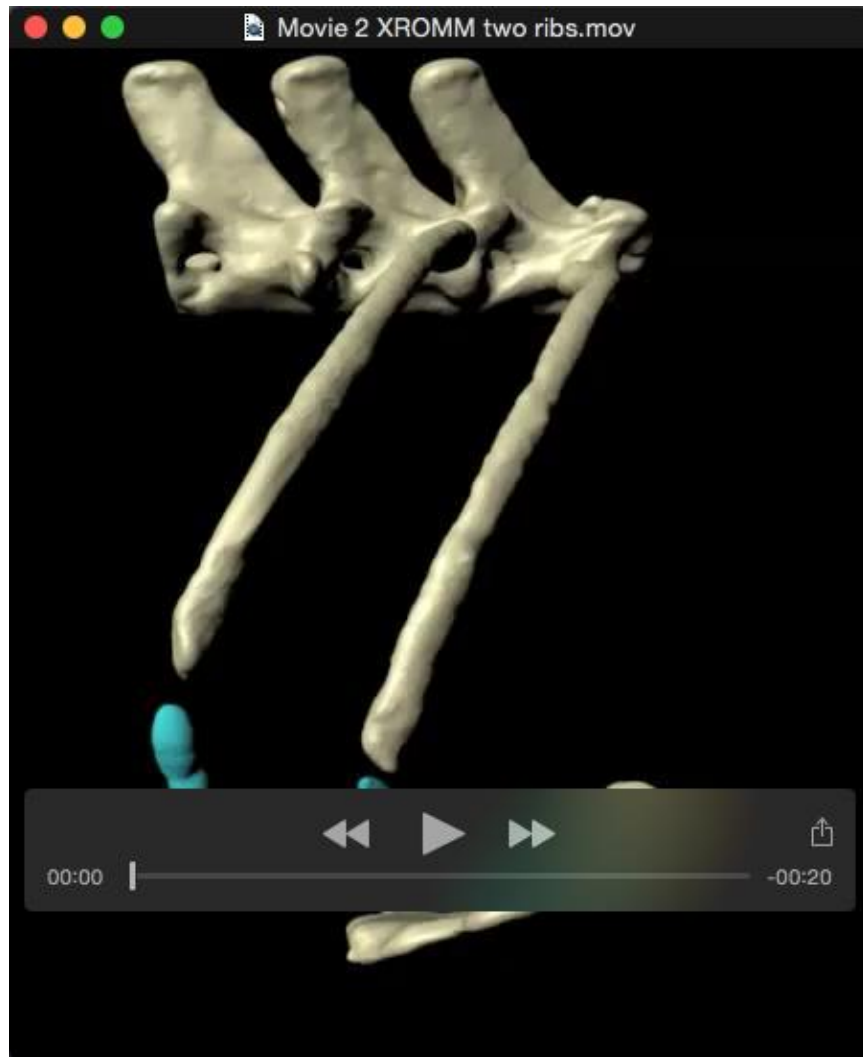
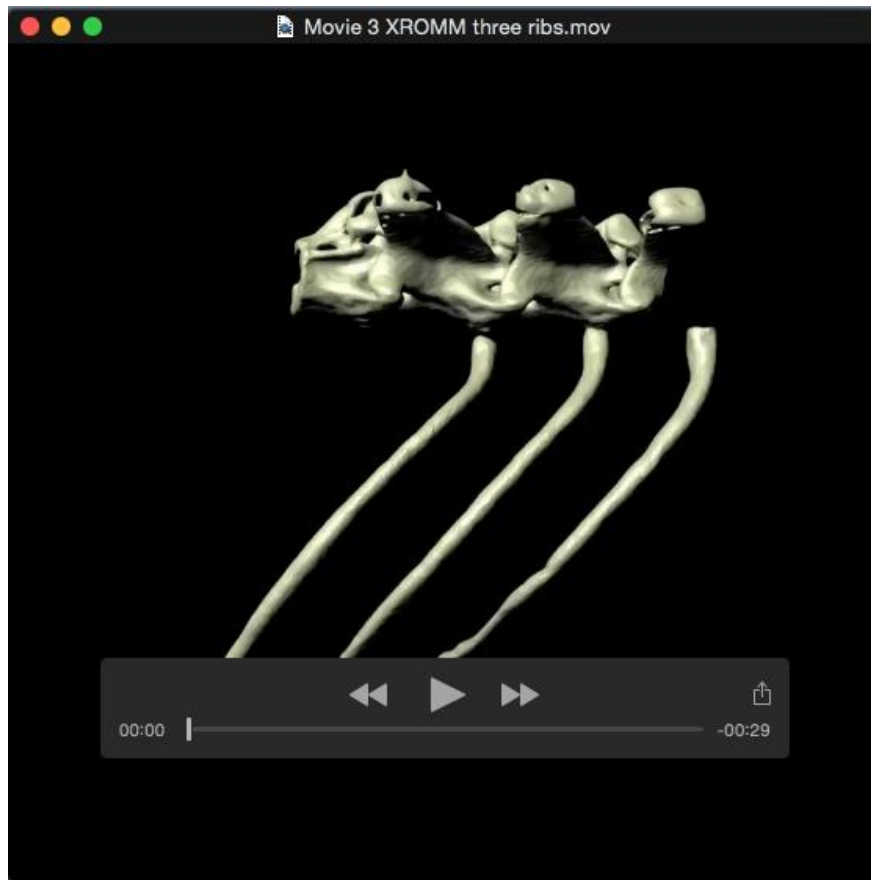




Movie 1. Biplanar X-ray video of lung ventilation in a green iguana. This animal is breathing heavily after trackway locomotion. One breath repeated five times.



Movie 2. XROMM animation of vertebral and sternal ribs 1 and 2 during heavy breathing in a green iguana.



Movie 3. XROMM animation of vertebral ribs 1-3 during heavy breathing in a green iguana. One breath repeated five times.

Table S1. Rotations in degrees of cervical ribs 3 and 4 (C3, C4) and vertebral ribs 1-4 (V1-V4) at the costovertebral joints.

Z: bucket¹		C3		C4		V1			V2			V3		V4		
		Ig03	Ig05	Ig03	Ig05	Ig02	Ig03	Ig04	Ig05	Ig02	Ig03	Ig04	Ig05	Ig03	Ig04	Ig03
max Inhale	mean	-28.9	2.6	-67.9	5.1	-21.3	-51.4	-51.6	-12.4	-15.2	-69.0	-44.4	-25.1	-66.4	-39.5	-56.8
	s.d.	0.8	4.9	3.3	1.8	2.2	4.2	7.3	1.2	2.8	2.9	7.1	2.0	1.0	6.3	3.7
max Exhale	mean	-28.5	2.7	-72.8	-3.8	-45.0	-61.9	-65.4	-30.5	-52.7	-81.0	-54.9	-40.9	-77.4	-47.7	-64.1
	s.d.	0.5	4.0	2.9	2.0	2.3	6.0	5.9	3.8	2.3	3.3	5.6	2.5	3.2	4.0	3.5
magnitude ²	mean	0.3	0.1	-4.9	-8.9	-23.7	-10.5	-13.8	-18.1	-37.4	-12.0	-10.5	-15.8	-11.1	-8.2	-7.4
	s.d.	1.0	4.2	1.5	1.7	0.9	2.9	2.0	3.2	1.9	2.9	2.6	2.6	2.4	2.7	1.6
Y: caliper¹		C3		C4		V1			V2			V3		V4		
		Ig03	Ig05	Ig03	Ig05	Ig02	Ig03	Ig04	Ig05	Ig02	Ig03	Ig04	Ig05	Ig03	Ig04	Ig03
max Inhale	mean	-31.5	-7.0	-24.3	-0.6	7.8	-8.2	38.0	16.7	15.7	-8.2	42.9	8.1	-16.9	44.2	-4.7
	s.d.	2.2	5.7	3.1	4.6	1.6	0.4	3.7	7.3	0.9	2.9	4.0	14.4	3.5	4.0	0.6
max Exhale	mean	-31.6	-6.3	-23.6	-1.4	3.2	-10.0	34.9	6.2	10.3	-8.7	41.2	-6.7	-17.4	43.2	-5.9
	s.d.	2.4	11.3	3.0	8.4	2.0	0.7	4.2	6.7	1.5	2.1	4.0	6.1	4.3	3.9	0.7
magnitude ²	mean	-0.1	0.7	0.7	-0.9	-4.6	-1.8	-3.0	-10.5	-5.4	-0.5	-1.7	-14.8	-0.5	-1.0	-1.1
	s.d.	0.4	12.7	0.8	8.2	0.8	0.6	0.7	6.9	0.7	1.0	0.5	5.3	0.9	0.3	0.5
X: pump¹		C3		C4		V1			V2			V3		V4		
		Ig03	Ig05	Ig03	Ig05	Ig02	Ig03	Ig04	Ig05	Ig02	Ig03	Ig04	Ig05	Ig03	Ig04	Ig03
max Inhale	mean	47.5	-9.5	17.9	-7.4	25.1	13.1	4.5	-27.2	22.5	2.3	8.2	-32.6	-8.4	4.3	3.1
	s.d.	1.0	5.6	1.7	3.9	4.3	7.1	2.2	1.1	3.0	1.2	2.6	3.0	3.5	2.5	2.6
max Exhale	mean	47.4	-7.2	20.6	-9.4	17.7	13.4	4.0	-30.5	6.1	6.2	8.8	-32.1	-4.1	3.8	5.5
	s.d.	0.7	10.4	1.5	3.0	4.1	6.6	2.2	3.4	3.5	2.5	2.9	5.3	4.1	2.7	3.4
magnitude ²	mean	-0.1	2.3	2.8	-2.1	-7.3	0.3	-0.5	-3.3	-16.4	3.9	0.5	0.5	4.3	3.8	2.4
	s.d.	0.8	5.7	1.2	1.5	1.4	1.8	0.9	2.6	0.5	1.6	1.4	5.3	5.5	2.7	4.0

¹rotation axes are defined by the JCS in Fig. 2

²magnitude is the difference in degrees between maximum exhale and maximum inhale

Table S2. Rotations in degrees at sternocostal joints 1-4 (S1-S4).

Z: bucket¹		S1				S2				S3		S4
		Ig02	Ig03	Ig04	Ig05	Ig02	Ig03	Ig04	Ig05	Ig03	Ig04	Ig03
max Inhale	mean	-51.3	-59.7	-96.7	-14.5	-49.5	-66.4	-39.5	-20.3	-56.8	-87.9	-56.4
	s.d.	3.6	5.0	8.6	7.0	4.0	1.0	6.3	4.3	3.7	6.5	12.2
max Exhale	mean	-81.9	-74.1	-109	-42.3	-76.6	-77.4	-47.7	-44.0	-64.1	-94.3	-64.1
	s.d.	2.3	2.4	4.7	7.4	2.0	3.2	4.0	4.6	3.5	3.7	11.7
magnitude ²	mean	-30.6	-14.4	-12.4	-27.7	-27.1	-11.1	-8.2	-23.7	-7.4	-6.3	-7.7
	s.d.	2.1	3.8	4.4	1.7	2.4	2.4	2.7	1.6	1.6	3.0	1.0
Y: caliper¹		S1				S2				S3		S4
		Ig02	Ig03	Ig04	Ig05	Ig02	Ig03	Ig04	Ig05	Ig03	Ig04	Ig03
max Inhale	mean	30.1	36.0	49.4	48.0	25.6	-16.9	44.2	-0.6	-4.7	49.4	36.0
	s.d.	5.9	6.0	4.7	2.5	3.6	3.5	4.0	4.6	0.6	4.7	6.0
max Exhale	mean	23.0	34.5	41.3	46.1	18.6	-17.4	43.2	-1.4	-5.9	41.3	34.5
	s.d.	3.7	4.1	4.2	2.0	2.3	4.3	3.9	8.4	0.7	4.2	4.1
magnitude ²	mean	-7.2	-1.5	-8.1	-1.9	-7.0	-0.5	-1.0	-0.9	-1.1	-8.1	-1.5
	s.d.	2.7	2.1	1.0	1.9	1.8	0.9	0.3	8.2	0.5	1.0	2.1
X: long-axis¹		S1				S2				S3		S4
		Ig02	Ig03	Ig04	Ig05	Ig02	Ig03	Ig04	Ig05	Ig03	Ig04	Ig03
max Inhale	mean	39.9	11.1	-30.7	31.5	-2.6	-8.4	4.3	-7.4	3.1	8.7	11.1
	s.d.	8.0	2.8	10.2	2.2	8.8	3.5	2.5	3.9	2.6	2.1	2.8
max Exhale	mean	27.0	7.9	-39.5	25.7	-28.6	-4.1	3.8	-9.4	5.5	6.1	7.9
	s.d.	8.0	2.0	8.0	5.7	6.9	4.1	2.7	3.0	3.4	1.4	2.0
magnitude ²	mean	-12.9	-3.2	-8.8	-5.7	-26.0	4.3	-0.5	-2.1	2.4	-2.6	-3.2
	s.d.	2.9	1.1	2.7	6.6	5.1	5.5	1.1	1.5	4.0	1.2	1.1

¹rotation axes are defined by the JCS in Fig. 3.

²magnitude is the difference in degrees between maximum exhale and maximum inhale

Table S3. Rotations in degrees at intracostal joints 1-4 (I1-I4).

Z: abduction¹		I1				I2				I3		I4
		Ig02	Ig03	Ig04	Ig05	Ig02	Ig03	Ig04	Ig05	Ig03	Ig04	Ig03
max Inhale	mean	1.5	-4.3	4.2	3.8	-6.9	7.2	4.3	5.0	-4.6	-1.7	-2.3
	s.d.	4.7	3.7	1.9	5.1	2.6	3.0	2.5	3.6	3.1	3.4	2.1
max Exhale	mean	5.1	-0.9	1.6	5.9	5.5	1.4	2.1	5.2	-4.2	-4.1	-2.5
	s.d.	5.7	4.6	2.2	2.0	4.2	3.3	3.2	5.8	3.8	2.8	1.8
magnitude ²	mean	3.6	3.4	-2.5	2.1	12.5	-5.8	-2.1	0.2	0.4	-2.4	-0.2
	s.d.	1.9	3.6	1.0	6.4	2.5	3.9	1.1	8.2	6.2	0.7	1.6
Y: depression¹		I1				I2				I3		I4
		Ig02	Ig03	Ig04	Ig05	Ig02	Ig03	Ig04	Ig05	Ig03	Ig04	Ig03
max Inhale	mean	10.1	-0.3	-8.1	-3.5	5.3	-9.0	-2.2	4.6	6.9	0.3	5.2
	s.d.	5.9	0.6	6.2	1.3	3.5	0.8	5.2	2.7	0.9	4.1	0.4
max Exhale	mean	4.0	-1.3	-8.0	-2.1	1.5	-8.8	-3.2	4.4	5.5	-0.9	5.3
	s.d.	6.6	1.2	6.4	1.8	3.9	1.0	5.8	2.2	0.9	4.4	0.9
magnitude ²	mean	-6.1	-1.0	0.1	1.4	-1.6	0.2	-1.1	-0.2	-1.3	-1.2	0.1
	s.d.	2.1	1.3	0.7	1.6	0.5	0.6	0.7	3.8	1.3	0.3	0.6
X: long-axis¹		I1				I2				I3		I4
		Ig02	Ig03	Ig04	Ig05	Ig02	Ig03	Ig04	Ig05	Ig03	Ig04	Ig03
max Inhale	mean	-3.9	-14.2	19.0	5.6	-3.3	-5.6	20.3	-4.1	6.2	8.7	1.7
	s.d.	3.9	2.9	0.7	3.5	2.8	4.0	3.1	7.6	6.5	2.1	5.1
max Exhale	mean	1.4	-14.0	21.7	2.7	-22.6	-2.8	15.9	-4.0	8.3	6.1	-0.1
	s.d.	2.4	3.9	1.7	8.4	5.2	3.0	2.0	7.3	3.1	1.4	7.8
magnitude ²	mean	5.4	0.2	2.7	-2.9	-19.3	2.8	-4.4	0.1	2.1	-2.6	-1.8
	s.d.	-5.0	1.1	1.5	6.4	5.6	3.8	1.3	8.0	3.5	1.2	6.4

¹rotation axes are defined by the JCS in Fig. 4

²magnitude is the difference in degrees between maximum exhale and maximum inhale