ISOTONIC EXTENSION OF UNSTRIATED MUSCLE

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ISOTONIC extension of unstriated muscle has been described by Jordan (1929); Winton (1930, 1937); Singh (1938, 1940, 1942 a, b). Unstriated muscle when stretched gives three kinds of curves. In the first kind there is a continuous curvature throughout and there is no linear phase (Fig. 1). In the second there is a point of inflexion with the curvature now in the opposite direction, followed by another point of inflexion with the curvature returning to the original direction (Fig. 2). The third curve is intermediate between the two, there being a linear phase (Fig. 3).

In this paper the curve with the linear phase is taken as the standard curve and variations from it are discussed.

Fig. 1. Isotonic extension of Mytilus muscle
Magnification 7 times, load 19 grams
Two equations fit the time extension curves with the linear phase (Singh, 1942 a, b).

\[ x = \frac{c}{p} \left(1 - e^{-\frac{pt}{k}}\right) + At, \] (1)

where \( x \) = extension, \( t \) = time, \( c \) = constant force of the undamped spring, \( p \) = restoring force proportionate to the modulus of elasticity, \( k \) = coefficient of inner friction or viscosity, \( A \) is a constant.

\[ x = m \left(\frac{v^2}{k} - \frac{mg - T}{k^2}\right) \left(1 - e^{-\frac{kt}{m}}\right) + \frac{mg - T}{k} \cdot t, \] (2)