To measure the co-ordinates of the root canal orifices and to determine the incidence of mesiobuccal-2 (MB2) in maxillary first molars in a Turkish sub-population. Materials and methods. Standard digital photographs were taken under a stereomicroscope from the occlusal aspect of each tooth (n = 176) before and after crown removal. Canal orifices were negotiated under moderate magnification using dental loupes. The coordinates of the orifices and the distances of each from the central fossa were measured by using geographic software. Intensity maps of the orifice locations were created by using the co-ordinates of all canal orifices. A representative map was drawn using the mean values of orifice locations and access projection area. Results. In the right maxillary first molars, the mean values for the (X, Y) co-ordinates were (0.67, 2.68) for mesiobuccal-1 (MB1), (0.81, 0.84) for MB2, (-1.12, 1.26) for distobuccal-1 (D1), (-0.89, 0.23) for distobuccal-2 (D2) and (0, -2.50) for palatinal (P); the corresponding mean values in the left maxillary first molars were (-0.78, 2.56), (-0.98, 0.90), (0.99, 1.18), (0.69, 0.78) and (0.00, -2.53), respectively. The average MB1-MB2 distance was 1.97 mm. Distobuccal canal orifices were localized at the distal side of the center in 98.3% of teeth. The incidence of MB2 was 46.02%. Conclusions. The distobuccal canal orifice is mostly located on the distal side of the central fossa. Thus, it should be considered that the access cavity of the maxillary molars may not be always limited mesially. The incidence of MB2 in this sub-population was 46.02%, which is of great importance clinically.