Screw guide template system

Sugawara et al., published a prospective clinical study of a multistep screw insertion method using a patient-specific screw guide template system (SGTS) for the cervical and thoracic spine.

Preoperative bone images of the computed tomography (CT) scans were analyzed using 3D/multiplanar imaging software, and the screw trajectories were planned. Plastic templates with screw-guiding structures were created for each lamina using 3D design and printing technology. Three types of templates were made for precise multistep guidance, and all the templates were specially designed to fit and lock onto the lamina during the procedure. In addition, plastic vertebra models were generated, and preoperative screw insertion simulation was performed. This patient-specific SGTS was used to perform the surgery was performed, and CT scanning was used to preoperatively evaluate screw placement.

Enrolled to verify this procedure were 103 patients with cervical, thoracic or cervicothoracic pathologies. The SGTS were used to place 813 screws. Preoperatively, each template was found to fit exactly and to lock onto the lamina of the vertebra models. In addition, intraoperatively, the templates fit and locked onto the patient lamina, and the screws were inserted successfully. Postoperative CT scans confirmed that 801 screws (98.5%) were accurately placed without cortical violation. There were no injuries to the vessels or nerves.

The multistep, patient-specific SGTS is useful for intraoperative pedicle screw navigation in the cervical and thoracic spine. This method improves the accuracy of pedicle screw insertion and reduces the operating time and radiation exposure during spinal fixation surgery [1)].

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Sugawara T, Kaneyama S, Higashiyama N, Tamura S, Endo T, Takabatake M, Sumi M. Prospective Multicenter Study of a Multistep Screw Insertion Technique Using Patient-Specific Screw Guide Templates for the Cervical and Thoracic Spine. Spine (Phila Pa 1976). 2018 Jul 24. doi: 10.1097/BRS.0000000000002810. [Epub ahead of print] PubMed PMID: 30045345.