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Review

The Use of the Flexible Thermoplastic Nylon-Based Dental Prostheses: A Literature Review

Saverio Ceraulo [1,2], Antonio Barbarisi [1,*], Zhong Hao Hu [1], Gianluigi Caccianiga [3], Dorina Lauritano [3] and Francesco Carinci [3]

[1] Department of Medicine and Surgery, University of Milano-Bicocca, 20100 Monza, Italy
[2] Fondazione IRCCS San Gerardo dei Tintori, 20900 Monza, Italy
[3] Department of Translational Medicine, University of Ferrara, 44121 Ferrara, Italy
* Correspondence: a.barbarisi@campus.unimib.it

Abstract

Background: Nylon-based removable partial dentures, such as Valplast® (Valplast International Corp, Westbury NY, USA), have been proposed as a valuable alternative to acrylic resin prostheses, particularly following oral surgical extractions and in patients with suspected methacrylate hypersensitivity. This review aimed to evaluate the clinical indications guiding the use of nylon-based prostheses after oral surgical extractions and to investigate their prevalence in patients with documented acrylic allergies. **Methods**: Following PRISMA 2020 guidelines, a comprehensive search was conducted in six databases (PubMed, Scopus, Embase, Google Scholar, LILACS, and Cochrane Library) for studies published between 2015 and 2025. Eligible studies were critically appraised using the Joanna Briggs Institute (IBI) tools. **Results**: Nine studies met the inclusion criteria, all of which were low-level evidence (six case reports and three case series), comprising a total of 11 patients (mean age 43 years). Nylon-based prostheses were used in both maxillary and mandibular arches, with rehabilitation motivated by esthetic and functional reasons. Outcomes were generally favorable, with patients reporting satisfaction in terms of comfort, function, and esthetics. **Conclusions**: Current evidence supporting the use of nylon-based removable partial dentures remains extremely limited and is based exclusively on case reports and small case series. While this type of prostheses represents a viable post-surgical rehabilitation option, primarily chosen for esthetic and functional benefits, evidence on their use in patients with documented acrylic hypersensitivity remains lacking. The low quality and limited number of studies highlight the need for prospective, controlled, and long-term research to clarify the role of nylon prostheses in post-surgical oral rehabilitation and to define their effectiveness in patients with material allergies.

Keywords: nylon-based removable partial denture; Valplast®; acrylic allergy; hypersensitivity to methacrylate; prosthetic rehabilitation; removable prosthesis

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1. Introduction

Removable prostheses play a fundamental role in restoring masticatory function and esthetics in patients who, following oral surgical procedures, experience partial or complete edentulism [1]. This is particularly relevant for individuals with severe systemic conditions or those who have developed hypersensitivity or intolerance to commonly used prosthetic materials, such as acrylic resin [2]. In these cases, alternative prosthetic solutions are essential to meet the individual clinic and biological needs of each patient.

Among the most promising options are flexible thermoplastic nylon-based prostheses, such as Valplast® (Valplast, USA) system, which are distinguished by their versatility, comfort and biocompatibility [3].

Contact allergy to dental materials is a relatively rare condition, most commonly triggered by metals, particularly whit amalgam, nickel, palladium and alloy in gold. However, methacrylates also exhibit significant sensitizing potential [4,5]. In these cases, acrylic-based dental materials in contact with oral tissues can lead to contact stomatitis, a type IV hypersensitivity reaction [6,7], leading to localized symptoms including burning sensation, itching, erythematous areas and vesicle formation [8].

Valplast® (Valplast, USA) is an innovative thermoplastic nylon material that is entirely free of methyl-methacrylate monomers. The nylon is a polyamide material synthesized through condensation reactions between a diamine, NH_2-$(CH_2)_6$-NH_2, and a dibasic acid, CO_2H-$(CH_2)_4$-COOH [9]. It is characterized by its flexibility, lightness and dynamic adaptability to oral tissues during mastication [10]. These proprieties make it particularly suitable for patients with allergies to conventional acrylic materials [11] or those seeking an esthetic solution that does not require invasive dental preparation. Its high-density polymer structure and fracture resistance make Valplast® (Valplast, USA) an ideal choice for patients requiring durable, esthetic, and comfortable prosthetic rehabilitation [12].

Valplast® (Valplast, USA) is primarily indicated in patients with small dental arches, limited partial edentulism [13], high esthetic demands, low masticatory forces [14] and favorable soft tissue conditions or in those with documented allergies to acrylic-based prosthetic materials [15].

The main advantages of Valplast® (Valplast, USA) include the following:

- Superior esthetics: its translucent nature allows seamless integration with oral tissues, enhancing the overall appearance of the prosthesis [16].
- Flexibility and impact resistance: its lower rigidity compared to PMMA improves shock absorption and long-term durability [17–19].
- Enhanced comfort: the material conforms naturally to oral tissue movements during mastication, reducing discomfort and irritation.
- Absence of allergenic metals and monomers [20].
- Minimally invasive: Valplast® (Valplast, USA) does not require extensive tooth preparation, preserving natural dental structures.

However, certain limitations must be considered:

- Difficulty in modification or repair and cutting it due to the thermoplastic nature of the material, that causes loss of mechanical proprieties of the prosthesis [21–23].
- Reduced stability and retention compared to conventional cast metal frameworks [24].
- Hygiene challenges, for patients with poor oral care, as the material's flexibility may promote plaque accumulation in hard-to-clean areas.
- Esthetic degradation over time due to the formation of a superficial opaque film and color changes [25,26].
- Increased bacterial and fungal plaque accumulation compared to acrylic materials, attributed to its higher surface roughness [27].

The aim of this review is to examine and analyze the use of nylon-based prostheses in patients who have undergone oral surgical extractions, evaluating the clinical indications guiding prosthetic choice and investigating the prevalence of nylon-based prosthetic rehabilitations in individuals with documented allergies to acrylic materials.

2. Materials and Methods

2.1. Search Strategy

A comprehensive literature search was conducted across six electronic databases: PubMed, LILACS, Scopus, Google Scholar, Embase, and the Cochrane Library. The search strategy employed advanced search functions available within each database, targeting publications dated between 2015 and 2025. Specific keywords were used in combination with predefined inclusion criteria. All retrieved records were manually screened, beginning with titles and abstracts, followed by full-text evaluation. Articles that met the exclusion criteria were discarded (Figure 1).

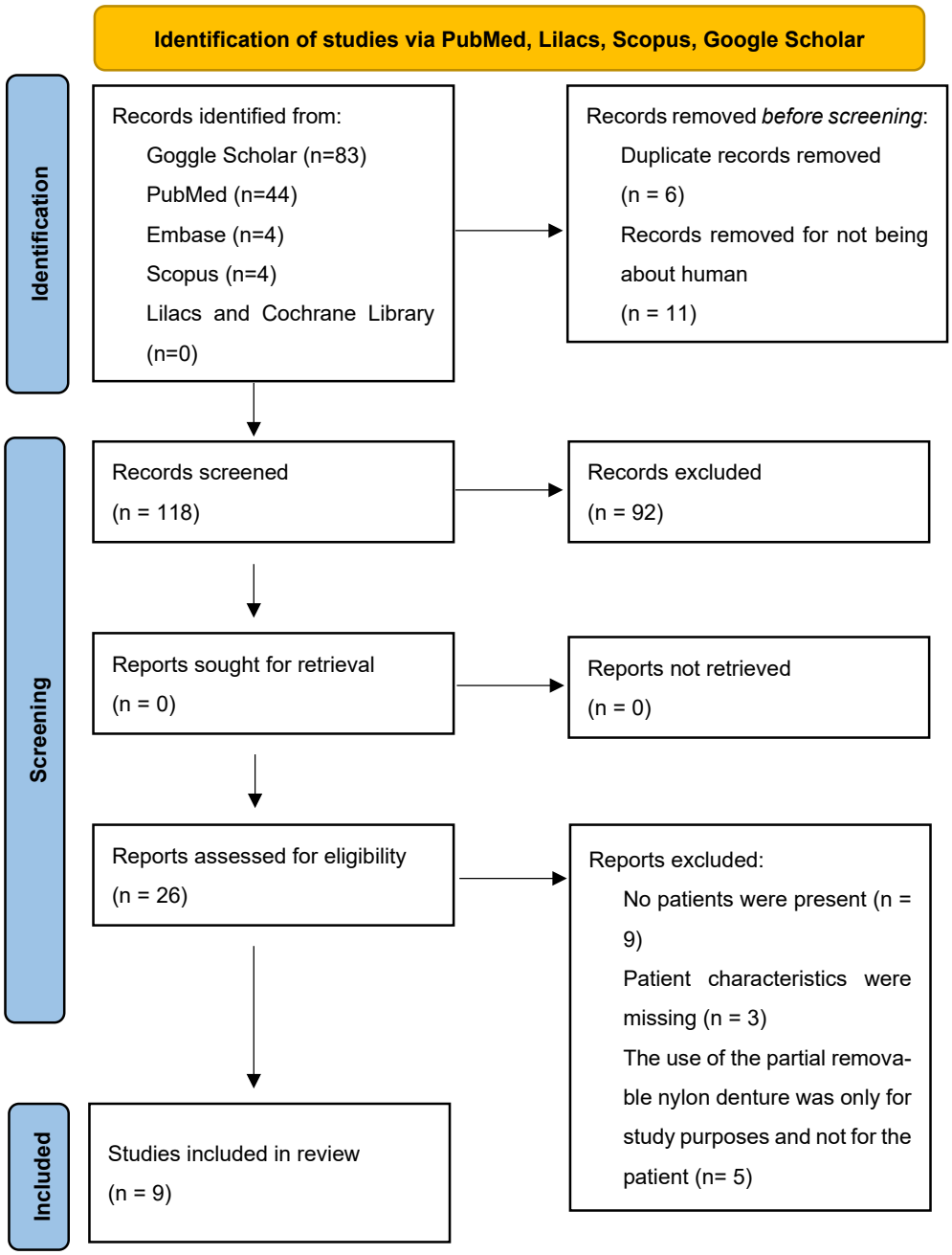

Figure 1. PRISMA flow diagram.

2.2. Selection Criteria

Inclusion criteria were as follows:

- Human subjects.
- Patients rehabilitated with a removable partial denture made of nylon.
- Patients who underwent oral surgical extraction procedures prior to prosthetic rehabilitation.
- Published papers in English language.

Exclusion criteria were as follows:

- Non-human subjects.
- Patients who did not undergo surgical intervention.
- Patients who were not rehabilitated with any form of prosthesis.
- Patients rehabilitated with materials other than nylon-based removable partial dentures.

2.3. Search Terms

The following keywords were applied consistently across all databases to identify relevant studies:

- "Valplast", "nylon denture", "polyamide denture", "nylon prosthesis", "polyamide prosthesis" to identify studies focused on nylon-based removable partial dentures.
- "post-surgical" "surgery" to identify prosthetic rehabilitations following surgical procedures.
- "male", "female" to filter studies involving specific patient demographics.

Keywords were subsequently structured into a Medical Subject Headings (MeSH) query and applied uniformly across all databases:

The exact strings were as follows:
("Valplast" OR "nylon denture" OR "polyamide denture"
OR "nylon prosthesis" OR "polyamide prosthesis")
AND
("post-surgical" OR surgery)
AND
(male OR female).

The MeSH term was then applied in all electronic database (PubMed, LILACS, Scopus, Google Scholar, Embase, and the Cochrane Library), targeting publications dated between 2015 and 2025.

2.4. Screening and Data Extraction Process

Titles, abstracts, and the full text were analyzed independently by two authors (H.Z. and A.B). If they considered a study inappropriate, the study was excluded. A third author (S.C.) resolved any disagreements.

Gray literature, such as abstracts and conferences, were included in the research to demonstrate a thorough search strategy and avoid selective evidence inclusion.

Graphs and tables were created using a spreadsheet application named Google Sheets.

No effect measures of the outcome were performed. None of the articles included were excluded.

In Google Scholar, the MeSH-based search yielded 169 articles, of which 83 met the temporal inclusion criteria. After screening titles and abstracts, 56 articles were excluded for lack of relevance to nylon-based removable partial dentures or post-surgical rehabilitation, and 3 were identified as duplicates. Full-text analysis led to the exclusion of 8 articles due to absence of patient data, 3 due to missing patient characteristics, and 5 because the prosthesis was used solely for experimental purposes, not for clinical rehabilitation.

In PubMed, the MeSH strategy yielded 175 articles, of which 44 met the temporal criteria. Only 33 involved human subjects. One duplicate was removed, and the remaining

articles were excluded after title and abstract screening due to lack of relevance to nylon-based removable partial dentures and post-surgical rehabilitation.

In Embase, the search returned 7 articles, of which 4 met the temporal criteria. One article was excluded after title and abstract screening for not addressing nylon-based removable partial dentures and two were identified as duplicates. Full-text analysis led to the inclusion of one article.

In Scopus, 21 articles were retrieved, with only 4 meeting the temporal criteria. All were excluded after screening for lack of relevance.

Search conducted in LILACS and the Cochrane Library using the MeSH strategy did not yield any articles eligible for inclusion.

2.5. Quality Assessment

The quality of each included study was assessed by two independent evaluators (H.Z. and A.B), and any potential disagreements were resolved by a third author (S.C.).

The included studies were evaluated using the JBI critical appraisal tools for case reports and JBI critical appraisal tools for case series [28,29]. To assess the quality of the studies, the included studies were rated using the checklist for each article type.

The studies were classified as having a low risk of bias (total "yes" score greater than 75%), a moderate risk of bias (total "yes" score of 50-75%), and a high risk of bias (total "yes" score less than 50%).

3. Results

A total of nine publications were selected, comprising six case reports and three case series (Table 1).

3.1. Characteristics of the Identified Subject

The nine included studies had a total of 11 patients (5 male and 6 female) with an age range from 12 to 77 years of age and a mean age of 43 years (SD 20.30). None of the included patients had a documented allergy and/or hypersensitivity to acrylic/methyl methacrylate resin.

3.2. Characteristics of Patients' Edentulism

In the evaluation of the maxillary arch of the included patients, four dental arches were diagnosed as Kenndey class I, two dental arches were diagnosed as a partial edentulism with only one missing tooth, two dental arches had no edentulism, one dental arch was diagnosed as Kennedy class III, one dental arch was diagnosed as total edentulism, and one dental arch presented an unknown edentulism.

In the evaluation of the mandibular arch of the included patients, three dental arches were diagnosed as Kennedy class II, two dental arches were diagnosed as Kennedy class III, two dental arches were diagnosed as Kennedy class I, two dental arches presented an unknown dentition, one dental arch was diagnosed as total edentulism, and one dental arch presented an unknown edentulism.

3.3. Rehabilitation of the Patients' Edentulism

Removable nylon partial dentures were fabricated in the maxillary arch in eight patients and in the mandibular arch in nine patients. Five patients had rehabilitation of both the maxillary and mandibular arches, two patients had rehabilitation of the maxillary arch only, and two patients had rehabilitation of the mandibular arch only. One patient had rehabilitation with a removable nylon partial denture in the mandibular arch and rehabilitation with a removable partial denture of a skeletal type in the maxillary arch, and one patient had rehabilitation with a removable nylon partial denture in the mandibular arch and rehabilitation with a fixed prosthesis on implants in the maxillary arch.

Table 1. Table showing the research results.

Author (Year)	Title	Type of Study	No of Patients	Age	Sex	Kennedy Classification for Max	Kennedy Classification for Man	Type of Polyamide Denture	Allergy	Reason for the Choice	Follow-Up
P. Papi et al. (2016)	Prosthetic rehabilitation with partial removable and esthetic dentures (Valplast) in a patient with recurrent right TMJ ankylosis: A case report [30]	case report	1	45	f	/	/	Partial removable	Not reported	esthetic and functional	Positive
M. B. Yaala et al. (2024)	LA PROTHÈSE FLEXIBLE DANS TOUS SES ASPECTS THE FLEXIBLE PROSTHESIS IN ALL ASPECTS [31]	case series	2	45	m	I	III	Partial removable	Not reported	esthetic	Not reported
				42	f	21	-	Partial removable	Not reported	esthetic	Not reported
S. Spintzyk et al. (2021)	Three-dimensional printing of polyamide to fabricate a non-metal clasp removable partial denture via fused filament fabrication: a case report [32]	case report	1	Not reported	f	26	-	Partial removable	Not reported	indicated	Not reported
K. L. Mounika et al. (2021)	Pliable Dentures-An Alternate Denture Base Material-Case Reports [33]	case series	1	58	m	I (skeletal type prosthesis)	III	Partial removable	Not reported	Not reported	Not reported
S. Ahuja et al. (2019)	Restoration of a partially edentulous patient with combination partial dentures [34]	case report	1	77	m	I	I	Partial removable	Not reported	esthetic	Negative
L. Kavaja et al. (2018)	TEMPORARY PROSTHETICS REHABILITATION IN ADOLESCENTS PATIENT [35]	case report	1	16	f	III	II	Partial removable	Not reported	esthetic and functional	Not reported
A. Belal et al. (2021)	Possibility of Using Flexible Dentures over Iliac Bone Graft in Adolescent Patients with Ameloblastoma: A 9-Month Follow-Up Clinical Report [36]	case report	1	12	m	no	II	Partial removable	Not reported	esthetic and functional	Not reported
J. Gandhimathi et al. (2015)	A systematic approach for functional rehabilitation of hemimandibulectomy patient [37]	case report	1	25	f	I	I	Partial removable with acetal resins clasps	Not reported	esthetic and functional	Positive
I. J. Kwon et al. (2016)	Newly designed retentive posts of mandibular reconstruction plate in oral cancer patients based on preliminary FEM study [38]	case series	2	58	f	no	II	Partial removable on retentive posts applied in the reconstruction plates	Not reported	functional	Positive
				52	m	totlal edentulism	totlal edentulism	Partial removable on retentive posts applied in the reconstruction plates	Not reported	functional	positive

In the table, in the description of the sex, "f" was used for female patients and "m" was used for male patients. In the description of the type of edentulism, "max" was used for maxillary arch, "man" was used for mandibular arch, "no" was used for patients without edentulism, "/" was used for unknown edentulism rehabilitated with polyamide denture, and "-"was used for unknown dentition.

3.4. The Reasons for the Choice

The choice of oral rehabilitation was based on esthetic and functional reasons in four patients, esthetic reasons in three patients, and functional reasons in two patients. In one patient, the use of the polyamide denture was a dentist's recommendation and in one patient the reason was not defined.

The functional reasons were facilitating prosthesis insertion in four patients with limited mouth opening, enhancing the effect of masticatory function in two patients and improving patient comfort and prosthesis hygiene in one patient.

In no case was the choice of prosthesis type driven by the presence of an allergy and/or hypersensitivity to acrylic/methyl methacrylate resin, as none of included patients exhibited such condition.

3.5. The Follow-Up

The follow-up was specified in five cases and unspecified in six cases. In the stated follow-up cases, four patients presented maintenance of the esthetic and functional satisfaction, and one patient presented a dissatisfaction caused by the rotation and the sinking of the base of the prosthesis.

The duration of the follow-up was described in four cases, not defined in six cases, and programmed in one case. In the described follow-up cases, the duration was 3 years in two patients, 12 months in one patient and 3 months in one patient. In the programmed follow-up case, the duration was planned for 2 years.

4. Discussion

This review examined the clinical use of the nylon-based removable prostheses in post-surgical patients, requiring partial or total dental rehabilitation, with particular attention to those with documented allergies to acrylic resins.

4.1. Clinical Indications and Patient Considerations

None of the included cases involved patients with confirmed hypersensitivity to acrylic-based materials, indicating that the actual prevalence of nylon use in allergic patients may be lower than initially hypothesized.

However, nylon-based dentures were chosen primarily to achieve superior esthetics and enhanced comfort. This finding suggests that the clinical application of nylon prostheses extends beyond allergen avoidance, positioning them as a valuable alternative in a broader spectrum of rehabilitative needs.

The evidence gathered demonstrates that patient-centered factors-such as esthetics, functional needs, and comfort are equally decisive in prosthetic choice.

Flexible thermoplastic prostheses offer advantages that are particularly relevant to patients with high esthetic demands [39] and those with anatomical and functional limitations following oral surgery or due to a systemic medical condition, such as difficulties in mouth opening and compromised hand function [40]. The ability of the polyamide denture to adapt dynamically to oral tissues may be beneficial in patients with limited mouth opening or altered alveolar morphology after surgical intervention [30,36,37].

Moreover, the absence of allergenic metals and monomers eliminates potential risks of contact stomatitis, making them suitable for medically compromised individuals.

4.2. Functional and Esthetic Outcomes

The review found that the majority of patients reported satisfactory outcomes in terms of comfort, mastication, and esthetics, which are consistent with the inherent material proprieties of nylon [41–43]. Particularly in cases with limited oral opening, polyamide denture

provided functional advantages [30,37]. However, one patient expressed dissatisfaction due to mechanical instability of the prosthesis [34].

Functionally, nylon-based dentures provided satisfactory mastication and comfort, although some patients required hybrid solutions, combining nylon-based prostheses skeletal frameworks or implant-supported restorations, to optimize stability [34,44]. These findings reflect the versatility of the polyamide denture in managing different clinical scenarios but also emphasize the need for individualized prosthetic planning rather than universal application.

Long-term data on wear resistance, surface roughness and microbial colonization were absent in the reviewed cases.

4.3. Evaluation of the Reason for Prosthetic Choice

The decision to employ nylon-based dentures was primarily driven by patient preference for superior esthetics and by clinicians' recommendations to enhance functional rehabilitation [32]. The absence of reported hypersensitivity cases underscores a key gap between the theoretical indication of nylon as an allergy-safe alternative and its actual application, which appears to be dictated more by patient-centered factors than by biological necessity.

4.4. Follow-Up and Outcome Stability

Follow-up evaluation was inconsistently reported, with structured monitoring described in less than half of the cases [30,37,38]. Where available, outcomes over 12 months to 3 years demonstrated stable functional and esthetic satisfaction, suggesting that nylon prostheses can provide durable solutions when appropriately indicated. However, the lack of uniform follow-up protocols, missing data on hygiene-related complications, and limited documentation of material degradation prevent definitive conclusions on long-term clinical performance.

4.5. Evaluation of the BIAS

The review revealed a predominance of case reports and case series with small patient numbers, reflecting the limited body of high-quality evidence available on this topic. The methodological assessment demonstrated a considerable proportion of studies with a high risk of bias, which constrains the strength of the conclusions that can be drawn. The diversity of study designs and patient profiles further complicates direct comparison of outcomes.

Nevertheless, the consistency of findings across different reports provides preliminary support for the clinical utility of nylon-based prostheses, while also highlighting the pressing need for studies with standardized outcome measures and control groups.

The evaluation of methodological quality using the JBI critical appraisal tools revealed five studies presenting a high risk of bias, one study presenting a moderate risk of bias, and three studies presenting a low risk of bias. The predominant limitations were the lack of standardized follow-up, incomplete reporting of patient characteristics, and the absence of objective outcome measurements (Table 2).

In several reports, such as those by Yaala et al. (2024) and Mounika et al. (2021), the selection bias was evident, as patient inclusion criteria were poorly defined and based on anecdotal experiences rather than controlled recruitment [31,33]. Additionally, reporting bias affected almost all case reports, with insufficient documentation of prosthetic complications or hygiene-related outcomes [30,32,34].

Performance bias also emerged, since procedural details (e.g., impression techniques, occlusal adjustments, or relining protocols) were inconsistently reported, limiting reproducibility and comparability across cases [36,38]. In contrast, studies such as Belal et al.

(2021) and Gandhimathi et al. (2015) provided more comprehensive clinical documentation, resulting in a lower bias rating [36,37].

Table 2. Evaluation of the BIAS.

Author (Year)	Type of Study	JBI Tool Used	Total "Yes" Score (%)	Risk of Bias	Main Bias Source
P. Papi et al. (2016) [30]	Case report	JBI Case Report Checklist	45%	**High**	Lack of follow-up; unclear outcome measurement
M.B. Yaala et al. (2024) [31]	Case series	JBI Case Series Checklist	40%	**High**	Incomplete patient data; absence of standardized outcome assessment
S. Spintzyk et al. (2021) [32]	Case report	JBI Case Report Checklist	60%	**Moderate**	Limited description of prosthetic adaptation process
K.L. Mounika et al. (2021) [33]	Case series	JBI Case Series Checklist	45%	**High**	Missing follow-up; unclear inclusion criteria
S. Ahuja et al. (2019) [34]	Case report	JBI Case Report Checklist	35%	**High**	Absence of long-term evaluation; limited reproducibility
L. Kavaja et al. (2018) [35]	Case report	JBI Case Report Checklist	80%	**Low**	Minor reporting limitations
A. Belal et al. (2021) [36]	Case report	JBI Case Report Checklist	70%	**Low**	Small sample size; adequate clinical description
J. Gandhimathi et al. (2015) [37]	Case report	JBI Case Report Checklist	85%	**Low**	Good follow-up and clear intervention reporting
I.J. Kwon et al. (2016) [38]	Case series	JBI Case Series Checklist	40%	**High**	Limited case details; no patient-reported outcomes

The overall lack of control groups and small sample sizes further restricted the ability to generalize the findings. This limitation underscores the need for prospective, multi-center clinical studies with standardized evaluation metrics, particularly regarding long-term adaptation, microbial colonization, and patient-reported comfort.

Most of the included studies were judged to have a high risk of bias, primarily due to limited follow-up, incomplete case documentation, and the absence of standardized outcome assessments. As a result, the overall certainty of the evidence remains low, and the conclusions drawn from this review should be interpreted with caution. While the available reports consistently describe favorable clinical outcomes for nylon-based prostheses, the methodological weaknesses and small sample sizes limit the generalizability of these findings. More robust, well-designed prospective studies are required to confirm these preliminary observations and provide stronger evidence for clinical decision-making [30–38].

4.6. Limitations of the Review

The primary limitation of this review is the scarcity of eligible studies and the very small sample size (11 patients in nine publications). Exclusive reliance on case-based evidence introduces considerable bias, and the absence of randomized or comparative trials prevents assessment of true clinical effectiveness. Furthermore, the lack of reports involving allergic patients undermines one of the main objectives of this review and limits the applicability of findings to that subgroup.

4.7. Implications for Clinical Practice and Research

From a clinical standpoint, nylon-based removable partial dentures represent a viable post-surgical option alternative to acrylic resin prostheses, particularly in patients with high esthetic expectations and functional limitations. However, their indication in patients with proven acrylic allergies remains insufficiently documented, requiring clinicians to exercise caution when presenting nylon as the definitive alternative for allergy management. Patient education regarding hygiene challenges, potential mechanical instability, and difficulties in repair is essential for long-term satisfaction.

Future studies should highlight the need for prospective, multicenter studies with standardized outcome measures and inclusion of patients with verified acrylic allergies. Well-designed prospective studies with standardized reporting of functional, esthetic, biological, and patient-reported outcomes are needed. Longitudinal follow-up focusing on microbial colonization, durability, and maintenance requirements will further define the role of nylon prostheses in post-surgical oral rehabilitation, and registering patients with documented acrylic hypersensitivity will clarify the true prevalence and outcomes of nylon-based prosthetic rehabilitation in this subgroup.

4.8. Clinical Decision-Making Algorithm for the Indication of Nylon-Based Removable Partial Dentures

The proposed clinical algorithm (Figure 2) provides a practical guide for selecting the most appropriate type of removable partial denture following oral surgery.

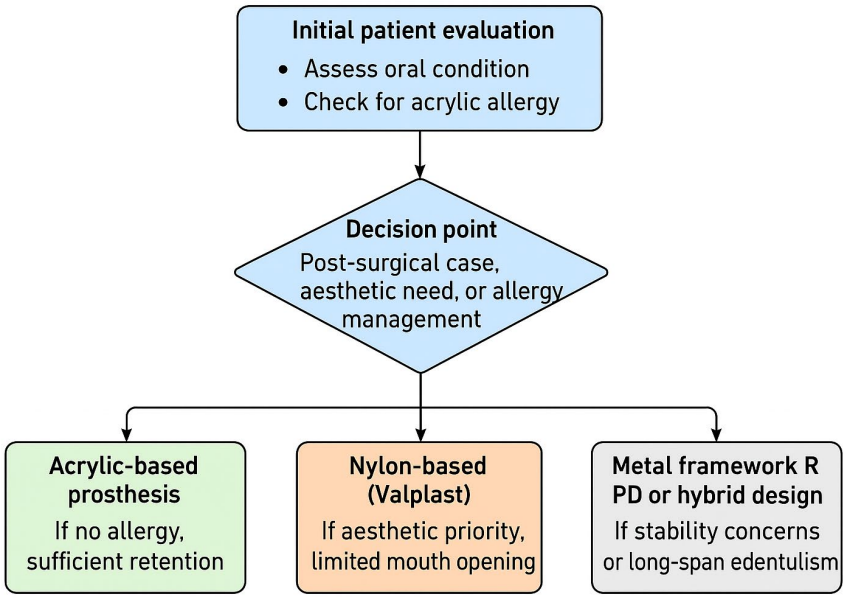

Figure 2. A clinical algorithm for removable partial denture selection following oral surgery.

It integrates both the evidence gathered in the literature and the identified methodological limitations of existing studies, aiming to offer clinicians a structured and reproducible approach. The first step focuses on comprehensive patient evaluation, including oral condition, residual ridge anatomy, and potential hypersensitivity to acrylic materials. This step is critical, as no reviewed study provided standardized allergy testing or validated diagnostic confirmation of methacrylate hypersensitivity [30–38]. The second decision point distinguishes between post-surgical needs, esthetic requirements, and allergy-driven indications. The review revealed that most nylon-based prostheses were prescribed primarily for esthetic and comfort reasons rather than proven allergy management [30,33,36]. This reflects a clinical shift from material safety to patient-centered functional and esthetic outcomes. The third level of the algorithm presents three potential therapeutic paths:

- Acrylic-based prostheses (Figure 3a) remain the gold standard when no allergy is present, and sufficient retention can be achieved.
- Metal framework or hybrid RPDs (Figure 3b) are indicated in long-span edentulism or cases where mechanical stability and repairability are priorities.
- Nylon-based (Valplast, Figure 3c,d) solutions are most suitable for patients with limited mouth opening, high esthetic expectations, or a history suggestive of acrylic

hypersensitivity. However, evidence supporting their superiority is limited by the methodological weaknesses highlighted in this review.

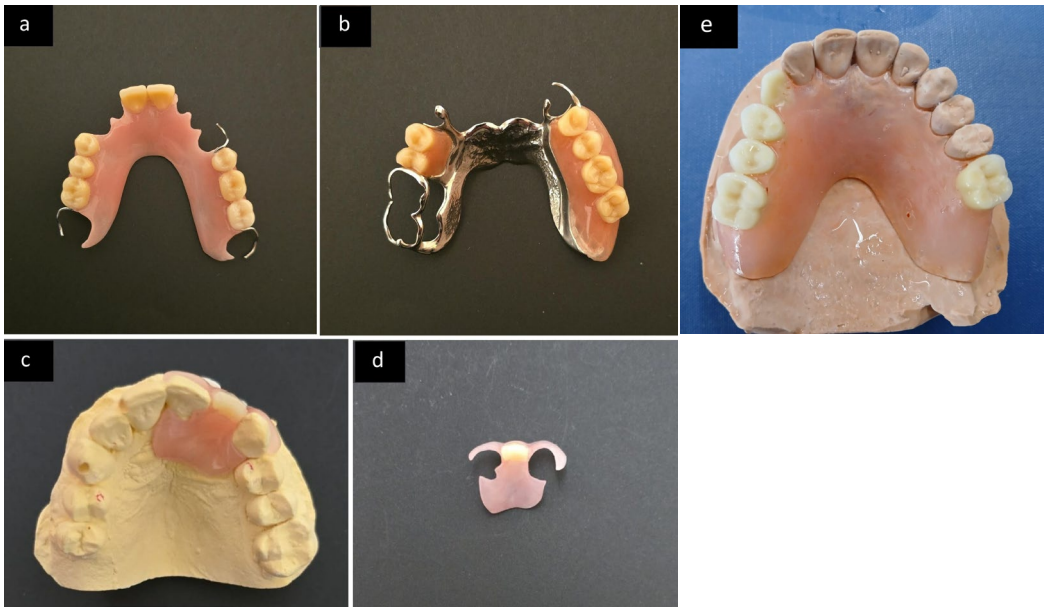

Figure 3. (**a**) A picture of a removable partial denture in acrylic resin of a maxillary arch classiefied as Kennedy class III. (**b**) A picture of a removable partial denture with metal framework of a maxillary arch classified as Kennedy class II. (**c**,**d**) A picture of the same removable partial denture in nylon (Valplast, USA) of a maxillary arch with only one missing tooth. (**e**) A picture of a removable partial denture in nylon (Valplast, USA) of a maxillary arch classified as Kennedy class I.

Furthermore, the choice of therapeutic paths must consider the characteristics of types of prosthesis such as microbial adhesion, wear resistance, repairability, and long-term maintenance.

When analyzing microbial adhesion, the polyamide denture show higher bacterial and fungal plaque accumulation compared to acrylic-based prostheses, due to high water absorption, increased solubility, and an overly rough surface [45].

When analyzing the long-term maintenance, the PMMA prostheses are easier to maintain in the long term, and CAD/CAM-milled prostheses are suggested in the presence of denture stomatitis due to reduced attachment of Candida albicans [45,46].

When analyzing wear resistance, the polyamide denture shows lower resistance compared to acrylic-based prostheses [47].

When analyzing repairability, the polyamide denture can be repaired using auto-polymerizing resin; however, bonding is exceedingly difficult [48].

Overall, the flowchart synthesizes the available low-level evidence into a rational, clinically applicable pathway that may help practitioners navigate the current lack of standardized guidelines regarding the indication of nylon-based removable partial dentures. Future studies should validate this algorithm through prospective clinical trials and consensus-based recommendations.

4.9. Limitations of the Research

Despite the systematic approach adopted, several limitations must be acknowledged, affecting both the reliability and generalizability of the findings. These limitations (Table 3) derive from the intrinsic weaknesses of the available literature and the methodological constraints of the present review.

Table 3. Limitations of the research.

Category	Description	Impact on Results	Potential Mitigation
Limited sample size	Only 11 patients across 9 studies	Reduces statistical power and external validity	Future multicenter studies with larger samples
Research design	All included papers were case reports or small case series	High risk of bias; absence of control groups	Conduct prospective comparative or randomized trials
Inconsistent follow-up	Follow-up duration reported in less than half of the studies	Prevents evaluation of long-term outcomes	Standardized follow-up protocols ($\geq$12 months)
Lack of standardized outcome measures	Esthetic, comfort, and function were qualitatively described only	Limits comparability and meta-analysis	Use validated questionnaires (e.g., OHIP-EDENT)
Absence of confirmed allergy cases	No study included patients with diagnostic confirmation of acrylic hypersensitivity	Limits conclusions regarding the allergy-safe claim	Inclusion of patch-tested patients in future research
Incomplete reporting	Missing details on prosthesis fabrication, hygiene, and maintenance	Reduces reproducibility	Implement CONSORT-like reporting checklists
Potential publication bias	Positive outcomes overrepresented	Inflates apparent success rate	Systematic registration of case studies
Language and regional bias	Most reports from single centers or specific countries	Limits generalizability	Encourage international multicenter collaboration

The findings of this review must therefore be interpreted with caution. The evidence base for nylon-based removable partial dentures remains fragmented and anecdotal, dominated by descriptive studies lacking methodological rigor. The absence of standardized diagnostic and follow-up criteria, together with missing data on microbial colonization, wear resistance, and mechanical stability, hampers robust clinical recommendations.

To strengthen future evidence, it is crucial to conduct prospective controlled trials with clearly defined patient populations (including verified cases of acrylic allergies), standardized outcome measures, and long-term follow-up. Only through such studies will it be possible to delineate the true clinical value of nylon-based prostheses in post-surgical oral rehabilitation.

5. Conclusions

This review confirms that nylon-based removable partial dentures are mainly chosen for their esthetic and comfort advantages rather than the management of confirmed acrylic hypersensitivity. Notably, all included studies are case reports or small case series, and none document a verified allergy to acrylic materials, highlighting a significant gap between the theoretical indications of polyamide dentures and their actual clinical applications.

Most available studies are case reports or small case series characterized by a high risk of bias, inconsistent follow-up, and incomplete reporting of long-term behavior. Although short-term outcomes generally demonstrated satisfactory esthetics, comfort and functional performance, the current evidence remains weak regarding stability, hygiene, and long-term durability.

The proposed clinical algorithm offers a preliminary framework to guide the indication of nylon-based dentures by integrating patients' needs, anatomical considerations, esthetic priorities, and possible hypersensitivity concerns. However, nylon-based dentures should be considered as a complementary option rather than a substitute for acrylic or metal framework removable partial dentures, especially in cases involving extensive edentulism or high functional demands.

To establish clearer guidelines and validate the clinical utility of nylon-based dentures, high-quality research is needed. Future prospective and controlled studies must focus on standardized diagnostic criteria, verified acrylic-allergic populations, objective functional and biological outcomes and long-term performance. Only through rigorous investigation

can the true clinical value of nylon-based removable partial dentures in post-surgical rehabilitation be accurately determined.

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