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Modifications in the Nails after Upper Extremity Transplantation

Yasemin Saray*

Department of Dermatology, Başkent University, Ankara, Turkey

Introduction

The nail's development originates from both the germinal matrix, which makes up most of the nail bed, and the sterile matrix, which makes up less of it. This article outlines the strategy and procedure for a composite nail, nail bed, hyponychium, and perionychium transplant in the event that the entire nail and nail bed need to be rebuilt. A case involving the repair of a nail unit matrix transplant and the removal of a nail bed junctional nevus is presented.

Description

Upper extremity allotransplantation (UEA), a more common form of vascularized composite allotransplantation, has helped more than 80 patients. These allografts contain the nail unit, a specialized epithelial appendage that may be the source of transplant rejection, in addition to the skin. Onychomadesis, or the shedding of the nail plate beginning at the proximal nail bed, as an initial sign of graft rejection, is the case in our case of a UEA patient. During this time, we examined the nail changes that we observed in a group of eight UEA patients who had grafts and had been monitored in our hospital since 1998 (average time to follow-up was 9.75 years). We also looked at relevant studies that documented changes in participants' nails at UEA. Onychomadesis, a finding typically associated with graft rejection in this particular circumstance [1-3], is the focus of a brief discussion of the significance of these modifications in the context of UEA.

This is the most recent in a series of findings from people who have had stem-cell transplants (SCT) that have shown that donor cells end up in nonhematopoietic tissues like the liver, stomach, buccal mucosa, and possibly muscle. While the current study definitively demonstrates that donor DNA is absorbed into nails, we should exercise caution when interpreting this information. It is up for debate whether and how SCT can recreate non-hematopoietic tissues. Both the possibility of fusion of hematopoiesis-derived nuclei in tetraploidal nonhematopoietic cells and the presence of hematopoietic cells contaminating epithelial tissue cannot be ruled out using fluorescence in situ hybridization (FISH) methods, and not all studies have been successful. In these human studies, it is still unknown whether the donor cells in these tissues were hematopoietic stem cells or other progenitors that were transferred during the graft. Transplanted mesenchymal stromal cells, for instance, have the potential to house a variety of tissues. The current study appears to rule out blood cell contamination due to the presence of donor DNA in nonvascular appendages like nails. In addition, despite the possibility of the vascular nail bed being present, the researchers searched for HTLV-1 DNA in the fingernails of patients with HTLV-1 leukemia-lymphoma but were unable to locate it. This demonstrates that fingernail DNA is not produced by blood cells, or at least lymphocytes. Could the tetraploidal nuclei of the recipient keratinocytes be fused with those of the donor DNA-containing cells? Most likely not in the three cases with more than 50% donor DNA. Consequently, we are forced to conclude that completely donor-derived nonhematopoietic cells can, at least occasionally, make a significant contribution to the recipient's nail keratinocytes [4].

It is impossible to identify the factors that encourage nonhematopoietic donor cells to engraft due to the study's small sample size. Given that myeloablative transplants result in the loss of nails, it stands to reason that these methods of transplantation would provide donor cells with more opportunities to produce new nails. In point of fact, all of the patients whose donor DNA had been identified had myeloablative SCT. On the other hand, as processes that damage tissue, acute and chronic GVHD did not seem to require donor nail chimerism; patients with grade 0-I acute and minimal chronic GVHD had some of the largest donor DNA contributions. Would peripheral blood transplants also include nonhematopoietic progenitors if 8 of the 9 patients who tested positive for donor DNA had donor cells from their bone marrow.

What bigger implications might this result have? In point of fact, none of the patients in this study had persistent GVHD that damaged their nails, indicating that donor cells could replace recipient tissues and reduce GVHD in the chimaera tissue. However, until more is known about the cells that contribute and the requirements for creating the integument, tissue regeneration from SCT is still a ways off [5].

Conclusion

The prevalence rate of various nail modifications among kidney transplant recipients varies greatly from region to region due to the inherent variation in nail form and color among various populations. Leuconychia, onychomycosis, and Muehrcke's nail are more prevalent in KTR in our region than in the general population. Absent lunula is a common variation among Egyptians.

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***Address for Correspondence:** Yasemin Saray, Department of Dermatology, Başkent University, Ankara, Turkey; E-mail: Yasemin_sa@hotmail.com*

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