**Supplementary Material 4.** Definitions of severity degree in upper extremity joint disorders

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| Grade | Definitions |
| Level | Number |
| 1 | 1 | ROM of all three major joints of both arms decreased by ≥75% |
| 2 | 1 | ROM of all three major joints of one arm decreased by ≥75% |
| 2 | ROM of two of three major joints of each arm decreased by ≥75% |
| ROM of all three major joints of both arms decreased by ≥50% and <75% |
| 3 | ROM of all fingers of both hands decreased by ≥75% |
| 3 | 1 | ROM of two of three major joints of each arm decreased by ≥50% and <75% |
| ROM of all three major joints of both arms decreased by ≥25% and <50% |
| 2 | ROM of the thumbs and 2nd fingers of both hands decreased by ≥75% |
| 3 | ROM of all fingers of one hand decreased by ≥75% |
| 4 | ROM of two of three major joints of one arm decreased by ≥75% |
| ROM of all three major joints of one arm decreased by ≥50% and <75% |
| 4 | 1 | ROM of one of three major joints of one arm decreased by ≥75% |
| ROM of thumbs of both hands decreased by ≥75% |
| 2 | ROM of thumb and 2nd finger of one hand decreased by ≥75% |
| 3 | ROM of three fingers of one hand including thumb or 2nd finger decreased by ≥75% |
| 4 | ROM of four fingers of one hand including thumb or 2nd finger decreased by ≥50% and <75% |
| 5 | 1 | ROM of two of three major joints of one arm decreased by ≥50% and <75% |
| ROM of all three major joints of one arm decreased by ≥25% and <50% |
| 2 | ROM of thumbs of both hands decreased by ≥50% and <75% |
| 3 | ROM of thumb of one hand decreased by ≥75% |
| 4 | ROM of thumb and 2nd finger of one hand decreased by ≥50% and <75% |
| 5 | ROM of three fingers of one hand including thumb or 2nd finger decreased by ≥50% and <75% |
| 6 | 1 | ROM of one of three major joints of one arm decreased by ≥50% and <75% |
| ROM of thumb of one hand decreased by ≥50% and <75% |
| 2 | ROM of two fingers of one hand including 2nd finger decreased by ≥75% |
| 3 | ROM of two fingers of one hand including thumb decreased by ≥50% and <75% |
| 4 | ROM of 3rd, 4th,and 5th fingers of one hand decreased by ≥75% |

ROM, range of motion

The three major joints refer to the shoulder, elbow, and wrist.