Appendix 1: Fusion assessment on 1 and 2 year CT-scans

Data quality:

* Volume (helical) CT-scan to make planar reconstructions
* Slice thickness ≤1 mm
* Raw volume datasets (DICOM scans) and preferably reconstructions in the coronal, sagittal and axial stored and exported

Software:

* Horos medical imaging viewer for Mac OS X

Method of fusion assessment and scoring:

* Each side of each segment was assessed in three planes (sagittal, coronal and axial)
* Two locations were assessed separately: intertransverse fusion (lateral to the rod) and facet fusion (at or medial to the rod)
* According to the definitions in Table 1 and using the scoring sheet in Table 2 (columns 2 to 7), fusion in each plane was scored as non-union (0), doubtful fusion (1) or fusion (2)
* Based on the sum score of all three planes (Table 2, columns 8 and 9), a fusion decision per location (intertransverse or facet) was calculated (Table 2, columns 10 and 11)
  + A sum score of ≥3 with at least score 2 in one plane was considered a fusion (2); otherwise it was doubtful fusion (1)
  + A sum score of 2 was regarded as doubtful fusion (1) and a sum score of 0 or 1 as non-union (0)
* The final decision of posterolateral fusion of the segment side (Table 2, column 12) was based on the highest score for intertransverse or facet fusion
* Interbody fusion was scored similarly in two planes (sagittal and coronal) using the scoring sheet in Table 3
  + A sum score of 3 or 4 was considered fusion, 2 doubtful fusion and 0 or 1 non-union

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| Table 1: Applied three-point classification system for posterolateral and interbody fusion. | |
| Scoring | Definition |
| 2 = fusion | Continuous bony bridge from one vertebra to the other, in the absence of any secondary signs of non-union such as fracture or loosening of the screws or rods |
| 1 = doubtful fusion | Doubts about continuity or quality of the bony bridge |
| 0 = non-union | Definite discontinuity or lack of a fusion mass, as well as obvious indications of mobility like material failure or apparent pseudoarthrosis |
| NE = not evaluable | When the quality of the scan does not allow assessment of the bone mass (for example due to scattering) or in case of an osteotomy |

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| Table 2: Example scoring sheet for posterolateral fusion at L4-L5. | | | | | | | | | | | |
|  | Sagittal plane | | Coronal plane | | Axial plane | | Sum score | | Decision | | Decision |
| Segment and side | Inter-transv. | Facet  joint | Inter-transv. | Facet  joint | Inter-transv. | Facet  joint | Inter-transv. | Facet  joint | Inter-transv. | Facet  joint | Segment |
| L4-L5 right | 0 / 1 / 2 | 0 / 1 / 2 | 0 / 1 / 2 | 0 / 1 / 2 | 0 / 1 / 2 | 0 / 1 / 2 | 0 - 6 | 0 - 6 | 0 / 1 / 2 | 0 / 1 / 2 | 0 / 1 / 2 |
| L4-L5 left | 0 / 1 / 2 | 0 / 1 / 2 | 0 / 1 / 2 | 0 / 1 / 2 | 0 / 1 / 2 | 0 / 1 / 2 | 0 - 6 | 0 - 6 | 0 / 1 / 2 | 0 / 1 / 2 | 0 / 1 / 2 |
| *Intertransv. = intertransverse* | | | | | | | | | | | |

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| Table 3: Example scoring sheet for interbody fusion at L4-L5. | | | | |
| Segment | Sagittal plane | Coronal plane | Sum score | Decision |
| L4-L5 | 0 / 1 / 2 | 0 / 1 / 2 | 0 - 4 | 0 / 1 / 2 |