Integrated Protocol of Nutrition and Stomatherapy in the Management of Peripheral Arterial Disease

Protocolo Integrado de Nutrição e Estomaterapia no Manejo da Insuficiência Arterial Periférica
Protocolo Integrado de Nutrición y Estomaterapia en el Manejo de la Insuficiencia Arterial Periférica

RESUMO
Objetivo: Analisar o papel da enfermagem e da nutrição no cuidado ao paciente com IAP e propor um protocolo integrado de apoio à prática clínica. **Método:** Revisão narrativa nas bases *PubMed, SciELO, LILACS, Cochrane e Web of Science* (2019–2024), com descritores MeSH/DeCS e operadores booleanos. Incluíram-se artigos em português, inglês e espanhol sobre cuidados interdisciplinares, enfermagem e nutrição na IAP. **Resultados:** As intervenções de enfermagem baseadas em NANDA, NIC e NOC promovem segurança e organização clínica, enquanto a nutrição contribui para o equilíbrio metabólico e cicatrização. O protocolo integrado propõe etapas práticas de atuação conjunta, com foco em educação em saúde e adesão terapêutica. **Conclusão:** A integração entre enfermagem e nutrição no manejo da IAP melhora desfechos clínicos, previne complicações e reduz amputações, fortalecendo a prática interdisciplinar e a eficiência dos serviços de saúde.
DESCRITORES: Insuficiência arterial periférica; Nutrição; Enfermagem; Estomaterapia; Cicatrização de feridas; Cuidados interdisciplinares de saúde.

ABSTRACT
Objective: To analyze the role of nursing and nutrition in the care of patients with AIP and propose an integrated protocol to support clinical practice. **Method:** Narrative review in the PubMed, SciELO, LILACS, Cochrane, and Web of Science databases (2019–2024), using MeSH/DeCS descriptors and Boolean operators. Articles in Portuguese, English, and Spanish on interdisciplinary care, nursing, and nutrition in API were included. **Results:** Nursing interventions based on NANDA, NIC, and NOC promote safety and clinical organization, while nutrition contributes to metabolic balance and healing. The integrated protocol proposes practical steps for joint action, focusing on health education and therapeutic adherence. **Conclusion:** The integration of nursing and nutrition in the management of PAI improves clinical outcomes, prevents complications, and reduces amputations, strengthening interdisciplinary practice and the efficiency of health services.
DESCRIPTORS: Peripheral arterial insufficiency; Nutrition; Nursing; Stomach therapy; Wound healing; Interdisciplinary health care.

RESUMEN
Objetivo: Analizar el papel de la enfermería y la nutrición en la atención al paciente con IAP y proponer un protocolo integrado de apoyo a la práctica clínica. **Método:** Revisión narrativa en las bases PubMed, SciELO, LILACS, Cochrane y Web of Science (2019-2024), con descriptores MeSH/DeCS y operadores booleanos. Se incluyeron artículos en portugués, inglés y español sobre cuidados interdisciplinarios, enfermería y nutrición en la IAP. **Resultados:** Las intervenciones de enfermería basadas en NANDA, NIC y NOC promueven la seguridad y la organización clínica, mientras que la nutrición contribuye al equilibrio metabólico y la cicatrización. El protocolo integrado propone etapas prácticas de actuación conjunta, con enfoque en la educación en salud y la adherencia terapéutica. **Conclusión:** La integración entre enfermería y nutrición en el manejo de la IAP mejora los resultados clínicos, previene complicaciones y reduce las amputaciones, fortaleciendo la práctica interdisciplinaria y la eficiencia de los servicios de salud.
DESCRIPTORES: Insuficiencia arterial periférica; Nutrición; Enfermería; Estomaterapia; Cicatrización de heridas; Cuidados interdisciplinarios de salud.

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INTRODUCTION

Peripheral arterial insufficiency (PAI) is a chronic condition that significantly impacts morbidity and mortality, mobility, and quality of life in patients, and is one of the

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main causes of amputations when not diagnosed and managed early. Proper detection, combined with risk stratification, is essential for preventing major complications and defining conservative or surgical therapeutic strategies[1,2].

The diagnosis of PAD traditionally involves the ankle-brachial index (ABI). However, indices focused on distal perfusion, such as the toe-brachial index (TBI) and systolic pressure of the big toe, have shown greater sensitivity in patients with calcified or incompressible arteries and are recommended for accurate assessment in high-risk clinical settings, such as patients with foot ulcers or advanced arterial disease[1] .

The management of PAD has proven to be more effective when structured in a multidisciplinary manner. Limb salvage programs and integrated units demonstrate better clinical outcomes and greater coordination of care. However, despite the concept of multidisciplinary care, the effective integration of nutritionists and nursing teams is still insufficient in many services, highlighting gaps in clinical practice and in the coordination of care flows[1,3] .

Nutrition plays a decisive role in the healing and prognosis of patients with API. Scope studies and clinical trials indicate a high prevalence of malnutrition in patients undergoing vascular interventions, associated with delayed healing and worse postoperative outcomes. Nutritional screening tools, such as *Controlling Nutritional Status* (CONUT) and *Prognostic Nutritional Index* (PNI), have been used to identify nutritional risk, although their application remains heterogeneous and poorly integrated into clinical nursing flows[4-6] .

In addition to nutrition, multiple factors influence wound healing in patients with APIs, including comorbidities such as diabetes and obesity, lesion characteristics, and habits such as smoking. Specific interventions, such as negative pressure therapy, glycemic control, and edema management, have been shown to reduce complications and promote limb salvage, highlighting the importance of integrated protocols between surgery, nursing, and nutrition[7-10] .

Recent studies investigate complementary strategies, such as passive exercises for patients with foot ulcers and infrared irradiation, as well as lifestyle medicine approaches, showing promising effects on perfusion and inflammation. However, this evidence is still exploratory and lacks robust clinical trials that systematically integrate nutritional assessment, nursing care, and vascular interventions[11-13] .

In summary, the literature confirms the relevance of accurate vascular diagnosis, adequate nutritional status, and multidisciplinary care in the treatment of patients with PAI, but highlights important gaps: heterogeneity in nutritional assessments, underrepresentation of nursing and nutrition in integrated protocols, and a scarcity of studies evaluating combined interventions in a controlled manner.

This manuscript therefore proposes a critical narrative review of the pathophysiology, diagnosis, and management of API, focusing on the role of nursing and nutrition in comprehensive care. It seeks to identify conceptual and operational gaps and present subsidies for the construction of interdisciplinary protocols that can improve healing and limb salvage.

METHODOLOGY

This study consists of a narrative review of the literature, conducted to integrate and critically analyze the available evidence on peripheral arterial insufficiency (PAI), with an emphasis on the interfaces between nursing, nutrition, and stoma therapy.

The literature search was conducted between March and April 2025 in the *PubMed/MEDLINE*, *SciELO*, *Web of Science*, and *Cochrane Library* databases, using *MeSH* and *DeCS* descriptors, combined with free terms and Boolean operators:

"Peripheral Arterial Disease" AND "Nutrition"

("Peripheral Arterial Disease" OR "Limb Ischemia") AND ("Dietary Supplements" OR "Nutrition") AND "Nursing Care"

"Peripheral Arterial Disease" AND "Wound Healing"

"Peripheral Arterial Disease" AND "Nutrition" AND "Nursing"

Filters were applied to restrict the results to publications from the last five years (2019–2024), in full text and free of charge**.**

Inclusion criteria: studies with adults diagnosed with PAD or critical limb ischemia, addressing nutrition, nursing, or stoma therapy in clinical or surgical management; languages: Portuguese, English, or Spanish; robust designs (systematic reviews, meta-analyses, clinical trials, observational studies).

Exclusion criteria: duplicates, opinion articles, editorials, studies on chronic venous insufficiency, or studies not directly related to the topic.

The initial search identified 240 articles. After reading the titles and abstracts, 128 were considered eligible. After excluding duplicates and evaluating the full texts, 14 articles remained, which comprised the final sample.

The data extracted included: authors, year, design, study population, nutrition, nursing, and stoma therapy interventions, main findings, and gaps. The results were organized in a summary table and discussed in light of interdisciplinarity.

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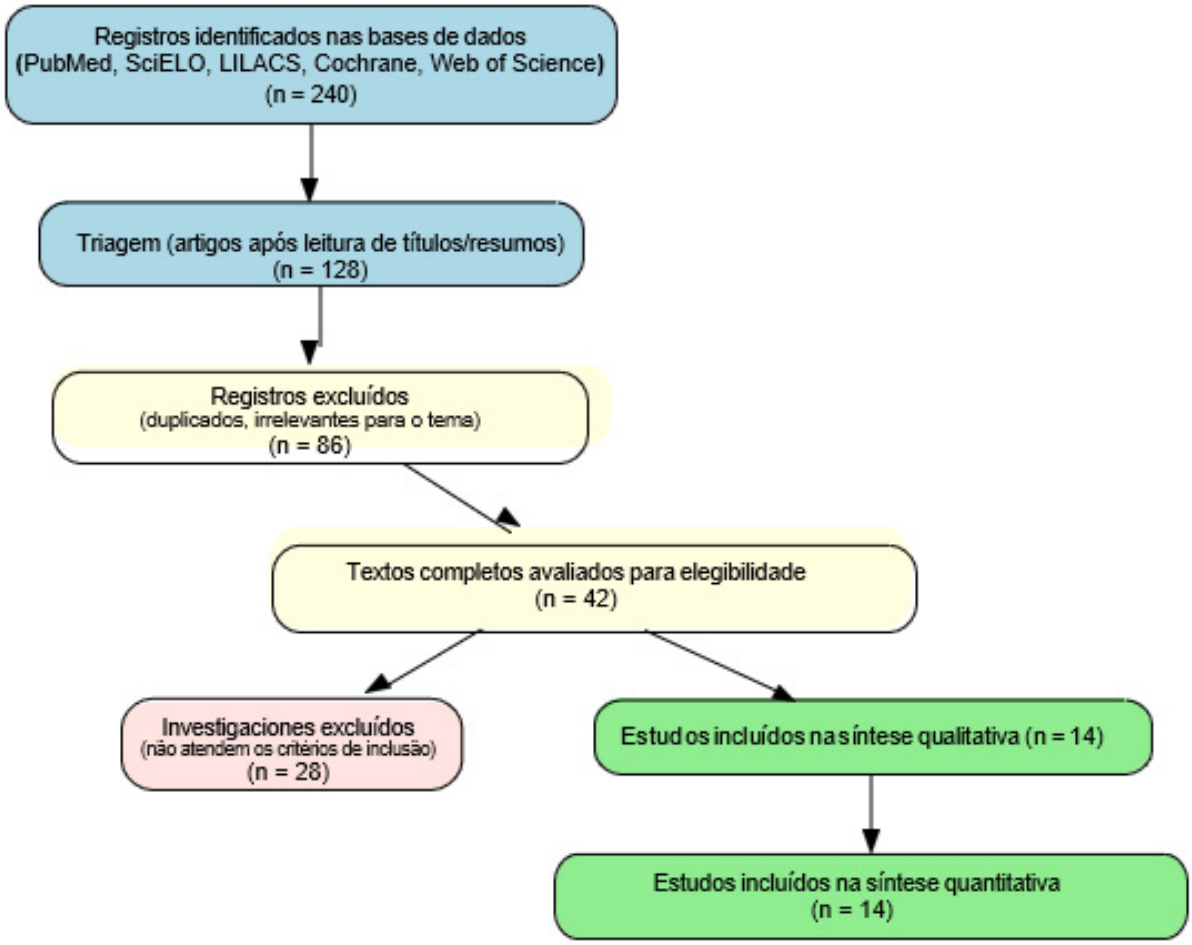
PRISMA flowchart:



RESULTS

Table 1 – Evidence on Peripheral Arterial Insufficiency and Interfaces with Nursing and Nutrition – Brazil, 2025

Author/Year	Title / Type of Study	Main Results	Contributions to Nursing/ Nutrition	Interdisciplinary Gaps
Tehan *et al*., 2024[1]	Toe-brachial index and toe systolic blood pressure for PAD diagnosis (Revisão Cochrane)	TBI and toe systolic blood pressure are reliable methods for diagnosing PAD	Supports early diagnosis, useful for nursing protocols	Little interface with nutritional assessment in diagnosis
Neville, 2024[2]	Management of PAD in multidisciplinary limb program (Revisão/Comentário)	Addresses multidisciplinary management of PAD in limb salvage programs	Reinforces the role of nursing in therapeutic adherence	Nutrition is not addressed in an integrated manner
Rodighiero *et al*., 2022[4]	Malnutrition in PAD interventions (Scoping review)	High prevalence of malnutrition in patients undergoing PAI intervention	Evidence of the need for pre-intervention nutritional screening	Nursing staff not very involved in nutritional protocols
Marques *et al*., 2023[7]	Prognostic factors for delayed healing (Scoping review)	Factors such as age, infection, and comorbidities delay healing	Nursing in wound monitoring	Nutrition appears indirectly; absence of combined protocols

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Frodl *et al*., 2022[8]	Negative pressure wound therapy in amputations (Meta-análise)	NPWT reduces infections in major amputations	Direct support for nursing protocols in surgical care	Does not explore nutritional support as an adjunct
Lai, 2024[13]	Lifestyle medicine in wound management (Revisão narrativa)	Healthy lifestyle accelerates healing	Health education and self-care, role of nursing	Need to integrate structured nutritional counseling
Lane *et al*., 2020[9]	Glycemic control and DFU outcomes (Revisão sistemática e meta-análise)	Glycemic control improves prognosis for diabetic ulcers	Monitoring by nursing staff is essential	Nutrition as a pillar of glycemic control not explored in depth
Burian *et al*., 2024[10]	Obesity and chronic oedema (Estudo multicêntrico)	Obesity aggravates edema/lymphedema in the lower limbs	Relevance for health education by nurses	Nutritional strategies not integrated into care protocols
Kobayashi *et al*., 2022[5]	Nutritional assessment in CLTI patients (Estudo clínico)	Preoperative assessments identify nutritional risk	Strengthens the role of the nutritionist before bypass surgery	Nursing poorly integrated into the process
Bechara et al., 2024[14]	Smoking and systolic toe pressures (Estudo observacional)	Smoking reduces systolic pressure and worsens prognosis	Support for health counseling by nurses	No integration with nutritional support
Jørgensen *et al*., 2024[11]	Passive movement exercise in DFU (Ensaio clínico)	Passive exercise promotes healing in diabetic foot	Potential for nursing protocols in rehabilitation	Nutrition not considered as a variable
Mine *et al*., 2021[6]	Controlling nutritional status and wound healing in CLTI (Estudo clínico)	Nutritional score impacts healing after endovascular treatment	Strengthens screening and nutritional support	Little integration with nursing care plan
Li *et al*., 2024[3]	Multidisciplinary approach to limb salvage (Observacional)	Multidisciplinary teams improve outcomes in limb salvage	Nursing essential in clinical follow-up	Nutrition not yet systematized in multidisciplinary workflows
Peng *et al*., 2020[12]	Far-infrared irradiation in adults (Ensaio clínico)	Increases skin temperature and improves cardiac variability	Complementary strategy to nursing care	Nutrition not addressed; limited interdisciplinarity

Source: author

DISCUSSION

The integrated analysis of the studies highlights the complexity of managing peripheral arterial insufficiency (PAI), which transcends the strictly vascular dimension and requires a multidisciplinary approach. Tehan *et al*.[1] reinforce the relevance of accurate diagnostic methods, such as the ankle-brachial index and systolic pressure of the big toe, which are fundamental for risk stratification and therapeutic planning. However, although indispensable, these methods do not consider the nutritional and functional determinants that modulate clinical evolution. In this regard, Rodighiero *et al*.[4] highlight the high prevalence of malnutrition in patients undergoing vascular interventions, pointing to a critical gap: the routine incorporation of nutritional screening protocols remains underutilized.

The work of Neville[2] broadens the debate by advocating multidisciplinary programs for the management of PAI, in which coordinated action between specialties is crucial for limb preservation. Despite this, it is observed that most initiatives prioritize the integration between vascular surgery and physical therapy, while nursing and nutrition are relegated to secondary roles, which highlights a structural gap in clinical practice. This absence contrasts with the findings of Kobayashi *et al*.[5] and Mine *et al*.[6], which prove the association between nutritional status and postoperative prognosis, including healing after revascularization. Both studies point out that patients with inadequate nutritional scores have higher rates of complications, emphasizing the need for nurses and nutritionists to work together in pre-procedure assessment.

In the field of direct wound care, Marques *et al*.[7] and Frodl *et al*.[8] identify prognostic factors for healing and discuss adjuvant strategies, such as negative pressure therapy. However, such technical interventions may lose their effectiveness if not accompanied by adequate nutritional support and rigorous monitoring by the nursing team. In addition, Lai[13] introduces the perspective of lifestyle medicine, suggesting that behavioral changes, including diet, smoking cessation, and physical activity, have a direct impact on the evolution of lesions. This approach is in line with Bechara *et al*.[14], who associate smoking with worsening tissue perfusion, reaffirming the importance of health education conducted by nurses, in alignment with individualized nutritional guidelines.

Another recurring point in the literature is the influence of metabolic comorbidities. Lane *et al*.[9] demonstrate that poor glycemic control compromises ulcer healing, reinforcing the role of clinical nutrition in supporting diabetic patients. Burian *et al*.[10] add that obesity contributes to the worsening of chronic edema, hindering the prognosis of PAI, which requires joint interventions between nutritionists, for weight control, and nurses, for edema management and prevention of secondary lymphedema.

Innovative strategies also emerge as potential adjuvants. Jorgensen *et al*.[11] show that passive exercises can

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promote healing in patients with diabetic foot, while Peng *et al.*[12] explore infrared irradiation for modulating skin perfusion. Despite the potential of these technologies, there remains a need to validate these findings in integrated protocols that simultaneously address nutritional support, nursing interventions, and vascular monitoring.

Finally, Li *et al.*[3] summarize the essence of contemporary care by describing a multidisciplinary model for limb salvage in complex patients. Although the study demonstrates tangible clinical benefits, there is still a lack of robust trials that include nutritional assessment and systematic nursing follow-up as central axes. This gap reveals a paradox: the literature recognizes the influence of nutritional status and adherence to care, but these variables are rarely integrated into the clinical outcomes evaluated.

Thus, the protocol proposed and described in Table 2 (below) represents a significant advance in clinical practice by structurally articulating nursing care, with an emphasis on stoma therapy, and specific nutritional strategies for patients with peripheral arterial insufficiency (PAI). The main objective was to reduce complications, optimize healing, preserve functional status, and strengthen therapeutic adherence, promoting a patient-centered approach.

From a nursing perspective, the protocol integrates standardized diagnoses (NANDA), systematized interventions (NIC), and expected outcomes (NOC), ensuring consistency and objectivity in care. Among the actions highlighted are monitoring skin integrity, managing ischemic wounds, preventing infections, and educating patients about home care.

In the nutritional field, we proposed individualized dietary assessment and planning, nutritional support aimed at healing, control of metabolic risk factors, and monitoring of functional status. Interdisciplinary integration between nursing and nutrition ensures that interventions are complementary, evidence-based, and oriented toward measurable results, enhancing tissue repair and preventing secondary complications.

We also believe that this protocol contributes significantly to clinical practice by systematizing interdisciplinary care flows, reinforcing continuous communication between professionals, and serving as a reference for future research on the management of APIs. The integrated approach offers a solid and innovative contribution to the care of patients with PAI, consolidating evidence and strengthening the role of interdisciplinarity in improving clinical outcomes.

Table 2 - Integrated Nursing and Nutrition Protocol for the Management of Peripheral Arterial Disease

Stage	Professional	Diagnóstico / Área de Avaliação	Intervenções	Resultados Esperados	Exemplos Práticos	Medical Record Entry	Expected Tables
1 – Initial Assessment	Nurse ET	Ineffective peripheral tissue perfusion (00024) Risk of impaired skin integrity (00047) Risk of infection (00004) Deficient knowledge about self-care (00126)	Peripheral circulation monitoring (6680) Wound care: arterial ulcers (3660) Teaching: disease process (5602) Infection prevention (6540)	Tissue perfusion: peripheral (0407) Wound healing: secondary intention (1103) Self-care: activities of daily living (0300) Knowledge: therapeutic regimen (1813)	Daily assessment of temperature, color, and pulse in the feet; wound classification; verbal guidance on home care	"Patient presents decreased peripheral perfusion in lower limbs, right plantar wound, with signs of early infection. Instruction provided on daily foot inspection and home care."	Dressing Record Assessment Table, Infection Risk Flowchart
1 – Initial Assessment	Nutritionist	Inadequate food intake Risk of malnutrition Increased need for protein and micronutrients	Assessment of nutritional status (BMI, calf circumference, MUST/NRS-2002 screening) Individualized dietary prescription Oral nutritional supplementation when indicated Nutrition education	Adequate nutritional status for healing Improved muscle strength and functionality Adherence to dietary plan	Prescription of a high-protein diet rich in vitamins A, C, zinc, and iron; practical guidance on food substitutions	"Patient presents high nutritional risk, with insufficient protein intake. Individualized dietary plan prescribed and guidance on supplementation provided."	Nutritional Assessment Table (BMI, weight, circumference), Meal Planning Spreadsheet, Supplementation Record

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2 – Joint Interventions	ET Nurse + Nutritionist	Alignment of wound care and nutritional status	Weekly interdisciplinary meeting; joint record in medical records; definition of short- and long-term goals	Joint improvement in healing and nutritional status; functional rehabilitation	Stoma therapist assesses ulcer, nutritionist adjusts meal plan according to wound status	"Interdisciplinary discussion held: dressing updated and nutritional supplementation adjusted to meet the patient's protein-calorie needs."	Interdisciplinary Planning Table, Joint Goal Record
3 – Education and Self-Care	Nurse ET	Teaching about home care, daily foot inspection, medication adherence	Individual or group educational sessions	Patient demonstrates knowledge and performs correct care at home	Practical demonstration of dressing, use of gloves, daily foot checks	"Patient instructed and demonstrated understanding of daily foot inspection and wound hygiene."	Health Education Checklist, Patient Education Record
3 – Education and Self-Care	Nutritionist	Strategies for diet adherence, meal preparation, adequate hydration	Practical guidelines, menus, food substitutions	Patient demonstrates adherence and adequate meal planning	Meal preparation with adequate protein, fluid intake control	"Patient received guidance on meal preparation and hydration; reported understanding and adherence to the meal plan."	Dietary Guidance Form, Food Diary
4 – Monitoring and Reassessment	ET Nurse	Wound reassessment, adjustment of local therapies	Healing scales, dressing adjustments, prevention of complications	Wounds showing signs of improvement, without infection	Weekly wound review, dressing adjustment, local therapy change	"Right plantar wound shows significant improvement in size and color; dressing adjusted according to protocol."	Wound Evolution Table, Healing Scales
4 – Monitoring and Reassessment	Nutritionist	Nutritional status, biochemical markers, adherence	Biweekly follow-up, diet adjustment, monitoring of laboratory parameters	Maintenance or improvement of nutritional and functional status	Adjustment of meal plan based on albumin and hemoglobin; recording of weight and daily intake	"Patient shows improvement in albumin levels; meal plan adjusted and adherence assessed as satisfactory."	Nutritional Monitoring Table, Weight and Biochemistry Progress Charts

Source: author

Interdisciplinary Summary: The integrated protocol strengthens the joint action of Nursing (Stomach Therapy) and Nutrition, promoting patient-centered care, with early diagnosis, continuous monitoring, adjusted nutritional interventions, practical education, joint recording, and overall assessment. The team office optimizes clinical results, reduces complications, increases patient adherence, and consolidates comprehensive care.

CONCLUSION

It is concluded that peripheral arterial insufficiency requires an interdisciplinary approach to optimize tissue perfusion, healing, and patients' quality of life. The available evidence suggests that joint actions by nursing, nutrition, and stoma therapy can promote treatment adherence, reduce complications, and contribute to better clinical and functional outcomes.

However, there is a scarcity of studies that robustly integrate the three areas in the management of the disease, which limits the generalization of the results. In this sense, it is recommended that future investigations adopt more consistent methodological designs, with representative samples and standardized outcomes, in order to strengthen the scientific basis that supports interdisciplinary protocols.

Thus, this study contributes by proposing an integrated protocol that can support clinical practice, while highlighting relevant gaps to be explored by research.

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