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Spinal Arthrodesis with instrumentation: Open Surgery vs Percutaneous Surgery

The study that was carried out is a comparison between patients, suffering from a severe degenerative pathology, treated surgically by an interspinous fixation system and by Spinal Arthrodesis instrumented with rods and screws.

The requirement of stability is of primary importance for the vertebral column in order to prevent a premature mechanical and biological degeneration of its components. In biomechanics, instability is defined as a lack of stability caused by an increase in mobility in the motion segments from the presence of anomalous vertebral movements and a slight rigidity of the FSU (Functional Spine Unit).

Spinal Arthrodesis is currently the gold standard in the treatment of severe lumbar instability and severe deformities. The aim of the surgeon is to restore the mechanical stability and the physiological balance of the spine in both the coronal and sagittal planes. To achieve these objectives it is necessary to use a means of synthesis endowed with great force associated with the execution, in selected cases, of specific techniques (osteotomies, cages, intersomatic cages, etc.).

In serious degenerative diseases and in deformities, Minimally Invasive Surgery does not allow optimal achievement of all the objectives of the case, furthermore there is an important exposure to ionizing radiation with risks to the patient, higher percentages of pseudo-osteoarthritis and impossibility to correct a deformity: in fact it is not possible to perform a cruentation of the joint apophyses and to implement a stable arthrodesis.

Open surgery, on the other hand, provides the possibility to improve the correction on both the coronal and sagittal planes, promote the arthrodesis which is more likely to obtain it, minimise radiation exposure with modest blood loss, easily control postoperative pain, have patients standing up on the first day and allow discharge on the third or fourth day. The success rate is around 95% in the medium term and in complex surgical cases, ie coronal and/or sagittal deformities, the success rate is around 87-90%.

All this, in most cases, is the result of combined anterior, lateral and posterior surgical approaches, with good results observed in the medium term. In the operating room average surgical times vary between one and a half hours and two hours with modest blood loss and easily managed post-operative pain relief.

Clinical Data	Open Surgery	Percutaneous Surgery
Operating time (min)	80/90*	190/230
Intra-operative blood loss (cc)	300/350	250/350
X-ray exposure time	28,9±8,2	45,3±11,7
Duration of hospital stay postoperative (d)	3-4	48h
VAS		
Preoperative	7±3	7,3±1,2
Postoperative	2±1,5**	2,2±0,6
Bone fusion	YES	NO
Complications (%)	1 dural tear; 1 screw mobilization; 2 dehiscence surgical wound	11,4
Achievement of goals	87/90% (severe deformity); 95% (traditional surgery)	Less chance of rebalancing of the spine; Greater risk of screw malposition; Greater possibility of pseudoarthrosis; No substantial difference in a decompression

Table: * Stabilization of 2/3 vertebral segments associated with decompression;
** Opiates and NSAIDs

Speaker Biography

Pierpaolo Mura is an orthopedic specialist in scoliosis and an expert in Spinal Ssurgery. He also serves as a professor at La Sapienza University of Rome, Polo Pontino and Chair in Orthopedics contract. He is specialized in Orthopedics and Traumatology and diagnostic radiology. He is the Director of the Department of Orthopedics; and Founder and Director of the Unit Complex Spine Surgery Center and Scoliosis Surgery Section. He is the head of unit of Orthopaedics and Regional Delegate of the Italian Society of Spine Surgery GIS (Italian Scoliosis Group) as well as an active member of SRS (Scoliosis Research Society). He is also scientific director of the research project on biomaterials in spine surgery at the Science and Technology Park in Pula.

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