E.J. Fimbel. Aging and myocontrol: impact on assistive technology. Gerontechnology 2008; 7(2):103. Myoelectric signals are used to control assistive devices like prostheses, computer interfaces and domestic systems[1]. However, they require that the disabled users can control their own myoelectric signals. Myocontrol (control of myoelectric signals) is by no means natural. The motor system evolved to control overt movements, not covert myoelectric activity, and our daily experience did not prepare us for myocontrol. **Methods** In a series of experiments[2,3], we assessed the capacity of myocontrol of young (n=19) and aged (n=23) healthy persons. A classical motor task (pointing) was adapted to myocontrol. Participants had to reach a target with a visual feedback bar controlled by their myoelectric signals (amplitude of a differential electrode placed on the front of the body and/or the hand). We compared two 'pointing' modalities: impulsion (reach the target by means of a single muscular contraction) and sustained (stabilizing the myoelectric amplitude in the target by means of sustained contraction). **Results** *Young participants* (ii) Performance was equivalent for hand and front electrode placements. We suggest that participants used adaptive control strategies, electrode-dependent but equally efficient. (ii) Performance was better when stabilization was required (similar reach time, higher accuracy). (iii) The speed-accuracy trade-offs were markedly different when stabilization was required.
Elderly participants (i) The patterns of performance (speed-accuracy trade-offs) were similar to those of young participants, but (ii) elderly were in average slower. However (iii) some aged individuals performed as well as young participants. In other terms, the main effect of age was to increase the inter-individual differences between 'good-agers' and 'bad-agers'. **Discussion** These results provide guidelines for designing myoelectrically controlled devices (myo-devices). (i) The control should not require rapid sequences of commands and/or adjustments. (ii) The training should encourage the discovery of efficient control strategies. (iii) An assessment of myocontrol is recommended for elderly disabled persons before adopting a myo-device. Indeed, technology can facilitate the control. Different techniques for EMG signal processing[1] provide distinct command spaces characterized by the signal dimension (single electrodes, multiples electrodes, arrays), the extracted features (amplitude, frequency, timing) and the type of command (analog parameters vs. discrete regions). We suggest that valuable quantitative information may be obtained by executing simple tasks, like pointing or stabilization in different command spaces.

References

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Keywords: myocontrol, aging, speed-accuracy trade-off, EMG

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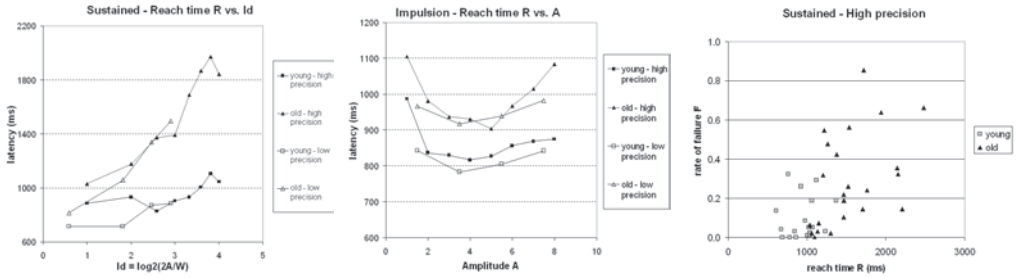

Figure 1. From left to right: speed-accuracy trade-offs for young and aged participants in the impulsion (A) and sustained (B) modalities. Individual performance (C) of young (white squares) and aged (black triangles) participants represented in a plane speed-accuracy. Observe that some aged participants are within the group of young participants[3]