Oxygen Deficit
At the onset of exercise (& when increase exercise intensity)
actual VO2 < VO2 needed to meet the bodies energy demands
Thus, muscles must use anaerobic energy systems

why does it occur?
takes time to get systems ready to utilize O2 efficiently
Think about the FICK Equation \[ \text{VO2} = Q \times \text{A-vO2difference} \]
It takes time to increase Q (i.e. heart rate & stroke volume)
It takes time for muscles to increase O2 extraction
(takes time to increase A-vO2diff) – vasodilate, temp, SaO2 curve shift

factors influencing the magnitude of O2 deficit (& EPOC)
training
muscle mass involved
intensity
individual differences:
cardiovascular efficiency
pulmonary efficiency
fiber type proportions

EPOC (Excess Post - Exercise Oxygen Consumption)
Oxygen consumed above resting values after exercise has ended

Historically called “O2 debt” (which is an outdated term)
It was originally thought that the excess VO2 was simply used to "repay" the oxygen deficit (thus the term "debt"), which was divided into two components

- fast component of O2 debt
  - replenish PCr stores & replenish Mb & Hb oxygen stores
- slow component of O2 debt
  - remove accumulated lactate by oxidation and use in glycogenesis

Possible factors causing EPOC
synthesis of ATP & PCr (i.e. need O2 to create ATP -> PCr)
PCr + ADP <= creatine kinase -> ATP + P Cr
removal of lactate by oxidation
replenishing glycogen stores
replenishing Mb & Hb oxygen stores
Q10 effect – elevated tissue temperature increases the rate of chemical reactions, and thus metabolic rate, in those tissues.
Heart & respiratory muscles still working harder than rest catecholamines (NE & Epi) - both tend to increase metabolic rate

Reasons why EPOC is not equal to O2 deficit (i.e. why we no longer call it O2 debt)