

2 Contraction Types

Break down Eccentric, Isometric, Concentric

- What is happening at each phase?
- What is the outcome of each phase?
- How do we leverage each phase to our targeted outcome?

Contraction

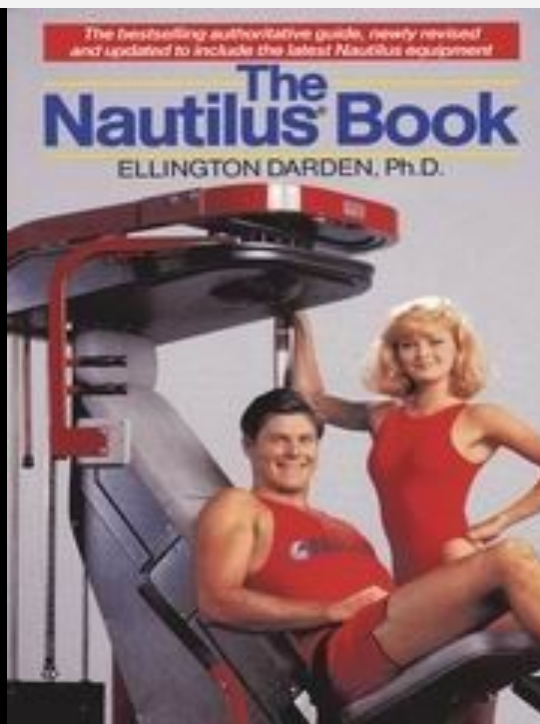
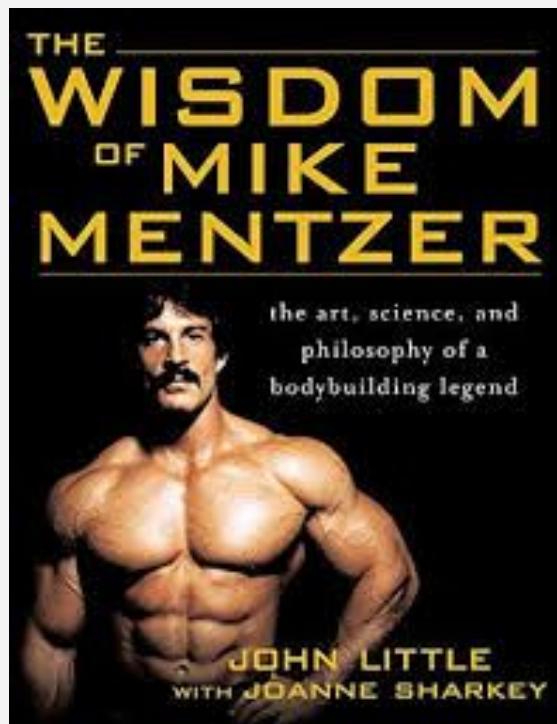
Eccentric - Lengthen

Concentric - Shorten

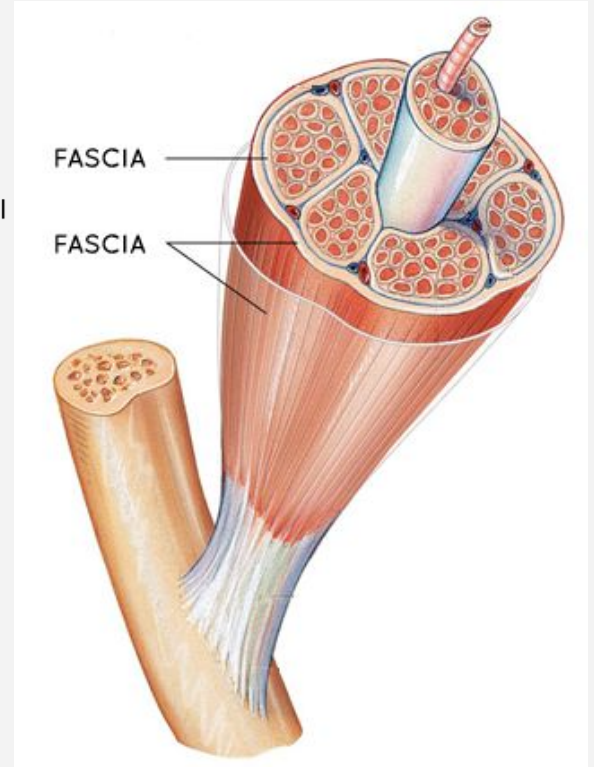
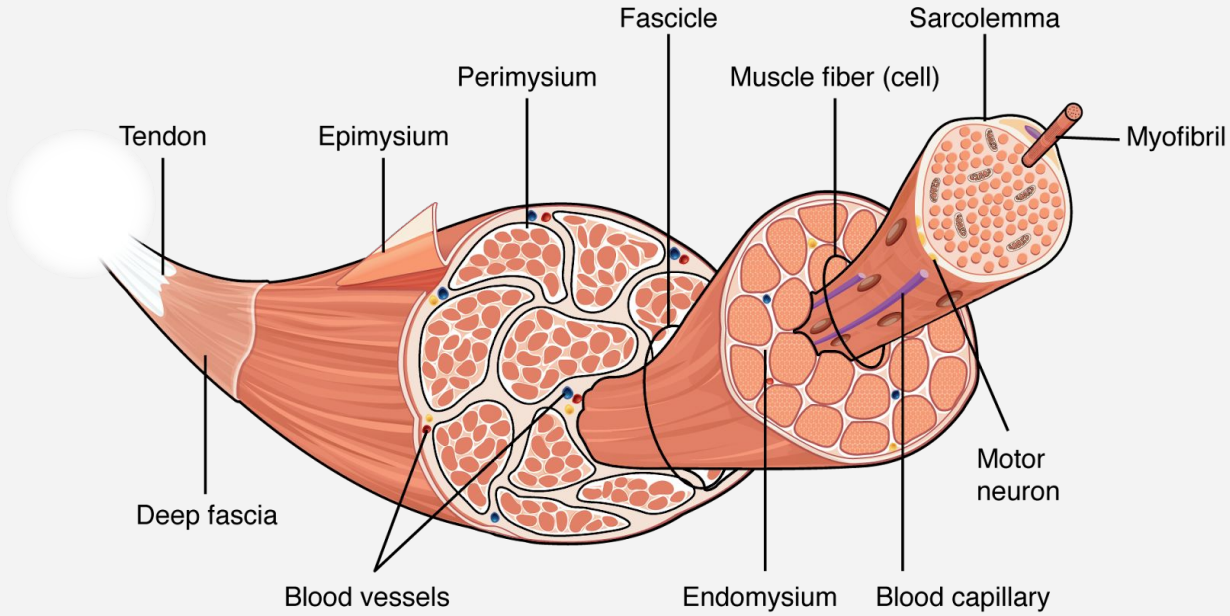
Isometric - Static

- Yielding - Resist Lengthening Position
- Overcoming - 'Move' to Shortened Position

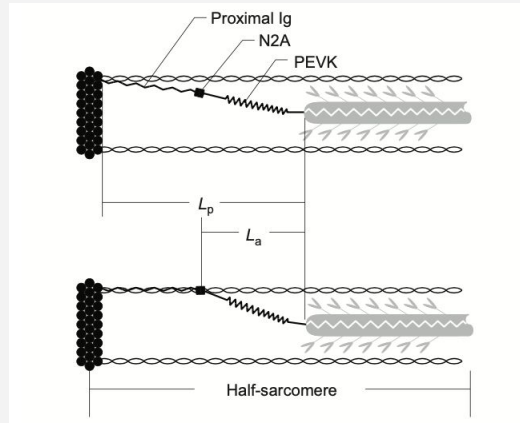
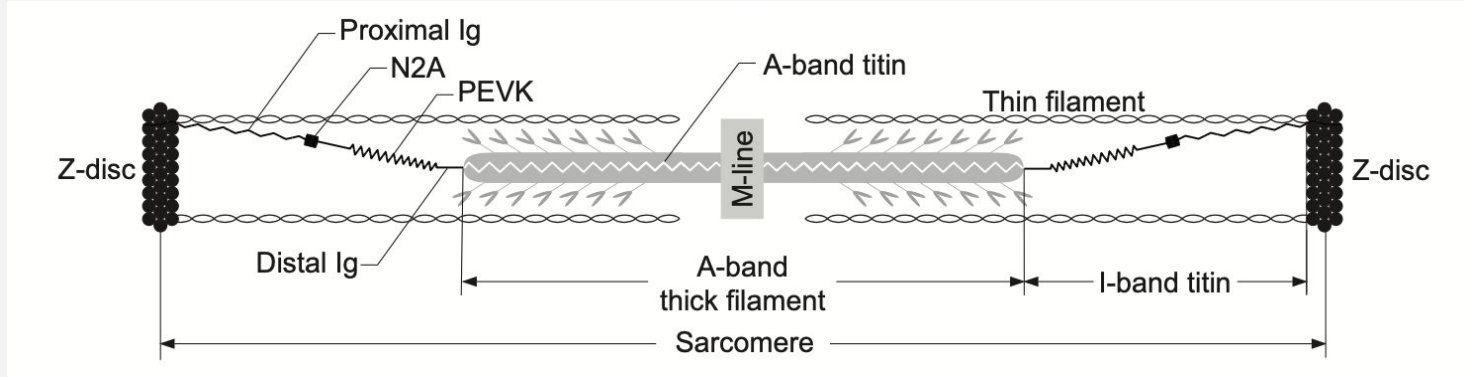
History



Physiology



Physiology



Length Tension

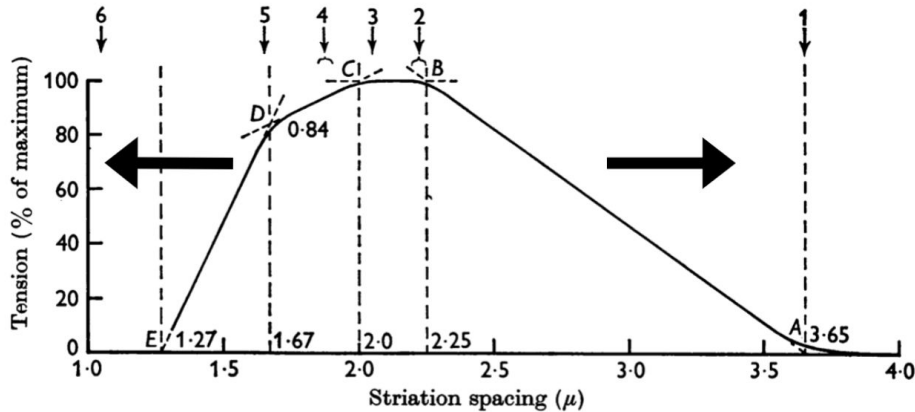
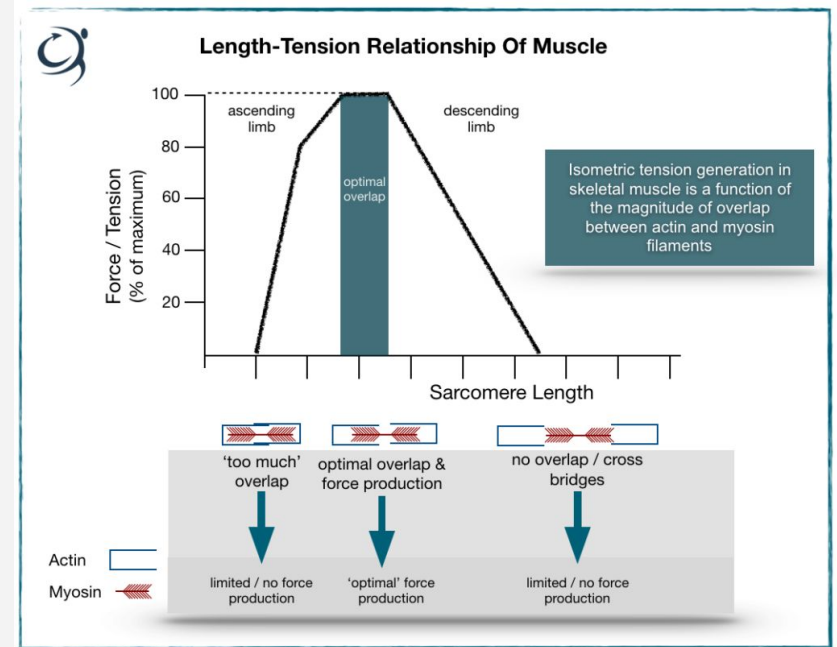
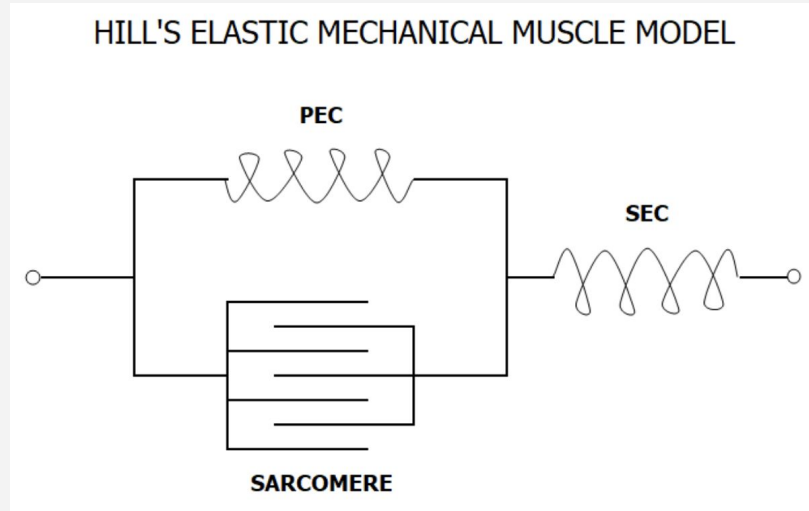


Fig. 12. Schematic summary of results. The arrows along the top are placed opposite the striation spacings at which the critical stages of overlap of filaments occur, numbered as in Fig. 14.

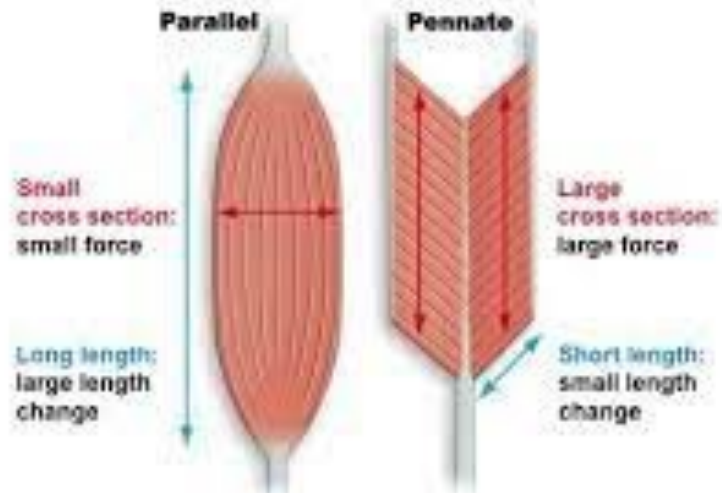


Length Tension



Muscle Fiber Types

Figure 45.9



Contraction Outcomes

Eccentric - More DOMs

- More rapid rate of adaptation (DOMs reduces tenfold in subsequent sessions)
- Greater MU/Fiber Recruitment, Increased Titin Strength, Longitudinal Hypertrophy
- Impact on SEC - SSC

Concentric - Less DOMs

- Slower rate of adaptation (Proportional to Intensity, Volume, Density)
- Most change is due to increase CSA
- Impact on the PEC - Inertia

Isometric - Depends

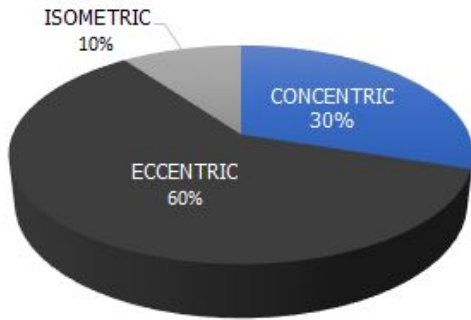
- Yielding Isos at Increased Lengths can result in DOMs
 - Also requires significant less external load
 - But can result in rapid changes to Force Length (SEC - SSC)
- Overcoming Isos at Shortened can result in CNS Fatigue
 - Require increased loads with maximal intent
 - Increase MU recruitment and strength in a shortened position (PEC - Inertia)

Rules

- Strength
 - Eccentric is stronger than Isometric which is stronger than Concentric
 - Eccentric training 130% of Concentric Strength
 - Full capacity of a contraction is based on eccentric stress
 - Most free weight exercises are governed by concentric ability
 - Only using Concentrically limited options Shrinks the Deficit
- CNS Fatigue
 - Result of external load and rate of force development
 - If we can use submaximal loads or move at high velocities there will be more impact on CNS
- DOMs
 - Proportional to Volume and Density at threshold Intensity
 - More Volume within a set or Density within a session will result in more Concentric Governing
 - Can adjust TUT to utilize higher Intensity per set to reach certain thresholds

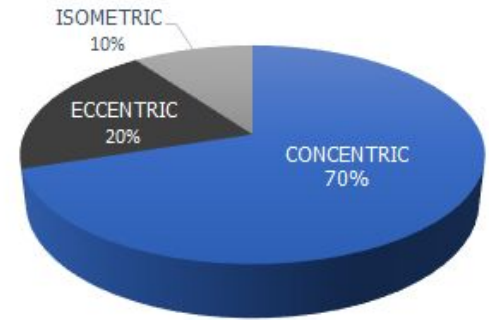
Rules

ECCENTRIC FOCUS



■ CONCENTRIC ■ ECCENTRIC ■ ISOMETRIC

CONCENTRIC FOCUS



■ CONCENTRIC ■ ECCENTRIC ■ ISOMETRIC

Take Home

- Know the assignment
 - Increasing the Deficit - Increase Eccentric Stress
 - Decrease the Deficit - Increase Concentric Stress
- Progress based functional levels and desired outcomes
 - Increase function longitudinally or cross sectionally
 - Develop capacity based on predetermined outcome
- Create your True North
 - Committing to the goal by predetermined time spent on Ecc/Conc/Iso
 - Create testing that supports development in key areas based on time spent