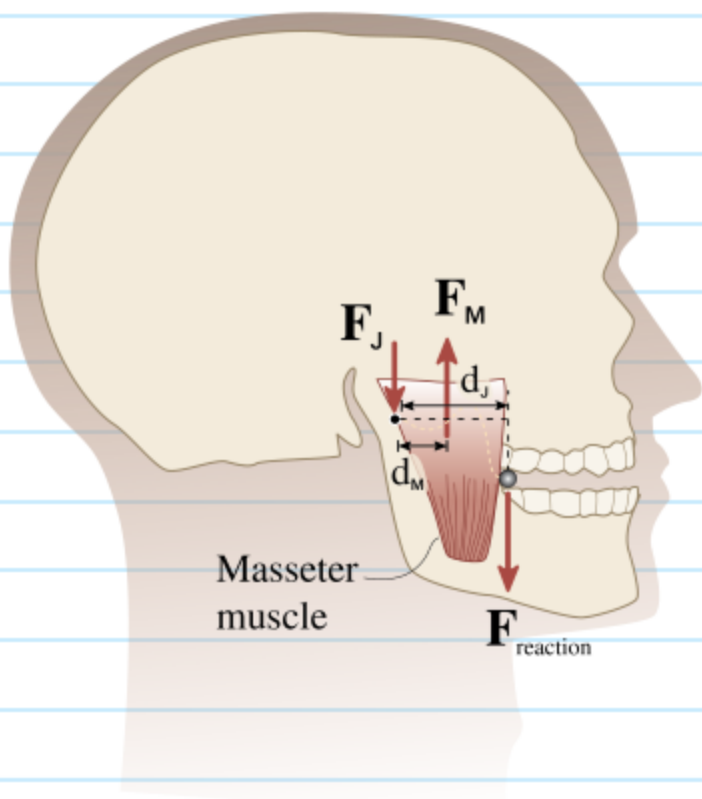


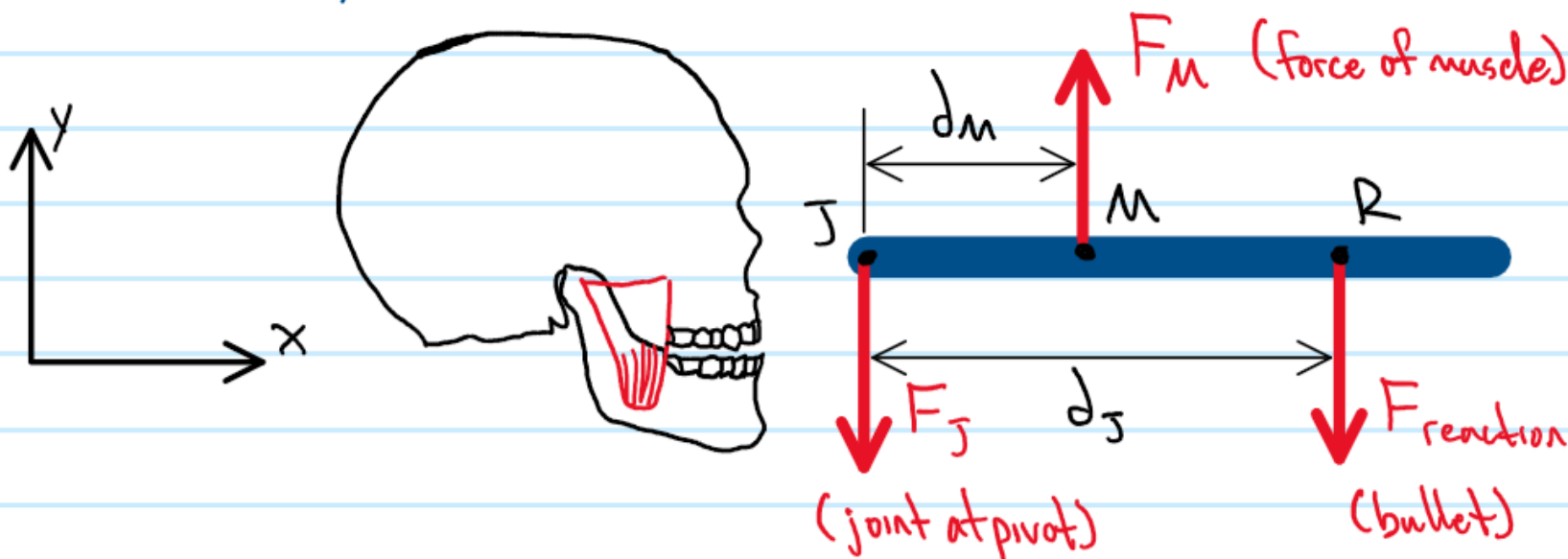
21-S-5-2-GD-001



Bite the bullet is an old expression meaning to be stoic in the face of pain. The masseter muscle in the jaw, unlike most other muscles in our bodies, is attached relatively far from the joint, enabling large forces to be exerted by the back teeth. If the masseter muscle applies a force of $F_M = 150 \text{ N}$, $d_M = 0.05 \text{ m}$, and $d_J = 0.02 \text{ m}$:

- Calculate the force exerted by the bullet on the lower jaw.
- Calculate the force on the joint, F_J .

given F_m, d_m, d_J (convert cm to m for calculations)
find F_{reaction}, F_J



$$a) +\curvearrowright \sum M_J = 0 = F_m(d_m) - F_{\text{reaction}}(d_J)$$

$$F_{\text{reaction}} = \frac{F_m(d_m)}{d_J}$$

$$b) \uparrow + \sum F_y = 0 = F_m - F_J - F_{\text{reaction}}$$

$$F_J = F_m - F_{\text{reaction}}$$