Computer Assisted Reconstruction of Unilateral Zygomatico-Maxillary Complex Fracture

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LIST OF ABBREVIATIONS

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2D	Two dimensional
3D	Three dimensional
ZMC	Zygomatico Maxillary Complex
ZA	Zygomatic Arch
CMF	Craniomaxillofacial
CT	computed tomography
MRI	Magnetic resonance imaging
CBCT	Cone beam computed tomography
CAS	Computer assisted surgery
CS	Conventional surgery
ASPRS	American Society of Plastic and Reconstructive Surgery
ANOVA	Analysis of variance
LSD	Least significant difference
CAD/CAM	Computer aided design/ computer aided manfacture.
DICOM	Digital Imaging and Communication In medicine
No.	Number
AST	Aspartate Transaminase

ALT	Alanine Transaminase
PT	Prothrombin Time
PC	prothrombin concentration
PTT	Partial Thromboplastin time
INR	International Normalized Ratio
STL	Stereolithographic
NOE	Naso- Orbito –Ethmoidal

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INTRODUCTION

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The zygomatic maxillary complex is the second most frequently fractured area of the craniofacial skeleton.[1] Typically, the entire complex is separated from its adjoining articulations.

This fracture has several clinically important consequences. First, it disrupts the normal, symmetrical position of the malar Prominence and causes significant facial deformity. [2] Second, it enlarges the volume of the bony orbit and results in enophthalmos and ocular globe dystopia.[3] Third, it interrupts the infraorbital canal and causes dysfunction of the infraorbital nerve. Consequently, precise reconstruction of the orbitozygomatic complex is essential to restore these deficits.

Early diagnosis and treatment offers the best opportunity to restore the pre injury structural relationships. [4]

Concomitant life-threatening injuries, misdiagnoses, or inadequate initial treatment can lead to delay in repair and secondary complications that usually require more complex methods of management. Planning of such cases is mainly dependant on clinical and radiographic findings, including those presented as three dimensional (3D) radiographic in computerized tomography (CT) scan.

The conventional techniques depend only on surgeons experience and a "mind's-eye view" to reconstruct the skeletal symmetry. The introduction of computer-aided surgical navigation systems and computer aided design & computer aided manufacturing (CAD/CAM) softwares has offered additional tools to assist the surgeon with accurate facial symmetric reconstruction.[5]

Computer assisted techniques had provided surgeons with an opportunity to perform virtual manipulations of CT datasets preoperatively and transfer the preoperative plane to the operating room.[6]

These techniques should be accurate in demonstrating ZMC fracture anatomy and it may help in the restoration of perinjury facial symmetry in unilateral ZMC fracture cases.