



**Supplementary figure 1** Deformation contour plots for different tested cranial configurations: (a-c) Original model, (d-f) medium-sized interpterygoid vacuities, (g-i) small interpterygoid vacuities, (j-l) closed palatal region. Different loading conditions: (a, d, g, j) unilateral bite on left side, (b, c, h, k) bilateral bite, (c, f, i, l) lateral pull to left side. Each in ventral and dorsal view. Location and size of the vacuities highlighted by stippled line.