

Case Report

A very rare case of locking screw pull-out after anterior cervical decompression and fusion with the Zero-profile Implant System

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Abstract: Recently a new zero-profile, standalone device (Zero-P, Synthes GmbH, Switzerland) for ACDF has been developed in an attempt to overcome the adverse effects associated with traditional cervical anterior plating such as increased dysphagia rates, tracheoesophageal lesions and plate malposition. The Zero-profile Implant System has been widely applied in ACDF but locking screw pull-out in this implant system has not been reported. A 46-year-old male was referred to our department who presented with neck and shoulders pain for 23 years and numbness and weakness of right hand for 6 months. The physical examination of the patient showed hypoesthesia in the right C6 and C7 roots distribution, myodynamia of the right little finger weakened to Grade 3. Magnetic resonance image confirmed cervical disc herniations in segments C5/6 and C6/7. Anterior cervical decompression and fusion with the Zero-profile Implant System was performed via a classic right Smith-Robinson approach after induction of general anesthesia. Six months postoperative X-ray and CT scan showed a locking screw at the segment C6/7 pulled out. Considering the patient was asymptomatic, the cervical stability is reliable and no evidence of esophageal perforation, conservative treatment was recommended and the patient was followed up every six months. This first case report demonstrated that the use of locking screws in the Zero-profile Implant System also does not extinguish the risk of screw pull-out. Conservative treatment and close follow-up may be suitable for some mild pull-out patients without esophageal perforation and clinical symptom.

Keywords: Locking screw, pull-out, zero-profile, anterior cervical decompression and fusion, ACDF

Introduction

The anterior approach to the cervical spine has been widely applied for surgical treatment of cervical spine pathologies including trauma and degenerative spinal diseases for several decades [1, 2]. Anterior cervical decompression and fusion (ACDF) with an anterior cervical plate can increase fusion rates, maintain or improve cervical sagittal alignment and stability, and reduce the risk of graft extrusion and subsidence [3, 4]. However, anterior plating may also be associated with potential disadvantages and complications such as increased dysphagia rates, tracheoesophageal lesions and plate malposition [5]. Recently a new zero-profile, standalone device (Zero-P, Synthes GmbH, Switzerland) for ACDF has been developed in an attempt to overcome the adverse effects associated with traditional cervical anterior plating. The Zero-profile Implant System consists of three main components: a

PEEK interbody spacer, a titanium alloy plate and locking head screws (**Figure 1**). The Zero-profile Implant System has been widely applied in ACDF but locking screw pull-out in this implant system has not been reported. To the best of our knowledge, this is the first case report of locking screw pull-out in the Zero-profile Implant System. By presenting of a special case, we are hoping to share our experience to deal with this rare but serious complication.

Case report

A 46-year-old male was referred to our department who presented with neck and shoulders pain for 23 years and numbness and weakness of right hand for 6 months. The physical examination of the patient showed hypoesthesia in the right C6 and C7 roots distribution, myodynamia of the right little finger weakened to Grade 3, Hoffmann sign (-), Babinski sign (-). Mild spondylotic changes in segments C5/6

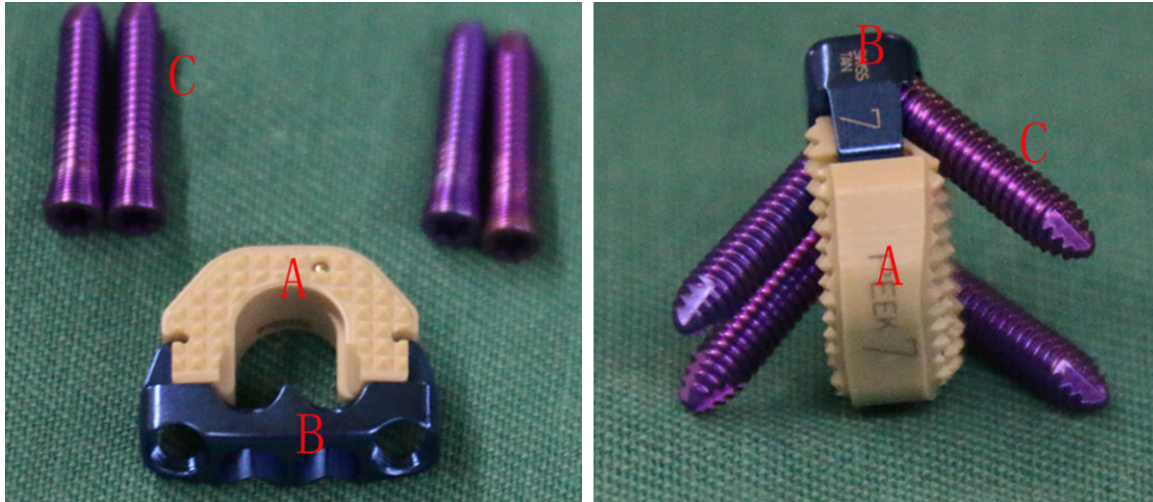


Figure 1. Entitative images of the Zero-profile Implant System (A. PEEK interbody spacer; B. Titanium alloy plate; C. Locking head screws).

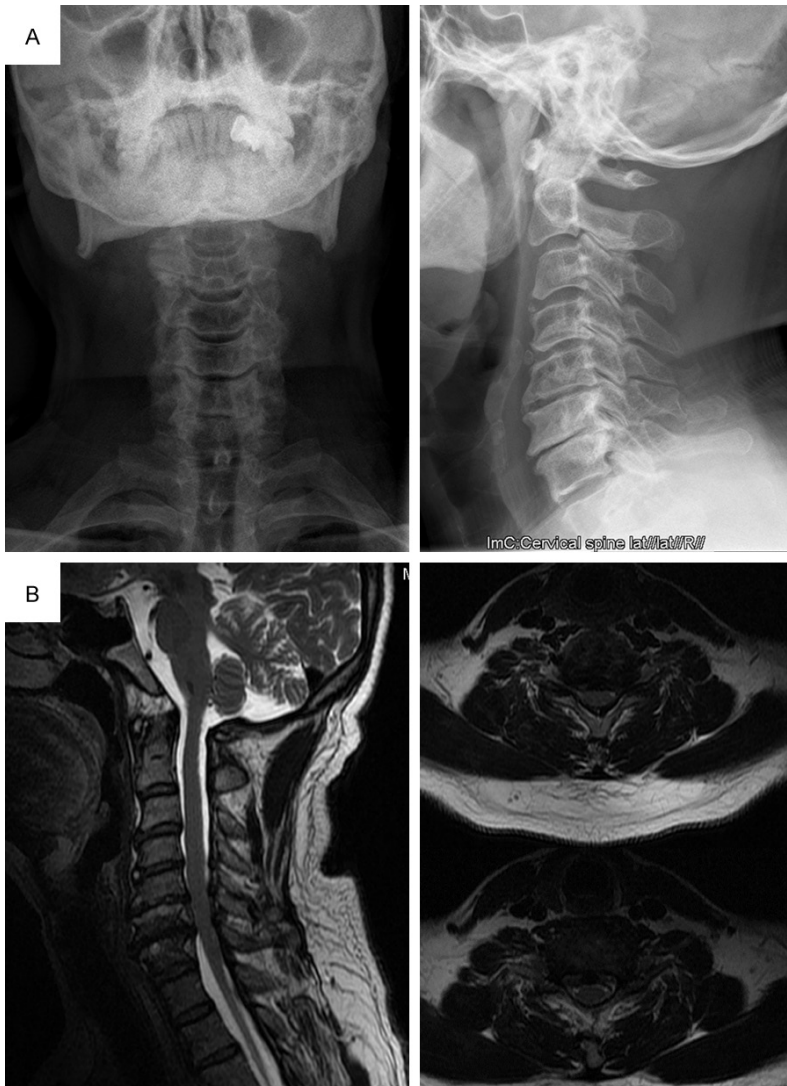


Figure 2. Mild spondylotic changes in segments C5/6 and C6/7 were detected on plain films (A). Magnetic resonance image confirmed cervical disc herniations in segments C5/6 and C6/7 (B).

and C6/7 were detected on plain films (**Figure 2A**). Magnetic resonance image confirmed cervical disc herniations in segments C5/6 and C6/7 (**Figure 2B**). Anterior cervical decompression and fusion with the Zero-profile Implant System (Synthes GmbH, Oberdorf, Switzerland) was performed via a classic right Smith-Robinson approach after induction of general anesthesia. One week postoperative X-ray showed the good position of the implant, a satisfying disc height and cervical lordosis (**Figure 3A**). Three months postoperative X-ray and CT scan also showed a good position of the implant (**Figure 3B**). However, when the patient was followed at the sixth month, the X-ray and CT scan showed a locking

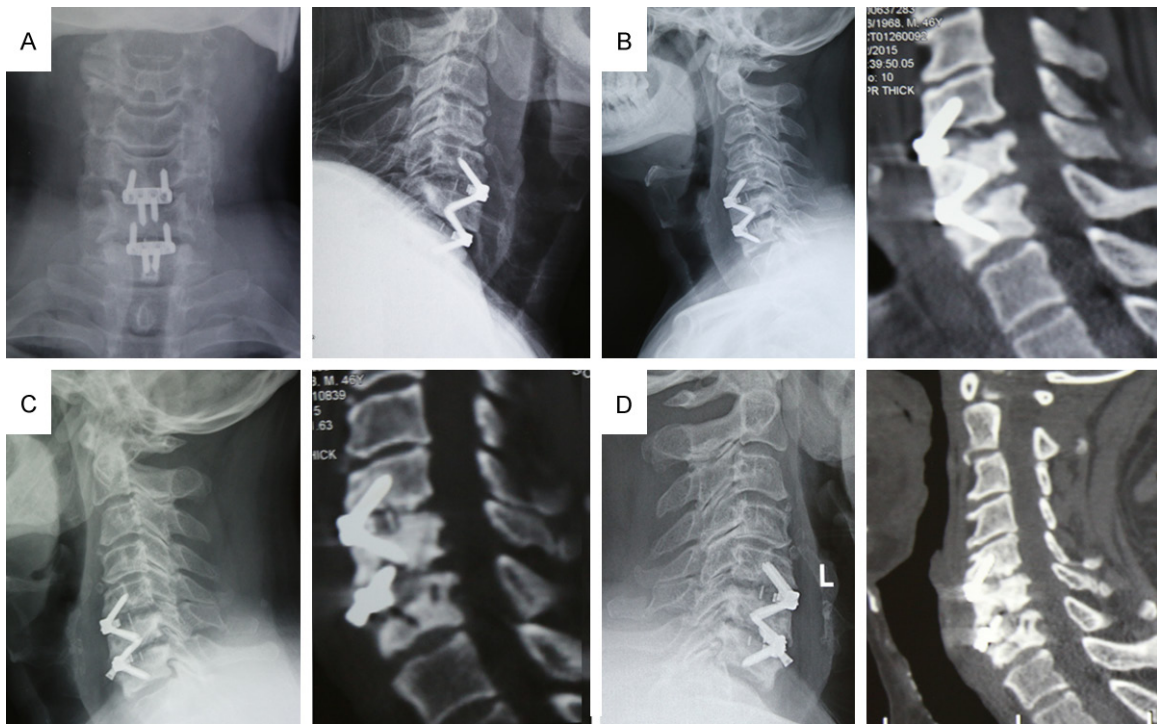


Figure 3. One week postoperative X-ray (A) showed the good position of the implant. Three months postoperative X-ray and CT scan (B) also showed a good position of the implant. Six months postoperative X-ray and CT (C) scan showed a locking screw at the segment C6/7 pulled out. One year postoperative X-ray and CT (D) showed obvious nonunion in segments C5/6 and C6/7 but no evidence of deterioration of screw pull-out.

screw at the segment C6/7 pulled out (**Figure 3C**). Subsequent radiographs one year after surgery showed obvious nonunion in segments C5/6 and C6/7 but no evidence of deterioration of screw pull-out while the patient was still asymptomatic (**Figure 3D**). Radiographical examination made after swallowing of soluble contrast and fiber optic esophagoscopy showed no evidence of esophageal extravasation. As the patient was asymptomatic and no evidence of esophageal perforation, conservative treatment was recommended and the patient was followed up every six months.

Discussion

Several studies have reported the application of the Zero-profile Implant System in anterior cervical discectomy and fusion with excellent clinical and radiographic results [6, 7]. Locking screw pull-out is a rare complication in anterior cervical fusion with plate since the application of locking mechanism. However, screw pull-out can cause serious secondary complications such as esophageal perforation, screw missing, pharyngoesophageal diverticulum perfora-

tion and wound infections. Geyer et al. reported a rare case of a 76-year-old woman who retched up a screw from a cervical spine lockingplate 5 years after anterior cervical spine fusion [8]. Fountas et al. presented a rare case report of a screw extrusion into the gastrointestinal tract of a patient 16 months after ACDF [9]. Results of previous case reports demonstrated that the use of locking screws does not extinguish the risk of this complication, particularly in cases of suboptimal initial placement of the anterior instrumentation. Management is dependent on the severity and progression of clinical and radiologic signs and symptoms. As an anterior cervical plate is placed directly posterior to the esophagus, screws pull-out may cause serious clinical symptoms and even esophageal perforation. However, the Zero-profile Implant System is different from traditional anterior cervical plate as it is zero-profile, there may be a larger space between the esophagus and the vertebral body which can tolerate mild screw pull-out. This may partly explain the reason that the patient in this case is asymptomatic. After a discussion in the surgery team, several treatment meth-

ods have been proposed: first, a posterior approach revision surgery such as fusion with lateral mass screws immediately; second, an anterior approach revision surgery such as fusion with cage and plate; third, conservative treatment and follow-up. Considering the patient was asymptomatic, the cervical stability is reliable and no evidence of esophageal perforation, conservative treatment was recommended and the patient was followed up every six months. The patient was still asymptomatic at the final follow-up. This first case report demonstrated that the use of locking screws in the Zero-profile Implant System also does not extinguish the risk of screw pull-out. Close follow-up is of critical importance in detecting any screw pull-out of Zero-profile Implant. Any signs of postoperative dysphagia or throat soreness should prompt immediate evaluation of the patient and, if indicated, surgical removal of the failed instrumentation is recommended. However, there may be a larger space between the esophagus and the vertebral body which can tolerate mild screw pull-out, conservative treatment and close follow-up may be suitable for some mild pull-out patients without esophageal perforation and clinical symptom.

Disclosure of conflict of interest

None.

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