EXPERIENCE AND REASON—Briefly Recorded

"In Medicine one must pay attention not to plausible theorizing but to experience and reason together. . . . I agree that theorizing is to be approved, provided that it is based on facts, and systematically makes its deductions from what is observed. . . . But conclusions drawn from unaided reason can hardly be serviceable; only those drawn from observed fact." Hippocrates: *Precepts. (Short communications of factual material are published here. Comments and criticisms appear as letters to the Editor.)*

Immersion Scald Burns and the Ability of Young Children to Climb Into a Bathtub

David Allasio, MSW*, and Howard Fischer, MD‡

ABSTRACT. *Introduction.* **Immersion scald burns in children are often suspicious for neglect or abuse. The history that a child climbed into a tub previously filled with hot water by the parent is common. The child's ability to climb into such a tub is a major factor in determining the reliability of the history.**

Methods. **A standard bathtub was installed in an examination room at a pediatric clinic in a children's hospital. Foam mats were placed in and outside of the tub. Toy boats were placed in the back of the tub. Children were selected if they were between 10 and 18 months of age, born at term, and had no past or present medical condition that could be expected to have affected their fine or gross motor or central nervous system development and had a normal Denver Developmental Screening Test within the past 3 months. The parent placed the child in a standing position with the child holding onto the front of the tub. Parents encouraged the child to climb into the tub and get the toys. The child's efforts were videotaped. Children were allowed 5 minutes to climb, depending on their attention span and tolerance.**

Results. **Of 176 children in the study, 62 (35%) climbed into the tub. One fourth climbed in head first, and the rest climbed in sideways.**

Conclusions. **Our study may have underestimated children's climbing abilities because of the absence of a shower curtain to help with balance and the distracting presence of strangers. The diagnosis of abuse is in part based on a described mechanism being inconsistent with the observed pattern of injury. This has severe repercussions for the child and his or her family. Our study brings into question previously held beliefs that these injuries could only be sustained by direct immersion.** ***Pediatrics*** **2005;115:1419–1421;** ***abuse, burns, bathtub, climbing.***

From the *Department of Social Work, Children's Hospital of Michigan, Detroit, Michigan; and ‡Carman and Ann Adams Department of Pediatrics, Wayne State University School of Medicine, Children's Hospital of Michigan, Detroit, Michigan.

Accepted for publication Sep 15, 2004.
doi:10.1542/peds.2004-1550
No conflict of interest declared.

Reprint requests to (H.F.) Carman and Ann Adams Department of Pediatrics, Wayne State University School of Medicine, Children's Hospital of Michigan, 3901 Beaubien Blvd, Detroit, MI 48201. E-mail: hfischer@dmc.org

PEDIATRICS (ISSN 0031 4005). Copyright © 2005 by the American Academy of Pediatrics.

The most common burns in pediatrics are scald burns. Immersion scald burns occur when children are placed into or enter hot water, such as in a sink or bathtub. Although the usual mechanism is caretaker accident or childhood curiosity, the possibility of child abuse must always be considered. The "classic" forced-immersion burn occurs when an individual forcibly holds a child's extremity under the surface of hot water. The burn pattern that results has a characteristic "stocking" or "glove" appearance, with a relatively sharp line demarcating the burned from unburned skin. In these abusive events, there are usually no "splash marks," that is, small scattered burns that would have resulted from splashing or struggling to remove the extremity from the water.[1] Health care professionals are taught to consider the possibility of child abuse when the history offered does not explain the physical findings adequately.[2]

One of the elements of the history that merits significant consideration is whether the child has the developmental ability to perform the alleged activity that led to the burn. We reviewed the child development, child abuse, and burn literature and found no study documenting the age at which children are able to climb into a bathtub. Wissow[3] states that most children cannot climb into a bathtub until they are 14 or 16 months old but cites no reference.

This study was conducted to evaluate the developmental ability of older infants and toddlers to climb into a standard bathtub. This information could help determine when parental histories of a child climbing into a tub are more likely to be accurate or suspicious for abuse.

METHODS

Subject Selection

Children included in this study were patients at the Children's Hospital of Michigan General Pediatric Clinic who were between 10 and 18 months old, were born at >36 weeks' gestation, and had a normal Denver Developmental Screening Test within the past 3 months. Children needed to be alert and cooperative at the time of the study. Exclusion criteria were any current or past medical condition that might be expected to affect the central nervous system or gross or fine motor performance. Our goal was to recruit 20 study subjects (10 girls and 10 boys) for each 1-month age group ranging from 10 to 18 months. Informed consent was ob-

Downloaded from http://publications.aap.org/pediatrics/article-pdf/115/5/1419/1028950/zpe00505001419.pdf
by San Francisco State University user

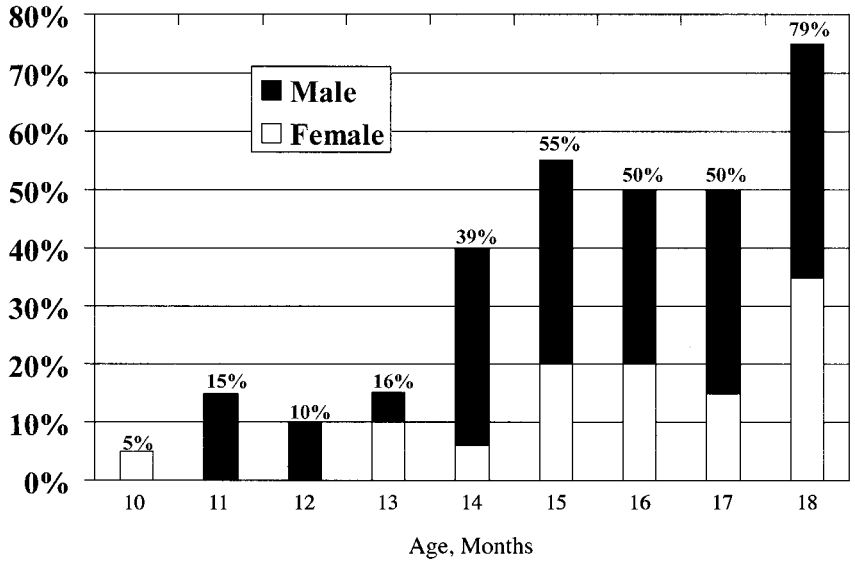

Fig 1. Percent successful climbers according to age.

tained from a parent of all subjects. The study was approved by the Wayne State University Human Investigations Committee.

Apparatus

A porcelain bathtub (15 in [38.1-cm] high) was placed in an examination room. There was no "toehold" on the wall of the tub to facilitate climbing. Ceramic tile over plywood was fitted vertically at each end of the tub to produce the appearance of an actual bathroom. A dense foam pad covered in vinyl was placed next to the tub, making the height of the tub 14 inches (35.56 cm) from the surface of the pad, which is a standard tub height in our geographical area. A foam pad was placed in the bottom of the tub for the child's safety.

Procedure

Subjects participated in the study after their physical examination but before any immunizations or blood tests. Toys were placed in the bathtub. The child was placed at the side of the tub and was encouraged by the parent and investigators to climb in and get the toys. The child was allowed ~5 minutes to climb into the tub. Climbing attempts were recorded on videotape.

RESULTS

We studied 176 children. Each 1-month age group had 10 girls and 10 boys with the exception of the 13-month group (missing 1 boy), the 14-month group (missing 2 girls), and the 18-month group (missing 1 girl). The parents of 21 children declined to participate in the study, most often because of time pressure. The racial/ethnic makeup of the subjects was 90% black, 5% white, and 5% Hispanic or Asian, which is reflective of the population of the clinic as a whole.

Of the 176 children, 62 (35%; 40 boys and 22 girls) successfully climbed into the bathtub. (Fig 1). Of interest was 1 10-month-old female who could not walk independently but was able to climb into the tub. There was an expected increase in successful climbing with increasing age. By 15 months, at least 50% of each age group climbed in, and nearly 80% of 18-month-olds climbed into the tub.

Of the successful climbers, 73% entered the tub leg first, and 27% entered head first with the upper part of their body and usually both arms first entering the tub. The choice of the child's footwear during the climbing attempt was left to the parents. Forty percent of the successful climbers wore shoes (including sneakers or sandals), 40% wore socks, and 20% were barefoot. This resembles the footwear distribution of the entire subject group. The distribution of heights and weights of the successful climbers was similar to that of the entire study group. Successful climbers were found at all height and weight centiles.

DISCUSSION

We have provided the first normative data describing the age at which some children can climb into a bathtub. We suggest that our 35% climbing rate is a conservative estimate. The children were climbing in an unfamiliar setting, with 2 strangers in the room, 1 holding a video camera. There was no shower curtain to grab and use as a climbing aid, nor were there any objects on which to step and facilitate climbing. There was no water in the tub, possibly making climbing less attractive. In addition, some parents told us that they had specifically instructed their children not to climb into the bathtub at home.

This study used subjects who were mostly inner-city black children. The literature shows that black infants and toddlers[4,5] are motorically advanced when compared with their nonblack age mates. It is not known how children from other demographic groups would perform. Almost twice as many boys as girls climbed into the tub.

Most of the subjects who climbed into the tub entered leg first, which is in contrast to Wissow's assertion that children climb in face first.[3] Subjects who were short and/or heavy were equally represented among the climbers. One 10-month-old who could not walk independently was able to climb into the tub; thus, this study may not have demonstrated the youngest age at which a child can climb into a bathtub.

Health care professionals who treat children with immersion burns need to consider their developmental abilities when determining the reliability of the history. At least some children at the youngest age limit used in our study are capable of independently climbing into a bathtub. Even with the information

Downloaded from http://publications.aap.org/pediatrics/article-pdf/115/5/1419/1028950/zpe00505001419.pdf
by San Francisco State University user

from this study it is possible that a referral to Child Protective Services may still be needed to help distinguish accidental from abusive burn mechanisms.

Additional research into the bathtub-climbing ability of children with different demographic characteristics is needed.

ACKNOWLEDGMENTS

This article is dedicated to the memory of Dr Barbara Fischer. We acknowledge the patience and help of the nurses, medical assistants, and housestaff of the Children's Hospital of Michigan General Pediatric Clinic.

REFERENCES

1. Jenny C. Cutaneous manifestations of child abuse. In: Reese RM, Ludwig S, eds. *Child Abuse: Medical Diagnosis and Management*. 2nd ed. Philadelphia, PA: Lippincott Williams and Wilkins; 2001:38
2. Kornberg AD. Recognizing and reporting child abuse. In: Ludwig S, Kornberg AE, eds. *Child Abuse: A Medical Reference*. 2nd ed. New York, NY: Churchill Livingstone; 1992:13–24
3. Wissow LS. *Child Advocacy for the Clinician: An Approach to Child Abuse and Neglect*. Baltimore, MD: Williams and Wilkins; 1990
4. Capute AJ, Shapiro BK, Palmer FB, Ross A, Wachtel RC. Normal gross motor development: the influences of race, sex and socio-economic status. *Dev Med Child Neurol.* 1985;27:635–643
5. Malina RM. Racial/ethnic variation in the motor development and performance of American children. *Can J Sport Sci.* 1998;13:136–143

GOVERNMENT PUTS DATA COMPARING HOSPITALS ONTO PUBLIC WEB SITE

"In a move to provide clear, unbiased information about the quality of hospital care, Medicare is launching a Web-based database that consumers can use to see for themselves how local institutions stack up against each other.

The Web site, Hospital Compare, went live [March 31, 2005] offering data on 17 widely accepted quality measures in treating heart attack, heart failure and pneumonia. It shows how most of the nation's general hospitals perform compared with state and national averages, as well as against their peers.

'This is another big step toward supporting and rewarding better quality, rather than just paying more and supporting more services,' says Mark McClellan, a physician who heads the Centers for Medicare and Medicaid Services, which oversees federal health-care programs for seniors and low-income people. The government 'ends up paying more when a patient gets poor-quality care and is readmitted' to the hospital, he added. . . . But, making wise choices is difficult without good information: Consumers today can get more information about buying a car or a TV set than they can about hospitals or doctors. Some information is available from government and private sources, as well as from some pioneering hospitals, but much of it is confusing and hard to use because it isn't standardized. Some states offer hospital report cards. A small number of commercial ventures and nonprofit groups, including a consortium of Fortune 500 companies and other large health-care purchasers called the Leapfrog Group, also make quality information available to the public. . . . All but about 60 of the nation's 4,200 general hospitals are voluntarily turning over data for the Hospital Compare site. More than two years ago, representatives of the hospital association, government agencies and many other public and private groups got together to hammer out a consensual approach. Still, many hospitals held back until late 2003, when Congress offered a financial carrot: The Medicare Modernization Act of 2003 included a 0.4% payment boost for participating hospitals. While that doesn't sound like a lot, it 'unquestionably had a significant impact,' says the Centers for Medicare and Medicaid Services' Dr. McClellan."

Rundle RL. *Wall Street Journal.* April 1, 2005

Noted by JFL, MD

Downloaded from http://publications.aap.org/pediatrics/article-pdf/115/5/1419/1028950/zpe00505001419.pdf
by San Francisco State University user