

The louse comb: past and present

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Abstract: Louse combs were used for centuries for the control of louse infestations and became redundant with the introduction of pediculicides. The oldest combs, which are similar to today's louse combs, are known from 1,500 B.C. Royal combs from Pharonic times in Egypt were used for delousing. Most of the combs were two-sided: one side of the comb was used to untangle knots in the hair while the other side with the fine teeth was used to remove lice and eggs. Most combs found in archaeological excavations were made of wood; some were made from bone and ivory. Today, there are a large number of plastic and metal combs on the market, which are used for the detection of head lice but also to control louse infestations and remove the nits from the hair. A battery-operated louse comb was developed to electrocute lice. There is also a battery-operated vibrating comb, which can open the hair knots and expel lice from the hair.

The number of cases of head louse infestations has increased worldwide since the mid-1960s, reaching hundreds of millions, annually. About 6-12 million people, mainly children, are treated annually for head lice (*Pediculus humanus capitis*) in the United States. High levels of louse infestations have also been reported in Israel, Denmark, Sweden, the United Kingdom, France, and Australia (Mumcuoglu et al. 2006; 2007).

Louse combs (also known as fine-toothed combs and nit removal combs) were used for centuries for the control of louse infestations and became somewhat redundant with the introduction of pediculicides such as DDT, lindane, malathion, and pyrethroids. In the last two decades, with the development of

resistant strains of lice to insecticides and general concerns about possible toxic side-effects, these combs are regaining their former popularity.

The oldest combs known, which are similar to today's louse combs, came from 1,500 B.C. (Mumcuoglu & Zias, 1989). Royal combs from Pharonic times in Egypt were used for delousing (Kamal, 1967). Head lice were recovered from the debris found between the fine teeth of a wooden comb excavated in Antionoe, Egypt and dated between the fifth and sixth centuries A.D. (Palma, 1991).

Head lice and their eggs were also found in combs recovered from archaeological excavations in the Judean and Negev deserts of Israel and dated from the first century B.C. to the eighth century A.D., including from Masada and Qumran. Most of the combs were two-sided (Fig. 1). One side of the comb was used to untangle knots in the hair, while the other side with the fine teeth was used to remove lice and eggs. Most



Fig. 1. Two-sided wooden comb found in the Judean Desert and dated from the second century A.D.



Fig. 2. Louse comb from India, approximately 200 years old, made of silver. Note that its handle is made of a container that could be filled with oil. Holes in the lower part of the container allow the oil to flow along the teeth, making combing and removal of nits easier.

combs found in archaeological excavations were made of wood; some were made from bone and ivory. Lice were found in 12 out of 24 combs examined from the Judean and Negev Deserts. In one comb from Wadi Farah, 4 lice and 88 eggs were found, while in a second comb from Qumran, 12 lice and 27 eggs (ten of them operculated) were isolated, indicating that these eggs were still

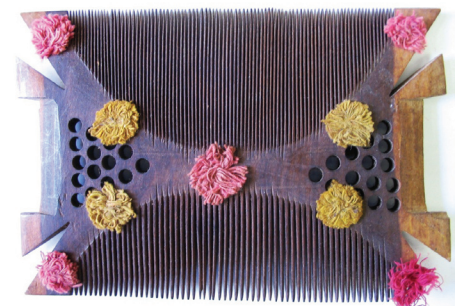


Fig. 3. Two-sided wooden comb from India, decorated with colored filament in the form of flowers.



Fig. 4. Wooden comb from China in the form of a butterfly (4x4 cm).



Fig. 6. Two-sided wooden comb from Turkey, painted with flowers.



Fig. 7. Two-sided wooden comb from India carved with symmetric figures.

embryonated before they were removed from the hair (Mumcuoglu & Zias, 1988). These eggs, deposited by the female approximately 0.5 cm from the scalp, are particularly difficult to remove.

Obviously, the numbers of lice and eggs on the combs would have been reduced by the circumstances of burial and excavation. In addition, in many cases only fragments of the original combs were available, and combs were handled and partially cleaned during museum storage and other studies. The large numbers of lice and eggs on these combs indicate that they were effective delousing implements, and that they probably were designed specifically this purpose (Mumcuoglu & Zias, 1988).

In a recent study, 3 head lice were found in 1 of 6 combs from an unidentified period from Nahal Ze'elim. Lice and eggs were also found in 2 out of 5 combs from the Roman period excavated in Ein Rachel (Mumcuoglu, 2006).

Combs made from precious metals such as silver are rare and were used by the Indian aristocracy in previous centuries (Fig. 2).

During the centuries, wooden louse combs were the most popular means to control head lice. Those from the earlier centuries, made by hand, were not always

smooth and were most probably painful during combing. In addition, the distance between the teeth could vary considerably (Fig. 3- 7). Louse combs composed of fine sticks bound together are still used in South America (Fig. 8) and in the Far East (Korea, Japan, China) (Fig. 9).

Today, there are a large number of plastic (Fig. 10, 11) and metal combs (Fig. 12) on the market. The static electricity generated during combing with some plastic combs may cause the lice to "jump" off the comb and infest the examiner. Some plastic combs were found to be less durable and break easily (Clore & Longyear, 1993). Not all metal combs are suitable for dry hair and others are too pointed, causing damage to the skin and pain to the child. Damage can be caused by some combs due to the heat that is generated by the friction of the hair between the comb's teeth; in these cases excessive combing could harm the hair.

There is a battery-operated vibrating comb (Fig. 13), which can open the hair knots and expel lice from the hair. Also in Israel, a battery-operated louse comb was developed that mechanically removes and electrocutes the lice. The device's concept is based on an electronic circuit, charging the comb's teeth with a constant voltage, which is discharged when shorted by the lice body, killing the lice on contact (Fig. 14).

Today, most examinations for head lice are done by direct visual examination by hand or with the help of a screening stick.



Fig. 8. One-sided comb from Mexico, composed of fine stick-like elements bound with a colored fabric.

However, examination of the hair with a louse comb is four times more effective in the diagnosis of a louse infestation, and twice as fast as examination by hand (Mumcuoglu et al. 2001; De Maeseneer et al. 2000).

Examination of the child's head at regular intervals using a louse comb allows the diagnosis of louse infestation at an early stage. Early diagnosis makes treatment easier and reduces the possibility of infesting others.

Combing with a louse comb should be an integral part of any pediculicidal treatment, whether with insecticides or natural products. A louse comb can remove living lice and their eggs that were not killed by the treatment, and should also be used to remove lice between treatments (Mumcuoglu & Miller, 2004).



Fig. 5. One-sided wooden comb with red case, from Japan.

Figure 9. Two-sided comb from China composed of two different sizes of stick-like wooden elements bound with painted plastic.



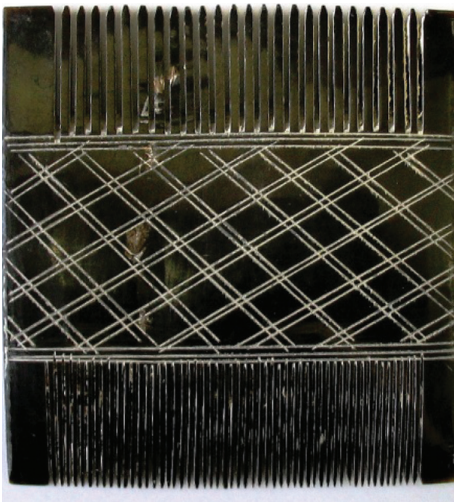


Fig. 10. Two-sided plastic comb ornamented with symmetrical shapes.

Systematic use of a louse comb over the 10-day period in which the eggs hatch can remedy an infestation. Successful treatment of an infestation by combing alone (also known as wet combing or bug busting) is possible if the hair is combed daily or every second day for a period of 12–14 days. This technique is indicated especially for children with short or medium-length straight or wavy hair (Mumcuoglu, 1999).

The louse comb should be used at the end of every anti-lice treatment to verify whether the treatment was successful. If living lice are present 10 days after the beginning of the treatment and the treatment was carried out according to instructions, it can be concluded that the pediculicide was ineffective or that lice have developed resistance to the product. Accordingly, another pediculicide with a different active ingredient should be used for the continuation of the treatment.

Removal of nits with a louse comb is easier when the hair is wet. As this method is not suitable for removing freshly laid eggs, it should be repeated weekly for 2–3 months.

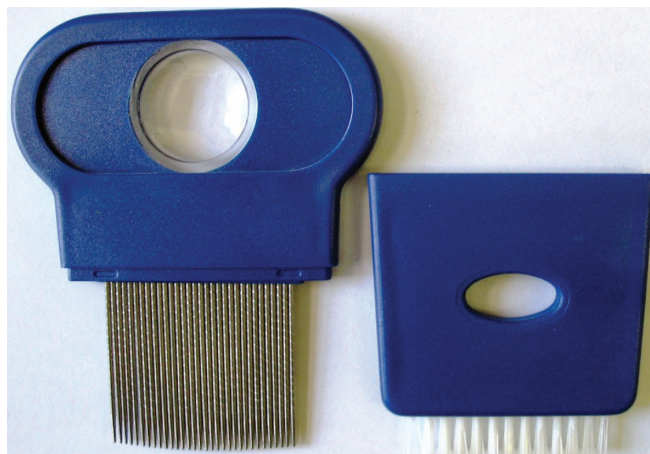


Fig. 11. Modern metal comb with a case, containing a brush for cleaning the teeth after removal of lice.



Fig. 12. Plastic comb composed from two rows of teeth. The first row is used to open the knots, while the second row can glide through the first, decreasing the distance between the teeth and rendering it more suitable for removing lice from the hair.

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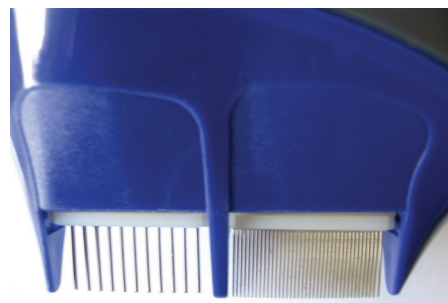


Figure 13. A battery-operated vibrating comb developed in Israel, which opens hair knots and expels lice from the hair.



Fig. 14. A battery-operated louse comb from Israel. The electronic circuit in the device charges the comb's teeth with a constant voltage, which electrocutes lice on contact.

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