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DIGITAL MODELING OF TATTOO COMPOSITIONS AS A FIELD OF VISUAL DESIGN

The relevance of this topic is determined by the growing significance of tattoos as an object of contemporary visual art that integrates artistic language, pictorial techniques, and diverse art forms, creating broad opportunities for cultural communication, self-expression, and the formation of individual identity. A tattoo functions not only as a decorative element but also as a synthesis of painting, graphics, sculpture, design, and digital technologies, forming a specific type of bodily sculpture that conveys symbolic, cultural, and social codes through an artistically designed body.

The aim of this study is to conduct a comprehensive analysis of digital modeling in tattoo composition as a direction of visual design, as well as to examine the evolution of artistic approaches in tattooing, their visual means, and their role in contemporary cultural communication. Particular attention is given to tattoos as a means of artistic synthesis that integrates traditional and modern creative practices, enabling the design of innovative compositions adapted to individual aesthetic, symbolic, and cultural needs.

The research employs methods of digital modeling, artistic-aesthetic and semiotic analysis, historical-comparative approaches, content analysis of artistic artifacts, and interdisciplinary methods of studying visual culture and contemporary design. The findings indicate that digital technologies enhance the precision, detail, and artistic expressiveness of tattoo compositions, facilitate the creation of multilayered and symbolically rich projects, and allow for the effective combination of various styles, techniques, and materials.

The study demonstrates that, through digital modeling, tattooing attains the status of a powerful instrument of modern visual design, capable of influencing aesthetic, cultural, and social practices, shaping significant cultural meanings, and reflecting both individual and collective identities.

The conclusions emphasize that the integration of digital technologies into the tattoo creation process not only optimizes the artistic workflow but also expands the possibilities for experimentation, creativity, and the implementation of innovative approaches in contemporary art and design.

Key words: *artistic language, synthesis of arts, cultural communication, body sculpture, art evolution, innovative design, symbolism, contemporary art.*

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ЦИФРОВЕ МОДЕЛЮВАННЯ КОМПОЗИЦІЙ ТАТУ ЯК НАПРЯМ ВІЗУАЛЬНОГО ДИЗАЙНУ

Актуальність теми зумовлена зростаючим значенням татуювань як об'єкта сучасного візуального мистецтва, що поєднує художню мову, образотворчі засоби та різноманітні форми мистецтв, формуючи широкі можливості для культурної комунікації, самовираження та становлення індивідуальної ідентичності. Татуювання слугує не лише декоративним елементом, а й синтезом живопису, графіки, скульптури, дизайну та цифрових технологій, утворюючи специфічний тип тілесної скульптури, який транслює символіку, культурні та соціальні коди через художньо оформлене тіло. Метою роботи є комплексний аналіз цифрового моделювання композицій татуювань як напряму візуального дизайну, а також дослідження еволюції художніх підходів у татуюванні, їхніх образотворчих засобів та ролі в сучасній культурній комунікації. Особливу увагу приділено вивченню татуювань як засобу синтезу мистецтв, що інтегрує традиційні та сучасні художні практики, уможливлюючи проєктування інноваційних композицій, адаптованих до індивідуальних естетичних, символічних і культурних вимог. У дослідженні застосовано методи цифрового моделювання, художньо-естетичного та семіотичного аналізу, історико-порівняльного підходу, контент-аналізу мистецьких артефактів, а також інтердисциплінарні методи дослідження візуальної культури та сучасного дизайну. Унаслідок проведеного дослідження встановлено, що цифрові технології уможливлюють підвищення точності, деталізації та художньої виразності композицій татуювань, створення багатошарових і символічно насичених проєктів, ефективне поєднання різних стилів, технік і матеріалів. Дослідження демонструє, що татуювання завдяки цифровому моделюванню набуває статусу потужного інструменту сучасного візуального дизайну, здатного

впливати на естетичні, культурні та соціальні практики, формувати значущі культурні сенси та відображати індивідуальні й колективні ідентичності.

У висновках підкреслено, що інтеграція цифрових технологій у процес створення татуювань не лише оптимізує творчий процес, а й розширює перспективи для художніх експериментів, розвитку креативності та впровадження інноваційних підходів у сучасному мистецтві та дизайні.

Ключові слова: *художня мова, синтез мистецтв, культурна комунікація, тілесна скульптура, еволюція мистецтва, інноваційний дизайн, символіка, сучасне мистецтво.*

Introduction. Tattooing today has acquired the status of an object of contemporary visual art that unites various forms of artistic self-expression and synthesizes painting, graphics, sculpture, design, and digital technologies. At the same time, tattoos have become an important means of cultural communication, a symbolic reflection of individual and collective identity, and a tool for conveying sociocultural codes.

Despite the growing popularity and significance of tattoos in the contemporary art space, there remains a lack of systematic analysis of the mechanisms through which tattooing, as a visual practice, influences the formation of cultural identity, integrates diverse artistic approaches, and fulfills the functions of artistic communication. Particularly relevant is the study of digital modeling in tattoo compositions, which opens new possibilities for designing complex, multilayered, and symbolically rich compositions, enhances precision and artistic expressiveness, and combines traditional and innovative methods of creating artistic objects on the human body.

The absence of a comprehensive analysis of digital technologies in tattoo design hinders the development of effective practices in the field of contemporary visual art and design, limiting the understanding of tattoos as a full-fledged artistic phenomenon and a medium of cultural communication. The relevance of this research lies in the need for a systematic study of digital modeling in tattoo composition as a tool for the development of innovative visual design, artistic synthesis, and the formation of new cultural meanings in contemporary art.

Literature Review. Modern academic discourse interprets tattooing as a complex, multidimensional phenomenon that unites artistic, cultural, psychological, and technological aspects. Scholars emphasize that in the 21st century, tattooing has transcended its earlier subcultural boundaries and has evolved into a recognized form of self-expression, artistic experimentation, and digital design.

Ukrainian researchers have contributed significantly to the understanding of tattooing within historical, cultural, and semiotic frameworks. For instance, I. Burchak, M. Vorobchuk, and A. Puz (2023) explore tattooing as an element of a society's artistic heritage, tracing its transformation from ancient ritualistic practices to modern visual culture. Similarly, A. Sechko (2024) examines tattooing as a cultural phenomenon within creative industries, emphasizing its social function and symbolic meaning.

The aspect of corporeality and self-presentation in tattoo culture is addressed by N. Artiukhina (2023), who interprets body modification as a means of constructing individual identity in contemporary society. M. Zhyhailo (2022) extends this discussion by focusing on the role of tattoos in social media, where they serve as visual markers of self-expression. The study by H. Ulunova, N. Teslyk, and A. Sokruta (2024) further highlights the psychological features of tattooing, framing it as a balance between tradition and fashion that shapes aesthetic norms and perceptions of the body.

A distinct area of recent research involves the psychological impact of tattoos. V. Puhach (2024) investigates the therapeutic and rehabilitative potential of tattoos for clients with scars, interpreting them as a form of art therapy that helps restore a positive body image.

Finally, the theoretical foundations of tattooing within the field of graphic design are articulated by O. Krotovych and S. Podlevskyi (2025). Their study explores the etymology and conceptual framework of tattoo design, positioning it as an interdisciplinary synthesis of art, technology, and communication that reflects contemporary aesthetic and cultural transformations.

At present, tattooing is primarily examined within the context of aesthetics, anthropology, and cultural heritage. L. Sizer (2020) identifies tattooing as a form of visual art governed by its own ethical and aesthetic principles. P. Ghosh (2020) interprets tattooing as part of humanity's cultural heritage that preserves traditional codes and folkloric motifs of different peoples. In turn, V. Zhytnyi, N. Iftekhar, and E. Sombilon (2020) explore both the historical and contemporary significance of facial tattoos, emphasizing their role in shaping ethnic identity.

At the same time, current scientific trends reveal the rapid integration of digital and bioengineering technologies into tattoo design. The study by Xu, Matkowski, and Kong (2020) presents a system for digitally transforming portrait photographs into tattoo images by combining artistic and algorithmic methods. In the work of Piovarci, Chapiro, and Bickel

(2023), the *Skin-screen* framework for computer modeling of colored tattoos is introduced, offering new opportunities for precision tattoo design.

Technological advancements in 3D bioprinting and skin modeling also play a crucial role in contemporary research. Minjun Ahn et al. (2023) developed 3D models of human skin for the laboratory simulation of tattooing and healing processes, while Zhang et al. (2023) analyze the potential of 3D bioprinting for wound treatment and for studying the interaction between tattoo pigments and biological tissues.

An innovative aspect of modern tattoo design is demonstrated by N. Kuryliak (2023), who investigates the use of artificial intelligence in tattoo creation through a dual-machine configuration aimed at achieving realistic black and gray tones.

Thus, the analysis of the literature indicates that contemporary tattooing represents a synthesis of cultural tradition, artistic self-expression, and technological innovation. By integrating humanistic, psychological, and technical approaches, it has evolved into a unique art form of the 21st century that unites the human body, culture, and digital materiality.

Purpose of the Study. The purpose of this article is to analyze the specific features of digital modeling in tattoo compositions as a contemporary direction of visual design, to define its artistic, aesthetic, cultural, and communicative functions, and to identify the potential of tattooing as a form of artistic synthesis and self-expression within the context of digital culture development. The study aims to systematically examine the evolution of artistic approaches in tattoo art, the integration of digital technologies into the creative process, and the formation of new principles of visual language and compositional harmony in design.

Research Objectives:

– To outline the essence of tattooing as an object of contemporary visual art and its place within the system of artistic practices.

– To analyze the role of digital modeling in creating tattoo compositions, identifying its influence on artistic expressiveness, symbolism, and aesthetic parameters.

– To determine the distinctive features of tattooing as a synthetic art form and a medium of cultural communication that combines traditional and innovative forms of visual design.

Research findings. The art of tattooing is rapidly evolving, combining centuries of accumulated experience with cutting-edge technological innovations. One of the most notable trends in recent years has been the use of artificial intelligence (AI) technologies in the initial stage of creating sketches. This has significantly transformed the design process: whereas previously an artist would spend hours on manual sketching, today, thanks to platforms such as MidJourney or DALL·E, preliminary compositional variations can be obtained within seconds (Kuryliak, 2023: 115). The use of AI not only accelerates the creative process but also enables the creation of visual concepts that transcend human imagination, forming a new direction: digital tattoo design. In today's digitalized cultural environment, tattooing is not merely a decorative mark or personal choice but a large-scale phenomenon in visual art and design. As Ukrainian researchers emphasize, tattooing is increasingly viewed as "a contemporary form of graphic art that combines aesthetics, technology, and bodily identity" (Krotevych, Podlevskyi, 2025: 303). The visual language of tattoos incorporates techniques from painting, graphics, design, and sculpture, all realized within bodily space. In this way, tattooing becomes a kind of biosculpture embedded in visual and sociocultural communication. As A. Sechko notes, tattooing in the contemporary context serves as a tool for self-expression, a carrier of social meanings, and a part of creative industries, rather than a marginal phenomenon (Sechko, 2024: 211). Similarly, N. Artiukhina emphasizes that bodily modifications today represent a form of personal self-presentation rather than social defiance (Artiukhina, 2023: 214). These ideas are consistent with the view of I. Burchak, M. Vorobchuk, and A. Puz, who consider tattooing an element of society's artistic heritage that transforms alongside cultural values (Burchak et al., 2023: 47).

In the context of technological changes, particular attention should be given to digital modeling of tattoo compositions, a process that combines digital sketches, 3D modeling, and AR/VR tools. Such technologies allow for adapting designs to the client's anatomical features, creating virtual tattoo try-ons on the body, and testing composition and colors before applying ink. As V. Puhach notes, the use of 3D visualization in tattoo practices has not only aesthetic but also psychological significance, helping clients with scars or burns to experience acceptance of their own bodies (Puhach, 2024: 148).

Contemporary research in the field of biodesign demonstrates that similar technologies are already being successfully applied in 3D modeling of human skin. Specifically, M. Ahn et al. developed a 3D model of human skin for experiments with visual modifications, which may serve as a foundation for new digital tattooing practices (Ahn et al., 2023: 80). Similarly, M. Zhang and colleagues investigate the possibility of using 3D bioprinting in modeling damaged skin for tattoo design planning and reconstructive procedures (Zhang et al., 2023: 5).

Furthermore, the integration of computer graphics and augmented reality enables the creation of interactive tattoos. For instance, research by M. Piovarci, A. Chapiro, and V. Bickel presented the Skin-Screen system, which allows for visualizing the color and placement of a tattoo on the body in real time through digital modeling (Piovarci et al., 2023: 7). H. Xu, W. Matkowski, and A. Kong also developed a photo-to-tattoo transform algorithm that automatically converts portrait photographs into tattoo sketches, taking into account skin texture (Xu et al., 2020: 24369).

Thus, digital modeling of tattoos functions not merely as a technical tool but as a new artistic paradigm that unites elements of art, biotechnology, and psychology. It transforms the process of creating tattoos into a comprehensive system where artistic vision, technological precision, and the client's emotional perception merge into a single act of creativity.

Having examined the artistic language of tattoos, key aspects of its evolution can be identified, as presented in Figure 1.

As shown in Figure 1, the artistic language of tattooing is a multidimensional phenomenon that combines communicative, aesthetic, visual, and technological aspects. Each of these components forms the unique structure of tattoo design, from its semantic content to the method of interaction with the body as a medium.

The communicative function defines tattooing as a means of self-expression and social identification; the synthesis of arts ensures the combination of various artistic forms, including graphics, painting, sculpture, and digital design; the visual medium reveals the technical potential of contemporary digital modeling for precise reproduction of composition, color, texture, and anatomical features.

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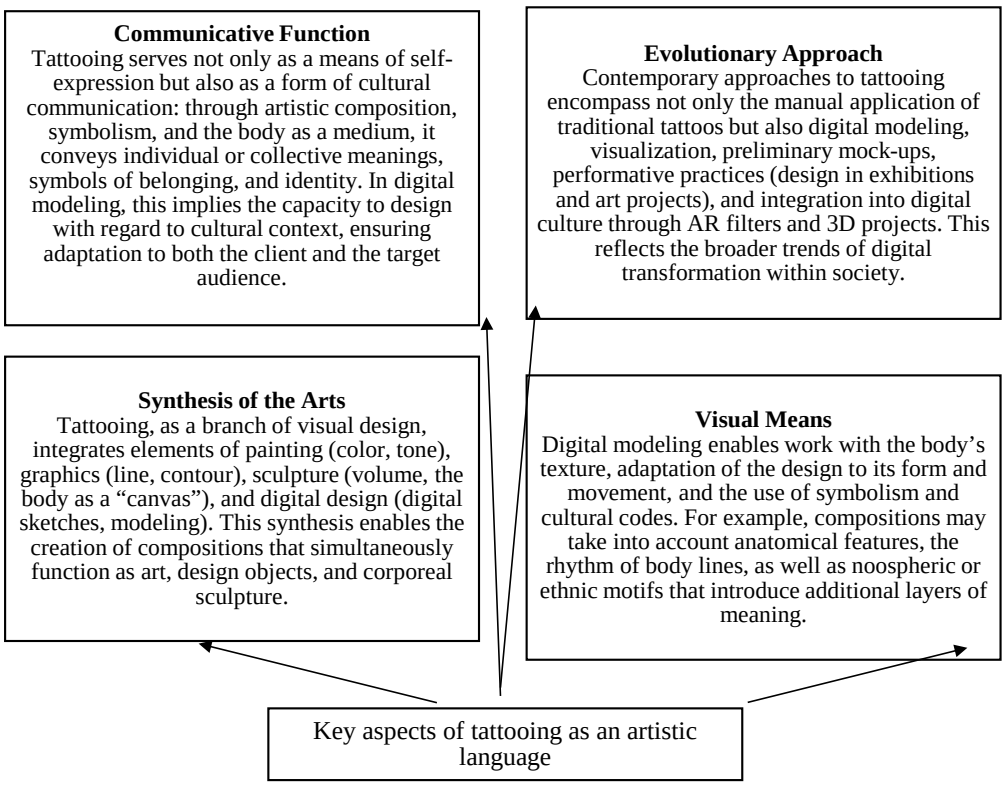

Fig. 1. Characteristics of Tattooing as an Artistic Language

Source: Author's elaboration

Table 1

Stages of Digital Modeling of Tattoo Compositions

Stage	Main Actions	Artistic / Communicative Aspects	Technological Tools
1. Concept	Defining the idea, symbolism, style, and placement	Artistic language, synthesis of the arts	Sketch, digital drawing
2. Digital Mock-up	Creating a 2D/3D model of the body or area and overlaying the composition	Adaptation to body shape, consideration of movement	3D modeling, AR scanning
3. Finalization	Developing the final design, verifying scale, composition, and symbolism	Artistic expressiveness, contextual coherence	Graphic editors, digital presentations
4. Application / Integration	Implementation on the body, possible documentation or exhibition	Tattoo as corporeal sculpture, communication medium	Tattoo machine, photo/ video documentation

Source: authors' own elaboration.

Therefore, digital modeling of tattoo compositions not only expands the artistic toolkit of practitioners but also shapes a new paradigm of bodily art in which technological innovation, psychological sensitivity, and cultural identity converge.

At the same time, this process has not only an aesthetic but also a practical dimension. Digital modeling offers a number of advantages: increased precision and detail in design, reduced time during the design stage, the ability to preview the tattoo on the client's body using 3D models or augmented reality technologies, as well as adaptation to various styles, from minimalism to photorealism, graphics, or abstraction (Piovarci et al., 2023; Kuryliak, 2023).

However, alongside technical achievements, new questions arise: to what extent do digital technologies affect the perception of tattooing as art, whether its bodily and cultural context is preserved, and whether it is being transformed into a serialized design product devoid of uniqueness (Sechko, 2024; Burchak, Vorobchuk, Puz, 2023).

To illustrate the stages of such a process, it is appropriate to present a generalized table that systematizes the main stages of digital modeling of tattoo compositions, along with their key artistic, technical, and communicative characteristics (Table 1).

In summary, the sequence of stages in digital modeling of tattoo compositions (Table 1) reflects a systematic approach to combining artistic-aesthetic, communicative, and technological components in the process of creating tattoos. From the inception of the concept to the integration of the finished image into bodily space, a gradual transformation of the idea into digital form takes place, ensuring precision, individualization, and harmonious integration of the composition with human anatomical features. This approach establishes the foundation for a new direction in visual design, where creativity is combined with innovative technologies and personal communication through bodily imagery. Thus, digital modeling of tattoo compositions emerges not merely as a technological process but as a new format of artistic thinking that unites aesthetics, technical precision, and cultural reflection. It expands the boundaries of contemporary design, opening possibilities for experimentation with form, context, and symbolism, as well as for deeper communication between the creator and the bearer of art, the human being.

Conclusions. This article examined the phenomenon of tattooing as an object of contemporary visual art and determined its place within the system of artistic practices. The analysis conducted demonstrated that the artistic language of tattoos is multidimensional, combining visual media, aesthetic principles, and communicative functions, which makes it a unique means of cultural expression.

Tattooing is considered a synthesis of arts that unites painting, graphics, sculpture, and digital technologies, enabling the creation of compositions of high artistic complexity. The evolution of artistic approaches in tattooing demonstrates a gradual transition from traditional techniques to contemporary digital modeling methods that ensure precision, individualization, and new possibilities for experimentation with form, color, and composition.

Visual media in tattoo art perform not only a decorative but also a symbolic function, transforming the body into a new type of bodily sculpture and a unique space for artistic self-expression. Furthermore, tattooing serves as an effective means of communication in contemporary culture, conveying individual, social, and cultural meanings.

Digital modeling of tattoo compositions opens new horizons for the development of visual design, providing high flexibility in composition planning, experimentation with artistic techniques, and integration of various artistic elements. Thus, tattooing as a direction in visual design confirms its relevance and potential as a contemporary artistic phenomenon that combines art traditions with innovative technologies.

BIBLIOGRAPHY

1. Артюхіна Н. В. Тілесні модифікації як засіб самопрезентації особистості. *Сучасні аспекти модернізації науки: стан, проблеми, тенденції розвитку: матеріали 33-ої Міжнар. наук.-практ. конф*. (м. Паола, 07 червня 2023 р.). Паола. 2023. С. 212–217. URL: https://dspace.onu.edu.ua/server/api/core/bitstreams/992c0f27-1770-424b-bcaa-4a6964d9decc/content (дата звернення: 09.11.2025)

2. Бурчак І., Воробчук М., Пуз А. Татуювання як мистецька спадщина суспільства: історія та сучасність. *Теорія та практика дизайну*. 2023. № 3. С. 45–58. DOI: https://doi.org/10.32782/2415-8151.2023.29-30.16

3. Жигайло М. Специфіка тілесних ідентифікаційних практик у соціальних мережах: вітчизняний вимір. *Вісник Національної академії керівних кадрів культури і мистецтв*. 2022. № 2. С. 48-52. DOI: https://doi.org/10.32461/2226-3209.2.2022.262205

4. Куриляк Н. Використання штучного інтелекту у дизайні татуювань: конфігурація з двома машинами для неперевершеного чорного та сірого реалізму. *Physical culture and sport: scientific perspective*. 2023. №4. С. 113–118. DOI: https://doi.org/10.31891/pcs.2023.4.15

5. Пугач В. Науковий аналіз впливу татуювань на психологічний стан клієнтів із шрамами. *Молодий вчений*. 2024. № 7 (131). С. 145-150. DOI: https://doi.org/10.32839/2304-5809/2024-7-131-44

6. Сечко А. Татуювання: культурологічне значення. *Докса: зб. наук. пр. з філософії та філології*. 2024. № 1(41). С. 210–215. DOI: https://doi.org/10.18524/2410-2601.2024.1(41).316173

7. Улунова Г., Теслик Н., Сокрута А. Між традицією та модою: психологічні особливості татуювання. *Соціально-гуманітарні аспекти розвитку сучасного суспільства: матеріали десятої Всеукраїнської наукової конференції студентів, аспірантів, викладачів та співробітників* (Суми, 27–28 квітня 2023 р.). Суми. 2023. 333-337. URL: https://essuir.sumdu.edu.ua/server/api/core/bitstreams/fbbf8962-15f1-4892-b043-cc1cc79a1634/content#page=333 (дата звернення: 09.11.2025)

8. Ghosh P. Tattoo: A Cultural Heritage. *Antrocom Online Journal of Anthropology*. 2020. Vol. 16, no. 1. P. 295-304. URL: https://www.antrocom.net/wp/wp-content/uploads/2024/05/ghosh-tattoo-cultural-heritage.pdf (дата звернення: 09.11.2025)

9. Krotevych O., Podlevskyi S. Етимологія та понятійно-термінологічні аспекти татуювання як виду графічного дизайну. *Theory and practice of design*. 2025. №35. С. 301-309. DOI: https://doi.org/10.32782/2415-8151.2025.35.31

10. Mengde Zhang, Chao Zhang, Zhao Li, Xiaobing Fu, Sha Huang. Advances in 3D skin bioprinting for wound healing and disease modeling. *Oxford Academic. Regenerative Biomaterials.* 2023. Vol. 10. DOI: https://doi.org/10.1093/rb/rbac105

11. Minjun Ahn, Won-Woo Cho, Wonbin Park, Jae-Seong Lee, Min-Ju Choi, Qiqi Gao, Ge Gao, Dong-Woo Cho & Byoung Soo Kim. 3D biofabrication of diseased human skin models in vitro. *Biomaterials Research*. 2023. Vol. 27. DOI: 10.1186/s40824-023-00415-5

12. Piovarci M., Chapiro A., Bickel B. Skin-screen: A computational fabrication framework for color tattoos. *ACM Transactions on Graphics (TOG)*. 2023. № 42(4). P. 1-13. URL: https://dl.acm.org/doi/abs/10.1145/3592432 (дата звернення: 09.11.2025)

13. Sizer L. The Art of Tattoos. *The British Journal of Aesthetics.* 2020. Vol. 60. № 4. P. 419–433. DOI: https://doi.org/10.1093/aesthj/ayaa012

14. Xu X., Matkowski W. M., Kong A. W. K. A portrait photo-to-tattoo transform based on digital tattooing. *Multimedia Tools and Applications*. 2020. № 79(33). Pp. 24367-24392. URL: https://link.springer.com/article/10.1007/s11042-020-09101-3 (дата звернення: 09.11.2025)

15. Zhitny V., Iftekhar N., Sombilon E. History, Folklore, and Current Significance of Facial Tattooing. *Tattoo and Body Art – Commentary*. 2021. Vol. 237. no. 1. P. 79-81. DOI: https://doi.org/10.1159/000505647

REFERENCES

1. Artiukhina N.V. (2023) Tilesni modifikatsii yak zasib samoprezentatsii osobystosti [Bodily modifications as a means of self-presentation]. Suchasni aspekty modernizatsii nauky: stan, problemy, tendentsii rozvytku: materialy 33-oi Mizhnar. nauk.-prakt. konf. (Paola, 07 chervnia 2023 r.), 212–217. Retrieved from: https://dspace.onu.edu.ua/server/api/core/bitstreams/992c0f27-1770-424b-bcaa-4a6964d9decc/content [in Ukrainian]

2. Burchak I., Vorobchuk M., Puz A. (2023) Tatuuvannia yak mystetska spadshchyna suspilstva: istoriia ta suchasnist′ [Tattooing as an artistic heritage of society: history and modernity]. Teoriia ta praktyka dyzainu, 3, 45–58. DOI: https://doi.org/10.32782/2415-8151.2023.29-30.16 [in Ukrainian]

3. Zhyhailo M. (2022) Spetsyfika tilesnykh identyfikatsiinykh praktyk u sotsialnykh merezhakh: vitchyznianyi vymir [Specifics of bodily identification practices in social networks: the domestic dimension]. *Visnyk Natsionalnoi akademii kerivnykh kadriv kultury i mystetstv – Bulletin of the National Academy of Managerial Staff of Culture and Arts*, 2, 48–52. DOI: https://doi.org/10.32461/2226-3209.2.2022.262205 [in Ukrainian].

4. Kuryliak N. (2023) Vykorystannia shtuchnoho intelektu u dyzaini tatuuvan: konfihuratsiia z dvoma mashynamy dlia nepereversheno chornoho ta siroho realizmu [Use of artificial intelligence in tattoo design: dual-machine configuration for unparalleled black and gray realism]. *Physical Culture and Sport: Scientific Perspective*, 4, 113–118. DOI: https://doi.org/10.31891/pcs.2023.4.15 [in Ukrainian].

5. Puhach V. (2024) Naukovyi analiz vplyvu tatuuvan na psykholohichnyi stan kliientiv iz shramamy [Scientific analysis of the influence of tattoos on the psychological state of clients with scars]. *Molodyi vchenyi – Young Scientist*, 7(131), 145–150. DOI: https://doi.org/10.32839/2304-5809/2024-7-131-44 [in Ukrainian].

6. Sechko A. (2024) Tatuuvannia: kulturolohichne znachennia [Tattooing: cultural significance]. *Doksa: zbirnyk naukovykh prats z filosofii ta filolohii – Doksa: Collection of Scientific Papers in Philosophy and Philology*, 1(41), 210–215. DOI: https://doi.org/10.18524/2410-2601.2024.1(41).316173 [in Ukrainian].

7. Ulunova H., Teslyk N., Sokruta A. (2023) Mizh tradytsiieiu ta modoiu: psykholohichni osoblyvosti tatuuvannia [Between tradition and fashion: psychological features of tattooing]. *Sotsialno-humanitarni aspekty rozvytku suchasnoho suspilstva – Socio-humanitarian aspects of the development of modern society: materials of the 10th All-Ukrainian Scientific Conference of Students, Postgraduates, Teachers and Staff* (Sumy, 27–28 April 2023), 333–337. Retrieved from: https://essuir.sumdu.edu.ua/server/api/core/bitstreams/fbbf8962-15f1-4892-b043-cc1cc79a1634/content#page=333 [in Ukrainian].

8. Ghosh P. (2020) Tattoo: A cultural heritage. *Antrocom Online Journal of Anthropology*, 16(1), 295–304. Retrieved from: https://www.antrocom.net/wp/wp-content/uploads/2024/05/ghosh-tattoo-cultural-heritage.pdf.

9. Krotevych O., Podlevskyi S. (2025) Etymolohiia ta poniatiino-terminolohichni aspekty tatuuvannia yak vydu hrafichnoho dyzainu [Etymology and conceptual-terminological aspects of tattooing as a type of graphic design]. *Theory and Practice of Design*, 35, 301–309. DOI: https://doi.org/10.32782/2415-8151.2025.35.31 [in Ukrainian].

10. Zhang M., Zhang C., Li Z., Fu X., Huang S. (2023) Advances in 3D skin bioprinting for wound healing and disease modeling. *Regenerative Biomaterials*, 10. DOI: https://doi.org/10.1093/rb/rbac105.

11. Ahn M., Cho W.-W., Park W., Lee J.-S., Choi M.-J., Gao Q., Gao G., Cho D.-W., Kim B.S. (2023) 3D biofabrication of diseased human skin models in vitro. *Biomaterials Research*, 27. DOI: https://doi.org/10.1186/s40824-023-00415-5.

12. Piovarci M., Chapiro A., Bickel B. (2023) Skin-screen: A computational fabrication framework for color tattoos. *ACM Transactions on Graphics (TOG)*, 42(4), 1–13. Retrieved from: https://dl.acm.org/doi/abs/10.1145/3592432.

13. Sizer L. (2020) The art of tattoos. *The British Journal of Aesthetics*, 60(4), 419–433. DOI: https://doi.org/10.1093/aesthj/ayaa012.

14. Xu X., Matkowski W.M., Kong A.W.K. (2020) A portrait photo-to-tattoo transform based on digital tattooing. *Multimedia Tools and Applications*, 79(33), 24367–24392. Retrieved from: https://link.springer.com/article/10.1007/s11042-020-09101-3.

15. Zhitny V., Iftekhar N., Sombilon E. (2021) History, folklore, and current significance of facial tattooing. *Tattoo and Body Art – Commentary*, 237(1), 79–81. DOI: https://doi.org/10.1159/000505647.

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