



**Dictionary of Terms:**  
SURGERY 2017 VERSION 2  
FOLLOW-UP 2017

DATE APPROVED: 01.07.2020

## Authors and Contributors

**Andrea Luca, MD**

IRCCS Istituto Ortopedico Galeazzi  
Spine Unit III – Adult and Pediatric Deformity  
Milan, Italy

**Marco Teli, MD, FEBOT**

Walton Centre for Neurology and Neurosurgery,  
Liverpool, UK

**Pedro dos Santos Silva, MD**

Centro Hospitalar de São João  
CHSJ · Department of Neurosurgery  
Porto, Portugal

**Everard Munting, MD**

Clinique Saint-Pierre  
Ottignies, Belgium

**Josef Georg Grohs, MD**

Department of Orthopedics and Trauma-Surgery  
University Hospital of Vienna  
Vienna, Austria

**Emin Aghayev, MD, M.Sc.**

EUROSPINE, Spine Tango Task Force  
Bern, Switzerland

Contents

<b>SURGERY 2017 VERSION 2 .....</b>	<b>4</b>
<b>ADMISSION / PATHOLOGY .....</b>	<b>4</b>
SPECIFICATION OF MAIN PATHOLOGY.....	5
<i>Degenerative disease .....</i>	<i>5</i>
<i>(Pathological) Fracture / Trauma .....</i>	<i>7</i>
<i>Spondylolisthesis.....</i>	<i>11</i>
<i>Deformity .....</i>	<i>13</i>
<i>Infection .....</i>	<i>14</i>
<i>Tumour .....</i>	<i>15</i>
<i>Repeat surgery .....</i>	<i>15</i>
<i>Additional characterisation of main pathology .....</i>	<i>16</i>
<i>Risk factors.....</i>	<i>19</i>
<b>SURGERY .....</b>	<b>19</b>
<b>IMPLANTS .....</b>	<b>25</b>
<b>SURGICAL MEASURES.....</b>	<b>25</b>
<b>HOSPITAL STAY .....</b>	<b>32</b>
<b>FOLLOW-UP 2017 .....</b>	<b>36</b>
FOLLOW-UP .....	36
COMPLICATIONS .....	40

## Surgery 2017 version 2

### Admission / Pathology

Variable	Categories	Definition
<b>Admission date</b>	Day Month Year	Date the patient was admitted as an inpatient to the facility. Online format: dd.mm.yyyy
<b>Main pathology</b>	degenerative disease	Pathology without apparent changes other than those due to aging.
	nondegenerative deformity	Clinically relevant scoliosis or deviation of sagittal alignment (more than two segments).
	fracture / trauma	Fracture or discoligamentous injury as sequelae of trauma.
	pathological fracture	Fracture / dislocation due to pathologic conditions of bone (tumour, osteoporosis etc.).
	spondylolisthesis (nondegenerative)	Vertebral slippage including segmental rotational displacement. For <b>degenerative spondylolisthesis</b> , e.g. vertebral slippage due to wear and tear of the facets without anatomical changes of the pars interarticularis, select <b>degenerative disease</b> as the main pathology and further specify as “degenerative spondylolisthesis” under the question “Primary type of degeneration.”
	Chiari malformation	Defined as displacement of one or both cerebellar tonsils through the foramen magnum, potentially associated with spina bifida and less commonly with serious developmental abnormalities of the cerebellum and hindbrain in types 3,4 and 5.
	infection	Condition due to invasion and proliferation of pathogenic microorganisms.
	tumour (US tumor)	Includes paravertebral soft tissue, bone and neurogenic tumours of the spine.
	repeat surgery	Any repeat surgery related to the index treatment or operation completed because the index surgery did not reach its technical goals (misplaced screw, insufficient decompression, non-union etc.) or clinical goals (the technical goals are fulfilled but the symptoms remain, e.g. solid fusion but persistent pain). Also included are elective repeat surgeries e.g. for metal removal.
	other...	→ Specify any other condition that does not fit the aforementioned pathologies.

## Specification of Main Pathology

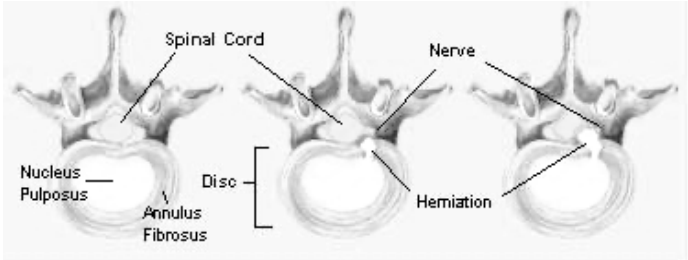
Specify **only** in relation to items in the section corresponding to the chosen **main pathology**. These questions serve to improve the definition of main pathology and to establish subgroups for later more differentiated identification.

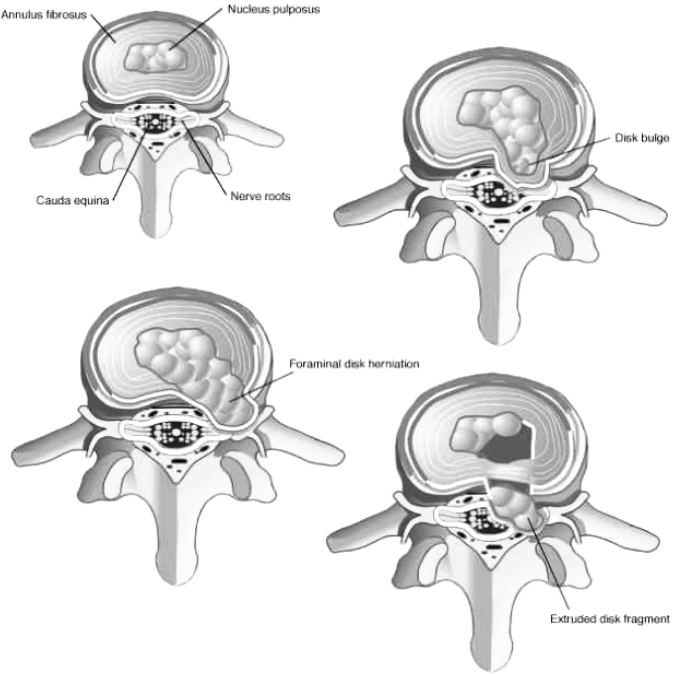
### Degenerative disease

Type of degeneration *primary* relates to main degenerative pathology, which is the primary indication for treatment. Only a single answer is allowed.

Type of degeneration *secondary* relates to all secondary degenerative pathologies, which are accompanying the main pathology, but are not the primary indication for treatment.

Similar patients with a similar set of degenerative pathologies may be treated with a different treatment focus. The documenting surgeon has to make sure that the *primary* pathology is the one which is the main target for the undertaken treatment.

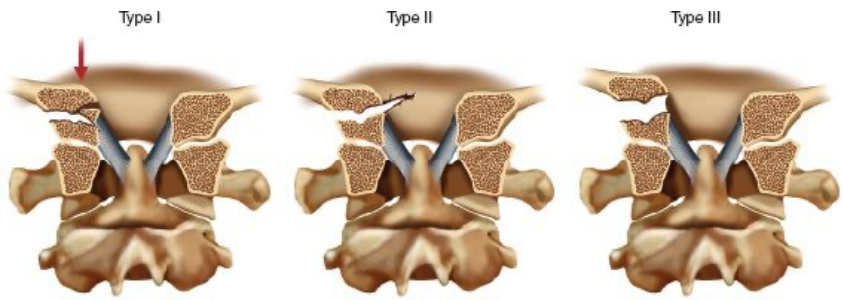
Variable	Categories	Definition
<b>Type of degeneration</b>	disc herniation	<p>Disc material within the borders of the spinal canal either connected to the disc space (bulging, protrusion) or separated from it (sequester). For further classification please tick: "other" and specify.</p>  <p style="text-align: center;"> <span data-bbox="788 1384 874 1413">Normal</span> <span data-bbox="1002 1384 1123 1413">Protrusion</span> <span data-bbox="1235 1384 1340 1413">Prolapse</span> </p>

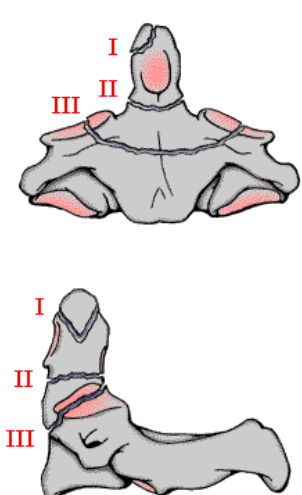
Variable	Categories	Definition
		
	central stenosis	Central narrowing of the spinal canal due to e.g. hypertrophy of the yellow ligament (lig. flavum) or bony restriction caused by enlargement of the facet joint (osteoarthrosis), osteophyte formation, or degenerative spondylolisthesis.
	lateral stenosis	Narrowing of the lateral recess of the spinal canal caused by e.g. disc height decrease, posterolateral disc protrusion or hypertrophy of the superior articular process.
	foraminal stenosis	Narrowing of the foramen, intraforaminal stenosis with nerve root compression.
	degenerative disc disease	Degeneration of the intervertebral disc. Disc-related pathology, e.g. loss of height, end plate modifications, intradiscal gas, etc. (Changes in the disc metabolism may lead to cellular changes, matrix degradation and structural damages occurring in disc degeneration).
	degenerative deformity  type of deformity	Deformation of the spine due to degenerative changes, e.g. scoliosis, kyphosis.  Also called 'De novo' meaning a deformity diagnosed in adulthood that was not present at end of skeletal growth.
	degenerative spondylolisthesis	Spondylolisthesis due to degenerative changes, e.g. vertebral slippage due to wear and tear of the facets

Variable	Categories	Definition
	grade of spondylolisthesis	without anatomical changes of the pars interarticularis. <b>Also complete Grade of spondylolisthesis question.</b> See under heading 'Spondylolisthesis'.
	other instability	Hypermobility / loss of stiffness in a motion segment (not spondylolisthesis) caused by degenerative changes.
	myelopathy	Gradual loss of nerve function caused by progressive narrowing of the spinal canal.
	facet joint arthrosis	Spondylarthrosis, degenerative changes (osteoarthritis) of the facet joints.
	synovial cyst	Fluid-filled sac that develops as a result of degeneration in the spine.
	SI joint	Sacroiliac joint degeneration.
	other...	→ Specify any other condition that does not fit the aforementioned pathologies.

### (Pathological) Fracture / Trauma

In the case of multiple fractures with different types, please use a separate form for each category if different treatment modalities are used.

Variable	Categories	Definition
<b>Type of (pathological) fracture / trauma</b>	condylar classification (Anderson and Montesano 1988): Type I, II and III	Fracture of the occipital condyle. 
	C0 / C1 dissociation	Atlanto-occipital dissociation.
	C1 fracture	Fracture of C1.

Variable	Categories	Definition
	C1 / 2 instability	Instability between C1 and C2.
	C2 dens fracture	→ Specify dens fracture type.
	C2 other fracture	C2 fractures excluding dens fractures.
	soft tissue injury neck	Whiplash injury: post traumatic cervicalgia without demonstrable tissue lesions by X-ray or MRI.
	fracture C3-C7	Traumatic injury or fracture involving the lower cervical spine.
	fracture Th1-L5 / S1	Traumatic injury or fracture involving the thoracic and lumbar spine including the lumbosacral junction.
	sacrum fracture	Fracture of sacrum
	other...	→ specify
<b>Fracture age</b>	fresh fracture	< 1 month
	old fracture	≥ 1 month
<b>Dens fracture type</b>	I	Specify according to the Anderson and d'Alonzo classification:
	II	
	III	
		 <p>Type I: Upper dens, oblique (8%)</p> <p>Type II: Base of dens, transverse (59%)</p> <p>Type III: Body of axis, facets (33%)</p>
Reference: Anderson LD, D'Alonzo RT (1974). Fractures of the odontoid process of the axis .JBJS-A 56 (8): 1663-1674		



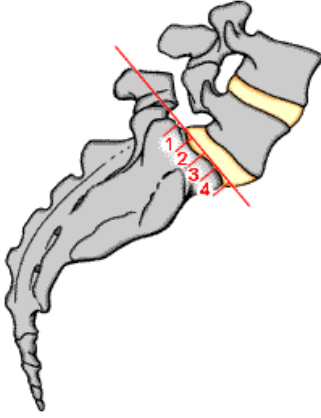
Variable	Categories	Definition
<b>AO classification</b>	<p><i>AO classification applies to the most severely affected vertebral body.</i></p> <p>References:</p> <ol style="list-style-type: none"> <li>Vaccaro, AR, Koerner, JD, Radcliff, KE et al. AOSpine subaxial cervical spine injury classification system. Eur Spine J. 2016 Jul;25(7):2173-84. doi: 10.1007 / s00586-015-3831-3.</li> <li>Vaccaro AR, Oner C, Kepler CK et al. AOSpine Thoracolumbar Spine Injury Classification System: Fracture Description, Neurological Status, and Key Modifiers. Spine. 2013 Nov 1;38(23):2028-37. doi: 10.1097 / BRS.0b013e3182a8a381.</li> </ol>	
<b>C3-L5 / S1 AO Fracture type</b>	<i>Compression injuries:</i>	
	A0	Minor, nonstructural fractures: no bony injury or minor injury such as an isolated lamina fracture or spinous process fracture.
	A1	Wedge-compression: compression fracture involving a single endplate without involvement of the posterior wall of the vertebral body.
	A2	Split: coronal split or pincer fracture involving both endplates without involvement of the posterior wall of the vertebral body.
	A3	Incomplete burst: burst fracture involving a single endplate with involvement of the posterior vertebral wall.
	A4	Complete burst: burst fracture or sagittal split involving both endplates.
	<i>Tension band injuries:</i>	
	B1	Posterior tension band injury (bony): physical separation through fractured bony structures only.
	B2	Posterior tension band injury (bony capsuloligamentous, ligamentous): complete disruption of the posterior capsuloligamentous or bony capsuloligamentous structures together with a vertebral body, disk, and/or facet injury.
	B3	Anterior tension band injury: physical disruption or separation of the anterior structures (bone / disk) with tethering of the posterior elements.
<i>Translation injuries:</i>		
C	Translational injury in any axis-displacement or translation of one vertebral body relative to another in any direction.	
<b>AO Neurological injury</b>	N0	Neurologically intact.
	N1	Transient neurological deficit, which is no longer present at the time of examination.

Variable	Categories	Definition
	N2	Radiculopathy.
	N3	Incomplete spinal cord injury.
	N4	Complete spinal cord injury.
	NX	Neurology undetermined (cannot be examined due to head injury or another condition which limits patient's ability to complete a neurological examination).
<b>AO Modifiers</b>	No modifiers	Modifiers not applicable.
	<i>Case-specific modifiers:</i>	
	M1	Posterior capsuloligamentous complex injury without complete disruption.
	M2	Critical disc herniation.
	M3	Stiffening / metabolic bone disease (ie.: DISH, AS, OPLL, OLF).
	M4	Vertebral artery abnormality.
	<i>Facet injuries:</i>	
	F1	Nondisplaced facet fracture; with fragment <1cm in height, <40% of lateral mass.
	F2	Facet fracture with potential for instability; with fragment >1cm, > than 40% lateral mass, or displaced.
	F3	Floating lateral mass.
	F4	Pathologic subluxation or perched / dislocated facet.
	<i>Bilateral injuries:</i>	
	BL	Bilateral injury
	<b>Pathological fracture due to</b>	osteoporosis
tumour		If ticked: -> go to section tumour and choose "type" and "localisation".

Variable	Categories	Definition
	other...	→ specify
<b>Osteoporotic vertebral fractures classification</b>	OF1	No deformation.
	OF2	Deformation without or with only minor involvement of the posterior wall (< 1 / 5).
	OF3	Deformation with distinct involvement of the posterior wall (> 1 / 5).
	OF4	Loss of vertebral frame structure, vertebral body collapse, or pincer type fracture.
	OF5	Injuries with distraction or rotation.
Reference: KJ Schnake, P Hahn, A Franck, et al. Development of a Classification System (OF-Classification) and a Score for Therapeutic Decision-Making (OF-Score) for Osteoporotic Thoracolumbar Fractures. Global Spine Journal, vol. 5, 1_suppl: pp. s-0035-1554314.		

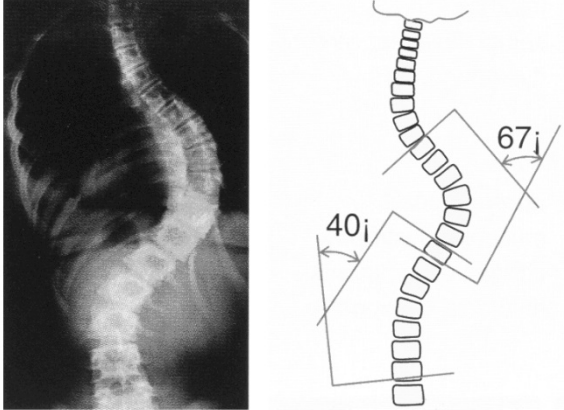
### Spondylolisthesis

Variable	Categories	Definition
<b>Type of spondylolisthesis</b>	Type I (congenital, dysplastic)	Congenital abnormalities of the upper sacrum or the arch of L5 permit the olisthesis to occur.
	Type II (isthmic)	The lesion is in the pars interarticularis. Three subtypes can be recognised: A. Lytic failure, B. Elongated but intact pars C. Acute fracture.
	Type III (degenerative)	Long-standing intersegmental instability. To define a degenerative spondylolisthesis, tick main pathology “degenerative disease” and specify type of degeneration as “degenerative spondylolisthesis”.
	Type IV (traumatic)	Fracture in areas of the bony hook other than the pars.
	Type V (pathological)	Localised or generalised bone disease.
	Type VI (postsurgical)	Due to iatrogenic instability: if in adjacent segment, tick “main pathology” > “Type of degeneration” > adjacent segment and tick “other”.
Reference: Wiltse LL, Rothman LG (1989). Spondylolisthesis: classification, diagnosis, and natural history. Seminars in Spine Surgery 1(2):78-94.		

Variable	Categories	Definition
<b>Grade of spondylolisthesis</b>		<p>Meyerding Grading System for classifying slips:</p> <p>Slips are graded on the basis of the percentage that one vertebral body has slipped forward over the vertebral body below. If the body completely slips off the body below it is classified as a Grade V slip, known as spondyloptosis.</p> 
	Grade 0	Lysis of pars without slip.
	Grade I	0-25% slip of the vertebral body forward over the body below.
	Grade II	25-50% slip
	Grade III	50-75% slip
	Grade IV	> 75% slip
	Spondyloptosis (V)	Spondyloptosis
	Reference: Meyerding HW (1932) Spondylolisthesis. Surg Gynecol Obstet 54: 371-377.	

## Deformity

The deformity question “type of deformity” should also be completed for cases of degenerative deformity.

Variable	Categories	Definition
<b>Type of deformity</b>	scoliosis	<p>Coronal spinal curvature of at least 10° with rotation of the vertebral bodies of unknown origin (Def. Cobb, 1948).</p>  <p>Reference: Cobb, J.R.; Outline for the Study of Scoliosis. Instructional Course Lectures, The American Academy of Orthopaedic Surgeons. Vol. 5, pp.261-275. Ann Arbor, J. W. Edwards, 19488.</p>
	kyphosis	The Scoliosis Research Society proposes to regard 10-40 degrees as the range for normal kyphosis between the upper endplate T5 and the lower endplate T12.
	frontal imbalance	Coronal malalignment with at least 4cm of CSVL (central sacral vertical line) offset, as measured on full spine standing radiographs (Jackson RP et al, Spine 1994).
	sagittal imbalance	Imbalance of the spine in the sagittal plane with an abnormal position of the vertical axis or associated pathologic compensatory mechanisms (Le Huec et al, Eur Spine J 2019, Volume 28, Issue 9, pp 1889–1905).
	other...	→ Specify any other condition that does not fit the available categories.
<b>Predominant etiology</b>	<i>In the case of combined aetiology, indicate the most prominent.</i>	
	idiopathic	Arising spontaneously or from an obscure or unknown cause.
	congenital	Failure of formation, failure of segmentation, or mixed.

Variable	Categories	Definition
	neuromuscular	Neuropathic or myopathic conditions (e.g. sub-classification by Lonstein et al: Group I: Double thoracic and lumbar curves; Group II: Large lumbar or thoraco-lumbar curves).
	degenerative	de novo, secondary degenerative.
	posttraumatic	Defective structure due to trauma or fracture.
	M. Scheuermann	Scheuermann’s disease (Type I, “classical” Scheuermann’s) is a thoracic or thoracolumbar hyperkyphosis due to wedged vertebrae developing during adolescence.  Atypical Scheuermann’s disease (Type II, “lumbar” Scheuermann’s) affects the lumbar spine and/or the thoracolumbar junction. It is a growth disturbance of the vertebral bodies without significant wedging causing loss of lumbar lordosis or mild kyphosis.
	syndromic	Deformity in the context of syndromic conditions.
other...	→ Specify any other aetiology that does not fit the available categories.	

## Infection

Variable	Categories	Definition
<b>Infection specification</b>	Pyogenic	Due to bacteria (not specific).
	Tuberculous	Tuberculosis
	multi-resistant	Acquired non-susceptibility to at least one agent in three or more antimicrobial categories.
	other...	→ specify
	unknown	
<b>Affected structures</b>	spondylitis****	Infection of the vertebrae.
	discitis****	Infection of the intervertebral disc.
	epidural space	“extradural space” or “peridural space”.

Variable	Categories	Definition
		Space within the spinal canal (bony structures) outside the dura matter.
	paravertebral infection	Infection of the paravertebral soft tissue (muscles etc.).
	other...	→ specify
****for spondylodiscitis tick spondylitis AND discitis (multiple choice question)		

### Tumour

Variable	Categories	Definition
<b>Localisation</b>	extraosseous soft tissue	Tumour located in the soft tissue, no osseous involvement.
	intraosseous	Lesion confined to bony spine without extraskeletal involvement.
	extraosseous (extradural)	Tumour tissue located in the spinal canal, extradural without osseous involvement.
	Intradural intramedullary	Affecting spinal cord tissue (e.g. glioma).
	Intradural extramedullary	Located deep in the theca but does not involve spinal cord tissue (e.g. meningioma).
	other...	→ specify
<b>Type of tumour</b>	primary malignant	According to the histologic classification.
	primary benign	According to the histologic classification.
	secondary malignant	Metastasis
	tumour-like lesion	Intermediate
	other...	→ specify

### Repeat surgery

Variable	Categories	Definition
	hardware removal	Removal of implants: e.g. screws, rods.

Variable	Categories	Definition
<b>Reason for repeat surgery</b>	non-union	Failure of bony consolidation of bridge / union 6 months after surgery.
	instability	Exceeded motion in a spinal segment after surgery.
	failure to reach therapeutic goals	Therapeutic goals were not achieved with index surgery.
	neurocompression	Compression of neural structures with or without neurological deficits.
	postop infection superficial	Superficial infection after surgery.
	postop infection deep	Deep (subfascial) wound / tissue infection after surgery.
	implant malposition	Incorrect position of the implant.
	implant failure	Problem due to an implant e.g. loosening, breakage etc.
	sagittal imbalance	Imbalance of the spine in the sagittal plane with an abnormal position of the vertical axis or associated pathologic compensatory mechanisms (Le Huec et al, Eur Spine J 2019, Volume 28, Issue 9, pp 1889–1905)
	adjacent segment pathology	Progressive (degenerative) changes in the adjacent segment of the index surgery.
other...	→ specify	

#### Additional characterisation of main pathology

Variable	Categories	Definition
<b>Most severely affected segment / vertebral body</b>	C0 to ilium	Tick the segment / vertebral body. For segments, indicate cranial vertebral body only, e.g. for segment L4 / 5 tick "L4".  <b>In deformity surgery:</b> Use the apex of the main curve as the most severely affected segment / vertebral body.
<b>Extent of lesion</b>	1	Indicate the number of <b>affected segments for the main pathology</b> . This may be different than the
	2	



Variable	Categories	Definition
	3	number of segments treated / operated (e.g. instrumented).
	4	
	>4	
<b>Number of previous spine surgeries</b>	At same / adjacent level(s):	
	0	Indicate the number of previous interventions on the spine at the same level as or an adjacent level compared to the level of the current procedure.
	1	
	2	
	3	
	4	
	>4	
	At other level(s):	
	0	Indicate the number of previous interventions on the spine at a different (non-adjacent) level than the level of the current procedure.
	1	
	2	
	3	
4		
>4		
<b>Duration of symptoms Requiring treatment</b>	< 3 months	From onset.
	3-12 months	From onset.
	> 12 months	From onset.
<b>ASIA impairment scale</b>	A	Complete: No sensory or motor function is preserved in sacral segments S4-S5.
	B	Sensory function incomplete: Sensory, but not motor, function is preserved below the neurological level and extends through sacral segments S4-S5.
	C	Motor function incomplete: Motor function is preserved below the neurological level, and most key

Variable	Categories	Definition
		muscles below the neurological level have a muscle grade of less than 3.
	D	Motor function incomplete: Motor function is preserved below the neurological level, and most key muscles below the neurological level have a muscle grade that is greater than or equal to 3.
	E	Normal: Sensory and motor functions are normal.
	Not assessable / applicable	The question is only mandatory if the main pathology selected is “fracture / trauma” or “pathological fracture”.
<b>Additional pathology</b>	<i>This question offers the opportunity to list other relevant pathologies (multiple choice). “Additional pathology” must be different from “main pathology”. Always select the most severe condition as the main pathology and less severe conditions as “additional pathology”.</i>	
	none	No additional pathology.
	degenerative disease	See definitions under <b>Main pathology</b> . Additional pathologies are not specified further (with the exception of the categories “repeat surgery” and “other”).
	nondegenerative deformity	
	fracture / trauma	
	pathological fracture	
	spondylolisthesis (nondegenerative)	
	Chiari	
	Infection	
	Tumour	
	repeat surgery	→ Also complete <b>Reason for repeat surgery</b> question.
	other...	→ Specify any other additional pathology not covered by the options above.

## Risk factors

Variable	Categories	Definition
Height	-	Height in centimetres.
Weight	-	Weight in kilograms.
BMI		Body mass index calculated in online form. WHO obesity classification: Underweight: <18.5 Normal weight range: >18.5 - 24.99 Overweight: 25 - 29.99 Obese: >30
Current smoker	yes	A person who smokes regularly at present OR a current occasional smoker (unknown number of days in the past month).
	no	A person who does not currently smoke at all (either never smoked or a former smoker).
	unknown	Smoking status not known.

## Surgery

Variable	Categories	Definition
Surgery date	Day Month Year	Date the patient underwent surgery. Online format: dd.mm.yyyy
Surgeon (Surgeon 1)		In the pull-down menus for "Surgeon" and "Assistant," all registered physicians / surgeons and residents for a given department appear.  If used properly and consistently, surgeons and residents can obtain a statistical overview of all procedures they have performed and/or assisted with.
Assistant (Surgeon 2)		
Therapeutic goals	<i>What the surgery should achieve from the surgeon's perspective. Select all that apply.</i>	
	axial pain relief	Aim: back / neck pain relief after surgery.
	peripheral pain relief	Aim: leg / arm pain relief after surgery.
	functional improvement	Aim: functional improvement compared to preoperative status, e.g. capable of walking longer distances,

Variable	Categories	Definition
		increased mobility, improved working ability (home and job), improved sports ability.
	motor improvement	Aim: improvement of neurological motor function compared to the preoperative status, e.g. muscular function of the legs / arms.
	sensory improvement	Aim: improvement of neurological sensory function compared to the preoperative status, e.g. recovery of sensation.
	bowel / bladder function improvement	Aim: improvement of the bladder and sexual function compared to the preoperative status.
	spinal stabilisation <i>(US stabilization)</i>	Aim: stabilisation of the spine.
	stop progression of deformity	Aim: avoidance of progression of the spinal deformity.
	deformity correction	Surgical restoration of spinal anatomy with the goal of significantly improving the sagittal and/or coronal alignment.
	prophylactic decompression	Aim: prophylactic / preventive decompression to avoid development of neurocompression.
	cosmetic improvement	Improvement of the physical appearance of the patient.
	diagnostic measures	Operation is a diagnostic procedure (e.g. biopsy).
	other...	→ Specify any other therapeutic goal not covered by the options above.
<b>Components</b>	none	
	with description	<p>Activates the implant subform for describing supplier for implants, article name and article number (e.g. screws, rods, disc prosthesis).</p> <p>➔ Complete “Components” subform by manually selecting the implant from the catalogue or by scanning their barcode (see “Implants”).</p>

Variable	Categories	Definition
	w / o description	Implants are used but no device details or further description is provided.
<b>Anterior access</b>	no anterior access	No anterior access.
	transoral	Through oropharyngeal cavity.
	anterolateral	Anterior medial approach to the cervical spine for mainly C3-Th1.  Note: anterior approach to the lumbar spine (see “retroperitoneal” or “transperitoneal”).
	cervicothoracic anterolateral	Access to pathologies involving the cervicothoracic junction.
	cervicothoracic w / sternotomy	With sternotomy depending on the extent / location of the lesion.
	thoracotomy	Thoracotomy to T4-T11.
	thoracoabdominal	Extensive approach opening the thorax and retroperitoneum by taking down the diaphragm. Provides access to Th10- L2.
	retroperitoneal	Anterior approach to L2-S without incision of peritoneum.
	transperitoneal	Anterior approach to L2-S through the peritoneal cavity.
	extreme lateral (e.g. XLIF)	Lateral, retroperitoneal, transpoas approach, (e.g for XLIF = extreme lateral interbody fusion).
	other...	→ Specify any other anterior access.
<b>Posterior access</b>	no posterior access	No posterior access.
	midline	Posterior approach to the cranio-cervical-thoracic-lumbo-sacral spine.
	paramedian	Paramedian incision.
	posterolateral	E.g. costotransversectomy.
	percutaneous	Percutaneous approach for e.g. minimal invasive surgeries.

Variable	Categories	Definition
	trans-sacral (e.g. AxiALIF)	Trans-sacral approach (also called presacral), used for e.g. AxiALIF = trans-sacral axial lumbar interbody fusion (also called percutaneous AxiALIF, anterior paraxial or paracoccygeal interbody fusion).
	other...	→ Specify any other posterior access.
<b>Morbidity state</b>	Unknown	Only if not indicated by the anaesthesiologist.
	ASA 1 (no disturbance)	<p><b>ASA I:</b> Healthy individual <b>with no systemic disease</b>, undergoing elective surgery. Patient not at extremes of age. (Note: age is often ignored as affecting operative risk; however, in practice, patients at extremes of age are often thought to represent increased risk).</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>- Fit patient with inguinal hernia.</li> <li>- Fibroid uterus in otherwise healthy woman.</li> </ul>
	ASA 2 (mild / moderate)	<p><b>ASA II:</b> Individual with <b>one systemic, well-controlled disease</b>. Disease does not affect daily activities. Other anaesthetic risk factors, including mild obesity, alcoholism, and smoking can be incorporated at this level.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>- Non-limiting or only slightly limiting organic heart disease.</li> <li>- Mild diabetes, essential hypertension, or anaemia.</li> </ul>
	ASA 3 (severe)	<p><b>ASA III:</b> Individual with <b>multiple system disease or well-controlled major system disease</b>. Disease status limits daily activity. However, there is no immediate danger of death from any individual disease.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>- Severely limiting organic heart disease.</li> <li>- Severe diabetes with vascular complications.</li> <li>- Moderate to severe degrees of pulmonary insufficiency.</li> <li>- Angina pectoris or healed myocardial infarction.</li> </ul>
	ASA 4 (life threatening)	<p><b>ASA IV:</b> Individual with <b>severe incapacitating disease</b>. Normally, disease stage is poorly controlled or end stage. Danger of death due to organ failure is always present.</p> <p>Examples:</p>

Variable	Categories	Definition
		<ul style="list-style-type: none"> <li>- Organic heart disease showing marked signs of cardiac insufficiency, persistent anginal syndrome, or active myocarditis.</li> <li>- Advanced degrees of pulmonary, hepatic, renal, or endocrine insufficiency.</li> </ul>
	ASA 5 (moribund)	<p><b>ASA V:</b> Patient who is in <b>imminent danger of death</b>. Operation deemed to be a last resort attempt at preserving life. Patient not expected to live through the next 24 hours. In some cases, the patient may be relatively healthy prior to catastrophic event which led to current medical condition.</p> <p>Examples:</p> <ul style="list-style-type: none"> <li>- Burst abdominal aneurysm with profound shock.</li> <li>- Major cerebral trauma with rapidly increasing intracranial pressure.</li> <li>- Massive pulmonary embolus.</li> </ul> <p>(Note: most of these patients require operations as a resuscitative measure with little, if any, anaesthesia.)</p>
	Reference: Composite from different editions of the "Textbook of Surgery" (Sabiston, David C., Textbook of surgery. Philadelphia: W.B. Saunders Company).	
<b>Surgeon credentials</b>	specialized spine	Self-indicated, spinal fellowship completed; majority of current work focussed on spinal disorders.
	board certif. orthopaedic	Board certified orthopaedic surgeon.
	board certified neuro	Board certified neurosurgeon.
	orthopaedic in training	Orthopaedic surgeon in training.
	neuro in training	Neurosurgeon in training.
	other...	→ specify
<b>Technology</b>	conventional	Conventional open surgery without any of the assistive devices mentioned below.
	MISS / LISS	MISS: minimally invasive spine surgery. LISS: less invasive spine surgery.

Variable	Categories	Definition
	intraop. 3D-imaging	Intraoperative acquisition of spinal imaging with equipment capable of rendering axial as well as coronal and sagittal imaging similar to a CT scan reconstruction.
	endoscope	Surgeon uses an endoscope.
	CASS / navigation	Computer assisted spine surgery / navigation.
	microscope	Surgeon uses a microscope.
	neuromonitoring	Intraoperative neurophysiological monitoring (IONM) or intraoperative neuromonitoring to monitor the functional integrity of certain neural structures during surgery.
	other...	→ specify
<b>Operation time</b>	unknown	Indicate the duration of surgery (skin to skin) to the nearest hour.
	<1 h	
	1-2 h	
	2-3 h	
	3-4 h	
	4-5 h	
	5-6 h	
	6-8 h	
	8-10 h	
	>10 h	
<b>Blood loss</b>	unknown	Indicate the amount of blood lost.
	< 100 ml	
	100-500 ml	
	500-1000 ml	
	1000-2000 ml	
	>2000 ml	



Variable	Categories	Definition
<b>Blood transfusion</b>	none	Multiple choice. Indicate the number of transfused units (autologous and allogeneic).  Also indicate if a cell-saver was used. The cell saver collects blood from the surgical field to a machine which separates the red blood cells from detritus, washes and concentrates the red blood cells to be reinfused into the patient.
	<2 units	
	>= 2 units	
	cell saver	
	unknown	

## Implants

Starting from Q1 2020, the implant will be documented based on the implant library with the standard pre-populated implant specification.

Variable	Categories	Definition
<b>Manufacturer / supplier</b>	-	Name of the company that manufactures the product.
<b>Catalogue number</b>	-	Can be found on the implant sticker and typed in or scanned by barcode. If an article does not have an article number, click "request" to request the number from the manufacturer.
<b>Lot number</b>	-	Enter lot number if available.
<b>Barcode (GTIN)</b>	-	Will be loaded automatically when selecting the component from the catalogue.
<b>Description</b>	-	Will be loaded automatically when selecting the component from the catalogue.

## Surgical measures

Variable	Categories	Definition
<b>Decompression</b>	none	No decompression.
	discectomy partial / total	Excision of an intervertebral disk partially and total.
	vertebrectomy partial	Partial resection of the vertebra.

Variable	Categories	Definition
	vertebrectomy full	Complete / full resection of the vertebra.
	laminotomy	Partial resection resp. opening the spinal canal through the lamina.
	hemi-laminectomy	Removal of one side of the vertebral lamina.
	laminectomy	Removal of the posterior arch of a vertebra.
	facet joint resection partial	Partial resection of the facet joints.
	facet joint resection full	Complete resection of the facet joint.
	sequestrectomy	Excision of a sequester.
	flavectomy	Removal of the ligamentum flavum.
	foraminotomy	Bone resection / widening of the foramina.
	laminoplasty	Opening up the space within the spinal canal by creating a hinge on the lamina.
	uncoforaminotomy	Anterior cervical foraminotomy.
	other...	→ specify
<b>Decompression - extent of surgery</b>	C0 to ilium	Tick <b>ALL</b> treated segments / vertebral bodies. For segments, indicate cranial vertebral body only. Example: tick L3 and L4 for a bisegmental discectomy on L3 / L4 and L4 / L5.
<b>Fusion promoting measures</b>	none	No fusion promoting measures.
	interbody fusion (A-IF)	Anterior interbody fusion of adjacent or distant vertebrae through an anterior approach. A-IF= anterior cervical / thoracic / lumbar interbody fusion (location defined by 'level of intervention' question).
	interbody fusion (PLIF)	Anterior interbody fusion of adjacent or distant vertebrae through a posterior approach. PLIF= posterior lumbar interbody fusion.
	interbody fusion (TLIF)	Anterior interbody fusion of adjacent or distant vertebrae through a posterior approach.

Variable	Categories	Definition
		TLIF = transforaminal lumbar interbody fusion.
	interbody fusion (XLIF)	Anterior interbody fusion of adjacent or distant vertebrae through a far lateral approach). XLIF = extreme lateral interbody fusion.
	other interbody fusion	If anterior interbody fusion types such as A-IF, PLIF, TLIF and XLIF do not apply, e.g. with AxiaLIF.
	posterolateral fusion	Posterolateral attachment of fusion material.
	posterior fusion	Posterior attachment of fusion material.
	Sacroiliac (S2AI) fusion	Positioning of instrumentation through the second sacral pedicle, sacroiliac joint and ileum to supplement lumbosacral fixation used in trauma and deformity cases.
	other...	→ specify
<b>Fusion material</b>		Substance that is intended to contribute to future bony union (e.g. BMP).
	none	No fusion material used.
	autol. bone harvested	Fusion material: autologous bone, harvested in extra location.
	autol. bone locally produced	Fusion material: autologous bone locally produced during operation, e.g. via spinal decompression.
	allog. bone	Fusion material: allogeneic bone.
	bone subst.	Fusion material: bone substitute.
	cement	Fusion material: cement.
	BMP or similar	Bone morphogenetic protein, other growth factors.
	other...	→ specify
<b>Fusion - extent of surgery</b>	C0 to ilium	Tick <b>ALL</b> treated segments / vertebral bodies. For segments, indicate cranial vertebral body only. Example: tick L3 and L4 for a monosegmental instrumented fusion on L3 / 4.

Variable	Categories	Definition
<b>Stabilisation rigid</b> <i>(US stabilization)</i>	interbody stabil. with cage	Cage implantation between two adjacent vertebrae (through an anterior <b>OR</b> posterior approach). Usually regarded as anterior rigid stabilisation / anterior and middle column).
	interbody stabil. with auto- / allograft	Stabilisation between adjacent vertebrae with autogeneic or allogeneic bone graft. Usually regarded as anterior rigid stabilisation.
	vertebral body replacement by cage	Cage implantation as vertebral body replacement with total or partial vertebral resection. Usually regarded as anterior rigid stabilisation.
	Vertebral body replacement with auto- / allograft	Vertebral body replacement by an auto- or allograft with total or partial vertebral resection. Usually regarded as anterior rigid stabilisation.
	plates	Stabilisation with plates. Usually regarded as anterior rigid stabilisation whereby the plate can be attached at the anterior or lateral aspect of the vertebral body.
	pedicle screws cemented	Pedicle screws stabilisation augmented by synthetic materials that increase the biomechanical properties of the pedicle screw (e.g. polymethylmethacrylate or calcium phosphate). A posterior form of spinal stabilisation.
	pedicle screws uncemented	Stabilisation with non-augmented pedicle screws. A posterior form of spinal stabilisation.
	facet screws	Used as synonym to lateral mass screw (see below).
	transarticular screws C1-C2	Stabilisation with transarticular screws through the C2-C1 joint realized by posterior approach.
	laminar hooks	Stabilisation with supra- or infra-laminar hooks connected to rods. A posterior form of spinal stabilisation.
	pedicle hooks	Stabilisation with pedicle hooks connected to rods. A posterior form of spinal stabilisation.
	lateral mass screw	Posterior stabilisation of the lower cervical spine, with screws crossing the facet joints and connected to rods.
odontoid screws	Anterior cervical spinal stabilisation with odontoid screw.	

Variable	Categories	Definition
	laminar screws	Translaminar facet screw fixation (TLFS). A posterior form of spinal stabilisation.
	Iliac screws	Posterior screws implanted from the posterior superior iliac spine towards anterior inferior iliac spine.
	other...	→ specify
<b>Rigid stabilisation - extent of surgery</b> <i>(US stabilization)</i>	C0 to ilium	Tick <b>ALL</b> treated segments / vertebral bodies. For segments, indicate cranial vertebral body only. Example: Tick L4 and L5 for a monosegmental interbody stabilisation L4 / L5 with cage.
<b>Deformity correction</b>	none	No deformity correction.
	Ponte / Smith-Petersen	A closing wedge, posterior column osteotomy applied to a mobile segment and involving the removal of a portion of the adjoining laminae, of both the superior and anterior facets and ligamenta flava used for the correction of spinal deformities.
	PSO	Pedicle Subtraction Osteotomy. A closing wedge, posterior column osteotomy involving the (at least) partial removal of the vertebral body, the two adjoining laminae, the pedicles of the affected vertebra, of facet joints and ligamenta flava used for the correction of spinal deformities.
	PVCR	Vertebral Column Resection. An opening wedge, posterior column (P-VCR) osteotomy applied to a rigid segment and involving the removal of the two adjoining laminae, of the pedicles and the vertebral body of the affected vertebra, of facet joints and ligamenta flava used for the correction of spinal deformities.
	VCR	A variant of the above where the vertebral body is excised from the front of the spine in a double approach, in order to spare nerve roots in sensitive areas of the cervical and lumbar spine.
	other...	→ specify
<b>Deformity correction - extent of surgery</b>	C0 to ilium	Tick <b>ALL</b> treated segments / vertebral bodies. For segments, indicate cranial vertebral body only.
	none	No motion preserving stabilisation.

Variable	Categories	Definition
<b>Stabilisation motion preserving</b> <i>(US stabilization)</i>	disc replacement	Motion preserving stabilisation by disc replacement (disc arthroplasty).
	dynamic stabilisation <i>(US stabilization)</i>	Motion preserving stabilisation by posterior dynamic technique.
	interspinous spacer	Interspinous process implants.
	other...	→ specify
<b>Stabilisation motion preserving - extent of surgery</b> <i>(US stabilization)</i>	C0 to ilium	Tick <b>ALL</b> treated segments / vertebral bodies. For segments, indicate cranial vertebral body only. Example: Tick C5 and C6 for a bisegmental disc replacement on C5 / C6 and C6 / C7.
<b>Other surgical measures</b>	none	No other surgical measures.
	vb augmentation with body restoration	E.g. kyphoplasty or vertebral body stenting system.
	vb augmentation w / o body restorat.	I.e. vertebroplasty.
	hardware removal	Removal of any type of spinal instrumentation.
	wound drain	Application of drain to help drainage of wound fluids such as blood and/or pus.
	other...	→ specify
<b>Other surgical measures - extent of surgery</b>	C0 to ilium	Tick <b>ALL</b> treated segments / vertebral bodies. For segments, indicate cranial vertebral body only. Note "wound drain", as the only other surgical measure, does not require an answer to "extent of surgery".
<b>Intraoperative adverse event</b>	none	No surgical complications occurring during the surgery.
	nerve root damage	Iatrogenic nerve root damage due to surgery.
	spinal cord damage	Iatrogenic spinal cord damage due to surgery.
	dura lesion	Iatrogenic damage of the dura with liquor emission.
	vascular injury	Iatrogenic damage of a vessel.

Variable	Categories	Definition
	fx vertebral structures	fx = fracture Iatrogenic fracture of osseous spinal structures, e.g. pedicle or vertebral body.
	other...	→ specify
	not documented	Complications unknown or unwillingness to record them.
<b>Measures during index surgery</b>	none	No measures taken because of complications occurred during surgery.
	suture	Closure of a wound or repair of an anatomical structure during an operation.
	glue	Application of a biological sealant, usually to augment the repair of a durotomy (interruption of the dura mater) or closure of the pleura.
	implant reposition	Revision of the position of an implant, typically of screws, cages or plates.
	other...	→ specify
<b>Intraoperative general complications</b>	none	No general complications.
	anesthesiologic <i>(US anaesthesiologic)</i>	Complications during operation due to anaesthesia / narcosis.
	cardiovascular	Cardiovascular complications during operation but not necessarily due to surgical intervention.
	pulmonary	Pulmonary complications during operation but not necessarily due to surgical intervention.
	thromboembolism	Thrombosis / embolism Intraoperative clot formation (thrombus) in a blood vessel that breaks loose and is carried by the blood stream to plug another vessel (e.g. in the leg, kidneys, lungs (pulmonary embolism), brain (stroke) or gastrointestinal tract).
	death	Death during the operation.
	other...	→ specify

Variable	Categories	Definition
	not documented	Complications unknown or unwillingness to record them.

## Hospital stay

Variable	Categories	Definition
<b>Postoperative surgical complications before discharge</b>	Complications occurred after index surgery but during hospitalisation. Refers exclusively to complications that occur during the hospital stay of the recorded surgery.	
	none	No complication occurred.
	epidural haematoma <i>(US hematoma)</i>	Bleeding haematoma outside dural sac but inside bony spinal canal.
	other haematoma <i>(US hematoma)</i>	Haematoma in other location but related to surgery.
	radiculopathy	Affection of nerve root which can lead to radicular pain, weakness, numbness, or difficulty controlling specific muscles.
	CSF leak / pseudo-meningocele	Cerebrospinal fluid leak, fistula.
	motor dysfunction	Motor / muscle dysfunction, new or worse than preoperative.
	sensory dysfunction	Sensory dysfunction, new or worse than preoperative.
	bowel / bladder dysfunction	Bowel or bladder dysfunction due to iatrogenic damage, new or worse than preoperative.
	wound infection superficial	Postoperative superficial wound infection.
	wound infection deep	Postoperative deep / subfascial wound infection.
	implant malposition	Incorrect positioning of the implant.
	implant failure	Failure of the implant e.g. breakage.
wrong level	Surgery on the wrong level, not on the level of the main pathology.	



Variable	Categories	Definition
	recurrent nerve paresis	Paresis of the recurrent nerve as an intraoperative complication observed during the hospital stay.
	other...	→ specify
	not documented	Complications unknown or unwillingness to record them.
<b>Postoperative general complications before discharge</b>	Complications appeared after index surgery but during hospitalisation. Refers exclusively to complications that occur during the hospital stay of the recorded surgery	
	none	
	anesthesiologic <i>(US anaestheisologic)</i>	Postoperative complications related to anaesthesia / narcosis. e.g.: sore throat or swallowing problems after intubation.
	cardiovascular	Cardiovascular postoperative complications. e.g.: heart rhythm disturbances after index surgery.
	pulmonary	Pulmonary postoperative complications. e.g.: pulmonary oedema with dyspnoea after index surgery.
	thromboembolism	Thrombosis / embolism Clot formation (thrombus) in a blood vessel during hospitalisation that breaks loose and is carried by the blood stream to plug another vessel (e.g. in the leg, kidneys, lungs (pulmonary embolism), brain (stroke) or gastrointestinal tract.
	death	Death after surgery, related or unrelated to the intervention.
	other...	→ specify
<b>Re-intervention after index surgery</b>	Second or multiple interventions caused by complications, performed after index surgery, not planned in advance, during the same hospitalisation.	
	none	
	haematoma evacuation <i>(US hematoma)</i>	Surgical evacuation of hematoma.

Variable	Categories	Definition
	suture	Suture of any structure that was not anatomically restored or became apparently insufficient after surgery.
	glue	Gluing of any structure that was not anatomically restored or became apparently insufficient after surgery.
	hardware removal	Removal of any implant.
	hardware re-implantation	Re-implantation after removal of an implant or implant failure.
	abscess drainage	Abscess drainage because of postoperative infection.
	(further) decompression	Expanded enlarged decompression because initial decompression was insufficient.
	other...	→ specify
	not documented	Details of re-intervention unknown or unwillingness to record them.
<b>Hospital stay</b>	uneventful	No special events other than during a routine hospitalisation.
	ICU > 2 days	Intensive care unit stay longer than 2 days.
	extended stay	Extended stay longer than normal with regard to the respective intervention and because of complications.
<b>Status of surgical AEs / complications</b>	Status of surgical and general complications at the time of discharge	
	resolved	Surgical and general complications are completely or almost completely resolved. No more obvious restrictions from complications.
	improved	Surgical and general complications have improved but are still obvious and may still restrict patient function or well-being.
	persisting	Surgical and general complications remain with same severity as when they occurred.
	Achievement of the therapeutic goals that were set preoperatively and recorded in the surgery section (see above)	

Variable	Categories	Definition
<b>Therapeutic goals upon discharge</b>	achieved	The surgical goals have been completely or almost completely achieved at the time of discharge.
	partially achieved	The surgical goals have been only partially achieved at the time of discharge and a further improvement is needed in order to consider them as achieved.
	not achieved	The surgical goals have definitely not yet been achieved at the time of discharge and a further improvement is needed in order to consider them (at least partially) achieved.
<b>Discharge date</b>	Day Month Year	Date the patient was discharged from the facility. Online format: dd.mm.yyyy

## Follow-up 2017

Note that the follow-up form should be created within the same CASE as the corresponding index surgery so that data can be linked for analysis using the case ID.

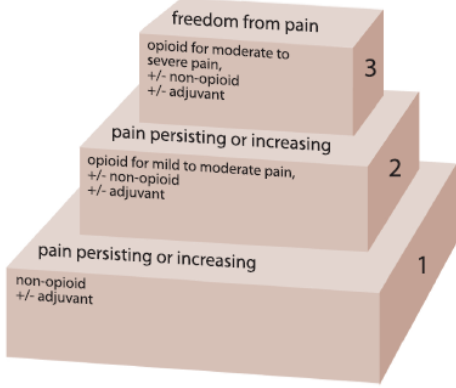
Variable	Categories	Definition
<b>Level of intervention</b>	<i>Select the level corresponding to the index surgery (calculated automatically in 2017 surgery form).</i>	
	upper cervical*	C0-C2
	mid lower cervical*	C3-C7
	cervicothoracic	Including C7 and T1.
	thoracic	T1-T12
	thoracolumbar	Including T12 and L1.
	thoraco-lumbo-sacral	Including T12, lumbar and S1.
	lumbar	L1-L5
	lumbosacral	Including L5 and S1.
	sacral	S1-S5
	coccyx	coccyx
	<i>* For interventions spanning both cervical levels, select the section with more affected levels: e.g. fixation from C0-C3=upper cervical; fixation from C0-C6=mid lower cervical.</i>	

### Follow-up

Variable	Categories	Definition
<b>Follow-up date</b>	-	Date the follow-up examination was completed. Format: dd.mm.yyyy
<b>Follow-up interval</b>	<i>Choose the interval closest to the respective date within the specified window or use the "other" option and specify the follow-up interval.</i>	
	6 weeks	Examination 6 weeks after surgery date ( $\pm 1$ week).

Variable	Categories	Definition
	3 months	Examination 3 months after surgery date ( $\pm 2$ weeks).
	6 months	Examination 6 months after surgery date ( $\pm 2$ weeks).
	1 year	Examination 1 year after surgery date ( $\pm 2$ weeks).
	2 years	Examination 2 years after surgery date ( $\pm 2$ weeks).
	other (yrs.)	<p>→ Specify any other follow-up interval not corresponding to the available categories in <b>years</b>. Examples:</p> <p>4 months=0.33 years 18 months=1.5 years 36 months=3 years</p>
<b>Work status</b>	not at work since OP	No work activity at all since surgery.
	started partially same job	Same professional situation as before surgery, but at a reduced effort (i.e. part-time).
	fully reintegrated	Same professional situation as before surgery.
	resumed work, but quit again	Failed attempt to go back to work, even if part-time.
	resumed work, different job	Successful attempt to go back to work, but in a different position.
	has been dismissed	Job loss, no new occupation yet.
	retired since OP	Retired after date of index surgery, includes both age and disability pension.
	retired before OP	Retired before date of index surgery, includes both age and disability pension.
	housewife/ man	Full-time homemaker.
	child / student	Not yet in professional or home-based work situation.
	other...	→ Specify any other status not covered by the options above.
<p><i>Report on all therapeutic goals <b>originally specified in the index Surgery form</b>. Select the <b>goals</b> under the appropriate question as to whether they were achieved,</i></p>		

Variable	Categories	Definition
<b>Therapeutic goals / measures achievement</b>		<i>partially achieved, or not achieved. The level of achievement should reflect the subjective impression of the surgeon, i.e. the achievement of the goals as they were "negotiated" preoperatively.</i> <i>For descriptions of therapeutic goal categories, see definitions under <b>Therapeutic goals in the Surgery form.</b></i>
	therapeutic goals / measures <b>achieved</b>	Select all therapeutic goals from the index Surgery that were fully reached.
	therapeutic goals / measures <b>partially achieved</b>	Select all therapeutic goals from the index Surgery that were partially, but not fully, reached.
	therapeutic goals / measures <b>not achieved</b>	Select all therapeutic goals from the index Surgery that were not even partially reached.
<b>Medication for spinal surgery / pathology</b>		<i>Tick all that apply, take note of WHO scheme of pain treatment.</i>
	none	No medication for surgery or pathology.
	NSAID, Paracetamol (WHO I)*	Step 1: MILD PAIN Paracetamol, NSAIDS (and adjuvants if needed) adjuvants (for nerve pain) include: tricyclic antidepressants / anticonvulsants, steroids.
	weak opiates (WHO II)*	Step 2: MILD TO MODERATE PAIN Mild-acting opioids + Step 1 non-opioids (and adjuvants if needed). Mild-acting opioids: codeine, dihydrocodeine, dextropropoxyphene.
	strong opiates (WHO III)*	Step 3: MODERATE TO SEVERE PAIN Stronger opioids + Step 1 non-opioids (and adjuvants if needed). Stronger opioids: morphine, diamorphine, fentanyl, hydromorphone.
	corticosteroids	Anti-inflammatory drugs used to treat inflammation.
	antidepressants	Medications used to treat depressive disorders, anxiety and chronic pain conditions.
	vitamin B complex	Water-soluble vitamins used to enhance function of central and peripheral nervous system.
	antibiotics	Antimicrobial substances useful to fight bacterial infections.
	other...	→ Specify any other medication not covered by the options above.

Variable	Categories	Definition
	*WHO pain ladder classification	
<b>Overall outcome (examiner)</b>	<i>Modified Macnab criteria. Reflects the surgeon's impression about the overall success of treatment in terms of patient's symptoms, mobility, return to work, and level of activity.</i>	
	not applicable	Macnab criteria not applicable.
	excellent	No pain, no restriction of mobility, return to normal work and level of activity.
	good	Occasional symptoms (e.g. non-radicular pain), relief of presenting symptoms, able to return to modified work.
	fair	Some improved functional capacity, still handicapped and/or unemployed.
	poor	Poor status or worsening of the underlying condition despite treatment (e.g. continued objective symptoms of root involvement, disabled); additional operative intervention needed at index level irrespective of length of postoperative follow-up.
	References:	
<b>Rehabilitation</b>	none	No organised and structured post-op treatment.
	home-based	Individually practiced exercises at home, as initially shown by a therapist in hospital.
	outpatient rehab / physio	Outpatient structured and monitored rehabilitation or physical therapy programme.

Variable	Categories	Definition
	inpatient rehab / physio	Inpatient structured and monitored rehabilitation or physical therapy programme.
	other...	→ Specify any other rehabilitation not captured by the options above.
<b>Decision</b>	no further follow-up	Patient discharged from care and supervision by treatment centre.
	further follow-up	Appointment made for further follow-up at treating centre.
	revision foreseen	Surgical revision decided at the time of follow-up visit / examination.
	other primary intervention foreseen	Additional spinal intervention planned that is not related to complications or (insufficient) outcome of index intervention but to a <i>different main pathology</i> or same main pathology <i>at a different level</i> .

## Complications

Variable	Categories	Definition
<b>Complications</b>	<p><i>Complications to be indicated in relation to adverse events arising <b>since the last recorded Tango surgery or follow-up form</b>. The complication may either be a new event or a remaining sequela from a previously mentioned complication. That sequela may disappear at a later follow-up. Examples:</i></p> <ul style="list-style-type: none"> <li><i>Infection after discharge will be recorded only at first FU examination.</i></li> <li><i>Implant loosening will be reported at first FU when diagnosis is made.</i></li> </ul>	
	no	No new complications or adverse events resulting from the index surgery, and no remaining sequela from previously reported complications.
	yes	A new complication / adverse event or remaining sequela from a previously reported complication.
<b>Time</b>	early, OP-day to 28 days postop	Onset of complications on the day of surgery to 28 days after surgery.
	sub-acute, 2-6 months	Onset of complications > 28 days and ≤ 6 months after surgery.
	late, > 6 months	Onset of complications > 6 months after surgery.



Variable	Categories	Definition
		<i>For late complications, specify the time when the complication(s) first occurred with respect to the date of the index surgery in months.</i>
<b>Type</b>	<p><i>Multiple choice: Tick all (only) new complications that have either newly occurred or have been ongoing since the last recorded Tango Surgery or Follow-up form.</i></p> <p>sensory dysfunction</p> <p>motor dysfunction</p> <p>bowel / bladder dysfunction</p> <p>non-union</p> <p>implant failure</p> <p>instability</p> <p>CSF leak / pseudo-meningocele</p> <p>wound infection superficial</p> <p>wound infection deep</p> <p>spondylitis</p> <p>discitis</p> <p>epidural haematoma <i>(US hematoma)</i></p> <p>extravertebral haematoma <i>(US hematoma)</i></p> <p>wrong level</p> <p>implant malposition</p> <p>recurrence of symptoms</p>	<p>Sensory dysfunction, new or worse compared with preoperative.</p> <p>Motor / muscle dysfunction, new or worse compared with preoperative.</p> <p>Bowel or bladder dysfunction due to iatrogenic damage, new or worse compared with preoperative.</p> <p>Failure of bony consolidation after fracture fixation or spinal fusion, usually 6 months after surgery.</p> <p>Failure of the implant e.g. breakage.</p> <p>Exceeded motion in a spinal segment after surgery.</p> <p>Cerebrospinal fluid leak, fistula.</p> <p>Postoperative superficial wound infection.</p> <p>Postoperative deep / subfascial wound infection.</p> <p>Infection of the vertebrae.</p> <p>Infection of the intervertebral disc.</p> <p>Bleeding haematoma outside dural sack but inside bony spinal canal.</p> <p>A collection of blood involving structures in proximity of the spine.</p> <p>Surgery on the wrong level, not on the level of the main pathology.</p> <p>Incorrect positioning of the implant.</p> <p>Relapse of symptoms after remission or treatment.</p>

Variable	Categories	Definition
	graft complication	A complication related to application of the graft, e.g. infection, dislocation or pain related to harvesting the same.
	sequelae anaesthesia	Complications due to anaesthesia / narcosis.
	adjacent segment pathology	Progressive (degenerative) changes in the adjacent segment of the index surgery.
	recurrent tumour <i>(US tumor)</i>	Relapse of neoplasm after remission or treatment.
	decompensation of spine	A condition where the patient has reached the point of no return into decompensation – requiring surgical treatment.  Reference: T. Barz, M. Melloh, S.J. Lord, R. Kasch, H.R. Merk, L.P. Staub. A conceptual model of compensation / decompensation in lumbar segmental instability. Medical Hypotheses; Vol. 83, Issue 3, Sep 2014, Pages 312-316.
	cardiovascular	Cardiovascular complications but not necessarily due to surgical intervention.
	gastrointestinal	Involving the upper and/or lower GI system.
	central nervous system	Involving the CNS.
	fx vertebral structures	Fracture of vertebral structures.
	thromboembolism	Formation of a clot (thrombus) in a blood vessel that is dislodged and carried by the blood stream into another vessel, plugging it.
other...	→ Specify any other complication not captured by the given categories.	
<b>Therapeutic consequences</b>	none	No subjective or measurable treatment effect.
	non-operative inpatient	Admitted for non-operative treatment.
	non-operative outpatient	Seen / consulted in non-operative clinic.
	reintervention	Further operative procedure on same patient.
	other...	→ Specify other therapeutic consequences.

Variable	Categories	Definition
<b>Individual consequences</b>	none	No subjective or measurable sequela of treatment or complications.
	increased pain	As measured on a VAS scale compared to pre-intervention.
	prolonged impairment	Protracted condition in which the function of a part of the human body is less than its normal full capacity
	reduced social activities	Impaired ability to be involved in activities considered normal on social occasions, for children or adults dep. on age of the subject.
	permanent impairment	Definitive condition in which the function of a part of the human body is less than its normal full capacity.
	other...	→ Specify other individual consequences.