Measuring Symmetry in Children With Cleft Lip. Part 3

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• Pre-processing
• Nasal Symmetry: Depth Area Difference
• Nasal Normalcy: Principle Component Analysis Reconstruction Error
• Result and comparison
Pre-processing
Nasal Symmetry: Depth Area Difference

Calculate mid-plane

Rendered 2.5D depth map

Example of a cutting plane $d_k$
Nasal Symmetry: Depth Area Difference

Subject with unpaired cleft lip

The same subject immediately after cleft lip repair

Age-matched control subject with “normal” nose
Nasal Normalcy: Principle Component Analysis Reconstruction Error

• We render 2279 normal Caucasian 3D faces into depth map and extract the first 100 PCs.

\[ S_{error} = \min_{\beta} \| \left( \bar{T} + \sum_{i=1}^{100} \beta_i t_i \right) - T_{input} \|_2^2 \]
Result and Comparison
Result and Comparison

PCA reconstruction error

- Before surgery
- After surgery
- Control LR
- Control HR