

**Table S1.** Peak bone and suture strains and the times at which they occur (expressed as percent of the feeding cycle), and kinematic measurements during suction and biting in *Polypterus*. Fish number, trial and event number, feeding type classification, and presence or absence of prey capture are noted for each event. S indicates suction events, while SB denotes "suction followed by biting". Analysis of the kinematic measurements during these events revealed that, within the limitations of this study, S and SB events should be considered identical. Therefore, both are referred to as simply suction feeding. B indicates an event in which the prey item is bitten, usually during manipulation, while P events are mastication, with the prey item fully in the fish's mouth. These two events are not distinguishable using our kinematic measurements; hence, both are termed "biting" in this paper.

Fish	Trial	Event	Prey	Classif.	Event duration	Percent through event		Percent through event		Percent through event		Percent through event		Percent through event		
						Min. IP strain ( $\mu\text{e}$ )	that Min. IP strain occurs	Max FP strain ( $\mu\text{e}$ )	that Max. FP strain occurs	Max IF strain ( $\mu\text{e}$ )	that Max. IF strain occurs	Max E1 ( $\mu\text{e}$ )	$\psi^\dagger$	through event that Max. E1 occurs	Max E2 ( $\mu\text{e}$ )	through event that Max. E2 occurs
1	3	1	S	y	0.267	-80	36	100	31	160	28	59	60	27	-37	28
1	3	9	S	n	0.450	-53	46	48	48	-13	40	-9	19	92	-45	90
1	3	2	SB	n	0.250	-180	24	159	23	152	19	46	65	17	-59	18
1	3	3	SB	n	0.267	-181	31	150	29	201	24	78	65	23	-136	24
1	7	1	SB	y	0.133	-105	55	220	36	368	42	103	72	38	-64	43
1	9	1	SB	y	0.216	-67	50	207	47	238	100	64	84	100	-172	100
1	9	2	SB	n	0.216	-108	35	242	33	158	29	29	69	27	-62	28
2	2	1	SB	y	0.104	-196	77	221	72	462	70	120	66	69	-182	100
2	2	2	SB	n	0.264	-123	75	122	70	153	96	61	63	85	-165	85
2	6	1	SB	y	0.160	-214	14	228	9	471	8	160	65	7	-279	9
2	6	2	SB	n	0.104	-26	87	2	0	40	96	-25	58	46	-54	100
2	7	1	SB	y	0.144	-185	22	253	17	589	80	121	69	11	-289	78
2	8	1*	SB	y	0.150	-	-	225	37	457	41	73	68	40	-162	42
3	9	1*	SB	y	0.096	-	-	225	63	865	44	292	80	42	-389	44
3	1	1	S	n	0.200	-19	26	6	44	88	17	58	78	14	-52	15
3	1	2	SB	y	0.112	-68	66	23	40	206	51	129	77	50	-135	52
3	2	5	SB	n	0.248	-34	20	-10	10	50	50	13	55	16	-70	60
3	2	6	SB	n	0.184	-36	34	-12	20	73	83	8	59	29	-94	96
3	3	3*	SB	y	0.072	-	-	38	92	1066	59	451	81	56	-680	61
4	8	1*	S	y	0.104	-	-	200	96	86	88	11	75	84	-97	100
4	8	2*	SB	n	0.144	-	-	220	66	98	66	-2	74	63	-173	100
4	8	5*	SB	n	0.176	-	-	173	70	169	73	4	77	76	-150	78
4	9	7*	SB	n	0.104	-	-	365	85	308	94	83	72	87	-250	94
4	8	8*	SB	n	0.120	-	-	385	70	309	70	39	79	67	-170	75
4	9	1*	SB	y	0.120	-	-	293	74	182	96	43	68	89	-179	100
4	9	4*	SB	y	0.120	-	-	194	67	250	92	26	72	90	-291	94
1	3	4	B	n	0.317	-72	40	12	69	60	84	-25	12	63	-52	24
1	3	10	P	n	0.567	-63	21	53	32	189	44	36	67	44	-95	45
1	3	11	P	n	0.317	-29	38	34	41	154	73	13	62	78	-35	80
1	3	12	P	n	0.267	-78	45	19	55	424	84	124	73	85	-227	84
1	3	13	P	n	0.250	-20	48	41	99	24	100	8	23	99	-13	68
1	3	14	P	n	0.300	-23	57	39	99	10	100	11	106	99	-12	62
1	3	15	P	n	0.366	-23	37	59	76	47	85	13	87	80	-10	65
2	6	3	B	n	0.288	-120	35	80	31	108	32	-12	58	31	-169	32
2	3	1	B	n	0.072	-63	71	40	100	52	100	22	50	100	-27	100
2	3	4	B	n	0.072	-87	98	55	100	57	100	-23	51	100	-94	43
2	9	5.5*	B	n	0.184	-	-	9	3	475	66	140	71	66	-553	64
2	9	7*	B	n	0.434	-	-	49	83	288	91	102	69	96	-406	91
2	12	3*	B	n	0.167	-	-	23	42	60	100	-29	108	41	-86	100
2	12	4*	B	n	0.133	-	-	45	66	-2	100	-26	113	75	-84	100
3	2	1	B	n	0.224	-61	56	47	66	14	0	29	28	66	-58	85
3	2	2	B	n	0.222	-99	49	61	50	-2	0	14	28	51	-87	100
3	2	3	B	n	0.192	-27	25	-5	28	-5	2	-14	40	89	-66	94
3	2	4	B	n	0.232	-31	72	5	60	23	100	-12	30	67	-68	87
3	3	4*	B	n	0.208	-	-	37	77	297	5	12	14	4	-151	4
3	3	5*	B	n	0.088	-	-	23	58	829	100	132	80	100	-341	100
3	3	6*	B	n	0.224	-	-	1	64	228	18	31	-5	0	-85	44
4	9	2*	B	n	0.184	-	-	126	57	24	4	-18	41	70	-116	3
4	9	5*	B	n	0.160	-	-	41	46	63	100	47	96	100	-400	100
4	9	6*	B	n	0.128	-	-	-25	73	-27	0	27	29	100	-267	100
4	8	6*	B	n	0.104	-	-	84	76	-3	17	-26	46	100	-74	100
4	8	7*	B	n	0.144	-	-	149	51	84	100	10	118	50	-119	100

\* IP gauge was detached in these events; therefore no IP data are available.

† Angle between maximum principal tension (E1) and E<sub>a</sub> gauge component of rosette, where positive angles represent counterclockwise rotation of E1 from the E<sub>a</sub> element of the rosette.