Metabolic bone disease (MBD), formerly known as osteopenia of prematurity. Clinically, it presents with poor extra-uterine growth, increased ventilator dependency and fractures. In addition, MBD has long-term consequences, including short stature and osteopenia, in young adulthood.¹

**Definition**
It is best defined as reduction in bone mineral content relative to the expected level of mineralization for an infant of comparable size or gestational age in combination with radiographic and biochemical changes.²

**Incidence**
16-40% in VLBW and ELBW infants.³

**Risk factors for MBD**
Prenatal: prematurity, maternal vitamin d deficiency, placental insufficiency, genetic (high number of (TA) repeats in the ER gene.)
Postnatal: inadequate intake of calcium and phosphate, vitamin D deficiency, immobility, drugs use such as caffeine, steroids and diuretics, long term prolonged parenteral nutrition, cholestasis.

**Prevention**
1. Establishment of early enteral feeding
2. Reduced duration of parenteral nutrition
3. Early fortification of human milk in babies who are at high risk for developing osteopenia

**How and when to start screening?**
See figure 38.1
**Target population**
1. Gestation age < 30 wk
2. Gestation age 30 to 34 wk with one of the following risk factors:
   a) Parenteral nutrition > 2 wk
   b) Cholestasis
   c) Use of bone active medications (steroids / loop diuretics / methylxanthine) for more than 2 weeks

**Screen**
(Serum calcium, phosphorus, ALP):
- At 4 wk
- At 2 weeks if on TPN since birth

**Abnormal**
ALP > 800 IU/L & PO < 4 mg/dL

- Maximize supplements (Ca, P, vitamin D) as tolerated
- Consider stopping bone active medication if possible

**Repeat screen after 2 wk. If no response, consider:**
- X ray knee or wrist, serum PTH, 25(OH)D

**Normal**
Monitor every 2 wk until discharge / 40 wk PMA

**PTH > 100 pg/mL, 25 (OH) D < 20 ng/mL:**
- Consider Vitamin D3 2000 IU daily + maintenance doses for 3 months with adequate supplementation

**Se PTH < 100 pg/mL and 25 (OH) D > 20 ng/mL:**
- Consider adding phosphate supplements

**Monitor**
Se Ca, ALP, P every 2 weekly
Stop monitoring if ALP < 800 and P > 4 mg/dL

1. Not to consider ALP values in cholestasis. Consider serum Phosphate levels
2. Consider fortification of breast milk with HMF in every feed
3. Consider adding phosphate supplements, starting at 20 mg/kg to maximum 50 mg/kg.

**Figure 38.1: Algorithm for screening and monitoring of metabolic bone disease**
References