MIXED VERSUS CLASSIC LE FORT FRACTURE PATTERNS: OPERATIVE BURDEN AND OCCLUSAL OUTCOMES IN 72 PATIENTS

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Abstract: This retrospective cohort study evaluated whether classic and mixed Le Fort fracture patterns differ in surgical complexity and outcomes. Among 72 adults undergoing occlusion-guided ORIF, mixed fractures were substantially more common than classic symmetrical patterns (79.2% vs 20.8%). Mixed fractures required significantly longer operative time, more frequent postoperative intermaxillary fixation, and longer hospital stays. However, three-month malocclusion rates were low and similar between groups. These findings indicate that CT-defined mixed Le Fort patterns increase treatment burden but can achieve comparable occlusal outcomes when managed with careful occlusion-guided reduction and selective IMF.

Keywords: Le Fort fracture; midface; computed tomography; internal fixation; intermaxillary fixation; malocclusion; maxillofacial trauma.

Introduction. Le Fort fractures are high-energy midfacial injuries, yet recent computed tomography (CT) studies show that ideal symmetrical Le Fort lines occur in fewer than 10% of patients [1]. Le Fort I is the most frequent subtype and typically affects working-age men [2]. Mixed and incomplete patterns may complicate reduction and increase reliance on intermaxillary fixation (IMF) [3, 4]. This study aimed to compare operative burden and clinical outcomes between classic and mixed Le Fort fracture patterns.

Methods. A retrospective cohort design was applied to 72 adults treated with occlusion-guided open reduction and internal fixation (ORIF) using titanium miniplates at the Department of Maxillofacial Surgery. Fractures were classified on CT as classic (symmetrical, bilateral, single-level) or mixed (asymmetrical, unilateral, incomplete or multilevel). Outcomes were operative time, postoperative IMF, concomitant orbital fracture, hospital stay and malocclusion at three months. Groups were compared with Fisher's exact test and Welch's t-test; $p < 0.05$ was considered significant.

Results. The mean age was 34.4 ± 11.2 years; 61 patients (84.7%) were men, and road traffic accidents caused 46 injuries (63.9%). Mixed patterns were found in 57 patients (79.2%) and classic patterns in 15 (20.8%). Compared with classic fractures, mixed fractures required longer operations (170.6 ± 27.5 vs 132.9 ± 24.3 min; $p < 0.001$), more frequent postoperative IMF (27/57, 47.4% vs 0/15; $p = 0.001$) and longer hospital stay (8.6 ± 3.1 vs 6.9 ± 1.3 days; $p = 0.002$). Concomitant orbital fractures occurred in 22.8% and 6.7%, respectively ($p = 0.273$). Malocclusion at three months was recorded in 7 patients (9.7%), with no significant difference between groups (10.5% vs 6.7%; $p > 0.99$).

Discussion. Mixed patterns predominated, in agreement with CT-based evidence from high-energy trauma [1] and national data showing frequent concomitant midfacial fractures [5]. Although mixed fractures increased operative time, IMF use and hospital stay, final occlusal outcomes were comparable, supporting occlusion-driven reduction with selective IMF [4, 6] and acute Le Fort I osteotomy when passive reduction fails [3]. Concomitant condylar injury should be excluded, as it is a key driver of

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malocclusion [7]. CT-based pattern analysis, rather than the Le Fort label alone, should guide surgical planning and resource allocation.

Conclusion

Mixed Le Fort fracture patterns were more common than classic symmetrical fractures and were associated with greater operative complexity, including longer operative time, increased postoperative intermaxillary fixation use, and prolonged hospitalization. Despite this higher treatment burden, occlusion-guided open reduction and internal fixation achieved comparable three-month occlusal outcomes in both groups. Therefore, CT-based assessment of fracture morphology should complement traditional Le Fort classification to improve surgical planning, anticipate resource needs, and guide selective use of postoperative IMF.

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