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Injuries due to Falling Coconuts

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Falling coconuts can cause injury to the head, back, and shoulders. A 4-year review of trauma admissions to the Provincial Hospital, Alotau, Milne Bay Province, Papua New Guinea, revealed that 2.5% of such admissions were due to being struck by falling coconuts. Since mature coconut palms may have a height of 24 up to 35 meters and an unhusked coconut may weigh 1 to 4 kg, blows to the head of a force exceeding 1 metric ton are possible. Four patients with head injuries due to falling coconuts are described. Two required craniotomy. Two others died instantly in the village after being struck by dropping nuts.

Falling coconuts can cause severe head injuries. Many coastal villages in the tropical Pacific are surrounded by tall coconut palms. In this paper, four head injuries which resulted from falling coconuts in Papua New Guinea are described. The physical forces involved in being struck by a falling coconut are discussed.

MATERIALS AND METHODS

All trauma admissions to the Provincial Hospital, Milne Bay Province, were reviewed for the 4-year period from 1 October 1978 until 30 September 1982. This hospital serves 130,000 Melanesians living mainly in isolated hamlets scattered over many small tropical islands.

RESULTS

Nine trauma admissions resulted from falling coconuts during the 4-year study period; during this time a total of 355 trauma cases were admitted. Thus 2.5% of trauma admissions were caused by falling coconuts. Injuries were to the back, shoulders, or head. Five of the injuries involved only soft-tissue damage, and the patients recovered after periods of hospitalization varying from 2 to 24 days. Table I gives details of four head injuries. Two were serious and required craniotomy. Two other skull fractures required no specific treatment. The health worker who referred Patient 1 for craniotomy informed us about another person in the same village who had died instantly a few years earlier when struck on the head by a falling coconut.

As our clerk and I were weighing coconuts to calculate the physical forces involved in such injuries, he recollected that as a boy he had seen another man killed by a falling coconut in his home village, a man who had come down to visit the coast from his home in the mountains of the island where there are few palm trees. He was perhaps unaware of the dangers of falling coconuts. He was standing beneath a tree as another man kicked down a coconut. It struck him squarely on the top of his skull; he dropped, and died on the spot within a few minutes.

DISCUSSION

Most coconut palms grow to a great height, particularly the tall palm, *Cocos nucifera*, variety *typica*, which is the most common variety in Milne Bay Province. The trees grow continuously in height for 80 to 100 years, commonly reach 24 to 30 meters, and can be as high as 35 meters (1, 2). The coconuts are attached high up in bunches at the top of the trunk, and function as the seeds of these trees. They are sometimes harvested green for drinking, which is done by climbing the tree and cutting, kicking, or pulling loose the coconuts. Coconuts often remain in the tree until dry, however, and eventually drop to the ground. They sometimes fall during heavy wind, or during prolonged rainfall when the weight of the husks may increase. Houses are often built close to coconut palms. It is not surprising that adults or children are occasionally struck by falling nuts.

An average unhusked, mature dry coconut may weigh from 1 to more than 2 kg. A nut whose husk is soaked with water, or a green coconut, can weigh as much as 4 kg. When such a mass is accelerated by gravity, after falling from a height approximately equivalent to a 10-storey building, and then comes to rest by being suddenly decelerated onto someone's skull, it is not surprising that severe head injuries sometimes occur. If a coconut weighing 2 kg falls 25 meters onto a person's head, the impact velocity is 80 km/hr. The decelerating force on the head will vary depending on whether a direct or glancing blow is received. The distance in which the coconut is decelerated is also an important factor. Thus an infant's head

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TABLE I
Details of 4 patients with head injuries caused by falling coconuts

Case No.	Age	Type of Injury	Treatment	Outcome
1	4 years	Dry coconut fell onto head; transferred to hospital in coma by air charter.	Burr holes, craniotomy, evacuation of large epidural hematoma.	Recovered.
2	2 years	Accidentally struck on the head by a green coconut thrown down from a palm tree by his father, from a height of about 15 meters. Arrived comatose and hemiplegic.	Burr holes with elevation of a depressed skull fracture over the left motor cortex.	Regained consciousness the next day. Slowly regained movement in the right arm and leg over the next 6 weeks.
3	8 years	Dry coconut fell onto head; transferred in coma to hospital	Observation, nursing care given, linear skull fracture noted on X-ray.	Regained consciousness after several hours. Recovered.
4	9 months	Dry coconut fell onto head; arrived at hospital conscious.	No treatment, linear skull fracture noted on X-ray.	Remained well.

lying on the ground would receive a much greater force than that received by the head of a standing adult, that dropped as it was struck. For a stopping distance of 5 cm and a direct blow, the force would be 1,000 kg.

In conclusion, it can be seen that the physical forces involved in a direct blow to the skull by a falling coconut are potentially very large. Glancing blows will, of course, be less serious. It seems unwise to locate dwellings near coconut palms, and children should not be allowed to play under coconut trees with mature nuts. In fact, most people living in the tropics are aware of this hazard, but village homes are still often constructed close to tall coconut trees. Some people do climb trees around their homes regularly and knock down dry nuts so that they will not fall unexpectedly onto a child.

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