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Prevalence and Characteristics by Age and Sex in Pediatric Trigger Digits: Nationwide Analysis Using Korea Health Insurance Dataset

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Background: Pediatric trigger digit (TD) does not appear at birth but is diagnosed after birth by finding a flexion contracture of the thumb or other fingers. The reported incidence of pediatric TDs varies from 0.5 to 5 cases per 1,000 live births without sex-specific predominance. We performed a nationwide large-scale study to determine the prevalence and incidence of pediatric TDs and analyzed operative treatment for pediatric TDs using the National Health Insurance data of South Korea.

Methods: Patients with pediatric TDs, aged 0–10 years between 2011 and 2020, were included in this study. Children born between 2011 and 2015 were set as the reference population and followed up until 2020. We calculated the prevalence and incidence rates of pediatric TDs according to age and sex and analyzed the operation rate, age at surgery, time interval from initial diagnosis to surgery, and follow-up period. Patient selection and treatment were based on International Classification of Diseases, 10th Revision (ICD-10).

Results: The prevalence rates of pediatric TDs ranged from 0.063% to 0.084%. Girls had a higher prevalence rate (0.066%–0.094%) than boys (0.060%–0.075%). The total incidence rate was 77.6/100,000 person-years, and the incidence rate was higher in girls (84.8) than in boys (70.7). Among 2,181,814 children born between 2011 and 2015, 12,729 were diagnosed with pediatric TDs, of which 1,128 (8.9%) underwent operative management. The means of age at initial diagnosis, age at surgery, and the time interval between diagnosis and operation were 2.76 ± 1.91 years, 3.79 ± 2.19 years, and 1.15 ± 1.71 years, respectively.

Conclusions: High prevalence and incidence rates of pediatric TDs were found in 2- to 3-year-old patients. Among pediatric patients, 8.9% underwent operative management that was most frequently conducted between 2 and 3 years of age (within 1 year of initial diagnosis).

Keywords: *Pediatric trigger digits, Pediatric trigger thumb, Incidence, Prevalence*

Trigger digit (TDs), including the triggering of thumbs and other fingers, in children were once thought to be congenital. However, several studies have reported that TD does not appear at birth but is diagnosed after birth by finding a flexion contracture of the thumb or other fingers. Pediatric TD occurs mainly in the thumb, and the incidence in other fingers is reported to be 1/10 that of the thumb.[1,2] Overall, 0.5 to 5 cases of trigger thumbs are detected per 1,000 newborns (less than 1 year of age), of which 25 to 30% cases are reported to be of bilateral trigger thumbs.[2-8] However, a sex-specific predominance of TDs has not yet been reported. In the case of triggering of fingers other

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than the thumb, most patients were ≤ 4 years of age.[1,9]

Efforts have been made to comprehend the natural course of pediatric TD, and thereby, to determine the course of treatment (non-surgical or surgical).[4,8,10-13] Various non-surgical methods of treatment have been introduced, from simple observation to splint fixation and stretching, whose success rate varies from 0 to 96%.[5,6,10,13-20] Although surgical treatment leads to good outcomes, the indications and the timing of surgical treatment remain controversial.[11,12]

Nevertheless, there are several obstacles to the understanding of pediatric TD. The overall incidence of pediatric TD is low, and patients such as newborn babies and infants cannot describe their symptoms. To our knowledge, no large-scale studies have been conducted on pediatric TD to examine the data obtained from patients in the entire country. Accordingly, the authors analyzed data from the National Health Insurance Corporation of Korea, ascertained the prevalence rates of TDs according to age and sex, and followed up the data for children with TD to determine the clinical treatment periods and operative treatment rates.

The purpose of this study was to ascertain the prevalence rates depending on age and sex. Second, we aimed to determine the incidence rates of TD and identify the operative treatment rate by monitoring pediatric TD after diagnosis.

METHODS

This retrospective study was approved by the Institutional Review Board of National Health Insurance Service Ilsan Hospital (IRB No. 2022-09-032), which waived the need for informed consent because the data were analyzed anonymously. All procedures performed in this study, which involved human participants, followed the ethical standards of the institutional and/or national research committee and the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Data Source

The study population was selected based on the data available from the National Health Insurance Service (NHIS). In Korea, NHIS is a public organization and the single largest insurer, providing health insurance for all citizens living in South Korea.[21] NHIS provides comprehensive datasets obtained from healthcare providers, including 99% of claims data. The datasets contain healthcare data of both inpatients and outpatients regarding demographics, diagnoses, and prescriptions, which include the following information: sex, age, diagnosis codes based on the International Classification of Diseases, 10th Revision (ICD-10), and treatments covered by NHIS.

Study Participants and Cohort

Patient selection according to the disease and the treatment was based on the ICD-10 codes registered with the NHIS. The ICD-10 codes for pediatric TDs (M6530, M6534, and M6539) and prescription codes for surgical treatment of pediatric TDs (8735700, 8710500, 8026600, 8735100, 8632900, and 8633000) are presented separately in Supplementary Table 1. The study participants were patients with TDs, aged 0–10 years between 2011 and 2020. These patients were selected after analysis of the qualification data obtained from NHIS. The flowchart used for patient selection and categorization is shown in Fig. 1.

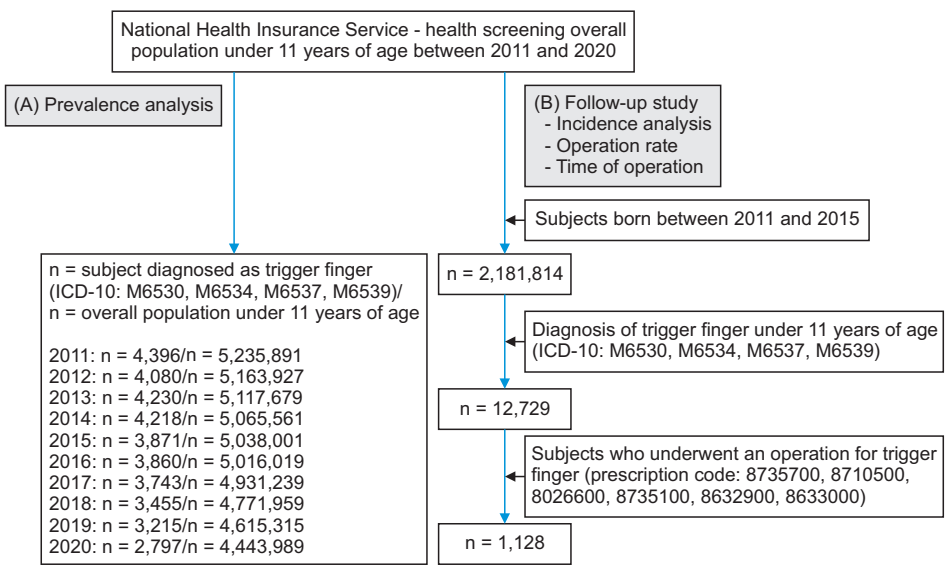

Fig. 1. Schematic diagram depicting study population. ICD-10: International Classification of Diseases, 10th Revision.

Analysis of Prevalence According to Age and Sex

Prevalence rates represent the number of existing cases of a disease at a given time point. From 2011 to 2020, we determined the number of children with pediatric TDs among the overall population. We determined the number and the proportion of pediatric TD patients according to age and sex for each year from the total population of children of each age (Fig. 1A). To calculate the number of patients with pediatric TDs every year, we examined the qualification data obtained from NHIS. The resident registration data provided by the Ministry of Interior and Safety were used to calculate the total population constituting each age group.[3,6-8]

Analysis of Incidence Rates and Follow-up after Pediatric TD Occurrence

All patients diagnosed with pediatric TDs between 2011 and 2015 were set as the reference population and were followed up until 2020 (Figs. 1B and 2). We assessed the age at the initial diagnosis of TD and calculated the cumulative incidence and incidence rates. The cumulative incidence was calculated by dividing the number of patients diagnosed with the disease (pediatric TD) over a certain period by the total number of patients followed up over this period. The incidence rate was calculated by dividing the number of patients diagnosed with the disease by the total time during which all individuals developed the disease.[22]

Additionally, we ascertained the number of patients who underwent operative treatment after diagnosis of TD. The types of operative management that the patients underwent were categorized according to the prescription codes of NHIS (Supplementary Table 1). We analyzed the time interval from diagnosis to surgery and the age at the time of surgery of the patients. For patients who did not undergo the surgery, the follow-up period was defined as the period from the initial confirmation of TD diagnosis to the time when the last medical record was documented (Fig. 2).

Statistical Analysis

Demographic and clinical history data were analyzed using descriptive statistics. Mean, standard deviation, minimum, and maximum values are presented for continuous data, and categorical data are presented as frequency and percentage values. Pearson chi-square test was used to determine whether there was a statistically significant difference in the prevalence of TDS in male and female pediatric patients.

RESULTS

Analysis of Prevalence Rates According to Age and Sex

Table 1 presents the prevalence of pediatric TDs according to age and sex from 2011 to 2020. The overall average prevalence of pediatric TDs ranged from 0.063% (2020) to 0.084% (2011). Girls presented a higher prevalence (ranging from 0.066% [2020] to 0.094% [2011]) than boys (ranging from 0.060% [2020] to 0.075% [2011]) every year. The highest prevalence of pediatric TDs was observed at

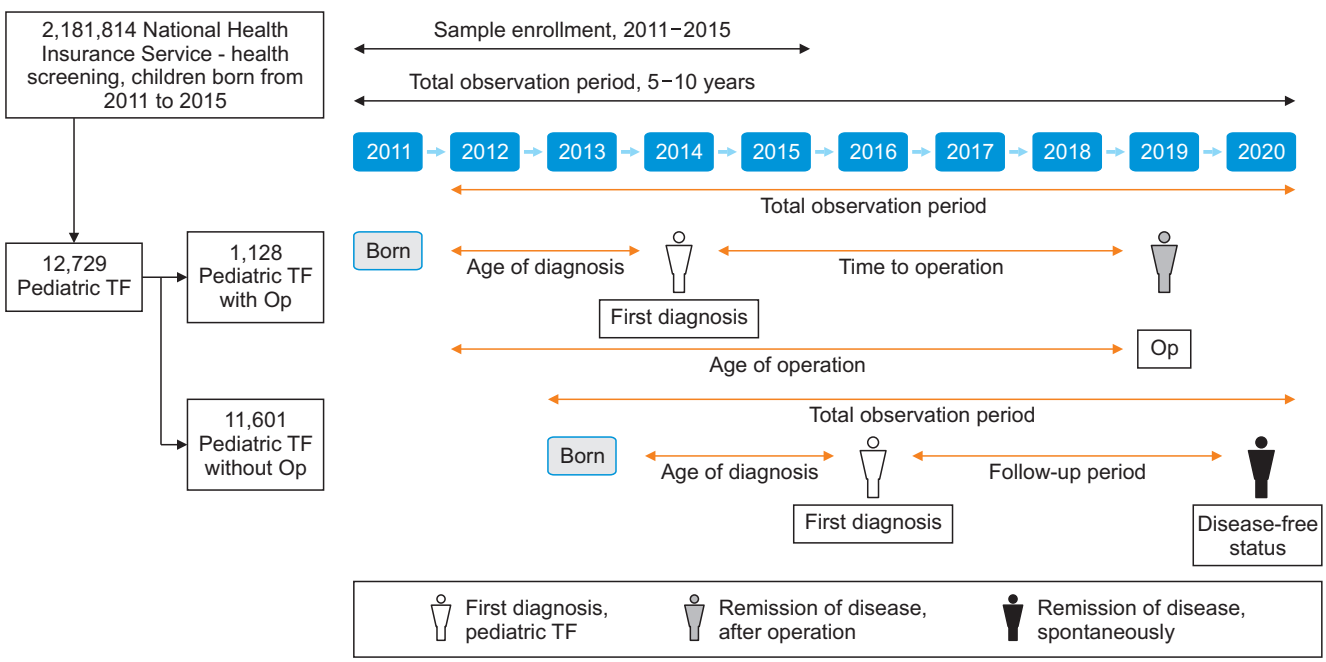

Fig. 2. Follow-up research after pediatric trigger finger occurrence. TF: trigger finger, Op: operation.

Table 1. Prevalences

Variable	Inspection time									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Total										
Boy	2,028 / 2,709,184 (75)	1,858 / 2,668,058 (70)	1,930 / 2,639,382 (73)	1,968 / 2,608,980 (75)	1,799 / 2,591,948 (69)	1,832 / 2,577,779 (71)	1,740 / 2,532,917 (69)	1,614 / 2,450,097 (66)	1,493 / 2,369,046 (63)	1,378 / 2,279,978 (60)
Girl	2,368 / 2,526,707 (94)	2,222 / 2,495,869 (89)	2,300 / 2,478,297 (93)	2,250 / 2,456,581 (92)	2,072 / 2,446,053 (85)	2,028 / 2,438,240 (83)	2,003 / 2,398,322 (84)	1,841 / 2,321,862 (79)	1,722 / 2,246,269 (77)	1,419 / 2,164,011 (66)
Boy + girl	4,396 / 5,235,891 (84)	4,080 / 5,163,927 (79)	4,230 / 5,117,679 (83)	4,218 / 5,065,561 (83)	3,871 / 5,038,001 (77)	3,860 / 5,016,019 (77)	3,743 / 4,931,239 (76)	3,455 / 4,771,959 (72)	3,215 / 4,615,315 (70)	2,797 / 4,443,989 (63)
Year of birth										
2001	107 / 560,042 (19)									
2002	102 / 495,288 (21)	90 / 495,216 (18)								
2003	99 / 493,658 (20)	84 / 493,679 (17)	104 / 493,745 (21)							
2004	148 / 473,970 (31)	120 / 474,009 (25)	98 / 474,106 (21)	102 /474,187 (22)						
2005	211 / 435,724 (48)	134 / 435,863 (31)	115 / 436,031 (26)	131 / 436,172 (30)	88 / 436,313 (20)					
2006	278 / 448,774 (62)	205 / 449,057 (46)	155 / 449,321 (34)	119 / 449,510 (26)	96 / 449,663 (21)	105 / 449,851 (23)				
2007	593 / 494,388 (120)	369 / 494,810 (75)	255 / 495,221 (51)	161 / 495,536 (32)	129 / 496,761 (26)	140 / 495,918 (28)	124 / 496,041 (25)			
2008	923 / 466,807 (198)	521 / 467,432 (111)	397 / 467,935 (85)	264 / 468,321 (56)	158 / 468,546 (34)	144 / 468,712 (31)	113 / 468,858 (24)	135 / 468,897 (29)		
2009	965 / 445,437 (217*)	786 / 446,256 (176)	512 / 447,055 (115)	364 / 447,531 (81)	248 / 447,817 (55)	169 / 448,049 (38)	134 / 448,183 (30)	129 / 448,251 (29)	124 / 448,401 (28)	
2010	798 / 470,224 (170)	912 / 470,956 (194*)	837 / 472,047 (177)	578 / 472,731 (122)	321 / 473,120 (68)	271 / 473,401 (57)	181 / 473,580 (38)	128 / 473,690 (27)	129 / 473,817 (27)	97 / 473,919 (20)
2011	172 / 451,579 (38)	721 / 472,275 (153)	933 / 474,098 (197*)	854 / 474,932 (180)	551 / 475,519 (116)	330 / 475,817 (69)	252 / 476,061 (53)	157 / 476,168 (33)	151 / 476,358 (32)	109 / 476,474 (23)
2012	Before the birth	138 / 464,374 (30)	697 / 486,655 (143)	946 / 488,030 (194*)	796 / 488,716 (163)	550 / 489,140 (112)	367 / 489,401 (75)	235 / 489,604 (48)	187 / 489,772 (38)	120 / 489,936 (24)
2013			127 / 421,465 (30)	560 / 438,778 (128)	762 / 439,989 (173*)	682 / 440,530 (155)	500 / 440,872 (113)	318 / 441,105 (72)	206 / 441,362 (47)	147 / 441,560 (33)
2014				139 / 419,833 (33)	588 / 437,994 (134)	768 / 439,207 (175*)	716 / 439,700 (163*)	470 / 440,123 (107)	307 / 440,483 (70)	203 / 440,710 (46)
2015					134 / 424,563 (32)	563 / 441,720 (127)	710 / 442,943 (160)	675 / 443,586 (152)	491 / 444,102 (111)	240 / 444,367 (54)
2016						138 / 393,674 (35)	522 / 409,814 (127)	698 / 411,225 (170*)	622 / 412,018 (151*)	404 / 412,429 (98)

Table 1. Continued

Variable	Inspection time									
	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2015					134 / 424,563 (32)	563 / 441,720 (127)	710 / 442,943 (160)	675 / 443,586 (152)	491 / 444,102 (111)	240 / 444,367 (54)
2016						138 / 393,674 (35)	522 / 409,814 (127)	698 / 411,225 (170*)	622 / 412,018 (151*)	404 / 412,429 (98)
2017							124 / 345,786 (36)	403 / 361,625 (111)	533 / 362,900 (147)	467 / 363,250 (129)
2018								107 / 317,685 (34)	379 / 330,970 (115)	552 / 331,606 (166*)
2019									86 / 295,132 (29)	351 / 304,651 (115)
2020										107 / 265,087 (40)

Values are presented as "patients with pediatric trigger fingers" / "total children in each year" ("prevalences"). The prevalences are reported as 1 per 100,000 persons.
*Maximal prevalence depending on age.

2 and 3 years of age. The prevalence decreased with an increase in the patient' age.

Analysis of Incidence Rates and Follow-up after Pediatric TD Occurrence

Incidence analysis

A total of 2,181,814 children were born between 2011 and 2015. Among them, 12,729 were diagnosed with pediatric TDs during the observation period (2011–2020). The patients with pediatric TDs were categorized according to the age at the initial diagnosis (Tables 2 and 3). Among the children with pediatric TDs, 26.8% were initially diagnosed between the ages of 2 and 3 years, while 23.4% were diagnosed between the ages of 1 and 2 years. The mean age of the initial diagnosis was 2.76 ± 1.91 years (minimum, 0; maximum, 10 years). The mean follow-up duration for all patients with pediatric TDs was 0.58 ± 1.17 years (minimum, 0; maximum, 9.38 years).

The cumulative incidence of pediatric TDs between 2011 and 2020 was 583.4 cases per 100,000 individuals; for boys and girls, the cumulative incidence rates were 0.532% and 0.638%, respectively. The incidence rate of pediatric TD between 2011 and 2020 was 77.6 cases per 100,000 person-years; for boys and girls, the incidence rates were 70.7 and 84.8 cases per 100,000 person-years, respectively. The cumulative incidence and incidence rates for each year are shown in Table 4.

Operation rates

Among 2,181,814 children, 12,729 were diagnosed with pediatric TDs, of whom 1,128 (8.9%) underwent operative management.

Age at surgery

The patients who underwent surgery for TDs were categorized according to their age at the time of surgery. The mean age at surgery was 3.79 ± 2.19 years (minimum, 0; maximum, 9 years) (Table 5, Fig. 3). The surgery was most frequently performed between the ages of 2 and 3 years.

Time interval from diagnosis to surgery

The patients who underwent surgery for TDs were categorized according to the time interval from diagnosis to surgery. The mean time interval between diagnosis and surgery was 1.15 ± 1.71 years (minimum, 0; maximum, 8.43 years). Among the patients with TDs, 67.6% underwent surgery within 1 year of the initial diagnosis (Table 6, Fig. 4).

Follow-up period for patients who did not undergo surgery

For children with pediatric TDs who did not undergo surgery, the mean follow-up period was 0.52 ± 1.09 years

Table 2. Age of Initial Diagnosis of Pediatric TF

Age of initial diagnosis of pediatric TF	Boy	Girl	Boy + girl	Percentage among reference population* (%)	Percentage among TF population† (%)
0–1	439	271	710	0.033	5.6
1–2	1,338	1,645	2,983	0.137	23.4
2–3	1,515	1,899	3,414	0.156	26.8
3–4	1,219	1,314	2,533	0.116	19.9
4–5	663	756	1,419	0.065	11.1
5–6	358	433	791	0.036	6.2
6–7	202	222	424	0.019	3.3
7–8	120	134	254	0.012	2.0
8–9	68	68	136	0.006	1.1
9–10	36	29	65	0.003	0.5
Total	5,958	6,771	12,729	0.583	100.0

TF: trigger finger.
*Reference population: total children born from 2011 to 2015 = 2,181,814 (see Table 3). †TF population: children who were diagnosed with pediatric TF = 12,729.

Table 3. Calculation of Reference Population (for Table 2)

Year of birth	Boy	Girl	Boy + girl
2011	231,954	219,625	451,579
2012	238,639	225,735	464,374
2013	216,177	205,288	421,465
2014	215,277	204,556	419,833
2015	217,775	206,788	424,563
Total	1,119,822	1,061,992	2,181,814*

*Reference population = total children born from 2011 to 2015 = 2,181,814.

(minimum, 0; maximum, 9.38 years) (Table 7, Fig. 5).

DISCUSSION

From 2011 to 2020, the prevalence of pediatric TDs in children under 11 years of age ranged from 0.063% to 0.084%, with a higher prevalence observed in girls than in boys. The maximum prevalence was observed in 2- to 3-year-old children. Moreover, the observed cumulative incidence of pediatric TDs was 0.583%. Most frequently, the initial diagnosis was made in 2- to 3-year-old children. Nine percent of patients with pediatric TDs underwent surgery after diagnosis. The surgery was most frequently conducted for 2- to 3-year-old patients, within 1 year of the initial diagnosis.

Our study has several strengths. First, we analyzed a large dataset containing information on the entire national population provided by the NHIS. To our knowledge, there has been no nationwide database study to date. Second, the overall data collection period was 10 years, and the follow-up period for each patient was more than 5 years. Third, since the data were collected from a nationwide population, there was minimal risk of selection bias.

In previous studies, the incidence of trigger thumb was reported to vary from 0.5 to 5 cases per 1,000 live births.[3,6-8] Our study revealed a higher cumulative incidence (5.83 cases per 1,000) than that previously reported. First, we included data on other digits, as well as on trigger thumbs, although there were few cases of triggering of other digits. Second, we could monitor the children for a minimum of 5 years and a maximum of 10 years, depending on the year of birth of all children in the Republic of Korea.

To date, none of the studies have reported a sex-specific predominance of this disease. According to our study, girls had a higher prevalence than boys every year from 2010 to 2022, and the incidence in girls born between 2011 and 2015 was higher than that in boys born in the same period. In a study conducted in the United States, it was reported that 69% of patients were diagnosed with trigger thumb between the ages of 2 and 5 years.[23] In

Table 4. Cumulative Incidence and Incidence Rate

Year	Population at risk (person)	Disease developing cases (person)	Person-years	Incidence rate (per 100,000 person years)	Cumulative incidence (per 100 persons, %)
Boy + Girl					
2011	451,579	172	451,493	38.10	0.038
2012	915,781	824	915,369	90.02	0.090
2013	1,336,422	1,552	1,335,646	116.20	0.116
2014	1,754,703	2,033	1,753,687	115.93	0.116
2015	2,177,233	2,166	2,176,150	99.53	0.099
2016	2,175,067	2,130	2,174,002	97.98	0.098
2017	2,172,937	1,645	2,172,115	75.73	0.076
2018	2,171,292	1,096	2,170,744	50.49	0.051
2019	2,170,196	697	2,169,848	32.12	0.032
2020	2,169,499	414	2,169,292	19.08	0.019
2011–2020	2,181,814	12,729	16,403,802	77.60	0.583
Boy					
2011	231,954	109	231,900	47.00	0.047
2012	470,484	378	470,295	80.38	0.080
2013	686,283	680	685,943	99.13	0.099
2014	900,880	937	900,412	104.06	0.104
2015	1,117,718	1,031	1,117,203	92.28	0.092
2016	1,116,687	1,007	1,116,184	90.22	0.090
2017	1,115,680	780	1,115,290	69.94	0.070
2018	1,114,900	522	1,114,639	46.83	0.047
2019	1,114,378	317	1,114,220	28.45	0.028
2020	1,114,061	197	1,113,963	17.68	0.018
2011–2020	1,119,822	5,958	8,423,114	70.73	0.532
Girl					
2011	219,625	63	219,594	28.69	0.029
2012	445,297	446	445,074	100.21	0.100
2013	650,139	872	649,703	134.22	0.134
2014	853,823	1,096	853,275	128.45	0.128
2015	1,059,515	1,135	1,058,948	107.18	0.107
2016	1,058,380	1,123	1,057,819	106.16	0.106
2017	1,057,257	865	1,056,825	81.85	0.082
2018	1,056,392	574	1,056,105	54.35	0.054
2019	1,055,818	380	1,055,628	36.00	0.036
2020	1,055,438	217	1,055,330	20.56	0.021
2011–2020	1,061,992	6,771	7,980,688	84.84	0.638

Table 5. Age of Operation for Pediatric Trigger Finger

Age of operation	Boy + girl	Boy	Girl
0–1	2 (0.2)	1 (0.2)	1 (0.2)
1–2	109 (9.7)	56 (11.0)	53 (8.5)
2–3	317 (28.1)	138 (27.2)	179 (28.9)
3–4	239 (21.2)	111 (21.9)	128 (20.6)
4–5	85 (7.5)	40 (7.9)	45 (7.3)
5–6	58 (5.1)	22 (4.3)	36 (5.8)
6–7	134 (11.9)	53 (10.4)	81 (13.1)
7–8	114 (10.1)	51 (10.0)	63 (10.2)
8–9	47 (4.2)	24 (4.7)	23 (3.7)
9–10	23 (2.0)	12 (2.4)	11 (1.8)
Total	1,128	508	620

Values are presented as number (%).

Table 6. Time Interval between Diagnosis and Operation

Time interval between diagnosis and operation (yr)	Boy + girl	Boy	Girl
0–1	762 (67.6)	352 (69.3)	410 (66.1)
1–2	141 (12.5)	63 (12.4)	78 (12.6)
2–3	56 (5.0)	22 (4.3)	34 (5.5)
3–4	51 (4.5)	25 (4.9)	26 (4.2)
4–5	48 (4.3)	19 (3.7)	29 (4.7)
5–6	43 (3.8)	14 (2.8)	29 (4.7)
6–7	21 (1.9)	8 (1.6)	13 (2.1)
7–8	4 (0.4)	3 (0.6)	1 (0.2)
8–9	2 (0.2)	2 (0.4)	0
9–10	0	0	0
Total	1,128 (100)	508 (100)	620 (100)

Values are presented as number (%).

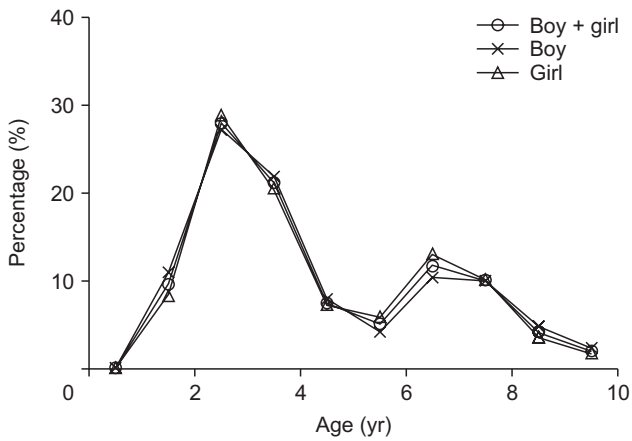

Fig. 3. The age at surgery.

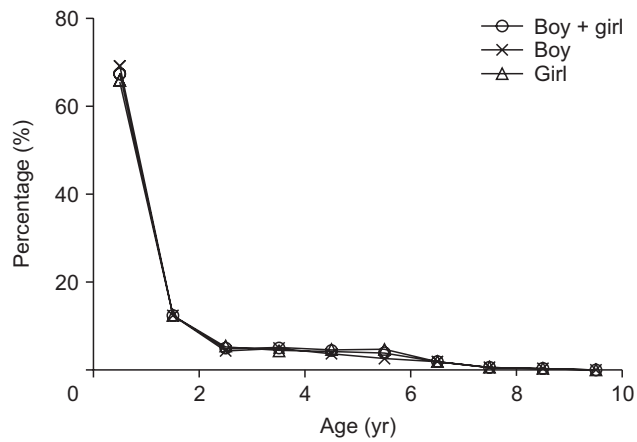

Fig. 4. Time interval from the initial diagnosis to surgery.

our study, the mean age at initial diagnosis was 2.76 ± 1.91 years, and 86.9% of patients were diagnosed with TDs till the age of 5 years. We found that the diagnoses of pediatric TDs decreased rapidly after the age of 5 years.

In several studies, the natural history of pediatric trigger thumbs has been examined. The spontaneous resolution rates range from 0% to 96% over a median follow-up period of 6 to 48 months.[5,10,13,16-20] In a study by Baek and Lee,[16] 76% of pediatric trigger thumbs resolved over an average follow-up period of 5 years. In contrast, Hutchinson et al. found that trigger thumbs spontaneously resolved in only 32% of the patients within 5 years of the initial diagnosis.[10] In our study, 8.9% of the patients with pediatric TDs underwent surgery. We assumed that if the patients with pediatric trigger thumbs or fingers had persistent symptoms, they would have visited the outpatient clinic or chosen operative management. In other words, these findings suggest that pediatric TDs were naturally resolved in more than 91% of the patients.

Park et al.[23] reported that 49% of the patients underwent surgery for trigger thumbs in the United States: 65% of the patients underwent surgery within 1 year of diagnosis, and 76% of the patients underwent surgery before the age of 5 years. In our study, patients with pediatric TDs underwent surgery at an average age of 3.79 ± 2.19

Table 7. Follow-up Period for Children Who Did Not Undergo Operation

Follow-up period (yr)	Boy + girl	Boy	Girl
0–1	9,538 (82.2)	4,518 (82.9)	5,020 (81.6)
1–2	918 (7.9)	420 (7.7)	498 (8.1)
2–3	558 (4.8)	244 (4.5)	314 (5.1)
3–4	318 (2.7)	148 (2.7)	170 (2.8)
4–5	144 (1.2)	63 (1.2)	81 (1.3)
5–6	83 (0.7)	40 (0.7)	43 (0.7)
6–7	25 (0.2)	10 (0.2)	15 (0.2)
7–8	14 (0.1)	5 (0.1)	9 (0.1)
8–9	2 (0.0)	2 (0.0)	0
9–10	1 (0.0)	0	1 (0.0)
Total	11,601 (100)	5,450 (100)	6,151 (100)

Values are presented as number (%).

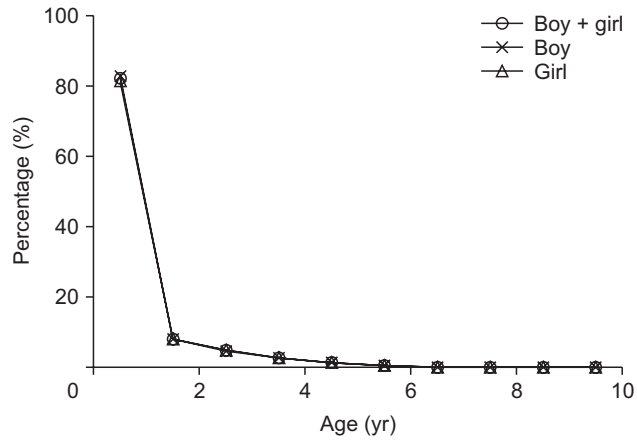

Fig. 5. Follow-up period for children who underwent conservative treatment.

years. Surgery was performed immediately after diagnosis in many patients below 5 years of age. According to previous reports, spontaneous resolution is more likely to occur in young infants than in children above 3 years of age.[24,25] This is thought to be the reason behind the conventional recommendation that most patients should undergo surgical treatment before the age of 5 years.

Although the number of patients diagnosed after 3 years of age decreased (Table 2), the number of patients undergoing surgical treatment decreased until 5 to 6 years of age and then increased from 6 to 9 years of age (Table 5). This finding indicates the possibility of failure of conservative treatment at the age of ≥ 5 years. Furthermore, more than 67.6% of the patients underwent surgery within 1 year of diagnosis, and 12.5% of the patients underwent surgery 1 to 2 years thereafter. This means that it does not take a long time for patients to decide surgical treatment after diagnosis. Surgery for the treatment of pediatric TDs is a simple and not challenging procedure with promising results and higher cure rates than those of conservative management.[12,14] However, Baek and Lee[16] reported a 76% success rate with conservative management, and a Kaplan-Meier analysis showed that the median time interval from the initial diagnosis to the resolution time was 49 months.

In our study, 67.6% of the patients underwent surgery within 1 year of diagnosis. If they had postponed surgery while waiting for the results of conservative treatment, some patients may have recovered spontaneously and the success rate of conservative treatment may have been higher. For 82.2% of the patients who did not undergo surgery, the follow-up period from the time of diagnosis to the last medical check-up was less than 1 year. This suggests that many patients did not visit the hospital even after diagnosis. There is a possibility that additional treatment was not required because the pediatric TD resolved naturally and did not cause any inconvenience to the children and their parents.

South Korea is experiencing a rapid decline in birth rates for various reasons. In our study, we observed a decrease in the number of newborns each year, and the prevalence also declined. South Korea is demographically characterized by high ethnic homogeneity, making genetic influences particularly important in pediatric disease research. Despite being a study conducted 20 years ago, a previous study in Japan, a neighboring country with similar conditions, reported an incidence of acquired trigger thumb in children under 1 year of age at 3.3 per 1,000 live births, which is higher than our study's findings.[3] Furthermore, research comparing incidence rates based on race indicates a higher occurrence in the Hispanic population compared to other racial groups.[26]

Despite the analysis of a large dataset from the NHIS-National Sample Cohort repository, several limitations were unavoidable. First, the NHIS does not differentiate between trigger thumb and trigger fingers, which is a clear limitation of the study design. Trigger finger in the pediatric population is a distinct condition from trigger thumb in children. However, considering that pediatric trigger finger is a rare condition and is about one-tenth as common as pediatric trigger thumb,[1,2] it does not affect the overall conclusion that the majority of Koreans with pediatric trigger thumb do not undergo surgery. Second,

since some children did not go to the hospital for a follow-up after the initial diagnosis, the actual prevalence of the disease might not be reflected in the prevalence rates estimated according to the patient's age. Third, we examined the overall number of patients diagnosed with TFs. However, disease severity might have influenced the number of patients who underwent operative treatment. Furthermore, we assumed that the patients who did not undergo surgery were conservatively treated, but we cannot say for sure that the outcome in these patients was good. Fourth, we only estimated the number of patients diagnosed with TFs and those who underwent surgeries; however, we could not identify the digits that were more frequently affected. Furthermore, we did not analyze whether the TFs occurred in a single, multiple, or both hands of the patients. Although secondary trigger finger is uncommon in children, distinguishing and excluding secondary trigger finger solely based on these codes is not feasible. Finally, our study was a nationwide observational study and treatment guidelines could not be provided.

Nevertheless, our study was the first attempt to determine the natural course of pediatric trigger thumbs and fingers using a national database. High prevalence and incidence rates of pediatric TDs were found in 2- to 3-year-old patients. Among the pediatric patients, 8.9% underwent operative management that was most frequently conducted between 2 and 3 years of age within 1 year of initial diagnosis.

CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

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SUPPLEMENTARY MATERIAL

Supplementary material is available in the electronic version of this paper at the CiOS website, www.ecios.org.

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