Introduction: Zygoma is most prominent portion of face and it is easily injured by trauma. Since 1927 when Sir Gillies announced the importance of malar prominency and introduced the closed reduction by "Gillies' approach", numerous methods to treat the zygomatic arch fractures were introduced. There are numerous reports about zygomatic arch reduction, however, there are no well organized classification and treatment algorithms. In the article, we reviewed our experienced cases and made a fracture type classification according to injury vector and surgical approach. Also, we analyzed the epidemiology of zygoma fracture for prevention strategy and for proper comprehension about zygoma fracture.

Methods: We retrospectively reviewed 424 patient's zygomatic arch view and facial bone CT who visit from 2007 to 2010 with zygomaticomaxillary fracture. In 424 patients, 113 cases were purely maxillary fracture patients without zygomatic arch fracture. Except the pure maxillary fracture cases, 311 zygomatic arch or zygomaticomaxillary fractures are analyzed. We collected the patient's data by the clinical chart review. Patient's data includes age, sex, causes of trauma. Statistical analysis was done by Chi-square analysis.

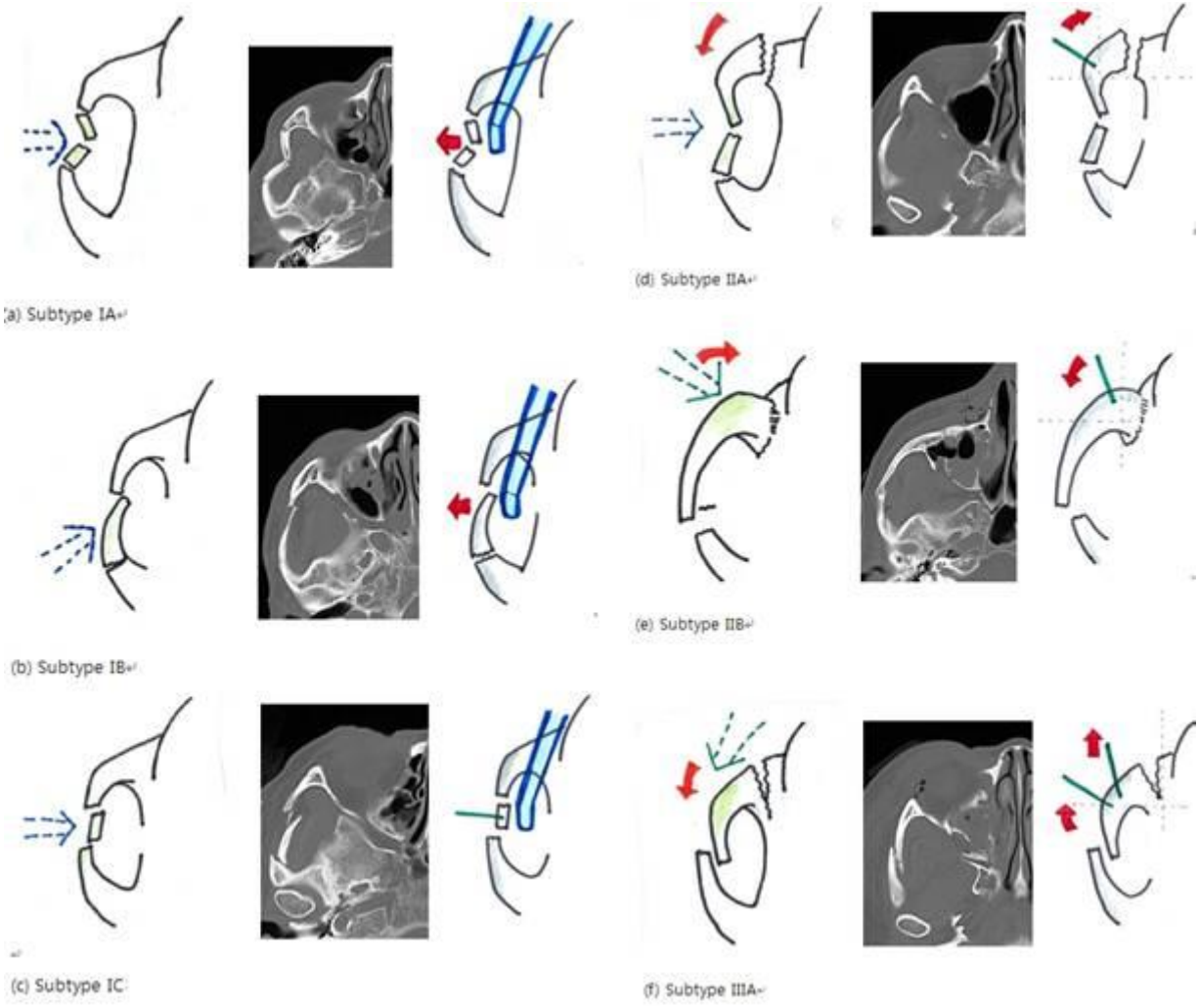

Figure 1. Zygomatic arch fracture classification and it's reduction

(Blue dotted arrow: trauma force, Red arrow: rotation vector,
Green line : inserted K-wire on zygoma segment
Blue device : Dingman elevator)

Results: Type I fractures are reducted with only Gillies' approach. In subgroup of type I, type IC is most difficult fracture. Usually, the middle bone segment of type IC is unstable after the Gillies' operation. Unstable fracture segments were sustained with K-wire suspension.
Type II, III fractures were developed by two vector of trauma and were rotated. Type II fractures were easily reducted with K-wired that is inserted on zygomatic body. After insert the double threaded 016 K-wire on zygomatic body, we reducted the whole zygomatic body with spin movement. Type III was more difficult fracture type. In these type fracture, with the K-wire reduction, elevation action of Dingman elevator through the Gillies' incision was needed.
After the reduction, no internal fixation was applied directly on the zygomatic arch. In type II or III fracture, internal fixation was performed on lateral buttress or inferior orbital rim as necessary. Only in ustable fracture of type IC, K-wire suspension was done during 3 weeks after reduction.

Conclusions: Except the communited type zygomatic arch fracture, mostly zygomatic arch fractures were reducted and sustained with closed approach. Only the Gillies' approach or K-wire reduction, almost zygomatic arch fractures were reducted stably. When we approach the zygomatic arch fracture cautiously, we can obtain good results without open approaches.