Table III Performance classes, feedback and condition used to identify exercise quality.

#	Performance class (feedback)	Condition
1	Correct (-)	$d_i \in [m_d - 2\sigma_d; m_d + 2\sigma_d]$, $r_i \in [m_r - 2\sigma_r; m_r + 2\sigma_r]$
2	Too fast (move slower)	$d_i < m_d - 2\sigma_d$, $r_i \in [m_r - 2\sigma_r; m_r + 2\sigma_r]$
3	Too slow (move faster)	$d_i > m_d + 2\sigma_d$, $r_i \in [m_r - 2\sigma_r; m_r + 2\sigma_r]$
4	Too large (move lower)	$d_i \in [m_d - 2\sigma_d; m_d + 2\sigma_d]$, $r_i > m_r + 2\sigma_r$
5	Too small (move higher)	$d_i \in [m_d - 2\sigma_d; m_d + 2\sigma_d]$, $r_i < m_r - 2\sigma_r$
6	Too fast and too large (move slower and lower)	$d_i < m_d - 2\sigma_d$, $r_i < m_r + 2\sigma_r$
7	Too fast and too small (move slower and higher)	$d_i < m_d - 2\sigma_d$, $r_i < m_r - 2\sigma_r$
8	Too slow and too large (move faster and lower)	$d_i > m_d + 2\sigma_d$, $r_i > mr + 2\sigma_r$
9	Too slow and too small (move faster and higher)	$d_i > m_d + 2\sigma_d$, $r_i < m_r - 2\sigma_r$

3.5 Evaluation study

To test and evaluate our training system, two sets of experiments were conducted. Initially, the system was validated with healthy participants using a scripted protocol where all performance classes have been equally represented. Subsequently, the training system was evaluated in an intervention study with COPD patients. The study was performed during normal therapy training sessions to evaluate the overall system performances and the feedback efficacy. Here we summarise the considered exercises and present the study protocols used with healthy participants and COPD patients.

3.5.1 Training exercises

Six exercises were chosen according to the COPD guidelines and in consultation with therapists. The exercises selected (as illustrated in Figure 8) do not require additional equipment to be performed, thus can be used also outside of the rehab centre. Due to their utility in exercising the breathing, the therapists considered these exercises suitable for daily training at home. The exercise set consist of three upper body exercises and three lower body exercises. The upper body exercises, arm abductions (AA), elbow circles (EC) and elbow breathing (EB), increase strength in arm and shoulder muscles, while the lower body exercises, knee extensions (KE), leg lifts (LL) and step-ups (SU), train lower body muscles.