

Introduction It is reported that maintenance of the 3 sagittal modifiers of the SRS-Schwab classification, PI-LL, pelvic tilt, and global alignment (SVA), is useful for maintaining QOL. The maintenance of back muscle strength is considered to be important for the maintenance of global alignment. However, few studies have longitudinally investigated whether maintenance or improvement of back muscle strength contributes to the maintenance of the 3 sagittal modifiers, prevention of low back pain, and QOL in the long term, so we conducted this study. **Method** A final total of 109 female volunteers who joined health check-ups since 2010 (mean age of the first screening: 65.2 years (56-80 years)) was included. 83 who could be evaluated longitudinally for 5 years and 26 for 10 years were evaluated. The clinical parameters were RDQ and VAS; the imaging parameters were LL, PI, PT, SS, and SVA; and the muscle strength was measured in the abdominal, back, quadriceps, and iliopsoas muscles using a dynamometer. The total scores of the 3 sagittal modifiers (TS3SMs) (0 to 6) and the correlation between each item were evaluated using Spearman's rank correlation coefficient. The three groups whose total modifier values improved, maintained, and worsened in the longitudinal course and the changes in each item were examined. **Result** The correlations between the TS3SMs and each item were significant for age ($r=0.405$: $p<0.001$), RDQ ($r=0.402$: $p<0.001$), VAS ($r=0.277$: $p<0.001$), and back muscles ($r=-.0320$: $p<0.001$). Back muscle strength ($r=-0.247$: $p=0.087$) was correlated with the TS3SMs in those under 64 years old, and age ($r=0.264$: $p=0.011$), back muscle ($r=-0.274$: $p=0.009$), RDQ ($r=0.535$: $p<0.001$) and VAS ($r=0.523$: $p<0.001$) were correlated with the TS3SMs in those 65-74 years old. In patients over 75 years old, only age ($r=0.379$: $p=0.032$) was correlated with the TS3SMs. Next, we examined the relationship between the maintenance, improvement, and exacerbation group of the TS3SMs, and muscle strength and clinical symptoms in the 5-year and 10-year longitudinal subjects. In the 5-year longitudinal subjects, there was no significant trend among the groups. In contrast, in the 10-year longitudinal subjects, back muscle strength improved by an average of 56.3 N in the modifier improvement group, worsened by 5.1 N in the maintenance group, and worsened by 14.6 N in the exacerbation group. In addition, the VAS worsened by 7.8 mm in the exacerbation group, compared with a minimal change of 1.8 mm worsened in the improvement group and 1.9 mm improved in the maintenance group. **Discussion** There was a relationship between the TS3SMs of the SRS-Schwab classification and back muscle strength, RDQ, and VAS. In a long-term longitudinal study, it was suggested that maintaining or improving back muscle strength is useful in preventing the worsening of low back pain.