A 57-year-old male was injured in a pedestrian traffic accident. He was diagnosed with anterior flail chest with concomitant multiple injury. We report the successful treatment of traumatic comminuted sternal fracture using the SternaLock plating and ZipFix® system.

Key Words: Sternum; Fracture; Fixation
successfully weaned from mechanical ventilation. Postoperative follow-up rib CT revealed complete approximation of the sternum (Fig. 4). No complaints associated with instability and wound problems were reported at the 3-month follow-up.

**DISCUSSION**

Traumatic sternal fractures have been known to occur in approximately 3%-8% of all patients with blunt trauma. Most of these fractures are conservatively treated, and surgical fixation management in selected cases is reportedly more effective and results in good progress (1).

In this case, the patient was diagnosed with anterior flail chest with concomitant multiple injuries involving the spine, extremities, pelvis, and bladder; thus, requiring multiple surgeries and long-term immobilization through bed rest. Moreover, despite conservative ventilation management, patients with anterior flail chest are expected to require longer mechanical ventilation.

There is no definitive optimal surgical fixation time of
the sternum with anterior flail chest. However, management of anterior flail chest has been reported with only pneumatic stabilization that needed mechanical ventilation for 15.6 days, and among them, the patient with displaced sternal fracture required sternal fixation (5). In our case, the patient needed sufficient time to confirm full mental status recovery and sternum and rib fracture evaluation because the initial chest CT showed unclear findings due to the presence of artifacts.

Several surgical techniques and options existed for anterior flail chest (2, 3). In our case, the SternaLock™ plating and ZipFix™ systems were used because the posterior lower fragment of the fracture was separated from the anterior and remained only in thin layer; therefore, incomplete approximation and iatrogenic fracture were suspected.

The ZipFix™ system is a cable-tie-based sternal closure system used to close the sternum after a median sternotomy during cardiac surgery. It is relatively flexible and provides low profile height over the sternal bone (4). As in our case, it was considered to provide good reduction and approximation without risks of iatrogenic fracture for the thinner fragment in the coronal separated sternal fracture.

This technique is considered to be a feasible method to surgically fix this type of sternal fracture in anterior flail chest.

Conflicts of Interest Statement
None of authors have a conflict of interest.

REFERENCE

4. Grapow MT, Melly LF, Eckstein FS, Reuthebuch OT. A new cable-tie based sternal closure system: description of the device, technique of implantation and first clinical