

Contamination of Children's Playground Sandpits with *Toxocara* eggs in İstanbul, Turkey*

Müfit TOPARLAK, Ayşen GARGILI, Erkut TÜZER, Vedat KELEŞ, Meltem ULUTAŞ ESATGİL, Handan ÇETİNKAYA
University of İstanbul, Veterinary Faculty, Department of Parasitology, 34851. Avcılar, İstanbul - TURKEY

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Abstract: In this study conducted in İstanbul, the contamination of sandpits in children's playgrounds with *Toxocara* eggs was investigated. For this purpose, a total of 132 sand samples were taken from the sandpits of 63 playgrounds between November 1998 and September 1999. *Toxocara* eggs were found in 10 (15.9%) of 63 playgrounds. A total of 22 eggs were recovered. The average egg number per 100 g of sand was found to be 0.067 for the overall examined playgrounds and 0.44 (ranging from 0.2 to 1.2) for the contaminated ones.

Key Words: *Toxocara*, Sandpit, Playground, Contamination, Prevalence, İstanbul, Turkey

İstanbul'da Çocuk Parkları Kum Havuzlarının *Toxocara* Yumurtalarıyla Bulaşıklığı

Özet: İstanbul'da yürütülen bu çalışmada çocuk parklarındaki kum havuzlarının *Toxocara* yumurtalarıyla bulaşıklık durumu araştırıldı. Bu amaç için Kasım 1998-Eylül 1999 arasında 63 çocuk parkının kum havuzlarından toplam 132 kum örneği alındı. Bu 63 çocuk parkından 10(%15,9)'unda *Toxocara* yumurtası görüldü. Toplam 22 yumurta ele geçirildi. 100 g kumdaki ortalama yumurta sayısı; incelenen tüm çocuk parkları kum havuzlarında 0,067, kontamine bulunanlarda 0,44 (0,2-1,2) olarak bulundu.

Anahtar Sözcükler: *Toxocara*, Kum havuzu, Çocuk parkı, Bulaşıklık, Yaygınlık, İstanbul, Türkiye

Introduction

Toxocara eggs are passed in the feces of the host (canines, felines) and develop to the infective stage (2nd stage larva) within 4 weeks at room temperature (1,2). The eggs may survive for several months in soil (3). Human beings become infected by ingesting infective eggs and the infective larvae, which hatch in the intestine, and migrate through the tissues and organs causing a syndrome known as visceral larva migrans (VLM) (1,3). This syndrome is characterized by hepatomegaly, ocular eosinophilic granuloma, cerebral lesions (1,3), behavioral disorders (4) and epileptic attacks (5). It is reported that VLM occurs mostly in children (6, 7) and this is usually associated with the contaminated sandpits of playgrounds (7).

In various countries including Turkey, some studies (8-21) on the contamination of public places with *Toxocara* eggs are given in Table 1. In Turkey, Güçlü and

Aydenizöz (20) reported that one out of 4 public parks was contaminated with *Toxocara* eggs in the city of Konya and in another study (21) performed in the city of Ankara, the contamination rate of public parks with *Toxocara* spp. was found to be 60.9%.

Materials and Methods

The study was carried out in İstanbul between November 1998 and September 1999. The places from which the samples were taken, the dates and the number of samples are given in Table 2.

The collection of sand samples from the sandpits of playgrounds and their examination were performed according to Duwell (11), which was based on the examination of sands in the sandpits, with the following modifications. An aliquot of 300 g was taken from one m² area selected randomly per 5 m² of sandpits. To do

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Table 1. In various countries, the contamination of public places with *Toxocara* eggs

Country, Year, (Ref.)	City	Public place	Contamination rate (%)
Argentina, 1989-1990, (8)	Buenos Aires	1) Public parks, 2) Sandpits	1) Soil: 7.2% 2) Sand: 2.7%
Austria, 1994-1995, (9)	1) St.Pölten, 2) Krems, 3) Zwettl, 4) Linz, 5) Ried im Innkreis	Public green areas, Playgrounds	1) soil: 4.2%, sand: 4.5% 2) soil:0%, sand:0% 3) soil: 8.3%, sand: 7.7% 4) soil: 1.6%, sand: 5.3% 5) soil: 0%, sand: 0%
Brazil, 03/1995-02/1996, (10)	Sao Paolo State (Botucatu)	Public parks	60%
Germany 1977-1981 (11)	Frankfurt/Main	Sandpits of playgrounds	87.1%
Greece, 1992, (12)	Thessaloniki	Public parks	97.5%
Japan, 1990, (13)	Tokushima	Sandpits of playgrounds	63.3%
Japan, 1989, (14)	Hyogo	Sandpits of playgrounds	41.9%
Malaysia, 1998, (15)	1) Petaling Jaya (urban areas) 2) Serdeng (suburban areas)	Public parks and playgrounds Public parks and playgrounds	1) 54.5% 2) 45.8%
Peru, 08/1989-01/1990, (16)	Lima	Public places	Positive
Romania, 1992-1993, (17)	Cluj Napoca, Satu Mare, Valea Jiului	Public parks, Sports grounds	Positive
Spain, 11/1984-03/ 1985, (18)	Madrid	Public parks	47.3% (9/19)
Sri Lanka, 1997, (19)	Kandy	Tea plantations, Gardens	7.8%-21.6%
Turkey, 06/1996-05/1997, (20)	Konya	Public parks	25% (1/4)
Turkey, 2000, (21)	Ankara	Public parks	60.9%

Table 2. The Playgrounds from which the sand samples were taken.

District	Names of the playgrounds	NP	NS	Date
Bakırköy	Yeşilköy; Ataköy 4; Ataköy 5; Miralay Reşat Çiğiltepe; Rönepark; Dedekorkut; AYTEKİN KOTİL	7	14	01.10.1998
Fatih	Ahırkapı; Cerrahpaşa Seaside; Narlıkapı	3	6	01.11.1998
Avcılar	Halide Edip Adivar 1; Avcılar 1; Avcılar 2*; Avcılar Seaside 1*; Avcılar Seaside 2	5	12	01.12.1998
Avcılar	Fırat; Alma Ata; Mustafa Burcu**; Ahmet Yesevi; Avcılar 3; Halide Edip Adivar 2	6	14	10.12.1998
Büyükkçekmece	Baharevler; Büyükkşehir; Hüseyin Yıldız; Albay Zeki; Büyükkçekmece Seaside; Albatros Seaside	6	12	20.01.1999
Haliç	Alibeyköy; Oyuncakistan; Balkan; Araphan; Gaziosmanpaşa	5	10	12.02.1999
Sarıyer	Kuruçeşme 1; Tarabya; Kireçburnu; Sarıyer; Sarıyer Mehmet Akif Ersoy	5	10	25.02.1999
Sarıyer	Kuruçeşme 2; Bebek; Ortaköy; İstinye Seaside 1; İstinye Seaside 2; İstinye Seaside 3; İstinye Seaside 4; İstinye Seaside 5; İstinye Seaside 6; İstinye Seaside 7	10	20	09.03.1999
Beşiktaş	Kabataş İSTEK	1	2	15.05.1999
Haliç	Haliç; Unkapanı	2	4	15.05.1999
Etiler	Çamlık 1	1	2	15.05.1999
Levent	Çamlık 2; Çağlayan; Şair Nedim; Yıldız Kolej; Funda 2; Funda 4	6	12	10.08.1999
Kadıköy-Maltepe	Kadıköy Seaside **; Moda; Şaşkınbakkal Seaside; Bostancı Seaside; Maltepe 1; Maltepe 2	6	14	11.09.1999
Total		63	132	10/98-09/99

NP: Number of playgrounds, NS: Number of samples

Two sand samples were taken from the playgrounds except *(3 samples) and **(4 samples)

this, the sand of one m² area, 10 cm in depth from the surface, was collected, mixed and the aliquot of 300 g was taken. The aliquots were put into an incubator at 28°-30° C for 24 hours for evaporation of excess water before weighing and examination. Then, a sample of 250g was taken from each aliquot. The samples were washed with running tap water into buckets through a set of 2 sieves having pore widths of 250µm and 150µm. The water collected in the bucket was left to sediment for 1-2 hours by adding several drops of detergent. The sediment was examined for *Toxocara* eggs using the flotation method with saturated salt water.

Results

The results are given in Table 3. As seen in Table 3, 10 (15.9%) out of 63 playgrounds were found to be contaminated with *Toxocara* eggs. A total of 22 *Toxocara* spp. eggs were recovered. The average number of eggs per 100 g of sand was found to be 0.067 in the overall examined playgrounds and 0.44 (ranging from 0.2 to 1.2) in the contaminated ones.

Discussion

The contamination rates of *Toxocara* eggs in playgrounds and sandpits were recorded to be between 2.7% and 97.5% in various countries (8-21). In Turkey, one out of 4 playgrounds in the city of Konya was found to be contaminated with *Toxocara* eggs (20) and the contamination rate of public parks in the city of Ankara (21) was 60.9%. The average number of *Toxocara* eggs was reported to be 5.3 eggs/100 g sand (ranging from 0 to 42) by Duwell (11) and 2.8 eggs/50 g soil (ranging from 1 to 10) by Öge and Öge (21). The highest number of eggs was reported to be 128 eggs/20 g sand by Uga et al. (14).

In the present study the percentage of playground sandpits contaminated with *Toxocara* eggs was found to be 15.9%. The average number of eggs per 100 g of sand in the overall examined playgrounds was found to be 0.067. This number in the contaminated playgrounds was 0.44 (ranging from 0.2 to 1.2).

In spite of the low contamination rate and the low number of eggs found in this study it should be kept in mind that children always take a risk of visceral larva migrans while playing in contaminated playgrounds.

No of playgrounds whose sandpits were examined	63
No of playgrounds whose sandpits were contaminated*	10 (15.9%)
No of sand samples examined	132
No of sand samples contaminated	11 (8.33%)
Total no of eggs recovered from sand samples	22
Min-Max no of eggs per 500 g (per 100 g) sand in contaminated playgrounds	1 - 6 (0.2 - 1.2)
Ave. no of eggs per 500 g (per 100 g) sand in total contaminated playgrounds	2.2 (0.44)
Ave. no of eggs per 500 g (per 100 g) sand in all playgrounds	0.33 (0.067)

Table 3. The Contamination of Children's Playground Sandpits in Istanbul with *Toxocara* eggs.

*Playgrounds whose sandpits were found to be contaminated: Yeşilköy, Ataköy 4, Avçılar 3, Halide Edip Adivar 2, Tarabya, Kireçburnu, Sarıyer, İstinye 7, Moda, Şaşkınbakkal. Of 2 samples from Tarabya, 2 were found to be contaminated and 1 of 2 from each of the others.

References

1. Urquhart, G.M., Armour, A.J., Duncan, J.L., Dunn, A.M., Jennings, F.W.: Veterinary Parasitology. Longman Sci Tech, Essex, England, 1987.
2. Galvin, T.J.: Experimental *toxocara canis* infection in chicken and pigeons. J Parasitol, 1964, 50(1), 124-127.
3. Soulsby, E.J.L.: Textbook of veterinary clinical parasitology, Vol.1 Helminths. Blackwell Sci. Publ., Oxford, 1965.
4. Hay, J., Amott, M.A., Aitken, P.P., Kendall, A.T.: Experimental toxocariasis and hyperactivity in mice. Z Parasitenkd, 1986, 72, 115-120.
5. Woodruff, A.W.: Toxocariasis. Med Intern, 1984, 2, 206-208.
6. Nakamura, S., Sotoyama, T., Hayasaka, S., Kameyama, Y., Maruyama, S., Katsube, Y.: Parasitism of *Toxocara canis* larvae in Japanese quails by inoculation of the ascarid eggs. J Vet Med Sci, 1991, 53 (5), 865-872.

7. Overgaauw, P.A.M.: Aspects of *toxocara* epidemiology: human toxocarosis. Clin Rew Microbiol, 1997, 23 (3), 215-231.
8. Sommerfelt, I., Degregorio, O., Barrera, M., Gallo, G.: Presence of *Toxocara* eggs in public parks of the city of Buenos Aires, Argentina, 1989-90. Rev Med Vet Buenos Aires, 1992, 73 (2), 70-74.
9. Kutzer, E., Golling, P., Wagneder, J.: On the contamination of public green areas and children's playgrounds with eggs of *Toxocara* from carnivores in Austrian towns. Vortrage anlässlich der xxx. Tagung der Österreichischen Gesellschaft für Tropenmed. und Parasitol., 1997, 19, 71-74.
10. Santarem, V.A., Sartor, I.F., Bergamo, F.M.M.: Contamination by *Toxocara* spp. eggs in public parks and squares in Botucatu, Sao Paulo State, Brasil. Rev Soc Brasileira Med Trop, 1998, 31 (6), 529-532.
11. Duwell, D.: The prevalence of *toxocara* eggs in the sand in children's playgrounds in Frankfurt/M. Ann Trop Med Parasitol, 1984, 78(6), 633-636.
12. Himonas, C., Antoniadou-Sotiriadou, K., Frydas, S.: Research survey on the prevalence of *toxocara* ova in the soil of public parks in Thessaloniki. Helliniki-Tatriki, 1992, 58 (5), 333-339.
13. Shimizu, T.: Prevalence of *Toxocara* eggs in sandpits in Tokushima city and its outskirts. J Vet Med Sci, 1993, 55 (5), 807-811.
14. Uga, S., Matsumura, T., Aoki, N., Kataoka, N.: Prevalence of *Toxocara* species eggs in the sandpits of public parks in Hyogo Prefecture, Japan. Jpn J Parasitol, 1989, 38 (5), 280-284.
15. Loh, A.G., Israf, D.A.: Tests on the centrifugal flotation technique and its use in estimating the prevalence of *Toxocara* in soil samples from urban and suburban areas of Malaysia. J Helminthol, 1998, 72 (1), 39-42.
16. Lescano, S.A.Z., Chieffi, P.P., Peres, B.A., Mello, E.O.de, Velarde, C.N., Salinas, A.A., Rojas, C.E., de Mello, E.O.: Soil contamination and human infection by *Toxocara* sp. in the urban area of Lima, Peru. Mem Inst Oswaldo Cruz, 1998, 93 (6), 733-734.
17. Şuteu, E., Cozma, V., Gligor, R., Sardi, I.: Observations on the parasitic pollution of microzones in three urban centres. Bul Univ Stiinte Agri Cluj-Napoca. Zoot Med Vet, 1994, 48, 227-231.
18. Angulo-Madero, R., Puento, C.A. de la., Guillen-Llera, J.L., De la Puento, C.A., Aguila de la Puente, C.: Contamination of the soils of public parks with *Toxocara canis*. Rev Iberica Parasitol, 1987, Vol. Extraordinario: Enero, 165-171.
19. Edirisinghe, J.S., Weilgama, D.J.: Soil contamination with geohelminth ova in a tea plantation. Ceylon Med J, 1997, 42 (4), 167-172.
20. Güçlü, F., Aydenizöz, M.: Çocuk parklarındaki kumların köpek ve kedi helminti yumurtaları ile kontaminasyonunun tesbiti. Türk Parazitol Derg, 1998, 22 (2), 194-198.
21. Öge, S., Öge, H.: Prevalence of *Toxocara* spp. eggs in the soil of public parks in Ankara, Turkey. Dtsch tierarztl Wschr, 2000, 107, 72-75.