

## Klinische Untersuchung zur Wirkung und Akzeptanz von Silbertextilien als Teil einer Kombinationstherapie bei atopischer Dermatitis und anderen Hauterkrankungen unter stationären Bedingungen

Clinical Investigation of the Effect and Acceptance of Silver Textiles as Part of a Combination Therapy for Inpatients with Atopic Dermatitis and Other Skin Diseases

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### Bibliography

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### Summary

▼  
This study investigated the additive effects of utilising the known antimicrobial action of silver incorporated into textile fibres as part of a combination therapy for acute inpatients with atopic dermatitis and other skin diseases. 125 patients were enrolled. Patients reported that wearing the silver clothing had an extremely positive effect on itching, night-

time sleep and skin appearance. Approx. 88% of patients with atopic dermatitis rated the wearing comfort as pleasant or excellent. Most patients also considered the textiles provided protection against scratching. No side effects were observed. The study also demonstrated benefits for the treatment of patients with hand and foot eczema.

### Introduction

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With a lifetime prevalence of 10-20% in children and 1-3% in adults, atopic dermatitis is one of the commonest chronic inflammatory skin diseases [1]. The most significant trigger factors are a genetic predisposition, Type IV sensitisation, irritative-toxic noxious agents, smoking, stress, diet and climatic effects. Bacterial colonisation of the skin, with staphylococci for example, can also induce atopic eczema and maintain its chronic nature [2-4]. Areas of skin affected by eczema that show a particularly marked colonisation by bacteria, can also produce severe itching and massive weeping. For these reasons, it is extremely important to minimise bacterial colonisation of the skin in atopic dermatitis. Antimicrobial substances such as triclosan, quaternary ammonium compounds and copper have a long history of topical use [5]. Silver has also long been known to exert an antibacterial action [6,7]. For instance, it has been used for water purification, wound management with special silver-containing dressings, in bone prostheses, catheters, surgical instruments or in reconstructive and cardiologial surgery [8,9]. It thus seemed obvious to use silver-

containing products for atopic dermatitis. In one study, Gauger has already demonstrated significant improvements in both objective as well as subjective symptoms of atopic dermatitis, within only 2 weeks of wearing silver textiles [2]. In 2006, a working group led by Juenger also confirmed significant improvements in atopic dermatitis through silver textiles [10]. The present study likewise investigated, under inpatient conditions, the efficacy and acceptance of silver textiles as part of a combined therapy in atopic dermatitis and other skin diseases where the problem of bacterial colonisation and an impaired skin barrier function is present.

### Methods

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From the start of July to the end of August 2007 a total of 125 acute inpatients (71 women, 54 men, average age  $27.6 \pm 20.6$  years) of the PsoriSol Hospital for Dermatology and Allergology in Hersbruck were enrolled in the prospective recording of data. In 76.0% of patients, the diagnosis was atopic dermatitis, in 14.4% of cases hand and foot



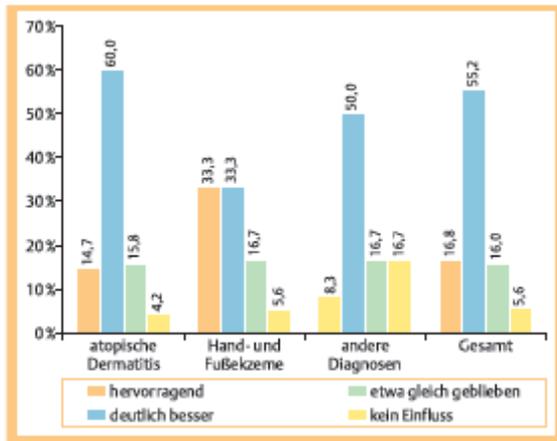


Fig. 4 The silver textiles as protection against scratching the skin. Atopic dermatitis, Hand and foot eczema, Other diagnoses, Total

excellent	stayed about the same
considerably better	no effect

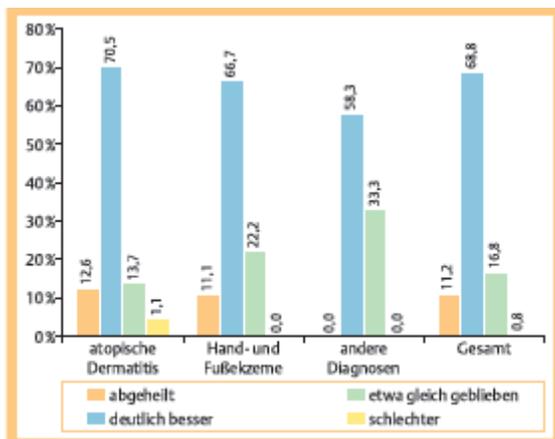


Fig. 5 Improvement in skin appearance under the combination therapy with silver textiles. Atopic dermatitis, Hand and foot eczema, Other diagnoses, Total

healed	stayed about the same
considerably better	worse

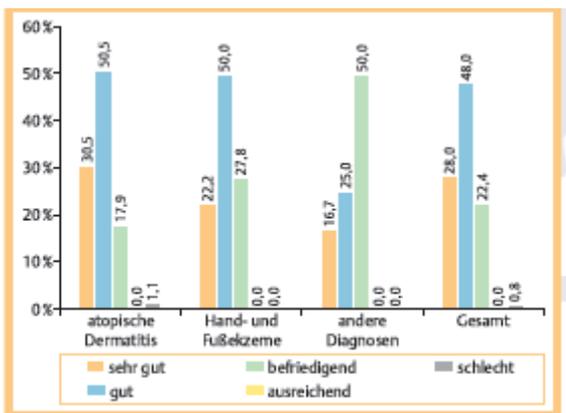


Fig. 6 Clinical global impression of the doctor of the effectiveness of the silver textiles as part of combination therapy. Atopic dermatitis, Hand and foot eczema, Other diagnoses, Total

very good	satisfactory	poor
good	adequate	

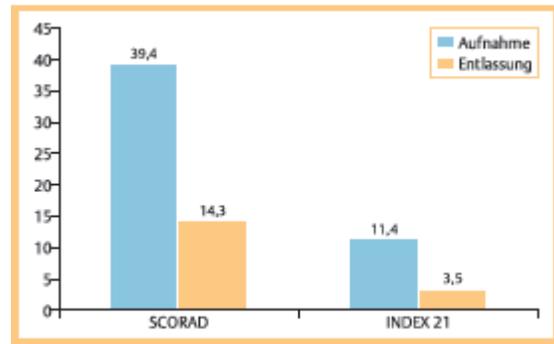


Fig. 7 Comparison of average scores on admission [Aufnahme] and discharge [Entlassung].

foot eczema and 100.0% in the remaining patients. During the study, 60.0% of the 125 patients were given gloves, 44.0% received a long shirt, 28.8% long trousers, 28.0% arm gaiters and 16.0% leg gaiters. The other products were used to a lesser extent. On questioning the patients, the silver-impregnated textiles were rated very highly. The individual results regarding wearing comfort, improvement in itching and night-time sleep can be found in **Fig. 1-3**. The silver textiles were also used as a type of protection against scratching. The assessment of this property was predominantly positive (**Fig. 4**). Overall, a marked improvement and even a healing of the skin under the adjuvant treatment with silver-containing textiles was seen in more than ¾ of cases of atopic dermatitis and of hand and foot eczema (**Fig. 5**). The effectiveness of the silver-impregnated clothing was rated by the investigating physician as very good or good in 81.0% of cases of atopic dermatitis and in 82.2% of hand and foot eczema (**Fig. 6**). The SCORAD score improved from  $39.4 \pm 14.9$  to  $14.3 \pm 10.6$  and the Index 21 from  $11.4 \pm 3.5$  to  $3.5 \pm 1.9$  (**Fig. 7**). In 76.0% of cases this improvement occurred without systemic or topical cortisone. In the neurodermatitis group, this figure was even higher at 83.2%. The topical treatment that was used is shown in **Fig. 8**. Between the time of starting therapy and discharge from inpatient care, marked improvements in terms of reddening, weeping, flaking and scratching (excoriation) were recorded. Whereas on admission, reddening was rated as massive or moderate in 96.8% of patients, by the time of discharge this was merely slight or completely absent in 90.4% of patients. Marked improvements were also noted in terms of flaking: on admission this was present in 89.6% of patients, whilst on discharge it had disappeared in 64.8% of cases. The proportion also changed with regard to weeping: initially 41.6% of patients showed marked or moderate weeping, but by the end of treatment this was present in only 0.8%, with 99.2% of patients showing merely slight, if any, weeping. Scratching (excoriation) likewise improved: this was marked or significant in 73.6% of patients on adm-

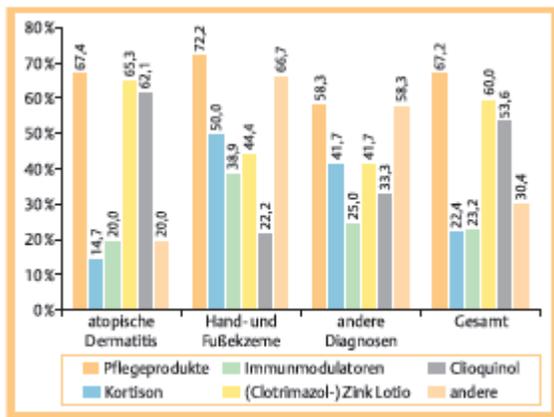


Fig. 8 Topical treatment of the areas in which the silver textiles were worn.

Atopic dermatitis	Hand and foot eczema	Other diagnoses	Total
skincare products	immunomodulators	clioquinol	
cortisone	(clotrimazole-) zinc lotion	other	

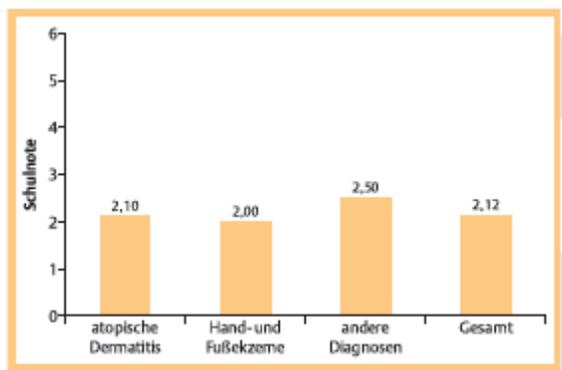


Fig. 9 Average grade.

Atopic dermatitis Hand and foot eczema Other diagnoses Total  
[Schulnote = grade]

Ission but fell during the course of treatment to affect only 3.2% at discharge. Almost all (96.8%) of patients then had only minor, if any, scratching (excoriation). When asked, the average grade patients gave for the silver textiles was 2.1 (i.e. good); a grade of 2.0 was given by patients with hand and foot eczema (↷ Fig. 9).

## Discussion

Several studies have already confirmed that silver-containing textiles are highly effective in atopic dermatitis. In 2006, Gauger showed significant improvements in eczema in 68 neurodermatitis patients after only 1 week. Furthermore, in terms of wearing comfort, the silver textiles were equal to those made of cotton and a significant improvement in itching was recorded compared to a placebo group [2]. The concentration of *Staphylococcus aureus* was also significantly reduced after only 2 days of wearing silver-containing textiles [2,14]. Juenger et al. likewise showed significant improvements in itching when silver-containing textiles were worn compared to silver-free. A

significant improvement in SCORAD values was also achieved within only 2 weeks and the SCORAD fell from 74.6 to 292.9 [10].

The present study was designed to investigate the effectiveness and acceptance of such silver textiles in atopic dermatitis. However the products were also beneficial in other diseases involving a problem of bacterial colonisation. Hand and foot eczema have a multifactorial genesis and are very difficult to treat [15] so a supportive therapeutic use of silver textiles is certainly an important aspect.

Overall, the severity of the patients enrolled in the study could be classed as somewhat marked. This is confirmed by the findings on admission for weeping, intensity of itching, the intensive use of cortisone and/or immunomodulators immediately before admission, as well as the very high disease activity scores. Serum IgE values in the neurodermatitis patients were also very high at  $1900 \text{ kU/l} \pm 4400$ .

In order to interpret the recorded data on the treatment of silver textiles correctly, it must also be noted that despite the marked severity of the diseases, 76% of patients received no form of systemic or external cortisone treatment during the study. This figure was even higher in the neurodermatitis patients at 83%. Phototherapies, cortisone replacement products, zinc preparations and skincare products were used instead of cortisone.

The results demonstrate that in the opinion both of patients as well as of investigators, the silver textiles tested constitute a very good addition to the spectrum of therapy for certain chronic skin diseases. Atopic dermatitis together with hand and foot eczema, showed the highest significance. Thus on discharge, 88% of all patients rated the wearing comfort as "outstanding" or "pleasant". Relief of itching through the combination therapy was also assessed very positively, with it described as "excellent" by 11.6% of neurodermatitis patients and "markedly improved" by 62.1%. In terms of improvement in night-time sleep, 53.7% of patients with neurodermatitis reported it as "excellent" or "greatly improved". 74.7% of neurodermatitis patients assessed the protection against itching provided by the silver textiles also as "excellent" or "markedly better". Furthermore, skin appearance was "markedly improved" or even "healed" in 80% of patients by the combination therapy. When rated using the classic German school grading system, the average grade awarded to the silver textiles was 2.1 (i.e. good).

No side effects were observed in this study.

At the final clinical evaluation of the silver textiles by investigators, the highest effectiveness was recorded in atopic dermatitis (81% "very good" and "good") and in hand and foot eczema (72.2% "very good" and "good"). If the assessments for all patients are combined, then 98.4% of patients showed a "very good", "good" or "satisfactory" result.

During the period of wear, there were also notable improvements in reddening, weeping, flaking and

scratching (excoriation). At the time of discharge, 90% of all patients said that they wished to continue using the silver textiles after ending the in-patient therapy.

In view of these numerous reasons, silver textiles should in future be included in the standard spectrum of adjuvant treatment for atopic dermatitis and hand and foot eczema, because they represent a very effective addition to the therapies available for certain chronic skin diseases.

## Abstract

### Clinical Investigation of the Effect and Acceptance of Silver Textiles as Part of a Combination Therapy for Inpatients with Atopic Dermatitis and Other Skin Diseases

The study investigated the effects of textiles containing silver, based on the well-known antimicrobial character of silver, as part of a combination therapy for atopic dermatitis and other skin diseases, which involve a bacterial superinfection that can worsen the illness. 125 inpatients were included. A clear improvement of the itching, night sleep and skin appearance could be evaluated by carrying silver textiles. The wearing comfort was judged to a large extent as pleasant or outstanding. The textiles were used also as scratching protection. Side effects were not observed. The textiles were also beneficial for hand and feet eczema.

## References

- 1 Leung DY, Bieber T. Atopic dermatitis. *Lancet* 2003; 361: 151–160
- 2 Gauger A. Silver-coated textiles in the therapy of atopic eczema. *Curr Probl Dermatol* 2006; 33: 152–164
- 3 Haug S, Roll A, Schmid-Grendelmeier P, Johansen P, Wüthrich B, Kündig TM, Senti G. Coated textiles in the treatment of atopic dermatitis. *Curr Probl Dermatol* 2006; 33: 144–151
- 4 Ricci G, Patrizi A, Bellini F, Medri M. Use of textiles in a topic dermatitis: care of atopic dermatitis. *Curr Probl Dermatol* 2006; 33: 127–143
- 5 Kramer A, Guggenbühler P, Heldt P, Jünger M, Ladwig A, Thierbach H, Weber U, Daeschlein G. Hygienic relevance and risk assessment of antimicrobial-impregnated textiles. *Curr Probl Dermatol* 2006; 33: 78–109
- 6 Deitch EA, Marino AA, Gillespie TE, Albright JA. Silver-nylon: a new antimicrobial agent. *Antimicrob Agents Chemother* 1983; 23: 356–359
- 7 MacKean PC, Person S, Warner SC, Snipes W, Stevens SE Jr. Silver-coated nylon fiber as an antibacterial agent. *Antimicrob Agents Chemother* 1987; 31: 93–99
- 8 Castellano JJ, Shafiq SM, Ko F, Donate G, Wright TE, Mannari RJ, Payne WC, Smith DJ, Robson MC. Comparative evaluation of silver-containing antimicrobial dressings and drugs. *Int Wound J* 2007; 4: 114–122
- 9 Lamsdown AB. Silver in health care: antimicrobial effects and safety in use. *Curr Probl Dermatol* 2006; 33: 17–34
- 10 Juenger M, Ladwig A, Staecker S, Arnold A, Kramer A, Daeschlein G, Panzig E, Haase H, Helsing S. Efficacy and safety of silver textile in the treatment of atopic dermatitis (AD). *Curr Med Res Opin* 2006; 22: 739–750
- 11 European Task Force on Atopic Dermatitis. Severity scoring of atopic dermatitis. The SCORAD index: consensus report of the European Task force on Atopic Dermatitis. *Dermatology* 1993; 186: 23–31
- 12 Kunz B, Oranje AP, Labrèze L, Stalder JF, Ring J, Taïeb A. Clinical validation and guidelines for the SCORAD index: consensus report of the European Task Force on Atopic Dermatitis. *Dermatology* 1997; 195: 10–11
- 13 Kappesser P, Mai A, Amon U. Index 21 – ein Score zur Objektivierung des Schweregrades bei Hand- und Fußekzemen. *Zeitschrift für Hautkrankheiten* 2001; 76 (Suppl. 1): 74
- 14 Gauger A, Mempel M, Schekatz A, Schäfer T, Ring J, Abeck D. Silver-coated textiles reduce *Staphylococcus aureus* colonization in patients with atopic eczema. *Dermatology* 2003; 207: 15–21
- 15 Reichl A, Vögtle V, Schöffler G, Brühl L, Frommelt R, Amon U. Therapie von Hand- und Fußekzemen unter stationären Bedingungen. *Akt Dermatol* 2007; 33: 379–384