Teenage Boys and Young Adult Men with Anorexia Nervosa

Melissa Russell, MD
Fellow, Pediatric Endocrinology
Neuroendocrine Unit
Massachusetts General Hospital
Boston, MA

MassGeneral Hospital
for Children℠

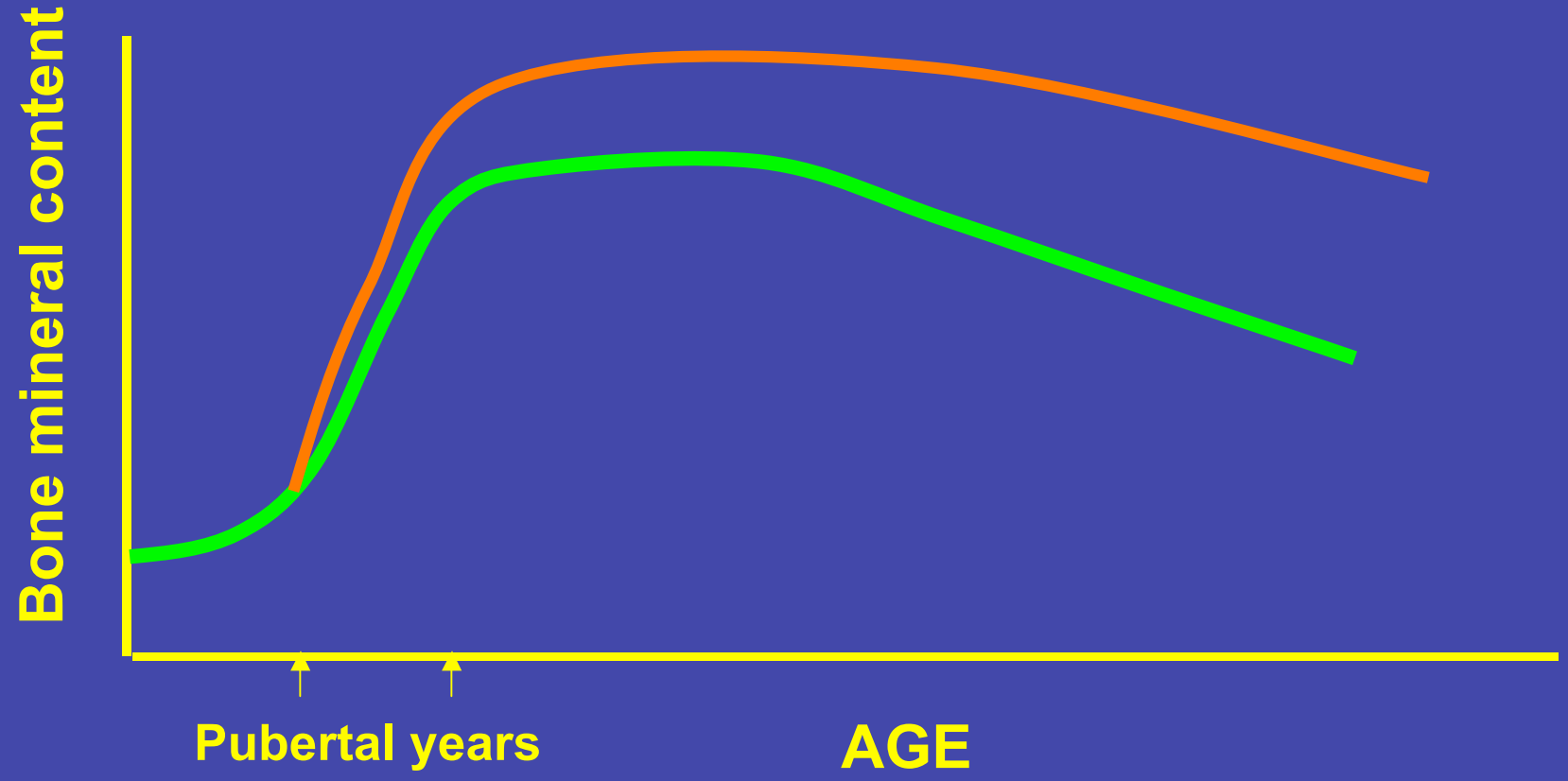
Anorexia Nervosa in Males

- Objectives
  - Effects on bone accrual in adolescents
  - Implications of secondary testosterone deficiency
  - Bone microarchitecture
- MGH studies for boys and young men

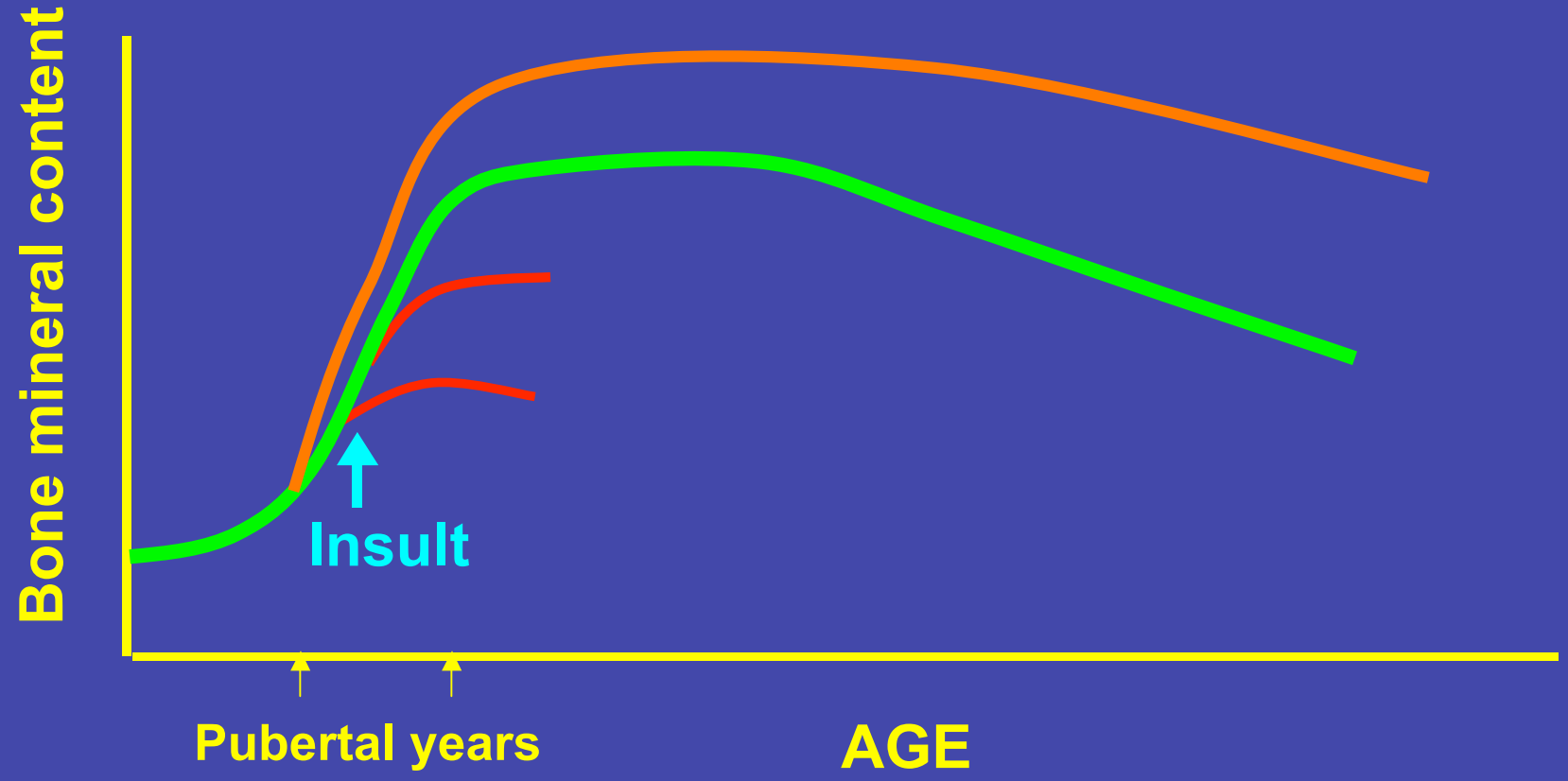
Bone Density

- The teenage and young adult years are critical for accrual of BMD
- >25% of bone mass accrued within 4 y surrounding peak growth velocity (growth spurt)
- >80% bone mass accrued by 18 y
- Insults incurred during this period can lead to permanent BMD deficits

ADOLESCENCE: Critical window in time to optimize bone mass



ADOLESCENCE: Critical window in time to optimize bone mass



Importance for males

- Approximately 10% male
- Largely undiagnosed
- Often assumed genetic or GI etiology
- At risk for effects of low testosterone and low estrogen

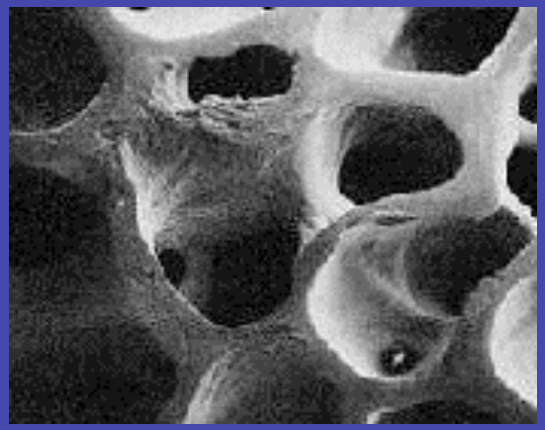
Importance for males

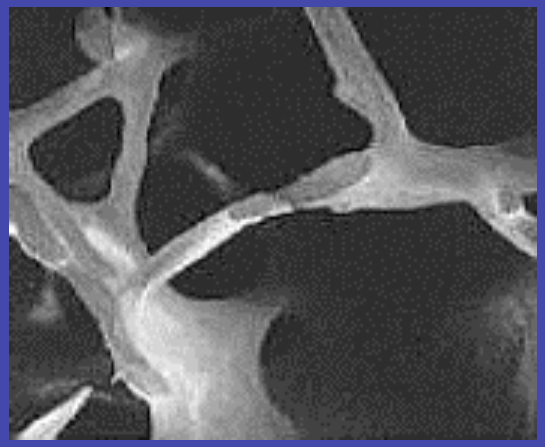
Testosterone → estrogen

- Testosterone ↑ bone formation
- Estrogen ↓ bone breakdown and stimulates other pathways that ↑ bone formation

Evidence for low bone density

- Adult men with testosterone deficiency have low BMD compared with normal men
- Testosterone supplementation in men with testosterone deficiency increases their BMD



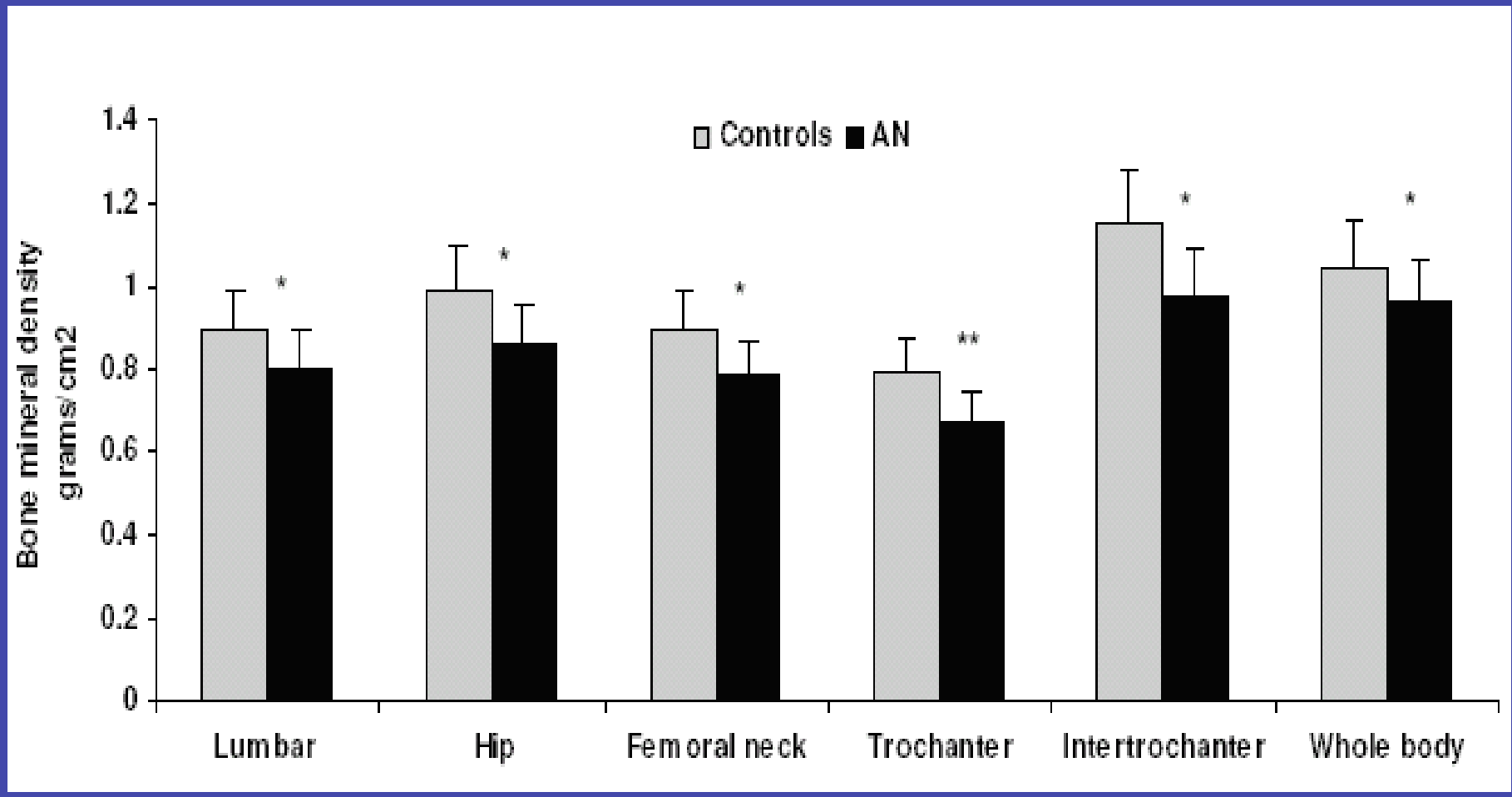


Data in Adolescent Boys

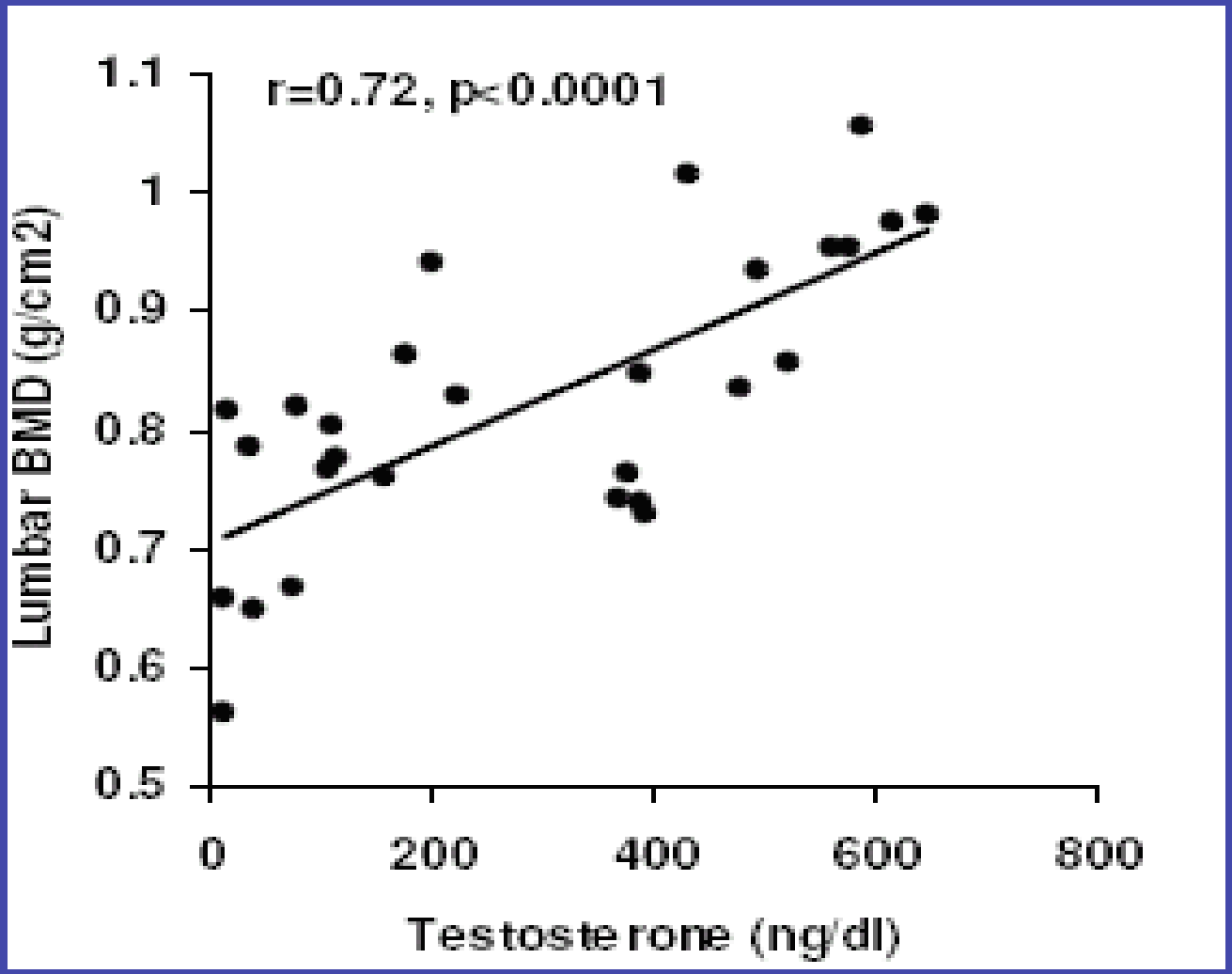
- **Misra, M., et al., *Bone Metabolism in Adolescent Boys with Anorexia Nervosa.* J Clin Endocrinol Metab, 2008**

- ***Above electron micrograph images from Dempster, DW et al. JBMR 1986***

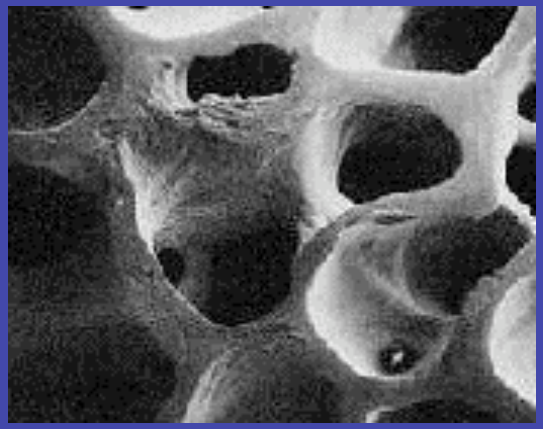
Bone mineral density is decreased in adolescent boys with AN compared with controls

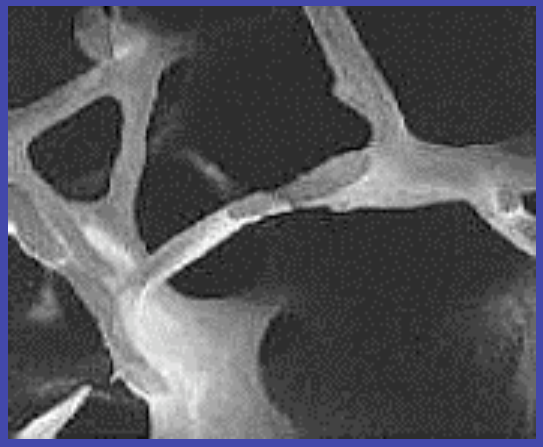


Boys with lower testosterone had lower bone density



Bone Microarchitecture





- Trabeculae – tiny interconnecting pieces of bone
- AN have decreased number and thickness of trabeculae
- Measure by MRI or CT
- More accurate correlation with fracture risk

Studies at MGH

- Effects of AN on bone mineral density and bone microarchitecture - all ages
  - One time visit with DXA, fp-VCT, serum bone markers
  - Optional follow-up visit in 6 -12 months
- Testosterone replacement therapy – 14 – 30 yo
  - 12 m randomized control study, no placebo
  - Testosterone injection every 3 weeks
  - DXA, CT, hormone evaluation at baseline, 6 m, 12 m
  - Stipend $375

Contact information

- Dr. Madhu Misra
  - 617-724-5602, mmisra@partners.org
- Dr. Melissa Russell
  - 617-726-1428, mrussell8@partners.org
- Jenna Stark
  - 617-726-8201, jnstark@partners.org
- Nara Mendes
  - 617-724-6046, nmendes1@partners.org

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