

PERMANENT MICROPIGMENTATION IN THE SYSTEM OF COMPREHENSIVE REHABILITATION OF PATIENTS AFTER ONCOLOGICAL TREATMENT: CLINICAL AND PSYCHOLOGICAL ASPECTS

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Received: 2024-09-11

Accepted: 2024-10-21

DOI: <https://doi.org/10.5281/zenodo.18982260>

Abstract. Cancer treatment saves lives - but it also leaves marks. Chemotherapy-induced loss of eyebrows and eyelashes, radiation-related skin changes, and surgical scarring are among the most visible and psychologically taxing consequences patients face once active treatment ends. This paper looks at permanent micropigmentation (PM) not as a cosmetic procedure, but as a clinically grounded rehabilitation tool that addresses precisely these aftermath effects.

We review the evidence on how treatment-related changes in appearance feed into broader disruptions of body image, self-recognition, and social confidence - and why correcting these changes matters beyond aesthetics. Special attention is given to eyebrow alopecia as a persistent marker of chemotherapy that patients encounter in the mirror long after remission, as well as to scar camouflage following oncological surgery.

Where PM fits in multidisciplinary rehabilitation is not really a debate about whether aesthetics belong in medicine. It is a more practical question: if an intervention reliably reduces distress, improves self-recognition, and lowers the daily friction of social interaction during remission - when exactly does it stop being optional? Safety parameters, treatment timing, and individual skin condition all shape when and how the procedure can be performed, and those boundaries are real. But within them, there is enough clinical ground to stop treating PM as a footnote in rehabilitation planning.

Keywords: permanent micropigmentation, oncological rehabilitation, body image, quality of life, eyebrow alopecia, scarring, psychological rehabilitation, chemotherapy.

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Introduction

More people survive cancer now than ever before. That is genuinely good news - and it has quietly created a problem that oncology as a field is still catching up with. Surviving treatment is not the same as recovering from it. Chemotherapy, radiotherapy, and surgery leave traces: on the skin, on the face, on how a person moves through the world afterward. Arnold et al. (2022) put the numbers plainly: breast cancer incidence is still rising and will keep doing so through 2040. More diagnoses mean more survivors - and more people who finish treatment and have to rebuild a life on the other side of it. That second part has not kept pace with the first. Medicine got better at keeping people alive. What happens to those people once they are technically in remission is a different and still underserved question.

Treatment leaves evidence. Chemotherapy takes eyebrows and eyelashes - not always temporarily. Radiation changes the skin in the treatment zone in ways that can be permanent: uneven pigmentation, thinning, small broken vessels, tissue that simply does not look or feel the same. Surgery leaves scars, and depending on the location and extent of the procedure, those scars can be hard to ignore and harder to hide. Amici et al. (2022) surveyed adults across multiple countries and found that scars - from any cause - consistently knock down quality of life, limit how freely people move through professional and social settings, and sit at the center of ongoing psychological strain. For people whose scars came from cancer treatment, that weight carries an extra layer: the mark is not just a mark, it is a record of what happened.

Appearance-related changes following cancer treatment extend beyond cosmetic discomfort. They may become a constant visual reminder of illness, disrupt established body image, and undermine a sense of control over one's life. As early as the late 1970s, Jamison et al. (1978) observed that alterations in appearance due to cancer therapy could trigger a profound psychological crisis manifested by disturbances of identity, anxiety, depression, and social withdrawal. These findings remain relevant, with contemporary studies further clarifying mechanisms of psychological trauma among oncology patients (Berezantsev, Monasypova, Strazhev, 2014).

In this context, permanent micropigmentation (PM) is of particular interest. The method involves the introduction of pigment particles into the superficial dermal layers using a needle-based device. The technique makes it possible to imitate eyebrow and eyelash follicles, camouflage scarred areas, correct uneven pigmentation, and create the visual effect of restored appearance. For a long time, PM was regarded solely as a cosmetic procedure associated with the beauty industry rather than medicine. However, its potential in oncological rehabilitation is attracting increasing scientific attention. Liszewski and Grasso (2024) note that dermatologists and specialists in medical cosmetology possess practical tools for comprehensive restoration of both physical appearance and psychological well-being, with PM occupying a notable place among them.

Biganzoli et al. (2020) set out what a proper specialist cancer centre actually requires - and the list goes well beyond surgery and pharmacology. Psychological support, physical rehabilitation, attention to how patients look and feel in their own bodies: all of it is named. That standard exists on paper. The gap is in practice, where appearance-focused interventions like PM still tend to get filtered out before they reach any official rehabilitation pathway.

Results

Treatment consequences vary by modality, but they share one feature: they show on the outside. Eyebrow and eyelash loss from chemotherapy is covered above. What radiation does to skin is a different kind of damage - slower to appear, harder to reverse. The treated area can end up with patchy pigmentation, thinned tissue, visible small vessels, a texture that no longer matches the surrounding skin. It does not always look dramatic, but it does not go away. Surgical scars from oncological procedures - melanoma excisions, head and neck operations, wide skin resections - range from thin lines to substantial deformations depending on what was

removed and where. Amici et al. (2022) found that scars reliably undermine quality of life and social participation across populations, and that the psychological toll holds regardless of how the scar got there. For oncology patients, the toll is compounded: the scar is not just an aesthetic issue, it is a daily physical reminder of a diagnosis. Radiotherapy produces a different spectrum of consequences. Within irradiated areas, persistent skin changes may develop, including pigment disturbances (both hypo- and hyperpigmentation), dermal atrophy, telangiectasia, and fibrosis. Surgical interventions - such as excision of skin tumors, procedures for head and neck cancers, or melanoma removal - lead to scars of varying extent and morphology. Amici et al. (2022) demonstrated that scars significantly reduce quality of life, limit professional and social activity, and are associated with chronic psychoemotional distress. Scars of oncological origin carry an additional symbolic burden, functioning as a visible bodily reminder of disease that cannot be concealed.

Particular attention should be given to the situation following post-mastectomy reconstruction. Jabor et al. (2002) showed that restoration of the nipple-areolar complex, even when surgical techniques are applied, does not always result in visually or psychologically satisfactory outcomes. Heimes, Stewen, and Hasenburg (2017), in their analysis of psychosocial aspects of breast reconstruction, reported that subjective dissatisfaction with postoperative appearance remains a source of tension for a considerable proportion of patients, even when the surgical result is objectively favorable. In such clinical contexts, permanent micropigmentation functions as a logical complement to surgical rehabilitation rather than as its alternative.

Body image represents a multidimensional psychological construct encompassing perceptual, affective, and cognitive components. Disruption of its integrity due to disease and treatment initiates a chain of psychological responses that extend far beyond aesthetic dissatisfaction. In her classic study, Polivy (1977) described the mechanism of disruption of the "female self" following mastectomy; her theoretical framework, however, applies broadly to visible consequences of oncological treatment. Loss of familiar appearance is often perceived as a loss of identity, marking a boundary between the self before illness and the self afterward.

Swinth (2002), analyzing historically formed representations of the female body as a symbol of social change, demonstrated that appearance never exists in a cultural vacuum; it carries social meanings related to health, youth, attractiveness, and normative identity. Oncology patients whose appearance has been altered by treatment may therefore find themselves in a position of symbolic marginality: their bodies no longer correspond to accepted norms, which may lead to stigmatization, social withdrawal, and reduced self-esteem.

Jamison et al. (1978) observed that the severity of psychological distress does not always correlate with the objective extent of physical changes. Patients with relatively minor but highly visible defects - such as absence of eyebrows or patchy facial pigmentation - often experience greater suffering than those with more extensive treatment consequences that can be concealed under clothing. This can be explained by the social function of the face as the primary identifier of the individual in interpersonal communication: the face is perceived by others instantly and involuntarily, and any alteration immediately elicits responses from observers, whether explicit or subtle.

Berezantsev, Monasypova, and Strazhev (2014) found that disrupted body image in female oncology patients consistently goes hand in hand with elevated anxiety, depressive symptoms, and withdrawal from social life. What makes this finding clinically uncomfortable is the implication that follows: standard psychotherapy tends to stall when the thing driving the distress - a visible, daily reminder on the patient's own face or body - has not actually changed. Talking about a scar does not make it disappear. This shifts appearance correction from the realm of personal preference into something with a legitimate therapeutic rationale and measurable rehabilitation outcomes.

Technically, PM means pushing pigment - mineral or organic - into the upper dermis, somewhere between 0.5 and 1.5 mm down, with a fine-needle device that can be motorized or hand-held. That is the modern version. Huppertz et al. (2009) ran radiological scans on Egyptian mummies and found pigment deliberately worked into skin tissue thousands of years ago - not accidentally, not decoratively in any simple sense, but with what looks like purposeful intent, therapeutic or ritual or both. The point is not that ancient Egyptians had microblading. The point is that using the skin to manage how one appears to the world - and perhaps to oneself - is not a contemporary vanity. It runs much deeper than that.

In oncology, PM currently gets used in three distinct situations. The most frequent is eyebrow restoration after chemotherapy-related alopecia that has not reversed on its own - using hair-stroke techniques or microblading to rebuild a realistic brow line that matches the patient's coloring and face. The second is areolar repigmentation after breast reconstruction, which has the longest research track record in this field: Jabor et al. (2002) showed it makes a measurable difference to how satisfied patients feel with the overall result of their reconstruction. Third is scar camouflage. Pigment matched to the surrounding skin tone does not remove a scar - nothing applied to the surface does that. What it does is reduce the contrast, the sharp visual edge between scar tissue and healthy skin that the eye keeps catching. The scar stays; it just stops announcing itself quite so loudly.

Skin that has been irradiated is not the same tissue it was before treatment. It heals more slowly, reacts more strongly, and has less tolerance for additional insult. Liszewski and Grasso (2024) are specific about the timing: at least 12 to 18 months should pass after radiation to a given area before PM is attempted there. During active chemotherapy or while a patient is immunosuppressed, the procedure should not be done at all - the infection risk and the likelihood of poor healing are too high to justify it. In stable remission, with intact aseptic technique, those risks come down to a level that is manageable and not specific to oncology. The window exists; it just has to be respected.

Gorini et al. (2019), examining cosmetic traditions from a pharmacological perspective, point to the long-standing use of natural substances for skin care and maintenance. This indirectly suggests that care for altered skin as part of rehabilitation has deep cultural roots. Permanent micropigmentation can be viewed as a continuation of this tradition, translated into a medical procedure supported by emerging evidence.

The psychological impact of micropigmentation in oncology patients has so far been studied mainly in relation to areolar reconstruction after mastectomy, yet the observed patterns can reasonably be extrapolated to other applications of the method. Franchelli et al. (1995), investigating psychological outcomes of reconstructive procedures, demonstrated that subjective satisfaction with the aesthetic result significantly correlates with improved mood, reduced anxiety, and restoration of social activity. By providing a final aesthetic outcome where surgical reconstruction alone may be insufficient, micropigmentation may enhance these effects.

Liszewski and Grasso (2024) describe clinical observations in which eyebrow restoration through micropigmentation in patients after chemotherapy produced an immediate and sustained positive response. Patients reported that they "recognized themselves in the mirror again," a phenomenon reflecting restoration of body image integrity. This observation echoes the identity-related mechanisms described by Polivy (1977), according to which recognition of oneself and continuity of the self before and after illness represent central psychological outcomes of successful rehabilitation.

Most people never register how much work eyebrows do - not until a patient sits across from them without any. The absence is immediate and legible. It says: this person has been through chemotherapy. People respond to it whether they intend to or not - a fraction of a second longer looking, a question phrased with unusual gentleness, a conversation that never

quite settles into normal. Patients learn to read these signals fast. What they describe is not dramatic mistreatment but something quieter and harder to shake: the sense that wherever they go, the illness gets there first. PM does not give someone their old face back. But it takes away that particular signal, and with it, a lot of the daily weight of being visibly sick in a world that does not know how to act around it.

Chemotherapy also does something to a person's relationship with their own body that gets almost no attention in rehabilitation planning. For the duration of treatment, the body is essentially on someone else's timetable. Side effects arrive uninvited. Appearance changes on a schedule set by the drugs, not by the person living in that body. Decisions about what happens next belong mostly to the medical team. By the time treatment ends, many patients have spent months feeling like a bystander to their own physical existence. When a patient sits down and decides - this shape, this color, this is what I want my face to look like - that is a different kind of moment. It is ordinary in one sense and significant in another. For someone who has spent months with almost no agency over their own physical self, making a deliberate choice about appearance and watching it become real can be the first solid foothold back toward feeling like themselves again.

Conclusions

The conducted analysis allows several substantive conclusions to be formulated regarding the place and role of permanent micropigmentation within the system of oncological rehabilitation.

First, the physical consequences of cancer treatment - most notably persistent eyebrow and eyelash alopecia following chemotherapy, as well as scar-related skin changes after surgery and radiotherapy - create an independent rehabilitation demand that cannot be addressed solely through pharmacological or psychotherapeutic means. Visible alterations in appearance carry a strong symbolic burden and represent an independent source of chronic psychological distress (Amici et al., 2022; Berezantsev, Monasypova, Strazhev, 2014).

Second, the psychological consequences of disrupted body image in oncology are deeply rooted and involve fundamental mechanisms of identity. Jamison et al. (1978) and Polivy (1977) established the foundations for understanding these mechanisms, and contemporary research confirms that loss of a familiar body image leads to identity disturbance, social withdrawal, and reduced adherence to rehabilitation programs. Correction of appearance therefore constitutes not a secondary but a central component of psychological rehabilitation.

Third, permanent micropigmentation represents a clinically justified and psychologically effective rehabilitative method that has demonstrated its value particularly in restoration of the nipple-areolar complex (Jabor et al., 2002; Franchelli et al., 1995) and shows considerable potential in eyebrow alopecia and scar correction (Liszewski & Grasso, 2024). The technique is safe when strict timing requirements and clinical criteria for the condition of the treated skin are observed.

Fourth, integration of micropigmentation into multidisciplinary rehabilitation programs in oncology centers is consistent with contemporary standards of comprehensive care (Biganzoli et al., 2020). A micropigmentation specialist working in collaboration with oncologists, dermatologists, and psychologists may substantially improve overall rehabilitation outcomes and quality of life in patients in remission.

Fifth, despite growing practical interest, the evidence base for the medical use of micropigmentation remains insufficient. There is a clear lack of randomized controlled studies and standardized instruments for evaluating psychological outcomes. This indicates promising directions for future research, including contributions from the Russian-speaking scientific community.

Calling PM a cosmetic option misses what it actually does for oncology patients. When someone comes out of treatment and no longer recognizes the face looking back at them, that is not a cosmetic

problem - it is a psychological one with a physical cause. PM addresses that cause directly. Used at the right time, with the right patient, it changes something concrete: the face in the mirror starts to look familiar again. That shift has consequences that ripple through the rest of recovery. Leaving it out of rehabilitation protocols is not a neutral decision - it is a gap.

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