RESULTS: A total of 201 patients with 224 orbital fractures (11.4% bilateral) were included. The mean age at injury was 50.5 ± 25.2 years; 21.9% of patients had an associated neurologic injury at the time of ED evaluation. The most common mechanisms of injury were mechanical fall (41%), occupational injuries (26.9%), and motor vehicle accident (25%). The posterior segment of the eye was most affected (16.1%), followed by the anterior segment (13.4%) and ocular adnexa (13.4%). A significant ocular injury was present in 21.9% of orbital fractures. These included choroidal hemorrhage (6.1%), hyphema (5.4%), retinal hemorrhage (4.5%), retrobulbar hematoma (4%), globe rupture (4%), choroidal hemorrhage (1.4%), retinal detachment (1.3%), corneal laceration (0.9%), choroidal rupture (0.4%), macular hemorrhage (0.6%), and retinal tear (0.4%). The mechanism of injury was not associated with an increased risk for a serious ocular injury. The most common ophthalmologic findings on examination were diplopia (30.4%), reduced extraocular movement (9.8%), and periorbital laceration (8.9%). Of all patients, 53.1% presented with one orbital wall fracture, of which, the orbital floor was the most commonly involved (44.2%). Associated facial fractures were found in 68.8% of patients. Computed tomography scans showed displaced fracture in 44.6% of orbits, comminution in 45.3% and herniation of orbital contents in 42.9%. On multiple variable analysis, motor vehicle accident (OR = 2.5 [1.4–4.7], \(P = 0.003\)) and injury to the posterior segment (OR = 2.6 [1.2–5.8], \(P = 0.045\)) were associated with the need of surgical treatment. However, injury to the anterior segment (OR = 3.4 [1.5–8.0], \(P = 0.028\)) and ocular adnexa (4.0 [1.6–10.1], \(P = 0.002\)) were associated with the need of medical treatment alone.

CONCLUSIONS: Our retrospective series demonstrated a 22% incidence of ocular trauma in orbital fractures. There were no association between mechanism of injury and serious ocular trauma. This emphasizes that the management of orbital traumas requires a multidisciplinary approach, including the facial trauma team and ophthalmology.

Optical Coherence Tomography for Assessment of Elevated Intracranial Pressure in Sagittal Craniosynostosis

Presenter: Christopher Kalmar, MD, MBA

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Retinal parameter measurements demonstrated ICP < 20 mm Hg in 91.4% (n = 32 of 35) patients aged < 6 months. Compared with these children, significantly fewer patients were in the age of 6–12 months (54.5%, n = 6 of 11, \( P = 0.013 \)), and those aged ≥ 12 months (53.8%, n = 14 of 26, \( P = 0.001 \)) had ICP < 20 mm Hg.

Directly measured intracranial pressure was inversely correlated to the cephalic index (\( P = 0.009 \)) such that patients with more severe scaphocephaly had a higher intracranial pressure.

CONCLUSIONS: The vast majority of patients undergoing early intervention for sagittal craniosynostosis do not have elevated intracranial pressure by OCT measurement, whereas those older than 6 months of age have a significantly higher incidence of elevated intracranial pressure.

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High Fidelity Cleft Lip Simulation Improves Performance and Self-confidence

**Presenter:** Carolyn Rogers-Vizena, MD

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**BACKGROUND:** High fidelity simulation has a growing role in education of plastic surgery trainees, particularly for cleft lip and palate repair. To this end, we developed a haptically accurate cleft lip simulator through collaboration among surgeons, engineers, and special effects experts. But despite good intentions, whether high fidelity simulation results in actual performance improvement and whether that improvement is sustained over time have not been demonstrated. This study tests the hypothesis that cleft lip simulation followed by structured debriefing improves objective performance and self-confidence and that gains persist over time.

**METHODS/DESCRIPTION:** Trainees performed an initial uncoached cleft lip repair on a high fidelity simulator followed by structured debriefing (plus/delta format). Afterward, they performed a second cleft lip repair to apply information discussed. Participants returned 3 months later for a third and final simulation. Procedural videos were blindly rated using the modified Objective Structured Assessment of Technical Skills (OSATS; score range 4–20) and the Unilateral Cleft Lip Repair Competency Assessment Tool (UCLR; score range 18–54). Influence of training level on score was estimated using Pearson R. Self-assessed performance was measured with a previously published scale (score range 6–24) and procedural self-confidence was measured with a validated tool (score range 6–30), both administered at the completion of simulation but before debriefing.

**RESULTS:** Twenty-six individuals participated. Training levels included Integrated PGY 3 (n = 4), Integrated PGY 4/Independent PGY 6 (n = 4), Integrated PGY 5/Independent PGY 7 (n = 8), Integrated PGY 6/Independent PGY 8 (n = 5), and craniofacial fellow (n = 5). Twenty participants (77%) returned for follow up.

Mean OSATS score increased from 15.8 ± 3.0 for the first simulation to 17.4 ± 2.0 for the second simulation and decreased slightly to 16.9 ± 2.0 for the third simulation. Mean UCLR score increased from 42.7 ± 7.4 for the first simulation to 47.3 ± 5.6 for the second simulation and was sustained at 47.6 ± 4.8 for the third simulation. Although training level moderately correlated with OSATS (\( r = 0.454, P = 0.020 \)) and UCLR (\( r = 0.550, P = 0.004 \)) for the first simulation, that correlation deteriorated with the second and third simulations.

Mean self-assessment score increased from 13.0 ± 3.8 after the first simulation to 17.0 ± 2.4 after the second simulation and further increased to 18.7 ± 2.2 after the third simulation. Mean self-confidence score increased from 15.6 ± 3.6 after the first simulation to 19.9 ± 3.2 after the second simulation and further increased to 21.4 ± 4.0 after the third simulation.

**CONCLUSIONS:** Both objective trainee performance and subjective self-assessment and self-confidence improve with high-fidelity simulation, and that improvement is sustained over time. Moreover, initial differences in performance seen with increasing training level resolve with the combination of simulation plus structured debriefing. This suggests that