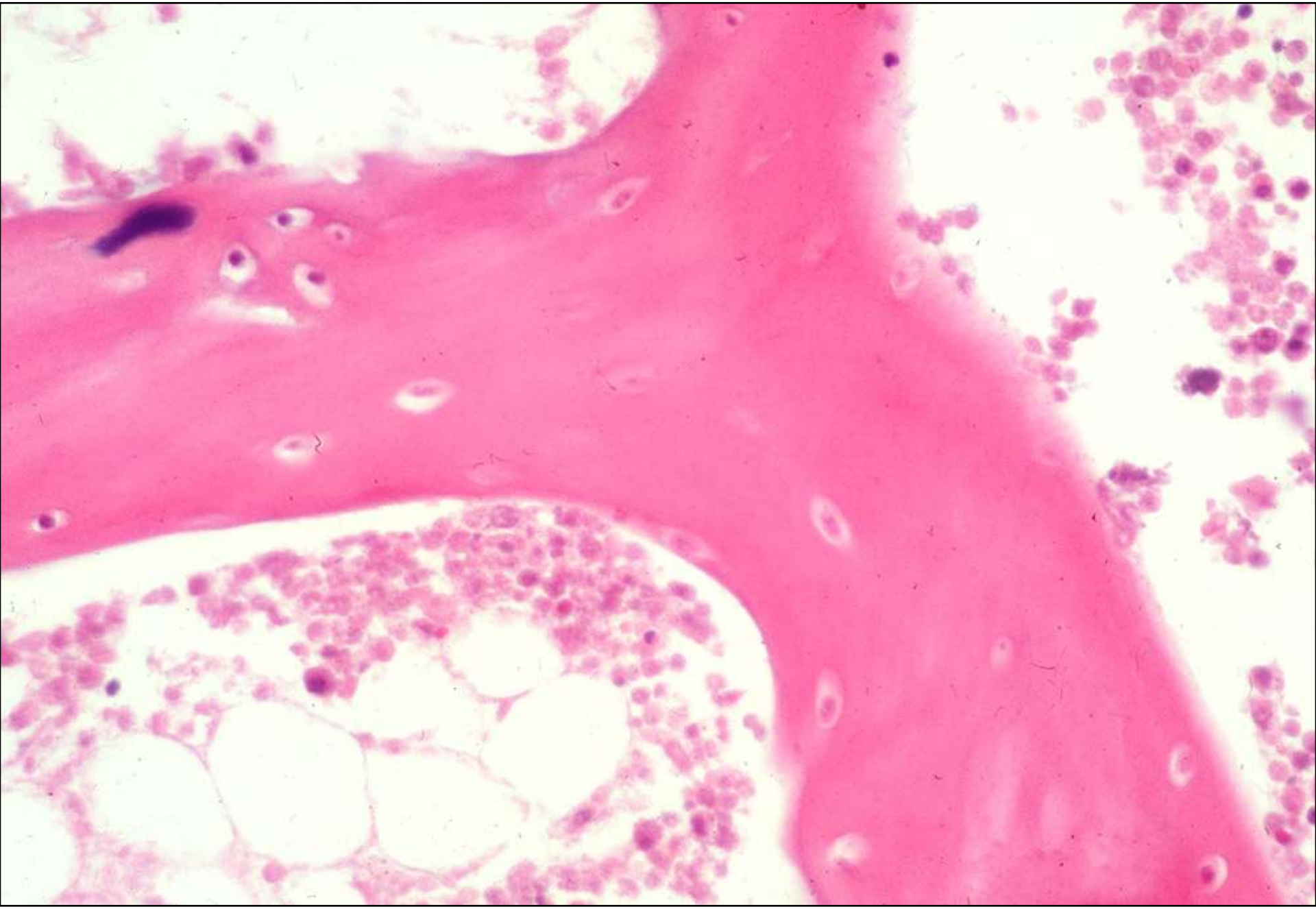
Trauma
Inflammation
Neoplasia
Necrosis

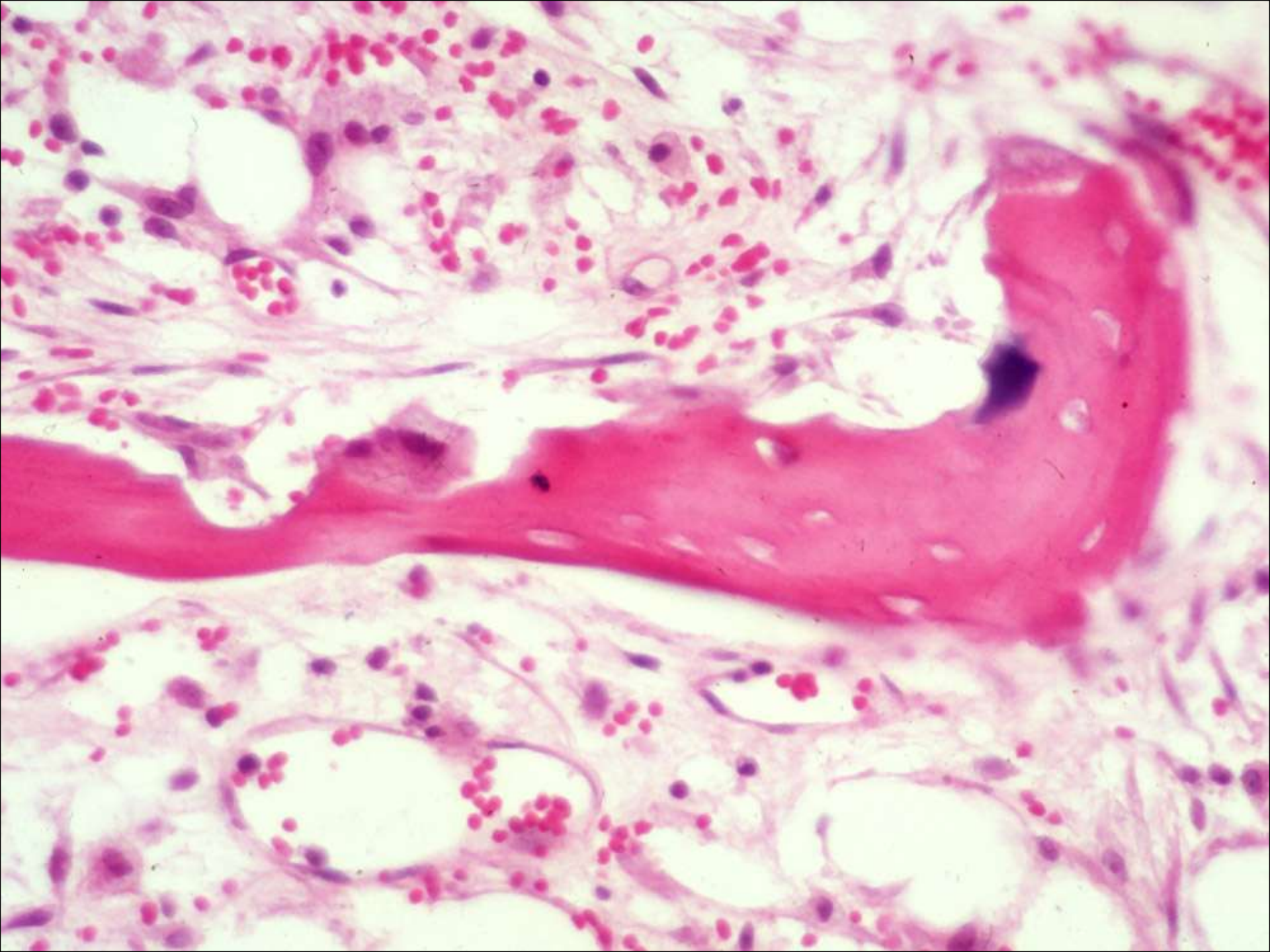


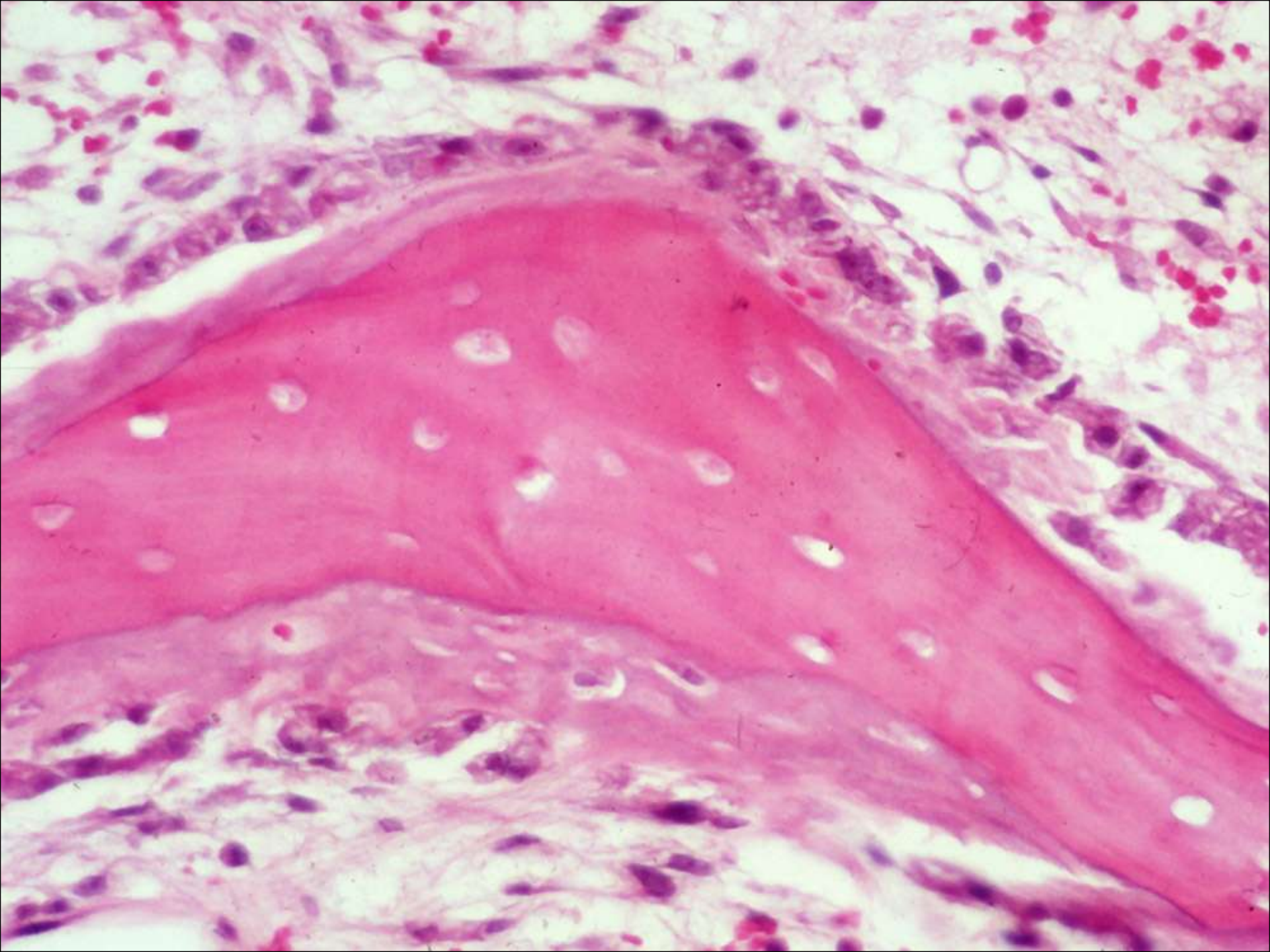


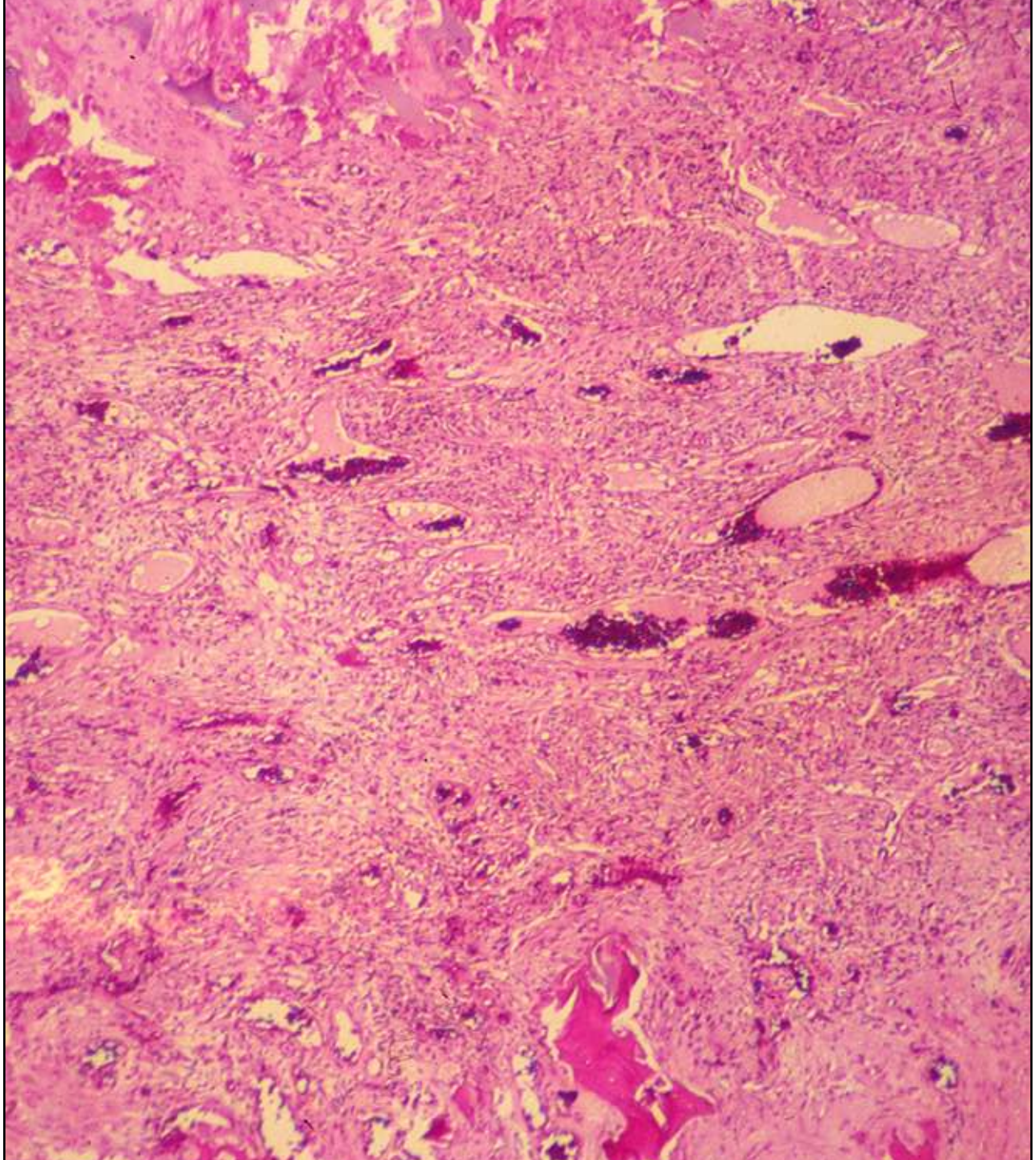
Revascularized Necrotic Bone

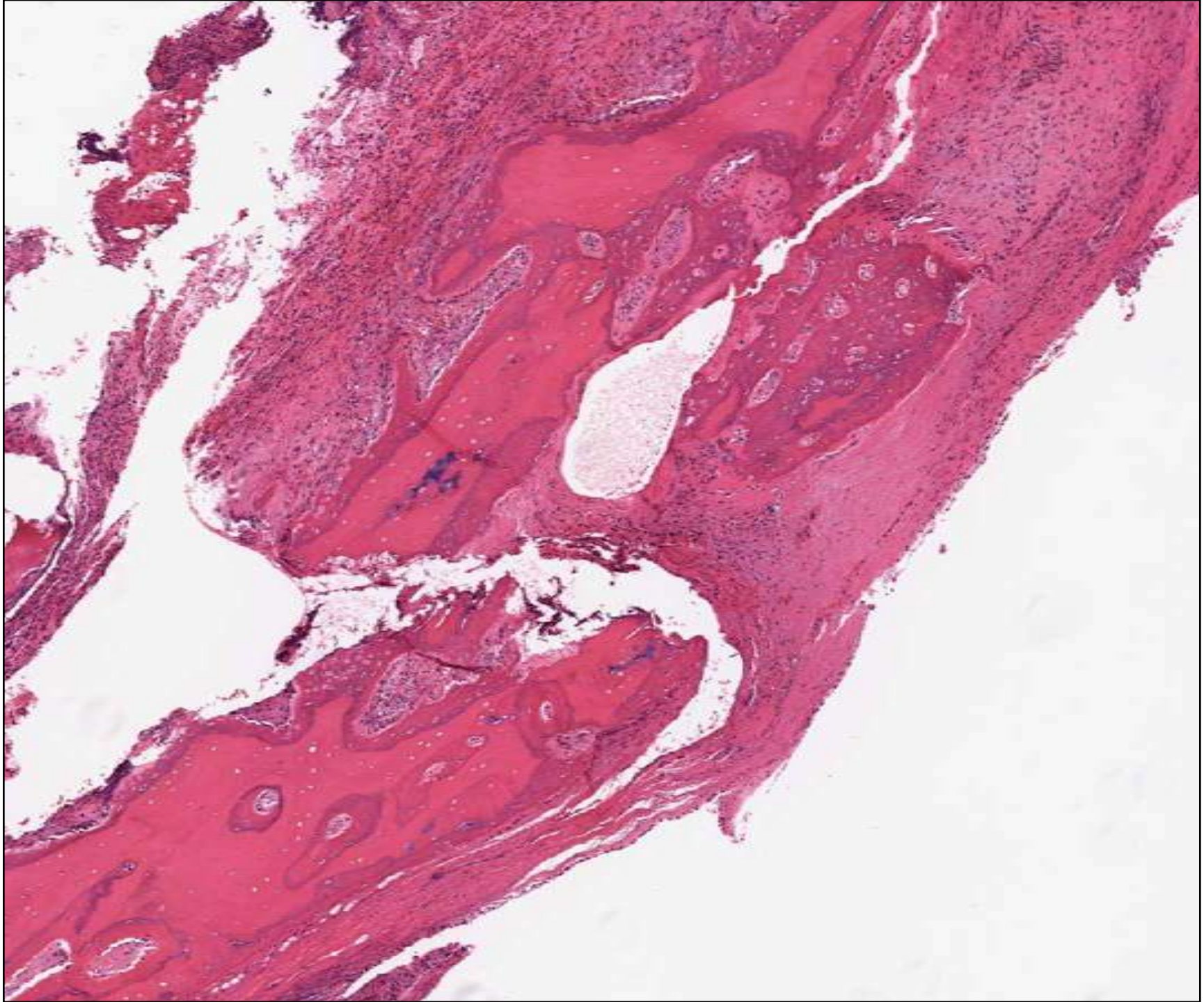
Woven Bone on Dead Bone

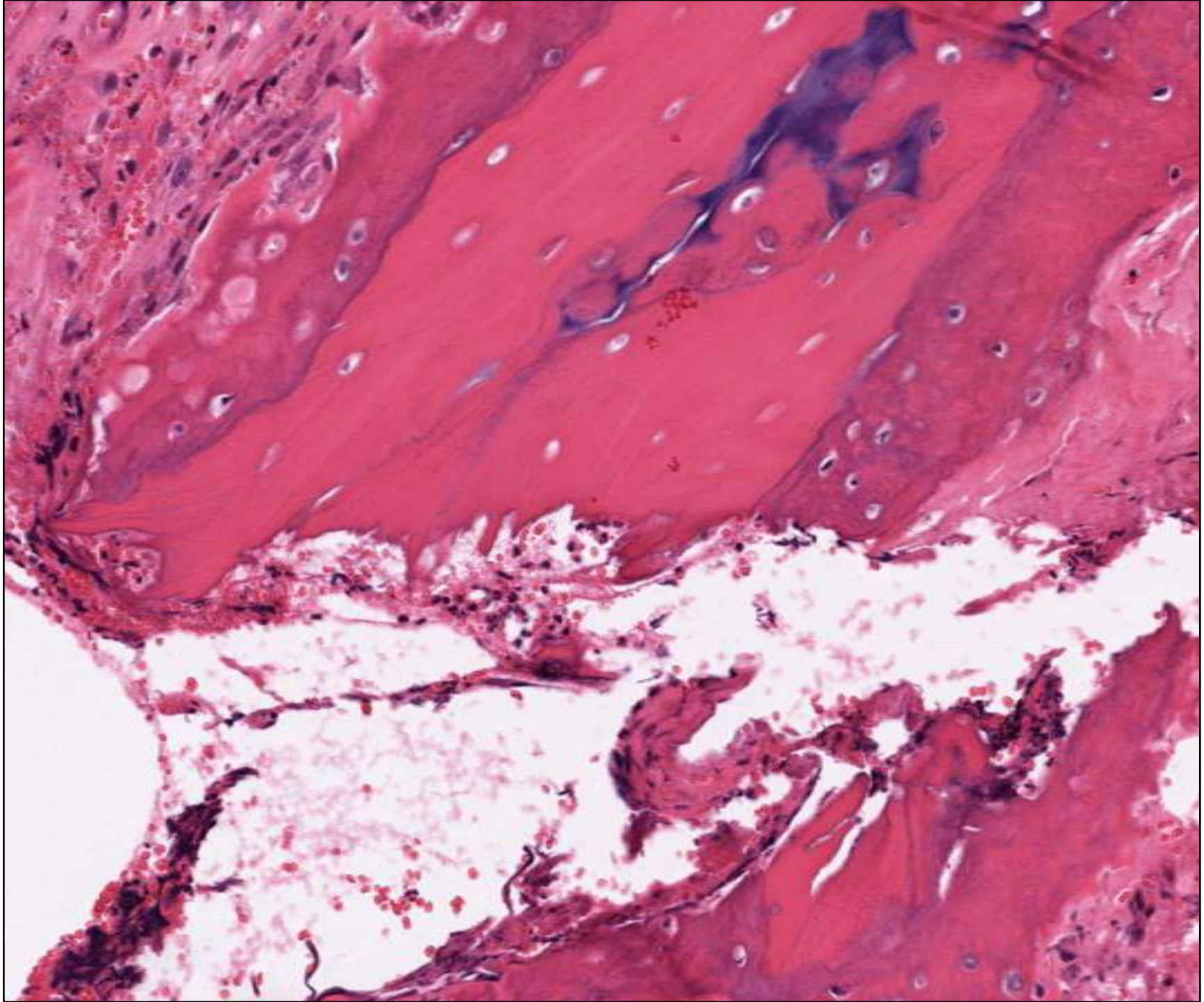








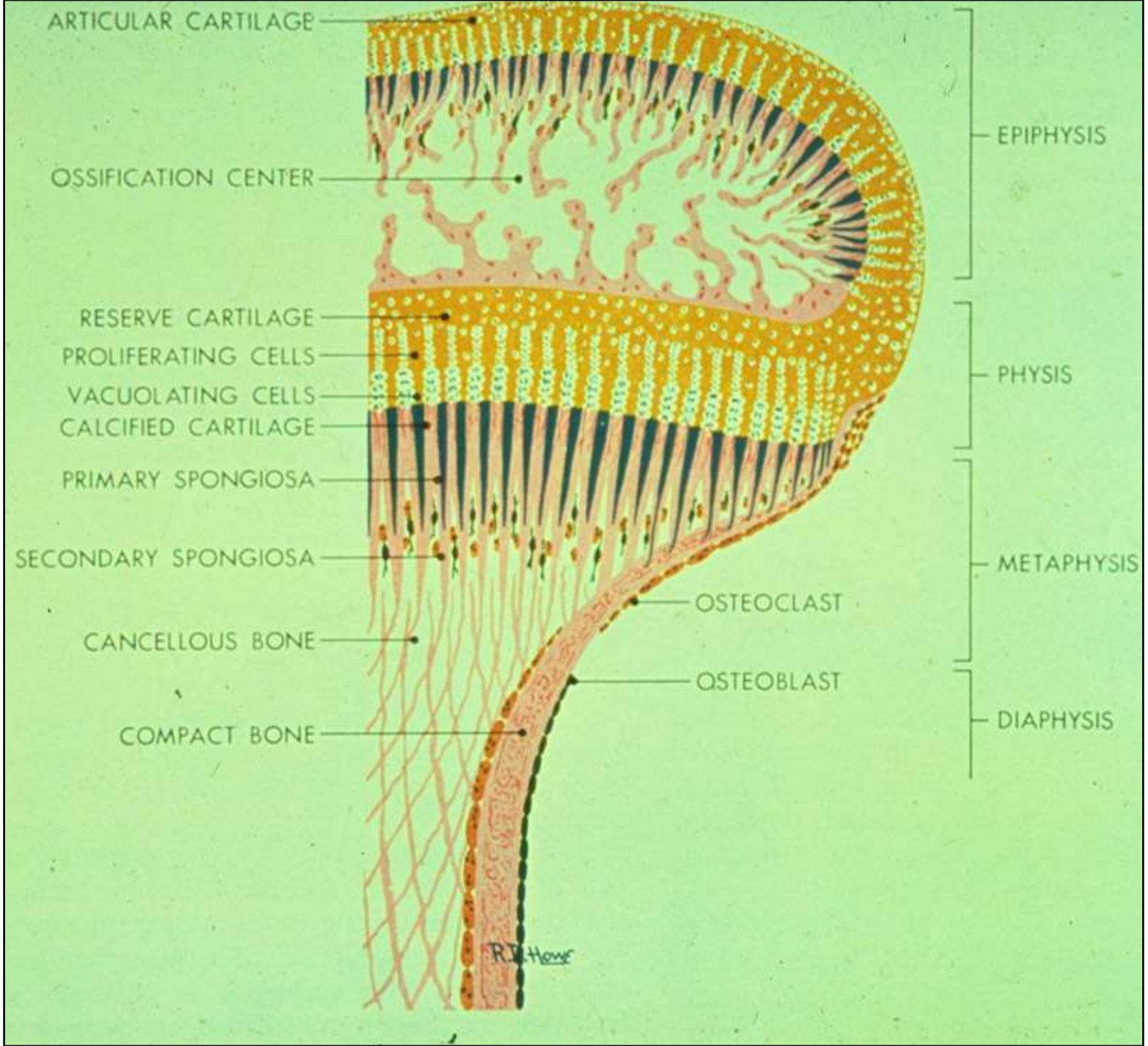


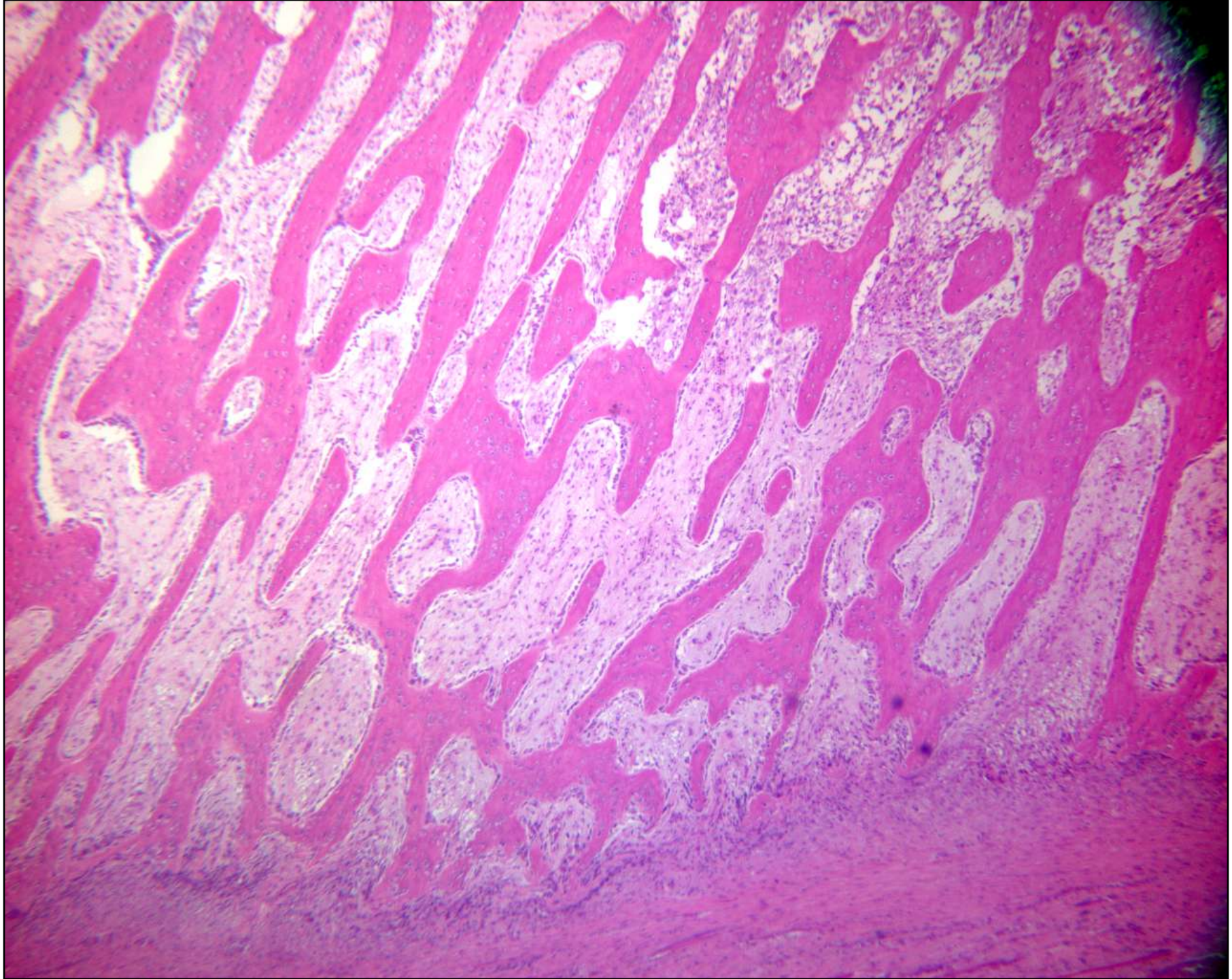


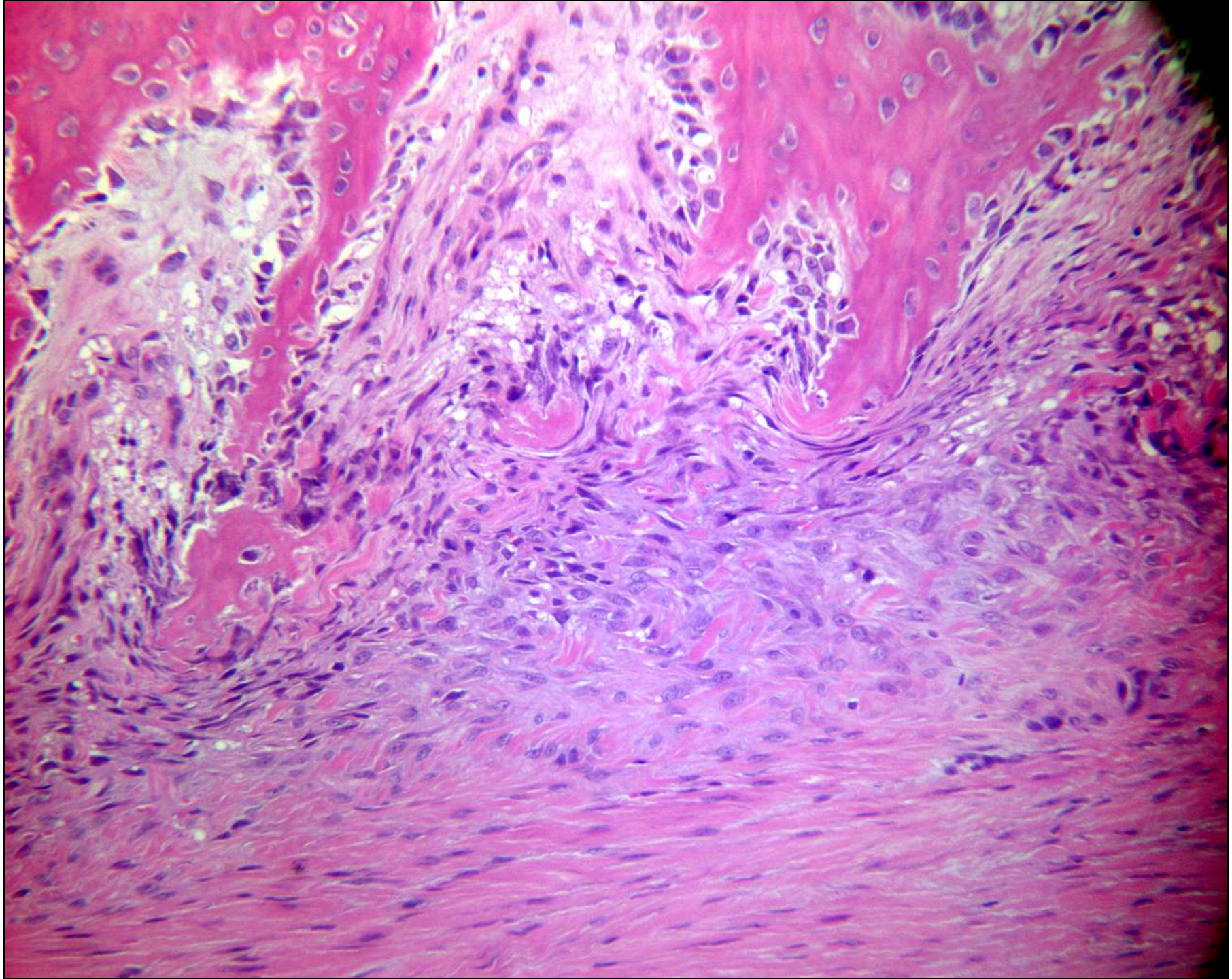
Periosteal Reactions to ‘Injury’

Periosteum responds to injury usually by formation of woven bone

- Reactive periosteal bone should have gradual transition between fibrous and osteogenic layers of periosteum


ARTICULAR CARTILAGE
OSSIFICATION CENTER
RESERVE CARTILAGE
PROLIFERATING CELLS
VACUOLATING CELLS
CALCIFIED CARTILAGE
PRIMARY SPONGIOSA
SECONDARY SPONGIOSA
CANCELLOUS BONE
COMPACT BONE
OSTEOCLAST
OSTEOBLAST
EPIPHYSIS
PHYSIS
METAPHYSIS
DIAPHYSIS
R.J. House





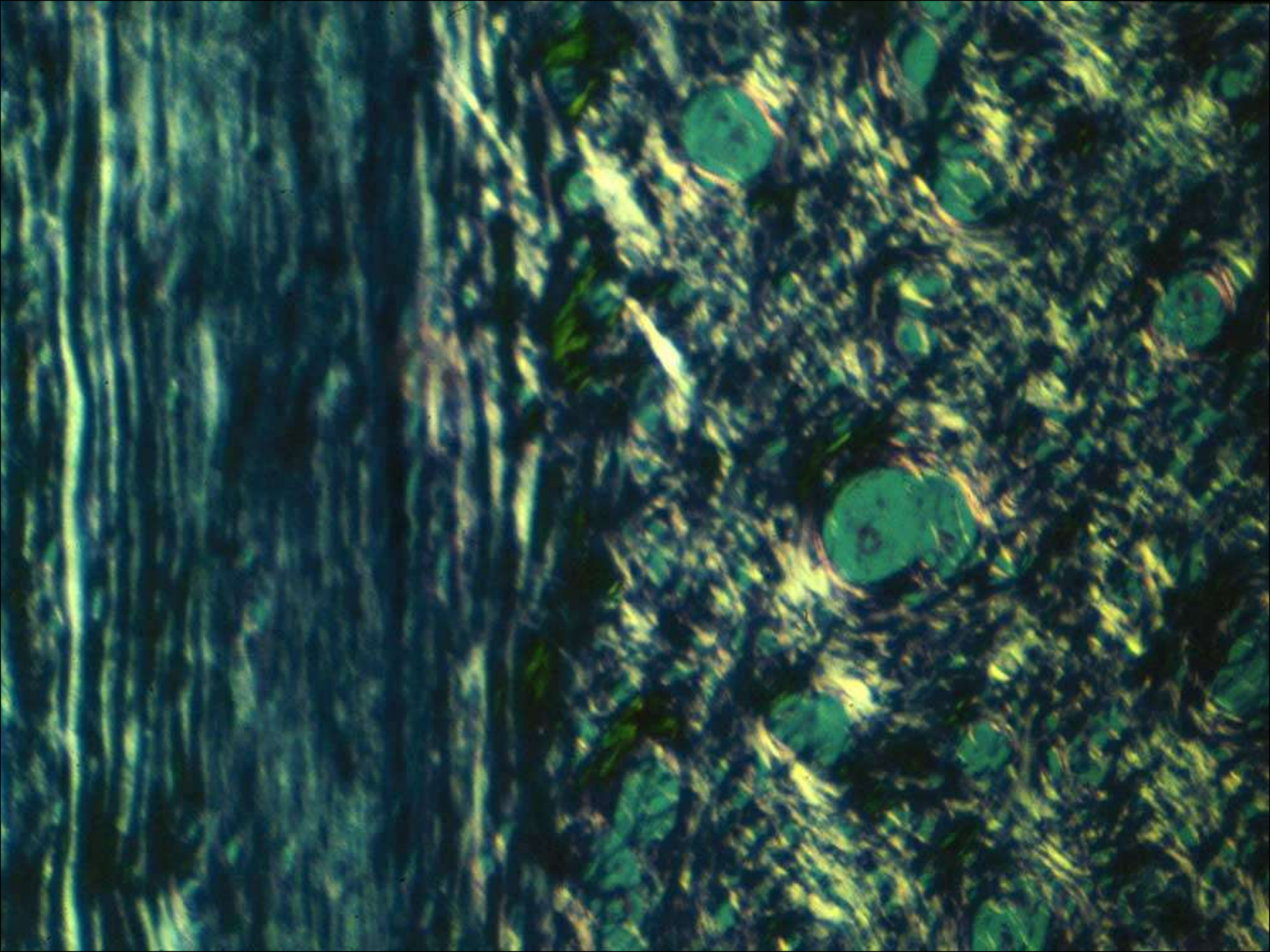
Periosteal Reactions to ‘Injury’

Trauma; Infammation; Neoplasia
Vascular
Inherited
Viral
Sterile Inflammatory
Nutritional/Metabolic

Periosteal Woven Bone Formation

Vascular

Hypertrophic Osteopathy

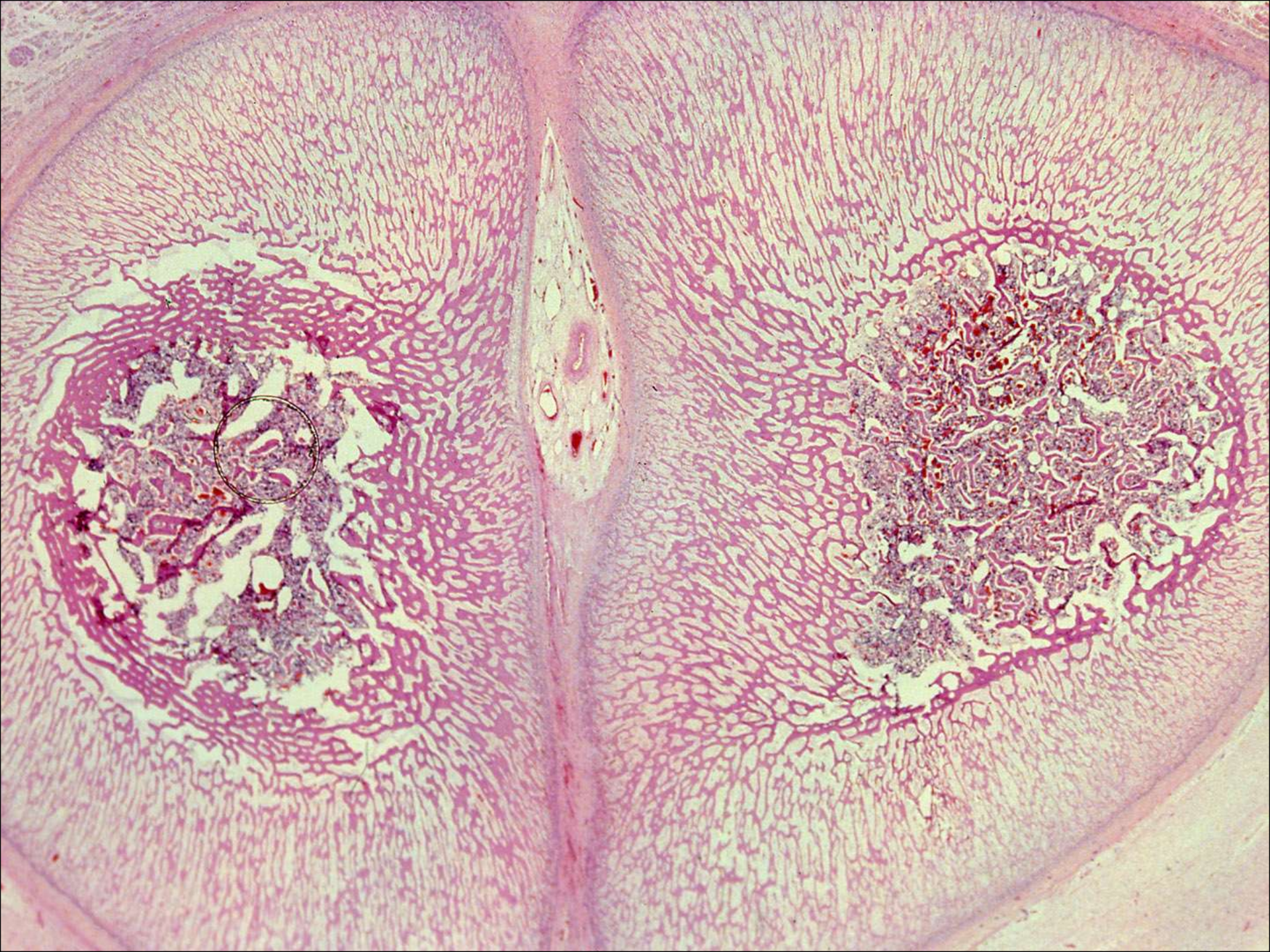


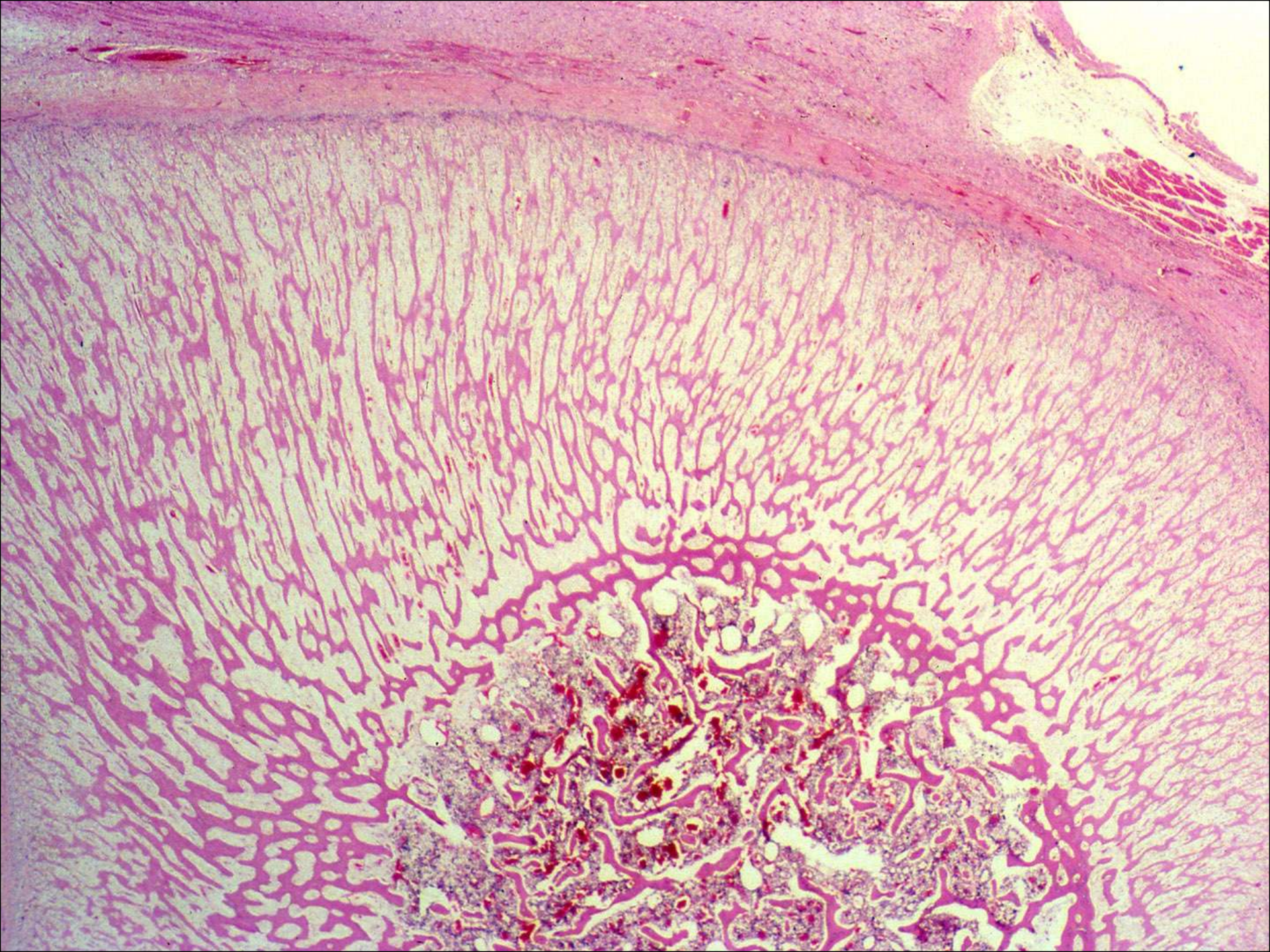
Periosteal Woven Bone Formation

Presumed Genetic

Hyperostosis of pigs


cm
1
2
3
SPEC.
DATE

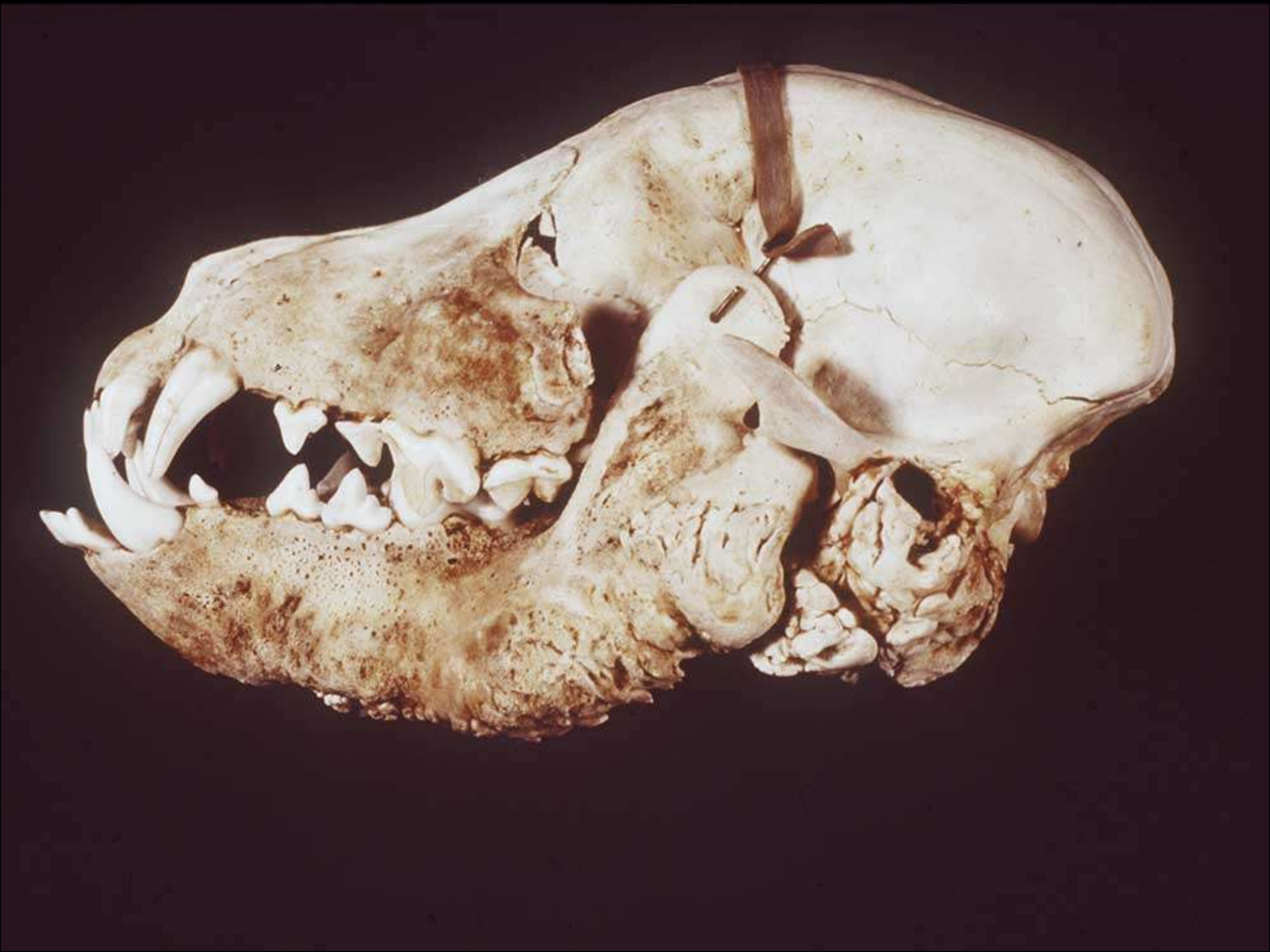




Periosteal Woven Bone Formation

Presumed genetic

Craniomandibular Ostopathy



Periosteal Woven Bone Formation

Infectious

Viral Ostepetrosis of Chickens

(viral osteoblastosis)


cm
1
2
3

Periosteal Woven Bone Formation

Metabolic

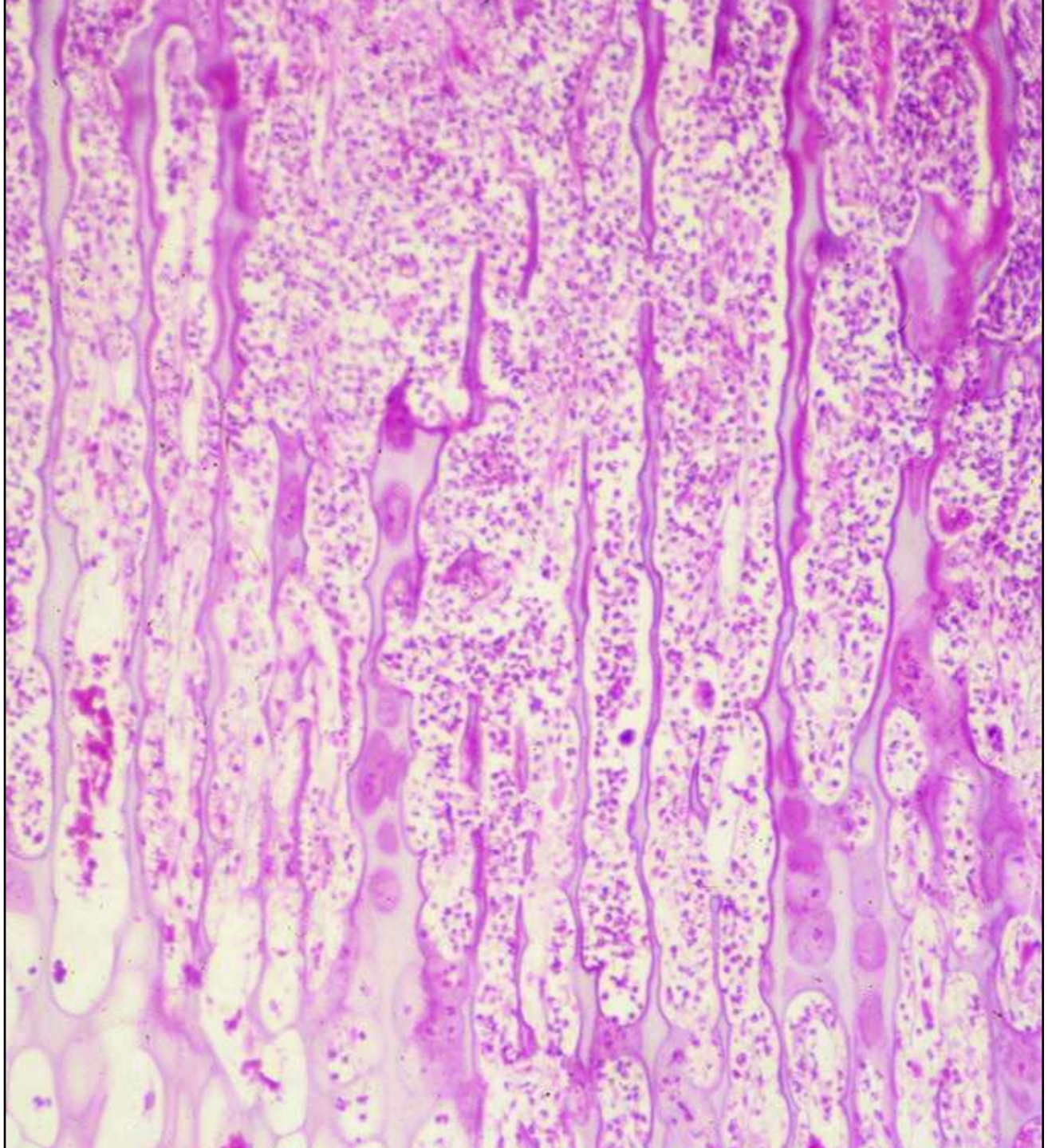
Hypervitaminosis A

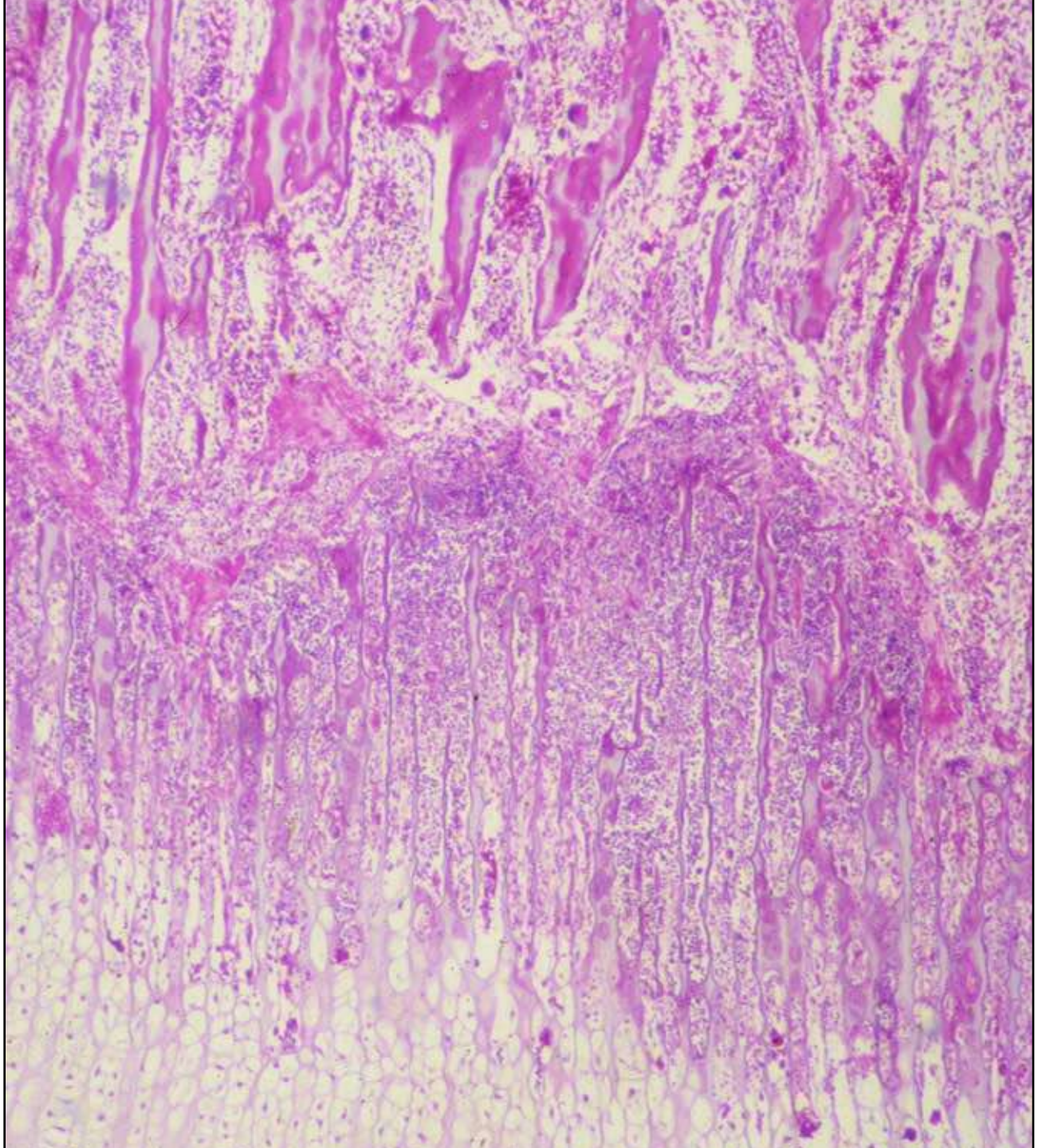
Periosteal Woven Bone Formation

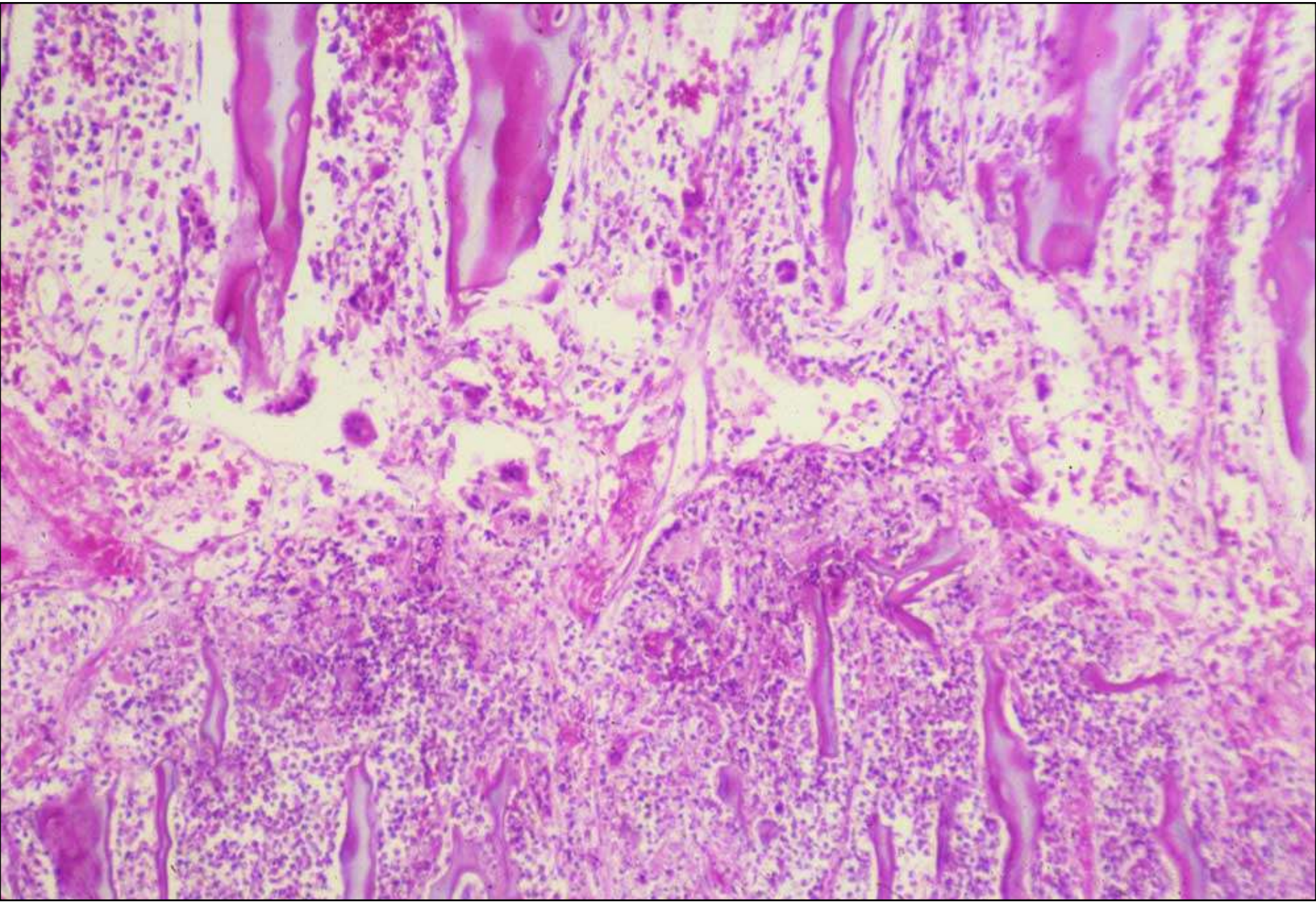
Response to Mechanical Instability secondary to sterile inflammation

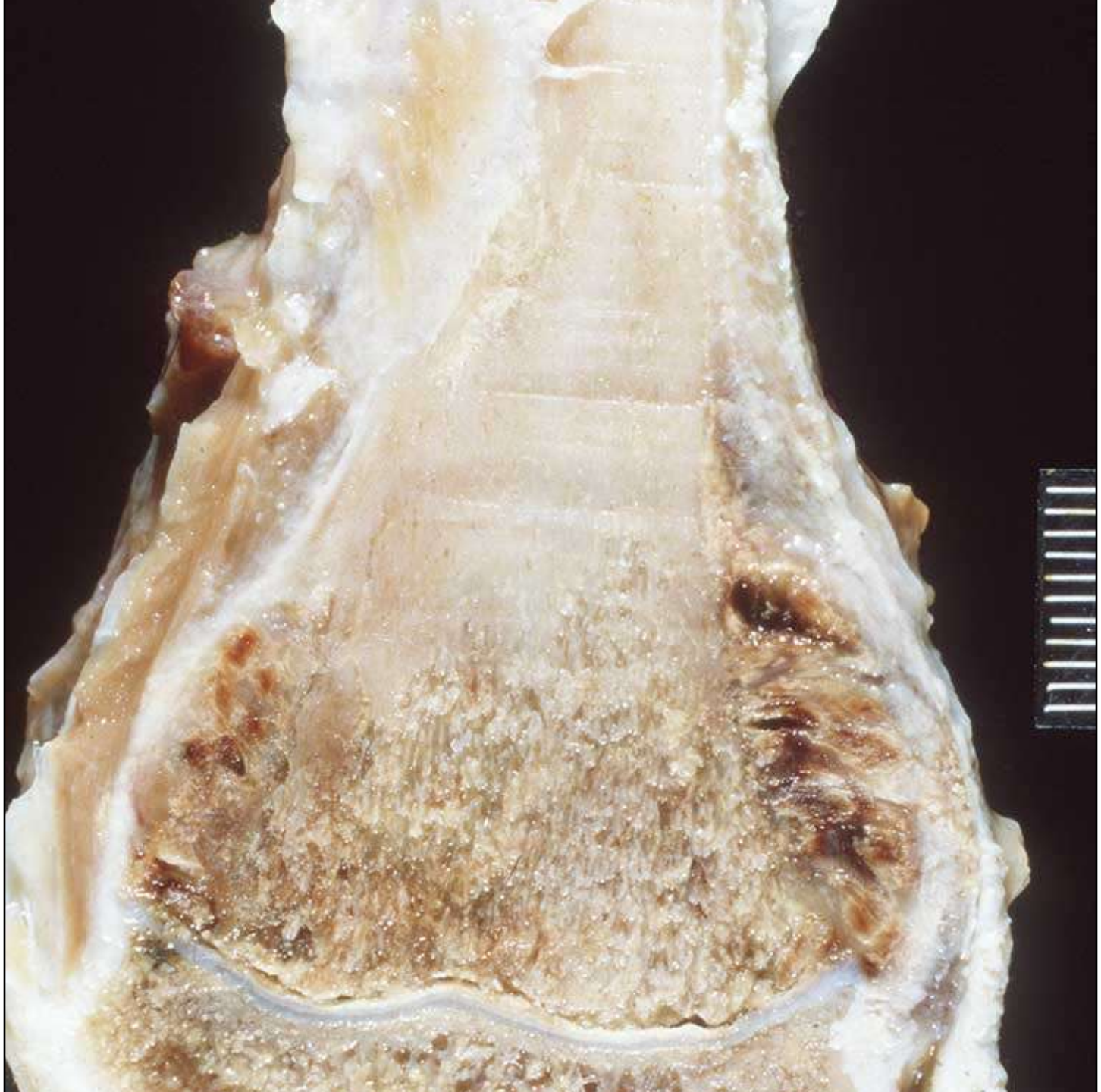
Metaphyseal Osteopathy

(HOD)









Periosteal Woven Bone Formation

Secondary to normal mechanical use on an abnormal skeleton