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## Hand injuries in children at King Fahd Hospital of the University in Saudi Arabia (1989-1991)

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### Summary

We study the pattern of hand injuries in children presenting to a university hospital in the eastern province of Saudi Arabia. A retrospective study evaluating all pediatric patients 12 years old or less with hand injuries excluding burns that attended the plastic surgery clinic at King Fahd Hospital of the University between January 1989 – December 1991. One hundred and one cases were identified. Male to female ratio was 1.5:1, 68% were Saudis. Most injuries were domestic and caused by doors. The commonest type of injury was laceration (32.5%), fingertips were involved in 50.5% of cases. Nerve injury occurred in 21.8%, only digital nerves were affected. Most hand injuries in children occurred at home and are preventable. Familiarity with such injuries by the healthcare providers in emergency situations is of diagnostic and therapeutic importance. This attitude will lead to the best possible outcome functionally and cosmetically. Furthermore, such a practice will go along way in improving the morbidity and mortality pattern of these surgical casualties among innocent children..

**Keywords:** *Hand injuries, pediatrics, domestic, Saudi Arabia.*

### Résumé

Pour étudier les caractéristiques des blessures de la main chez les enfants présentes dans un hôpital universitaire dans la province est de l'Arabie Saoudite. Une étude retrospective évaluant tous les malades pédiatriques de 12 ans ou moins, avec des blessures de la main excluant les brûlures qui ont suivi la chirurgie plastique à l'Hôpital du Fahd (de l'université) entre Janvier 1989 - Décembre 1991. Cent un cas (101) ont été identifiés. La proportion homme - femme était de 1, 5:1, 68% étaient d'Arabie Saoudite. La plupart des blessures étaient domestiques et causées par les portes. Les blessures les plus communes étaient la laceration (32, 5%), le bout des doigts (50, % des cas). La blessure des nerfs était notée dans 21, 8% des cas, et seulement les nerfs digitaux (numériques) étaient affectés. La plupart des blessures chez les adolescents lieu la maison et sont évitables. La familiarité avec ces blessures de la part des services de santé en cas d'urgence et d'une importance diagnostique et thérapeutique. Cette attitude conduira à un meilleur résultat fonctionnel et cosmétique. En plus, une telle pratique améliorera à long terme la morbidité et la mortalité des blessures chez les enfants innocents.

### Introduction

Injuries to the hand are very common in children [1]. In addition, the number of children requiring hand surgery is extremely great, there is first, the traumatic group that represents a high proportion of the patients seen in pediatric hos-

pitals, those with lacerations, thermal and electrical burns and fractures. The other major groups includes those with congenital malformations of the hand [2]. Therefore, knowledge of the pattern of hand injuries may assist in planning their prevention and needed management facilities.

### Method

All pediatric patients that are up to 12 years old with hand injuries excluding burns patients, that attended the plastic surgery clinic at King Fahd Hospital of the University from January 1989 to December 1991 were included in the study.. Patients were identified from the clinic records, as this source is the final channel of emergency room (ER) cases, admissions and outpatients. The data collected from the medical records onto a proforma designed for the purpose were analysed regarding age, sex, nationality, site and type of hand injury and cause of injury.

### Result

One hundred and one pediatric hand cases were identified. There were 60 males and 41 females, (ratio is 1.5:1). The mean age was  $4.16 \pm 2.96$  sd and a range (from birth to 12 years old). The number of injured children in relation to various agegroups is reflected in (Table 1), where 65.3% of injuries occurred in the agegroup 0-4 years old. The most affected nationalities were Saudis, Kuwaitis, Egyptians, and Yemenis and the numbers were 69, 8, 5, and 4 respectively. The left hand was affected in 50% of cases, right hand in 48% and both in 1% of cases while 1% of the cases had a doubtful record.

**Table 1:** Hand injuries in children at KFHU (1989-1991) age distribution

Age group (yrs)	Percentage of injured children
0-4	66 (65.3)
5-8	21 (20.8)
9-12	14 (13.9)

The site of injury most involved was finger tip (50.5%), followed by fingers (without the tip) in 32.5% (Table 2). The nailbed was involved in 16.2% and both bed and root in 15.2%.

**Table 2:** Pattern of hand injuries at KFHU (1989-1991) pediatric cases site of injury

Site	N=	(%)
Fingertip	51	(50.5)
Fingers	33	(32.5)
Metacarpals	15	(15)
Multiple lesions	1	(1)
Wrists	1	(1)

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Table 3 displays the type of the most common injuries: lacerations or minor skin loss, arterial, amputations and nerve injury in 32.5%, 16%, 13% and 13% respectively. Volar tendons injuries were mostly both flexor digitorum profundus and superficialis (11.8%) while nerve injuries were mainly digital nerves. Bony injuries were detected in 31% of cases with the terminal phalanx mostly effected. The pattern of bony involvement was mainly in the form of fractures. Among those recorded, the place of injury was mostly domestic while in 94 cases this was not specified precisely in chart.

**Table 3:** Hand injuries in children at KFHU (1989-1991) type of injury

Type of injury	No. of cases	(%)
Simple skin laceration / minor skin loss	55	(32.5)
Arterial	27*	(16)
Amputations	22	(13)
Nerve injury	22	(13)
Flexor tendon injury	21	(12.4)
Fracture / Dislocation	14	(8.3)
Extensor tendon injury	8	(4.7)
Total	169	(100)

\*Not specified in 12 and 15 were digital, arterial injuries only.

\*Some patients have multiple injuries

The principal cause was trapped door (Table 4), and in 48 cases, no identifiable cause was recorded in medical records. The mean hospital stay was  $4.62 \pm 3.55$  SD with the a range of 1-12 days. Thirteen were admitted over 24 hours and sick leave from school was granted only to one child in the records.

**Table 4:** Pattern of hand injuries at KFHU (1989-1991) pediatric cases principal external cause

Variable	N=	(%)
Trapped Door	31	(30.1)
Piece of Glass	9	(9.0)
Knife	2	(2.0)
Heavy Object	2	(2.0)
Car Accident	2	(2.0)
Vacuum Cleaner	2	(2.0)
Mauling Accident	1	(1.0)
Sharp Object	1	(1.0)
IV Line Insertion	1	(1.0)
Shaving Blade	1	(1.0)
Car Door	1	(1.0)

Not Specified = 48 (48%)

### Discussion

Innis stated "injury is our children's greatest health problem and pediatricians will frequently see finger and hand injuries in the office and emergency room". Finger tip crush injuries are quite common in toddler and often under treated. Pediatric finger and wrist fractures and sprains generally do well but require proper diagnosis and treatment. Innocent looking wounds from glass lacerations may disguise extensive damage to underlying nerves, arteries and tendons. Advances in microsurgery allow re-implantation of distal amputations even in young children and infants. Although, often not without complications [3].

Wakefiled reported his experience with patient aged from birth to 14 years. The accident patterns were different from those encountered among adults and the wounds were tidy where the damaged tissue viability is not the problem. The casualties occurred in and around the home where the patients fell down with a glass or bottle in the hand or falling on pieces of broken glass or tin. The commonest offender in this Australian study was the milk bottle which occur in 70% of the study group. This pattern improved after public awareness campaign about this risk [4]. Although the place of injury was also commonly domestic among the recorded cases of our study, the commonest offender was different from Wakefiled's experience.

Kay and Coady recently highlighted the role of innovative microvascular autotransplantation in reconstructive surgery of the pediatric upper limb. However, transplantation of skin flaps in one stage, and with the transplantation of vascularized joints and adjacent growth centers or digit reconstruction by transplantation of homologues from the foot are complex. But reliable surgical maneuvers of a trauma surgeon [5]. Al-Arabi and NA Sabet from Riyadh, Saudi Arabia drew attention to the plight of twenty two children aged of  $1.9 \pm 0.3$  years who sustained mutilating fingers and hand injuries due to a domestic mincer machine[6], their report confirmed domestic injuries too.

The management of acute hand injuries in children is difficult to approach and diagnose. Also, steel doors, bicycle chains and lawn mower snip off a large number of children's finger tips. Fortunately, many are incomplete amputations with residual small bridges of skin remaining intact [7]. This study has agreed to a certain extent with having trapped doors as the commonest offender in our study.

Table 3 revealed the high incidence of lacerations injuries in our study. This validates the audit report of Gaine and Braidwood on hand injury where 50% of patients presented to and discharged from the emergency room, and where they concluded that the vast majority of the presenting patients could have been treated in a modern well equipped General Practitioner's surgery[8].

Table 4 reflects the etiology of the various injuries but our records were not complete in 48 cases. Despite this limitation of the medical records, certain observations and deductions can still be made. Our study showed that trapped door, and piece of glass were common causes unlike Wakefields study. In addition, having lacerations as the commonest type encountered agreed with Rodolfo Contrera Gamboa's chapter on traumatic injuries of the hand in the developing countries [9]. The incidence and pattern of hand injuries occurring in children living in Nottingham has been reviewed by Worlock and Stower [10]. They found out that the hand is the second commonest site of fracture in children. The incidence is low in infants but rise steeply after the age of eight, especially in boys and the most common site is the proximal phalanx. In our study, more males are affected too, however, the commonest age groups affected in those 4 years or less and the terminal phalanx is the most affected bone.

### Conclusion

Hand injuries in children occur at home and are preventable. Trauma surgeons must make accurate diagnosis of such casualties and acquire up-to-date experience in the management of complex injuries in children. Improving the public awareness of the community by general practitioners, pediatricians, surgeons, will go a long way in decreasing the morbidity of affected or liable children.