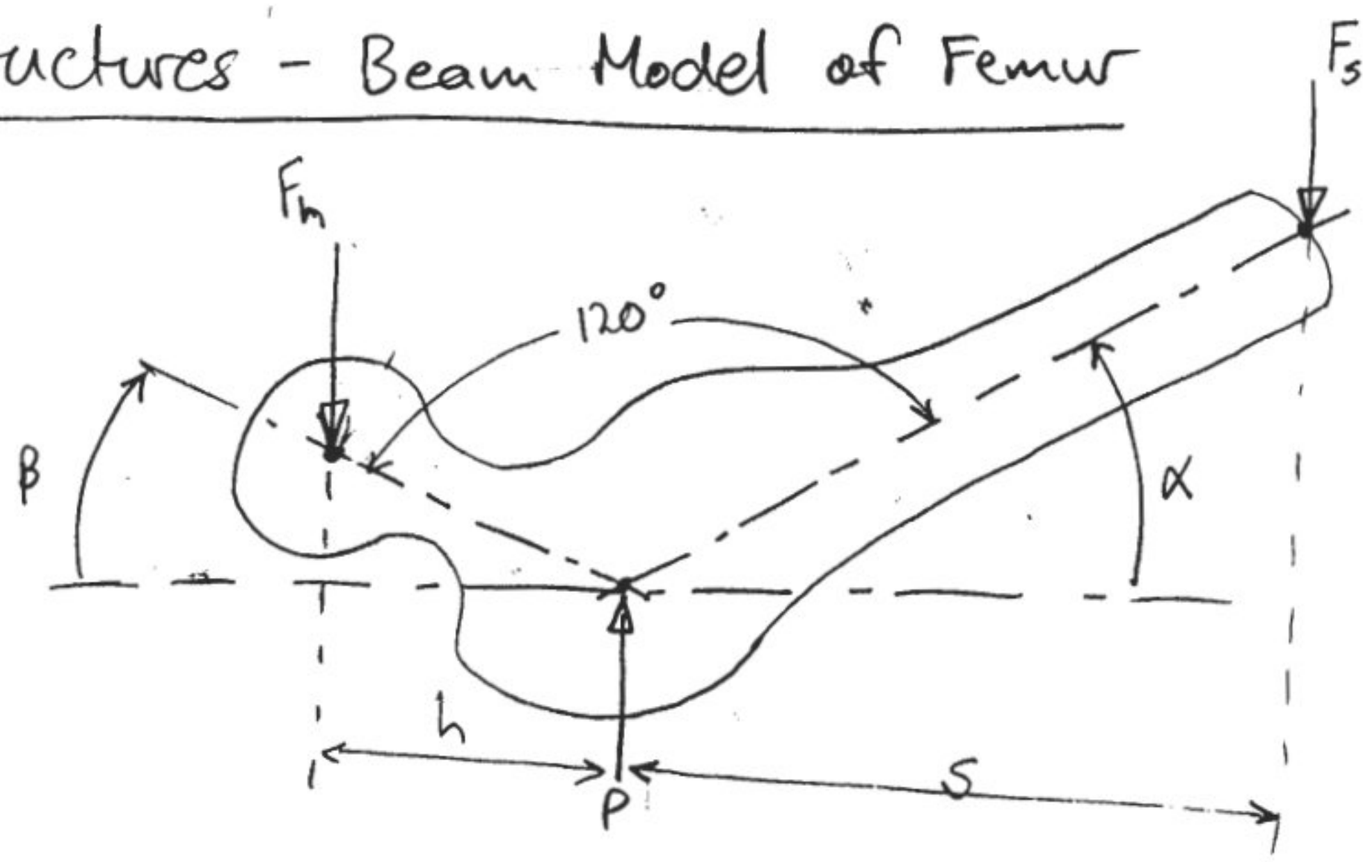
II Structures - Beam Model of Femur



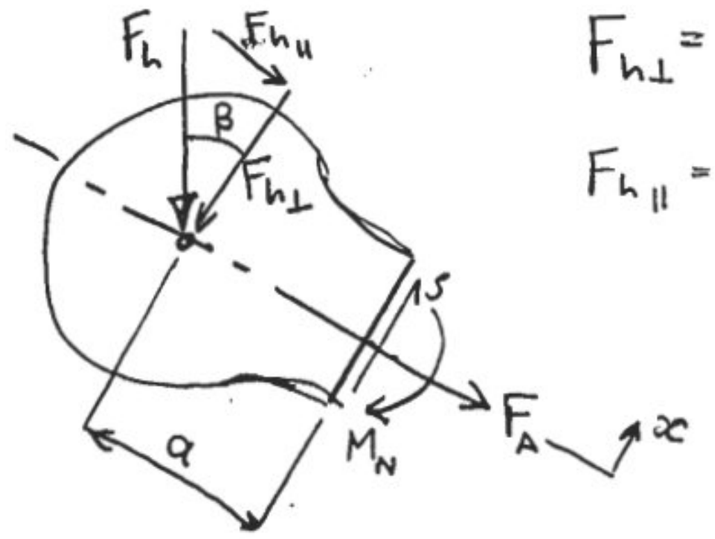
$$+\uparrow \sum F_v = 0: \quad P - F_h - F_s = 0 \qquad (1)$$

$$+\circlearrowleft \sum (M)_p = 0: \quad (F_h)h - (F_s)s = 0 \qquad (2)$$

$$(1) \rightarrow \quad F_h = P - F_s$$

$$\rightarrow (2) \rightarrow \boxed{F_s = P\left(\frac{h}{s+h}\right)}$$

$$\Rightarrow \boxed{F_h = P\left(\frac{s}{s+h}\right)}$$



$$F_{h\perp} = F_h \cos\beta$$

$$F_{h\parallel} = F_h \sin\beta$$

$$+\circlearrowleft \sum M_N = 0: \quad M_N - (F_{h\perp})a = 0 \quad \Rightarrow \boxed{M_N = P\left(\frac{as}{s+h}\right)\cos\beta}$$

$$+\rightarrow \sum F = 0: \quad F_A + F_{h\parallel} = 0 \quad \Rightarrow \boxed{F_A = -P\left(\frac{s}{s+h}\right)\sin\beta}$$