

## **Comparing soft versus bony upper airway dimensions between populations of different climates**

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Differences in airway passages lead to a multitude of different impacts on the way humans breathe. Mainly, longer, narrower, and taller pathways lead to more air turbulence compared to their smaller counterparts. This results in humidification and heating of air prior to its arrival in the lungs. Our research looked at how human airway passages differ between populations that originate from different climates. I worked with 3DSlicer 5.2.2 to orient 3D imaging of subjects' skulls (n = 41) into Frankfurt Horizontal position and interpolate them with 2D images of the soft tissues. I then plotted 12 midline landmarks including bony and soft tissue portions of the nasal cavity, nasopharynx, and oropharynx. We ran linear regressions of nasal dimensions against the functional soft tissue nasal length (external nasal tip to posterior nasopharynx). Ultimately, we found females had smaller airways compared to males, as expected given their smaller builds on average. Compared to European females, African females tended to have longer nasal cavity and nasopharynx lengths (anterior nasal spine to C1) but shorter soft-tissue nasal lengths in the nose (nasal tip to anterior nasal spine) relative to their functional soft tissue nasal length. African vs European nasal dynamics in males could not be assessed due to small sample sizes. Future studies will need to utilize a larger sample size and imaging of the laryngopharynx.