Retrieval of broken pedicle screws by “friction” technique

Technical note

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The authors describe a simple and fast technique for removal of deeply situated broken pedicle screw fragments. The screw fragments are removed using a fine-serrated, conically cored bit with a light rough inner surface that is mounted on a common slow-speed drill capable of rotating clockwise and counterclockwise. The cored head of the bit is pressed and engaged on the cut surface of the broken screw, and the drill is made to turn in counterclockwise rotation; this, by means of friction, causes the two surfaces to interlock, and consequently the broken screw fragment backs out. This technique was used to retrieve both broken titanium and stainless steel screws, and satisfying results were obtained. There were no complications associated with the application of the technique, and the pedicle as well as the screw hole were always preserved, offering, in the event that the vertebral instability continued, the possibility of applying a new screw of slightly larger diameter at the same screw hole.

This technical application offers the opportunity of removing deeply situated screw fragments by using a simple technique while maintaining the vertebral pedicle and screw-hole integrity.

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for the subsequent application of a new transpedicular stabilization system with screws of slightly larger diameter.

Description of Technique

Our technique requires the use of a slow-speed drill (1000–1500 rotations/minute) capable of rotating in a clockwise and a counterclockwise direction. The bits used are fine serrated and conically cored with a light rough inner surface (Fig. 1) so that they can be fitted to screws of various dimensions, which facilitates interlocking the bit with the cut surface of the screw fragment. To avoid excessive enlargement of the screw hole, the bit head is provided in two different sizes, thereby covering the range of diameters of most common screws (Fig. 2).

The first step in the procedure is to free the screw hole and the cut surface of the screw fragment from the scar tissue. The involved pedicle is usually easily observed because the proximal part of the broken screw indicates the direction. Fluoroscopic guidance may be useful in cases in which only the distal part of the screw is present. The pedicle is then cannulated, with the bit rotating in a clockwise direction; the fine-serrated edge of the bit head removes 1 mm of scar tissue and/or bone around the fractured screw, and the light rough inner surface provides an optimal engagement between the bit tip and the fragment head. This engagement is also favored by fine irregularities of the cut surface of the screw. In rotating the bit in a counterclockwise direction, a mild pressure is then applied to obtain interlocking of the screw with the conical cored bit (Fig. 3). Once the motion of the screw fragment is sensed, the pressure of the bit on the screw is decreased while the rotation is continued; eventually the screw fragment backs out in a counterclockwise rotation.
Results

We have successfully used this technique in three recent cases in which the hardware failed due to screw fracture, thereby enabling us to achieve the complete preservation of the pedicle and the screw hole and were thereby able to implant a new transpedicular stabilization system by using screws of slightly larger diameter.

Conclusions

This very simple technique can be used to achieve fast retrieval of screw fragments situated deeply inside the pedicle while preserving both the pedicle as well as the screw hole for eventual application of a new stabilization system.

References


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