


Literature Review: The Effectiveness of Recell in Wound Healing Burn

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Article Info	ABSTRACT
Keywords: burns, ReCell, autologous skin cell suspension, wound healing.	Background: Burns are serious tissue injuries that require rapid treatment to prevent infection, accelerate healing, and reduce the risk of scarring. One therapeutic innovation is Autologous Skin Cell Suspension (ASCS) using the ReCell device. Based on a real-world registry data study from the United States (Burn Care Quality), ReCell uses a small sample of patient skin processed into a cell suspension and sprayed onto the wound to stimulate skin regeneration and improve healing outcomes. Objective: This literature review aims to analyze the effectiveness of ReCell in healing burns based on ten articles published in the period 2018–2025. Methods: The literature review was obtained from PubMed, ScienceDirect, and Google Scholar, then analyzed narratively. Results: The study results showed that ReCell accelerates re-epithelialization with a shorter healing time compared to conventional skin grafts, and reduces the need for a skin donor area by more than 30%. In addition, ReCell provides better aesthetic results, although its effectiveness in reducing pain, infection, and repigmentation has not been consistent. Several pediatric studies also reported the success of ReCell as a monotherapy. Conclusion: ReCell is a promising method to help heal second-degree (deep partial thickness) to third-degree (full thickness) burns.
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INTRODUCTION

Burns are a serious and complex form of tissue injury that can have long-term physiological, psychological, and social impacts on sufferers. These injuries occur due to exposure to heat, chemicals, electricity, or radiation, causing damage to the skin layers and deeper tissues. 1,3 According to the World Health Organization (WHO, 2018), approximately 180,000 deaths from burns occur annually worldwide, with morbidity rates much higher, especially in developing countries. In addition to causing death, burns often leave severe scars, contractures, and impaired function, requiring intensive care and long-term rehabilitation. 2,9

The burn wound healing process is greatly influenced by the severity of the wound, the depth of tissue damage, and the treatment method used. In general, wound healing involves three main phases: inflammation, proliferation, and remodeling, each of which requires optimal biological balance and therapeutic support. 1 For decades, conventional therapies

such as autologous skin grafts and topical wound care have been the primary options. However, these methods often limit comprehensive skin regeneration and carry the risk of complications such as infection or engraftment failure. 1,6

ReCell is a technological innovation in tissue engineering, which enables the use of autologous skin cell suspension (ASCS) to accelerate the skin regeneration process. This technology works by isolating various types of skin cells from the patient's own donor tissue, then spraying them directly onto the wound area to stimulate healing and new tissue formation. 2 Clinical studies have shown that the use of ReCell not only accelerates the epithelialization process, but also reduces the need for donor sites and produces better aesthetic results compared to traditional skin grafts. 4,5 Based on real-world registry data studies in the United States through the Burn Care Quality Platform (BCQP), the use of ReCell has been shown to accelerate epithelialization and reduce hospital stays by up to 36% compared to conventional split-thickness skin graft (STSG) therapy. These findings support ReCell's potential as an effective innovation in accelerating burn wound healing, while reducing the need for donor skin and improving functional and aesthetic results. 24

With the development of bioengineered skin technologies like ReCell, approaches to burn healing are shifting toward more effective and individualized regenerative therapies. Therefore, it is important to review ReCell's effectiveness in accelerating burn wound healing based on current scientific evidence. This review is expected to provide a comprehensive understanding of ReCell's role in burn wound care and serve as a basis for developing more efficient and safe clinical protocols.

METHOD

This study used a literature review method to assess the effectiveness of ReCell in burn wound healing. The literature was obtained from scientific articles or journals accessed through international databases such as PubMed-MEDLINE, ScienceDirect, and Google Scholar. The search process was carried out using keywords such as "ReCell", "burn wound healing", "autologous cell suspension", "skin regeneration", and "burn treatment". The articles reviewed were selected based on inclusion criteria, namely articles published between 2018 and 2025, available in full-text, written in English or Indonesian, and specifically discussing the use of ReCell in the context of burn wound healing.

Articles that were irrelevant, single case reports without sufficient supporting data, or did not clearly state clinical outcomes were excluded from the review. Data obtained from the selected literature were then analyzed narratively, focusing on study design, sample size, intervention, observed outcomes, and the clinical effectiveness of ReCell in accelerating wound healing. The analysis results were systematically organized in the results and discussion sections to illustrate ReCell's contribution to post-burn tissue regeneration.

RESULTS AND DISCUSSION

Ten articles were sampled in this study. Some of them directly discussed the effectiveness of Autologous Skin Cell Suspension (ASCS) using the ReCell device in burn wound healing. Autologous Skin Cell Suspension ASCS provides equivalent or even faster re-epithelialization results than standard methods such as Split-Thickness Skin Graft (STSG) and xenograft.

After reviewing the selected articles according to the inclusion criteria, ten articles were found that specifically discussed the use of Autologous Skin Cell Suspension (ASCS) with the ReCell device in burn wound management. These articles included studies with randomized controlled trials (RCTs), descriptive observational studies, and meta-analyses, which generally evaluated the effectiveness of ReCell in accelerating the re-epithelialization process, reducing the need for skin donors, and improving functional and aesthetic outcomes. A summary of the characteristics of each study, including methods, outcomes, and key findings, is presented in Table 1 below to provide a systematic and comprehensive overview of ReCell's effectiveness based on available scientific evidence.

Table 1. Characteristics of literature review articles

No.	Researchers	Research title	Method Study	Results
1.	Obeid, FM (2025)	<i>Effect of Autologous Skin Cell Suspensions Versus Standard Treatment on Re-Epithelialization in Burn Injuries: A Meta Analysis of RCTs</i>	<i>Systematic Review and Meta-Analysis</i>	This study shows that the use of autologous skin cell suspension (ASCS) such as RECELL significantly accelerates skin healing (re-epithelialization) in burn patients, with a mean time of 1.71 days faster than standard care. The main result showed that the use of ASCS significantly accelerated the process of skin healing (re-epithelialization), with a mean time of 1.71 days faster than the control group (MD = -1.71 days; 95% CI: -2.73 to -0.70; p = 0.001), although there was moderate heterogeneity between studies ($I^2 = 58\%$).
2.	Zhang Yue et al. (2024)	<i>Limited debridement combined with ReCell Techniques for deep second-degree burns</i>	Observational Descriptive	Twenty patients with deep second-degree burns covering less than 10% of the total body surface area (TBSA) treated in our department from June 2019 to June 2021 participated in this study. These patients first underwent limited debridement with an electric/pneumatic dermatome, followed by the ReCell technique for secondary wounds. All patients' wounds healed completely. One patient

No.	Researchers	Research title	Method Study	Results
				experienced infection at the skin graft site and eventually recovered with regular dressing changes. The average healing time was 12 days (range: 10–15 days). The new skin in the treated area was soft and matched the surrounding normal skin color, with VSS scores ranging from 3 to 5 for each patient. Of the 20 patients, 19 were very satisfied and 1 was satisfied.
3.	Aoki Kohei, et.al (2024)	<i>A Pilot Study to Evaluate the Minimally Invasive Burn Care for Small, Deep Partial-Thickness Burns of the Hands and Feet Using Enzyme Debridement and Autologous Skin Cell Spray</i>	Observational Descriptive	Patients treated with a combination of NexoBrid and ReCell techniques. Scar quality was assessed using the Vancouver Scar Scale (VSS). The results showed that four patients aged 0–28 years with an average total burn surface area of 1.2% were treated on two hands and two feet, with a mean follow-up of 12 months; no additional surgical treatment was required. The mean VSS score was 0.25. The patients were satisfied with the aesthetic appearance of their hands and feet, and there were no complications, such as hypertrophic scars.
4.	Wala Samantha et al. (2022)	<i>Brief Communication A single institution case series of ReCell use in treating pediatric burns</i>	Descriptive	In the study, most patients (95.2%) had received a dermal substrate prior to RECELL application. Four patients did not undergo split-thickness skin grafting (STSG) concurrent with RECELL application. The median time between burn injury and the first RECELL application was 18

No.	Researchers	Research title	Method Study	Results
				days, with a range of 5 to 43 days. The number of RECELL applications varied from one to four per patient. The median time to wound healing was 81 days, with a range of 39 to 573 days.
5.	Puling, I., et al. (2025)	<i>Optimizing Burn Injury Care: A Comparative Network Meta-Analysis of Skin Grafts' Efficacy</i>	<i>Network Meta-Analysis and Single Arm Meta-Analysis</i>	ReCell showed the highest efficacy in increasing reepithelialization but had a lower repigmentation rate than xenograft. Xenografts are suitable for rapid wound closure, but carry a high risk of hyperpigmentation. These results suggest that ReCell or device-assisted autologous skin cell transplantation is the best option functionally and aesthetically.
6.	Oshima Junya et al., (2025)	<i>Autologous Skin Cell Suspension Monotherapy Without Split-Thickness Skin Grafting for Deep Dermal Burns in Pediatric Patients</i>	Observational Descriptive	This study is a case report of three pediatric patients under three years of age who suffered deep dermal burns (DDB) due to exposure to hot water. All three patients were treated using Autologous Skin Cell Suspension (ASCS) monotherapy with the RECELL device, without split-thickness skin grafting (STSG). Results showed that all wounds healed within 41–45 days, with minimal scarring and without the need for grafting surgery. ASCS helps accelerate healing, reduces wound care, and minimizes scarring because it requires only a small amount of donor skin.
7.	Holmes, JH, et al.	<i>A Comparative Study of the ReCell Device and Autologous Split-Thickness Meshed</i>	<i>Randomized Controlled Trial/RCT</i>	<i>Autologous skin cell suspension</i> ASCS produced by the ReCell device is a viable alternative to STSG in the

No.	Researchers	Research title	Method Study	Results
		<i>Skin Graft in the Treatment of Acute Burn Injuries</i>		treatment of deep partial thickness thermal burns. Definitive wound closure at sites treated with Autologous skin cell suspension ASCS was comparable to sites treated with 2:1 mesh autograft.
8.	Cerceo Jaclyn R et al., (2024)	<i>Management of Large Full-Thickness Burns Using Kerecis™ Acellular Fish Skin Graft and ReCell™ Autologous Skin Cell Suspension: A Case Report of Two Patients with Large Surface Area Burns</i>	Observational Descriptive	The results of RECELL use in this study were demonstrated in patient 2, who suffered extensive burns of up to 86% TBSA due to a methamphetamine explosion. Due to the limited donor skin area, the medical team used RECELL (autologous skin cell suspension) and Novosorb BTM™ as part of a multi-stage treatment strategy, in addition to allograft and Kerecis. Overall, the use of RECELL in this case demonstrated its benefits in the context of limited donor sites, allowing for more extensive wound coverage with minimal skin resources.
9.	Holmes, JH, et al. (2019)	<i>Demonstration of the safety and effectiveness of the RECELL1System combined with split-thickness meshed autografts for the reduction of donor skin to treat mixed-depth burn injuries</i>	<i>Randomized Controlled Trial/RCT</i>	This study was a randomized clinical trial involving 30 patients aged five years and older with mixed-depth burns covering 5–50% of the total body surface area. Results showed that 92% of wounds in the RECELL-treated group healed within eight weeks, compared with 85% in the control group, indicating equivalent effectiveness. Furthermore, donor skin use was reduced by 32% in the RECELL group, with

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				a higher expansion ratio (1:1.97 compared with 1:1.35; p < 0.001).
10.	Bairagi Anjana, et al. (2023)	<i>A Pilot Randomized Controlled Trial Evaluating a Regenerative Epithelial Suspension for Medium-Size Partial-Thickness Burns in Children: The BRACS Trial</i>	<i>Randomized Controlled Trial/RCT</i>	This study was a pilot study involving 22 children with partial-degree burns. The results showed that the median time for wound healing (re-epithelialization) in the RECELL®/Biobrane® group was 12 days, the same as the silver dressing group and slightly faster than the Biobrane®-only group, which had a median time of 14 days. Furthermore, the RECELL®/Biobrane® group demonstrated better clinical outcomes than the other two groups, including less pain, fewer infections, no sepsis, no need for skin grafts, and the lowest impact on patients' quality of life.
11.	Bairagi Anjana, et al. (2019)	<i>Comparative effectiveness of Biobrane, RECELL Autologous skin Cell suspension and Silver dressings in partial thickness pediatric burns: BRACS randomized trial protocol</i>	<i>Randomized Controlled Trial/RCT</i>	The BRACS study compared the effectiveness of three burn treatment methods in children: silver dressings, Biobrane®, and a combination of Biobrane® and Recell Regenerative Epithelial Suspension (REST™). Of the 22 children involved, the fastest healing time was achieved in the REST™/Biobrane and silver dressing group (12 days), while Biobrane alone was slightly slower (14 days).
12.	Kenneth W., et al (2020).	<i>Treatment of a Full-Thickness Burn Injury With NovoSorb Biodegradable Temporizing Matrix</i>	Observational Descriptive	This study is a case series involving three patients with full-thickness burns, two of whom suffered extensive burns, covering more than 90% of the

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		<i>and RECELL Autologous Skin Cell Suspension: A Case Series</i>		total body surface area (TBSA). All patients were treated with a combination of NovoSorb Biodegradable Temporizing Matrix (BTM) and RECELL Autologous Skin Cell Suspension (ASCS). BTM was applied first as a temporary dermis to help initial wound and body stabilization, followed by RECELL application combined with a thin skin graft (STSG) at a ratio of 3:1. The results showed that all patients experienced good wound healing, including two patients with extensive burns who survived.
13.	Aldin Malkoc., et al (2021)	<i>Lessons learned from two survivors of greater than 90% Total Body Surface Area Full Thickness Burn Injuries using NovoSorb Biodegradable Temporizing Matrix™ and Autologous Skin Cell Suspension, RECELL™: A Case Series</i>	Observational Descriptive	This study is a case report of two young adult patients who suffered extensive full-thickness burns, each covering more than 90% of the total body surface area (TBSA). In this report, two patients with extreme full-thickness burns (more than 90% TBSA) were successfully treated using a multi-pronged approach: first, BTM and allograft were applied for initial closure and metabolic stabilization, then RECELL Autologous Cell Suspension was applied with autograft/allograft for definitive reconstruction.
14.	Anjana Bairagi., et al (2021)	<i>A systematic review and meta-analysis of randomized trials evaluating the efficacy of autologous skin cell suspensions for re-epithelialization of</i>	<i>Randomized Controlled Trial/RCT</i>	This study is a systematic review and meta-analysis that analyzed five randomized clinical trials (RCTs) with a total of 347 patients with partial-degree burns or split-thickness skin graft (STSG) donor wounds.

No.	Researchers	Research title	Method Study	Results
		<i>acute partial thickness burn injuries and split-thickness skin graft donor sites</i>		Several studies in this analysis directly used ReCell as a source of autologous skin cell suspension (ASCS) to accelerate wound re-epithelialization. The meta-analysis results showed that the use of ReCell significantly accelerated burn wound healing in children and in adult donor sites compared with standard care.
15.	Joseph A. Molnar.,etal (2020)	<i>Initial experience with autologous skin cell suspension for treatment of deep partial-thickness facial burn</i>	Observational Descriptive	In this study, Of a total of five patients (4 males, 1 female; ages ranging from 2.1 to 40.7 years; average 18.2 years) who suffered extensive burns on the face, all patients underwent initial excision followed by temporary closure with allograft, then ASCS application within a maximum of 30 days post-trauma. showed that the use of RECELL Autologous Skin Cell Suspension (ASCS) in deep facial burns provides safe and effective results, especially in accelerating re-epithelialization and improving aesthetic results. This therapy also reduces the need for skin donors, with good cosmetic and functional results and minimal complications.

Discussion

Burn wound management demonstrates a diversity of therapeutic approaches, including modern technologies such as Autologous Skin Cell Suspension (ASCS) with ReCell. Based on 15 articles analyzed specifically discussing the effectiveness of ASCS using the ReCell device, these approaches each have their own advantages in accelerating the wound healing process and reducing the risk of further complications.

This literature review demonstrates that the use of Autologous Skin Cell Suspension (ASCS) using the ReCell device consistently provides significant benefits in accelerating the

burn wound healing process (re-epithelialization). Several studies, such as a meta-analysis by Obeid (2025), show that ReCell can accelerate healing time by an average of 1.71 days compared to standard therapy, although it has not been proven superior in terms of pain, infection, or scar quality. 10

Other studies by Zhang Yue et al. (2024) and Aoki Kohei et al. (2024) corroborate these findings, with clinical results showing complete healing within 10–15 days, high patient satisfaction, and low scarring scores. In pediatric cases, as reported by Oshima Junya et al. (2025), ReCell was even used as a single therapy without skin grafting and successfully achieved complete healing within 41–45 days, demonstrating high efficacy even without STSG. 11,12,16

Studies by Holmes et al. (2019) and Cerceo Jaclyn R. et al. (2024) also emphasized that ReCell can reduce the need for donor skin by up to 32% without compromising healing effectiveness, which is particularly useful in cases of extensive burns with limited donor sites. On the other hand, a study by Puling et al. (2025) noted that although ReCell excels in re-epithelialization, its repigmentation results are still inferior to xenografts, so its use must be adjusted according to functional or aesthetic priorities. Similar findings were also confirmed in the BRACS Trial by Bairagi et al. (2023), which showed that ReCell provided rapid healing results, reduced pain and infection, and eliminated the need for skin grafts, although the study was small-scale. 15,17,18

ReCell is a regenerative system based on autologous skin cell suspension (ASCS) that has been extensively researched and used in burn wound management. ReCell's effectiveness in accelerating burn wound healing is supported by numerous clinical studies and meta-analyses. This technology works by taking skin tissue from a small donor area (usually around 1–2 cm²), which is then processed into a suspension of epidermal cells, including keratinocytes, fibroblasts, and progenitor cells, and sprayed onto the wound surface. This component plays a crucial role in accelerating re-epithelialization, the process of wound closure with new skin tissue.10

In addition to accelerating re-epithelialization and reducing the need for donor sites, ReCell also plays a role in improving functional and cosmetic outcomes after burn wound healing. Several studies have shown that combining ReCell with meshed skin grafting (STSG) can cover a larger area, resulting in smoother, more flexible scars. This is particularly important for patients with wounds in high-movement areas such as the neck, elbows, and hands, to prevent joint contractures and maintain long-term mobility.11

From a patient experience and quality of life perspective, several studies have shown that ReCell provides a higher level of satisfaction, especially in pediatric and adolescent patients, who tend to experience greater psychosocial impacts from burns and visible scars. A study by Zhang et al. reported that 95% of patients expressed very satisfied with the healing results after ReCell application, with minimal scarring and skin color resembling natural skin. 18 Meanwhile, in extreme full-thickness burns (>90% TBSA), studies by Kenneth W. (2020) and Aldin Malkoc (2021) showed that the combination of ReCell with a dermal substitute such as NovoSorb BTM allowed patients to survive with satisfactory healing results, although limited donor area was a major obstacle. 21,23

Overall, the study results indicate that ReCell is effective in accelerating burn wound

healing and reducing the need for donor skin, particularly in partial-degree to deep burns, in both children and adults. However, because outcomes related to scarring, repigmentation, and patient comfort vary, ReCell is best used in an individualized approach that considers clinical needs, wound condition, and donor site availability. Further studies with larger designs and long-term evaluation are needed to strengthen the basis for widespread use of ReCell in burn clinical practice.

CONCLUSION

Based on the literature review, it can be concluded that approaches to burn wound management involve various methods, starting with the use of modern technologies such as Autologous Skin Cell Suspension (ASCS) with the ReCell device. Autologous Skin Cell Suspension (ASCS) has been shown to provide rapid and promising re-epithelialization results in terms of function and aesthetics, although it is not always superior in terms of pain and scarring. ReCell has been shown to accelerate the re-epithelialization process, reduce the need for donor skin, and provide better functional and aesthetic results compared to conventional therapies such as split-thickness skin grafts (STSG). Several studies have also shown that ReCell can be used as monotherapy, especially in pediatric patients, without the need for additional skin grafts. However, ReCell's effectiveness in other aspects such as pain, infection, and repigmentation quality still shows variation between patients and between studies. Therefore, although ReCell offers many advantages, its use still needs to be tailored to the individual patient's clinical condition. Further studies with larger, controlled designs and long-term evaluation are needed to strengthen scientific evidence regarding the effectiveness and safety of ReCell's use in clinical practice.

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