

Three-dimensional Comparative Analysis Of Bone To Soft Tissue Changes Following Box Osteotomy And Facial Bipartition For Surgical Correction Of Hypertelorism

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Background

- Orbital hypertelorism is characterized by the **excessive bony horizontal distance** between the orbits
- Correction of hypertelorism can be accomplished with **box osteotomy (BO)** or **facial bipartition (FB)**
- The **success of these procedures** hinges significantly on the manipulation of the **surrounding soft tissue**
- This study analyzed and compared the **bony and soft tissue changes** achieved with the **BO and FB**

Methods

- Retrospective cohort study evaluating patients who underwent **Bilateral BO or FB** from 2005–2024
- Correction of the **interdacryon distance (IDD)** and **intercanthal distance (ICD)** were used to quantify bony and soft tissue changes, respectively
- Three-dimensional measurements were collected by **two independent raters** twice on two different days
- Absolute and relative changes were calculated
- The ratio of **bone-to-soft tissue change** was computed by calculating the change in the ICD for *every 1-millimeter change in the IDD*
- Statistical Analysis: Pearson Correlation Coefficient, Wilcoxon Sign-Rank Test, Wilcoxon Rank-Sum Test

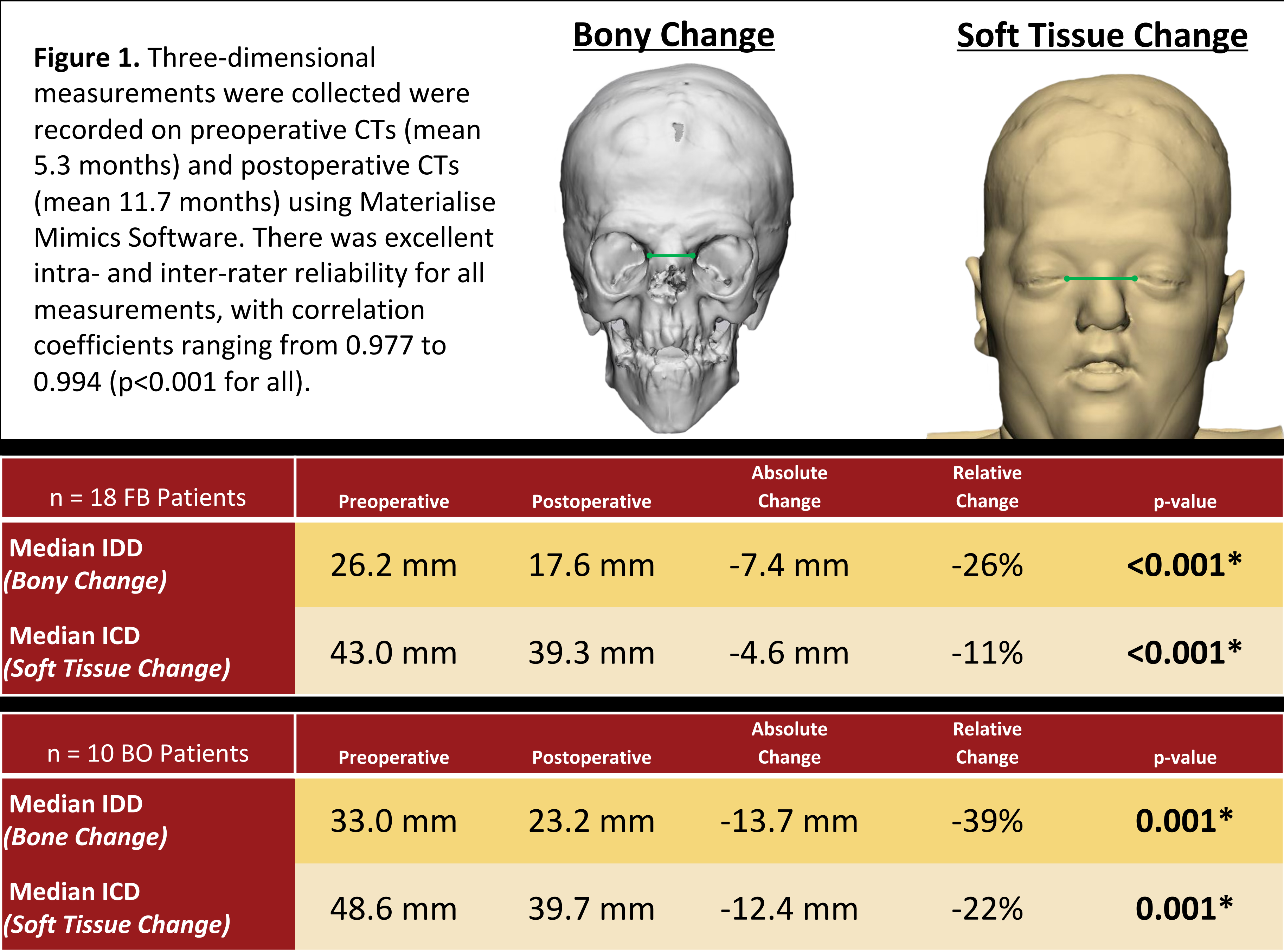
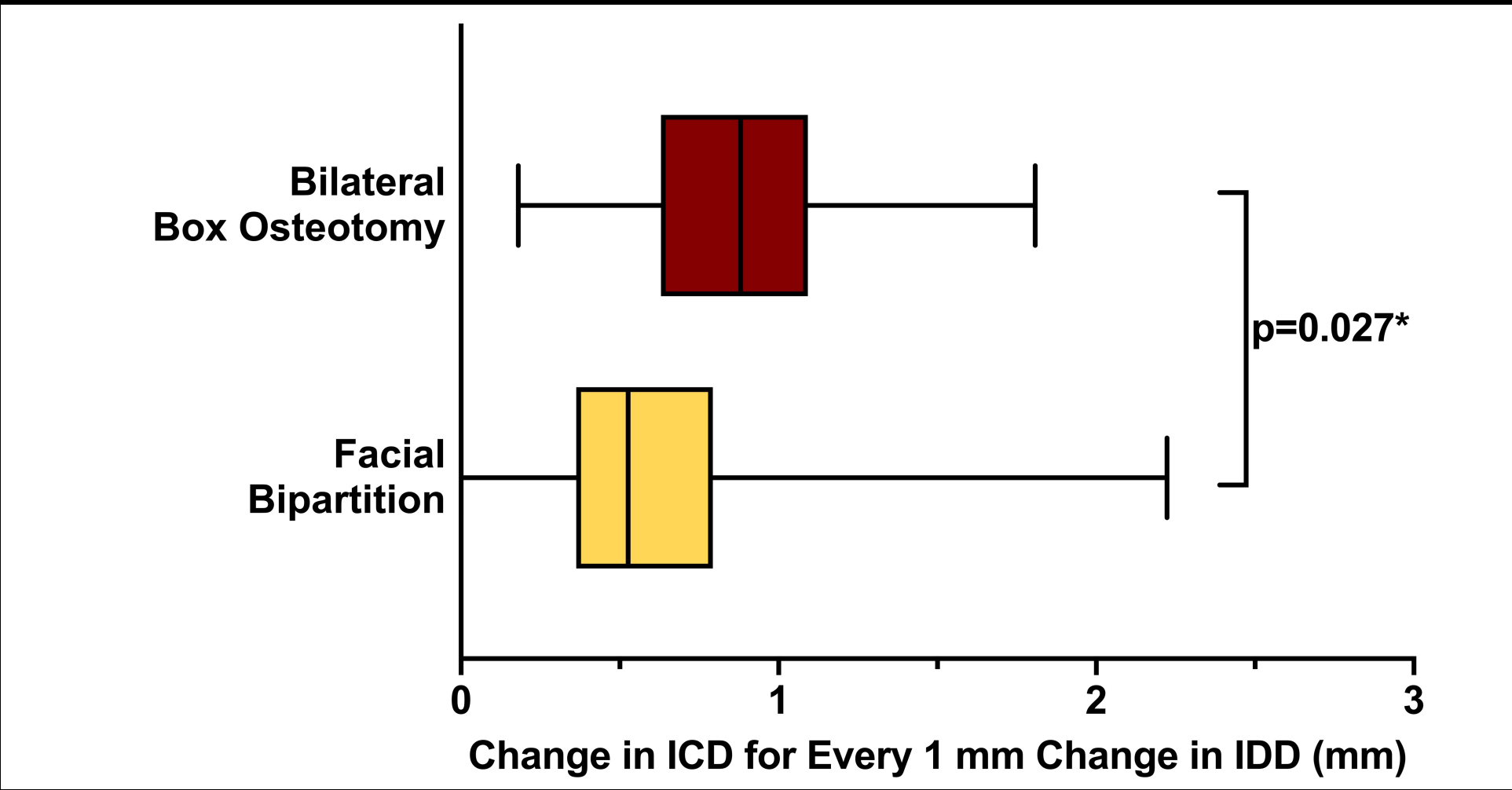


Figure 2. Bone to soft tissue change ratios between the bilateral box osteotomy and facial bipartition (1-to-0.88 vs. 1-to-0.53, $p = 0.027$)



Results

- In total, 37 cases of FB or Bilateral BO were performed
 - 28 cases** with appropriate imaging were included (**18 FB** and **10 BO**)
- Median age at surgery** for both groups were *comparable* (FB: 8.5 years vs. BO: 8.1 years, $p = 0.443$).
- Both BO and FB demonstrated significant improvement in the IDD and ICD (**$p < 0.001$ for all**).
- Compared to the FB cohort, the BO cohort demonstrated a **greater absolute change in the IDD** (13.7 mm vs. 7.4 mm, $p = 0.014$) and **ICD** (12.4 mm vs. 4.7 mm, $p = 0.003$).
- When controlling for preoperative severity, the BO cohort still demonstrated a **significantly greater relative change** compared to FB **for both IDD** (39% vs. 26%, $p = 0.003$) and **ICD** (22% vs. 11%, $p = 0.008$).
- The **bone-to-soft tissue change ratio** was *significantly larger* in the BO cohort (**1-to-0.88**) compared to the FB cohort (**1-to-0.53**, $p = 0.027$).

Conclusion

- BO and FB effectively correct orbital hypertelorism, demonstrating **significant bone and soft tissue changes**
- BO demonstrated a **higher degree of soft tissue change** for every mm of interorbital bone resected compared to FB
- Both techniques are powerful operations that can be performed safely in a tertiary setting by craniofacial surgeons