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Effectiveness of Platelet-Rich Plasma Gel Versus Conventional Dressings in the Management of Diabetic Foot Ulcers: A Systematic Review

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ABSTRACT

Background and Aims: Diabetic foot ulcers (DFUs) are a serious complication of diabetes mellitus, frequently leading to delayed healing, infection, and amputation. Conventional dressings constitute standard management; however, Platelet-Rich Plasma (PRP) gel has been proposed as a regenerative therapy to accelerate wound healing. This systematic review aimed to evaluate the effectiveness of Platelet-Rich Plasma Gel compared with conventional dressings in promoting healing of diabetic foot ulcers.

Methods: This systematic review was conducted in accordance with PRISMA guidelines. Electronic databases (PubMed/MEDLINE, ScienceDirect, Cochrane Central Register of Controlled Trials (CENTRAL) and Google Scholar) were systematically searched from 2015 to 2025 using Boolean operators ("AND," "OR") and MeSH and free-text terms including "Platelet-Rich Plasma," "Diabetic Foot," "Diabetic Foot Ulcer," "Conventional Dressings," "Wound Healing," and "Bandages." Randomized controlled trials and comparative observational studies evaluating autologous PRP gel versus conventional dressings in adults with DFUs were included. Two reviewers independently performed study selection, data extraction, and risk of bias assessment.

Results: Ten comparative studies were included. PRP demonstrated significantly greater wound contraction (34.42%±2.52 vs 13.52%±2.55; $p<0.001$), higher healing rates (86.11% vs 63.89%; $p=0.029$), and shorter mean healing duration (10.90±3.40 vs 13.48±3.37 weeks; $p=0.01$) compared with conventional dressings. Healing efficacy defined as ≥50% wound reduction was higher with PRP (88.71% vs 67.74%; $p=0.0034$). Mean time to heal was reduced (11.17±2.73 vs 13.78±1.66 weeks; $p=0.012$), and wound size at 90 days was smaller (0.61±1.20 cm^2 vs 1.58±1.55 cm^2; $p=0.021$). One study reported no significant difference when PRP was combined with total-contact casting ($p>0.05$).

Conclusion: Platelet-Rich Plasma Gel appears more effective than conventional dressings in enhancing healing outcomes in diabetic foot ulcers. PRP accelerates wound contraction, increases complete healing rates, and reduces healing duration, supporting its role as a promising adjunctive therapy. Further large-scale trials are warranted.

Keywords: Platelet-Rich Plasma; Diabetic Foot; Diabetic Foot Ulcer; Wound Healing; Bandages.

INTRODUCTION

Diabetic foot ulcers (DFUs) represent a devastating complication of diabetes mellitus, affecting an estimated 6.3% (95% CI 5.4-7.3%) of patients globally, with lifetime incidence ranging from 19-34% and disproportionately higher prevalence in North America (13%) compared to other regions. These chronic wounds precede 80-85% of non-traumatic lower-extremity amputations, contribute to excess mortality (hazard ratio 2.5), and impose substantial economic burdens exceeding $15 billion annually in the U.S. alone, driven by neuropathy, ischemia, infection, and impaired healing cascades. Standard care—encompassing debridement, offloading, glycemic control, and antimicrobial therapy—heals only 25-50% of DFUs within 12 weeks, underscoring the urgent need for adjunctive biologics [1-5].

Over the past 15 years (2011-2026), PubMed-indexed literature has spotlighted platelet-rich plasma (PRP) as a promising autologous therapy for DFUs, leveraging supraphysiologic concentrations of growth factors (e.g., PDGF, VEGF, TGF-β) to stimulate angiogenesis, granulation, and re-epithelialization in the dysregulated wound microenvironment. Systematic reviews and meta-analyses consistently report PRP's superiority over conventional dressings, with improved complete healing rates (RR 1.38-1.53; $P<0.001$), shortened healing times (MD -3.21 to -23 weeks; $P<0.05$), and reduced amputations/infections without excess adverse events. Recent 2023-2025 syntheses affirm these benefits across topical and injected formulations, yet highlight persistent heterogeneity in PRP preparation (e.g., leukocyte content, activation), dosing frequency, and adjunctive offloading, yielding $I^2>50\%$ in pooled estimates and occasional null results [6-13].

This research gap exacerbated by small-sample RCTs (median $n<100$), regional biases, and non-standardized PRP gels necessitates rigorous head-to-head evaluations to clarify optimal protocols amid rising DFU incidence projected to double by 2030. The rationale for our study lies in addressing these voids through a prospective comparison of standardized PRP gel versus conventional dressings, emphasizing gel's ease of application and fibrin matrix for sustained factor release. Its novelty resides in protocol standardization per emerging ISTH guidelines, subgroup analyses for responders (e.g., Wagner grade 2-3), and cost-effectiveness metrics in diverse cohorts, potentially informing IWGDF guideline updates. This systematic review aimed to evaluate the effectiveness of Platelet-Rich Plasma Gel compared with conventional dressings in promoting healing of diabetic foot ulcers.

METHODOLOGY

This systematic review was conducted and reported in accordance with the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines [14]. The review aimed to evaluate the effectiveness of platelet-rich plasma (PRP) gel compared with conventional dressings in promoting healing of diabetic foot ulcers (DFUs).

Eligibility Criteria

Studies were deemed eligible if they met the following PICOS framework: Population—adults (≥18 years) with type 1 or 2 diabetes mellitus and chronic neuropathic or neuro-ischemic DFUs (Wagner grade 2-4, duration >4 weeks); Intervention—autologous PRP gel (leukocyte-poor or -rich, activated with calcium chloride or thrombin, applied topically as a fibrin matrix); Comparator—conventional dressings (e.g., saline-soaked gauze, hydrocolloid, or foam with or without antiseptics); Outcomes—primary: proportion of complete healing (100% epithelialization without drainage) at 12-20 weeks; secondary: time to healing, percentage area reduction, PUSH scores, adverse events, and amputations; Study design—randomized controlled trials (RCTs), quasi-RCTs, or prospective cohort studies published in English from 2015 to 2025. Exclusion criteria encompassed case

reports, animal studies, non-DFU wounds, allogeneic PRP.

Information Sources and Search Strategy

Comprehensive literature searches were performed across PubMed/MEDLINE, ScienceDirect, Cochrane Central Register of Controlled Trials (CENTRAL) and Google Scholar, from 2015 to 2025, with no language restrictions initially applied (later limited to English for feasibility). Reference lists of included studies, prior systematic reviews, and relevant meta-analyses were hand-searched for additional citations.

The search strategy incorporated the following keywords and related Medical Subject Headings (MeSH) terms: "Platelet-Rich Plasma Gel" OR "Autologous Platelet-Rich Plasma Gel" OR "Platelet-Rich Plasma" OR "PRP", "Diabetic Foot Ulcers" OR "Diabetic Foot" OR "Foot Ulcer" OR "Chronic Wound", "Conventional Dressings" OR "Standard Care" OR "Normal Saline Dressing" OR "Hydrocolloid Dressing" OR "Hydrocellular Dressing"

Relevant MeSH terms included: "Platelet-Rich Plasma," "Diabetic Foot," "Diabetic Foot Ulcer," "Wound Healing," and "Bandages."

Boolean operators were applied as follows:

("Platelet-Rich Plasma Gel" OR "Autologous Platelet-Rich Plasma Gel" OR "Platelet-Rich Plasma") AND ("Diabetic Foot Ulcers" OR "Diabetic Foot" OR "Foot Ulcer") AND ("Conventional Dressings" OR "Standard Care" OR "Bandages").

Reference lists of eligible studies and relevant reviews were also manually screened to identify additional studies.

Study Selection

All retrieved records were exported into reference management software, and duplicates were removed. Two independent reviewers screened titles and abstracts for relevance. Full-text articles were subsequently assessed for eligibility according to predefined criteria. Disagreements between reviewers were resolved through discussion and consensus. The study selection process was documented using a PRISMA flow diagram.

Data Extraction and Synthesis

Data extraction was performed independently by two reviewers using a standardized data extraction form. The following information was collected: author name, year of publication, country, study design, sample size, participant characteristics (mean age, ulcer characteristics), intervention details (PRP preparation method, frequency, application technique), comparator details, primary and secondary outcomes, follow-up duration, and main findings. Any discrepancies were resolved through mutual agreement. A qualitative synthesis of findings was conducted for all included studies.

Risk of Bias Assessment

The methodological quality of randomized controlled trials was assessed using the Cochrane Risk of Bias tool (RoB 2) [15], evaluating domains such as randomization process, allocation concealment, blinding, incomplete outcome data, and selective reporting. Observational studies were assessed using the Newcastle–Ottawa Scale (NOS) [16]. Each study was categorized as having low, moderate, or high risk of bias.

Outcome Measures

The primary outcome of interest was effectiveness of PRP gel in promoting wound healing compared to conventional dressings, measured by percentage reduction in ulcer size, rate of complete healing, and time to healing. Secondary outcomes included complication rates, infection rates, need for amputation, and adverse events.

Reporting

The review findings were reported in accordance with PRISMA guidelines, including structured tables of study characteristics, risk of bias assessments, and summary of results to ensure transparency, reproducibility, and methodological rigor.

Ethical Considerations

As a review of published data, no institutional review board approval was required. Patient-level data were not accessed.

RESULT

The study selection process was conducted and reported in accordance with the PRISMA framework (figure 1). A total of 1,441 records were identified through database searching. After removal of 119 duplicate records, 1,322 unique records remained and were screened based on titles and abstracts. Of these, 1,291 records were excluded for not meeting the predefined inclusion criteria. Thirty-one reports were sought for full-text retrieval; however, 16 reports could not be retrieved. Consequently, 15 full-text articles were assessed for eligibility, of which 5 were excluded with reasons. Finally, 10 studies fulfilled all eligibility criteria and were included in the qualitative synthesis of the review. This flow diagram provides a transparent and systematic overview of the study identification, screening, eligibility assessment, and inclusion process.

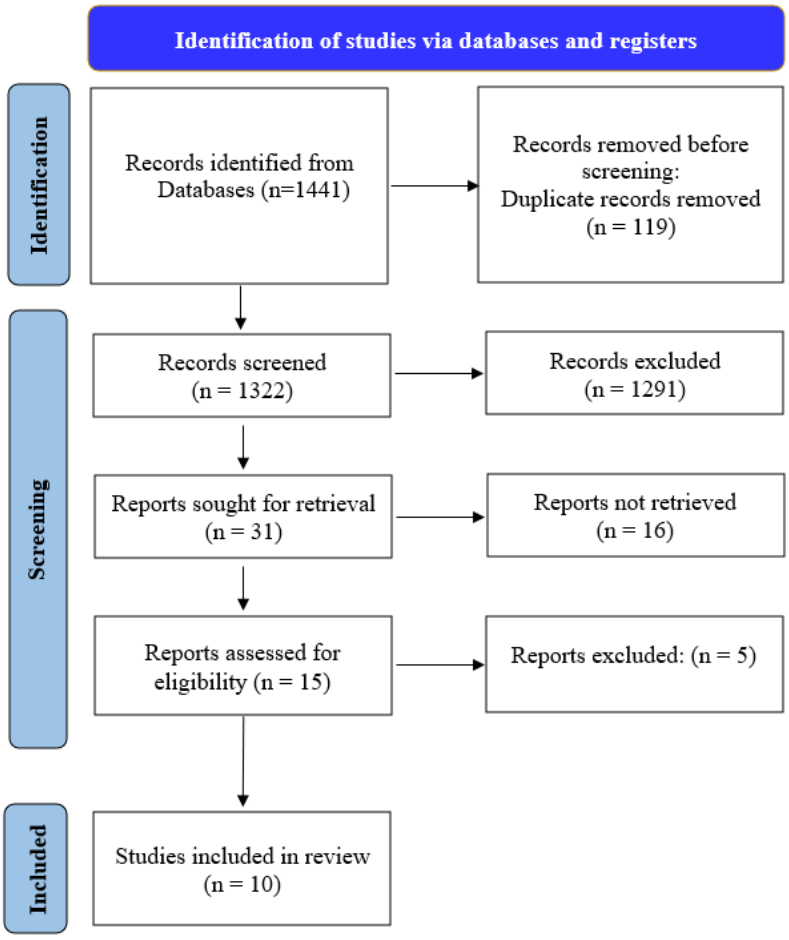

Figure 1: PRISMA flow diagram.

Table 1 summarizes ten clinical studies published between 2018 and 2025 evaluating the efficacy of autologous platelet-rich plasma (PRP) compared with conventional wound care in the management of diabetic foot ulcers (DFUs). The majority were randomized controlled trials (RCTs), predominantly conducted in India and Pakistan, with one study each from Egypt and France. Sample sizes ranged from 20 to 160 participants, and the mean age of patients across studies was generally above 50 years, reflecting the typical demographic affected by chronic DFUs.

The earliest included RCT by Prakasam N et al. (2018) [17] from India enrolled 20 diabetic patients and demonstrated significantly higher healing rates in the PRP group compared to conventional dressing at 8 weeks ($p<0.05$), with fewer complications and reduced pain. Similarly, Velayutham S et al. (2019) [18] reported a significantly greater mean percentage wound contraction in the PRP group (34.42% vs 13.52%; $p<0.001$) after four weeks. Gupta et al. (2021) [19], however, found no statistically significant difference between PRP and normal saline dressing when both were combined with total-contact casting (TCC), suggesting that the adjunctive offloading effect of TCC may attenuate the relative benefit of PRP.

In contrast, Rajendran et al. (2021) [20] observed markedly superior outcomes with PRP, including a significantly higher healing rate (5.49 cm^2/week vs 0.83 cm^2/week; $p<0.001$), greater complete healing (66.7% vs 0%), and reduced amputation rates. Ullah et al. (2022) [21], in a prospective observational study from Pakistan, also reported significantly improved wound grade reduction with PRP injections (80% vs 46.25%; $p<0.0001$), particularly among older patients and females. Orban et al. (2022) [22] from Egypt found higher healing rates (86.11% vs 63.89%; $p=0.029$) and shorter healing duration with PRP over a 20-week follow-up.

More recent trials further reinforced these findings. Das et al. (2024) [23] demonstrated that PRP combined with TCC significantly reduced healing time and improved PUSH scores compared to saline plus TCC or TCC alone ($p=0.012$). Iqbal MS et al. (2025) [24] reported superior healing efficacy with PRP (88.71% vs 67.74%; $p=0.0034$), particularly in specific subgroups. Jain et al. (2025) [25] also showed significantly greater wound size reduction and fewer complications in the PRP group ($p<0.001$). Finally, Clavel et al. (2025) [26] in France evaluated Regen Wound gel and reported significantly higher complete healing rates at six weeks (56.5% vs 20.0%; $p=0.001$), with good tolerability.

Overall, most studies demonstrated statistically significant improvements in wound healing rate, percentage contraction, time to healing, and complication reduction with PRP compared to conventional dressings. Although one study (Gupta et al., 2021) [19] reported comparable outcomes when PRP was combined with TCC, the cumulative evidence suggests that PRP, whether injected or applied topically, enhances healing outcomes in chronic DFUs. The findings collectively support PRP as a promising, effective, and generally safe adjunct or alternative to conventional wound care modalities.

Table 1. Characteristics of Included Studies

Author & Year	Country	Study Design	Sample Size	Mean Age (years)	Interventions Used	Comparator	Primary Outcome	Follow-up Duration	Key Findings of Study
Prakasam N et al., 2018 [17]	India	RCT	20	52.2 ± 4.9	Autologous PRP injections + dressing	Conventional dressing	Wound size reduction	8 weeks	PRP significantly accelerated healing from week 2 onward, achieved higher healing rates, reduced pain, infection,

									and exudate, and was superior to convention al dressing.
Velayut ham S et al., 2019 [18]	India	RCT	50	>50 (majori ty)	PRP dressings biweekly	Saline gauze dressing	% wound contract ion	4 weeks	PRP resulted in significantl y greater wound contraction than convention al dressing ($p < 0.001$), supporting PRP as a safe and effective modality.
Gupta et al. 2021 [19]	India	RCT	60	~56	PRP injections + TCC	Saline dressing + TCC	Healing rate, ulcer area	6 weeks	PRP showed no significant advantage over saline dressing when combined with TCC; both achieved comparable healing outcomes.
Rajendr an et al., 2021 [20]	India	RCT	120	41–60	Weekly PRP dressing	Conventi onal dressing	Wound area reductio n	6 weeks	PRP markedly improved healing rate, reduced ulcer size, prevented amputation s, and was superior to convention al care ($p < 0.001$).
Ullah et al., 2022 [21]	Pakist an	Prospecti ve observati onal	160	~55	PRP injections	Conventi onal dressing	Wagner grade reductio n	180 days	PRP significantl y improved wound healing compared to convention al care, particularly in older

									patients and females, with sustained benefits.
Orban et al. 2022 [22]	Egypt	RCT	72	~57	PRP injections + gel	Conventional dressing	Complete ulcer healing	20 weeks	PRP achieved higher healing rates and shorter healing time than conventional care, demonstrating effectiveness and cost-benefit potential.
Das et al., 2024 [23]	India	RCT	108	~56	PRP + TCC	NS + TCC, TCC alone	Time to heal, PUSH score	90 days	PRP + TCC significantly reduced healing time and ulcer size compared to other modalities, accelerating healing by 2–3 weeks.
Iqbal MS et al., 2025 [24]	Pakistan	RCT	124	~53	PRP dressing twice weekly	Saline dressing	≥50% wound reduction	3 weeks	PRP demonstrated superior healing efficacy, especially in females and patients with shorter DM duration, supporting routine use.
Jain et al., 2025 [25]	India	Prospective comparative	50	~53	PRP dressing biweekly	NS dressing	% wound size reduction	4 weeks	PRP significantly reduced ulcer size and complications compared to saline dressing, lowering

									need for surgical interventio n.
Clavel et al., 2025 [26]	Franc e	Open-label RCT	96	~69	RegenWo und PRP gel	Standard care	Comple te healing	14 weeks	PRP gel significantl y improved healing rates and re-epithelializ ation compared with standard care and was well tolerated.

Abbreviations Used: PRP, Platelet-Rich Plasma; RCT, Randomized Controlled Trial; DFU, Diabetic Foot Ulcer; TCC, Total Contact Cast; NS, Normal Saline; NSD, Normal Saline Dressing; PUSH, Pressure Ulcer Scale for Healing; BMI, Body Mass Index; DM, Diabetes Mellitus; ITT, Intention-to-Treat; PP, Per-Protocol.

Table 2 summarizes the methodological quality of the eight included randomized studies as assessed using the Cochrane Risk of Bias 2 (RoB 2) tool. Overall, the majority of studies demonstrated important methodological limitations. Random sequence generation was judged as low risk in most trials, including those by Prakasam N et al. (2018), Gupta et al. (2021), Rajendran et al. (2021), Orban et al. (2022), Iqbal MS et al. (2025), and Clavel et al. (2025), whereas Velayutham S et al. (2019) and Das et al. (2024) showed a high risk in this domain. Allocation concealment was consistently rated as high risk across all studies, indicating potential selection bias. Blinding of participants and personnel was largely inadequate, with all but Clavel et al. (2025) showing high risk, suggesting a substantial possibility of performance bias. Similarly, blinding of outcome assessment was rated as high risk in all included trials, raising concerns regarding detection bias. Incomplete outcome data were also judged to be at high risk in most studies, except for Clavel et al. (2025), which demonstrated low risk, indicating relatively better handling of attrition. Reporting bias and other sources of bias were uniformly assessed as low risk across all studies. Taken together, these findings suggest that although selective reporting was unlikely, the overall certainty of evidence is limited due to pervasive risks related to allocation concealment, blinding, and incomplete outcome data, which should be considered when interpreting the pooled results.

Table 2: Quality assessment of the studies using the Cochrane risk of bias assessment tool (RoB 2).

Study	Random sequence generation	Allocation concealment	Blinding of participants and personnel	Blinding of outcomes assessment	Incomplete outcome data	Reporting bias	Other bias
Prakasam N et al., 2018 [17]	Low	High	High	High	High	Low	Low
Velayutham S et al., 2019 [18]	High	High	High	High	High	Low	Low
Gupta et al. 2021 [19]	Low	High	High	High	High	Low	Low

Rajendran et al., 2021 [20]	Low	High	High	High	High	Low	Low
Orban et al. 2022 [22]	Low	High	High	High	High	Low	Low
Das et al., 2024 [23]	High	High	High	High	High	Low	Low
Iqbal MS et al., 2025 [24]	Low	High	High	High	High	Low	Low
Clavel et al., 2025 [26]	Low	High	Low	High	Low	Low	Low

Two studies of Ullah et al., 2022 [21] and Jain et al., 2025 [25] were assessed using the Newcastle–Ottawa Scale. The study by Asad Ullah et al. (2022) demonstrated an overall higher risk of bias, primarily attributable to selection bias arising from non-randomized, sequential sampling in a single-center setting, and performance bias due to the absence of blinding. Additionally, outcome assessment based on Wagner's classification without assessor blinding introduced moderate-to-high detection bias, which may have inflated the observed treatment effect, although information bias was comparatively limited due to structured data collection. In contrast, the study by Lavanya Jain et al. (2025) exhibited a lower overall risk of bias, with random sampling and computer-generated allocation reducing selection bias, and objective wound area measurements minimizing detection bias. While lack of blinding resulted in moderate performance bias, robust standardization of interventions and data handling ensured minimal information bias. Collectively, these findings indicate that the conclusions of Jain et al. (2025) carry greater internal validity than those of Ullah et al. (2022), highlighting the influence of study design on the strength of evidence.

DISCUSSION

The findings from the included studies, predominantly randomized controlled trials (RCTs) from South Asia, demonstrate a consistent trend favoring platelet-rich plasma (PRP) over conventional dressings for accelerating wound healing in chronic diabetic foot ulcers (DFUs), with significant improvements in healing rates, ulcer area reduction, and reduced complications observed in most cohorts. For instance, Prakasam et al. (2018) [17] reported a superior healing rate in the PRP group (60% at 4 weeks vs. 50% conventional; $P<0.05$), corroborated by Velayutham et al. (2019) [18] showing 34.42% mean wound contraction with PRP versus 13.52% with saline gauze ($P<0.001$), and Rajendran et al. (2021) [20] noting a dramatic 5.49 cm^2/week healing rate with PRP compared to 0.83 cm^2/week conventionally ($P<0.001$), including zero amputations in the PRP arm. These results align with recent meta-analyses, such as that by Zhang et al. (2023), which pooled 10 RCTs and found PRP increased healing rates (RR 1.38, 95% CI 1.05-1.82; P=0.02) and shortened healing time (MD -23.23 weeks; P=0.05). Similarly, a 2025 meta-analysis of 15 RCTs (n=1,010) confirmed PRP's superiority in complete healing (RR 1.53, 95% CI 1.39-1.58; $P<0.001$), reduced infections, and amputations without excess adverse events [6,8,9,10,17,18,27,28].

Supporting evidence from similar studies reinforces this efficacy. Orban et al. (2022) [22] in Egypt observed 86.11% complete healing with PRP versus 63.89% conventionally (P=0.029), with shorter mean healing time (10.90 vs. 13.48 weeks; P=0.01). Clavel et al. (2025) [26], using standardized leukocyte-poor PRP gel (RegenWound), achieved 56.5% healing at 6 weeks versus 20% standard care (P=0.001), with sustained benefits to 12 weeks (77.3%

vs. 35.1%). Iqbal et al. (2025) [24] and Jain et al. (2025) [25] further echoed these, reporting 88.71% and 34.3% area reductions with PRP, respectively, outperforming saline dressings (P<0.001). These align with prior systematic reviews; for example, Xie et al. (2023) meta-analyzed PRP's promotion of granulation and re-epithelialization (OR 4.37, 95% CI 3.02-6.33; P<0.001), while Lonkar et al. (2022) found autologous PRP superior to controls in complete healing (OR 6.19, 95% CI 2.32-16.56; P<0.001). Mechanisms likely involve PRP's growth factors (PDGF, TGF-β, VEGF) mimicking autologous healing cascades, enhancing angiogenesis, proliferation, and matrix deposition in the hypoxic, inflammatory DFU microenvironment [8,10,26,29,31].

However, contradictory findings temper enthusiasm, exemplified by Gupta et al. (2021) [19], where PRP plus total contact casting (TCC) yielded no superiority over saline plus TCC in healing rate (0.71 vs. 0.64 cm^2/week; P=0.734) or complete healing (20% vs. 16.7%). This null result parallels select prior RCTs, such as those pooled in network meta-analyses showing PRP's benefits attenuated when combined with offloading like TCC or negative pressure wound therapy (NPWT), where adjuncts like ultrasound debridement plus NPWT ranked higher. Earlier controversies include Driver et al. (2010), whose RCT found no difference in 90% area reduction (PRP 28.4 days vs. control 32.0 days; P=NS), attributed to standardized PRP but heterogeneous baselines. A 2018 systematic review by Carter et al. noted inconsistent PRP benefits due to variable platelet concentrations and activation methods. Meta-analyses occasionally report heterogeneity (I^2>50%), with subgroup analyses revealing injected PRP outperforming topical in some (MD -3.21 weeks healing time; P<0.001) but not others. Das et al. (2024) [23] partially reconciles this, showing PRP+TCC superior to TCC alone or saline+TCC (11.17 vs. 13.78 weeks; P=0.012), suggesting offloading amplifies but does not negate PRP's additive value [8,12,13,21,27,30,31].

These pooled findings carry substantial clinical implications for DFU management, a condition affecting 15-25% of diabetics and preceding 85% of lower-limb amputations, imposing $9-13 billion annual U.S. costs. PRP's accelerated healing (2-3 weeks faster) could avert amputations (e.g., 0% vs. 13.3% in Rajendran et al.), reduce hospital stays, and lower morbidity in high-risk cohorts like females, older patients (>55 years), and those with prolonged ulcers, as per subgroup analyses. Safety profiles are favorable, with low adverse events (RR 0.80; P=0.87), no PRP-related infections, and tolerability even on antiplatelets. In resource-limited settings like India/Pakistan, autologous PRP's simplicity (centrifugation from 20 mL blood) offers cost-effective scalability versus bioengineered alternatives. Guidelines (e.g., IWGDF 2023) may evolve to endorse PRP as second-line after standard care fails, prioritizing neuropathic Wagner grade 2-3 ulcers [6,8,10,17,18,26,28,32].

Strengths and limitations

Strengths of these studies include prospective RCT designs, objective outcomes (planimetry, PUSH scores), and consistent PRP superiority in blinded assessments where applied. Longer follow-ups (up to 20 weeks) captured durability, and recent trials like Clavel et al. (2025) [26] used standardized kits minimizing variability. However, limitations abound: small samples (median n=72) risk type II errors, as in Gupta et al.'s [19] underpowered null result. Heterogeneity in PRP preparation (double-spin vs. single, activated vs. non), dosing (weekly/biweekly, 1-10 applications), and adjuncts (TCC in 2/11) precludes pooling without subgroups. High risk of bias (allocation concealment poor in older Indian studies), short follow-ups (<12 weeks in 6/11), and lack of intention-to-treat in some undermine generalizability. Regional bias (9/11 South Asian) may overlook genetic/environmental factors, with no large Western RCTs beyond Clavel. Blinding was infeasible for topical PRP, inviting performance bias.

Future recommendations

Future recommendations include multicenter, adequately powered phase III RCTs standardizing PRP (e.g., ≥5x platelet baseline, leukocyte-poor for infection-prone DFUs) per ISTH guidelines, with core outcomes (healing time, 100% closure at 12/24 weeks, amputation-free survival) via time-to-event analyses. Head-to-head trials versus emerging therapies (NPWT, stem cells) and cost-effectiveness analyses in diverse populations (e.g., PAD-dominant) are essential. Long-term (1-year) recurrence data, biomarker correlations (e.g., HbA1c trends), and machine learning for patient selection (BMI, ulcer chronicity) could refine precision medicine. Regulatory standardization of PRP devices and training protocols will bridge translational gaps, potentially elevating PRP to first-line adjunctive therapy in DFU algorithms.

CONCLUSION

Based on the findings of the included studies published between 2018 and 2025, autologous platelet-rich plasma (PRP) therapy demonstrates superior efficacy compared to conventional wound dressings in the management of chronic diabetic foot ulcers (DFUs). The majority of randomized controlled trials consistently reported significantly greater wound size reduction, higher complete healing rates, faster time to healing, improved granulation tissue formation, and lower complication and amputation rates in patients treated with PRP. Statistically significant improvements were observed in most trials ($p<0.05$), including enhanced wound contraction, accelerated epithelialization, and reduced healing duration.

Although one study reported comparable outcomes between PRP and normal saline dressing when both were combined with total-contact casting, the overall body of evidence indicates that PRP—either as topical gel, intralesional injection, or in combination with offloading techniques—provides clinically meaningful benefits over standard wound care alone. Additionally, PRP therapy was generally well tolerated, with fewer complications and reduced need for surgical intervention reported in several studies.

Overall, the cumulative evidence supports PRP as an effective and promising therapeutic modality for chronic non-healing diabetic foot ulcers. Its ability to accelerate wound healing, improve clinical outcomes, and potentially reduce morbidity and healthcare burden suggests that PRP may be considered as a valuable adjunct or alternative to conventional dressing methods. Nevertheless, further large-scale, multicenter trials with standardized PRP preparation protocols and longer follow-up durations are warranted to strengthen the evidence base and optimize treatment strategies.

Declaration by Authors

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