How to connect a pedicle screw construct to a Ransford Loop: technical note

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Abstract This technical note describes how a standard pedicle screw system can be connected to the 4 mm rod of a Ransford Loop. This report may be of interest for spinal surgeons who need to perform similar add-on stabilizations.

Keywords Ransford Loop · Pedicle screw · Adjacent segment instability · Connector · Stabilization

Background

Since around 1990, Ransford Loops (Surgicraft, UK), combined with sublaminar wiring, have been successfully employed for posterior occipitocervical stabilizations. According to the manufacturer, between 2003 and today, a total of 786 Ransford Loops have been sold worldwide; so it is safe to assume that several thousand loops have been implanted. These implants are made from precontoured stainless steel or titanium rods of 4 mm diameter. Given the rod diameters of the currently available pedicle-based posterior stabilization systems, there is no straightforward connectivity option when one has to deal with an adjacent-segment problem. While producers of pedicle screw-based stabilization systems will be able to manufacture custom connectors for their respective systems, this is not an option when one is pressed for time, for example in cases with acute neurological deficit. In such urgent situations, an immediate “out-of-the-box” solution is required. We

recently had to deal with such a problem and this technical report describes the way we were able to connect a Ransford Loop to a modern pedicle screw and hook system.

Case

A 45-year-old female rheumatoid arthritis patient had received anterior cervical decompression, anterior plating and a Ransford Loop stabilization from the occiput to T1 10 years before (Fig. 1). While in hospital for an elbow procedure, she began to develop slowly progressive paraplegia, compatible with a T5 level. The work-up revealed spondylodiscitis with an epidural abscess and gross instability at T3–4 (Figs. 2, 3), requiring urgent decompression, drainage and stabilization. In a CT scan, the implants were shown to be firmly embedded in the fusion mass, so that removal of the loop and the wiring prior to renewed instrumentation was not an attractive option. Also, given the great momentum of the head with the whole cervical spine fused to it, a long and stable construct extending to the mid-thoracic spine was needed. Surgicraft UK supplied us with the specifications of the Ransford Loop within hours. We then contacted a number of manufacturers of pedicle screw systems with the question whether they could rapidly provide side-connectors to a 4 mm rod. While all of the manufacturers would have been able to produce custom-made connectors, none of them had fitting connectors on the shelf. However, Stryker Spine was able to rush their Xia 4.5 (pediatric) pedicle screw and hook system to us overnight. This system contains a large variety of cross-connectors, side-connectors, offset-connectors and angled offset-connectors, all of which are open and clip-on (as opposed to closed and slide-on). These connectors are designed for a

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Fig. 1 CT scout image in anteroposterior view, showing the occipitocervical instrumentation with a Ransford Loop and sublaminar/transoccipital wires. The patient also has a moderate upper thoracic scoliosis

Fig. 3 Coronal CT reconstruction, preoperative, with intrathecal contrast. The arrow indicates the lateral translation at the unstable T3/T4 junction. The thoracic scoliosis can also be appreciated

Fig. 2 Sagittal CT reconstruction, preoperative. The arrows indicate (from top to bottom) the lower end of the anterior plate, the lower end of the Ransford Loop with the cross connector, the destruction/instability at T3/T4

Fig. 4 Anteroposterior and lateral view radiographs of the completed construct. The use of transverse process hooks and of the various connectors is clearly visible

Fig. 5 3-D reconstructions of the same postoperative situation as displayed in Fig. 4 (with additional intrathecal contrast)

4.5 mm rod, but we found them to exert a very good grip on the 4 mm Ransford Loop. Using four such connectors and very little in situ bending of the free ends of the

Ransford Loop, we were able to build a stable construct and treat the patient (Figs. 4, 5). She has since recovered much of her neurological deficit, the construct has remained stable for over 1 year, the infection has cleared and the T3 and T4 vertebrae have begun to fuse.

Conclusion

Connecting modern pedicle screw systems to older implants is always a challenge and even more so when rod diameters are very different. When one is pressed for time, a customized solution is often not an option. We hope that this report might help others faced with similar situations. Given the fact that some of the Hartshill Rectangles (Surgicraft, UK) also have a 4 mm rod diameter, the Xia 4.5 pediatric system should also work with those implants.

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