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SYSTEMATIC REVIEW

The impact of extra-oral facial prosthesis on quality of life for people with aquired defects: A systematic review

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ABSTRACT

Purpose: Acquired facial defects caused by traumatic injury or malignancy are likely to affect one's physical wellbeing. They may lead to segregation from society due to the stigma and the subjective opinions of the individual, decreasing their overall quality-of-life (QoL). Facial prostheses are suitable forms of rehabilitation for people with acquired facial defects. Recently, QoL has been receiving attention important in evaluating patient outcomes. The aim of this systematic review was to synthesise research reporting the impact of extra-oral facial prostheses on QoL for individuals with an acquired facial defect.

Materials and methods: A systematic review was undertaken following Joanna Briggs Institute and PRISMA guidelines. The protocol was registered (CRD42024403538), and the searches were performed in six databases from inception to 5th August 2024.

Results: 1291 records were retrieved after review ten articles were retained for inclusion. The papers were grouped into those assess people with acquired facial defects in either the auricular, nasal, or orbital regions. A total of 363 people were represented. Six QoL measures were used. Across all three groups, QoL improved post-prosthesis. Although nasal prosthesis users reported lower physical and social functioning than those with auricular prostheses.

Conclusions: All ten studies reported positive impact on QoL of prosthesis, however their generalizability is limited by varying methodologies and QoL measures, none of which are designed for use with prosthesis users. Despite these limitations, QoL improvements were seen regardless of follow-up duration or prior prosthetic experience. Future research should use standardized, prosthesis-specific QoL measures for clearer comparisons. (*Int J Maxillofac Prosthetics 2025;8:30-41*)

Keywords

Acquired, Facial Prosthetic, Systematic Review.

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AUDIOABSTRACTACT

INTRODUCTION

Acquired facial defects can be caused by traumatic injury including, accidents, assault or ballistic injuries. Acquired facial defects may also be caused by surgical resection for various types of cancer including malignant or non-malignant tumours. Irrespective of the cause, facial disfigurement is likely to impact ones physical, psychological and social wellbeing than those who have not, due to the face being at the forefront of communication and expression of feelings.[1,2] Acquired facial defects may lead to individuals self-isolation from society due to the feeling of loss, particularly related to their body image and identity.[3] The use of a facial prosthesis may also influence these experiences, particularly in contexts where facial difference and prosthetic use are perceived to carry social stigma.[4]

A study by[5] reported that head and neck cancer (HNC) is the seventh most common cancer diagnosed worldwide, with 890,000 new cases annually. According to Cancer Research UK,[6] 12,759 of HNC cases derive from the United Kingdom (UK) and the two main types are Basal Cell Carcinoma (BCC) and Squamous Cell Carcinoma (SCC) with incidence rates of 75% and 23% respectively. These figures are known to be increasing with the rising consumption of tabaco, alcohol, areca nut, human papilloma virus (HPV), excessive exposure to radiation (ultraviolet B rays, artificial and natural radiation) and prolonged life expectance.[7-9] In the UK, HNC mortality rates are increasing, 53% of people are

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diagnosed late (stages III and IV) and those living in deprived areas are over-represented in HNC population.[10] Also in the UK the average age that HNC's occur is 65 with a slightly higher prevalence in men and more commonly affecting the lower-face.[1,6,11]

Worldwide traumatic maxillofacial injuries are extremely common with approximately 1 million people hospitalised each year and according to Lyer et al,[1] this figure is expected to continuously increase year-on-year. The aetiology of these injuries differs depending on patient demographics, injury type and severity depending on the population studied.[12-15] In England and Wales around 1.4-million people attend accident and emergency departments each year with maxillofacial injuries, 33-50% are under 15-years-of-age and 90% are minor in severity.[16] The aetiology of maxillofacial traumas in the United Kingdom includes motor vehicle accidents, sport injuries, industrial injuries and interpersonal violence.[17] A retrospective cohort study conducted in West England found that 809 patients were treated for facial fractures between Janurary-2016 and June-2017, however failed to mention if any received prosthetic rehabilitation.[18]

While surgical reconstruction of the face is preferred following traumatic injury or HNC, it is not always possible or opted for by the patient for example when life expectancy is uncertain and/or the tissue condition is compromised. Therefore, in such instances, a facial prosthesis may be a reasonable alternative to surgery.[19] However, it is difficult to quantify overall the number of patients that are prosthetically rehabilitated with an extraoral facial prosthesis following both traumatic injury or HNC. This is due to a lack of such figures being published in research, and the diverse treatment protocols and services available at different centres.

There are two methods to rehabilitate acquired facial deformity. Firstly, surgical reconstruction, a well-known effective method to restore function and aesthetics via autologous tissue.[20,21] However, this method is not always viable for patients that have large defects that demand a large amount of donor tissue and for those patients that require adjuvant therapies such as radiotherapy due to the decrease in blood supply.[22,23] Similarly, surgical reconstruction frequently requires multiple procedures that can lead to a less favourable aesthetic result and/or prohibit disease surveillance. Revision procedures are also not uncommon in surgical reconstruction, due to the need of debulking free-flap reconstruction sites consequently prolonging recovery.

Prosthetic rehabilitation using an extra-oral prosthesis offers an alternative approach. There are several types of extra-oral facial protheses including auricular, nasal, orbital and ocular each with the aim to restore aesthetics at the same time as facilitating early rehabilitation, shortening surgery times and hospital stays.[24] Extra-oral facial prostheses have been known to significantly improve functionality, for example, Walsh et al[25] found that auricular prostheses aided hearing by channelling soundwaves towards the external auditory meatus while Jain et al[26] found that nasal prostheses enabled the support for spectacles.

Although, prosthetic rehabilitation has been described as a viable option for nasal and auricular rehabilitation, the use of autologous tissue reconstruction for such cases still remains the current gold standard. In orbital exenteration cases where large orbital volume has had to be removed, a skin paddle is optimal for wound closure with an overlaying prosthesis.[27]

Over the past decade numerous outcome measures have been used in research involving facial prostheses.[28] More recently QoL as an outcome has been considered more often as a factor which plays an important role in assessing the quality of medical intervention. The World Health Organisation currently defines QoL as an individual's perception of their position in life in the context of culture and value systems in which they live and in relation to their goals, expectations, standards and concerns.[29] A recent systematic review by Nayar et al,[30] reported that individuals who received implant-retained facial prostheses as part of their rehabilitation demonstrated improvements in quality of life. Therefore, the aim of this systematic review is to synthesise research reporting the impact of extra-oral facial prostheses on QoL for individuals with an acquired facial defect following a traumatic injury or HNC.

MATERIALS AND METHODS

This systematic review was undertaken following the Joanna Briggs Institute (JBI) guidelines[31] and reported in line with the Preferred Reporting Items for systematic Reviews and Meta Analysis (PRISMA).[32] The protocol was registered with the International Prospective Register of Systematic Reviews (PROSPERO - CRD42024403538).

The search strategy was developed using the PICO (Population, Intervention, Comparison, Outcome) model. The strategy was trialled and adapted to each database, with the assistance of a clinical librarian. The study inclusion and exclusion criteria are presented in Table 1.

The population of interest were people who have a facial prosthesis due to an acquired deficit e.g., accident, injury, or disease. Studies of prostheses adjoining to an intra-oral prosthesis and, those that solely include a population under the age of sixteen were excluded due to the dissimilarity of treatment protocols and the unknown likeliness of Gillick competence respectively. Studies that solely include facial defects involving intra-oral, or combined intra-

Table 1. Inclusion and exclusion criteria.

Category	Included	Excluded
Population	Participants with facial defects who required or had received prosthetic rehabilitation. Facial defects due to accident/injury/disease (acquired)	Participants with facial defects not requiring prosthetic rehabilitation. Studies exclusively involving children under the age of 16. Studies solely including facial defects involving intra-oral or combined intra-oral/extra-oral prosthetic rehabilitation. Indwelling eye prosthetics Studies exclusively involving patients with acquired defects caused by malignancy or trauma.
Intervention	Studies of facial prostheses with any retention modality, manufacturing technique or material.	-
Comparator	For comparative studies, any treatment for facial defects, no treatment, or unaffected comparator group.	-
Outcome	QoL measured with a published validated tool.	The occurrence or aetiology of facial defects.
Study Type	Observational studies. Mixed methods studies. Health economics studies. Experimental studies. Pilot studies. Any clinical studies with quantitative data.	Any study not including quantitative data. Systematic reviews with/without meta-analysis.
Characteristics	Studies deriving from any country.	Studies not obtainable written in full English text.

oral/extra-oral prosthetic rehabilitation were not included within the study due to the extreme differences in treatment protocols and the added multifaced factors likely to affect QoL in such patients.

Medical Subject Heading (MeSH) index terms were identified, and the search strategy was informed by previous literature, and subject matter experts in the form of senior authors.

Electronic searches were performed in MEDLINE, Embase, Emcare, CINAHL, APA PsycInfo and the Cochrane CENTRAL Register of controlled trials by a clinical librarian. The search strategy for OVID MEDLINE is reported in Table 2. Databases were searched from their inception to 5th August 2024.

The search results were consolidated and imported into the reference management system Rayyan with all duplicates identified and removed. Screening of the titles and abstracts were carried out by two independent reviewers [KS & GC]. All conflicts were resolved by a third reviewer [SH] and the retrieval of potentially relevant full text manuscripts were conducted.

The full text manuscripts were independently screened against the inclusion and exclusion criteria. Any disagreements were resolved by consensus or by consultation. A summary of the review process, detailing the number of records retained at each stage is provided (Fig.1). Data were extracted by reviewers [GC & SH], and cross checked by reviewer [KS]. Extracted data included the fields; author(s), sample size, participant/population group, age range, defect aetiology, the type of prosthesis, means of assessing QoL, and findings of the studies.

Critical appraisal was evaluated using the JBI family of tools depending on the research design.[31] A summary of the critical appraisal assessment is presented in Appendix 1. Due to the range of methodologies and data collection tools, a narrative synthesis following the European Social Research Council Guidance on the Conduct of Narrative Synthesis in Systematic Reviews was undertaken.[33]

RESULTS

Ten papers, representing nine separate studies were retained for data extraction.[24,34-41] Across the studies, the JBI quality appraisal tool indicated a generally reasonable level of 75% or more (Table 3 and Appendix 1), however, Balakrishnan et al[32] only reached 55%. One paper reported data collected in England,[41] four papers (reporting data from 3 studies) from Germany,[4,35,39] one from Malaysia,[38] two the Netherlands,[37,40] one India[34] and one Turkey.[24]

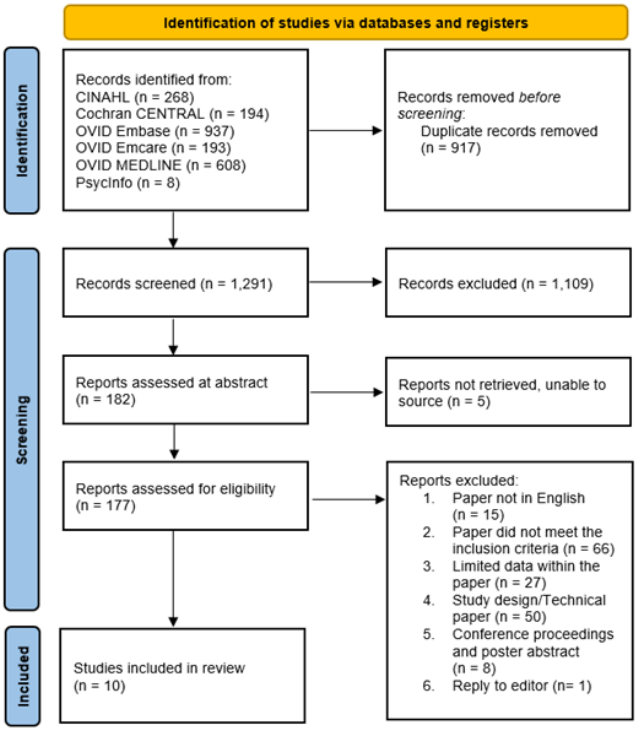


Fig 1. PRISMA Flowchart.

Study Design and Participants

Two studies used a case series methodology,[37,40] one was a cohort design,[34] six studies were cross-sectional[4,35,36,38,39,41] and one was quasi-experimental.[24]

363 people (206 Male, 157 Female) are represented across the studies. However, only 259 (71.3%) people included across the studies had an acquired facial deficit treated with a prosthesis. Two studies did not provide a gender split for the sub-groups of patients, but approximately one third more males were represented in the facial prosthesis people.[4,38] This differed from the total participant split where it was only a quarter more males to females.

The mode of defect acquisition of the deficit was not always stated within the papers; however, the location of the defect could be grouped into 3 categories; Auricular, Nasal, and Orbital. With 56 (21%), 81 (30%), 125 (47%) patient/participants in each group respectively, and 5 (2%) stated as having combined defects, but not specifically defined.

Quality of Life

Six QoL measures (with the Medical Outcomes Short form SF-12 and SF-36 being classified as the same measure) were used across the study's (Table 4). Although, some papers e.g., Atay et al[24] cover multiple defect locations, the presentation of data allows for the comparison of QoL for each area. Where this is not the

Table 2. Ovid MEDLINE® All search strategy.

Ovid MEDLINE(R) ALL
1. Maxillofacial Prosthesis/
2. Orbital Implants/ or Eye, Artificial/
3. ((maxillofacial or maxillo-facial or cranio-facial or craniofacial or face or facial or orbit or orbital or ocular or eye or eyes or auricular or ear or ears or nasal or nose* or cheek*) adj2 (prosthe* or epithe* or artificial)).mp.
4. "Prostheses and Implants"/
5. face/ or eye/ or ear/ or nose/ or cheek/
6. 4 and 5
7. 1 or 2 or 3 or 6
8. "quality of life"/
9. "Activities of Daily Living"/
10. "surveys and questionnaires"/
11. patient satisfaction/
12. Self Concept/
13. ("quality of life" or QoL).mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
14. "validation studies"/ or "validation studies as topic"/
15. (scor* adj5 (system* or scale*)).mp. [mp=title, book title, abstract, original title, name of substance word, subject heading word, floating sub-heading word, keyword heading word, organism supplementary concept word, protocol supplementary concept word, rare disease supplementary concept word, unique identifier, synonyms]
16. or/8-15
17. 7 and 16

Table 3. The characteristics of included studies.

Author	Country of origin	Study design	Participants	Mean average Age (SD or range)	Mode of acquisition of deficit	Location of defect	JBI Score
Atay et al 2013[24]	Turkey	Quasi Experimental	n=72 (3 experimental groups; 36 Males, 36 females) n=24 control group (13 Male, 11 Female)	Orbital group 55.83 (16.51); Auricular group 47.00 (14.28); Nasal group 61.04 (11.00); Control group 49.04 (9.49)	Not Stated	n=15 Auricular; n=16 Nasal; n=17 Orbital	78

Balakrishnan et al 2022[34]	India	Cohort study	n=19 (Pre op group; 10 Male, 9 Female);
			n= 10 (retrospective group; 6 Male; 4 Female)
				Pre op 66.4 (7.8); retrospective 61.0 (8.15)	**Eyelid malignancy**:
					Squamous cell carcinoma n=5
					Sebaceous gland carcinoma n=3
					Basal cell carcinoma n=1
					Orbital malignancy: Spindle cell tumour n=1
					Adenocarcinoma n=2
					Ocular surface: squamous neoplasia n=3
					Lacrimal sac: Lacrimal sac malignancy n=1
						n=9 Eyelid;
						n=3 Orbital;
						n=3 Ocular surface;
						n=1 Lacrimal sac
							55

Becker et al 2016[35]; **Becker et al 2017**[36]	Germany	Cross sectional	n= 43 partial (27 Male, 16 Female)	Mean 62.4 years (ranged 37 to 87 years)	All patients had under-gone surgery for advanced cancer of the nose/nasal cavity.	All Nasal	75

Gaudin et al 2023[4]	Germany	Cross sectional	n=76 (42 Male, 34 Female)	Mean 59.28 (19.2); range 22–89 years	n=44 cancer;
					n=24 congenital malformations;
					n=8 accidents
						n=32 Ear;
						n=31 eye;
						n=8 nose;
						n=5 combined
							88

Hui et al 2023[38]	Malaysia	Cross sectional	n=64 (41 Males, 23 Females)	Mean 38.13years (21.5)	n=34 head and neck cancer; n=28 accidents; n=2 congenital	n=3 Auricular; n=61 Ocular	75
Kievit et al 2013[37]	Netherlands	Case series	n=9 (3 Male, 6 Female) ONLY n=1 Trauma Male	Mean 40.7years (range 16-67); Trauma = 37 years	n=8 congenital or genetic; n=1 Trauma	Right ear	70
Plath et al 2020[39]	Germany	Cross sectional	n=7 prosthesis (3 Male, 4 Female); n= 18 Reconstruction (12 Male; 6 Female)	Prosthesis 85 years (range74–92); Reconstruction 68 (range 52-93)	BCC or SCC, but no between group detail given	Nasal	100
Vijverberg et al 2018[40]	Netherlands	Case series	n=11 (9 Male, 2 Female) ONLY n=5 cancer or trauma, all male	Cancer or trauma = mean 71.8 (15.9) range 52-89	n=3 SCC, n=1 Melanoma, n=1 Trauma	n= 4 Right ear, n=1 Left ear	100
Worrell et al 2017[41]	England	Cross sectional	n=10 (6 Male, 4 Female) ONLY n=3 for solely facial prosthesis (all Male), n=3 both oral and facial prosthesis (1 Male, 2 Female)	Mean 71 years (8.6); Facial prosthesis mean 65 years (10.5); Oral and Facial mean age 69.7 years (3.1)	n=1 Nasopharyngeal carcinoma, n=1 Adnexal Carcinoma & n=1 SCC	All Nasal	88

Key: Basal cell carcinoma (BCC), Joanna Briggs Institute (JBI), Squamous cell carcinoma (SCC), Standard Deviation (SD).

the case a general commentary will be presented at the end of this section. It is also worthy of note that the majority of the QoL measures translate as the higher the scores the better the QoL. The only difference is in the EORTC QLQ-H&N35, where the higher scores on the symptom scales indicate worse symptoms or problems, while higher scores on the functional scales indicate better functioning.

Auricular

Atay et al[24] used the WHOQOL-BREF, and population level data is available from the World Health Organization.[29] Visual analysis of the data indicates that the respondent in Atay's work that had received auricular prosthesis reported better QoL on all four domains of the scale than the general population of Turkey (the country of data collection), but worse than their own control group. When compared with the control group constituted by Atay et al[24] on the overall score this subgroup was significantly worse. The change as it relates to the WHO normative values is supported by the work of Kievit et al,[37] who used a general QoL scale the SF-12 and found that their patients were better across domains than age matched norms for a healthy population.

Kievit et al[37] and Vijverberg et al,[40] both used the Glasgow Benefit Inventory (GBI) and found very similar levels (Table 4) of positivity. There are no normative values available for the GBI however other studies have reported on patients who have had treatments due to an otorhinolaryngological condition. In these studies, the data reported has not been standardised, and this makes comparison challenging. However, it does suggest auricular prosthesis have a positive impact as measured by the GBI.

Nasal

Atay et al[24] also investigated people who had received nasal prosthesis. In relation to their control group, as with auricular prosthesis, they reported a reduced QoL. When visually assessed against general Turkish population data, this specific subgroup of participants, scored the same or worse.[29] When compared with the control group on the overall score this subgroup was significantly worse.

Plath et al[39] used the SF-36, similar to the WHOQOL-BREF which uses general QoL scales and has published normative data. Only 7 of the 25 people had received a nasal prosthesis as their rehabilitation, however no significant differences were observed in all QoL scores between surgical reconstruction versus prosthetic rehabilitation. Plath et al39 report that the SF-36 scores for all the people in their study (across both groups) were significantly lower than those in the normally distributed reference population (n=2,900) for physical functioning (P=0.049) and social functioning (P<0.001).

Two studies[35,36,41] (reported in 3 papers) used the UWQoL as their measure. Worrell et al., only had 3 participants that had a nasal prothesis.[41] Unfortunately, individual data is not reported, and the data presented is in a figure and not numerical. It is therefore difficult to compare Worrell et al[41] with that of any other papers including that of Becker et al.[35,36] However, a visual comparison with the meta-analysis undertaken by Becker et al[35] and their novel data suggests that the data obtained by Worrell et al[41] are somewhat similar, although specific comparison is not appropriate.

In the general HNC analysis that Becker et al[35,36] undertook found that people with nasal prosthesis show distinctly better results for 'swallowing', 'chewing', 'speech' and 'shoulder' function. The score difference for the domain 'appearance' between patients with nasal prosthesis and people after treatment of oral cavity or oropharynx cancer is 7.8, which Becker et al[35,36] suggest is a smaller difference than expected.

Orbital

Three of the studies reported QoL related to orbital prosthesis, however they all use different measures of QoL (Table 4). As mentioned previously, Atay et al[24] used the WHOQOL-BREF. Overall, in relation to the other prosthesis groups reported in the paper, people with orbital prosthesis did not differ from those with auricular or nasal prosthesis. They did however differ from the control group, overall and on 2 (Physical and Environmental) out of the 4 subscales. When the Orbital group is compared with the WHO normative data from Turkey, this patient group is very similar across domains except for that of 'Physical' where the population data where notably lower (population data = 53.57 vs Atay et al patient data = 66.7).

The Functional Assessment of Cancer Therapy - General (FACT-G) is a 27-item questionnaire designed to measure four domains of health related QOL in cancer patients: Physical, social, emotional, and functional well-being. This is the scale used by Balakrishnan et al[34] where they found that people wearing a spectacle mounted prosthesis reported significantly better QoL than those who were post op (orbital exenteration) but pre-prothesis fitting. When compared to FACT-G normative data[42] with people wearing an orbital prosthesis in Balakrishnan et al[34] study reported worse QoL than the general population (74.6 vs. 88.0 respectively), but better than a cancer population (74.6 vs. 72.7).

Table 4. Quality of Life measures and outcomes for people with acquired facial deficits.

Author	Outcome Measures used	Prosthesis retention modality	Previous experience wearing a prosthesis	Data collection time points as reported (mean/range or time point)
Atay et al 2013[24]	WHOQOL-BREF	Adhesive retained- n= 42, Implant retained n=30	6+ months	6+ months
Balakrishnan et al 2022[34]	FACT-G	Spectacle mounted	Group I non, Group II 3+ months	3+ months
Becker et al 2016[35]; **Becker et al 2017**[36]	UWQOL	bone-anchored or implant-retained prosthesis (single stage)	none	Mean 45.3 months (range from 6 to 163 months)
Gaudin et al 2023[4]	EORTC QLQ-H&N35	Not reported	Mean 31.2 years (St Dev 24.46)	Mean 31.2 years (St Dev 24.46)
Hui et al 2023[38]	UWQOL	Not reported	6+ months	Not reported
Kievit et al 2013[37]	GBI and SF12	Implant 2 screws,	yes	Mean 8.9 years (range 4months to 17.6 years)
Plath et al 2020[39]	SF-36	Implants	none	1.7 years after surgery
Vijverberg et al 2018[40]	GBI	Implant bar & clip	none	Mean 2.6 years
Worrell et al 2017[41]	UWQOL	Not reported	Yes	Mean 22 years (range 6 to 51 years)

Key: European Organization for Research and Treatment of Cancer quality-of-life questionnaire – H&N35 (EORTC QLQ-H&N35), Functional Assessment of Cancer Therapy - General (FACT-G), Glasgow Benefit Inventory (GBI), Medical Outcomes Short form (SF12), Medical Outcomes Short Form (SF-36), Turkish version of the world health organization QOL, Short Form (WHOQOL-BREF), University of Washington Quality of Life (UWQOL).

Hui et al[38] use the UWQoL, but unlike Becker et al,[35,36] they do not report individual questions and the impact of the prosthesis on each domain, but on the total. In comparison to the people receiving a nasal prosthesis in Becker et a,l[35,36] a greater proportion of Hui et al38 participants reported their QoL as 'much better' than before their prosthesis. The overall QoL was similar between Hui et al,[38] Becker et al[35,36] even though the prosthesis sites are different.

Mixed Cancer Site

One paper[4] reported QoL for 31 people with cancer related prostheses, unfortunately it was not possible to differentiate the region of defect, and therefore the data could not be included in the above sub-group analysis. Guadin et al[4] used the EORTC QLQ-H&N35 and calculated the symptom scale values to achieve comparability. Based on the symptom scale values, patients reported their biggest limitations as mouth opening (37.63 ± 41.94) and having the sensation of a dry mouth (32.26 ± 38.95). However, neither of these domains would be affected through the intervention of/treatment with a facial prosthesis. This is the only retained study that uses the EORTC QLQ-H&N35, so there is no comparable data with prosthesis wearers.

DISCUSSION

The systematic review aimed to collect research findings which investigated how extra-oral facial prostheses affect QoL as measured by validated measures, in individuals who have acquired facial defects resulting from traumatic injuries or HNC. The ten included papers, representing nine distinct studies, highlight a complex but generally positive role for extra-oral facial prostheses in the rehabilitation of such defects. The various study methodologies together with differing QoL measure and different patient demographics create obstacles to establish clear general findings.

The literature included in this review demonstrates that extra-oral facial prostheses lead to better QoL results for patients when they are compared to both their previous state without a prosthesis, and the general population averages. In studies where the GBI was used the general population data indicated that (i) patients with auricular defects gained better QoL outcomes after receiving prostheses[37,40] and (ii) auricular prostheses function as effective solutions to

reduce the negative impacts on QoL caused by such defects. The study by Atay et al.[24] revealed that the patients achieved scores significantly below those of their control group, but this requires additional investigation to understand the nature and equivalence of the control groups.

The QoL assessment for nasal prosthesis users presents a more complex pattern of outcomes, than other extra-oral facial regions. The research conducted by Atay et al.[24] demonstrated lower (worse) QoL for patients with nasal prostheses compared to their control subjects and general population data, yet Plath et al.[39] discovered no significant difference in QoL between prosthetic rehabilitation and surgical reconstruction although both groups scored lower than reference population metrics. The comparable QoL outcomes between prostheses and surgical reconstruction make prostheses an excellent choice for particular treatment scenarios since they provide equal benefits to patients. The research conducted by Becker et al.[35,36] showed that people who had received treatment for HNC who were rehabilitated with a nasal prostheses achieved functional improvements in swallowing and speech functions which suggests particular domain-based advantages when measured with the disease specific UWQOL measure.

The data indicates that prostheses provide beneficial effects on QoL for patients who have orbital defects. After prosthetic fitting patients showed improved QoL outcomes in comparison to their post cancer therapy (pre-prosthesis) state[34] while often reaching QoL levels comparable to or surpassing general population or cancer population values.[24,34,38] The research conducted by Hui et al.[38] shows that a significant number of patients who received orbital prostheses described their post-treatment QoL as much better than before.

The diverse range of QoL measures in the studies presents a major difficulty for interpreting the combined results. Various QoL measures existed across the studies which contained different assessment domains and scoring systems. The multiple QoL tools create difficulties for running meta-analyses because it is not possible to generate unified and dependable conclusions. Standardisation of outcome reporting faces similar challenges in QoL research of maxillofacial prosthetics since it remains under development.[28]

This presented systematic review has a detailed search protocol that incorporates relevant databases as well as following established JBI and PRISMA guidelines and using two reviewers for screening and data extraction that makes the review rigorous. The JBI tools that the reviewers used for evaluating the studies made the quality assessment of the evidence base transparent.

Despite these strengths, several limitations must be acknowledged. One is the heterogeneity of the included studies in terms of QoL measures, the study design (ranging from case series to quasi-experimental) and the reporting detail, which prevented meta-analysis. Some studies had small sample sizes for specific defect types (e.g., Worrell et al.,[41] for nasal prostheses), limiting the generalizability of their individual findings.

Furthermore, the inability to differentiate QoL outcomes based on the primary cause of the defect (HNC vs. trauma) within some of the studies means potential nuances between these aetiologies could not be fully explored. The use of narrative synthesis is appropriate but may introduce a degree of subjectivity in interpretation. Finally, the variability in control groups used (or their absence) in some studies makes direct comparisons of QoL impact challenging. It is also worth exploring QoL differences more explicitly between patients with defects resulting from trauma versus HNC to provide tailored insights for these distinct aetiologies.

The study's findings provide evidence for the continued use of extra-oral facial prostheses as a rehabilitation option that can improve the QoL of patients with acquired facial defects. Clinicians should discuss prosthetic rehabilitation as a means to improve various aspects of QoL, acknowledging that outcomes can vary.

It is also worthy of note that the measurement of QoL with people who are referred for extra-oral facial prostheses is important to understand their holistic needs. It was for this reason that the research conducted by Guadin et al.[4] was included in the current review. Guadin et al[4] sample of people who had had HNC reported functional challenges like mouth opening difficulties and dry mouth symptoms, and unsurprisingly these were not resolved by extra-oral facial prostheses. But findings confirm that patients need to be evaluated through a comprehensive assessment of their QoL since the prosthesis helps address appearance and functionality but not all sequelae from their primary disease or its treatment can be resolved.

Future clinical practice and research should use standardized and validated QoL measures, with both general health related QoL instruments and disease/ site specific modules to allow more direct comparison and meta-analysis. To track changes in QoL over time from pre-treatment baseline through to post-prosthetic fitting and long-term follow-up, prospective, longitudinal studies are crucial.

Furthermore, understanding how different factors such as social support, coping strategies, method of prosthesis retention (e.g., adhesive vs. implant-retained), and visibility of the defect may mediate or moderate QoL outcomes would also enrich understanding.

CONCLUSION

The results of the systematic review indicate that extra-oral facial prostheses have generally positive impact on the QoL of people with acquired facial defects. However, the improvements are evident across auricular, nasal and orbital defect types, but the extent and specific domains of QoL affected vary. In the current evidence base, the methodological heterogeneity, particularly in QoL measurement tool, means that there is a clear need for standardization in future research. Despite these limitations, prosthetic rehabilitation remains an essential treatment modality that can significantly aid individuals in adapting to and improving their lives following facial disfigurement.

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Appendix 1. JBI Critical appraisal.

Reference	JBI Quality Appraisal Tool	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Atay et al 2013[24]	Quasi Experimental	Y	Y	Y	Y	N	Y	Y	N	Y		
Balakrishnan et al 2022[33]	Cohort	Y	Y	Y	Y	N	N	Y	U	N/A	N/A	Y
Becker et al 2016[34]	Cross sectional	Y	Y	Y	Y	N	N	Y	Y			
Becker et al 2017[35]	Cross sectional	Y	Y	Y	Y	N	N	Y	Y			
Gaudin et al 2023[36]	Cross sectional	Y	Y	Y	Y	Y	N	Y	Y			
Hui et al 2023[38]	Cross sectional	Y	Y	Y	Y	Y	N	Y	Y			
Kievit et al 2013[37]	Case Series	N	Y	Y	N	N	Y	Y	Y	Y	Y	
Plath et al 2020[39]	Cross sectional	Y	Y	Y	Y	Y	Y	Y	Y			
Vijverberg et al 2018[40]	Cross sectional	Y	Y	Y	Y	Y	Y	Y	Y			
Worrell et al 2017[41]	Cross sectional	Y	Y	Y	Y	Y	N	Y	Y			