

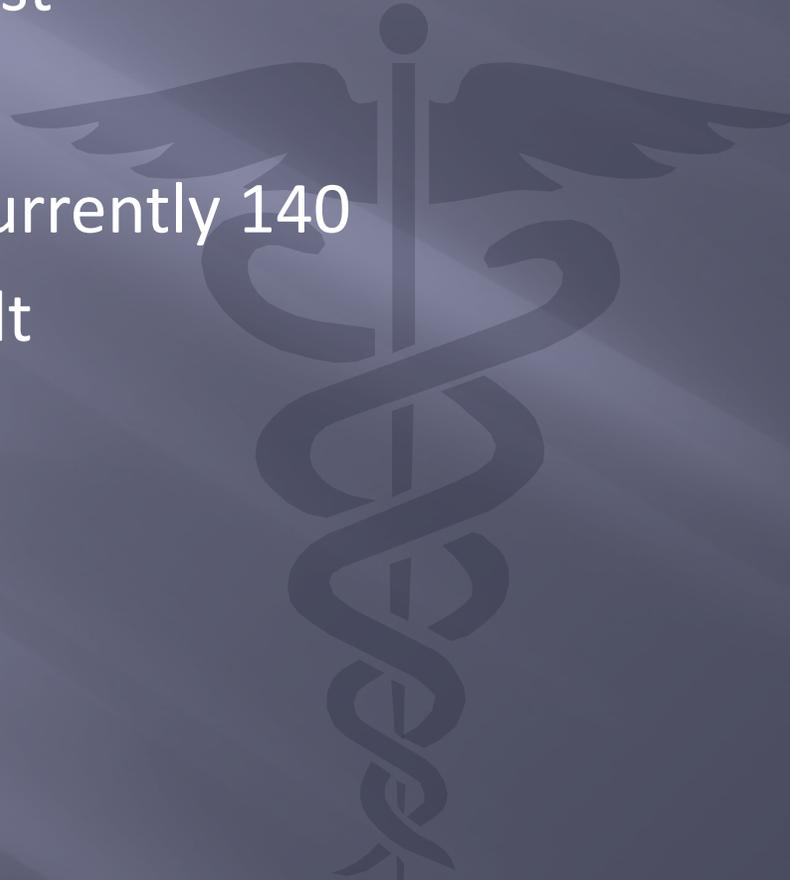
PRE-BOUT HYPERTENSION: A RISK FACTOR FOR INTRA-CEREBRAL HEMORRHAGE

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Disclosures

- ▣ No conflicts of interest
- ▣ Fanatic fight fan
- ▣ Wrestled at 69 lbs, currently 140
- ▣ Krav Maga brown belt



My Background

- ▣ Family Medicine, with Sports Medicine CAQ
 - Fellowship Director
- ▣ Army 29 years, combat veteran, retired Colonel
- ▣ Elite military athletes: international competitions in boxing, wrestling, TKD, Judo
- ▣ Olympic athletes: 2012/2016 boxing, wrestling, TKD, judo
- ▣ Pro-MMA/Boxing, Washington & Oregon athletic commissions



Bottom line up front (BLUF)

- ▣ **Hypertension** is a risk factor for some types of intracranial hemorrhage
- ▣ **Trauma** is a risk factor for some types of intracranial hemorrhage
- ▣ **Hypertension** plus **Trauma** is a recipe for disaster
- ▣ Take a hard line with pre-fight hypertension ≥ 160 SBP or ≥ 100 DBP
- ▣ Fighter safety is paramount and is YOUR responsibility

Epidemiology of Intracranial Hemorrhage

- ▣ Subdural hemorrhage (75% of boxing deaths)
 - Risk Factors: **trauma**, anticoagulants, cerebral atrophy
- ▣ Intracerebral hemorrhage (ICH)
 - RF: **Htn**, smoking, alcohol, diabetes, cerebral amyloid angiopathy, **?trauma**
 - Risk = 9x when BP >160/>100
 - ▣ Ikram et al, *Curr Atheroscler Rep* 2012
- ▣ Subarachnoid hemorrhage
 - Aneurysmal: RF = **Htn**, smoking, FHx, **trauma**
 - Non-aneurysmal: RF = **Htn**, **trauma**



Gary Whittom, died Mar 2018

▣ **Trauma + Hypertension = Trouble**

Definitions in Hypertension

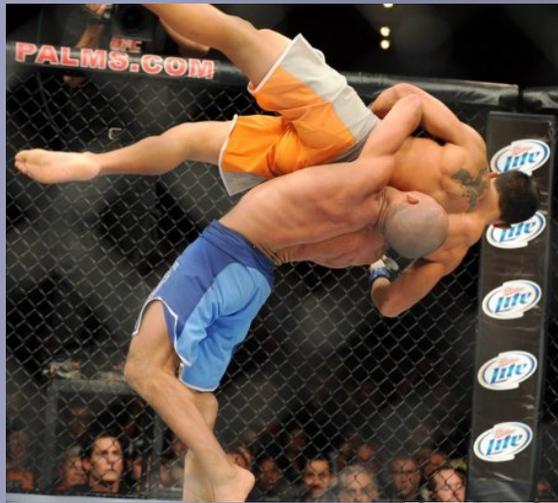
- ▣ **Normotensive:** BP <120/80
- ▣ **Pre-hypertension:** 120-139 / 80-89
- ▣ **Stage 1 Hypertension:** 140-159 / 90-99
- ▣ **Stage 2 Hypertension:** ≥160 / ≥100
- ▣ **Hypertensive Urgency:** asymptomatic, severe elevated BP, usually >180/>120
- ▣ **Hypertensive Emergency:** severe Htn with symptoms of acute end-organ damage (MI, stroke, dissection, etc)

American College of Sports Medicine recommendations

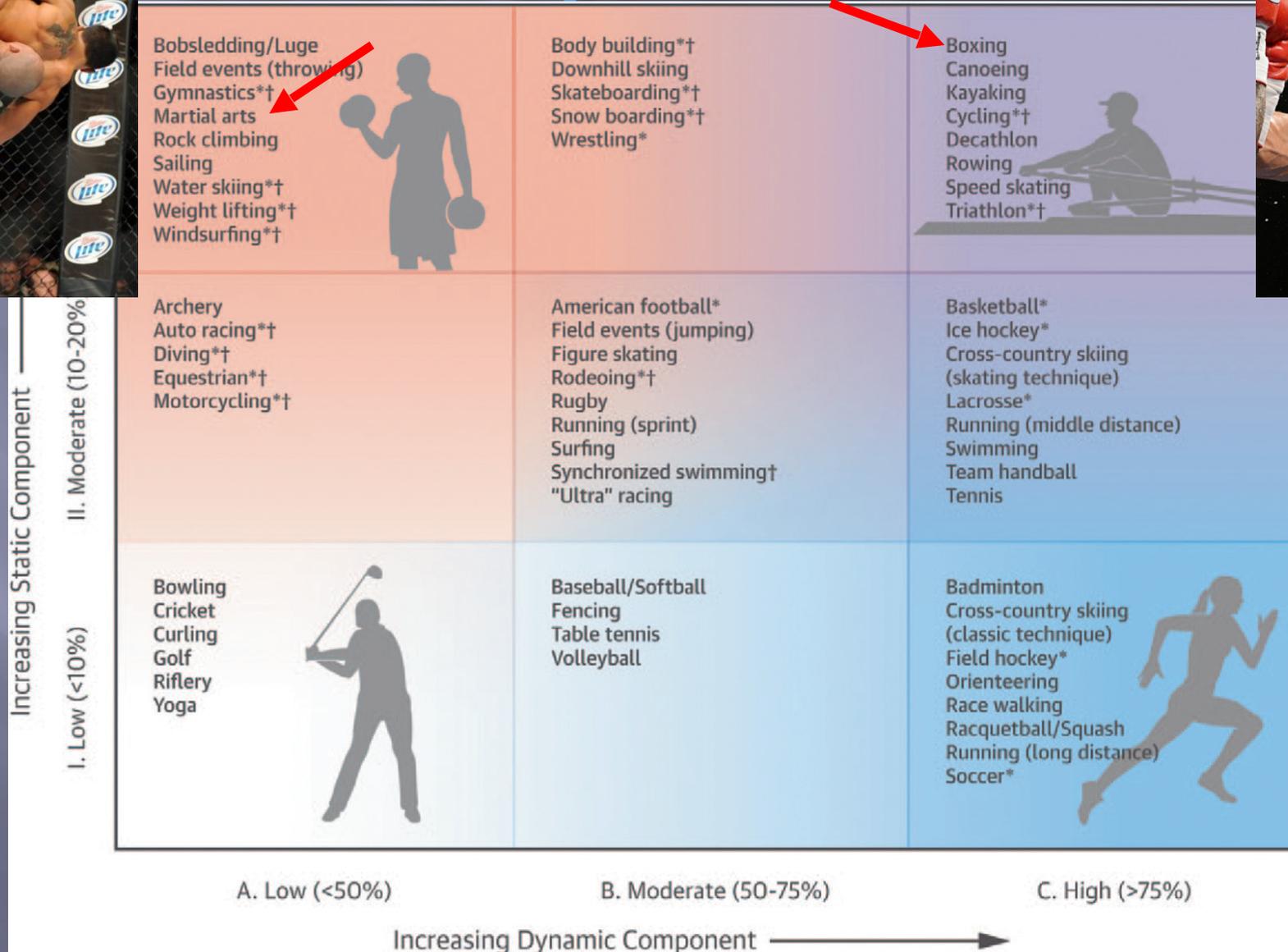
- ▣ “Individuals with stage 2 hypertension (SBP \geq 160, DBP \geq 100) or with target organ disease...**must not** engage in any exercise...prior to a medical evaluation and adequate BP management.”
 - **ACSM's Guidelines for Exercise Testing and Prescription, 10th Ed. 2018:280.**

American Heart Association and American College of Cardiology recommendations

- ▣ AHA/ACC Scientific Statement, Eligibility and disqualification recommendations for competitive athletes with cardiovascular abnormalities.
 - “It is reasonable that athletes with **stage 2 hypertension (SBP>160 or DPB >100)**, even without evidence of target-organ damage, should be restricted, particularly from high static sports, such as weight lifting, boxing, and wrestling, until hypertension is controlled....”
 - ▣ **Black HR et al. JACC 2015, 66(21)**



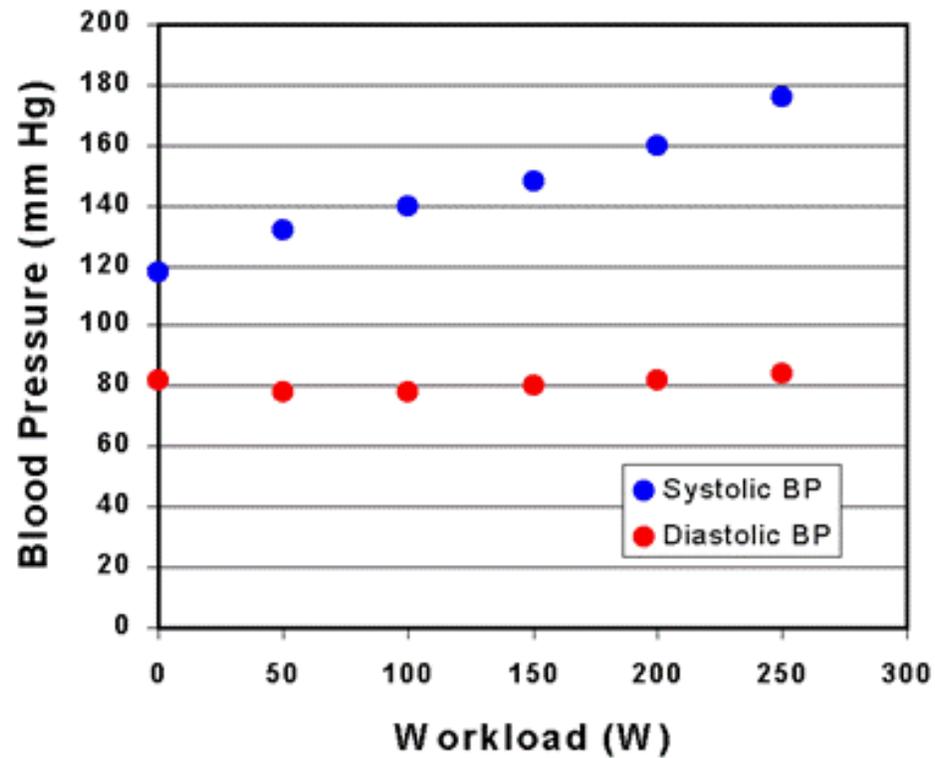
Static vs Dynamic Exercise



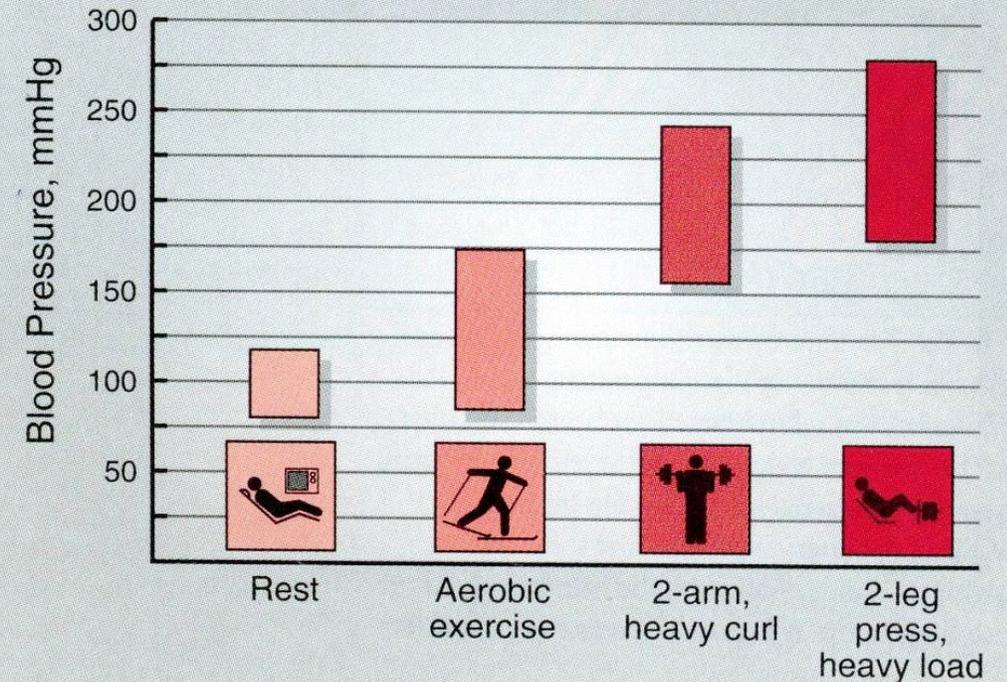
Blood pressure response to exercise

- Blood pressure rises during exercise
 - What's high pre-fight will be MUCH HIGHER during fight

Effects of Incremental Exercise on BP

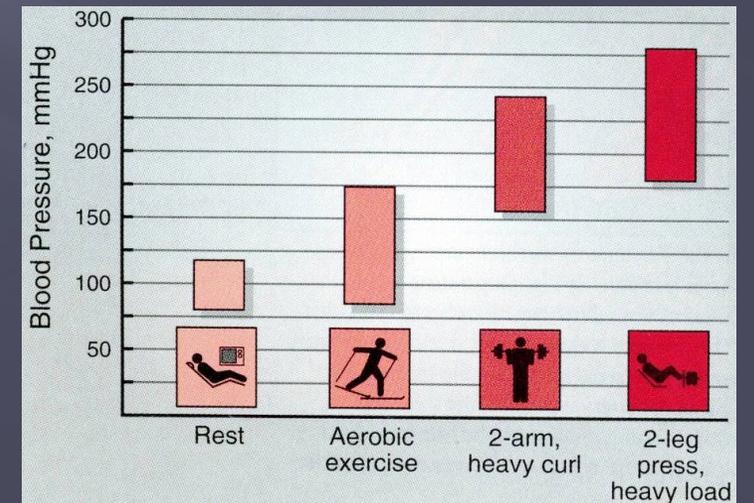


Blood Pressure Response During Rhythmic Aerobic Exercise and Heavy Resistance Training of Small and Large Muscle Mass



But...but...but...what if...?

- ▣ What if it's just situational hypertension? Fighter's BP was ok on licensing physical, but it's now 165/105.
 - How do you know this isn't new-onset Stage 2 Hypertension?
 - Does the brain care what that cause of the hypertension is?
 - BP will only go UP from there
 - Remember Risk of ICH = 9x when BP >160/>100
- ▣ What if the fighter feels fine despite this BP of 165/105?
 - See above
- ▣ What if I'm comfortable with BP of 165/105?
 - Is the brain comfortable with it?
 - Is it prudent to go against several major scientific bodies?
 - ▣ ACSM, AHA, ACC
 - Could you defend yourself in a courtroom?



Do your job, protect the brain

- ▣ Ringside physicians are not there to just take vitals, but also to interpret them and to courageously make the hard decisions
- ▣ We should err toward caution when the brain is at risk, just as we do with other vulnerable organs:
 - E.g. Uncorrected vision 20/200 or worse: DISQUALIFIED

What if a fighter has pre-bout hypertension?

- ▣ Recheck with manual cuff of adequate size
- ▣ Recheck after 5 minute rest, sitting, relaxed, in quiet place
- ▣ Recheck after 30 minute rest and relaxation
- ▣ If still ≥ 160 or ≥ 100 , disqualify the fighter.

