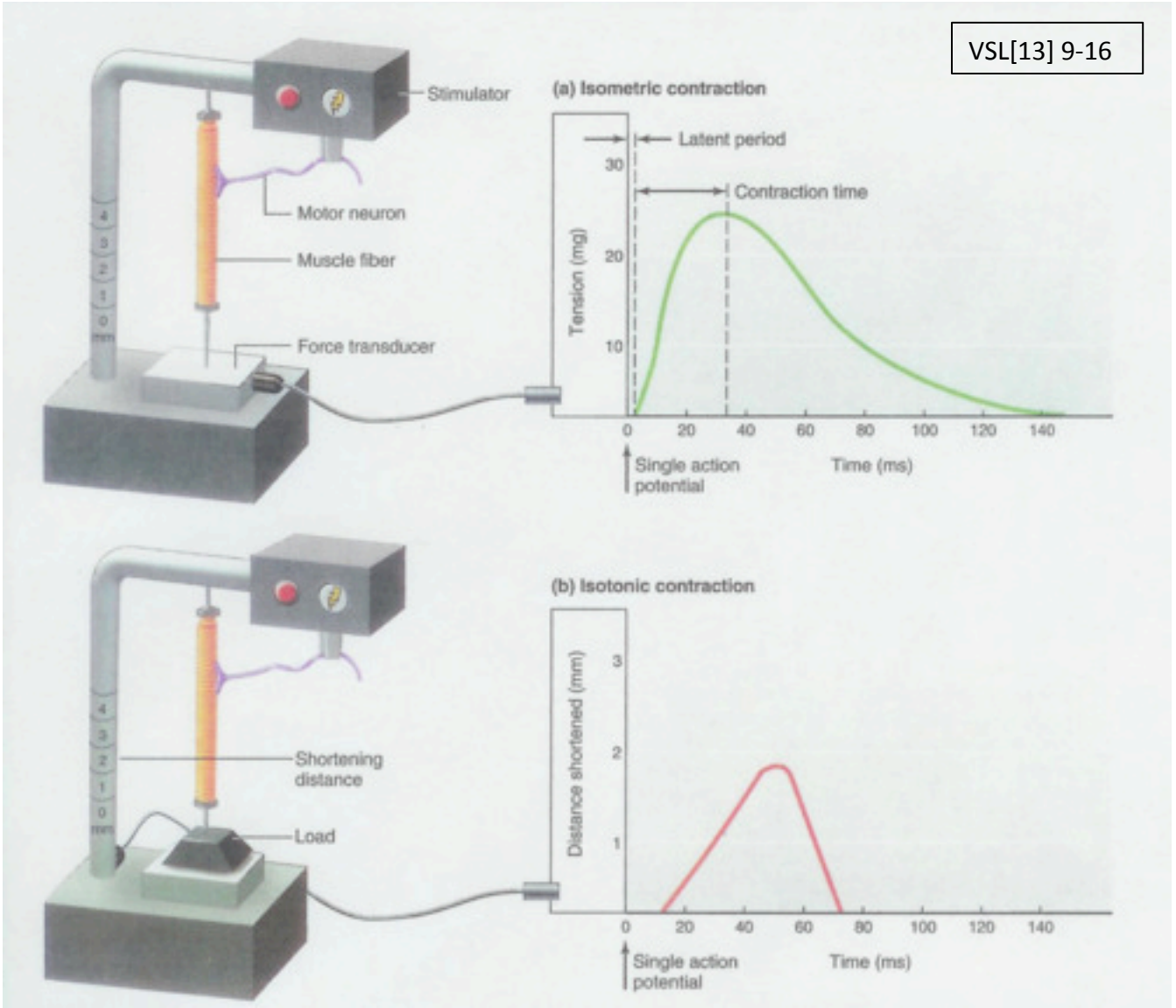
VSL[13] 9-16


Stimulator
Motor neuron
Muscle fiber
Force transducer
(a) Isometric contraction
Latent period
Contraction time
Tension (mg)
30
20
10
0
20
40
60
80
100
120
140
Single action potential
Time (ms)
Shortening distance
Load
(b) Isotonic contraction
Distance shortened (mm)
3
2
1
0
20
40
60
80
100
120
140
Single action potential
Time (ms)

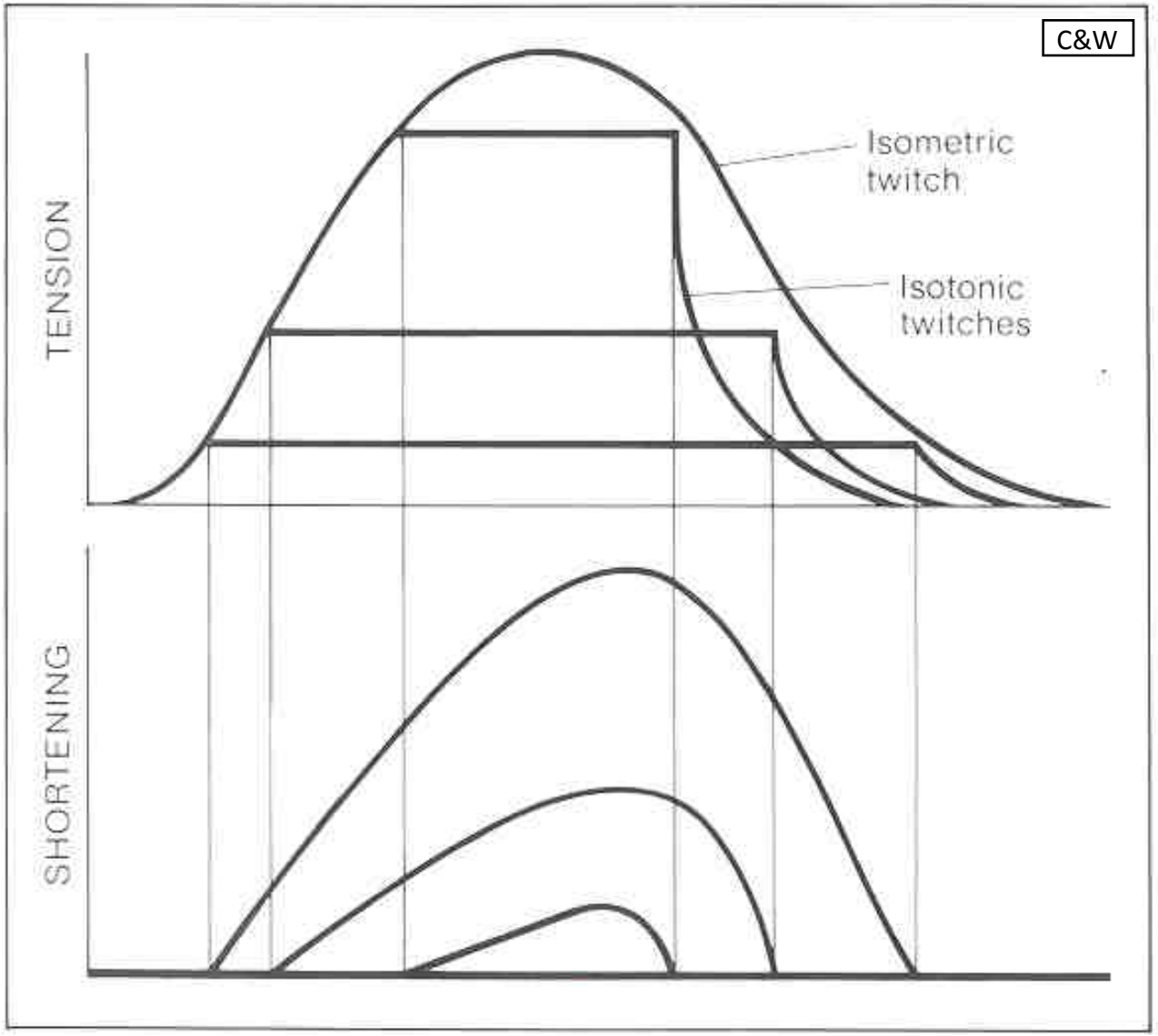
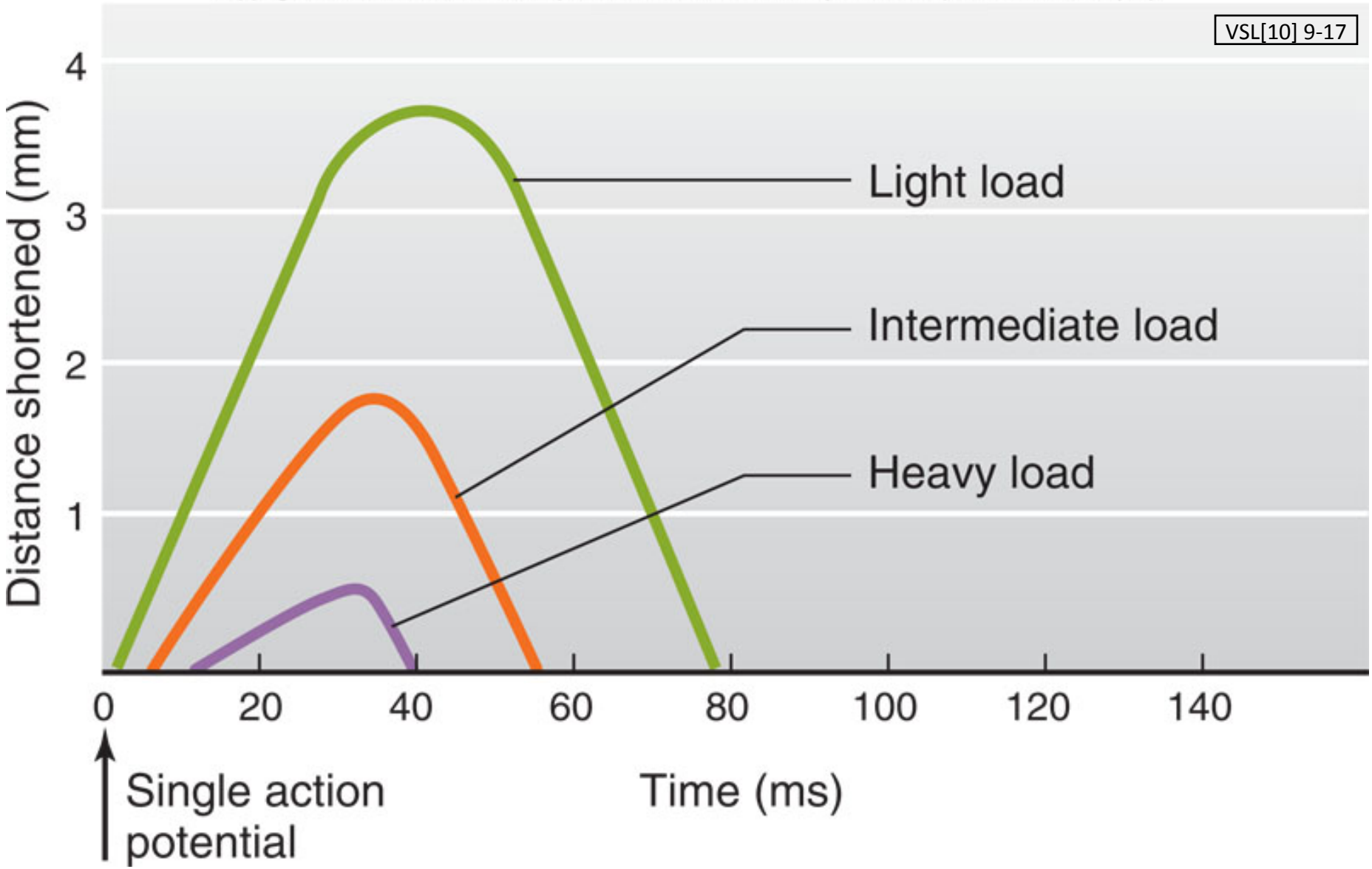
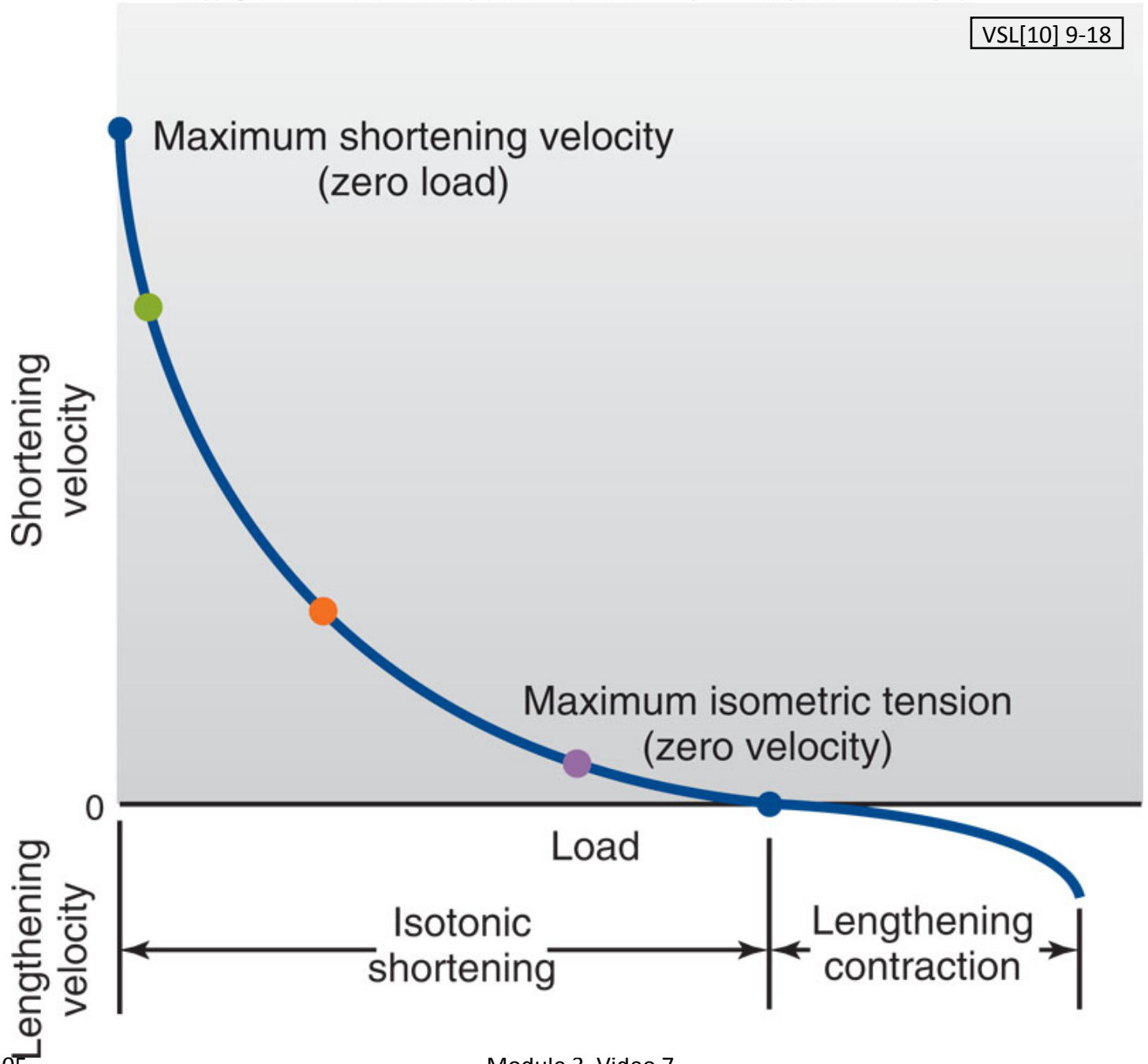


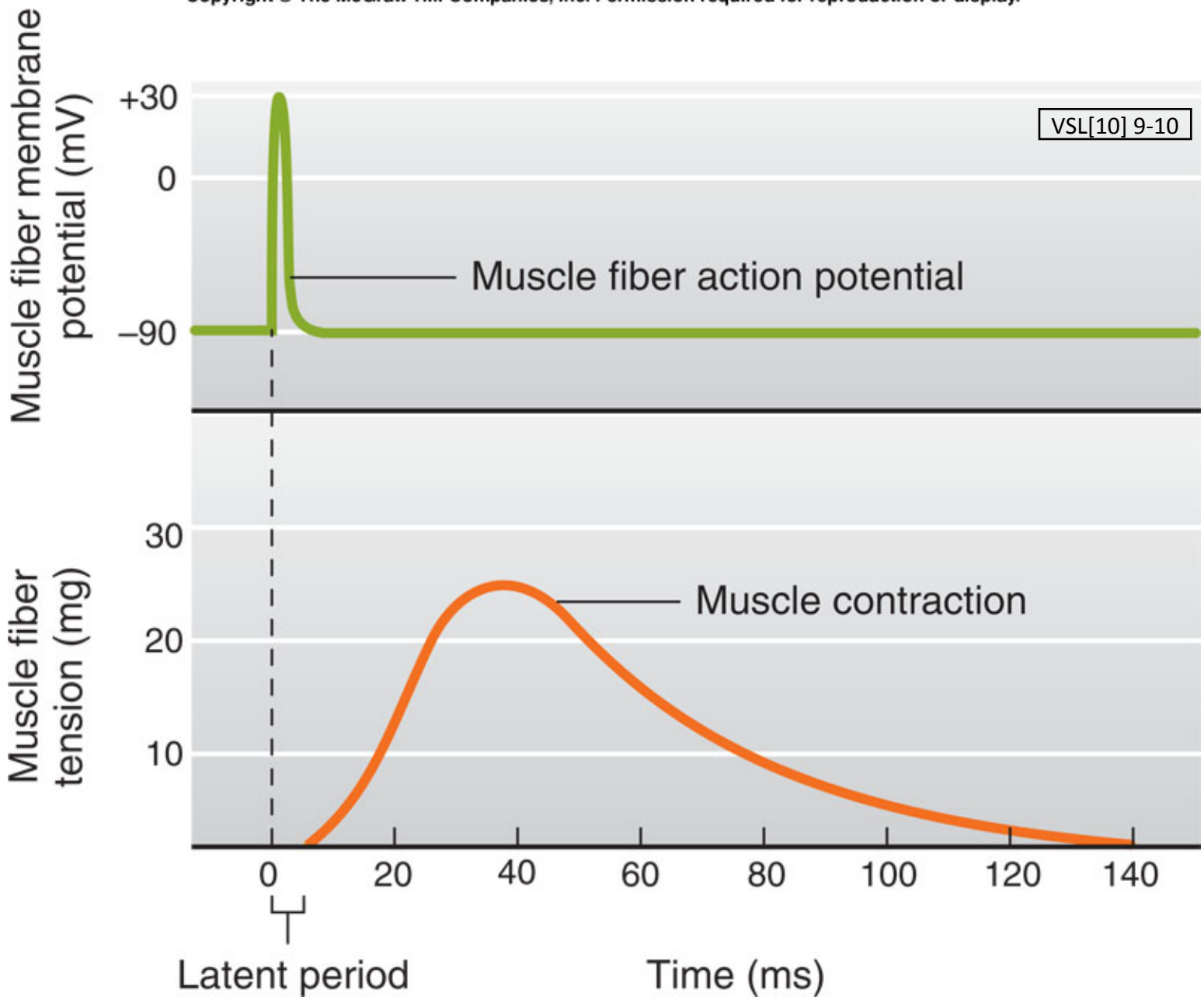
Fig. 2–8(a). Changes in length and tension recorded simultaneously, using a lever such as that shown in Fig. 2–3(c) during after-loaded isotonic twitches against various loads. [For further details, see B. R. Jewell and D. R. Wilkie (1960), *J. Physiol.*, 152, 30–47.]

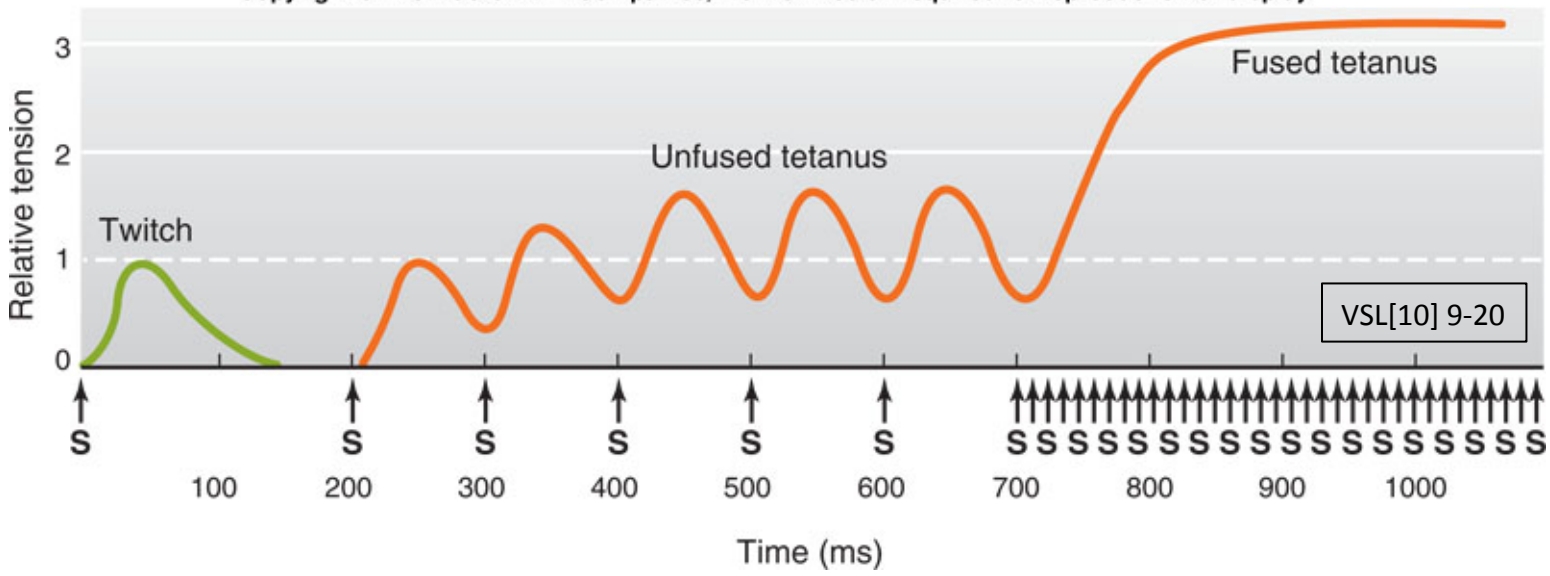
VSL[10] 9-17



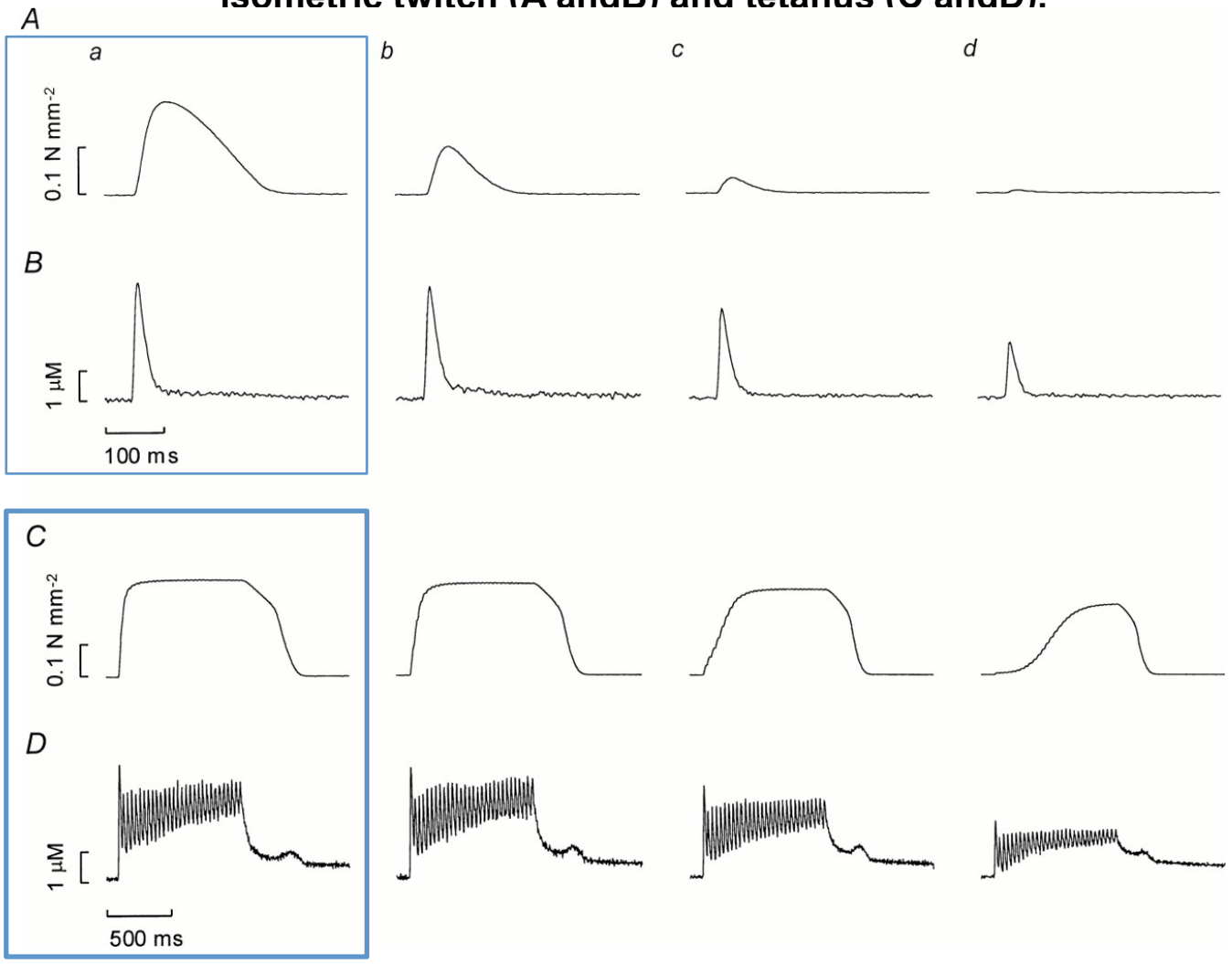
VSL[10] 9-18







Effects of EGTA on force (A andC) and Ca2+ transient (B andD) in a single muscle fiber during isometric twitch (A andB) and tetanus (C andD).



Sun Y et al. Am J Physiol Cell Physiol 1998;275:C375-C381

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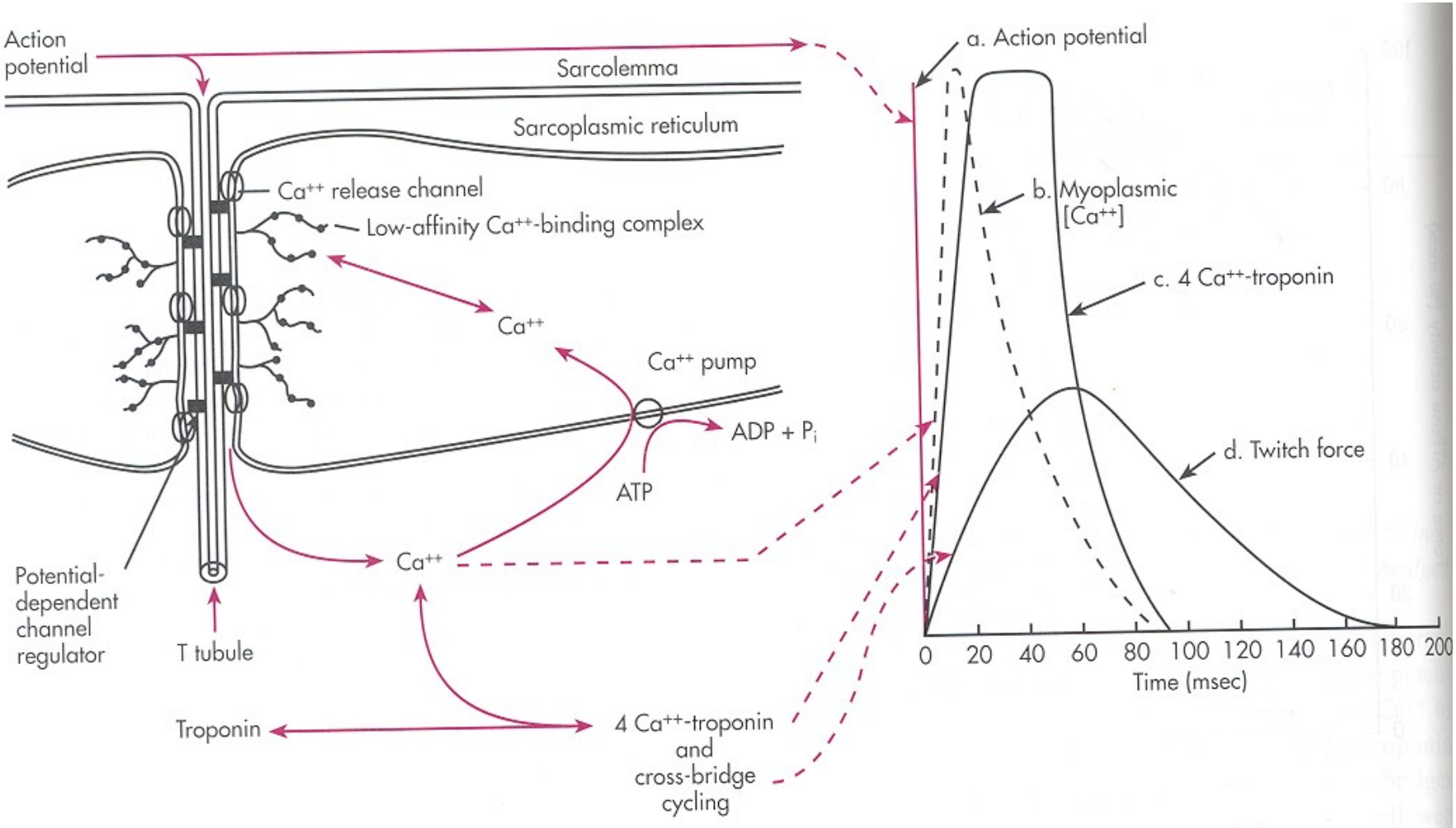
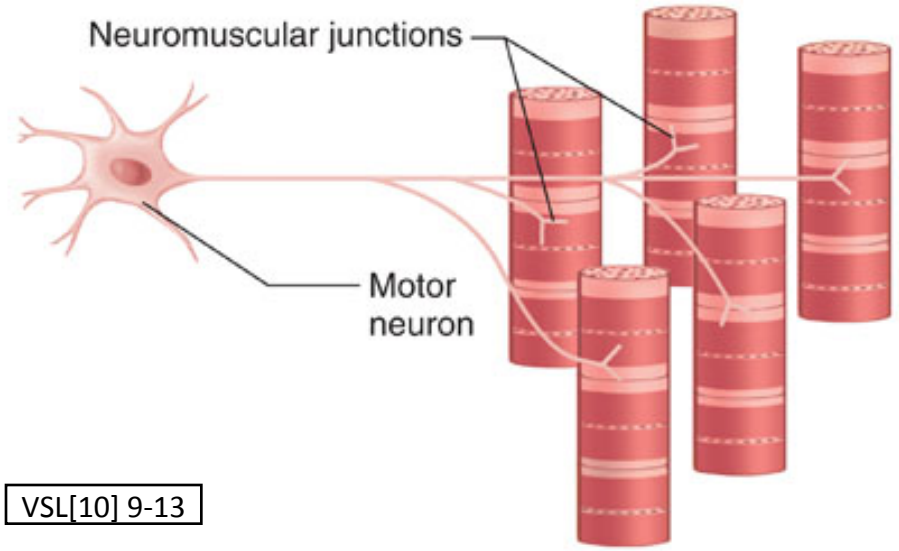


■ **Fig. 18-3** **A**, Membranes and proteins involved in the regulation of myoplasmic Ca^{++} in skeletal muscle. Action potentials propagating along the sarcolemma (**B**, *a*) depolarize T-tubular membranes containing voltage-sensitive elements that regulate the opening of Ca^{++} channels in the adjacent membranes of the sarcoplasmic reticulum. A pulse of Ca^{++} ions (**B**, *b*) diffuses out of the sarcoplasmic reticulum into the myoplasm while the channel is open. In the myoplasm, the Ca^{++} can bind to troponin (**B**, *c*) and initiate cross-bridge cycling (**B**, *d*) or to Ca^{++} pumps that return it to the sarcoplasmic reticulum where most Ca^{++} ions reversibly associate with low-affinity Ca^{++}-binding proteins.

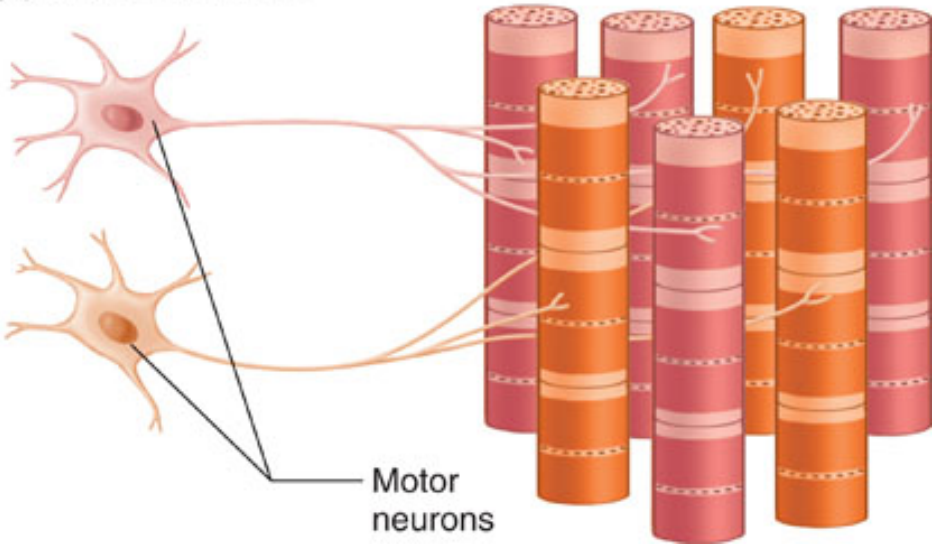
B&L[4]

(a) Single motor unit



VSL[10] 9-13

(b) Two motor units



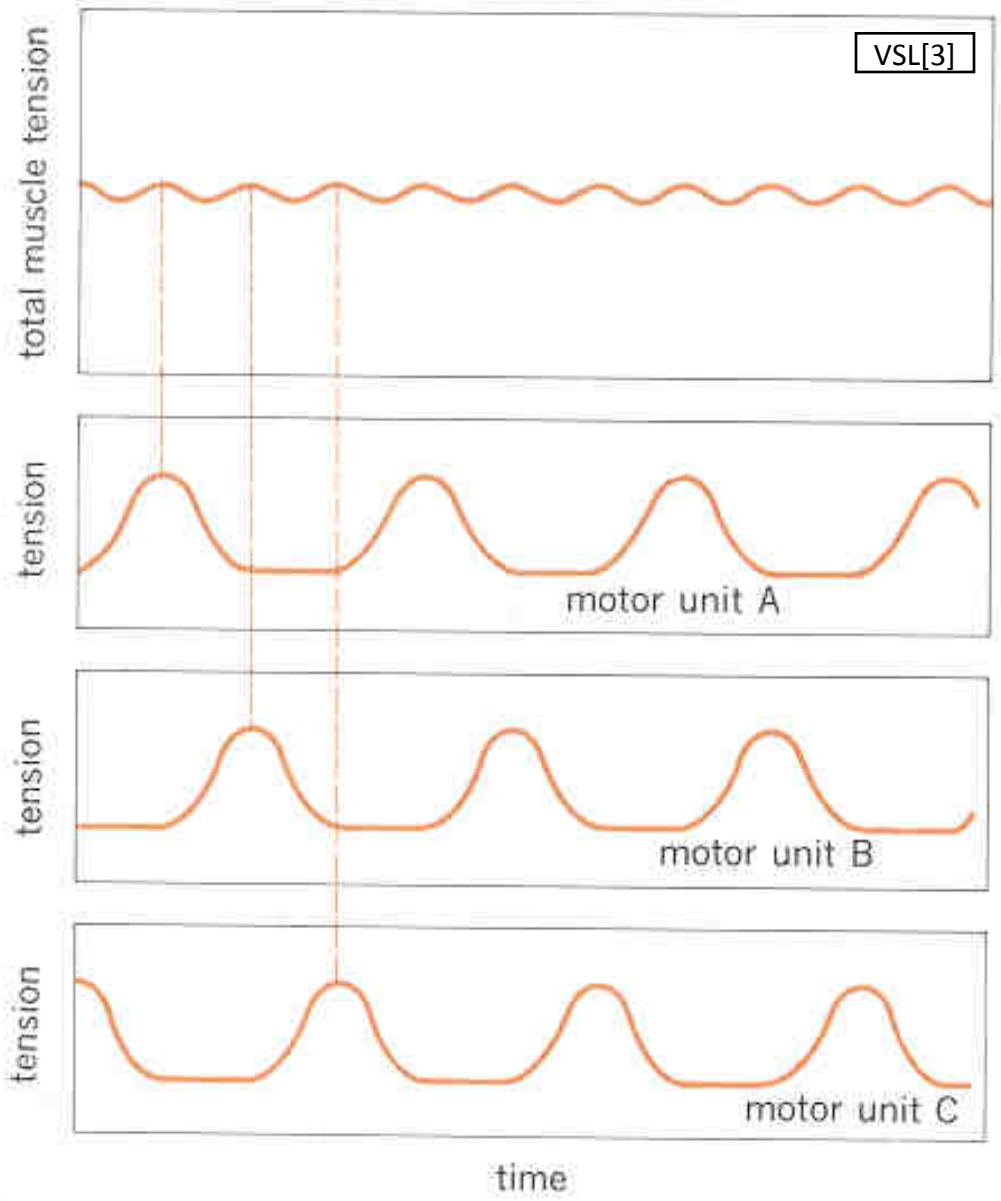


Figure 10-24. Asynchronous motor-unit activity can maintain a nearly constant tension in the total muscle.

END

Video 7, Module 3