**Supplementary Materials**

For patient P03 in the PLP group, the normalized EMG amplitudes measured from the VL muscle in the amputated leg during the flexion/extension movement condition exceeded 2 (2.120). This indicated that the average EMG amplitude was greater than twice the mean amplitude obtained during the maximum voluntary contraction (MVC). Normalized EMG amplitudes for this patient also exceeded 1 (1.02) in the VL muscle of the amputated leg during the abduction/adduction movement condition. Further analysis showed that the EMG amplitudes obtained from this patient were greater than 2.5 SD above the PLP group mean for both the flexion/extension (mean = .508, SD = .590) and abduction/adduction (mean = .325, SD = .273) movement conditions. For these reasons, P03 was considered an outlier and their data was excluded from the analyses included in the manuscript. However, we recognize that excluding a patient with a sample size of n=10 can introduce bias into our results. To mitigate this risk, we have included the data from P03 in the supplementary results here.

Supplementary Table 1: *Including patient* 3, Spearman rank correlation matrix including two-point discrimination (TPD) of the intact and amputated thighs, average pain before amputation, months post amputation, proportion prosthetic use and reported average phantom limb pain (PLP). Threshold for statistical significance .05.

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| --- | --- | --- | --- | --- | --- |
|  | TDP Amputated Limb | TPD Intact Limb | Average Pain Before Amputation | Months Post Amputation | Proportion Prosthetic Use |
| Spearman’s Rho (rs) | .030 | .309 | -.087 | .475 | -.380 |
| *p*-value | .385 | .385 | .811 | .165 | .279 |

Supplementary Table 2*: Including patient 3* Model 1 Results: Effects of limb status, group, and dominant limb amputation scaled EMG amplitude. \**p*<.05, \*\**p*<.01, \*\*\**p*<.001.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Fixed Effects | | | Interaction | Interaction Breakdown: Control Model Fixed Effects | | Interaction Breakdown: Patient Model Fixed Effects | |
| Direction | Limb Status  (Amp/Intact) | Group | Dominant Limb Amputation | Limb Status: Group | Limb Status  (Amp/Intact) | Dominant Limb Amputation | Limb Status  (Amp/Intact) | Dominant Limb Amputation |
| Flex/  Extend | χ2= 15.793  *p*< .001\*\*\*  Estimate=- .014  SE=.055 | χ2= 2.084  *p*= .149  Estimate=.351  SE=.132 | χ2= 2.693  *p*= .101  Estimate= .198  SE= .127 | χ2= 20.101  *p*< .001\*\*\*  Estimate= -.356  SE= .076 | χ2= .310  *p*= .578  Estimate= .014  SE= .026 | χ2= 2.267  *p*= .132  Estimate= .132  SE= .014 | χ2= 20.657  *p*< .001\*\*\*  Estimate= -.342  SE= .068 | χ2= 1.448  *p*= .229  Estimate= .259  SE= .232 |
| Abduct/  Adduct | χ2= 17.338  *p*< .001\*\*\*  Estimate= -.013  SE= .034 | χ2= 6.732  *p*= .009\*\*  Estimate= .237  SE= .061 | χ2= 2.590  *p*= .108  Estimate= .085  SE= .056 | χ2= 14.271  *p*< .001\*\*\*  Estimate= -.182  SE= .047 | χ2= 1.701  *p*= .192  Estimate= -.013  SE= .010 | χ2= 1.827  *p*= .177  Estimate= .017  SE= .013 | χ2= 17.183  *p*< .001\*\*\*  Estimate= -.195  SE= .044 | χ2= 2.279  *p*= .131  Estimate= .149  SE= .104 |

Supplementary Table 3*: Including patient 3* Model 2 Results: Effects of PLP, limb status, and dominant limb amputation on scaled EMG amplitude. \**p*<.05, \*\**p*<.01, \*\*\**p*<.001.

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Fixed Effects | | | Interaction | Interaction Breakdown: Intact Model Fixed Effects | | Interaction Breakdown: Amputated Model Fixed Effects | |
| Direction | Limb Status  (Amp/Intact) | Average PLP | Dominant Limb Amputation | Limb Status: Average PLP | Average PLP | Dominant Limb Amputation | Average PLP | Dominant Limb Amputation |
| Flex/  Extend | χ2= 20.657  *p*< .001\*\*\*  Estimate=-.342  SE= .060 | χ2= 3.104  *p*= .078  Estimate= .177  SE=.068 | χ2= 1.464  *p*= .226  Estimate= .224  SE= .214 | χ2= 13.623  *p*< .001\*\*\*  Estimate= -.146  SE= .038 | χ2= 1.645  *p*= .200  Estimate= .036  SE= .032 | χ2= .628  *p*= .428  Estimate= .071  SE= .106 | χ2= 3.302  *p*= .069  Estimate= .173  SE= .104 | χ2= 1.617  *p*= .204  Estimate=.377  SE= .340 |
| Abduct/  Adduct | χ2= 17.183  *p*< .001\*\*\*  Estimate= -.195  SE= .041 | χ2=4.203  *p*=.040\*  Estimate=.088  SE= .031 | χ2= 2.619  *p*= .106  Estimate= .131  SE= .091 | χ2= 7.190  *p*=.007\*\*  Estimate= -.070  SE= .026 | χ2= 2.464  *p*= .117  Estimate= .021  SE= .015 | χ2= .547  *p*= .460  Estimate= .031  SE= .050 | χ2=4.419  *p*= .036\*  Estimate= .085  SE= .043 | χ2=3.272  *p*= .070  Estimate= .231  SE= .140 |