

OPTIMIZATION AND APPLICATION OF RAGLAN SLEEVE ATTACHMENT METHODS IN WOMEN'S WEAR FROM THE PERSPECTIVE OF CULTURAL SYMBOLS

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Abstract

This study takes the perspective of cultural symbols as the point of departure to systematically explore the optimization of raglan sleeve attachment methods in women's wear. By reviewing the evolution of raglan sleeves in women's fashion since the 20th century, the research identifies the enduring tension between functionality and aesthetics. Through prototype experiments and pattern analysis, the study reveals the differences in mobility, shoulder fit, and visual aesthetics across various sleeve attachment methods. Furthermore, by incorporating culturally symbolized design approaches, the research proposes an optimized pathway that balances comfort, silhouette, and cultural expression. The results demonstrate that raglan sleeves are not only structural components but also important symbols that embody femininity and identity. Ultimately, the study emphasizes the need to integrate scientific pattern control with cultural contexts to advance the innovative application of raglan sleeves in contemporary fashion.

Keywords: Raglan sleeve; Sleeve attachment method; Cultural symbols; Pattern optimization

1. Introduction

Throughout the development of human society, clothing has always served as a vital link between material life and spiritual culture. Beyond its basic functions of protecting and adorning the body, clothing acts as a medium for expressing individuality, conveying emotions, and signaling identity. With the prosperity of the fashion industry, clothing has gradually evolved into a social symbol. Its structural design and detailed treatments are no longer mere technical choices, but are closely intertwined with aesthetic trends, cultural values, and social identity. Against this backdrop, the raglan sleeve in women's wear, due to its distinctive silhouette and comfort, has acquired new significance, becoming an important element that embodies cultural symbols and fashion aesthetics.

Originally derived from the practical needs of sportswear and military uniforms, the raglan sleeve eliminates the conventional shoulder seam, allowing greater flexibility of arm movement and smoother shoulder lines, thereby combining functionality with comfort. As fashion culture has evolved, raglan sleeves have been widely adopted in women's wear design and endowed with richer aesthetic and cultural connotations. Its softened shoulder line and flowing shape visually reduce angularity, creating a gentle and inclusive feminine

temperament. Thus, the raglan sleeve has become not only a functional component of garment structure but also a key symbol reflecting aesthetic trends and cultural values.

However, in actual design and production, raglan sleeve attachment methods still face certain technical limitations. For example, in traditional craftsmanship, improper control of the proportion between the sleeve cap and the shoulder often leads to unnatural shoulder lines, excessive armhole wrinkles, or restricted mobility. These problems not only affect wearing comfort but also weaken the visual appeal of raglan sleeves, even undermining the cultural symbolism they are meant to convey. As expectations for garment quality and aesthetics increase, such shortcomings have become more pronounced.

In recent years, with the advancement of digital pattern-making technologies and three-dimensional virtual simulation, designers have gained more possibilities for optimizing raglan sleeve structures. Through precise data analysis and ergonomic research, it is possible to enhance comfort and aesthetics while preserving the cultural symbolism of raglan sleeves. Such optimization not only meets modern women's needs for fit and flexibility on a technical level but also reinforces the feminine softness and identity expression that raglan sleeves communicate on a cultural level.

Based on this context, the present study adopts a cultural semiotics perspective to explore the optimization

and application of raglan sleeve attachment methods in women's wear. The research emphasizes not only technical improvements but also the symbolic significance of raglan sleeves in contemporary women's fashion culture. By combining theoretical analysis with practical validation, this study aims to propose a design approach that integrates both functional value and cultural meaning, thereby offering new pathways for structural innovation and fashion expression in women's wear.

2. Research Questions

- (1) How is the cultural symbolic significance of raglan sleeves manifested in women's wear?
- (2) What functional and aesthetic shortcomings exist in the current methods of raglan sleeve attachment?
- (3) How can raglan sleeve attachment methods be optimized to balance ergonomics with fashion expression from the perspective of cultural symbolism?

3. Literature Review

3.1 The Cultural Symbolic Significance of Women's Wear

Clothing is not merely a material tool for covering the body but also an important symbol carrying cultural connotations and social identity. As one of the most expressive categories within the fashion system, women's wear often embeds symbolic meanings within its structures, patterns, and colors. Scholars generally agree that the application of cultural symbols in women's wear not only enhances the uniqueness of design but also plays a crucial role in identity construction, cultural inheritance, and emotional expression.

First, cultural symbols strengthen the identity function of clothing. Luo (2025) argues that garment patterns, as a symbolic language, can shape personal images and convey social recognition. In women's wear design, floral, geometric, and ethnic motifs are not merely decorative elements but also embody social and cultural meanings. Dong (2025) further emphasizes that symbolic elements enhance cultural identity and emotional resonance, enabling garments to combine both aesthetic and social functions within consumer contexts.

Second, cultural symbols serve as an important bridge between tradition and modernity. Zhang (2025), in her study on the application of batik motifs in Neo-Chinese women's wear, found that intangible cultural heritage symbols acquire renewed vitality in modern fashion. The integration of traditional crafts with contemporary design allows women's wear to act as a carrier and extension of national culture. Similarly, Ge and Chu (2025), through research on the translation of Chaozhou architectural motifs, illustrate that combining

traditional decorative symbols with modern women's wear enables innovative use of cultural resources and expands design diversity.

At the same time, cultural symbols endow women's wear with emotional and aesthetic value. Wang (2024) notes that symbols and imagery in clothing not only meet aesthetic demands but also stimulate emotional resonance. For example, auspicious motifs are not only visual elements but also embody people's aspirations for a better life (Zhao, 2023). Thus, symbols in women's wear function as both a formal language and a medium of emotion and value.

In addition, cultural symbols provide women's wear with differentiated competitiveness. Dong and Ma (2025), in their study of modern Gothic style, argue that the uniqueness of symbols can serve as a core brand competitiveness. For women's wear, culturally symbolized design enhances artistic value while also creating market advantages. Li and Feng (2024), in their study on the Minnan "Shou" character pattern in steamed rice cakes, found that symbols not only meet contemporary women's aesthetic needs but also promote the inheritance and dissemination of regional culture.

Finally, the introduction of cultural symbols provides opportunities for the sustainable development of women's wear. Chen, He, and Zhang (2023) highlight that symbolized elements of ethnic clothing not only broaden design perspectives but also offer pathways for cultural heritage protection. Through contemporary expressions of cultural symbols, women's wear achieves a unity of market demand and cultural responsibility.

In summary, the significance of cultural symbols in women's wear goes far beyond visual decoration; they represent a comprehensive embodiment of identity, culture, and aesthetics. On the one hand, they strengthen individual identity and social belonging; on the other, they drive design innovation through the fusion of tradition and modernity. More importantly, cultural symbols have become essential supports for the differentiation and sustainable development of women's wear. This provides the theoretical foundation for exploring the optimization of raglan sleeve attachment methods from a cultural-symbolic perspective.

3.2 The Development of Raglan Sleeves

As a distinctive form of structural design in women's wear, raglan sleeves hold an important place in fashion history due to their smooth silhouette and high level of comfort. Tracing their development, the evolution of raglan sleeves not only reflects advancements in garment

technology but also mirrors changes in social aesthetics and cultural needs.

From a historical perspective, raglan sleeves were first widely applied in sportswear and military uniforms. By removing the traditional shoulder seam, this design allowed freer arm movement and a more natural shoulder line, thereby meeting the demands of high mobility (Liu, 2015). This functional feature established the foundational role of raglan sleeves in garment design. With the progress of society, their comfort and visual effect gradually attracted the attention of fashion designers and were increasingly introduced into women's wear, becoming a structural choice that combines functionality with aesthetics.

In the latter half of the 20th century, raglan sleeves diversified, with designs no longer confined to functional needs but increasingly integrated into fashion styling. Fang (2017), through her study on the three-dimensional modeling of raglan sleeves, pointed out that factors such as sleeve cap height, central line angle, and sleeve fullness interact to directly influence both the dynamic comfort and static aesthetics of raglan sleeves. This research highlighted the complexity of raglan sleeve design and encouraged designers to explore the unity of form and function from the perspective of three-dimensional structure. Similarly, Wei and Zhang (2015), analyzing proportional relationships based on arm structure characteristics, argued that scientific structural design can significantly improve wearing comfort and enhance the overall aesthetic quality of women's wear.

Entering the 21st century, with the diversification of fashion consumption, raglan sleeves in women's wear encountered new development opportunities. Zhou (2021), in his research on the structural design of loose raglan sleeves, proposed adjustments to the difference between the front and back sleeve centerlines and sleeve segmentation techniques, which allow dynamic comfort to be improved while maintaining a loose silhouette. This design trend aligns with modern women's pursuit of comfort and freedom in dressing and reflects the shift in women's fashion aesthetics from tight-fitting styles toward relaxed natural forms. At the same time, Xiong (2023) stressed that the design of modern women's raglan sleeves must precisely control key parameters such as sleeve cap height, sleeve centerline angle, and the point of junction between body and sleeve in order to achieve a balance of fit and beauty. This indicates that the development of raglan sleeves has become highly dependent on refined pattern-making and design methods.

In recent years, studies on raglan sleeves have increasingly adopted data-driven and parameterized

analysis. Liang and Yin (2023), through comparative experiments on raglan sleeves with different attachment angles, found that the angle between the sleeve cap and shoulder is a critical factor influencing both comfort and visual effect. Their research demonstrated that different sleeve attachment angles not only determine the range of movement but also directly affect the visual characteristics of the raglan sleeve silhouette. This experimental and data-based approach provides a scientific foundation for the optimization of raglan sleeves. Similarly, Fu and Yang (2015) emphasized that as one of the most common sleeve types, raglan sleeve design involves the balancing of multiple parameters and therefore requires comprehensive consideration of ergonomics and aesthetics during pattern-making and shaping.

Beyond structural exploration, the cultural development of raglan sleeves in fashion is also noteworthy. Chen (2018), through survey research, found that preferences for raglan sleeves vary across age groups: younger consumers prefer looser, fashion-oriented raglan sleeves, whereas middle-aged and older consumers place greater emphasis on comfort and functionality. This finding suggests that the development of raglan sleeves in women's wear is influenced not only by technology and aesthetics but also by the characteristics of consumer groups. Designers must therefore integrate the cultural background and lifestyle of target audiences in order to achieve both market and cultural value.

Overall, the development of raglan sleeves demonstrates a transformation from functionality to fashion and from empirical methods to scientific approaches. While early raglan sleeves focused on enabling freedom of movement, modern designs emphasize both aesthetic expression and cultural significance alongside functionality. With the introduction of digital pattern-making and virtual simulation technologies, raglan sleeve design has increasingly moved toward precision and diversification. Looking ahead, their further development will depend not only on technological innovation but also on a keen awareness of cultural context and consumer trends.

3.3 Raglan Sleeve Attachment in Women's Wear from the Perspective of Cultural Symbols

The uniqueness of raglan sleeves in women's wear lies not only in their structural and functional features but also in their cultural symbolic significance. Their smooth lines soften the shoulder, creating a gentle and inclusive temperament, thereby symbolizing femininity, identity, and cultural imagery (Li, 2022). Luo (2025) argues that

the role of clothing symbols in image construction indicates that raglan sleeves have transcended mere technical significance to become a medium of identity recognition.

In recent years, research on optimizing raglan sleeves has increasingly integrated cultural semantics with structural refinement. While Xiong (2023) emphasizes the importance of parameter control, technical improvements alone cannot fully address cultural needs. Consequently, scholars propose embedding symbolic thinking into sleeve attachment methods. For example, Zhang (2025), in her study on batik patterns in Neo-Chinese fashion, demonstrated that the reinterpretation of traditional symbols in modern garments can imbue designs with unique cultural connotations. By the same logic, the optimization of raglan sleeves should respond to cultural and aesthetic demands at a symbolic level.

Consumer perspectives further highlight the multifaceted symbolic significance of raglan sleeves. Chen (2018) found that different age groups hold distinct preferences: younger consumers view raglan sleeves as a fashion symbol, while older groups prioritize comfort and practicality. Dong (2025) emphasizes that cultural symbols enhance emotional resonance and cultural identity in clothing, providing insights into raglan sleeve optimization: attachment methods should consider cultural-psychological differences among consumer groups while maintaining technical rationality.

Moreover, the integration of raglan sleeves with regional culture and ethnic symbols has revealed new development pathways. Ge and Chu (2025) showed that the translation of Chaozhou architectural motifs into women's wear not only enhanced stylistic uniqueness but also achieved cultural innovation. Similarly, Chen, He, and Zhang (2023) stress that the contemporary expression of ethnic dress symbols in modern clothing not only broadens design thinking but also contributes to cultural preservation. This suggests that raglan sleeve optimization should balance cultural innovation with cultural heritage.

Digitalization and experimental research further provide technological support for raglan sleeve optimization. Liang and Yin (2023) verified through data analysis that sleeve attachment angles are key determinants of comfort and silhouette. When combined with a cultural semiotics framework, such optimization gains deeper cultural significance. Dong and Ma (2025) note that style evolution is often accompanied by a reconstruction of symbolic systems, indicating that the ultimate goal of raglan sleeve optimization is to achieve an integrated innovation of function, aesthetics, and culture.

In summary, from a cultural-symbolic perspective, the optimization of raglan sleeve attachment is no longer merely a matter of structural refinement but one of reconstructing cultural meaning. Its development should be grounded in ergonomics and aesthetic parameters while incorporating symbolic expression, thereby uniting functionality, fashion, and cultural value. This approach opens new pathways for women's wear design that combine cultural depth with market competitiveness.

4. Research Methods

This study adopts a mixed approach that integrates literature review, case analysis, and experimental practice. First, relevant literature on semiotics and visual culture was reviewed to establish a cultural-semiotic analytical framework for raglan sleeves. Second, representative cases of women's raglan sleeve designs were selected for structural and symbolic analysis. Finally, based on ergonomics and garment pattern-making experiments, optimized sleeve attachment methods were proposed and subjected to application testing and validation.

5. Research Process

5.1 Tracing the Evolution of Raglan Sleeves in Women's Wear Since the 20th Century

Table 1 : Characteristics of Raglan Sleeves in Women's Wear Since the 20th Century

Time Period	Socio-Cultural Context	Design Features of Raglan Sleeves	Functional & Aesthetic Focus	Application Scenarios / Styles
Early 20th century	Industrialization and increased female participation in sports and labor	Raglan sleeves mainly appeared in sportswear and workwear; no-shoulder-seam design	Emphasis on practicality and freedom of arm movement; loose structure, simple lines	Sportswear and workwear, commonly seen in women's sports and labor settings

Mid-20th century	Development of ready-to-wear industry, transformation of women's social roles	Integrated into everyday wear and fashion garments; adjustments to sleeve cap height and shoulder slope	Balanced comfort with femininity and smooth silhouette	Suits, dresses, coats; diversified styles
1970s–1980s	Fashion trends highlighting individuality and bodily expression	Combined with fitted tailoring to accentuate shoulder and arm lines	Emphasis on shaping female image and conveying modernity	Fitted dresses, suits, fashionable womenswear; increasing symbolic significance
21st century	Popularity of casual style and oversized silhouettes; rise of digital design	Return to comfort and looseness, combined with athleisure, street style, and neo-Chinese fashion; digital pattern-making and 3D simulation	Integration of functionality and fashion; precise control of structural proportions; balance among mobility, fit, and aesthetics	Casual wear, street fashion, neo-Chinese womenswear; diversified design contexts
Overall trend	Driven by social and technological development	Shift from functionality to fashionability; diversification of structures; transition from experiential to digital design	Technical structure integrated with aesthetic value and cultural symbolism	Raglan sleeves as a key womenswear element that unifies function, aesthetics, and cultural connotation

Source: Drawn by the researcher.

Since the early 20th century, women's fashion has evolved continuously in response to changing social and cultural contexts as well as shifting aesthetic values. As an important garment structure, raglan sleeves have undergone multiple transformations, shifting from functionality to fashionably. In the early stage, raglan sleeves were mainly applied in sportswear and work wear. Their characteristic shoulder-seam-free design provided greater freedom of arm movement, which made them practical and well-suited for women engaged in sports and labor. The loose structure and clean lines aligned with the needs of functional clothing, making raglan sleeves a common choice in such settings(see Table 1).

By the mid-20th century, with the expansion of the ready-to-wear industry and the changing roles of women in society, raglan sleeves began to enter everyday and

fashion apparel. At this stage, designs not only addressed comfort and mobility but also emphasized femininity and smooth visual effect. Many designers adjusted structural parameters such as sleeve cap height and shoulder slope to achieve a balance between comfort and elegance, thereby enhancing the graceful, refined image of women. Raglan sleeves became widely applied in suits, dresses, and coats, with diverse stylistic variations.

During the 1970s and 1980s, fashion trends highlighted individuality and the expressive potential of the body. In this context, raglan sleeves were often combined with fitted tailoring, accentuating the lines of the shoulders and arms while introducing a sense of modern style. Raglan sleeves increasingly served as a means of shaping diverse female identities and were imbued with symbolic and cultural connotations.

Entering the 21st century, the evolution of raglan sleeves has become more diversified. With the popularity of casual and oversized silhouettes, raglan sleeves have re-emphasized comfort and looseness while being integrated into athleisure, street fashion, and even neon-chine womenswear. At the same time, advances in digital pattern-making and 3D simulation technologies have enabled designers to more precisely control structural proportions, achieving an optimal balance between mobility, fit, and aesthetics.

Overall, the evolution of raglan sleeves since the 20th century demonstrates three major trends: (1) a shift

from functionality to fashionably; (2) a progression from singular to diverse and differentiated structures; and (3) a transition from experiential to scientific and digitized design. Raglan sleeves are no longer merely a technical garment structure, but rather a key element of women's fashion that integrates functional, aesthetic, and cultural dimensions.

5.2 Performance of Sleeve Attachment Methods in Raglan Sleeve Prototypes

Table 2. Advantages and Limitations of Raglan Sleeve Design

Dimension of Analysis	Advantages	Potential Limitations	Applicable Scenarios
Mobility	Eliminates the shoulder seam, allowing greater freedom of arm movement; suitable for stretching or frequent motion	Improper sleeve cap angle or armhole depth → slackness under the arm, lack of sharp silhouette	Sportswear, loose casual wear
Shoulder Fit	Natural, soft lines that diminish shoulder contours and flatter slender or angular body types	Excess sleeve cap fullness or inaccurate shoulder angle → bulging, wrinkles; particularly evident in fitted womenswear	Fitted suits, dresses
Aesthetic Appearance	Simple, soft lines with strong fluidity, conveying elegance and approachability; loose styles can look casual and comfortable	Insufficient fit → risk of appearing loose or bulky, weakening feminine grace	Elegant womenswear, loose fashion styles
Overall Performance	Freedom of movement, graceful lines	Localized lack of fit, structural control challenges	Modern womenswear balancing comfort and aesthetics

Source: Drawn by the researcher.

The quality of raglan sleeve design directly influences how women swear performs in terms of comfort and aesthetics. Analysis of sleeve attachment methods in prototypes reveals both strengths and weaknesses regarding mobility, shoulder fit, and aesthetic appearance(see Table 2).

In terms of mobility, the traditional raglan sleeve, by removing the shoulder seam, provides greater freedom of arm movement—especially suited to situations requiring stretching or frequent motion. However, in some prototypes, if the sleeve cap angle and armhole depth are

poorly controlled, excess looseness may occur under the arm, compromising the overall sharpness of the silhouette. Thus, while raglan sleeves enhance freedom of movement, they also pose the challenge of maintaining a refined appearance.

Regarding shoulder fit, raglan sleeves typically create a smooth transition line that softens the shoulder contour, making the silhouette appear fluid and natural. This design is particularly beneficial for women with angular shoulders or a slender build, as it enhances the body's proportions. Nevertheless, poor handling of the

attachment method—such as excessive sleeve cap fullness or inaccurate shoulder angle—can lead to bulging or wrinkling at the shoulder. This issue is especially critical in fitted womenswear, where precision in fit is essential.

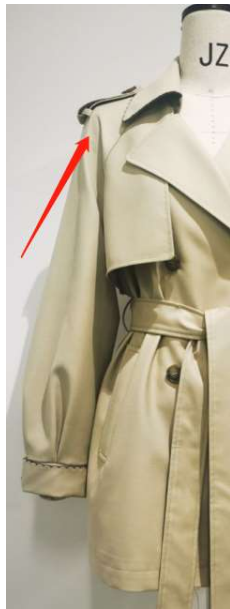
From the perspective of aesthetic appearance, raglan sleeves are capable of producing a clean, soft, and flowing visual effect, often used to highlight elegance and applicability in womenswear. Their application in loose-fitting garments can also express a sense of casualness and comfort. However, without proper control of garment fit, raglan sleeves risk appearing too loose or even bulky, which undermines the intended graceful effect. Achieving


aesthetic appeal thus relies heavily on precise pattern parameters.

In summary, raglan sleeve prototypes present both advantages and drawbacks across mobility, fit, and aesthetics. Their primary strength lies in providing freedom of movement and graceful lines, while their weaknesses are concentrated in localized fitting issues and structural control. Therefore, in studying and optimizing sleeve attachment methods, it is crucial to strike a balance between comfort and aesthetic refinement.

5.3 Optimization Approaches for Raglan Sleeve Patterns in Women's Wear

Table 3: Optimization Approaches for Raglan Sleeve Patterns

Optimization Approach	Main Method	Problem Solved	Features/Significance	Sample Display
Ergonomic Parameter Optimization	Collect data on shoulder and arm dimensions; scientifically determine sleeve cap height, mid-line angle, and armhole depth	Overcome experiential errors; balance fit and freedom of movement	Parametric design, more scientific and precise	Before adjustment: 
3D Virtual Simulation Technology	3D Virtual Simulation Technology	Reduce repeated mock-up modifications, improve efficiency	Visualize dynamic fit and aesthetic performance	
Zonal Adjustment Method	Divide the shoulder-sleeve junction into sections for localized adjustment (smooth front shoulder + corrected back shoulder)	Avoid wrinkles or tightness; adapt to diverse body types	Ensures both smooth lines and improved fit	
Cultural Symbolic Design	Enhance symbolic meaning through lines, fabrics, and	Improve functionality while enriching	Communicates temperament (e.g., softness,	

	decorative elements	cultural expression	strength, independ ence)	<p>After adjustment:</p> 
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Source: Drawn by the researcher.

To overcome the tension between mobility and aesthetics inherent in traditional raglan sleeve construction, recent academic research and design practice have proposed several optimization approaches(see Table 2).

First, ergonomic parameter optimization has emerged as a key method. By collecting and analyzing data on women's shoulder and arm dimensions across different body types, designers can more accurately determine parameters such as sleeve cap height, midline angle, and armhole depth. This method effectively reduces errors stemming from purely experience-based design, enabling raglan sleeves to achieve a better balance between fit and freedom of movement.

Second, 3D virtual simulation technology provides a powerful new tool for pattern optimization. Designers can use virtual fitting software to rapidly simulate and compare different pattern parameters, thereby minimizing the need for repeated sample modifications. This not only improves design efficiency but also enables the visualization of raglan sleeve fit and aesthetic qualities under dynamic motion, offering a clear reference for optimization.

Third, the zonal adjustment method has been increasingly applied to raglan sleeve refinement. This approach divides the shoulder-sleeve junction into smaller sub-sections, allowing for differentiated local

adjustments. For example, designers can maintain a smooth front shoulder line while adjusting the back shoulder angle and armhole drop to avoid wrinkles or tightness. Such localized adjustments enhance overall fit while maintaining flowing lines, thereby accommodating a wider range of body types.

Finally, culturally symbolic design introduces a more conceptual dimension to optimization. In addition to technical adjustments, designers may integrate symbolic meaning through choices of lines, fabrics, and decorative details. For instance, soft fabrics combined with smooth shoulder lines may convey gentleness and inclusivity, while firm fabrics with sharper shoulder lines may express strength and independence. This culturally enriched approach ensures that raglan sleeves not only improve in functionality but also carry deeper symbolic significance.

In summary, the optimization of raglan sleeve patterns in women's wear reflects a dual logic that integrates technical precision with cultural meaning. While parametric and virtual tools resolve structural and ergonomic challenges, zonal adjustments and symbolic design extend the garment's expressive capacity. Future optimization research should further explore the integration of ergonomics, digital technology, and cultural expression, ensuring that raglan sleeves simultaneously meet demands for comfort, fit, and the symbolic articulation of women's identity and aesthetics.

6. Discussion

This study, through a review of the evolution of raglan sleeves in women's wear since the 20th century, analysis of prototype sleeve attachment methods, and exploration of optimization strategies, reveals the dynamic balance between functionality, aesthetics, and cultural significance of raglan sleeves. The research indicates that traditional raglan sleeves excel in mobility and graceful lines but exhibit limitations in shoulder fit and refined shaping.

With the application of ergonomic parameterization and 3D virtual simulation technology, pattern control of raglan sleeves has become more precise, enhancing both comfort and visual appeal. At the same time, the introduction of zonal adjustment methods and culturally symbolic design extends the value of raglan sleeves beyond mere structural optimization, incorporating aspects of identity and temperament. Therefore, the significance of raglan sleeves transcends technical functionality, becoming an important vehicle for cultural and aesthetic expression.

7. Conclusion

The evolution of raglan sleeves reflects multiple shifts: from functionality to fashion, from experience-based design to scientific precision, and from structural considerations to cultural expression. Optimizing sleeve patterns requires balancing freedom of movement with precise fit, utilizing digital and zonal techniques for scientific control. Moreover, culturally informed design imbues raglan sleeves with deeper symbolic meaning, allowing them to embody comfort, aesthetic appeal, and cultural expression in contemporary women's wear. Future research should further explore the integration of ergonomics, digital technologies, and cultural contexts to drive innovative development of raglan sleeves in modern fashion.

References

- Chen, J., & Guan, Z. (2021). Exploration of the symbolic application of traditional Chinese knots in fashion design. *Journal of Huaibei Normal University (Philosophy and Social Sciences Edition)*, (3), 105–109.
- Chen, X., He, X., & Zhang, Y. (2023). Exploration and application of ethnic costume from a semiotic perspective. *Western Leather*, (14), 136–138.
- Deng, M. (2009). Traditional cultural symbols in modern fashion design: The influence and significance of Chinese traditional cultural symbols. *Times Literature (Second Half Month)*, (7), 166–167.
- Deng, M., & Deng, W. (2008). Application of traditional ethnic cultural symbols in modern fashion design. *Journal of Changsha University*, 22(1), 117–118.
- Dong, X. (2025). Analysis of cultural symbols in IP fashion. *Western Leather*, (14), 147–149. <https://doi.org/10.20143/j.1671-1602.2025.14.147>
- Dong, Y., & Ma, D. (2025). From punk to Neo-Chinese style: Style evolution and cultural symbol reconstruction in modern Gothic fashion. *Dyeing and Finishing Technology*, (5), 57–60.
- Fang, J. (2017). Study on three-dimensional design methods of raglan sleeves. *Modern Vocational Education*, (36), 187.
- Fu, X., & Yang, G. (2015). Re-understanding the structure of raglan sleeves. *Light Textile Industry & Technology*, 44(6), 35–37. <https://zhifu.cnki.net/kcms/detail/45.1379.ts.20151204.0943.028.html>
- Ge, Y., & Chu, H. (2025). Translation and application of Chaozhou ancient architectural decorative patterns in modern women's fashion design. *Dyeing and Finishing Technology*, (3), 72–74.
- Guo, R. (2024). Research on Neo-Chinese women's fashion design based on customization patterns (Master's thesis). Wuhan Textile University. <https://doi.org/10.27698/d.cnki.gwhxj.2024.000269>
- He, Q. (2014). Study on the "image" cultural symbols and modeling thinking in fashion design. *Journal of Xinyu University*, 19(5), 83–85.
- Qiao, D. (2017). Cultural symbols and characteristics of traditional Chinese costume modeling. *Fashion Guide*, (5), 15–20. <https://zhifu.cnki.net/kcms/detail/42.1826.TS.20170817.1735.022.html>
- Li, Y., & Feng, L. (2024). Innovative application of Minnan "Shou" character patterns in women's fashion design. *Western Leather*, (11), 100–103. <https://doi.org/10.20143/j.1671-1602.2024.11.100>
- Liang, Z., & Yin, Z. (2023). Parameter analysis of fitted raglan sleeve elbow angle. *Liaoning Silk*, (2), 33–35.
- Liu, C. (2018). Analysis of symbols as a language of fashion design in fashion brands. *Western Leather*, (1), 44–47.
- Liu, S. (2015). Study on the shaping of raglan sleeves. *Western Leather*, (23), 36–37.
- Luo, Q. (2025). Cultural symbols and character image construction in fashion pattern design. *Dyeing and Finishing Technology*, (2), 102–104.

- Wang, W. (2024). Cultural symbols and imagery interpretation in fashion design. *Art Appreciation*, (6), 47–50.
- Wei, B., & Zhang, C. (2015). Study on raglan sleeve shaping technology and comfort in women's wear. *Art and Technology*, 28(10), 24.
- Wei, J. (2011). Reverse thinking study of raglan sleeve pattern drafting methods. *Tianjin Textile Science & Technology*, (4), 42–44.
- Xiong, S. (2023). Study on the structural design of fashion-fitting women's raglan sleeves. *Chemical Fiber & Textile Technology*, 52(7), 110–112.
- Xu, Q. (2020). Analysis of traditional ethnic cultural symbols in modern fashion design. *Art Appreciation*, (29), 68–69.
- Yu, S. (2021). Application of Central Plains traditional cultural symbols in fashion design from the perspective of "craftsman spirit." *Liaoning Silk*, (1), 24–26.
- Yu, T. (2019). Application of traditional cultural symbols in fashion design. *Western Leather*, (13), 96–98.
- Zhang, M. (2025). Application of batik patterns in Neo-Chinese fashion design from the perspective of cultural symbols. *Shanghai Fashion*, (1), 38–40.
- Zhao, J. (2023). Application of Chinese folk auspicious patterns in fashion design. *Chemical Fiber & Textile Technology*, 52(5), 123–125.
- Zhao, K. (2022). Analysis of traditional costume applications in modern fashion design. *Western Leather*, (4), 74–76.