Squat, Bench, Deadlift – Theory Presentation

Introduction about me

- Hello everyone and welcome! My name is Greg Elkington, I am a Personal Trainer at GoodLife Fitness in Regina, Saskatchewan. I also work for GoodLife Fitness Head Office as the Personal Training Specialist for the Club Opening team. I have travelled around the country and opened a GoodLife in every province except for Quebec, and helped hundreds of trainers to set up their businesses and become better trainers. I have a Bachelor of Science in Mathematics/Physics from the University of Regina and as such love the biomechanics and technical aspects of why the powerlifts are such an integral part of the training programs I provide for my clients and myself.

Why Squat Bench and Deadlift are considered the big 3 lifts

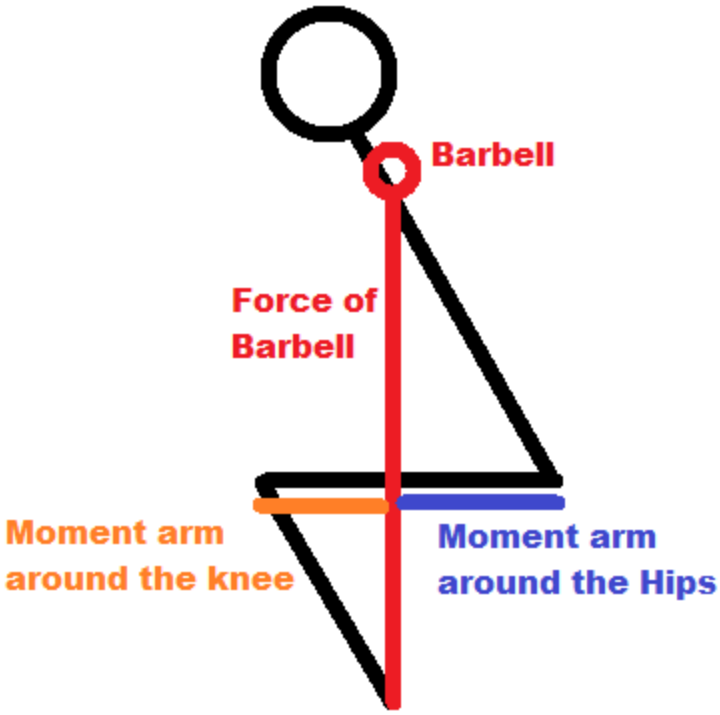
- The answer lies in the physics of the lifts
    - Maximal Load
    - Motor Units -A **motor unit** is made up of a **motor** neuron and the skeletal muscle fibers innervated by that **motor** neuron's axonal terminals. Groups of **motor units** often work together to coordinate the contractions of a single muscle; all of the **motor units** within a muscle are considered a **motor** pool.
    - Work Energy Theorem – The work-energy theorem states that the work done by all forces acting on a particle equals the change in the particle's kinetic energy. This can be derived from Newton's 2nd Law. The simplest form of the equation looks like W = Fd where W is the work done, F is the Force applied and d is the distance.
        - What the crap does that mean and how does that apply to us as trainers?!
    - Free body diagrams
    - Center of Mass
    - Moment Arm
- Positioning should be determined based on the goal

Start from the Spine

- Translational motion what is it
- What risks are involved
- Fixed flexion/extension
- CNS and force generation

The Squat

- Where you load, determines the mechanics of the movement

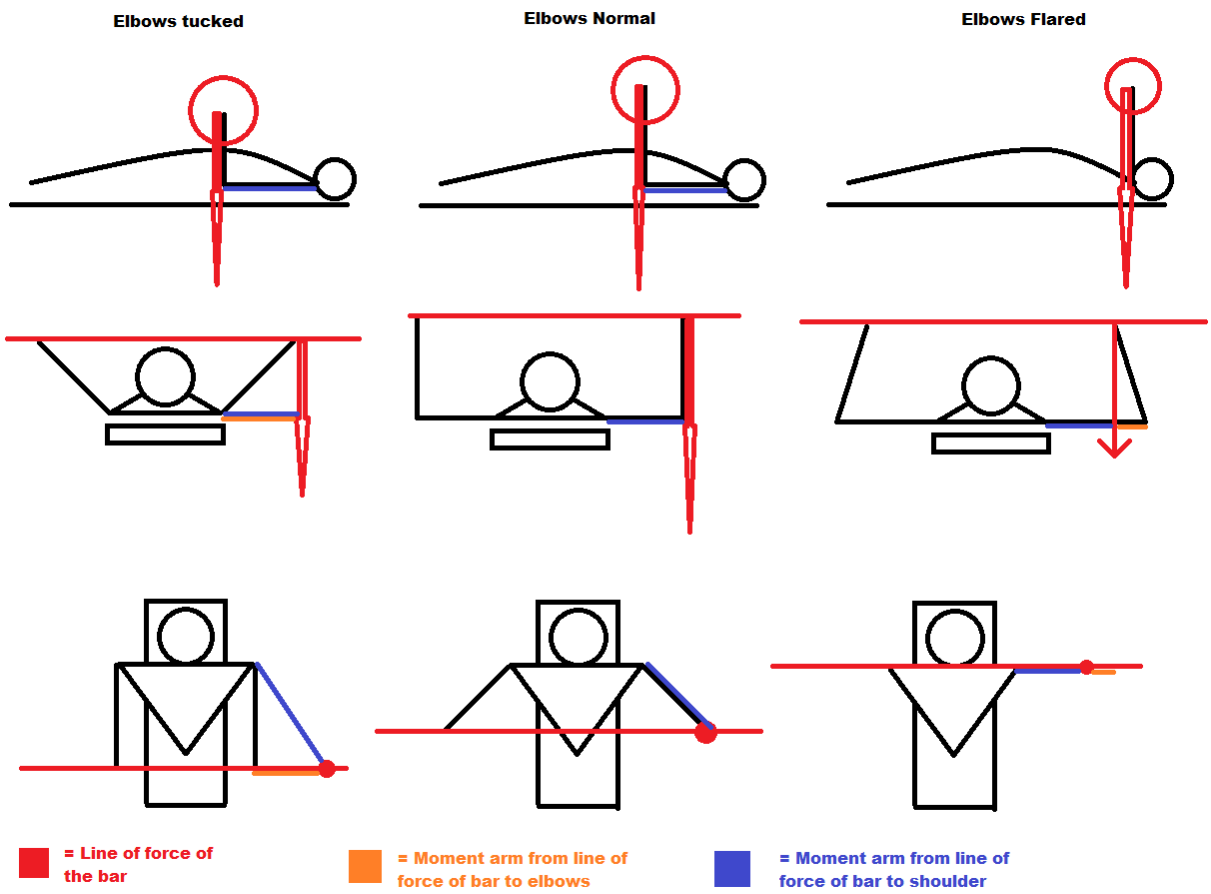


- 3 Barbell positions
    - High
    - Low
    - Front(not what we are working on today)
- Foot Position
    - Q Angle(hip)
    - Foot Angle
    - Determining what is best for a client based on their specific body type(this may change throughout training them)
- 3 Keys to a great squat
    - No translational motion of spinal position
    - Knees track over 2nd/3rd Toe
    - Hip crease breaks the knee plane without a posterior hip tilt
- Biggest Faults
    - Ankle inversion
        - Probable causes
            - Poor dorsi flection
            - Collapsed arch
            - Tight calves
        - How this effects the mechanics/force
        - Correctives

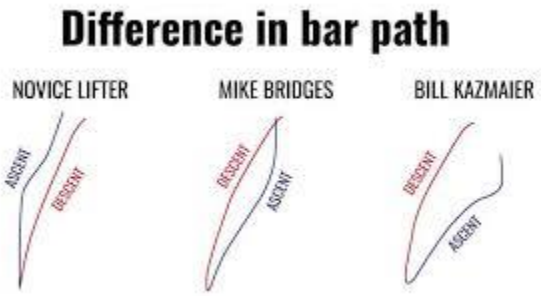
- Knee Caving in(hip adduction)
    - Probable causes
        - Weak VMO/Glute Medius
        - Tight adductors
    - How this effects the mechanics/force
    - Correctives
- Leaning Forward(generally accompanied by back flexion)
    - Probable causes
        - Weak core
        - Tight hip flexors
    - How this effects the mechanics/force
    - Correctives
- Posterior Pelvic Tilt(Butt Wink)
    - Probable causes
        - Weak core
        - Tight posterior lower body chain
    - How this effects the mechanics/force
    - Correctives
- Lateral Shifts in the hip
    - Probable causes
        - Injury
        - Imbalance
    - How this effects the mechanics/force
    - Correctives

The Bench Press

- Where you load and how you position your body, determines the mechanics of the movement



- Barbell Path in a Bench Press
    - Why is it an arc?
    - LEVERS and the fulcrum(shoulder) and the Moment Arm



- Position on the Bench
    - Importance of your feet
    - Creating a table(scapula)
        - Lumbar Extension
    - Hand Position(understanding where to put them and why)
        - Happy medium on force generation and distance travelled(refer to work energy theorem)

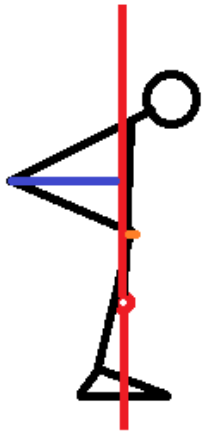
- 3 Keys to a great bench
    - Start and finish with stacked joints(Bar path)
    - Stable core and spine throughout the motion(push through the floor)
    - Scapula flush with the bench the entire time
- Biggest Faults
    - Elevated Shoulders
        - Probable causes
            - Upper trap dominance
            - Weak lats
        - How this effects the mechanics/force
        - Correctives
    - Scapula Protraction/Anterior Shoulder Rotation
        - Probable causes
            - Upper trap dominance
            - Weak lats
            - Weak mid back
        - How this effects the mechanics/force
        - Correctives
    - Translational Extension through the lumbar
        - Probable causes
            - Weak core
            - Poor setup/pushing through the floor
        - How this effects the mechanics/force
        - Correctives

The Deadlift

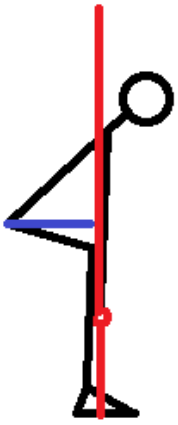
- Body type/lever length will determine position

SAGGITAL PLANE

CONVENTIONAL

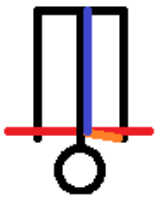


SUMO

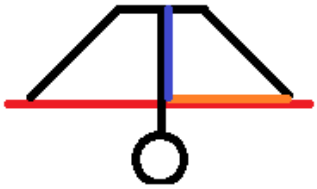


TRANSVERSE PLANE

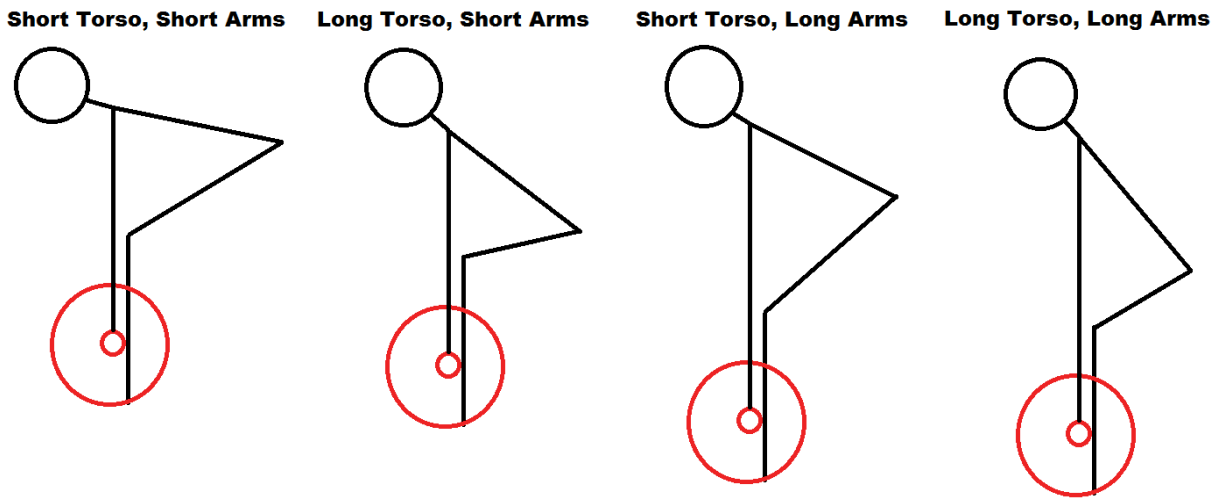
CONVENTIONAL



SUMO



= Bar + Line of Action of Bar = Hip Moment Arm = Knee Moment Arm



- The Great Debate: Conventional vs Sumo
    - Differences(biomechanics)
    - Moment Arm → erectors/back
    - Quad demands
    - Distance travelled(work energy)
- Foot Position
- Hand Position
- Head Position
- 3 Keys to a great deadlift
    - Pull the bar into you
    - Get set from the top down(core tension)
    - Push through the floor as you drive your hips forward
- Biggest Faults
    - Thoracic Flexion and scapular protraction
        - Probable causes
            - Weak lats
            - Weak upper back
            - Weak core
        - How this effects the mechanics/force
        - Correctives
    - Lumbar Extension
        - Probable causes
            - Weak core
            - Weak glutes/poor activation
        - How this effects the mechanics/force
        - Correctives
    - Knees Caving in
        - Probable causes
            - Weak glute med
            - Poor glute activation

        - Not pushing through the floor
    - How this effects the mechanics/force
    - Correctives