

Appendix E-2

TABLE E-1 Associations Between Participation in Other Sports and AIS

				Risk for AIS Adjusted for Age, Menarcheal Status, School, and Family Composition			
	No. of Participants	No. of Participants with AIS	Percentage with AIS	Adjusted OR	95% CI		P Value for Trend*
Swimming							
Age at initiation							
None	1,656	759	45.8	Ref.			
<7 yr	593	285	48.1	1.02	0.84	1.24	
≥7 yr	349	184	52.7	1.25	0.99	1.58	
Years of experience							0.517
None	1,656	759	45.8	Ref.			
<7 yr	710	361	50.9	1.13	0.95	1.36	
≥7 yr	228	105	46.1	0.99	0.74	1.31	
Frequency							0.695
None	1,656	759	45.8	Ref.			
≤1 time/wk	726	369	50.8	1.14	0.95	1.36	
2-3 times/wk	128	57	44.5	0.89	0.62	1.29	
≥4 times/wk	44	15	34.1	0.58	0.30	1.11	
Duration†							0.919
None	1,656	759	45.8	Ref.			

Lowest tertile	308	161	52.3	1.16	0.90	1.49	
Middle tertile	295	147	49.8	1.11	0.86	1.43	
Highest tertile	290	130	44.8	0.94	0.73	1.21	
Rhythmic gymnastics							
Age at initiation							
None	2,483	1,172	47.2	Ref.			
<7 yr	82	38	46.3	0.95	0.61	1.49	
≥7 yr	34	17	50.0	1.23	0.61	2.45	
Years of experience							0.955
None	2,483	1,172	47.2	Ref.			
<7 yr	82	40	48.8	1.08	0.69	1.70	
≥7 yr	31	14	45.2	0.93	0.45	1.93	
Frequency							0.510
None	2,483	1,172	47.2	Ref.			
≤1 time/week	84	43	51.2	1.20	0.77	1.87	
2-3 times/week	13	4	30.8	0.39	0.12	1.32	
≥4 times/week	16	6	37.5	0.72	0.25	2.06	
Duration†							0.822
None	2,483	1,172	47.2	Ref.			
Lower half	53	25	47.2	1.04	0.59	1.80	
Upper half	57	26	45.6	0.92	0.53	1.58	
Dancing							
Age at initiation							

None	2,280	1,072	47.0	Ref.			
<7 yr	112	61	54.5	1.35	0.91	2.00	
≥7 yr	208	95	45.7	0.90	0.67	1.20	
Years of experience							0.321
None	2,280	1,072	47.0	Ref.			
<7 yr	238	110	46.2	0.90	0.69	1.19	
≥7 yr	82	46	56.1	1.55	0.98	2.44	
Frequency							0.660
None	2,280	1,072	47.0	Ref.			
≤1 time/wk	213	109	51.2	1.13	0.84	1.50	
2-3 times/wk	67	29	43.3	0.87	0.52	1.43	
≥4 times/wk	32	13	40.6	0.74	0.36	1.52	
Duration†							0.594
None	2,280	1,072	47.0	Ref.			
Lowest tertile	116	55	47.4	0.89	0.61	1.31	
Middle tertile	79	38	48.1	1.05	0.67	1.66	
Highest tertile	117	58	49.6	1.14	0.78	1.67	
Artistic gymnastics							
Age at initiation							
None	2,507	1,179	47.0	Ref.			
<7 yr	57	25	43.9	0.81	0.47	1.38	
≥7 yr	36	24	66.7	2.26	1.11	4.59	
Years of experience							0.610

None	2,507	1,179	47.0	Ref.			
<7 yr	76	40	52.6	1.17	0.74	1.87	
≥7 yr	15	7	46.7	1.01	0.36	2.83	
Frequency							0.294
None	2,507	1,179	47.0	Ref.			
≤1 time/wk	75	37	49.3	1.02	0.64	1.63	
≥2 times/wk	17	11	64.7	2.07	0.75	5.67	
Duration†							0.467
None	2,507	1,179	47.0	Ref.			
Lower half	44	21	47.7	0.93	0.51	1.72	
Upper half	46	25	54.4	1.32	0.73	2.39	
Tennis							
Age at initiation							
None	2,260	1,074	47.5	Ref.			
<7 yr	26	15	57.7	1.29	0.58	2.88	
≥7 yr	314	139	44.3	0.85	0.67	1.09	
Years of experience							0.278
None	2,260	1,074	47.5	Ref.			
<7 yr	321	143	44.6	0.86	0.68	1.09	
≥7 yr	13	7	53.9	1.06	0.35	3.27	
Frequency							0.311
None	2,260	1,074	47.5	Ref.			
≤1 time/wk	90	41	45.6	0.91	0.59	1.40	

2-3 times/wk	50	23	46.0	0.81	0.45	1.43	
≥4 times/wk	192	87	45.3	0.89	0.65	1.20	
Duration†							0.459
None	2,260	1,074	47.5	Ref.			
Lowest tertile	109	50	45.9	0.78	0.52	1.16	
Middle tertile	115	52	45.2	0.84	0.57	1.23	
Highest tertile	102	45	44.1	1.00	0.67	1.51	
Volleyball							
Age at initiation							
None	2,387	1,139	47.7	Ref.			
<7 yr	1	0	0				
≥7 yr	212	89	42.0	0.76	0.57	1.02	
Years of experience							
None	2,387	1,139	47.7	Ref.			
<7 yr	208	87	41.8	0.75	0.56	1.01	
≥7 yr	4	1	25.0	0.59	0.06	5.69	
Frequency							0.040
None	2,387	1,139	47.7	Ref.			
≤1 time/wk	12	8	66.7	2.09	0.61	7.18	
2-3 times/wk	23	10	43.5	0.72	0.31	1.67	
≥4 times/wk	174	70	40.2	0.72	0.52	0.99	
Duration†							0.013
None	2,387	1,139	47.7	Ref.			

Lowest tertile	74	40	54.1	0.97	0.60	1.56	
Middle tertile	56	24	42.9	0.82	0.47	1.42	
Highest tertile	78	23	29.5	0.55	0.33	0.90	

*Linear trend was tested by assignment of the ordinal value. †Duration was defined as a product of years of experience and frequency.

TABLE E-2 Associations Between Other Factors and AIS

		Participants with AIS		Adjusted for Age, Menarcheal Status, School, and Family Composition		
	No. of Participants	No.	Percentage	Adjusted OR	95% CI	
Commute time to school						
≤10 min	856			Ref.		
11-30 min	1,273	605	47.5	1.08	0.90	1.29
>30 min	447	231	51.7	1.01	0.72	1.42
Dominant hand						
Right	2,370	1,115	47.1	Ref.		
Left	187	96	51.3	1.18	0.87	1.60
Time spent watching television and/or playing games every week						
<5 hr	578	265	45.9	Ref.		
5 to <15 hr	1,266	625	49.4	1.14	0.93	1.39
≥15 hr	677	310	45.8	0.99	0.78	1.24
Posture when watching television and/or playing games						
Lying down	1,835	881	48.0	Ref.		
Sitting	548	241	44.0	0.86	0.71	1.05
Restricting food intake						

No	2,460	1,168	47.5	Ref.		
Yes	125	54	43.2	0.95	0.66	1.37
Food allergy						
No	2,330	1,106	47.5	Ref.		
Yes	242	110	45.5	0.91	0.70	1.20
Use of pesticide and/or insecticide in the participant's room						
No	1,385	666	48.1	Ref.		
Any	1,215	562	46.3	0.90	0.77	1.06
Vision impairment*						
No	1,081	507	46.9	Ref.		
Yes	754	348	46.2	1.04	0.86	1.26
History of diseases						
Varicella						
No	933	442	47.4	Ref.		
Yes	1,667	786	47.2	1.01	0.86	1.19
Rubella						
No	2,374	1,127	47.5	Ref.		
Yes	226	101	44.7	0.89	0.67	1.18
Measles						
No	2,374	1,132	47.7	Ref.		
Yes	226	96	42.5	0.88	0.66	1.17
Mumps						

No	1,675	799	47.7	Ref.		
Yes	925	429	46.4	0.99	0.84	1.16
Influenza						
No	469	227	48.4	Ref.		
Yes	2,131	1,001	47.0	0.92	0.75	1.13
Asthma						
No	2,310	1,095	47.4	Ref.		
Yes	290	133	45.9	1.00	0.78	1.29
Atopic dermatitis						
No	2,270	1,074	47.3	Ref.		
Yes	330	154	46.7	1.00	0.79	1.26
Kawasaki disease						
No	2,573	1,213	47.1	Ref.		
Yes	27	15	55.6	1.46	0.67	3.18
Anorexia nervosa						
No	2,595	1,225	47.2	Ref.		
Yes	5	3	60.0	1.74	0.29	10.60
Cleft lip and/or palate						
No	2,590	1,224	47.3	Ref.		
Yes	10	4	40.0	0.74	0.20	2.68
Developmental dysplasia of the hip						
No	2,592	1,224	47.2	Ref.		
Yes	8	4	50.0	0.93	0.23	3.84

External injuries						
No	2,505	1,187	47.4	Ref.		
Any	95	41	43.2	0.87	0.57	1.32
Fractures						
No	2,239	1,057	47.2	Ref.		
Any	361	171	47.4	1.01	0.80	1.26
Type of delivery						
Vaginal	2,184	1,023	46.8	Ref.		
Caesarean	362	182	50.3	1.14	0.91	1.43
Multiple birth						
No	2,459	1,158	47.1	Ref.		
Twin	53	30	56.6	1.53	0.88	2.68
History of complications during pregnancy						
Diabetes (diagnosed before pregnancy)						
No	2,597	1,227	47.3	Ref.		
Yes	3	1	33.3	0.61	0.05	6.70
Gestational diabetes mellitus						
No	2,580	1,216	47.1	Ref.		
Yes	20	12	60.0	1.64	0.66	4.10
Hypertensive disorders in pregnancy						

No	2,534	1,199	47.3	Ref.		
Yes	66	29	43.9	0.87	0.53	1.44
Hyperthyroidism						
No	2,592	1,222	47.2	Ref.		
Yes	8	6	75.0	2.75	0.54	14.02
Hypothyroidism						
No	2,595	1,227	47.3	Ref.		
Yes	5	1	20.0	0.22	0.02	2.01
Intrauterine infection						
No	2,598	1,227	47.2	Ref.		
Yes	2	1	50.0	0.99	0.06	16.08
Anemia						
No	2,042	962	47.1	Ref.		
Yes	558	266	47.7	1.02	0.85	1.24
Use of commercial supplements or health foods during pregnancy						
Multivitamins						
No	2,125	1,015	47.8	Ref.		
Occasionally or regularly	60	33	55.0	1.30	0.77	2.19
Calcium						
No	2,093	1,005	48.0	Ref.		
Occasionally or	85	38	44.7	0.83	0.53	1.30

regularly						
Iron						
No	1,844	876	47.5	Ref.		
Occasionally or regularly	388	180	46.4	0.93	0.75	1.17
Zinc						
No	2,145	1,031	48.1	Ref.		
Occasionally or regularly	21	9	42.9	0.73	0.30	1.76
Folic acid						
No	2,122	1,022	48.2	Ref.		
Occasionally or regularly	69	32	46.4	0.81	0.50	1.33
Passive smoking during pregnancy						
Almost never	1,267	623	49.2	Ref.		
Sometimes	806	377	46.8	0.93	0.77	1.12
Often	451	192	42.6	0.82	0.65	1.02
Weaning age						
≤6 mo	993	466	46.9	Ref.		
7-8 mo	383	195	50.9	1.17	0.92	1.49
9-11 mo	240	117	48.8	1.10	0.82	1.46
≥12 mo	372	163	43.8	0.91	0.71	1.16
Development						

Hold her head up						
<4 mo	1,332	621	46.6	Ref.		
≥4 mo	471	235	49.9	1.11	0.90	1.38
Turn over in bed						
<7 mo	1,330	630	47.4	Ref.		
≥7 mo	295	133	45.1	0.88	0.68	1.14
Walk unaided						
<12 mo	1,355	636	46.9	Ref.		
≥12 mo	631	315	49.9	1.10	0.91	1.33
Sleep posture during infancy						
Supine	1,684	806	47.9	Ref.		
Prone	186	84	45.2	0.84	0.62	1.15
Lateral	74	38	51.4	1.15	0.71	1.84

*Vision impairment was defined as an uncorrected distance visual acuity of worse than 0.5 in the better eye.

TABLE E-3 Associations Between the Potential Risk Factors and AIS After Excluding Participants with a Cobb Angle of 10° to 19° (N = 1,222)

		Participants with AIS (Cobb Angle of ≥20°)		Adjusted for Age, Menarcheal Status, School, and Family Composition			Adjusted for All Factors Associated with AIS		
	No. of Participants	No.	Percentage	Adjusted OR	95% CI		Adjusted OR	95% CI	
Commute time to school									
≤10 min	402	183	45.5	Ref.					
11-30 min	609	281	46.1	1.01	0.77	1.31			
>30 min	203	105	51.7	0.90	0.54	1.50			
School bags participant uses to commute to school									
Backpack									
No	634	318	50.2	Ref.					
Yes	583	254	43.6	0.84	0.66	1.07			
Shoulder bag									
No	544	252	46.3	Ref.					
Yes	673	320	47.6	1.06	0.84	1.34			
Hand bag									
No	638	292	45.8	Ref.					
Yes	579	280	48.4	1.03	0.81	1.30			
Weight of the school bags									
Light	30	15	50.0	Ref.					
Normal	253	115	45.5	0.66	0.30	1.46			

Heavy	929	439	47.3	0.62	0.29	1.33			
Time spent studying outside of school on weekdays									
None	54	26	48.2	0.96	0.53	1.74			
<1 hr	337	162	48.1	Ref.					
1 to <2 hr	486	246	50.6	1.17	0.88	1.57			
≥2 hr	339	137	40.4	1.01	0.73	1.39			
Dominant hand									
Right	1100	517	47.0	Ref.					
Left	100	51	51.0	1.23	0.81	1.88			
Time spent watching television and/or playing games every week									
<5 hr	263	121	46.0	Ref.					
5 to <15 hr	603	293	48.6	1.10	0.81	1.49			
≥15 hr	315	145	46.0	0.99	0.70	1.40			
Posture when watching television and/or playing games									
Lying down	856	407	47.6	Ref.					
Sitting	263	119	45.3	0.92	0.69	1.23			
Experience of performance of musical instrument									
No	399	178	44.6	Ref.					
Yes, except wind instrument	207	86	41.6	0.81	0.57	1.16			

Yes, wind instrument	179	72	40.2	0.92	0.64	1.34			
Sports experiences									
Swimming									
No	765	354	46.3	Ref.					
Yes	457	220	48.1	0.98	0.77	1.25			
Rhythmic gymnastics									
No	1,166	545	46.7	Ref.					
Yes	56	29	51.8	1.29	0.74	2.26			
Classical ballet									
No	1,053	477	45.3	Ref.			Ref.		
Yes	169	97	57.4	1.58	1.12	2.23	1.38	0.97	1.97
Dancing									
No	1,070	505	47.2	Ref.					
Yes	152	69	45.4	0.85	0.60	1.22			
Artistic gymnastics									
No	1,182	562	47.6	Ref.					
Yes	40	12	30.0	0.47	0.22	1.01			
Tennis									
No	1,044	487	46.7	Ref.					
Yes	178	87	48.9	1.01	0.73	1.41			
Basketball									
No	1,131	542	47.9	Ref.			Ref.		
Yes	91	32	35.2	0.62	0.39	0.98	0.59	0.36	0.95

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room									
No	635	304	47.9	Ref.					
Any	587	270	46.0	0.87	0.69	1.10			
Vision impairment									
No	530	245	46.2	Ref.					
Yes	331	152	45.9	1.15	0.86	1.54			
Teeth									
Dental braces									
No	899	400	44.5	Ref.			Ref.		
Yes	316	172	54.4	1.47	1.12	1.93	1.33	1.00	1.76
Fluoride treatment									
No	311	132	42.4	Ref.					
Occasionally or regularly	878	429	48.9	1.09	0.83	1.43			
Weight reduction of >1 kg from a year earlier									
No	1,076	513	47.7	Ref.					
Yes	111	43	38.7	0.69	0.45	1.04			
Current BMI (kg/m ²)									
18.5-24.9	623	245	39.3	Ref.			Ref.		
<18.5	565	315	55.8	1.55	1.21	1.99	1.38	1.07	1.79
≥25.0	24	10	41.7	1.04	0.44	2.47	0.93	0.39	2.24
Family history of scoliosis									
No	1,065	490	46.0	Ref.					
First-degree	131	72	55.0	1.51	1.03	2.21			

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No	1,069	501	46.9	Ref.					
Yes	153	73	47.7	1.16	0.82	1.65			
Kawasaki disease									
No	1,211	568	46.9	Ref.					
Yes	11	6	54.6	1.38	0.41	4.72			
Anorexia nervosa									
No	1,219	573	47.0	Ref.					
Yes	3	1	33.3	0.72	0.06	8.21			
Cleft lip and/or palate									
No	1,216	570	46.9	Ref.					
Yes	6	4	66.7	2.11	0.36	12.53			
Developmental dysplasia of the hip									
No	1,220	574	47.1	Ref.					
Yes	2	0	0						
External injuries									
No	1,181	557	47.2	Ref.					
Any	41	17	41.5	0.82	0.43	1.58			
Fractures									
No	1,047	490	46.8	Ref.					
Any	175	84	48.0	1.10	0.79	1.54			
Maternal age at delivery									
<25 yr	98	46	46.9	Ref.					
25-29 yr	411	195	47.5	1.02	0.64	1.61			

30-34 yr	464	230	49.6	1.02	0.65	1.62			
≥35 yr	202	88	43.6	0.83	0.50	1.37			
Gestational age at birth									
Term (37-41 wk)	685	330	48.2	Ref.			Ref.		
Preterm (<37 wk)	104	50	48.1	1.05	0.68	1.60	1.11	0.72	1.72
Postterm (≥42 wk)	34	10	29.4	0.42	0.19	0.91	0.49	0.22	1.08
Term low birth weight (<2,500 g)									
No	601	293	48.8	Ref.					
Yes	52	27	51.9	1.21	0.67	2.18			
Type of delivery									
Vaginal	1,019	473	46.4	Ref.					
Caesarean	181	92	50.8	1.15	0.83	1.60			
Multiple birth									
No	1,157	542	46.9	Ref.					
Twin	24	14	58.3	1.56	0.66	3.65			
History of complications during pregnancy									
Diabetes (diagnosed before pregnancy)									
No	1,219	573	47.0	Ref.					
Yes	3	1	33.3	0.60	0.05	6.61			
Gestational diabetes mellitus									
No	1,214	570	47.0	Ref.					

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during pregnancy									
Never drank	664	321	48.3	Ref.					
Former drinker who quit before pregnancy	58	25	43.1	0.79	0.45	1.40			
Drank during early pregnancy	460	213	46.3	0.96	0.75	1.22			
Feeding									
Breast milk	449	207	46.1	Ref.					
Formula milk	308	152	49.4	1.11	0.82	1.51			
Mixed	435	203	46.7	1.04	0.79	1.36			
Weaning age									
≤6 mo	445	209	47.0	Ref.					
7-8 mo	171	84	49.1	1.02	0.71	1.48			
9-11 mo	123	58	47.2	1.02	0.68	1.55			
≥12 mo	190	77	40.5	0.79	0.56	1.13			
Development									
Hold his/her head up									
<4 mo	618	285	46.1	Ref.					
≥4 mo	225	118	52.4	1.20	0.87	1.65			
Turn over in bed									
<7 mo	614	295	48.1	Ref.					
≥7 mo	144	66	45.8	0.88	0.60	1.29			
Walk unaided									
<12 mo	615	281	45.7	Ref.					
≥12 mo	306	155	50.7	1.12	0.84	1.49			

Sleep posture during infancy									
Supine	772	358	46.4	Ref.					
Prone	97	43	44.3	0.84	0.54	1.31			
Lateral	32	14	43.8	0.87	0.41	1.82			