



3rd International Expert Meeting
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The modern standard in head lice therapy:
Dimeticone





Chairman:	Prof. U. R. Hengge, M.D., M.B.A.	Germany
08:45 – 09:00	Opening Remarks	Prof. U. R. Hengge, M.D., M.B.A.
09:00 – 09:30	Head lice infestation - Overview of epidemiology and treatment Epidemiology of head lice infestation in the world of today Clinical aspects of the ectoparasitosis General principles of treatment (benefits and risks) The importance of evidence-based medicine National aspects (France)	Prof. O. Chosidow, M.D., Ph.D. France
09:30 – 10:00	Health policy for head lice control - the case of Scandinavia National recommendations - must they be updated? The current knowledge of parents - why should parents be better informed? Do changes in climate result in more infestations? Diagnosis	K. S. Larsen, Ph.D. Denmark
10:00 – 10:30	Current treatment options Insecticides, plant-based pediculicides, synthetic silicone oils, ivermectin, combing Advantages and disadvantages Assessment methods	Prof. H. Feldmeier, M.D., Ph.D. Germany
10:30 – 11:00	Coffee break	
11:00 – 11:30	Resistance to insecticides in head lice Biological basics Occurrence and spread of resistance – international, with particular emphasis on the EU Dimeticone – the answer to resistance? National aspects (Great Britain)	I. F. Burgess, Ph.D. Great Britain
11:30 – 12:00	Mode of action of dimeticone Theoretical considerations Dimeticones - one is not like the other Mode of action of the special dimeticone formula NYDA®	A/Prof. W. Böckeler, Ph.D. I. Richling, Ph.D. Germany
12:00 – 12:30	Efficacy assessment of NYDA® <i>In vitro</i> results for pediculicidal and ovicidal action Controlled, randomised clinical trial National aspects (Brazil, Australia)	Prof. J. Heukelbach, M.D., Ph.D. Brazil
12:30 – 13:00	Podium discussion	all



Ulrich R. Hengge, M.D., M.B.A.

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Prof. Ulrich Hengge, M.D., M.B.A. is director of the polyclinic and deputy director of the department of dermatology at Heinrich-Heine-University, Duesseldorf, Germany. His study group focuses on dermatological research areas: The oncology research team put their main emphasis on the malignant melanoma and the squamous epithelium carcinoma investigating improved diagnostical methods and therapy. Other scientific research projects are on psoriasis, neurodermitis, gene therapy as well as various viral and tumour diseases associated with immune problems. More than 200 scientific publications and 7 books bear evidence for his enormous scientific activity and academic success. On top of that, Ulrich Hengge is president of the German Society of Gene Therapy and chairman of the Joachim-Kuhlmann-AIDS foundation in Essen, Germany.



Olivier Chosidow, M.D., Ph.D.

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Olivier Chosidow, M.D., Ph.D. is Professor of Dermatology and Therapeutics at the University of Paris VI, Medical School Pierre et Marie Curie, Hôpital Tenon, Paris, France. He served the French Society of Dermatology as Secretary General (2002-2006) and is the Vice-President of the forthcoming congress of the European Academy of Dermatology and Venereology in Paris, september 2008. He belongs to several Ministry of Health 's Committees, including the dermatologic committee for the approval of drugs at the French Drug Agency and the «commission de la transparence» which aims to evaluate the value of the new drugs in the therapeutic strategy. His research interests include infectious and inflammatory diseases, and clinical pharmacology and therapeutics. He conducted several clinical trials in the field of dermatology and supports evidence-based dermatology. He published around 220 papers (Pubmed database) and is the author/coordinator of many reviews and book chapters, including in the Harrison's, Evidence-based Dermatology.

Main publications in the field of ectoparasitic infections:

O. Chosidow, Cl. Chastang, C. Brue, E. Bouvet, M. Izri, N. Monteny, S. Bastuji-Garin, J.J. Rousset, J. Revuz. Controlled study of malathion and d-phenothrin lotions for *Pediculus humanus var capitis*-infested schoolchildren. *Lancet* 1994; 344: 1724-1727.

O. Chosidow. Scabies and pediculosis. *Lancet* 2000; 355: 819-826.

O. Chosidow. Scabies. *New England Journal of Medicine* 2006;354:1718-27.

A. IZRI, O. Chosidow. Efficacy of machine laundering on head lice : recommendations to decontaminate washable clothes, linens and fomites. *Clinical Infectious Diseases* 2006;42:e9-e10.

O. Chosidow. Bug busting for head lice : is it effective? *Archives of Dermatology* 2006;142:1635-7.



Head lice infestation - Overview of epidemiology and treatment

Head lice are known for more than 15,000 years. Prevalence is increasing worldwide reaching hundreds of millions of cases although there are not many rigorous longitudinal surveys. Head lice infestation is a « true » disease with a measurable morbidity, including itching, impetigo, psycho-social stigma.

Treatment of head lice should be evidence-based and updated on a regular basis. It may include decontamination.

Cochrane or systematic review should:

- include chemicals and non-chemicals
- have fair selection of trials, e.g., all RCTs
- give advantages and limitations of the main trials
- be updated according new data, e.g., resistance

Individual trials should be rigorous:

- Process of randomisation: cluster vs individual, centralized randomisation
- Secret of allocation
- Fair comparison: choice of the product, number of application, non-inferiority margin, educational, ...
- Groups should be similar at base-line, investigator-blinded, time of evaluation fair for both groups, ...
- Generalisation of the results: difficult with small samples, IC95% at least 90%, all interventions should be considered (hair conditioners and bug busting)
- Same principles to both chemicals and non-chemicals

National aspects regarding treatment of head lice should include description of insecticidal resistance which has been described in France since the early 90s.

Clothes and linen should be washed at a temperature of 50°C at least or dried to get an efficacious decontamination.



Kim S. Larsen, Ph.D.

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Worked for 10 years as research entomologist working on blood sucking insects and mites. Later he worked as R&D Manager and PR & Technical Manager for a company selling food supplements and dermatological products. Established 1998 KSL Consulting. The latter is a company combining science, technology and practical experience working closely with the industry as well as national and international organisations having focus on ectoparasites of veterinary and medical importance. Over the years he has published a comprehensive number of scientific, educational and popular science papers as he has been a consultant in radio, television and video productions. When not working he spends his time with the family, on running their farm and on his hobbies (hunting and fishing, travelling, music and football).



Health policy for head lice control - the case of Scandinavia

Head lice infestations are rampant among school children and large sums are spent on products to treat infestations. As people in general do not at all tolerate lice on their children it is important to inform about new efficient products developed in the past few years along with implementing new diagnostic and control strategies.

National and international recommendations are essential in this context. Unfortunately such recommendations are lacking in many countries or, if present, there is often a strong need for updating the information. This is quite a problem as these recommendations are or rather should be the information on head lice used by professionals like e.g. pharmacy personnel, school nurses, the industry, physicians (e.g. pediatricians, dermatologists), health authorities etc. However, these recommendations are also important for the general consumer. Along with increased use of the internet there is also a growing need for international coordination of this information. Examples of various recommendations and of potential pitfalls caused by misinformation will be presented.

As most head lice treatments take place at home parents have a key role in head lice control. Unfortunately it looks like most parents are lacking even very basic knowledge on head lice and on key elements in the control like how to diagnose a lice infestation and how to use the products correctly. Several surveys from Denmark, Sweden and Australia have demonstrated this lack of knowledge on lice and lice control.

Everybody talks about the weather but nobody does anything about it....! Global warming is a hot issue and the mild winters seem also to affect the lice infestation level. No snow or rather more rain appears to change the behaviour of children. They tend to spend more time indoors, thus have more head to head contacts compared to when they play outside, especially during cold winter periods. This difference in behaviour is reflected in sale statistics of head lice products.

For parents and professionals it is essential to be able to diagnose head lice so they will know when to treat and when not to treat. The advantages and disadvantages of different diagnostic methods will be discussed e.g. a comparison of hand screening and detection combing, the use of different types of lice combs or the advantages of wet combing and it will be shown why presence of nits can not be used as a diagnostic tool.



Hermann Feldmeier, M.D., Ph.D.

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Professor Hermann Feldmeier teaches tropical medicine and infectious diseases epidemiology at the Charité University Medicine in Berlin. He has received education and training in tropical medicine, immunology and epidemiology at the Sorbonne University, Paris, at the Bernhard-Nocht-Institute for Tropical Diseases, Hamburg and during fieldwork in Africa, Asia and South America. He has been a visiting professor at several universities in the tropics and is Professor honoris causae at the Medical School of Alagoas, Northeast Brazil. He is a WHO expert on parasitic diseases.

His research activities have focussed on infectious diseases that are related to tropical environments, sexually transmitted diseases, particular aspects of tropical diseases in women, and the so-called neglected diseases of neglected populations such as tungiasis, scabies and pediculosis. The results of his studies have been published in >300 articles in peer-reviewed journals.



Current treatment options

Pediculosis capitis is the most common parasitic disease in childhood. If not diagnosed and treated promptly, severe clinical pathology may develop. The intense itch induces scratching, which, in turn, causes breaks and excoriations in the epidermis, and is responsible for the superinfection of lesions with pyogenic bacteriae such as streptococci and staphylococci. Treatment must take into consideration that the great majority of patients are children.

Currently, there are five treatment options. The mechanical elimination of head lice by combing is the oldest approach to get rid of the ectoparasites. Combing is a time-intensive process, and is only effective if repeated several times using a high-quality comb. Nits are difficult to be eliminated by combing. The second approach, most commonly used today, is the repeated application of chemical pediculocides. These belong to various classes of insecticides and have a neurotoxic mode of action. The effectiveness of these compounds is hampered by the fact that the insecticides cannot kill very young developmental stages of the egg (or cannot penetrate into the egg shell) and that various types of resistance exist. An altered skin barrier will enhance the resorption of topically applied insecticides. Plant-based pediculocides contain amongst others a mixture of essential oils and/or short-chain fatty acids. With a few exceptions, the effectiveness and non-toxicity of these compounds remain to be demonstrated. Dimeticones are silicone oils with a low surface tension and special creeping and spreading properties. They are regarded as chemically inert and toxicologically harmless and are a new class of highly effective anti-head lice compounds with a purely physical mode of action. They penetrate into the spiracles of the louse and impede the exchange of oxygen and water vapour. Development of resistance is very unlikely. Ivermectin is the only pediculocide available as a systemic treatment. The drug is highly effective, but its use in head lice infestation is off-label.

The assessment of the efficacy of head lice treatments contains several fallacies which are seldomly appreciated and which cause biases in the interpretation of the results of clinical trials.



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Ian F. Burgess - first became interested in ectoparasites whilst studying medical parasitology at the London School of Hygiene and Tropical Medicine in 1972. Several posts and 11 years later he joined the newly formed Medical Entomology Centre (MEC) in Cambridge, where in 1988 he became deputy director with responsibility for the administration of clinical and epidemiological studies in UK and abroad. During the past decade he has been particularly interested in the activity of insecticide formulations and evaluation of the development of insecticide resistance in the community.

Since 2002 Ian has been Director of Insect Research & Development Limited (incorporating the MEC) a company that deals with all aspects of public health entomology. He is now involved in developing novel insecticides for use in humans and companion animals that are safe and bypass resistance problems. These investigations range from formulation development through laboratory evaluation to clinical trials.

Ian has been lecturing since the early 70's and regularly presents at professional meetings, training courses, and in the media, mostly on biting insect problems and ectoparasites.



Resistance to insecticides in head lice

Head lice in Western and Central Europe and Israel have developed resistance to the most commonly used insecticides. This problem was first identified in 1993 following use of permethrin and the chemically related d-phenothrin, and this has now been shown to be associated with so called “knockdown” resistance (kdr), affecting the sodium gated channel of nerve conduction. All countries affected also used DDT as a louse control agent in the 1950s.

More recently, malathion resistance has been identified, associated with non-specific esterase metabolism of the insecticide and suspected alternative acetylcholine esterase selection in some isolates. This type of resistance has now crossed over to affect pyrethroid insecticides so that not only are the insecticides degraded by esterase activity but due to the excess production of enzymes in some lice the insecticides appear to be sequestered before they reach the binding site.

Resistance actions due to mixed function oxidase enzymes appear to be limited if they are active at all in this category of drug.

New products aim to avoid effects due to resistance. By developing products that exhibit a physical mode of action, such as those based on silicones, it is possible to overcome resistance and to eliminate infestations that previously were unaffected by insecticide treatments.



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He is an associate professor at Christian-Albrecht-University of Kiel, Germany, and professor at the Universidad Nacional de Asunción, Paraguay. His main scientific interests are in zoology, parasitology and zoo-biology. After his study of zoology and parasitology at the University of Bonn, Germany, he later qualified as an associate professor at the University of Kiel. Besides his activities as a lecturer of zoology and parasitology Wolfgang Böckeler has specialised in several parasitological areas: the diagnosis of human and animal parasites and pests, applied research on parasites of domestic, farm and zoo animals and finally evolution and transfer mechanisms of reptile and bird parasites. From 1971 to 1973 he was a lecturer at the University of Kabul, Afghanistan, and conducted parasitological research in the subtropics. Since 1984 he has been carrying out four-week annual research stays in the tropics. Besides that he works as an expert witness for various pharmaceutical companies and as a volunteer for the Gettorf zoo, Germany.



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Biologist Ira Richling, Ph.D., has worked on several zoological projects at the University of Kiel, Germany, since her diploma thesis there in 1999: In 2002 she finished her Ph.D. thesis at the zoological institute on a tropical land snail family which was awarded with the faculty price. Between 2004 and 2007 she focused on systematic and parasitological research. Mrs. Richling conducted several research trips to Central America as well as to London, Gainesville, Philadelphia, Warsaw and Paris. In 2007 she started working as an independent biologist and free lancer at the University of Kiel, Germany. She both works as an expert witness in landscaping and as a mission oriented researcher. Furthermore she is also interested in scientific and nature photography.



Mode of action of dimeticone

There is increasing criticism against conventional head lice remedies based on neurotoxic insecticides: they are not completely harmless to health and they become noticeably less effective, due to increasing resistance in head lice worldwide.

For a long time, experts have been calling for the development of a contemporary, non-toxic and effective remedy for head lice. Pediculicides on the basis of Dimeticone are modern head lice remedies that work by physical means. They are non-toxic and without the risk of resistance. Despite early therapeutic success the mode of action of these products has been unclear so far. Experimental proof concerning the mode of action has not been delivered until now. A hypothetical cause of death postulated in one publication was the formation of a watertight film covering the lice and thereby causing a lethal disturbance in their water balance [1].

NYDA® excels in comparison to other Dimeticone preparations through its special formulation of two different Dimeticones resulting in highly creeping and spreading properties. The product contains two different types of Dimeticone (total amount 92%) – one with a low viscosity, which is volatile at room temperature and a second viscous, heavy volatile Dimeticone. The low viscous Dimeticone causes the lice remedy to have a very low surface tension and therefore very good creeping and spreading properties. Thereby it is capable of penetrating deeply into the respiratory openings (spiracles) and the entire tracheal system of the parasites finally displacing the air in there. Thereafter the volatile Dimeticone evaporates – NYDA® thickens and seals the respiratory system irreversibly. The lice suffocate and die. NYDA® consistently fights head lice infestation through its special composition causing suffocation.

This therapeutic mode of action of NYDA® against lice could be experimentally documented for the first time [2].

Scanning electron microscope pictures of the head louse surface and in particular of its respiratory openings shows that following application of the Dimeticone preparation, the louse is completely coated with a thin, cohesive NYDA® layer which also enters the respiratory openings.

Subsequent observation by stereomicroscopy allowed to clearly observe the penetration of NYDA® into the lice` entire tracheal system, starting at the main tracheal branches (cross section: 0.02-0.035 mm) far into the thinnest dendrites (ca. 1/500 mm). An analysis of how the filling of the tracheal system progresses in time compared with the decrease of signs of vitality in the lice was conducted. It clearly shows that by the time the tracheae which lead to the head and supply the central nervous system with oxygen are reached (within one minute), the lice become motionless („no major vital signs“). The observed irreversible filling of the entire tracheal system by NYDA® is associated with suppression of the entire oxygen supply within the head of the louse. It can therefore be assumed with certainty that death of the louse ultimately follows. None of the lice in the experiment recovered from the treatment with NYDA®.

[1] Burgess I. F. et al. (2005): Treatment of head louse infestation with 4% dimeticone lotion: randomised controlled equivalence trial. *BMJ* 330: 1423-1427.

[2] Richling I. and Böckeler W. (2007): Physical effects on the tracheal system of lice (Anoplura, Phthiraptera: *Pediculus humanus*) after treatment with the special dimeticone formula NYDA®. Poster Abstract, 41. Annual Conference of the Austrian Society for Tropical Medicine and Parasitology (ÖGTP) in Vienna on November 22-24.



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QUALIFICATIONS AND TRAINING

- 2007 MScIH (Master of Science in International Health), Charité Medical Faculty, Berlin, Germany
- 2006 Post-Doc, School of Public Health, Tropical Medicine and Rehabilitation Sciences, James Cook University, Townsville, Australia
- 2002 DTMPH (Diploma of Tropical Medicine and Public Health), Humboldt University, Berlin, Germany
- 1998 PhD in Pharmacology, University of Aachen, Germany.
Title of thesis: "Cloning and characterization of a novel protein-serine threonine kinase (SNRK) that is differentially expressed in 3T3-L1 cells"
- 1996 MD, University of Aachen, Germany

EMPLOYMENT HISTORY AND WORK EXPERIENCE

- 2006 – current Adjunct Professor, School of Public Health, Tropical Medicine and Rehabilitation Sciences, James Cook University, Townsville, Australia
- 2004 – current Professor of Epidemiology, Department of Community Health, Federal University of Ceará, Brazil
- 2002 – current Project Coordinator and Director, Mandacaru Foundation, Fortaleza, Brazil
- 2005 – 2006 Visiting Professor, Endeavour Research Fellowship at the School of Public Health, Tropical Medicine and Rehabilitation Sciences, James Cook University, Townsville, Australia
- 2001 General Practitioner at Caucaia Municipal Hospital, Brazil
- 2000 – 2001 Medical Residency in Community Health, School of Public Health of Ceará State, Brazil
- 1999 – 2000 Research Scholarship, School of Public Health of Ceará State, Brazil
- 1999 Visiting Physician, Surgery, Santa Casa Hospital, Fortaleza, Brazil
- 1997 – 1998 Medical Residency, Gynaecology & Obstetrics, Holweide Hospital, Cologne, Germany



Efficacy assessment of NYDA®

The efficacy of NYDA®, a new pediculicide containing a high concentration of dimeticone, was assessed by:

1. *in vitro* studies on head lice (pediculicidal action)
2. *in vitro* studies on head louse eggs (ovicidal action)
3. a randomized controlled observer blinded clinical trial (clinical efficacy)

1. *In vitro* studies on pediculicidal action

Seven products available on the market for head lice infestation were compared by *in vitro* assays: NYDA® (92% dimeticone); Hedrin® Lotion (4% dimeticone); mosquito® LäuseShampoo (soy oil, coconut oil); Lyclclear® Crème Rinse (1% permethrin; aqueous solution); Infectopedicul® (0.5% permethrin, alcoholic solution); Prioderm® Shampoo (1% malathion); and Goldgeist® forte (pyrethrum extract and pipronyl butoxide, chlorocresol, diethylenglycol). A negative control group was also included (no treatment).

Head lice were collected from heavily infested patients in a resource-poor community in northeast Brazil, where no resistance against pediculicides has been reported. In each of the eight groups, 50 adult fully active lice were tested, by immersion in the undiluted products for 3 min. The products were washed off after 20 min. Using strict mortality criteria, lice were monitored for activity at different points in time, for a period of 24 h.

NYDA® and Prioderm® killed all lice after 5 minutes, and this effect persisted in all observations (100% *in vitro* efficacy). Efficacy of Infectopedicul® ranged between 76% and 96% (in evaluations after 5 min to 6 hours); Lyclclear® killed between 86% and 94% of lice in this period. All lice treated with mosquito® were considered dead after 5 min, but at observation points between 60 min and 6 h, achieved only 58% - 66% mortality. Similarly, despite showing no major vital signs during the first hour, lice treated with Hedrin® recovered, with a mortality of 74% after 6 h. Goldgeist® killed only 22% - 52% of lice (5 min to 3 hours after treatment).

It is concluded that NYDA® and Prioderm® showed excellent action in killing head lice *in vitro*. The head lice tested were virtually not resistant against permethrin. A considerable number of lice treated with mosquito® and Hedrin® resurrected. Efficacy of Goldgeist® was only moderate.

2. *In vitro* studies on ovicidal action

The following products were tested for their ovicidal action *in vitro*: NYDA® (92% dimeticone); Infectopedicul® (0.5% permethrin, alcoholic solution); mosquito® LäuseShampoo (soy oil, coconut oil); and Goldgeist® forte (pyrethrum extract and pipronyl butoxide, chlorocresol, diethylenglycol). In a control group, eggs were left untreated.

To produce a sufficient number of fertile eggs with exact age known, head lice attached to hair strands were exposed in a plastic chamber ("artificial dog") with a mesh. The plastic chamber was left for several days attached to the skin of volunteers, to allow blood feeding of lice *ad libitum*, and checked several times per day for newly laid eggs.

Ovicidal action was assessed in two groups of eggs: young eggs (treated 1-2 days after oviposition), and mature eggs with visible eyespot and embryonal movements (treated 10 days after oviposition). Eggs were immersed into the undiluted products for 3 min and washed with shampoo after incubation periods of 30 min and 60 min, respectively. Ovicidal activity of NYDA® was also tested after 10 min incubation. In each group, 50-60 eggs were tested. Hatch rates were assessed 14 days after oviposition.

In young eggs, the highest ovicidal action was observed for NYDA®. Hatch rate in the NYDA® group was 0% for all three incubation periods. Hatch rates of young eggs in the Infectopedicul® group ranged between 48.0% and 54.9%, in the mosquito® group between 19.7% and 65.6%, and in the Goldgeist® group between 56.4% and 72.5%.



Similarly, in mature eggs best ovicidal action was observed for the dimeticone-based product. NYDA® reduced hatch rates to 27.5% (10 min), 9.4% (30 min) and 3.9% (60 min). The hatch rates of mosquito®-treated eggs ranged between 38.9% and 42.3%. Permethrin and pyrethrum showed only a low ovicidal action: hatch rates ranged between 78.4% and 80.0% (Infectopedicul®) and between 72.5% and 89.5% (Goldgeist®). Hatch rates in the control groups were 77.1% (young eggs) and 83.6% (mature eggs), respectively. We conclude that only the dimeticone-based product NYDA® showed high ovicidal action in vitro. NYDA® performed significantly better than all other products. Hatch rates decreased with increasing incubation period, which should last at least 60 min.

3. Clinical trial

To assess the clinical efficacy of NYDA®, we conducted a randomized, controlled, observer blinded clinical trial in children (5-15 years) with high intensity of head lice infestation in Fortaleza, Brazil. Participants were recruited from a poor urban neighbourhood in Brazil, where pediculosis is highly prevalent. During the trial, study participants were transferred to a holiday resort outside the endemic area, for a period of 9 days.

NYDA® was compared to a product containing 1% permethrin (Kwell®). The participants were treated topically on days 1 and 8, and no fine tooth combing was performed on these days. Visual inspection was done to detect head lice before treatment, and diagnostic wet combing on days 2, 7 and 9. Clinical examination was performed, and degree of itching was recorded daily, based on an ordinal visual analogue scale; cosmetic acceptability was assessed using a scale including smell, irritation of scalp, cosmetic changes of hair and changes in combing. The primary outcome was defined as cure rates on days 2, 7 and 9 (complete absence of vital head lice).

In total, 145 individuals (73 in the dimeticone group; 72 in the permethrin group) were included in the study. Sex and age distribution, intensity of infestation before treatment and length of hair did not differ between both groups. Overall cure rates were: day 2 – dimeticone 94.5% and permethrin 66.7% ($p < 0.0001$); day 7 – dimeticone 64.4% and permethrin 59.7% ($p = 0.5$); day 9 – dimeticone 97.2% and permethrin 67.6% ($p < 0.0001$). Itching was reduced similarly in both groups. Cosmetic acceptability was significantly better in the dimeticone group as compared to the permethrin group ($p = 0.01$). Only one possibly related adverse event (conjunctivitis) occurred, in the permethrin group.

The observation that 7 days after the first application cure rates were considerably lower can be attributed mainly to reinfestation, as the vast majority of study participants cured on day 2, but diagnosed with pediculosis on day 7, had adult lice detected. Adults found up to one week after cure derive from reinfestation - no newly hatched nymphs can develop into adults within one week.

We conclude that NYDA® is a highly efficacious and safe pediculicide. NYDA® is a treatment option for individuals that do not want to use insecticides with a neurotoxic potential and for those who seek a high cosmetic acceptability. As efficacy of dimeticone was very high without using a head louse comb, NYDA® will also be ideal for parents who find combing nasty and time consuming. Due to its mode of action (interruption of oxygen exchange in the spiracles of lice), the development of resistance is unlikely.

