We assessed the morphological characteristics and dimensions of the ilium and fibula to evaluate the suitability of particular areas of bone for use as donor sites for dental reconstructions that carry implants. We measured the dimensions of 130 bilaterally harvested ilium and fibula bones from 65 adult cadavers using osteometric methods, and analysed the effects of age, sex, and side. Dimensions at measuring points, overall suitability for implantation, and relations among age, sex, and side, were evaluated statistically. We report observations of bone morphology involving cross-sections, and clinical relevance. Although the mean dimensions of the fibula and iliac crest were adequate, some segments would not support an implant 10 mm long and 3.5 mm wide. The overall suitability of parts of the iliac block fell to 30%. Fibular morphology is characterised by constant height and width, and relation of cortical and cancellous bone. Bony dimensions on the iliac fossa and fibula were significantly greater in men than in women. Age had a negative impact in one area of the iliac fossa, but nowhere on the iliac crest. Side was not significant. We found differences in dimensions and morphology between measuring points on the same bone. Precise knowledge about which areas of the donor sites can reliably provide sufficient bone to carry implants after reconstructions will allow greater flexibility and safety when reconstructions are designed.