

Ethnic variation in deep lateral orbital anatomy and its implications on decompression surgery

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Aim: To describe differences in the deep lateral orbital wall (specifically, trigone) between Chinese, Malay, Indian and Caucasian subjects.

Materials and Methods: Single centre retrospective Computed Tomogram (CT)-based study measuring deep lateral wall length, thickness and volume and orbital depth. 20 subjects of each ethnicity were used from existing databases, matched for gender, average age and laterality.

Subjects below 16 years of age were excluded. DICOM image viewing softwares CARESTREAM Vue PACS (Carestream Health Inc., USA) and OsiriX version 7.5 (Pixmeo., Switzerland) were used for measurements and statistical analyses performed using Statistical Package for Social Sciences version 21 (IBM, USA).

Results: In each group, there were 12 males (60%) and average age was not significantly different ($p=0.682-0.987$). Using Chinese subjects as a reference, in Chinese, Malay, Indian and Caucasian subjects, mean trigone thickness was 13.68, 14.02, 11.60 ($p<0.001$) and 13.80mm, curved total wall length 45.23, 42.29 ($p=0.048$), 41.91 ($p=0.020$) and 45.00mm, curved trigone length 23.03, 22.61, 17.19 ($p=0.011$) and 18.76mm ($p=0.030$) and trigone volume 3120.97, 3221.01, 1613.66 ($p<0.001$), 2498.46mm³ ($p=0.059$) respectively. Similarly, perpendicular orbital depth was 27.54, 24.97, 22.12 ($p=0.001$) and 25.93mm and diagonal orbital depth was 34.19, 33.27, 29.48 ($p=0.01$) and 34.63mm respectively. On further analysis, total decompression length was 24.10, 24.38, 20.79 ($p=0.020$) and 25.00mm, trigone decompression length was 17.22, 15.65, 11.88 ($p<0.001$) and the ratio of trigone decompression length/total decompression length was 0.72, 0.64, 0.57 ($p=0.002$) and 0.58 ($p<0.001$) in Chinese, Malay, Indian and Eurasian subjects respectively, as compared to Chinese subjects.

Conclusions: Indian and to a lesser extent, Caucasian subjects have smaller trigones compared to their Chinese and Malay counterparts. Indian subjects also have shallower orbits and due care should be taken during decompression surgery.