

Pedicle Screw Placement using Cortical Bone Trajectory

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Description

After thorough examination of topography, deformity was corrected with closed medial wedge osteotomy and plating by posterior approach with anterior transposition of ulnar nerve. Post-operatively left elbow was immobilized for 3 weeks after which movements were encouraged. With persistent motivation and supervised physiotherapy, he regained complete range of movements, ulnar neuropathy resolved progressively and performed daily activities independently.

Cortical Bone

Pedicle screw placement using cortical bone trajectory has become a popular method of fixation especially in minimal invasive spine surgery over the last few years. Complications of this technique have been rarely reported in the literature. A clear understanding of fractures and screw loosening is crucial before embarking on this new surgical technique. Fatigue failure in osteoporotic bone using this technique is alarming and warrants further study to understand its indication. Four out of the initial 26 patients demonstrated radiographic lucency surrounding pedicle screws within 3 month after their initial surgery. This was clearly demonstrated on their CT milligrams, which raised concerns of pseudo arthritis. In addition to our clinical experience, biomechanical studies were performed in our lab to compare fatigue strength of CBT to traditional pedicle screw using osteoporotic cadavers. Side by side comparisons were performed on 12 cadaveric vertebrae. Pedicle screws placed using traditional trajectory outperformed screws placed using cortical bone trajectory based on fatigue testing in osteoporotic vertebrae. CBT screws reached relative motion of 15.2 degree (SD: 5.5), while traditional pedicle screw's relative motion was 6.9 degree (SD: 4.8) after 100 cycle with 4 Nm load. Pedicle screw placement using cortical bone trajectory has become a popular method of fixation especially in minimal invasive spine surgery over the last few years. Complications of this technique have been rarely reported in the literature. A clear understanding of fractures and screw loosening is crucial before embarking on this new surgical technique. Fatigue failure in osteoporotic bone using this technique is alarming and warrants further study to understand its indication.

Osteosynthesis

Complications of spine surgery are common in surgical practice and practitioners should be aware of the multiple risks related to these operations as well as of the means to prevent them. To present day in Belgium, the patient has to support the evidence of a fault resulting from medical malpractice in case of legal dispute. The authors remind the foundations of the medical responsibility applied to the surgery of the spine in Belgium, although it is well known that any surgical damage does not necessarily result from an error or from a surgical misconduct, and that therefore, the surgeon is not always responsible for the damage in the absence of a proven fault in the legal sense. Spine surgery has made huge progresses, particularly in the analysis, understanding and realization of spinal osteosynthesis and fusions. In addition, multiple minimally invasive approaches provide answers to many problems encountered by spinal surgeons whether of orthopedic or neurosurgical backgrounds. In spine surgery, there are basically two main surgical options with many different techniques supporting them. The first consists in the decompression of the neural elements of the spine from tightness. The second aims to stabilize the spine in order to protect the nerves and eliminate the pain resulting from abnormal loading from the different movements. Any indication for surgery has to be well documented since the expected results are far less predictable if the actual indication for one of these surgical options is not clear. Let us beware then when the phrase "unindicated surgery" is pronounced during a litigation process because it is often referring to the lack of reasonable identification of the surgical problem. In order to draw the practitioners' attention on the multiple risks related to these operations, we will describe some complications of usual spine surgery as well as the means to prevent their unwanted side-effects or to have them discontinued. Peroneal nerve compression at the fibular neck is possible in any patient positioning, inducing simple paresthesia or severe motor impairment with drop foot. Femoral cutaneous nerve involvement results in meralgia paresthetica following ventral decubitus with compression of the anterior superior iliac spine region. A prospective study reported 20% prevalence of femoral cutaneous nerve damage after spinal surgery. In half of the

patients, involvement was bilateral, secondary to compression of the framework supporting the anterior superior iliac spines. More rarely, there was neurological damage due to retroperitoneal hematoma or sustained during iliac crest graft harvesting. In 89% of cases, recovery was complete within 3 months.