

# Multiple Sclerosis Functional Composite

## MSFC

The Multiple Sclerosis Functional Composite (MSFC) is a clinical outcome measure that assesses arm, leg, and cognitive function through the use of the nine-hole peg test (9HPT), timed 25-foot walk (T25FW), and 3-minute Paced Auditory Serial Addition Test (PASAT-3), respectively.

### The following components compose the MSFC score:

- Average scores from four 9HPT trials (two per hand, which are averaged for each hand and converted to reciprocals that are averaged)
- Average scores of two T25FW trials
- PASAT-3 number correct

## Formula for Creating the MSFC Score to Compare Groups within a Study (The Preferred Method)

$$\begin{aligned} \text{MSFC Score} = & \{ (\text{Average (1/9-HPT)} - \text{Baseline Mean (1/9-HPT)}) \\ & / \text{Baseline Std Dev (1/9-HPT)} \\ & + \{ - (\text{Average 25-Foot Walk} - \text{Baseline Mean 25-Foot Walk}) \\ & / \text{Baseline Std-Dev 25-Foot Walk} \} \\ & + (\text{PASAT-3} - \text{Baseline Mean PASAT-3}) \\ & / \text{Baseline Std Dev PASAT-3} \} / 3.0 \end{aligned}$$

**Note:** “Average (1/9-HPT)” is the average of the inverse (reciprocal) for the mean time of the two trials on the right hand and reciprocal of the mean time of the two left-hand trials from the test patient, Baseline Mean (1/9-HPT) and Std Dev (1/9-HPT) are the baseline values from each patient in all study groups combined at the baseline assessment; “Average 25-Foot Walk” is the mean time from the two trials of the 25-foot timed walk; and we take the negative value of the Z-score to make the direction of change the same as the other components. Similarly, the Baseline Mean and Std Dev 25-Foot Walk are of all Baseline Groups combined, and “PASAT-3” is the score from the test patient, and the Baseline Mean PASAT-3 and Std Dev PASAT-3 of the combined baseline assessments.

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Std Dev = Standard Deviation

Not only does change in MSFC score correlate with change in the Expanded Disability Status Scale (EDSS), but it has been shown to be predictive of subsequent change in EDSS, suggesting increased sensitivity.

## References

Cutter GR, Baier ML, Rudick RA, et al. Development of a multiple sclerosis functional composite as a clinical trial outcome measure. *Brain*. 1999;122:871-882.  
NMSS\_MSFC. [https://www.nationalmssociety.org/nationalmssociety/media/msnationalfiles/brochures/10-2-3-31-msfc\\_manual\\_and\\_forms.pdf](https://www.nationalmssociety.org/nationalmssociety/media/msnationalfiles/brochures/10-2-3-31-msfc_manual_and_forms.pdf) Accessed November 16, 2020.