

Dedicated High-Resolution Maxillo-Facial Computed Tomography in Determining the Operative Management of Facial Trauma Patients: Is It Necessary?

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Purpose: Computed tomography (CT) is invaluable in the diagnosis of craniofacial pathology. For trauma patients, CT head (CTH) scans obtained to assess intracranial injury may reveal facial fractures.¹ Patients without simultaneous CT maxillo-facial (CTMF) scans often undergo additional imaging to fully characterize the fractures, increasing exposure to ionizing radiation.¹ The aim of this study was to evaluate differences in fracture identification between CTH and CTMF scans at a Level One Trauma Center, and to assess if CTMF scans are necessary in determining operative management of patients.

Methods: Retrospective chart review was performed of all patients presenting with facial trauma between January 2009 to May 2019. Demographics and injury mechanism were collected. CTH and CTMF scans were reviewed, fractures were identified, and operative status was assessed by predetermined radiographic criteria. Fractures were categorized as skull, frontal sinus, orbital, nasal, naso-orbito-ethmoid, zygoma, maxilla, or mandible. Differences in fractures identified by each scan were compared to determine if management changed between CTH and CTMF. It was also recorded whether the patient underwent CTH and CTMF simultaneously or as separate scans. Univariate analysis was performed using paired t-tests and Chi square tests.

Results: 1215 patients presented with facial trauma. Every year the number of facial trauma activations increased. The most common injury mechanism was motor vehicle accident (32%). 899 patients had both CTH and CTMF. CTMF identified 28% more fractures than CTH ($p < 0.001$); specifically, more frontal sinus, orbital, nasal, naso-orbito-ethmoid, zygoma, maxilla, and mandible fractures ($p < 0.001$, Figure 1). Additional findings seen on CTMF delegated change in operative plan in 26% ($n = 231$) of cases. Duplicate imaging occurred in 20% of patients, translating to potential cost savings of \$260,000 if both scans were ordered simultaneously.

Conclusions: This study represents the largest direct comparison of CTH and CTMF in identifying facial fractures. CTMF is unsurprisingly superior in identifying all

facial fractures except skull fractures. This difference results in meaningful change in operative management. We propose certain imaging guidelines for providers to triage patients presenting with facial fractures to limit radiation exposure, control costs, and avoid delays in care (Figure 2).

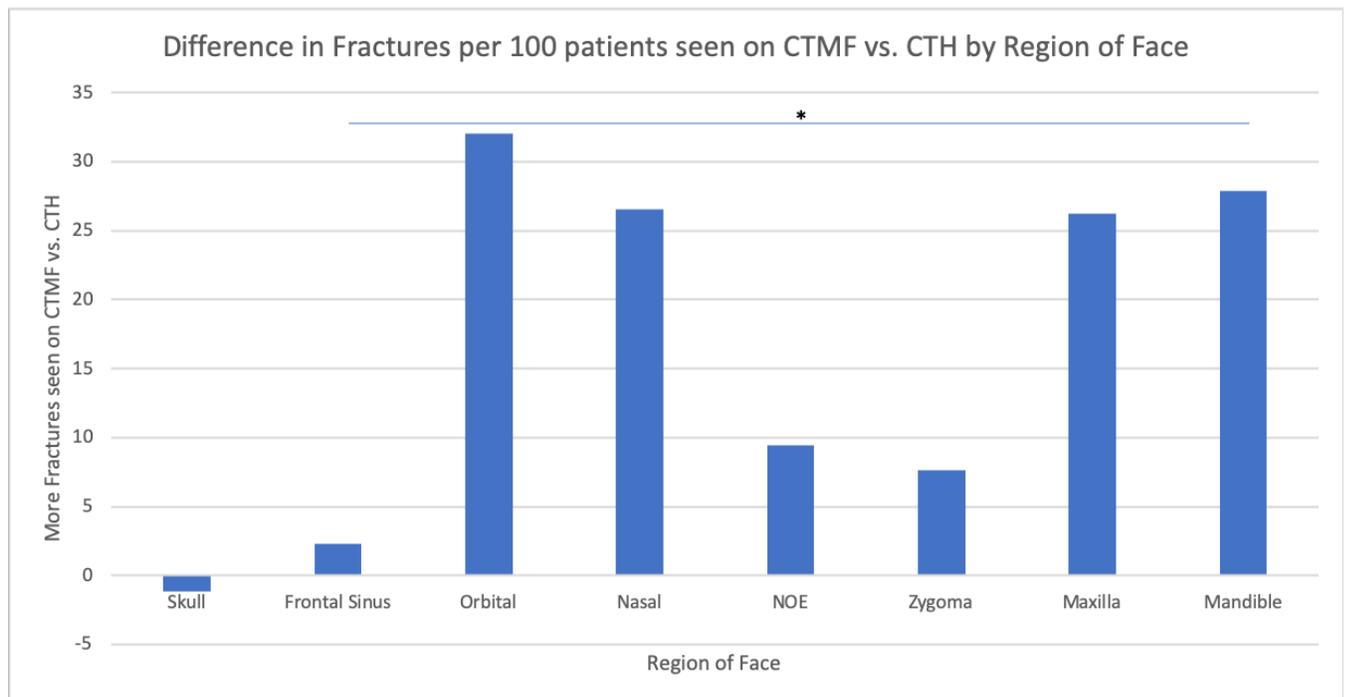


Figure 1. Differences in fractures identified on CTMF vs. CTH, organized by region of face. * indicates $p < 0.001$.

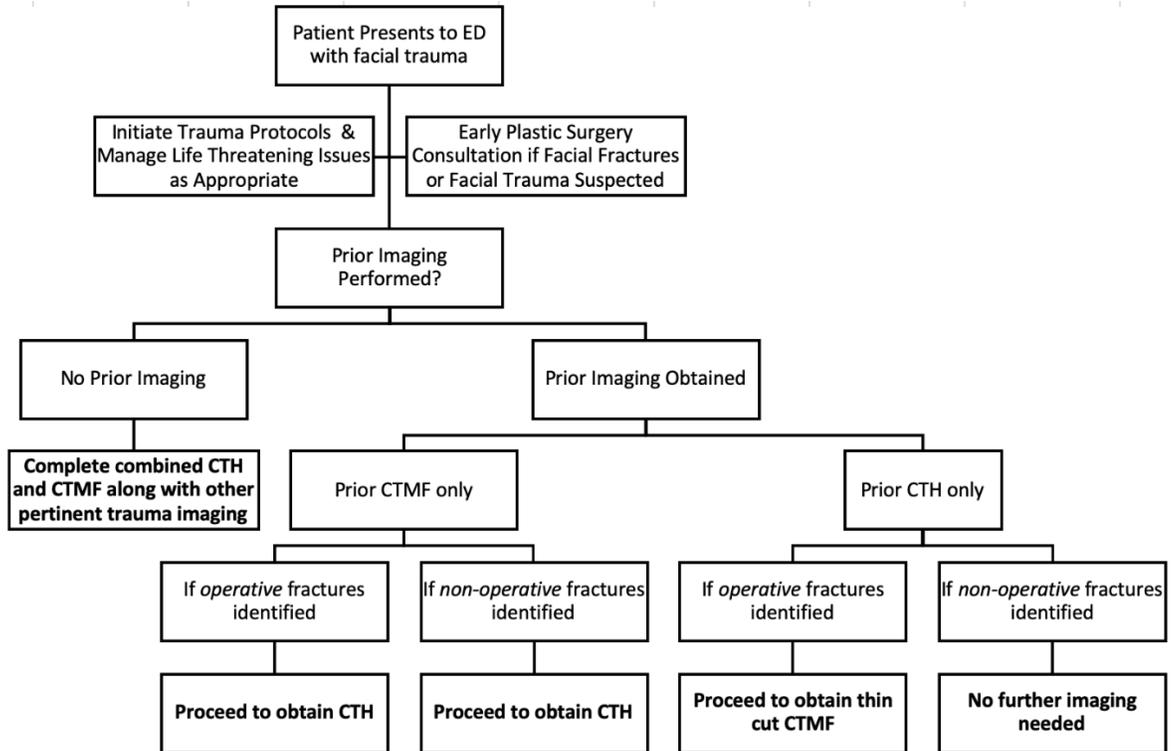


Figure 2. Proposed guidelines on imaging for presenting facial trauma patients.

References

1. Ricci, J.A., et al., *Comparing Head and Facial Computed Tomographic Imaging in Identifying Operative Facial Fractures*. *Ann Plast Surg*, 2018. **80**(4 Suppl 4): p. S219-S222.