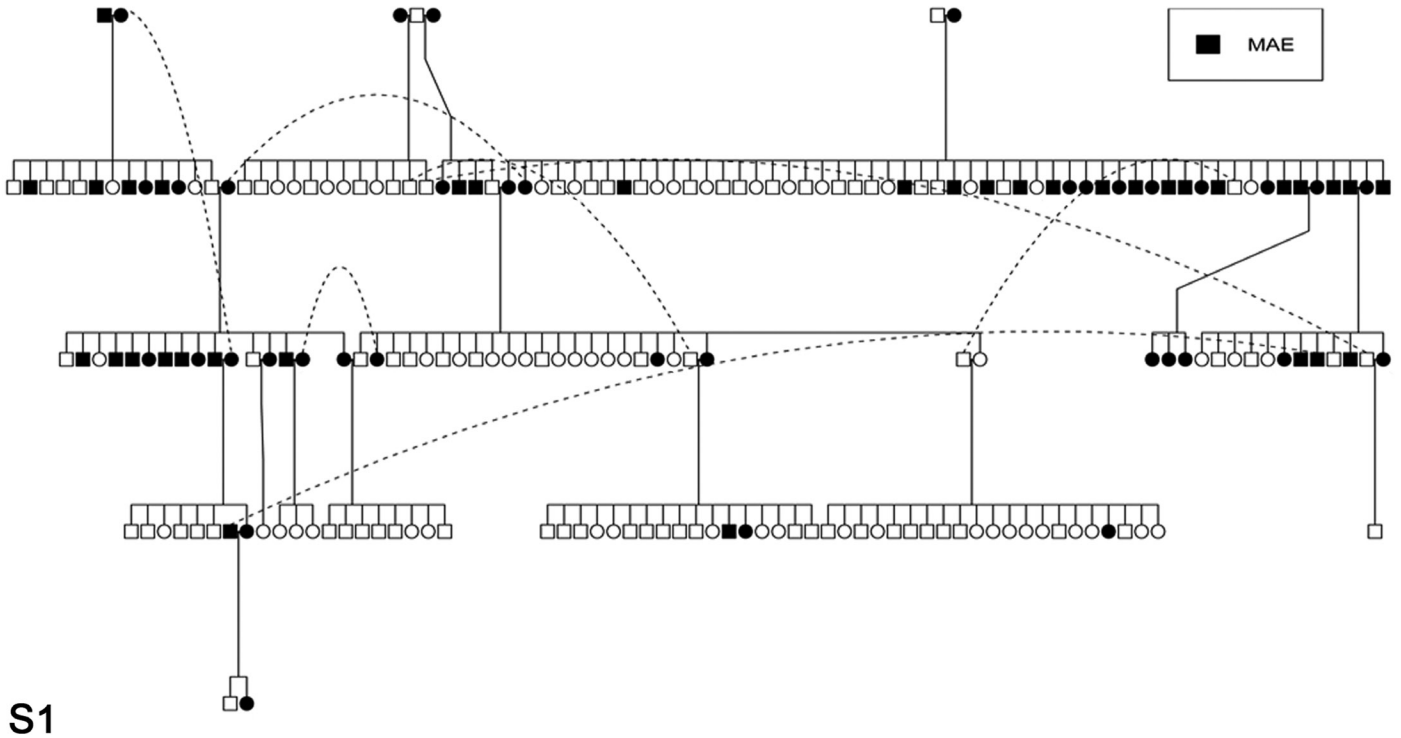


Veterinary Pathology: Supplemental Materials.
Imai et al. Apical elongation of molar teeth in captive *Microtus* voles.



Supplemental Figure S1. Heritability of molar apical elongation (MAE), California vole. Pedigree analysis from the combined collection of captive *M. californicus* at the Museum of Vertebrate Zoology is supportive of a heritable trait but no clear heritance pattern was identified. White circles or squares are unaffected. Black circles or squares are affected. Circles are female. Squares are male.

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

Supplemental Table S1. Combined dataset for both Buffy and Age datasets as referred to in text. MVZ number, MOMID and DADIS is the catalog number in the Museum of Vertebrate Zoology, UC Berkeley if 6 digit. Otherwise, values that are 3 or 4 digit or a hyphenated number indicate wildcaught specimens that were not cataloged. Specimens without skulls were included to help construct pedigree. Data for individual specimens can be retrieved from <http://arctos.database.museum/>

BUFFY SET										
MVZ#	AFFECTED	MANDIBLE	UPPER MOLARS	MOLAR COMMENT	INCISOR COMMENT	GENERAL COMMENT	MOMID	DADID	AGE (days at time of death)	SEX
228833	0						228750	228776	17	M
228837	0						228786	228773	17	M
228812	0						228681	228680	21	F
228813	0						228681	228680	21	M
228819	0						228705	228712	32	F
228820	0						228705	228712	32	M
228847	0						228792	228789	32	M
228814	0						228694	228678	33	M
228815	0						228694	228678	33	M
228816	0						228694	228678	33	F
228871	0						228793	228838	35	M
228808	0						228681	228680	36	F
228809	0						228681	228680	36	M
228826	0						228792	228789	36	M
228821	0						228786	228773	37	F
228822	0						228786	228773	37	M
228827	0						228727	228724	39	M
228735	0						228681	228680	40	M
228817	0						228750	228776	40	M
228818	0						228750	228776	40	M
228823	0						228777	228752	40	F

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

228790	0							228694	228678	41	F
228794	1	1	0	0	0	VERY MILD PROTRUSI ON		228681	228680	41	M
228807	0							228705	228712	41	F
228824	0							228777	228752	42	F
228825	0							228777	228752	42	F
228811	0							228748	228742	43	F
228857	0							228786	228773	43	F
228866	0							228792	228789	43	M
228791	1	0	0	1	SLIGHTLY UNEVEN	TOP TOOTH SURFACE VERY MILDLY UNEVEN		228705	228712	44	M
228797	0							228727	228724	44	M
228862	0							228786	228773	46	M
228863	0							228786	228773	46	M
228836	0							228750	228776	47	M
228731	0							228681	228680	48	M
228803	0							228727	228724	48	F
228832	0							228727	228724	49	M
228800	0							228727	228724	50	F
228804	0							228727	228724	50	M
228860	0							228786	228773	50	M
228861	0	0	0	0	0			228786	228773	50	M
228876	0							228839	228788	51	M
228806	0							228705	228712	53	F
228830	0							228786	228773	53	M
228831	0							228786	228773	53	F

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

228709	0	228681	228680	54	F
228710	0	228681	228680	54	F
228740	0	228681	228680	54	M
228828	0	228750	228776	54	M
228829	0	228750	228776	54	F
228834	0	228727	228724	55	F
228835	0	228727	228724	55	F
228840	0	228750	228776	55	F
228841	0	228750	228776	55	M
228741	0	228681	228680	56	F
228781	0	228694	228678	57	M
228782	0	228694	228678	57	F
228783	0	228694	228678	57	F
228707	0	228681	228680	58	M
228708	0	228681	228680	58	M
228772	0	228681	228680	59	F
228848	0	228792	228789	59	F
228810	0	228681	228680	60	M
228851	0	228786	228773	60	F
228865	0	228792	228789	61	F
228867	0	228792	228789	63	M
228868	0	228792	228789	63	M
228869	0	228792	228789	63	M
228738	0	228681	228680	64	F
228739	0	228681	228680	64	M
228858	0	228786	228773	64	F
228859	0	228786	228773	64	F
228864	0	228786	228773	64	F

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

228805	1	1	0	1	0	BARELY PROTRUD E JAW RT, UPP TOOTH SURF IRREG	228705	228712	65	F
228798	0						228677	228722	66	M
228799	0						228677	228722	66	M
228801	0						228727	228724	68	F
228802	0						228727	228724	68	M
228774	0						228681	228680	69	F
228754	0						228677	228722	70	F
228755	0	0	0		0	LOWER MILDLY UNEVEN	228677	228722	70	M
228761	0						228727	228724	70	F
228762	0						228727	228724	70	F
228771	0						228681	228680	70	M
228775	0						228727	228724	70	F
228842	0						228792	228789	70	M
228845	0						228792	228789	70	M
228780	0						228681	228680	71	M
228787	0						228727	228724	72	F
228763	1	1	0	0	0		228716	228717	75	F
228749	0						228690	228683	76	M
228843	0						228792	228789	76	F
228778	0						228681	228680	79	M
228779	0						228681	228680	79	F
228713	1	0	1	0	0		228681	228680	81	M
228714	0						228681	228680	81	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

228715	0						228681	228680	81	M
228753	0						228677	228722	84	M
228756	0						228677	228722	84	M
228853	0						228786	228773	88	M
228855	0						228786	228773	88	F
228856	0						228786	228773	88	F
228746	1	1	1	0	0		228690	228683	89	M
228747	0						228690	228683	89	F
228697	0						228677	228676	90	M
228698	1	1	1	0	0		228677	228676	90	M
228699	0					TOP INCISOR CHIPPED (?)	228677	228676	90	M
228743	1	1	1	0	0		228690	228683	90	M
228702	0						228677	228676	92	M
228703	0						228677	228676	92	M
228733	1	1	0	0	0		228681	228680	92	M
228734	0						228681	228680	92	F
228764	1	1	0	UPPER MILDLY SEP	0		228705	228712	95	M
228784	0						228727	228724	95	F
228785	0						228727	228724	95	M
228757	0						228694	228678	97	M
228759	0						228694	228678	97	F
228718	1	1	1	UPPER MOLAR UEVEN	0		228681	228680	103	M
228721	0						228681	228680	103	M
228838	1	1	1	0	0		228705	228712	105	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

228849	1	1	1	0	0		228786	228773	106	F
228850	0						228786	228773	106	M
228796	1	1	0	0	0	VERY MILD PROTRUSI ON	228727	228724	110	F
228854	0						228786	228773	115	F
228696	1	2	1	0	0		228677	228676	117	M
228700	1	1	1	0	0		228681	228680	121	M
228701	0						228681	228680	121	F
228870	1	1	1	0	0		228793	228838	121	F
228730	1	1	0	MILD SEP/UNEV EN	0		228681	228680	126	M
228732	1	1	0	0	0		228681	228680	126	F
228760	0						228727	228724	128	F
228769	1	1	1	0	0		228690	228683	129	M
228770	1	1	0	0	0		228690	228683	129	F
228684	1	3	1	UNEVEN, BOTTOM SEP, TOP CURVED OUT	BOT GAP		228681	228680	132	F
228685	1	2	1	UNEVEN	0		228681	228680	132	M
228872	1	1	1	0	0		228792	228789	135	M
228873	1	1	1	0	0		228792	228789	135	F
228768	1	1	1	MILDLY UNEVEN, TOP MILD PROTRUD OUT	0		228716	228717	136	F
228728	1	1	0	0	0		228681	228680	139	F
228729	1	1	0	UPPER VERY MILD	0		228681	228680	139	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

				UNEVEN							
228736	1	2	1	0	0		228681	228680	140	F	
228737	1	1	0	0	0		228681	228680	140	M	
228766	0						228705	228712	140	M	
228720	1	1	0	UPPER SURF MILD SEP	0		228681	228680	141	M	
228767	1	1	1	MOLAR SEP, MILD UNEVEN	BOT INCIS VERY MILD UNEVEN		228716	228717	142	F	
228751	1	1	0	0	0		228690	228683	143	M	
228758	0						228694	228678	143	M	
228706	1	1	0	0	0		228681	228680	144	F	
228852	0						228786	228773	145	F	
228765	1	1	1	MILDLY UNEVEN/S EP	0		228705	228712	146	M	
228839	1	1	0	1	0	MOLARS MILD SEP	228705	228712	160	F	
228744	1	1	1	0	0		228690	228683	162	M	
228745	1	1	0	0	0		228690	228683	162	F	
228846	0						228792	228789	162	F	
228844	0						228792	228789	163	F	
228722	1	1	0	0	0		228690	228683	165	M	
228748	1	1	0	0	0		228690	228683	165	F	
228777	1	1	1	0	BOT VERY MILD UNEVEN		228727	228724	166	F	
228711	1	1	0	0	0		228681	228680	167	M	
228752	1	1	1	MOLARS SEP	UPP INCIS MILDLY UNEVEN		228690	228683	168	M	
228773	0	0	0	BOTH VERY MILD MOLAR	0		228681	228680	171	M	

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

SEP										
228789	0						228694	228678	172	M
228686	0						228677	228676	176	F
228687	1	1	1	0	0		228677	228676	176	M
228776	0						228727	228724	178	M
228750	1	1	0	0	0		228690	228683	181	F
228719	0						228681	228680	188	F
228742	0						228690	228683	188	M
228793	1	3	1	1	BOTTOM ELONGAT ED	BOTTOM TOOTH SURF UNEVEN,T OP TOOTH SURF MILD CURVE OUT	228677	228722	188	F
228691	1	1	0	0	0	0	228681	228680	189	F
228692	1	2	1	UNEVEN, MILDLY CURVED OUT	0	0	228681	228680	189	M
228792	1	1	0	0	TOP/BOTTOM UNEVEN	MILDLY	228727	228724	189	F
228688	1	2	1	UNEVEN, CURVE OUT	0	0	228679	228678	191	F
228874	0						228792	228789	206	M
228875	0						228792	228789	207	M
228695	1	3	1	MOLAR SEP	0	0	228677	228676	213	F
228690	1	1	0	0	0	0	228681	228680	218	F
228693	1	1	1	0	0	0	228679	228678	222	M
228788	0						228694	228678	223	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

228682	1	3	1	VERY UNEVEN, CURVE OUT	BOTH MALOCCL UDE	UPPER ROOT CRIT CONDITIO N	228677	228676	227	M
228704	1	1	1	MILD MOLAR SEP		0	228677	228676	227	F
228727	1	1	0	TOP UNEVEN		0	228681	228680	227	F
228786	0						228727	228724	242	F
228716	1	2	1	MILD MOLAR SEP		0	228681	228680	258	F
228717	1	1	1	TOP MOLARS SEP, BOTH UNEVEN		0	228681	228680	258	M
228724	0						228679	228678	260	M
228683	0						228677	228676	264	M
228723	1	1	1	MOLAR SEP, TOP PROTRUD OUT	TOP INCIS ELONGAT ED, BOTH INCISORS VERY SHORT	VERY ABNORMA L LOOKING, BIG BUMP IN FRONT OF JAW ROOTS	228679	228678	281	M
228795	1	2	1		1 BOTTOM ELONG, TOP OK	TOP TOOTH SURF CURVED OUT	228681	228680	356	M
228705	1	3	1	MOLAR SEP		0	228681	228680	395	F
228712	1	2	1		0	0	228681	228680	418	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

228689	1	3	1	SEP, UNEVEN, CURVE OUT		BOTH MALOCCLUDE	228681	228680	517	M
228676	1	1	0		0		-	-	156+	M
228679	1	1	0		0		-	-	192+	F
228694	1	1	0		0		-	-	287+	F
228726	0	0	0	TOP MOLAR SEP			-	-	364+	M
228677	1	1	0		0		-	-	386+	F
228678	0						-	-	407+	M
228680	0						-	-	676+	M
228681	1	1	0		0		-	-	800+	F
228725	0						228677	228676	<75	F

AGE SET

MVZ#	AFFECTED	JAW	UPPER	MOLAR TOOTH COMMENT	INCISORco mment	COMMENT	MOMID	DADID	AGE IN DAYS	SEX
227510	SKIN ONLY						14	2	157	M
227507	SKIN ONLY						14	2	180	M
227696	0		UPPER ROOT SHOWING				269	227840	17	F
227694	0						269	227840	17	F
227695	0						269	227840	17	F
227697	0						269	227840	17	M
227847	1	3	1	SURFACE OF TEETH SMOOTH, VERY MALFORM	0	REALLY BAD. ROOTS INTO CRANIUM.	7337	7336	1059	F

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

				ED		SURFACE OF TEETH SMOOTH, VERY MALFORM ED. PICTURE.				
227677		1	3	1	MOLAR SURFACE UNEVEN, SEPARATE D	0	7337	7336	505	F
227783		0					7337	7336	295	F
227457	SKIN ONLY						7337	7336	24	M
227458	SKIN ONLY						7337	7336	24	M
227462	SKIN ONLY						7337	7336	24	M
227465	SKIN ONLY						7337	7336	24	F
227466	SKIN ONLY						7337	7336	24	M
227501	SKIN ONLY						7337	7336	59	F
227502	SKIN ONLY						7337	7336	59	F
227503	SKIN ONLY						7337	7336	59	F
227504	SKIN ONLY						7337	7336	59	F
227505	SKIN ONLY						7337	7336	59	M
227449	SKIN ONLY						7337	7336	62	F
227494	SKIN ONLY						7337	7336	81	F
227518	SKIN ONLY						7337	7336	81	M
227669	SKIN ONLY						7337	7336	82	M
227667	SKIN ONLY						7337	7336	92	F
227495	SKIN ONLY						7337	7336	141	F
227511	SKIN ONLY						7337	7336	141	M
227519	SKIN ONLY						7337	7336	141	F

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227498	SKIN ONLY						7337	7336	163	M
227509	SKIN ONLY						7337	7336	163	M
227506	SKIN ONLY						7337	7336	188	M
227508	SKIN ONLY						7337	7336	188	F
227534	SKIN ONLY						7337		226	F
227555	SKIN ONLY						7337	7336	227	M
227446	SKIN ONLY						7337	7336		M
227448	SKIN ONLY						7337	7336		F
227777	1	3	1	MARKEDLY UNEVEN	LENGTH UNEVEN		227443		308	M
227785	1	3	1	MOLAR SURFACE UNEVEN		0	227443	7332	342	M
227786	1	3	1	MARKEDLY UNEVEN	INCISORS CURVED INTO A RING		227443	7332	369	M
227848	1	1	1	MOLARS SEP		0	227443	7332	316	F
227675	1	1	0			0	227443	7332	718	M
227784	1	1	1	SLIGHT SEPARATE		0	227443	7332	105	F

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227672		1	3	1	D MOLAR SURFACE UNEVEN, CELL-LIKE TEETH	SEPARATE D	227443	7332	634	M
227451	SKIN ONLY						227443	7332	26	F
227452	SKIN ONLY						227443	7332	26	M
227453	SKIN ONLY						227443	7332	26	F
227454	SKIN ONLY						227443	7332	26	F
227455	SKIN ONLY						227443	7332	26	F
227456	SKIN ONLY						227443	7332	26	F
227659	SKIN ONLY						227443	7332	100	M
227497	SKIN ONLY						227443	7332	128	F
227500	SKIN ONLY						227443	7332	128	F
227513	SKIN ONLY						227443	7332	128	M
227514	SKIN ONLY						227443	7332	128	M
227653	SKIN ONLY						227443	7332	227	M
227444	SKIN ONLY						227443	7332		F
227445	SKIN ONLY						227443	7332		M
227512	SKIN ONLY						227444	227446	130	M
227660	SKIN ONLY						227448	227785	44	M
227499	SKIN ONLY						227448	227785	75	M
227520	SKIN ONLY						227448	227785	75	M
227844		1	0	0		0 SLIGHTLY MALOCCLUDING	227573	227571	609	F
227537	SKIN ONLY						227573	227571	84	M
227538	SKIN ONLY						227573	227571	84	M
227539	SKIN ONLY						227573	227571	84	F
227542	SKIN ONLY						227573	227571	84	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227568	SKIN ONLY						227573	227571	181	M
227627	SKIN ONLY						227637	227636	20	F
227628	SKIN ONLY						227637	227636	20	M
227629	SKIN ONLY						227637	227636	20	F
227630	SKIN ONLY						227637	227636	20	M
227631	SKIN ONLY						227637	227636	20	F
227632	SKIN ONLY						227637	227636	20	M
227633	SKIN ONLY						227637	227636	20	M
227654	SKIN ONLY						227641	227640	63	F
227655	SKIN ONLY						227641	227640	63	F
227656	SKIN ONLY						227641	227640	63	M
227773	0						227671	60-83	17	F
227799	0						227671	227734	107	F
227801	0						227671	227734	107	F
227589	SKIN ONLY						227671	227734	16	F
227590	SKIN ONLY						227671	227734	16	F
227829	1	1	0	0	0		227677	60-85	95	M
227824	1	1	0	0	0		227677	60-85	117	M
227833	1	1	0	0	0		227677	60-85	117	F
227737	0						227677	60-85	48	M
227828	0						227677	60-85	95	M
227832	0						227677	60-85	95	F
227836	0						227677	60-85	117	M
227738	0						227677	60-85	123	M
227791	0						227677	60-85	139	F
227811	0						227677	60-85	139	M
227749	0						227677	60-85	153	M
227618	SKIN ONLY						227677	60-85	38	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227619	SKIN ONLY					227677	60-85	38	M
227620	SKIN ONLY					227677	60-85	38	F
227595	SKIN ONLY					227677	60-85	52	M
227596	SKIN ONLY					227677	60-85	52	F
227602	SKIN ONLY					227677	60-85	69	F
227603	SKIN ONLY					227677	60-85	69	F
227604	SKIN ONLY					227677	60-85	69	M
227605	SKIN ONLY					227677	60-85	69	F
227559	SKIN ONLY					227677	227777	84	F
227529	SKIN ONLY					227677	227777	98	F
227531	SKIN ONLY					227677	227777	98	M
227532	SKIN ONLY					227677	227777	98	M
227562	SKIN ONLY					227677	227777	179	M
227615	SKIN ONLY					227677	227777	235	M
227753	skin (head missing) and skeleton				NO SKULL	227715	227716	167	M
227680	1	1	1	MOLAR SEPARATE D	0	227715	227716	159	M
227754	1	1	0	SLIGHTLY UNEVEN	0	227715	227716	167	F
227841	1	1	1	MOLAR SURFACE UNEVEN, SEPARATE D	0	227715	227716	421	F
227674	1	2	1	MOLAR SURFACE UNEVEN, SEPARATE D	0	227715	227716	267	M
227671	1	1	1	MOLAR SURFACE UNEVEN	SLIGHT UNEVEN	227715	227716	354	F

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227682	1	1	1	MOLAR SEPARATE D, SURFACE FLAT	UPPER INCISORS BROKEN	227715	227716	159	F
227642	SKIN ONLY					227715	227716	34	F
227643	SKIN ONLY					227715	227716	34	M
227644	SKIN ONLY					227715	227716	34	M
227580	SKIN ONLY					227715	227716	45	F
227581	SKIN ONLY					227715	227716	45	F
227582	SKIN ONLY					227715	227716	45	F
227646	SKIN ONLY					227715	227716	122	M
227657	SKIN ONLY					227715	227716	140	M
227651	SKIN ONLY					227715	227716	158	M
227692	0			UPPER ROOT HOLE		227730	227731	32	F
227691	0			UPPER ROOT SHOWING		227730	227731	32	F
227725	0					227730	227731	17	M
227687	0					227730	227731	32	M
227688	0					227730	227731	32	M
227689	0					227730	227731	32	F
227690	0					227730	227731	32	M
227693	0					227730	227731	32	F
227739	0					227730	227731	90	M
227606	SKIN ONLY					227730	60-144 or 60-128	89	F
227607	SKIN ONLY					227730	60-144 or 60-128	89	M
227608	SKIN ONLY					227730	60-144 or 60-128	89	M
227609	SKIN ONLY					227730	60-144 or 60-128	89	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227795	1	1	0	0	0	227736	227735	116	M
227803	1	1	0	0	0	227736	227735	116	M
227798	1	1	0	SLIGHT MOLAR SEPARATE D	0	227736	227735	116	M
227779	1	3	1	MOLAR SEPARATE D, UNEVEN, OCCLUSAL SURFACE BUMPY	SEPARATE D	227736	227735	188	M
227747	0					227736	227735	108	M
227750	0					227736	227735	108	M
227789	0					227736	227735	116	F
227583	SKIN ONLY					227736	227735	16	F
227584	SKIN ONLY					227736	227735	16	F
227585	SKIN ONLY					227736	227735	16	F
227586	SKIN ONLY					227736	227735	16	M
227587	SKIN ONLY					227736	227735	16	M
227588	SKIN ONLY					227736	227735	16	F
227597	SKIN ONLY					227736	227735	78	F
227598	SKIN ONLY					227736	227735	78	M
227599	SKIN ONLY					227736	227735	78	F
227600	SKIN ONLY					227736	227735	78	F
227601	SKIN ONLY					227736	227735	78	M
227794	1	1	0	0	0	227752	227751	128	F
227807	1	1	0	0	0	227752	227751	128	F
227703	0			UPPER ROOT HOLE		227752	227751	16	M
227701	0					227752	227751	16	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227702	0						227752	227751	16	F
227704	0						227752	227751	16	F
227705	0						227752	227751	16	M
227721	0						227752	227751	16	M
227713	0						227752	227751	62	F
227714	0						227752	227751	62	M
227815	0						227752	227751	98	F
227816	0						227752	227751	98	F
227796	0						227752	227751	109	F
227797	0						227752	227751	109	M
227800	0						227752	227751	128	F
227839	1	1	0	0	0	good example of jaw root 1	227780	227719	113	M
227776	0	0	0	0	0	UPPER ROOT ONE SIDE HOLE	227780	227719	16	M
227774	1	0	1	0	0	UPPER ROOT ONE SIDE HOLE	227780	227719	16	M
227775	1	0	1	0	0	UPPER ROOT ONE SIDE HOLE	227780	227719	16	F
227712	1	1	0	0	0		227780	227719	62	M
227837	1	1	0	0	0		227780	227719	113	M
227838	1	1	0	0	0		227780	227719	113	M
227818	1	1	1	0	0		227780	227719	101	F
227708	0						227780	227719	18	F
227709	0						227780	227719	18	F
227710	0						227780	227719	18	F
227711	0						227780	227719	62	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227744	0					227780	227719	79	M
227817	0					227780	227719	101	F
227823	0					227780	227719	113	F
227450	1	3	1	MOLAR SEPARATE D	0 *PICTURE WORTHY*	227783	227786		F
227734	1	3	1	UPPER MOLARS SLIGHTLY SEPARATE D	0 UPPER ROOT CRIT AFFECTED	227783	227786	294	M
227736	1	3	1	VERY UNEVEN, CURVED OUTWARD	0	227783	227786	229	F
227731	1	3	1	UPPER MOLARS CURVED OUTWARD		227783	227786	235	M
227782	0					227783	227786	91	F
227778	0					227783	227786	147	F
227787	0					227783	227786	156	M
227845	0					227783	60-195 or 60-186	843	F
227461	SKIN ONLY					227783	42	33	F
227463	SKIN ONLY					227783	227786	33	F
227464	SKIN ONLY					227783	227786	33	M
227541	SKIN ONLY					227783	227786	44	M
227545	SKIN ONLY					227783	227786	44	M
227480	SKIN ONLY					227783	227786	49	F
227481	SKIN ONLY					227783	227786	49	M
227482	SKIN ONLY					227783	227786	49	F
227483	SKIN ONLY					227783	227786	49	F
227484	SKIN ONLY					227783	227786	49	M
227485	SKIN ONLY					227783	227786	49	F

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227496	SKIN ONLY							227783	227786	87	F
227536	SKIN ONLY							227783	227786	108	M
227552	SKIN ONLY							227783	227786	110	F
227554	SKIN ONLY							227783	227786	110	M
227557	SKIN ONLY							227783	227786	110	M
227516	SKIN ONLY							227783	227786	111	M
227517	SKIN ONLY							227783	227786	111	M
227570	SKIN ONLY							227783	227786	147	F
227540	SKIN ONLY							227783	227786	150	F
227493	SKIN ONLY							227783	60-195 or 60-186	155	F
227645	SKIN ONLY							227783	227786	158	M
227551	SKIN ONLY							227783	227786	173	M
227561	SKIN ONLY							227783	227786	184	F
227593	SKIN ONLY							227783	227786	187	M
227543	SKIN ONLY							227783	227786	195	M
227613	SKIN ONLY							227783	227786	216	M
227614	SKIN ONLY							227783	227786	216	F
227637	SKIN ONLY							227783	227786	220	F
227594	SKIN ONLY							227783	227786	230	F
227571	SKIN ONLY							227783	227786	245	M
227573	SKIN ONLY							227783	227786	245	F
227822		0	0	0	0	0	UPPER ROOT ONE SIDE HOLE	227841	227840	13	F
227790		1	1	0	0	0		227841	227840	110	F
227793		1	1	0	0	0		227841	227840	110	F
227819		1	0	1	0	0		227841	227840	13	M
227757		1	1	1	0	0		227841	227840	86	F
227820		0						227841	227840	13	F

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227821	0					227841	227840	13	M
227743	1	1	0	0	0	227843	227647	196	M
227752	1	1	1	0	0	227843	227647	248	F
227758	1	1	1	MILDLY UNEVEN	BOTH INCISORS MILDLY UNEVEN	227843	227647	70	F
227724	0					227843	227647	55	F
227745	0					227843	227647	60	M
227684	0					227843	227647	61	F
227685	0					227843	227647	61	M
227686	0					227843	227647	61	M
227825	0					227843	227647	98	M
227826	0					227843	227647	98	F
227827	0					227843	227647	98	F
227755	0					227843	227647	116	M
227756	0					227843	227647	116	M
227718	0					227843	227647	184	M
227577	SKIN ONLY					227843	227647	51	M
227578	SKIN ONLY					227843	227647	51	F
227579	SKIN ONLY					227843	227647	51	M
227610	SKIN ONLY					227843	227647	51	F
227611	SKIN ONLY					227843	227647	51	M
227612	SKIN ONLY					227843	227647	51	M
227624	SKIN ONLY					227843	227647	135	M
227625	SKIN ONLY					227843	227647	135	F
227626	SKIN ONLY					227843	227647	135	M
227805	1	1	0	0	0	227844	227788	128	F
227761	1	0	1	0	0	227844	227788	16	M
227759	0					227844	227788	16	M
227760	0					227844	227788	16	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227717	0					227844	227788	87	M
227830	0					227844	227788	107	F
227831	0					227844	227788	107	F
227834	0					227844	227788	107	M
227835	0					227844	227788	107	M
227802	0					227844	227788	128	M
227804	0					227844	227788	128	M
227768	1	0	1	0	0	227845	227795	140	M
227769	1	1	1	0	0	227845	227795	140	M
227683	1	1	1	0	0	227845	227795	147	M
227722	1	2	1	0	0	227845	227795	150	M
227810	1	1	0	MOLARS UNEVEN	0	227845	227795	114	M
227707	1	1	1	UPPER MOLAR SURFACE SLIGHTLY UNEVEN	0	227845	227795	164	F
227842	1	1	1	MOLAR SURFACE UNEVEN	0	227845	227795	610	M
227699	0			UPPER ROOT HOLE		227845	227779	16	M
227700	0			UPPER ROOT HOLE		227845	227779	16	F
227698	0					227845	227779	16	M
227720	0					227845	227795	59	F
227812	0					227845	227795	78	F
227813	0					227845	227795	78	F
227814	0					227845	227795	78	F
227808	0					227845	227795	114	M
227723	0					227845	227795	150	F
227706	0					227845	227795	164	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227681	0					227845	227795	167	M	
227521	SKIN ONLY					227845	227795	12	M	
227522	SKIN ONLY					227845	227795	12	F	
227523	SKIN ONLY					227845	227795	12	M	
227524	SKIN ONLY					227845	227795	12	M	
227525	SKIN ONLY					227845	227795	12	F	
227526	SKIN ONLY					227845	227795	12	M	
227527	SKIN ONLY					227845	227795	12	F	
227528	SKIN ONLY					227845	227795	12	F	
227647	SKIN ONLY					227845	227795	18	M	
227648	SKIN ONLY					227845	227795	18	M	
227649	SKIN ONLY					227845	227795	18	F	
227650	SKIN ONLY					227845	227795	18	F	
227638	SKIN ONLY					227845	227795	112	M	
227639	SKIN ONLY					227845	227795	112	M	
227616	SKIN ONLY					227845	227795	128	M	
227617	SKIN ONLY					227845	227795	128	F	
227592	SKIN ONLY					227846	60-84	182	M	
227591	SKIN ONLY					227846	60-84	201	F	
227636	SKIN ONLY					227846	60-84	215	M	
227634	SKIN ONLY					227846	60-84	225	F	
227658	SKIN ONLY					227846	60-84	238	F	
227730	1	2	1	SEPARATE D, LEFT/RIGH T UNEVEN HEIGHT, OUT CURVED	MALOCCL UDING	ASYMMET RIC/ONE SIDE WORSE	227847	60-81	261	F
227763	0					UPPER ROOT ONE	227847	60-81	16	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227764	0						SIDE HOLE UPPER ROOT ONE SIDE HOLE	227847	60-81	16	M
227770	0						UPPER ROOT ONE SIDE HOLE	227847	60-81	16	M
227727	1	2	0	0	0			227847	60-81	138	F
227678	1	0	1	0	0			227847	60-81	149	M
227809	1	1	0		0		BOTH MOLAR SEP	227847	60-81	120	M
227767	1	1	1		0		BOTH MOLAR SEP	227847	60-81	128	M
227766	1	1	1		0		MILD MOLAR SEPARATI ON	227847	60-81	128	F
227806	1	1	0		0		MOLAR SEPARATE D	227847	60-81	120	F
227780	1	1	0		0		SLIGHT MOLAR SEPARATE D	227847	60-81	281	F
227840	1	2	1		0		MOLAR SURFACE UNEVEN, ALL MOLARS SEPARATE D	227847	60-81	419	M
227735	1	3	1	0			BOTH INCISORS MALOCCLUDING	227847	60-81	255	M
227719	1	3	1				MOLARS THICK	227847	60-81	373	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

		SEPARATE D, OUT CURVED			
227762	0		227847	60-81	16 F
227771	0		227847	60-81	16 M
227772	0		227847	60-81	16 M
227740	0		227847	60-81	36 M
227741	0		227847	60-81	36 M
227742	0		227847	60-81	36 F
227746	0		227847	60-81	63 M
227781	0		227847	60-81	101 F
227748	0		227847	60-81	112 M
227792	0		227847	60-81	120 M
227765	0		227847	60-81	128 F
227726	0		227847	60-81	138 M
227728	0		227847	60-81	138 F
227729	0		227847	60-81	138 M
227679	0		227847	60-81	149 M
227670	0		227847	60-81	439 F
227665	SKIN ONLY		227847	60-81	41 M
227574	SKIN ONLY		227847	60-81	59 M
227575	SKIN ONLY		227847	60-81	59 F
227576	SKIN ONLY		227847	60-81	59 F
227621	SKIN ONLY		227847	60-81	67 F
227622	SKIN ONLY		227847	60-81	67 F
227623	SKIN ONLY		227847	60-81	67 F
227572	SKIN ONLY		227847	60-81	121 F
227652	SKIN ONLY		227847	60-81	153 F
227565	SKIN ONLY		227847	60-81	194 M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227569	SKIN ONLY							227847	60-81	194	F
227635	SKIN ONLY							227847	60-81	264	M
227843		1	2	1	MOLARS SEP AND ABNORMA L SURFACE	SLIGHTLY MALOCCL UDING	PICTURE	227848	227809	581	F
227751	listed as skin (missing head) and skeleton parts						NO SKULL	227848	68	243	M
227733		1	1	1	0	0	ASYMMET RIC/ONE SIDE WORSE	227848	68	176	F
227716		1	2	1	MOLARS SEPARATE D	THICK	UPPER ROOT CRIT AFFECTED	227848	227809	313	M
227715		1	3	1	SEPARATE D, UNEVEN	THICK	UPPER ROOT CRIT AFFECTED	227848	227809	310	F
227732		1	1	0	0	0		227848	68	174	M
227676		1	1	0	0	0		227848	227809	297	M
227788		1	3	1	MARKEDL Y SEPARATE D, UNEVEN	SEPARATE D		227848	227809	507	M
227472	SKIN ONLY							227848	56	30	M
227473	SKIN ONLY							227848	56	30	F
227474	SKIN ONLY							227848	56	30	M
227475	SKIN ONLY							227848	56	30	M
227476	SKIN ONLY							227848	56	30	F
227477	SKIN ONLY							227848	56	30	F
227478	SKIN ONLY							227848	56	30	M

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227479	SKIN ONLY							227848	56	30	F
227468	SKIN ONLY							227848	56	85	M
227469	SKIN ONLY							227848	56	85	F
227470	SKIN ONLY							227848	56	85	F
227471	SKIN ONLY							227848	56	85	F
227547	SKIN ONLY							227848	227809	90	F
227548	SKIN ONLY							227848	227809	90	F
227530	SKIN ONLY							227848	227809	93	F
227533	SKIN ONLY							227848	227809	93	F
227661	SKIN ONLY							227848	227734	103	F
227662	SKIN ONLY							227848	227734	103	F
227663	SKIN ONLY							227848	227734	103	F
227664	SKIN ONLY							227848	227734	103	F
227640	SKIN ONLY							227848	227809	229	M
227641	SKIN ONLY							227848	227809	229	F
227846	SKIN ONLY	1	3	1	1	INCISORS BADLY MALOCCL UDING, LOOPED AROUND	TOOTH SURFACE VERY BAD. PICTURE.	58-14	58-2	977	F
227459	SKIN ONLY							58-14	58-7	37	M
227460	SKIN ONLY							58-14	58-7	37	M
227467	SKIN ONLY							58-14	58-7	37	M
227515	SKIN ONLY							58-14	58-7	115	M
227666	SKIN ONLY							58-14	58-2	131	F
227535	SKIN ONLY							58-14	58-2	243	M
227556	SKIN ONLY							58-14	58-2	245	F
227486	SKIN ONLY							58-15	227445	75	F
227487	SKIN ONLY							58-15	227445	75	F

Veterinary Pathology: Imai et al. Apical elongation of molar teeth in captive *Microtus* voles. Supplemental Table S1.

227488	SKIN ONLY	58-15	227445	75	M
227489	SKIN ONLY	58-15	227445	75	F
227490	SKIN ONLY	58-15	227445	75	F
227491	SKIN ONLY	58-15	227445	75	M
227492	SKIN ONLY	58-15	227445	75	M
227563	SKIN ONLY			58	F
227564	SKIN ONLY			58	F
227553	SKIN ONLY			65	M
227558	SKIN ONLY			65	F
227560	SKIN ONLY			65	M
227550	SKIN ONLY			68	M
227546	SKIN ONLY			97	F
227544	SKIN ONLY			108	F
227566	SKIN ONLY			139	M
227668	SKIN ONLY			459	M
227442	SKIN ONLY		492		M
227443	SKIN ONLY				F
227447	SKIN ONLY				M
227549	SKIN ONLY				M
227567	SKIN ONLY				F

Veterinary Pathology: Supplemental Materials.
Imai et al. Apical elongation of molar teeth in captive *Microtus* voles.

Supplemental Table S2. Conditions of specimens of *Microtus socialis* examined at MVZ. Specimens were housed, but duration of housing, or age of specimens, unknown.

MVZ	condition	COUNTRY	PROVINCE	COUNTY	SPECIFIC LOCALITY
198799	upper and lower molars splayed and misaligned, surfaces abnormal outline. Mild root penetration in cranium, extreme root extension in mandible, both sides	Iran	Tehran Province		Tar Lake
198800	normal	Iran	Tehran Province		Tar Lake
198801	normal	Iran	Tehran Province		Tar Lake
198802	normal	Iran	Tehran Province		Tar Lake
198803	upper and lower molars mildly splayed and misaligned. Mild root penetration in cranium, extreme root extension in mandible, but more prominent on right side.	Iran	Tehran Province		Tar Lake
198804	upper and lower molars splayed and misaligned. Mild root penetration in cranium, extreme root extension in mandible, both sides	Iran	Tehran Province		Tar Lake
198805	normal	Iran	Tehran Province		Tar Lake
198816	normal	Iran	Tehran Province		Roudbar ghasran- Abrike
198817	normal	Iran	Tehran Province		Roudbar ghasran- Abrike
198823	normal	Iran	Tehran Province		Central Alborz Protected Area

Veterinary Pathology: Supplemental Materials.
Imai et al. Apical elongation of molar teeth in captive *Microtus* voles.

Supplemental Table S3: Histopathologic scores for molar apical elongation in *Amargosa* voles.

Vole ID	Age (mo)	Antemortem assessment	Mandibular				Maxillary			
			hyperplasia ^a	dysplasia	bone	devitalization	hyperplasia	dysplasia	bone	devitalization
pup	0.5	N	0	0	0	0	0	0	0	0
3967	3+	N	1	0	0	0	1	0	0	0
3939	6.5	N/P	1	0	0	0	1	0	0	1
3594	13	N/P	1	0	0	0	1	0	0	0
3949	12 ^{+b}	N/P	1	0	0	0	1	0	0	0
3115	6.5	P/V	2	1	1	2	2	0	0	0
3216	7	P/V	1	1	0	1	2	0	1	0
3253	8	V/VE	2	0	1	1	2	1	0	0
2989	8	V/VE	2	0	1	0	1	0	1	0
3220	8	VE	3	2	1	2	3	2	1	0
3241	9	VE	2	2	1	2	2	0	1	0
3117	14	VE	NE	NE	NE	NE	3	2	1	0

^a in all categories, grade is based on the most affected molar in the mandibular or maxillary arcades

^b wild-caught individuals with unknown birthdate are estimated to be 1 mo old at capture

Supplementary Table S4: Skull specimens from *Amargosa* voles with molar apical elongation

Vole ID	Age (mo)	Antemortem assessment
3258	3.2	N
3273	3.2	N
3238	9	V
3230	7.8	VE
3215	11.5	VE