INTRODUCTION: It is well recognized that unilateral strength and skill training improves motor performance of not only the practiced limb, but also in the unpractised contralateral homologous limb. Neural adaptations have been implicated, because the cross-transfer of strength occurs in the absence of muscle hypertrophy. Recent investigations have shown that unilateral strength training leads to adaptive changes in the primary motor cortex ipsilateral to the training limb (iMI) in the form of increased corticospinal excitability.

AIM: Determine whether increases in corticomotor excitability and reductions in SICI of the iMI modulates the cross-transfer of strength following heavy-load, controlled tempo strength training of the knee extensor muscles.

METHODS: Right leg dominant participants (n = 14), were randomly divided into either a strength training (ST) or control group. The ST group completed 9 training sessions (4 sets of 6-8 repetitions of single right leg squats).

RESULTS: We observed a 41% increase in right leg strength, and a 35% increase in strength of the untrained left leg (p < 0.01). There was a significant increase in motor evoked potential (MEP) amplitude recruitment curve for the untrained left leg (p < 0.01). SICI of the iM1 decreased by 21% for the untrained left leg (p < 0.01).

CONCLUSION: The findings provide evidence for corticomotor adaptation for cross-education leg strength training within the iM1 that is modulated by changes in interhemispheric inhibition.