**Supplementary Material 8.** Definitions of severity degree in spine disorders

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| Grade | Definitions |
| Level | Number |
| 2 | 5 | ROM of the C and T-L spines decreased by ≥4/5 of normal |
| 6 | Complete stiffness of the C and T-L spines due to AS |
| 3 | 1 | ROM of the C or T-L spine decreased by ≥4/5 of normal |
| 4 | 1 | ROM of the C or T-L spine decreased by ≥3/5 of normal |
| 5 | 8 | ROM of the C or T-L spine decreased by ≥2/5 of normal |
| 9 | Complete stiffness of the C and T or T and L spines due to AS |
| 6 | 5 | ROM of the C or T-L spine decreased by ≥1/5 of normal  |
| 6 | Complete stiffness of the C or L spine due to AS |

ROM, range of motion; C, cervical; T-L, thoracolumbar; T, thoracic; L, lumbar; AS, ankylosing spondylitis