

Medical tattooing, the new frontiers: a case of nail bed treatment

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Abstract

The primary objective of medical tattooing is to restore part of a patient's physical integrity. Moreover, the procedure seeks to assist in psychological recovery from the physical and/or psychological consequences of disease, surgery or trauma. The method described in this brief note marks a step forward in the field of such tattooing. The treatment simulates reconstruction of the nail bed, as the nails of the big toes had previously been removed through a surgical avulsion procedure. This treatment, agreed with the physician and performed by a tattooist with proven experience in medical tattooing, also involved the use of specific colour nuances that resulted in an extremely realistic outcome.

Key words

- tattooing
- procedure
- scars

BACKGROUND

Medical tattooing, which in Italy is synonymous with dermopigmentation, dates back as far as the early 1900s [1]. In the past, several attempts were made to use artistic tattooing in aesthetic medicine, but the end results were only partially acceptable [2]. Quite often, misapplication of the pigment, or its migration and/or fanning, were a source of customer dissatisfaction. In such circumstances, the fact that it was permanent was most likely the greatest disadvantage. Reasons for dissatisfaction were: unnatural aspect, colour, shape, fading, fanning, distortion [3].

From a technical point of view, dermopigmentation does not differ much from artistic tattooing. In both instances, pigments are implanted in the intradermal skin.

Currently, medical tattooing is used to deal with certain consequences of a number of pathological conditions, such as the reconstruction of the nipple-areola complex, camouflaging of scars or Hypochromic spots, corneal pigmentation and improvement of the lip contour after trauma or surgery, as well as in cases of alopecia due to various causes and in different locations.

Therefore, tattooing for medical purposes is employed to restore patient's physical integrity and whenever skin "recolouring" is needed. An innovation in this field is its application to simulate the reconstruction of the nail bed.

TECHNIQUE

The patient, now fifty years old, had suffered as a young woman from Onychocryptosis hallux involving

both her big toes. In 1974, this condition forced her to undergo a bilateral surgical avulsion procedure. The woman experienced deep psychological discomfort on account of the missing toe nails, which over time resulted in progressive loss of self-esteem. In this particular case, the medical tattooing procedure was deemed the most suitable to restore the patient's physical and psychological well-being.

The technique employed was one previously validated at a public health facility, used successfully to reconstruct the nipple-areola complex.

The treatment was carried out under the strict supervision of the physician who had previously taken the patient's case history.

The digital nerve was anaesthetised with a solution of 2% lidocaine, injected between the toes, with a 25G hypodermic needle. Complete anaesthesia was achieved after approximately five minutes, after which the patient stated that she felt "no pain" according to the Visual Analog pain Scale (VAS).

The full treatment required a single session lasting about 1 hour and 40 minutes.

The instrument used to perform the procedure was a modified dermatograph, similar to a tattoo-gun, capable of being completely sterilized (Figure 1).

DISCUSSION

Generally speaking, medical tattooing (dermopigmentation) is a treatment that entails multiple sessions in order to achieve a full match between the colour obtained and that of the surrounding skin. In our case, the



Figure 1
The tattooist during an application session, using sterilized instruments and products.

treatment was finalized in a single session, owing to the particular expertise of the tattooist and the choice made of agreeing the shape and colour of the toenail with the patient beforehand; this also involved paying attention to such intrinsic factors as the complexion and colour of the adjacent nails. Wherever necessary, the skin surface was not covered with a continuous line of pigment. Rather, a series of small dots was applied next to each other, so as to enable the treated skin area to adapt to seasonal colour changes. This allowed the recreation of volumes, shadows and highlights, thereby producing a 3-D effect.

For the correct and safe execution of the treatment, it is essential that the tattooist should have a thorough knowledge of the specific techniques and is capable of using and safely managing the materials required. Often, the outcome of the treatment proves unsatisfactory owing to the lack of experience and knowledge of the technique on the side of the operator performing the treatment [4].

The training for a tattooist performing medical tattoos, in addition to design and artistic considerations, should cover a working knowledge of anatomy and skin pathology, the implementation of correct procedures and hygiene rules, as well as a thorough knowledge of the utilized equipment and materials.

In this case, the nail reconstruction was performed using a set of disposable tools for medical tattooing, certified as sterile Medical Equipment and commonly referred to as Sterile Field (*Figure 2*).

Similarly, use was made of disposable sterile, non-toxic and hypoallergenic inks, manufactured in accordance with the requirements of European Resolution ResAP 2008(1) [5] in force in Europe and specifically developed for this particular use. This allowed the tattooist to achieve a safe and highly effective use of colour that commercially available inks for artistic tattooing are hardly capable of reproducing [6].

CONCLUSIONS

Medical tattooing, applied to restore the appearance of the nail bed, represents a major step forward that confirms the versatility of the technique.

The supervision of a qualified physician and the



Figure 2
Sterile field: set of disposable tools for medical tattooing, certified as sterile Medical Equipment.

professionalism of the tattooist enabled the patient to reclaim her sense of physical integrity, without any risk to her health. The results attained have met with the patient's full satisfaction and allowed her to re-establish her proper psychological balance (*Figure 3* and *Figure 4*).



Figure 3
This photo shows the missing toe nails before the tattoo.



Figure 4
The results of tattooing, applied to the reconstruction of the nail bed.

The above case shows the importance and the potential of using tattoos for medical purposes in cases where it is necessary to complete and/or refine the results obtained by plastic surgery, thereby avoiding further invasive procedures.

Conflict of interest statement

There are no potential conflicts of interest or any financial or personal relationships with other people or organizations that could inappropriately bias conduct and findings of this work.

Received on 18 May 2017.

Accepted on 24 July 2017.

REFERENCES

1. Vassileva S, Hristakieva E. Medical applications of tattooing. *Clin Dermatol* 2007;25:367-74. DOI:10.1016/j.clindermatol.2007.05.014
2. van der Velden EM, Drost BHIM, Ijsselmuiden OE, Baruchin AM, Hulsebosch HJ. Dermatography for alopecia areata of the eyebrows. *Int J Dermatol* 1998;37:617-21. DOI: 10.1046/j.1365-4362.1998.00540.x
3. De Cuyper C. Permanent makeup: indications and complications. *Clin Dermatol* 2008;26:30-4. DOI: 101007/978-3-642-03292-9
4. van der Velden EM, Defranq J, Ijsselmuiden OE, Baruchin AM, Hulsebosch HJ. Dermatography: a review of 15 years of clinical applications in surgery. *Int J Cosm Surg Aesthet Dermatol* 2001;3(2). DOI: 10.1089/153082001753231081
5. Council of Europe. *Resolution ResAP (2008)1 on requirements and criteria for the safety of tattoos and permanent make-up*. 2008.
6. Halvorson EG, Cormican M, West ME, Myers V. Three-dimensional nipple-areola tattooing: a new technique with superior results. *Plast Reconstr Surg* 2014;133:1073-15. DOI:10.1097/PRS.0000000000000144