

Propositions accompanying the thesis

FROM MESH TO MEANING

COMPUTATIONAL ANALYSIS OF CRANIOFACIAL DYSMORPHOLOGIES AND SURGICAL INTERVENTIONS

by Tareq Abdel Alim

1. 3D photogrammetry's versatility positions it as a powerful non-invasive imaging modality, suitable for anthropometric measurements, and detailed analysis of the relationship between craniofacial form and treatment. (*this thesis*)
2. Diagnosing craniosynostosis before the age of six months permits the use of minimally invasive techniques that achieve cephalometric outcomes comparable to more extensive surgeries performed later, but at a reduced risk. (*this thesis*)
3. Initial findings from 3D geometric analysis of metopic synostosis advocate for further research and a critical reassessment of surgical versus conservative treatments in mild to moderate cases. (*this thesis*)
4. Kernel density estimates from skull normal vectors embed sufficient data to accurately distinguish craniosynostosis subtypes and quantify deformation severity. (*this thesis*)
5. The rise of 3D photogrammetry has led to a surge in methods for analyzing craniofacial data, highlighting the field's progress. However, these developments also introduce variability that complicates outcome interpretation and comparison across studies. (*this thesis*)
6. Over the next decade, advancements in smartphone-based photogrammetry will revolutionize the analysis and communication of visible pathologies.
7. Embracing open science drives innovation and accelerates progress by promoting shared knowledge and enhancing collaborative efforts, ultimately leading to improved patient care.
8. Future efforts should directly link objective (shape) metrics to patient well-being, prioritizing a strong correlation with enhanced quality of life over mere conformity to arbitrary norms.
9. We cannot expect or desire healthcare and research professionals to be driven by moral clarity and compassion, only to confine these virtues within the walls of our hospitals and universities.
10. "It is an aesthetic principle almost universally acknowledged among mathematicians that *the best way to solve a problem is to find an ingenious way not to have to solve it at all.*" - Paul Lockhart, *Measurement*
11. "The gravity of the battle means nothing to those at peace." - Mohammad Gawdat