Given the significant health and socioeconomic consequences of falls, to develop and promote effective falls prevention strategies among older adults represents a major issue. Jaques-Dalcroze eurhythmics is a music education program through movement method developed in Geneva, Switzerland, in the early 20th century. This new exercise form, adapted for elderly people, features various multitask exercises performed to the rhythm of improvised piano music and mainly challenge gait and balance, but also memory, attention and coordination. We report here the results of a randomized controlled trial conducted in Geneva showing that Jaques-Dalcroze eurythmics practice can improve gait performance under single and dual-task conditions, and balance, as well as reduce both rate of falls and the risk of falling in at-risk elderly community-dwellers.