- 4/5 Bone/Teeth
 - Calcium / Phosphate / OH Mineral aka Hydroxyapatite
- 1/5 Intracellular (esp muscle)
 - 2/3 incorporated into the four organic macromolecules
 - 1/3 into inorganic phosphate
- 1/100 Extracellular
 - \circ 80% ionized (80% existing as HPO₄⁻² and 20% existing as H₂PO₄⁻¹ and complexed w/ Na/Mg/Ca)
 - 20% albumin bound
 - NB like K+ serum PO4 poorly reflects total body PO4
 - NB unlike calcium labs measure all forms of PO4
 - o NB almost all phosphorus is in the form of phosphate
 - NB a new class of hormones called phosphatonins (eg. fibroblasts growth factor-23) have emerged which increases PO4 renal excretion, produced by bone, inhibits conversion of 25VitD to 1,25VitD, increased when there is increased PO4
- Measure: Same Ca Stuff, 24hr Urine PO4
- Similar hormone/organ regulation as Ca



Muscular (inability to make ATP and decreased oxygen release at tissues 2/2 decreased 2,3-DPG which shifts oxygen	Calcification of Tissue
dissociation curve to the left)	 blood vessels (if so bad that
• Skeletal Muscle Failure (Rhabdo (this is the big one) /Weakness/Myalgia and esp Diaphragm Failure resulting	there is decreased blood
in hypoventilation)	flow resulting in ischemia it
Cardiac Muscle Failure (Systolic CHF, Dysrhythmias)	is called "calciphylaxis"),
CNS (impaired cell membrane function)	cornea, skin, kidney,
Confusion, Paresthesia, Seizure, Ataxia, Coma, Peripheral Neuropathy, Gullain-Barre Syndrome	periarticular tissue
Heme	HypoCa Symptoms (refer)
Hemolysis (decreased deformity of RBCs)	
Plt Dysfxn (impaired aggregation)	Increases in phosphate are
Bone	accompanied by parallel increases in
Rickets/Osteomalacia (inability to mineralize bone)	mortality rate much of which is 2/2 CV
Renal	dz
Hypercalciuria	
Hypermagnesuria	
PT dvsfxn b/c PT requires a lot of energy	

НуроРО4

• Mild (1.0-2.0)

0

0

0

- Milk 1000mg/qt vs Supplements 250mg/packet
 - Neutra-Phos 1-2packets in 75mL juice/water with food PO QID
 - NB 7mEq of Na, 7mEq of K, 7mEq of PO4 / packet (therefore use in pts with no other electrolyte problem)
- Neutra-Phos K 1-2packets in 75mL juice/water with food PO QID
 - NB 14mEq of K, 7mEq of PO4 / packet (therefore use in pts with hypokalemia)
 K-Phos Neutral 1-2tabs PO QID
 - NB 13mEq of Na, 1mEq of K, 7mEq of PO4 / tab (therefore use in pts with hyponatremia)
- Severe (<1.0)
 - Pick Na or K Phos (based on if they are low in Na or K) then 15,30,45mmol IV x1 over 3,6,9hrs (usually given in a 250cc solution but if they don't need any more fluids then write "max concentrate")
 - NB 40mEq = 30mmol = 900mg
 - NB you can add 40mmol/d of PO4 in IVF

HyperPO4 (always limit dietary PO4 to 800-1000mg/d b/c if not the below will not work as well)

- Mild (5.0-5.5) (bind phos in gut during meals, don't take >1500mg of elemental Ca/d)
 - CaAcetate (PhosLo) 2-4caps PO QAC (before each meal) (you need 7.5g of Ca to remove 300mg of PO4) NB 8mEq of elemental calcium / cap
 - CaCarbonate 500-1000mg w/ 200mg of elemental Ca for every 500mg of CaCarbonate (before each meal) don't use if the Ca x PO4 product is >55 b/c it will cause metastatic calcification
 - Mod (5.5-6.0) (resin phosphate binders similar to kayexelate for potassium)
 - o lanthanum (Fosrenal) (you need 2.3g of lanthanum to remove 300mg of PO4)
 - sevelamer (Renagel/Renvela) (you need 14.2g of sevelamer to remove 300mg o PO4)

Severe (>6.0) o Fluids
Severe (>6.0) o Fluids
Opyright 2015 - Alexander Mantas MD PA

- Hemodialysis
- Aluminum hydroxide (Amphojel, AlternaGEL) NB it was found that AlOH caused aluminum toxicity resulting in encephalopathy, anemia, osteomalacia, fungal infections esp Mucormycosis occurred in RRT pts on AlOH but it was later found that the Al was likely from the dialysate than AlOH itself nevertheless no one uses it anymore except in short-term therapy