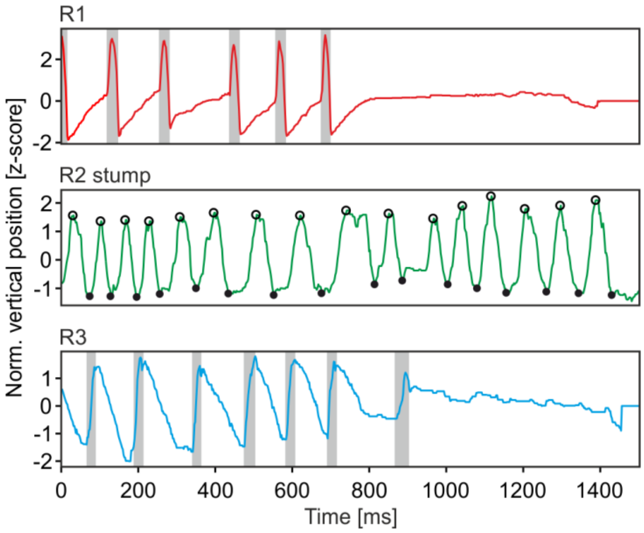
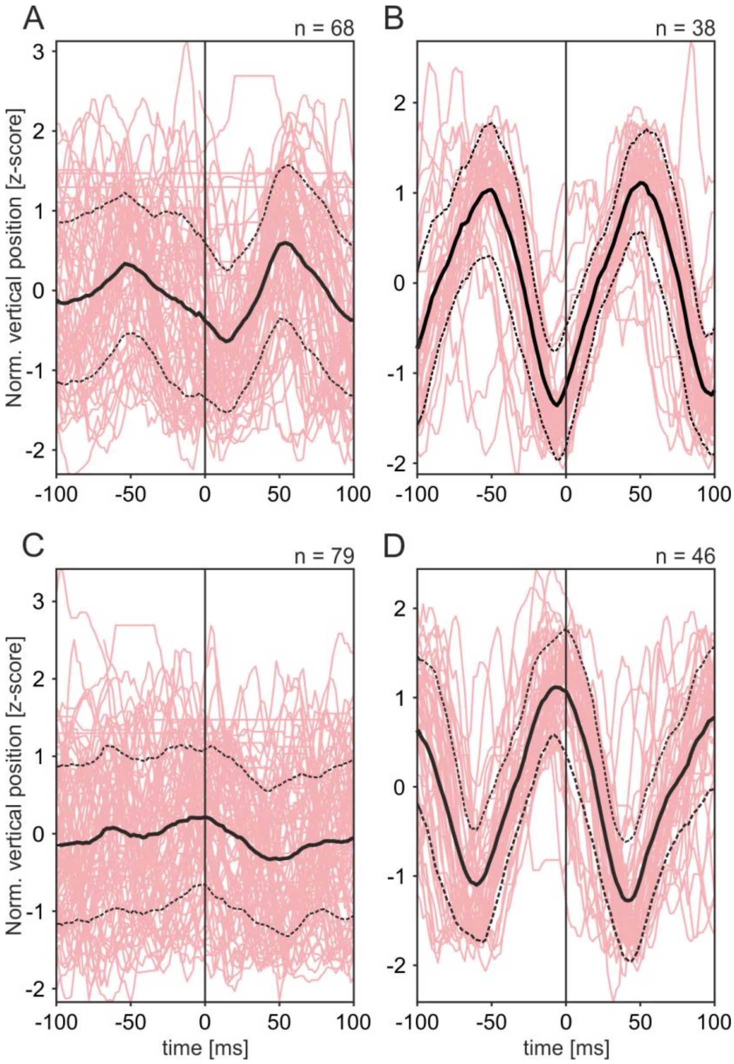
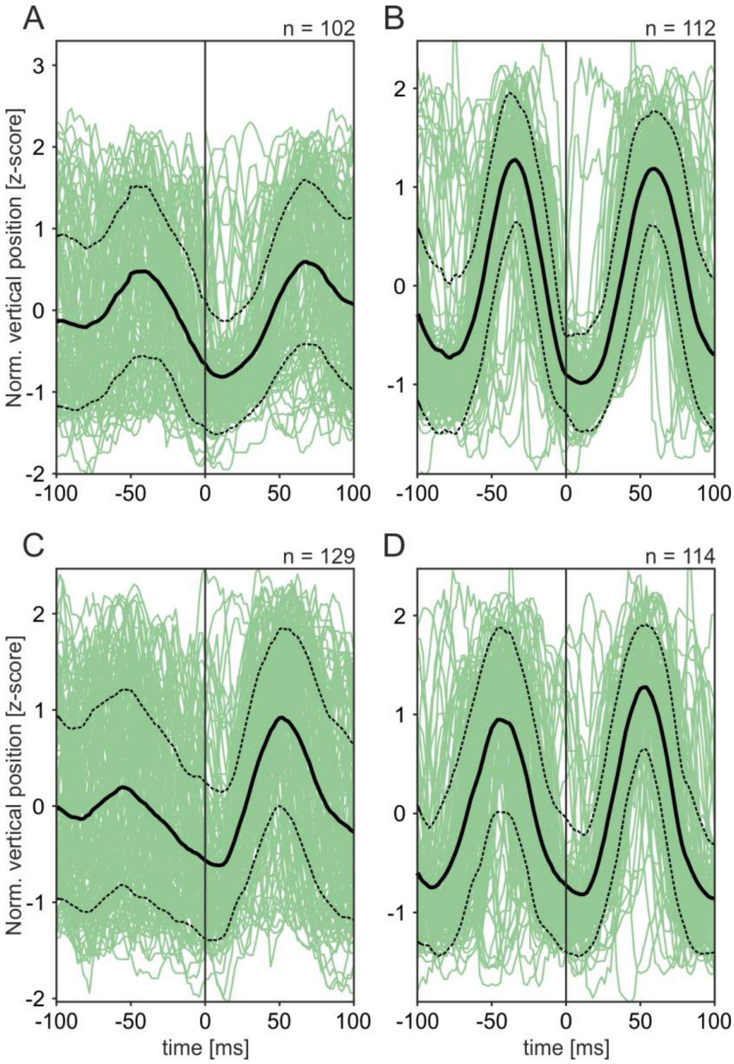


Supp. Fig. 1: Stump oscillations without overt stepping in intact legs. In this example, a middle leg amputee (R2 stump) came to a rest after a walking sequence. Return strokes in intact legs (R1 and R3) are indicated by gray areas. The segment shown here occurred at the end of this sequence. Here, the front leg (R1) took its last step at approx. 700 ms, the hind leg (R3) took its last step at approx. 900 ms. Although the fly was not completely inactive afterwards (as indicated by the non-stationary R1 and R3 traces), the intact legs ceased stepping. At the same time, the middle leg stump continued oscillating up and down. The amplitude and frequency of these oscillations are very similar to those found at the beginning of this sequence (0 to 700 ms).



Supp. Fig. 2: Front leg stump oscillations aligned to PEPs in intact legs. Here, R1 stump movements (normalized vertical component) were aligned to PEP events (at time 0, vertical black line) in intact middle legs (A and B) and intact hind legs (C and D). Light red lines indicate individual stump movements from 100 ms before a PEP event to 100 ms after a PEP event. The solid black line is the average of all stump movements in a given panel. Dashed lines indicate the standard deviation above and below the average. Panels A and C show data for slow walking sequences (≤ 5 BL s^{-1}), panels B and D show data for fast walking sequences (> 5 BL s^{-1}). The number of individual steps (n) is indicated in each panel, the number of front leg amputees was 7.



Supp. Fig. 3: Middle leg stump oscillations aligned to PEPs in intact legs. Here, R2 stump movements (normalized vertical component) were aligned to PEP events (at time 0, vertical black line) in intact front legs (A and B) and intact hind legs (C and D). Light green lines indicate individual stump movements from 100 ms before a PEP event to 100 ms after a PEP event. The solid black line is the average of all stump movements in a given panel. Dashed lines indicate the standard deviation above and below the average. Panels A and C show data for slow walking sequences (≤ 5 BL s^{-1}), panels B and D show data for fast walking sequences (> 5 BL s^{-1}). The number of individual steps (n) is indicated in each panel, the number of middle leg amputees was 10.

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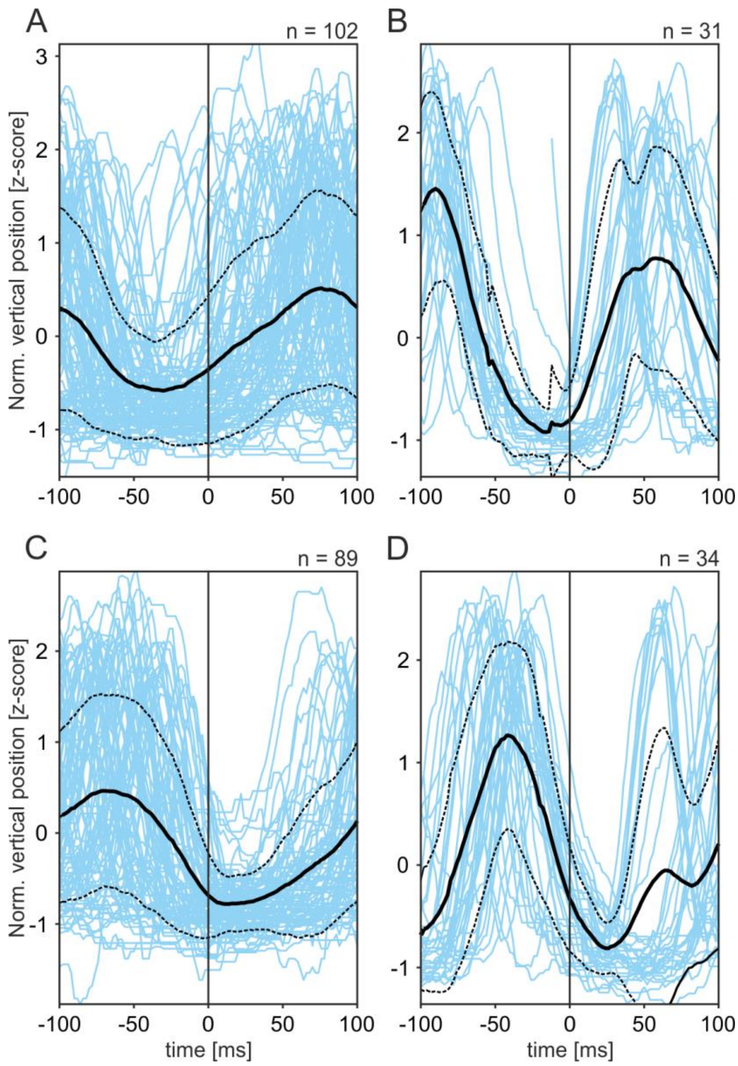
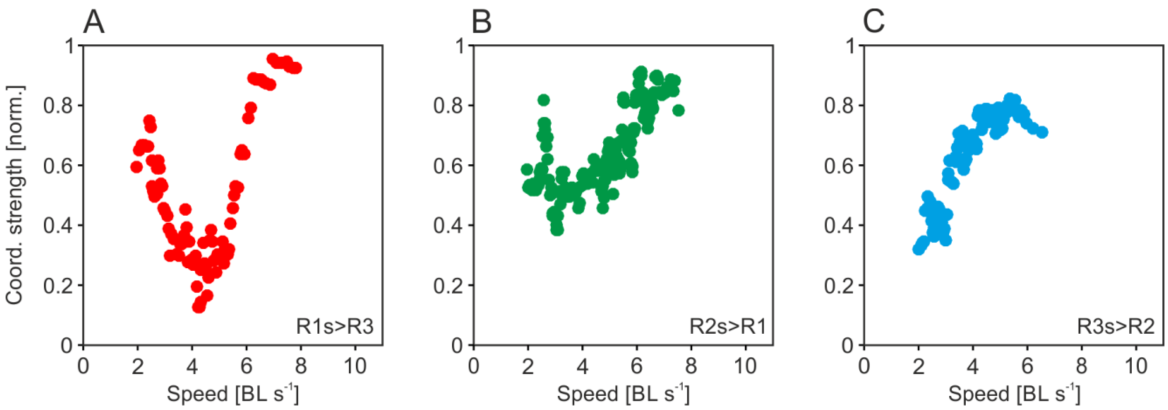
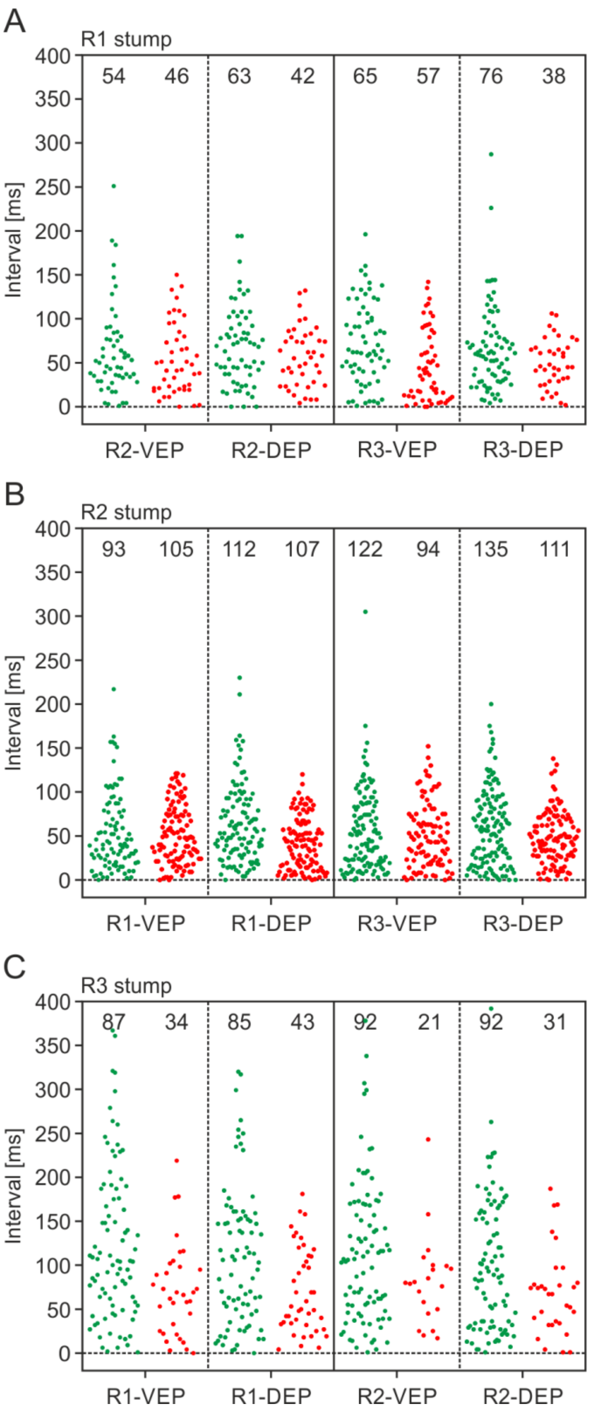


Supp. Fig. 4: Hind leg stump oscillations aligned to PEPs in intact legs. Here, R3 stump oscillations (normalized vertical component) were aligned to PEP events (at time 0, vertical black line) in intact front legs (A and B) and intact middle legs (C and D). Light blue lines indicate individual stump movements from 100 ms before a PEP event to 100 ms after a PEP event. The solid black line is the average of all stump movements in a given panel. Dashed lines indicate the standard deviation above and below the average. Panels A and C show data for slow walking sequences (≤ 5 BL s^{-1}), panels B and D show data for fast walking sequences (> 5 BL s^{-1}). The number of individual steps (n) is indicated in each panel, the number of hind leg amputees was 7.



Supp. Fig. 5: Coordination strength between reference legs and dependent legs as function of walking speed, based on the data shown in Fig. 7. This analysis has been carried out in analogy to the analysis shown in Fig. 6 with the difference that here only the first stump DEP after a PEP in a reference leg was considered (data in Fig. 7). Panels A, B, and C correspond to panels Bi, Cii, and Diii, respectively, in Fig. 6. On average, coordination strength increases in all three stumps in the lower walking speed range. This can be explained by the preferred intervals found between PEPs in intact legs and stump events (Fig. 7). Discarding additional DEP events reveals this preferred phase relationship even in the more variable slow walking sequences.



Supp. Fig. 6: Expected random distribution of intervals between PEP events in intact legs and stump events. For this analysis we calculated the speed-dependent statistical distributions of all PEP events in intact legs and DEP/VEP events in stumps, respectively, based on the assumption that they were log-normally distributed. Based on these statistics we then generated artificial sequences of PEP and DEP/VEP events and calculated the intervals between those analogously to the data in Fig. 7. Because these events are by definition not correlated we can determine the expected random distribution for the intervals in Fig. 7 in this way. The distributions shown here can be used as a reference for the distributions in Fig. 7.