



Technology Commercialization Opportunity

Spinal Fixture –“Method and Fixture for Guided Pedicle Screw Placement”

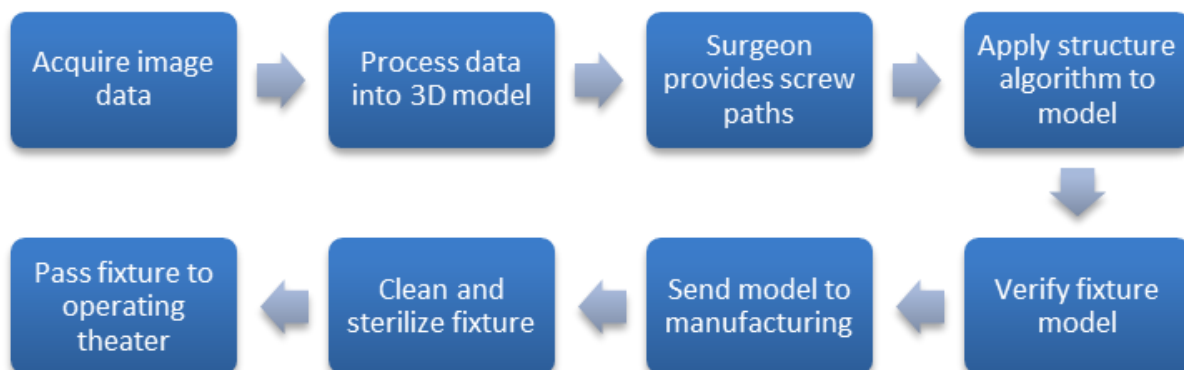
Inventor(s):

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Background and Technology Description:

Pedicle screws are placed in the spine when a patient's spine has become unstable for reasons such as trauma, tumors, deformity or pain relief. Traditionally pedicle screws are placed by hand using anatomical landmarks on the vertebrae to guide the drill trajectory and finally place the pedicle screw. Over the years technologies such as fluoroscopy and navigation have been utilized to improve the safety of pedicle screw placement and reduce potential injury to the spinal cord and nerves. These technologies have their own limitations which include inaccuracy, longer procedure times and large initial investment which may deter their use in smaller hospitals or countries.

Researchers at RIT have developed a method of spinal fixation including scanning an affected area of spine of the patient in need of spinal fixation to generate image data; generating a 3D model of the spine from the data; selecting a set of specific screw paths using software to make a digital template for a fixture; modifying the digital template of the fixture to fit the selected screw paths; making the fixture from the finished digital template by additive manufacturing; locating the fixture on the affected segment of the spine; passing the drill through a drill guide and each screws passage in the fixture; removing the guide once the screw depth is verified; placing a standard surgical screw in a screw passage in the fixture and tightening the screw until the fixture boss is tightly seated to the vertebra and repeating for each screw passage in the fixture.



Keywords: spinal fixture, pedicle screws, additive manufacturing, spine .

Technology Readiness:

This novel technology is currently in the prototype stage. The prototypes have been tried with success on the spine models. Currently the researchers are working towards trying the prototype on the cadaver spine followed by checking with the CT scan regarding the accuracy and then moving forward with its use in human patients.

Intellectual Property (IP):

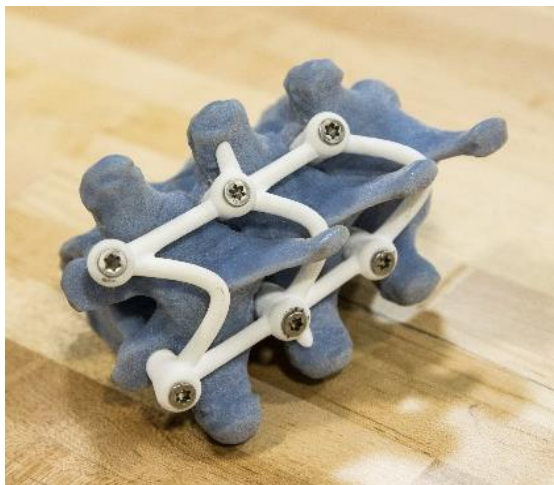
The technology is currently the subject of a pending US patent application.

How it is different from current technologies:

Unlike intra-operative navigation the fixture is prepared before the start of the operation, resulting in a faster procedure that requires no additional support of technicians in the operating room. The fixture also removes the uncertainty of free hand placement techniques, and intraoperative navigation by providing a restricted and pre-defined path for the screws. Due to the certainty of placement the need for most secondary modalities will be removed, and can be replaced with fluoroscopy, which requires no specialized equipment and the associated costs. Additionally the need for complex pedicle screws, custom bending jigs for rods, and custom tooling for insertion, can be replaced by standard orthopedic screws.

Primary uses of the technology include spinal fusion where indications include:

- a) Mechanical lower back pain
- b) Degenerative spondylolisthesis and isthmic spondylolisthesis
- c) Treatment of fractures to the vertebra resulting in instability requiring surgical stabilization
- d) Treatment of scoliosis and kyphosis after correction of deformity to maintain spine alignment
- e) Treatment of spinal stenosis with instability



3D printed implant with pedicle screws (left) and prototype (right)

Target Customers:

The end-user customer would be practicing spine surgeons and also the surgeons in training who deal with the patients with spinal instability.

Opportunity:

RIT researchers are interested in working with parties who are qualified and interested in the commercialization of this revolutionary new medical technology. Arrangement types include funding opportunities, licensing the technology to existing or new organizations or strategic partnerships with those who have expertise in the field.

Contact:

Those interested in learning more about this opportunity should contact:

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