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A Method to Assess Response Inhibition During a Balance Recovery Step

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A METHOD TO ASSESS RESPONSE INHIBITION DURING A BALANCE RECOVERY STEP

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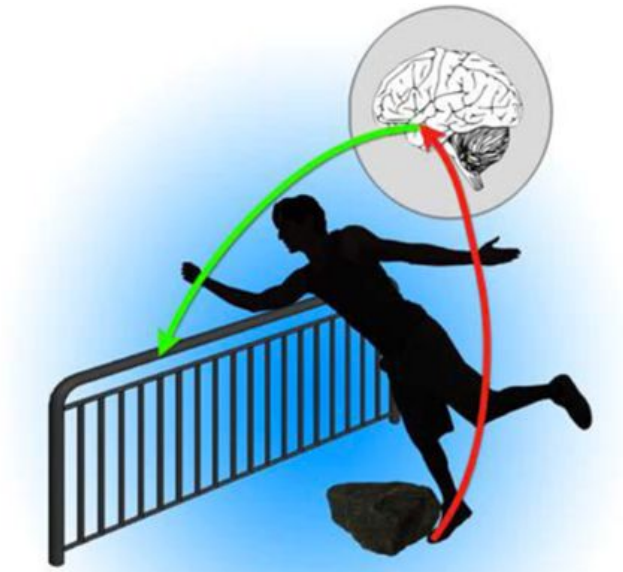


Response Inhibition

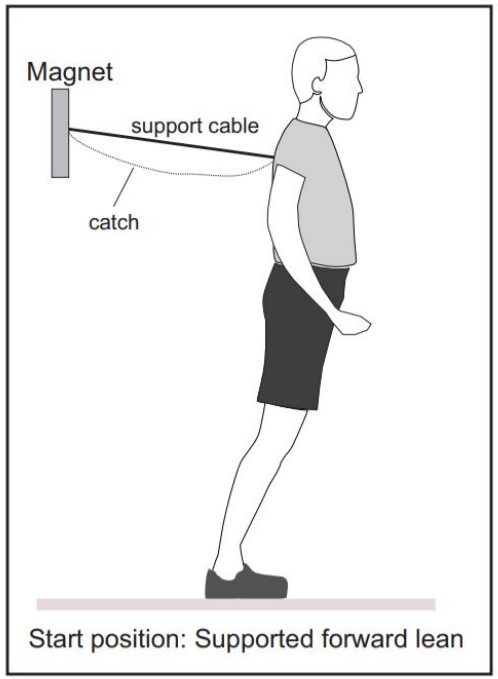
- Tests that emphasize inhibition correlate with falls
- Inhibitory control is stopping unwanted reflexive action
- Stop-signal task is gold standard for measuring response inhibition

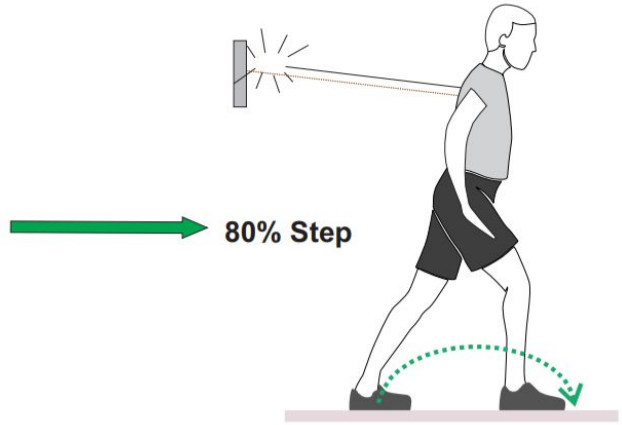
RESEARCH QUESTION

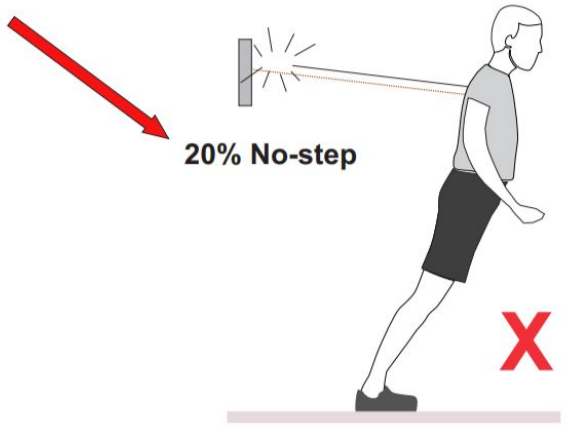
Can we apply a method used in traditional cognitive testing - the stop signal task - to measure response inhibition in a speeded, balance recovery task?

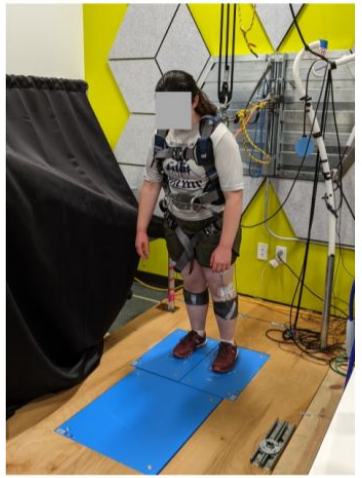
METHODS

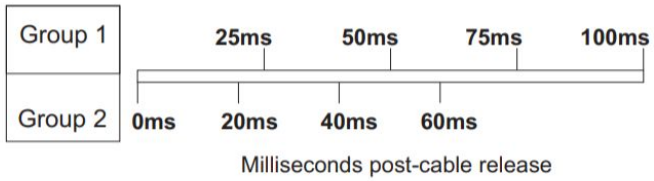
- 20 healthy, young adults
- Lean and release system
- 80% ‘Go’ 20% ‘Stop’
- Stopping capacity calculated



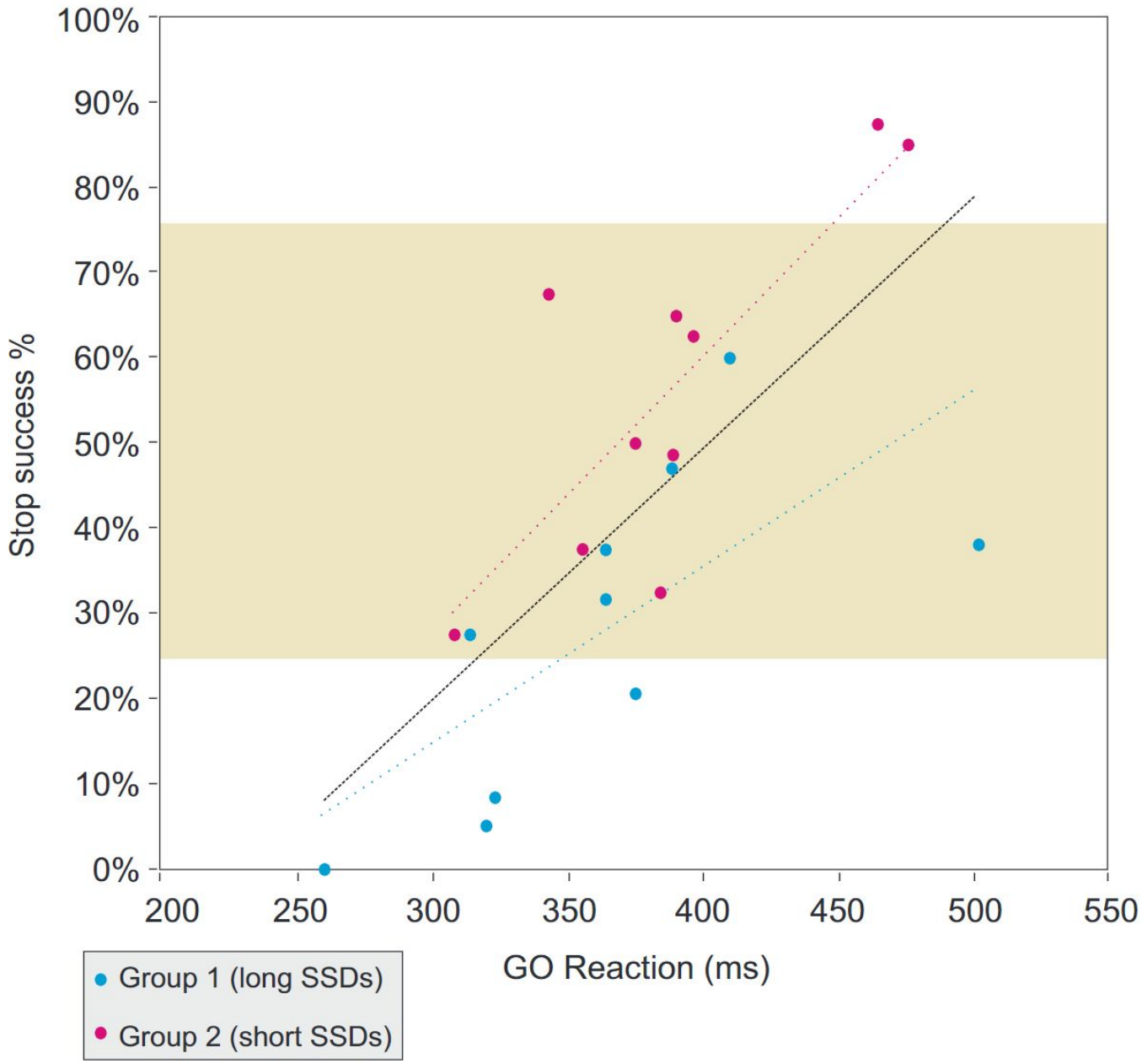


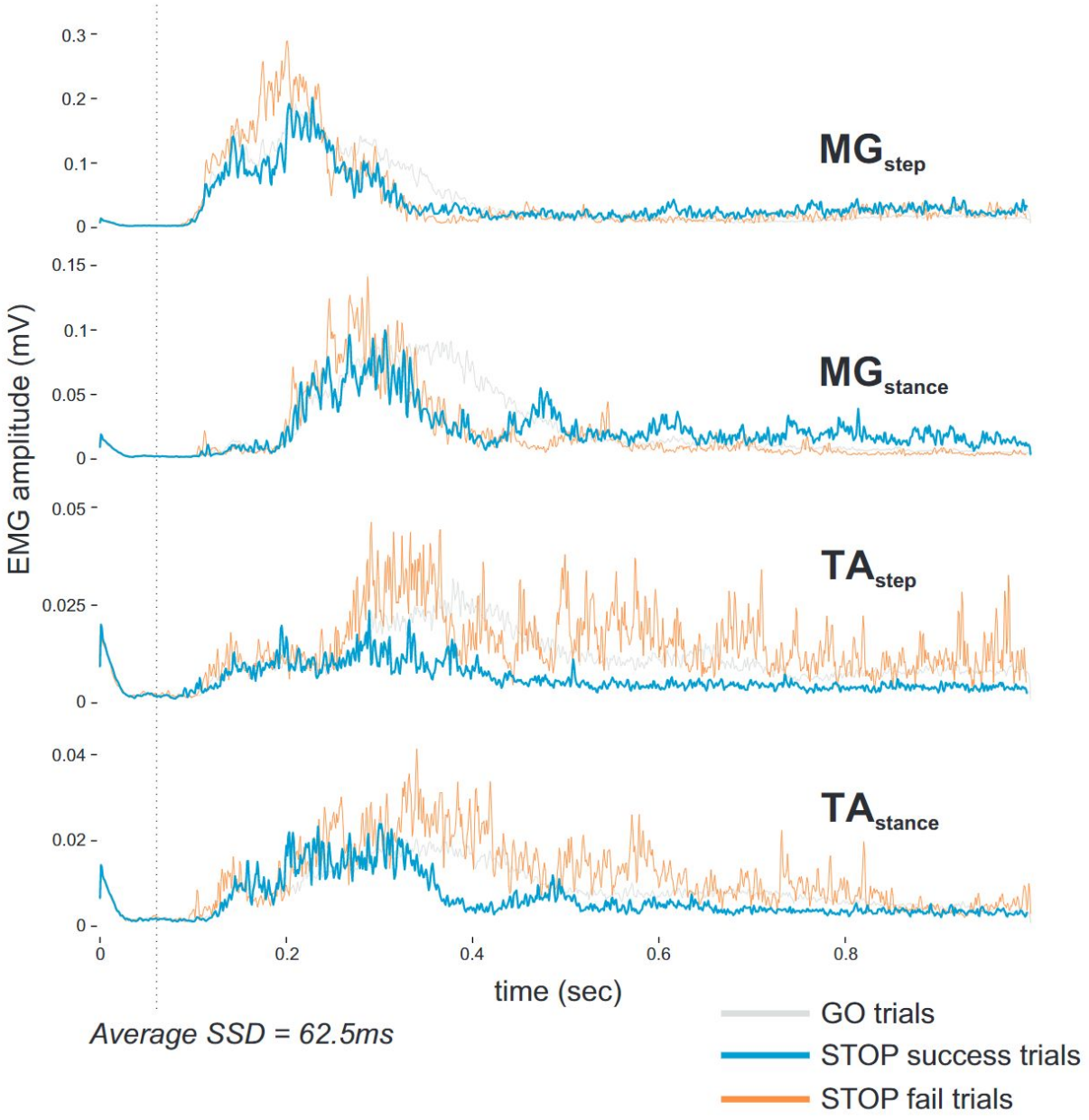




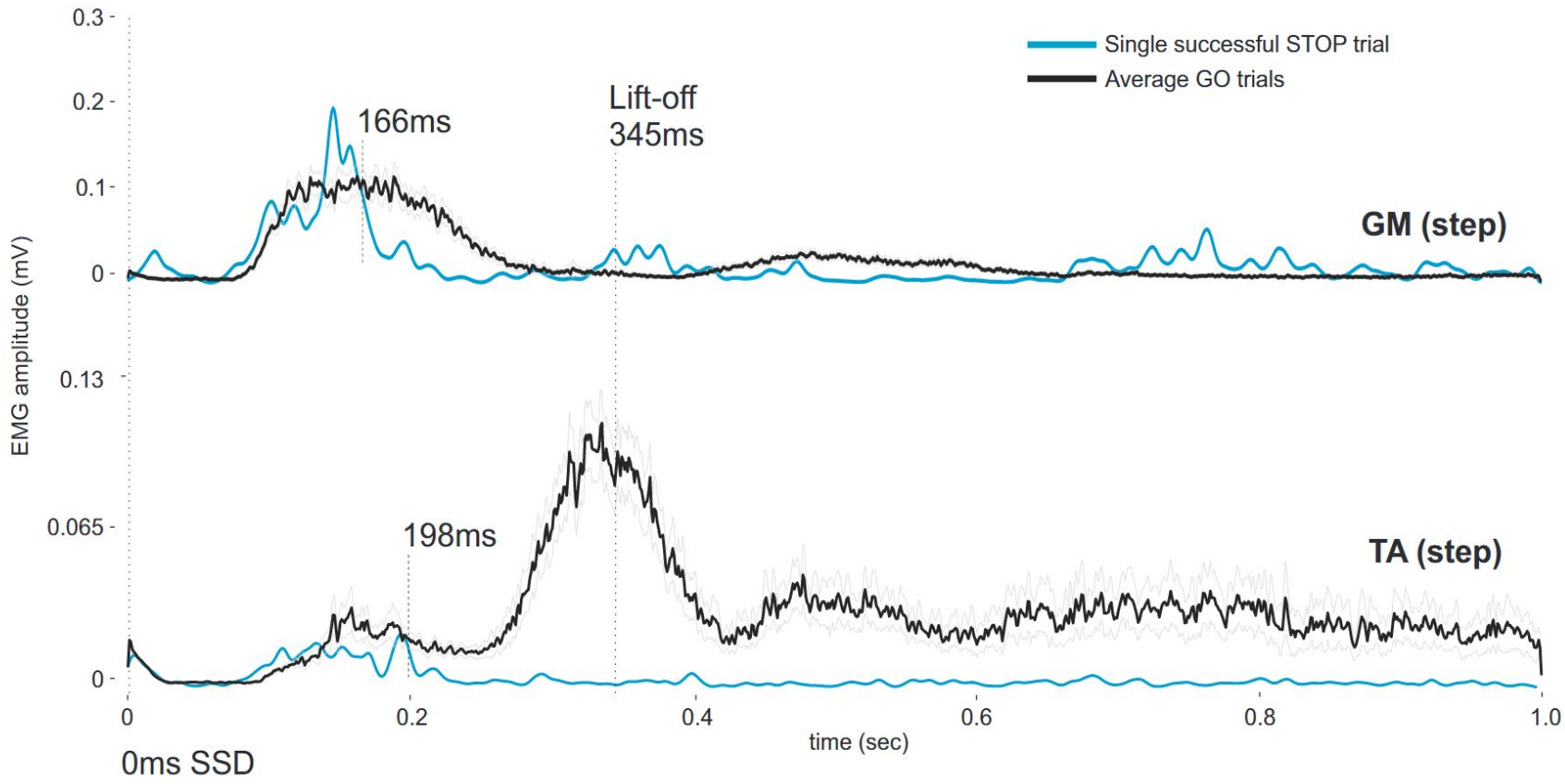


RESULTS


100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Stop success %
200
250
300
350
400
450
500
550
GO Reaction (ms)
Group 1 (long SSDs)
Group 2 (short SSDs)


EMG amplitude (mV)
0.3
0.2
0.1
0
MG step
0.15
0.1
0.05
0
MG stance
0.05
0.025
0
TA step
0.04
0.02
0
TA stance
0
0.2
0.4
0.6
0.8
time (sec)
Average SSD = 62.5ms
GO trials
STOP success trials
STOP fail trials

Cancel Time


Single successful STOP trial
Average GO trials
166ms
Lift-off
345ms
GM (step)
198ms
TA (step)
EMG amplitude (mV)
0.3
0.2
0.1
0
0.13
0.065
0
0
0.2
0.4
0.6
0.8
1.0
time (sec)
0ms SSD

HIGHLIGHTS

- Tests that emphasize inhibitory control correlate with falls
- Reactive balance test to assess response inhibition
- Stop signal reaction time and stopping ability were calculated
- Fills gap in assessing key cognitive variable of falls

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