Summary
Volume augmentation of the back of the hand is a new technique which is not yet often employed. We describe the treatment of two patients who received hyaluronic acid products produced by Q-Med (Macrolane™ VRF20, Restylane® Vital, Restylane® Vital Light). The injections of Macrolane™ VRF 20 were done by feathering technique using a long and blunt 18 gauge canula while Restylane® was injected by tunneling or tenting technique with a 30 gauge needle. Significant adverse events did not occur. After injection of the hyaluronic acid fillers, the appearance of the back of the hands was improved. Both patients were very satisfied with the result.

Keywords
hand augmentation – hyaluronic acid – injection

Introduction
The face is still the prime focus of aesthetic dermatology [1]. Next to the face the hands are the structures of the human body impacted most by environmental factors. In addition to cutaneous atrophy that is often accompanied by pigment alterations, the loss of fatty tissue with prominence of underlying veins and tendons can be impressive. In order to correct lipoatrophy of the hands and to improve total skin appearance, various injectable fillers can be employed [2–9]. We report on two 59-year-old women with prominent signs of aging on the back of the hands. Particularly notable was the atrophy of subcutaneous tissue (grade 4 according to Carruthers et al. [10], Table 1). After discussing the various therapy options we recommended augmentation with resorbable hyaluronic acid fillers.

Anatomy of the hand
The carpus is formed of two rows – a proximal and distal – of four carpal bones each. The metacarpus is composed of five short hollow bones. The back of the hand is covered by thin connective tissue, so that the bones can easily be felt. The visible and palpable bones serve as leading structures for nerves and blood vessels from the forearm to the dorsal hand. The skin is easily movable over the superficial fascia and can be lifted in folds. Due to the loose and flexible structure of the subcutaneous connective tissue, large amounts of fluids can accumulate causing edema. This flexibility of the tissue offers ideal conditions for the injection and distribution of fillers. As the veins are minimally fixed by subcutaneous fat, they are to a certain extent displaceable avoiding injection. Cutaneous nerves lie deeper than veins and do not run in a parallel fashion but have variable patterns of branching, so that the visible veins cannot be viewed as guiding structures to protect cutaneous nerves (Figure 1).

Materials employed
Macrolane™ was licensed in September 2007 in Germany for the treatment of volume deficits of the body. Macrolane™ VRF20 is a stabilized synthetic hyaluronic acid produced using NASHA™ technology (NASHA = non-animal stabilized hyaluronic acid). By stabilization of about 1 % of the hyaluronic acid three-dimensional formability as gel particles is attained. Macrolane™ is available in two variations (Volume Restoration Factor VRF20 and VRF30) with differing lifting capacity. Restylane® Vital and Vital Light are also products of NASHA™ technology and are intended for augmentation in the dermis. Restylane® Vital Light is suitable for rejuvenation of the face, neck, décolleté and hands and has a lower concentration of hyaluronic acid (12 mg/ml) than Restylane® Vital (20 mg/ml) [3].

Pretreatment
At the start the patients were treated with EMLA® 5 % cream, a topical

| Table 1: Hand Grading Scale according to Carruthers et al. [10]. |
|-----------------|----------------------------------------------------------------------------------|
| 0               | No loss of fatty tissue                                                          |
| 1               | Mild loss of fatty tissue and mild visibility of veins and tendons                |
| 2               | Moderate loss of fatty tissue and mild visibility of veins and tendons            |
| 3               | Severe loss of fatty tissue and moderate visibility of veins and tendons          |
| 4               | Very severe loss of fatty tissue and marked visibility of veins and tendons       |
thoroughly disinfected with octenidine hydrochloride. During treatment the patients sat in a treatment chair in a slightly reclined position; the hands were lying flat. The patient treated with Macrolane™ VRF20 received additional local anesthesia with 1 % prilocaine at the incision site.

Patient 1
In the first patient after a small incision with a single-use scalpel centrally in the proximal portion of the back of the hand, a long, blunt canula (1.2 × 70 mm – 18 gauge, Canule Fillin, Thiebaud) was introduced. The canula was advanced superficially in the subcutis. Macrolane™ VRF20 was injected during withdrawal (Figure 2). Multiple fan-shaped injections made a uniform filling of the back of the hand possible. Subsequently the material was modeled by massage and the incision site was closed with a Steristrip®. At the end of treatment, small irregularities were corrected with Restylane® Vital Light. A total of 10 ml Macrolane™ VRF20 and 3 ml Restylane® Vital Light were distributed to both hands. Ten days after treatment we observed a very good improvement of appearance with substantial reduction of visibility of the veins and tendons as well as symmetrically filled interphalangeal spaces. At a visit after 3 months continued distinctly improved appearance was seen (Figure 3).

Neither patient developed side effects such as hematomas, pruritus, pain or nodule formation.

Discussion
In these two cases, two differing methods of skin augmentation are presented: (1) subcutaneous injection (with Macrolane™ VRF20) using a long, blunt canula and (2) dermal injection (with Restylane® Vital or Restylane® Vital Light) using a short 30 G needle. In both cases the patients were highly satisfied. The indication for the appropriate
Injection technique depends on the patient’s need for correction. Subcutaneous injection should be reserved for patients with substantial lipoatrophy (i.e., when tendons and blood vessels are very visible). It is important to inject an adequate amount, as in this case 5 ml per hand. Besides the technique described above with injection using a long, blunt canula and a single incision, injection can also be performed using a short needle with multiple injections in tenting technique [3]. Beside Macrolane other Restylane products can be also used, such as Restylane Perlane (Figure 5). The technique of dermal injection with Restylane products can be used for fine corrections or to correct less impressive lipoatrophy. Here, the material should be injected superficially, i.e., dermal or superficially subdermal. A combination of the described techniques is possible.

What risks exist?
In principle, bacterial infections are possible in any injection, so that the injection should be performed under sterile conditions. There have not been any reports yet of bacterial infection after injection of a filler on the back of the hand. The hand phlegmon occurs especially after bites or other injuries [11]. As in all injection therapies hematomas and product-specific intolerance reactions can occur.

Which material should be used for hand augmentation?
With the exception of a small pilot study by Man et al. [8] no comparative studies of products used for hand augmentation exist [2–9]. In order to assure that a safe and effective injectable filler is used, we recommend the use of products whose efficacy and tolerability have been
demonstrated by controlled clinical studies [12–15] for at least one aesthetic indication (e. g. nasolabial folds). This is especially true in view of the fact that two hyaluronic acid products without clinical studies were withdrawn from the European market in recent years because of unacceptable intolerance reactions. Resorbable materials should be favored. Even if rare side effects occur, it is highly probable that these side effects will be transient and for products based on hyaluronic acid can be successfully controlled by combination therapy with hyaluronidase and immunomodulatory agents [3].

Last but not least
In the discussion of hand augmentation it should not be forgotten that filler materials cover only one aspect of aesthetic treatment. Pigmented lesions require other approaches such as peels, laser and intense pulsed light.

Conflicts of interest
The materials used for treatment were supplied by Q-Med. The report is based on a script of user courses at the Charité supported by Q-Med.

References
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