


Factors associated with the indication of alternative feeding following tongue cancer: a systematic review

Fatores associados à indicação de via alternativa de alimentação após câncer de língua: uma revisão sistemática

Factores asociados a la indicación de via alternativa de nutrición después del cáncer de lengua: una revisión sistemática

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Abstract

Introduction: Oral cavity cancer constitutes lesions on the surface of the oral mucosa and, due to the consequences of the disease and its treatment, dysphagia often occurs. When oral feeding becomes impossible, it is essential to indicate alternative feeding routes. **Objective:** to verify the occurrence and factors associated with the use of an alternative feeding route after tongue cancer. **Method:** The search was conducted by two independent researchers in the Medline (Pubmed), LILACS, SciELO, Scopus, WEB OF SCIENCE and BIREME databases without language and location restrictions, from 2010 to 2021. To complement and to avoid risk bias, a search for gray literature on Google Scholar was performed. **Selection Criteria:** The systematic review was conducted in accordance with the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Studies that scored ≥ 6 points according to the protocol for qualitative scoring proposed by Pithon. **Results:** Studies show

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Authors' contributions:

LDSC and LFG: Methodology, collected the data, wrote the paper, critical revision.

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that most individuals with oral cancer develop significant weight loss, requiring intervention. The overall stage of the disease is a significant predictor of critical weight loss in patients undergoing treatment. **Conclusion:** The indication of an alternative feeding route after tongue cancer was 19.3% to 68.2%, and the factors associated with this indication of AAV were the general stage, surgery associated with adjuvant therapy, poor adherence to multidisciplinary treatment, presence of complications and poor survival.

Keywords: Deglutition Disorders; Speech, Language and Hearing Sciences; Enteral Nutrition; Nutritional status.

Resumo

Introdução: O câncer de cavidade oral constitui lesões da superfície da mucosa oral, e, devido às sequelas da doença e de seu tratamento, frequentemente ocorrem quadros de disfagia. Quando a alimentação por via oral se torna impossibilitada, é fundamental a indicação de vias alternativas de alimentação. **Objetivo:** verificar a ocorrência e os fatores associados ao uso de via alternativa de alimentação após câncer de língua. **Método:** A busca foi conduzida por dois pesquisadores independentes nas bases de dados Medline (Pubmed), LILACS, SciELO, Scopus, WEB OF SCIENCE e BIREME sem restrição de idioma e localização, no período de 2010 a 2021. Para complementar e evitar viés de risco foi realizada uma busca por literatura cinza no Google Scholar. **Critérios de Seleção:** A revisão sistemática foi conduzida conforme as recomendações do Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). Foram incluídos na pesquisa estudos que obtiveram pontuação ≥ 6 pontos segundo o protocolo para pontuação qualitativa proposto por Pithon. **Resultados:** Os estudos mostram que a maioria dos indivíduos com câncer oral desenvolvem uma perda significativa de peso, necessitando de intervenção. O estágio geral da doença é um preditor significativo de perda de peso crítica em pacientes em tratamento. **Conclusão:** A indicação de via alternativa de alimentação após câncer de língua foi de 19,3% a 68,2%, e os fatores associados a essa indicação de VAA foram o estágio geral, cirurgia associada à terapia adjuvante, má adesão ao tratamento multidisciplinar, presença de complicações e baixa sobrevida.

Palavras-chave: Transtornos da Deglutição; Fonoaudiologia; Nutrição enteral; Estado nutricional.

Resumen

Introducción: El cáncer de cavidad oral constituye lesiones en la superficie de la mucosa oral y, debido a las consecuencias de la enfermedad y su tratamiento, es frecuente que se presente disfagia. Cuando la alimentación oral se hace imposible, es imprescindible la indicación de vías alternativas de alimentación. **Objetivo:** verificar la ocurrencia y los factores asociados al uso de una vía alternativa de alimentación después del cáncer de lengua. **Método:** La búsqueda fue realizada por dos investigadores independientes en las bases de datos Medline (Pubmed), LILACS, SciELO, Scopus, WEB OF SCIENCE y BIREME, sin restricciones de idioma y ubicación, de 2010 a 2021. Para complementar y Evitar riesgo de sesgo, se realizó una búsqueda de literatura gris en Google Scholar. **Criterios de selección:** La revisión sistemática se llevó a cabo de acuerdo con las recomendaciones de Elementos de informe preferidos para revisiones sistemáticas y metanálisis (PRISMA). Los estudios que puntuaron ≥ 6 puntos según el protocolo de puntuación cualitativa propuesto por Pithon et al. (2015). **Resultados:** Los estudios muestran que la mayoría de las personas con cáncer oral desarrollan una pérdida de peso significativa, lo que requiere intervención. El estadio general de la enfermedad es un predictor significativo de pérdida de peso crítica en pacientes que reciben tratamiento. **Conclusión:** La indicación de vía alternativa de alimentación tras cáncer de lengua varió del 19,3% al 68,2%, y los factores asociados a esta indicación de AAV fueron el estadio general, cirugía asociada a terapia adyuvante, mala adherencia al tratamiento multidisciplinario, presencia de complicaciones y baja supervivencia.

Palabras clave: Trastornos de Deglución; Fonoaudiología; Nutrición Enteral; Estado nutricional.

Introduction

The oral cavity is the anatomical site of the upper air-digestive tract in which the emergence of malignant diseases that grow uncontrolled and excessively is more frequent, the most common being Squamous Cell Carcinoma (SCC). This histological type accounts for more than 95% of malignant oral neoplasms, the main etiological factors being exposure to tobacco and alcohol use¹. Neoplastic lesions may have a reddish or whitish appearance, are mostly asymptomatic, and may or may not be associated with leukoplakic lesions. Thus, oral cavity cancer constitutes lesions of the surface of the mucosa of the lips, floor of the mouth, buccal mucosa, tongue, upper and lower gingiva, hard palate, and retromolar trigone².

The main symptoms of oral cavity cancer are the presence of lymphedema in the cervical region, pain gradually developed, evident weight loss, constant hoarseness, and difficulty in speaking, chewing, and swallowing, in which the chance of causing dysphagia is common. Also, it is more common for men in their 40s to be affected by oral cavity cancer since the prevalence of this group exposed to alcohol, smoking, excessive body fat, poor oral hygiene, and the genetic factor itself is higher³.

Oral cavity cancer can be diagnosed through clinical examination, but only confirmed with biopsy. Also, computed tomography exams help diagnose and mainly favor the assessment of the tumor extent. In most cases, the surgical procedure is the most common treatment, both in minor lesions and major surgeries, which can cause functional sequelae in the patient. Generally, surgery involves removing one or more areas of the oral cavity related to removing lymph nodes from the neck and, if necessary, some reconstruction. During major surgery, it may be necessary to remove bone segments, and these resections are scheduled to find the best reconstruction to obtain the best functional results⁴.

Chemotherapy related to radiation therapy is used in more advanced cases when surgery is impossible. With chemotherapy, the patient may have the tumors cured or their size decreased before surgery and further supplemented with radiation therapy. However, both manifest side effects such as mucositis, periodontitis, decreased salivary flow, dysphagia, and trismus. Salivary flow is compromised qualitatively and quantitatively, in

which there is an increase in salivary viscosity, causing difficulty in swallowing. Also, radiation therapy is known to alter the salivary glands causing xerostomia⁵.

Xerostomia is a manifestation resulting from dysfunction of the salivary glands, reported as a “dry mouth sensation” and begins after two weeks of treatment. The patient may suffer from halitosis, chapped lips, and difficulty feeding (dysphagia). Mucositis is an inflammation of the soft tissues of the oral cavity that affects 40% of patients who have undergone chemotherapy and 10% of individuals who have undergone radiation therapy³. Trismus is a late effect and is associated with malignancies in the retromolar region and soft palate observed in 75.5% of patients due to exposure of the temporomandibular joint (TMJ) and masticatory muscles to radiation⁶.

In addition to the functional impairments resulting from the disease and its treatment, these individuals may present cancer-induced cachexia characterized by a complex multifactorial metabolic syndrome. In these cases, it may be associated with tumor growth and treatments, which cause extreme weight loss and appetite with signs of systemic inflammation⁷.

Due to dysphagia and weight loss resulting from the disease and the treatments, the safe and efficient maintenance of oral feeding becomes impossible, and it is essential to indicate alternative feeding routes (AFR) for nutritional maintenance and hydration in some cases. The type of feeding route will be chosen depending on the clinical conditions related to swallowing, the integrity of the gastrointestinal tract, and the state in which the patient is. Enteral nutrition is performed with diets with the controlled intake of nutrients prepared by equipment such as nasogastric tubes, nasoenteric tubes, and ostomies (gastrostomy and enterostomy), taking food directly into the stomach or intestine to absorb nutrients⁸. However, parenteral nutrition is indicated due to the relevant losses of nutrient absorption by the digestive tract in some cases because it takes nutrients directly to the bloodstream⁹.

Given the data demonstrated in the literature, numerous changes contribute to malnutrition, dehydration, and safe swallowing in patients with oral cancer. Thus, it is relevant to determine criteria for indicating an alternative feeding route for these individuals according to the different conditions in

the oral cavity, aiming at their safety and quality of life.

Objective

Given the above, the main objective of this study is to verify the occurrence and factors associated with using an alternative feeding route after tongue cancer, aiming to answer the following guiding research question: When is the use of an alternative feeding route after tongue cancer indicated?

Research strategy

This is a systematic literature review. The descriptors were selected from the controlled vocabularies Health Sciences Descriptors (DeCS) and Medical Subject Heading Terms (MeSH), given their wide use by the scientific community for indexing articles in the PubMed database. The search strategy used was combining descriptor and Boolean operator: (Tongue cancer) or (Oral cancer) and (tube feeding). The search occurred in

a concentrated manner in May 2021. A search for gray literature on Google Scholar was performed to complement and avoid risk bias.

This systematic review was conducted according to the PRISMA *recommendations (Preferred Reporting Items for Systematic Reviews and Meta-Analyses)*¹⁰, in order to obtain the strictest criterion of scientific evidence protocol. Two independent researchers searched scientific articles in the electronic databases MEDLINE (Pubmed), LILACS, SciELO, SCOPUS, WEB OF SCIENCE, and BI-REME, without language, period, and location restriction. The research was structured and organized in the PICOS form, representing an acronym for target Population, Intervention, Comparison, and “Outcomes”. The population of interest or health problem (P) corresponds to patients with tongue cancer; intervention (I): alternative feeding route in patients with tongue cancer; comparison (C): not applicable; outcome (O): Enteral Nutrition and Parenteral Nutrition; (S): cross-sectional study, observational study, case reports, case-control studies, controlled clinical trials, cohort studies (Chart 1).

Chart 1. Description of the PICOS components.

Acronym	Definition
P	tongue cancer patients
I	alternative feeding route in patients with tongue cancer
C	not applicable
O	Enteral Nutrition and Parenteral Nutrition
S	Cross-sectional study Observational study Case reports Case-control studies Controlled clinical trials Cohort studies

Selection criteria

Studies without language and location restrictions were included from 2010 to 2021. Table 2 represents the inclusion and exclusion criteria applied specifically for this research. The study obtained a score of 12 in the modified protocol described by Phiton et al. (2015)¹¹, which assesses

the methodological quality of the studies. Studies published in the formats of Letters to the editor, guidelines, literature reviews, narrative reviews, systematic reviews, meta-analyses, and abstracts were excluded. Studies unavailable in full were also excluded (Chart 2).

Chart 2. Summary of the inclusion/exclusion criteria.

Inclusion Criteria	
Design	Case reports Case and control studies Controlled clinical trials Cohort studies Screening studies Observational studies
Location	Unrestricted
Language	Unrestricted
Exclusion Criteria	
Design	Letters to the Editor Guidelines Literature reviews Systematic reviews Meta-analyses
Studies	Unclear studies Poorly described or inadequate
Form of publication	Only abstract

Data analysis

The selected studies were retrospective cohort, randomized clinical trial, and retrospective. Data extraction for the eligibility process of the studies was performed using a specific form for systematic review prepared by two researchers in the Excel® program, in which the extracted data were added by one of the researchers and then checked by another researcher. Initially, they were selected according to the title; then, the abstracts were analyzed, and only those potentially eligible and answering the guiding question were selected. Articles were selected for full reading based on the abstracts, and those that met all predetermined criteria were admitted.

The selection and analysis of the quality of the methods used in the study were assessed by the reviewers independently (PH, CTM), according to the recommendation of the PRISMA¹⁰ protocol. The assessment prioritized the clear description

of the information. At this point, the review was performed blindly, masking the names of the authors and journals, avoiding any potential bias and conflict of interest.

Initially, the eligibility reviewers (PH, CTM) were calibrated to perform the systematic review by LFG and LSC. After calibration and clarification of doubts, the titles and abstracts were independently examined by an eligibility reviewer (PH), who was not blinded to the names of the authors and journals. Those that presented a title within the scope, but which abstracts were not available, were also obtained and analyzed in full. Studies outside the proposed scope, case reports, letters to the editor and/or editorial, literature reviews, indexes, abstracts, systematic reviews, meta-analyses, and animal studies were excluded. Subsequently, the full text of the eligible studies was preliminarily obtained and assessed. In specific cases, when the study with the potential for eligibility presented incomplete data, the authors could be contacted by email for more information. However, this was not necessary for this research.

Results

The results obtained in this research and observed in Figure 1 highlight the exclusions were made by duplication, title, abstract, and full reading. At the end of the selection process, one study met all eligibility criteria. It is possible to verify the entire admissibility selection of the articles through Figure 1. The studies included in this research were a retrospective cohort, randomized, and retrospective clinical trial. The data obtained from the eligible studies were also transported to a spreadsheet in the same program to organize the results, as shown in Table 1.

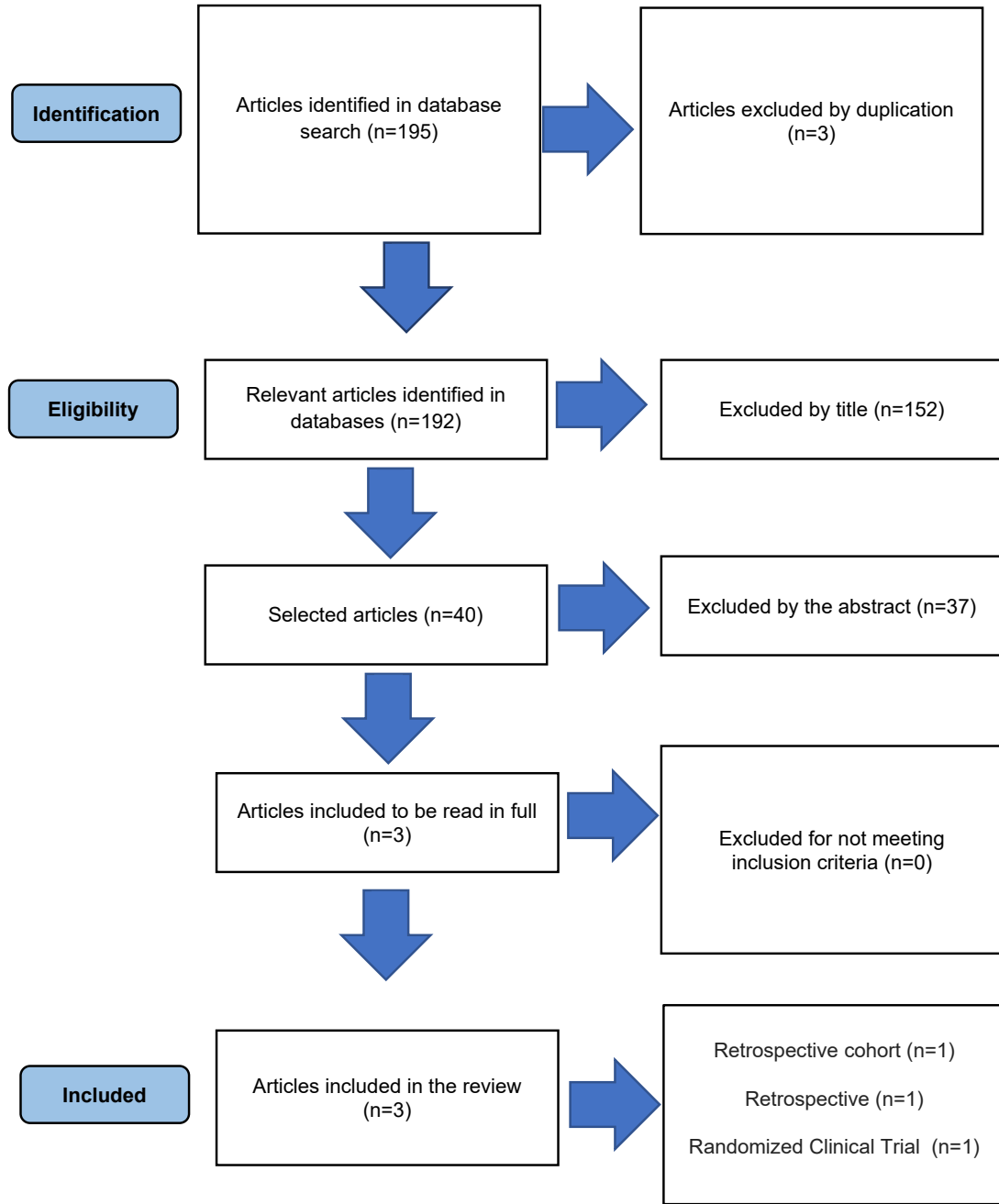


Figure 1. Diagram of identification and selection of articles adapted from the Prisma guidelines.

Table 1. Classification of references obtained from Pubmed, Bireme, SciELO, Lilacs, Web Of Science, and Scopus databases.

Descriptors	Total number of articles	No. of References excluded	Reason for exclusion	No. of selected articles	Database
(Tongue cancer) or (Oral cancer) and (tube feeding)	0	-	-	-	Lilacs
(Tongue cancer) or (Oral cancer) and (tube feeding)	0	-	-	-	Web of Science
(Tongue cancer) or (Oral cancer) and (tube feeding)	0	-	-	-	Scopus
(Tongue cancer) or (Oral cancer) and (tube feeding)	0	-	-	-	SciELO
(Tongue cancer) or (Oral cancer) and (tube feeding)	75	72	Excluded by title (65) Deleted by abstract (7)	3	Pubmed
(Laser therapy) and (Speech therapy)	120	120	Excluded by title (87) Excluded by abstract (30) Duplicates (3)	0	Bireme
Total	195	192		3	Pubmed

Design of studies

In the first study¹² in this analysis, the objective was to assess whether gastrostomy improves the postoperative phase in patients with oral cancer undergoing hemi-mandibulectomy and selective neck dissection or not. Subjects eligible for inclusion in the study had stage III or IV oral squamous cell carcinoma and underwent hemi-mandibulectomy and selective neck dissection.

The sample consisted of (n=40) patients who were randomly allocated into 2 groups according to a randomized list: Group 1 (n=20 patients) had a nasogastric tube (NG) for 4 weeks, and Group 2 (n=20 patients) underwent Percutaneous Endoscopic Gastrostomy (PEG) for 4 weeks or more after surgery. Group 1 consisted of 11 men and 9 women, and Group 2 consisted of 13 men and 7 women. All patients received post-surgical radiation therapy 4 weeks after the surgery at doses between 60 and 70 Gy. The mean age of the patients was 61 years old in Group 1, and 62 years old in Group 2.

Wound infection and dehiscence were documented, and patients' weight was studied before surgery and 4 weeks after surgery. Weight loss was defined as a difference in pre-surgical weight and 4 weeks later. Age, sex, and stage of disease were variable factors of the study; wound dehiscence, infection, and weight loss were considered results of the study¹².

The second research¹³ included, aimed to assess the factors associated with critical weight loss during treating patients with squamous cell carcinoma of the oral cavity. The subjects included in the studies were (n=150) patients over 18 years of age with a confirmed diagnosis of squamous cell carcinoma of the oral cavity. Patients were divided into two groups, isolated surgery (unexposed) and surgery plus adjuvant therapy (exposed). There was a total of 111 patients who underwent surgery and adjuvant therapy and 39 patients who underwent surgery alone. The mean age of patients undergoing surgery with adjuvant therapy was 46.9 ± 12.77 years old. Most patients were male 89 (80.2%), and the remaining 22 (19.8%) were female¹³.

The third study¹⁴ assessed the clinical-epidemiological profile, postoperative complications, survival rates, and functional aspects of patients with oral cavity and oropharynx cancer undergoing total glossectomy. Male patients were recruited (n=22), all with oral cavity and oropharynx cancer. The collected data were recorded separately with information on the preoperative, treatment, postoperative, and clinical follow-up periods.

At diagnosis, 13 (59.1%) individuals smoked cigarettes, and 10 (45.5%) consumed alcohol. Most patients, 13 (59.1%), had mouth and oropharynx tumor involvement. In 7 (31.8%) cases, the tumor was restricted to the mouth and 2 (9.1%) to the

oropharynx. All tumors were invasive squamous cell carcinomas, the majority T4a (14 cases, 63.3%). Regarding the clinical stage, 15 (68.2%) were classified as IVa¹⁴. Total glossectomy (TG) as initial treatment was performed in 18 (81.8%) patients and as a rescue treatment in 4 (18.2%). Neck dissection was performed in all cases except 1 (4.5%), and reconstruction with pectoralis major myocutaneous flap was used in all cases. Functional results were assessed considering the decannulation time, permanence of the nasoenteral tube, and need for gastrostomy. Survival was calculated considering the time in months between the initial treatment and the date of death or the date of the last information received¹⁴.

Main findings of the studies

In the first study, the results showed a significant difference in weight loss between the two groups, and Group 1 (use of nasogastric tube) showed greater weight loss. In Group 1, 10 patients (50%) had surgery site dehiscence compared to 3 (15%) in Group 2. Postoperative infection occurred in 7 patients (35%) in Group 1 and 1 patient (5%) in Group 2. Data analysis showed a greater indication of a nasogastric tube (NG) in patients with greater dehiscence at the surgery site and more postoperative infections than in Percutaneous Endoscopic Gastrostomy (PEG). The duration of PEG use was significantly longer, with a median of 139 days compared to 66 days for the NG tube, which has been shown to be a more acceptable nutrition route for enteral nutrition than NG¹².

In the second study, most patients (81.3%) had a weight loss of more than 5% within 1 month or more than 10% of body weight within 6 months of starting treatment (surgery). Of all the variables considered, those significant from the univariate analysis were general stage, mode of nutrition, type of enteral nutrition, adjuvant therapy, and comorbidities. It was observed that patients with advanced-stage disease (stage III and IV) are more likely to develop weight loss and, consequently,

receive enteral nutrition since they are more subjected to extensive resection associated with adjuvant therapy¹³.

Among the (n=150) patients included in the study, 29 (19.3%) had the feeding tube nutrition mode. There was an occurrence of 69.3% of feeding tube use in the group undergoing surgery alone and 86.5% in the group undergoing surgery plus adjuvant therapy. In patients undergoing surgery alone, 2 (5.1%) required NG tubes, 20 (51.2%) gastrostomy, and 5 (12.8%) PEG. In the group undergoing surgery and adjuvant therapy, 5 (4.5%) required NG tube, 60 (54%) gastrostomy, and 31 (27.93%) PEG¹³.

In the study by Quinsan et al. (2020)¹⁴, 8 (36.4%) patients did not become dependent on an enteral diet or tracheostomy. Removal of the tracheostomy was possible in 4 (18.2%) patients, but they maintained the need for a partial or total enteral diet. 15 (68.2%) of the patients required an enteral diet, and the time to remove the nasoenteral tube ranged from 64 to 167 days, and to remove the tracheostomy ranged from 17 to 352 days (mean of 92.7 and median of 54.5 days). On the other hand, 10 (45.4%) patients required tracheostomy and enteral diet up to the date of the last information, and 3 (13.6%) of them underwent gastrostomy.

Patients not dependent on tracheostomy and enteral diet had significantly longer follow-up and survival than the other patients. Patients who did not require tracheostomy and enteral diet had an overall 5-year survival of 43.8%. Among those who required tracheostomy or enteral diet, the longest survival was 15 months. All patients who survived over 15 months could progress to oral diet rehabilitation and tracheostomy removal. The non-compliance of some patients to multidisciplinary care in outpatient and home settings contributed to the non-progression of the diet. Furthermore, it was observed that follow-up time and survival were determinants for the best functional results¹⁴. The information regarding the admitted study is summarized in Table 2.

Table 4. Synthesis of the articles included.

Author/ Year/ Place of publication	Objective	Sample	Method	Results	Conclusion
Tabrizi, Hosseinpour, Taghizadeh, 2016 Iran	To assess whether gastrostomy improves the postoperative phase in patients with oral cancer undergoing hemi-mandibulectomy and selective neck dissection or not	40 patients	Randomized clinical trial study. The occurrence of infection and wound dehiscence was assessed. Weight loss was defined as patients' weight reduction 4 weeks after surgery compared to pre-operation.	Weight loss was 7.9 kg in group one and 5.3 kg in group two. In group one, 10 subjects had dehiscence versus 3 subjects in group two. Data analysis demonstrated a significant difference in post-surgical infection between the two groups.	Gastrostomy may be an appropriate method for feeding in patients with extensive oral cancer.
Iftikhar et al., 2018 Pakistan	To assess the factors associated with critical weight loss during treating patients with oral cavity squamous cell carcinoma.	150 patients	A retrospective cohort study was conducted at the Aga Khan University Hospital in Karachi, Pakistan in 125 patients. Patients receiving adjuvant therapy were considered exposed, and the outcome was critical weight loss.	The mean age was 46.9 ± 12.8 years in patients undergoing surgery and adjuvant therapy, 119 (79.3%) males and 31 (20.7%) females. One hundred and twelve patients (81.3%) developed critical weight loss 6 months after starting treatment, and the only significant variable associated with critical weight loss was disease stage	A large proportion of oral cancer patients have developed critical weight loss requiring intervention. The overall stage of the disease is a significant predictor of critical weight loss in patients undergoing treatment.
Quisan et al., 2020 Brazil	To assess the clinical-epidemiological profile, postoperative complications, survival, and functional aspects of patients with oral cavity and oropharynx cancer after total glossectomy.	22 patients	A retrospective study including patients with cancer of the oral cavity and oropharynx after total glossectomy.	All patients were male, with a median age of 57 years. Most tumors were located on the tongue and floor of the mouth and were classified as stage IVa. Total glossectomy as initial treatment was performed in 18 and as a rescue in four patients. The pectoralis major myocutaneous flap was used for reconstruction in all cases. The main postoperative complication was surgical wound infection and salivary fistula.	Overall survival was 19%, and cancer-specific survival was 30.8% at five years. Eight patients were rehabilitated to exclusive oral feeding without depending on tracheostomy and enteral tube, all with overall survival greater than 15 months.

Source: Tabrizi, Hosseinpour, Taghizadeh, 2016; Iftikhar et al., 2018; Quisan et al., 2020.

Discussion

This study aimed to verify the occurrence and factors associated with the indication of an alternative feeding route in patients with tongue cancer. This systematic literature review found three studies that answered the guiding question. The indication of an alternative feeding route in the studies in this review ranged from 19.3%¹³ to 68.2%¹⁴, depending on the associated factors. Regarding head and neck cancer, the studies showed a variation in the indication of alternative routes from 60%¹⁵ to 97.1%¹⁶, considering the importance of minimizing the impacts of cancer treatment.

According to the literature, the indication of AFR is directly related to complications of HNC. The studies in this review indicated that the factors associated with weight loss are the presence of dehiscence and postoperative infection¹², and the factors associated with the indication of AFR include the general stage, surgery associated with adjuvant therapy^{13,14}, in addition to poor compliance to multidisciplinary treatment, presence of complications and low survival¹⁴. In head and neck cancer, significant complications such as tissue necrosis, infection, and wound dehiscence are common because the anatomy of the head and neck have specific characteristics¹⁷. Fernandes *et al.* (2013)¹⁸, in their study, report that the complication variables (5.9%) are associated with the length of hospital stay.

Head and neck cancer, as far as it is concerned, can affect the function of chewing and swallowing according to size and location. To select the best treatment and therapeutic alternatives, information obtained through tumor staging is used to assign the patient's clinical stage¹⁹. The most frequent sites for the appearance of oral cavity cancer are the tongue (40% of cases), floor of the mouth (30% of cases), and lower lip. A Brazilian study found that cancer is usually diagnosed in advanced stages regardless of the accessibility of the oral cavity during clinical examination¹⁸. Considering that the studies in this review refer that the general stage of cancer is a factor associated with the indication of AFR, it is inferred that, in most cases of late diagnosis, enteral nutrition will be indicated since, as oral cavity cancer causes dysphagia, it can generate a state of malnutrition and an increased chance of aspiration pneumonia²⁰.

It is known that oral cavity cancers can be treated with surgery, radiation therapy, chemotherapy, or combination therapy. In order to conserve the organ, radiation therapy alone or associated with chemotherapy is currently seen as a good treatment alternative for patients affected by HNC²¹. However, conventional radiation therapy has been burdened by a large amount of severe toxicity, which can bring high fatal potential and, in most cases, interfere with the treatment outcome²⁰. Thus, the indication of AFR will be necessary, corroborating the results found in the present research, which showed that low survival and surgery associated with other treatments contribute to this indication.

Treatment, mainly associated with radiation therapy, can generate long-term sequelae such as xerostomia, trismus, and dysphagia²². Concerning post-radiation therapy reactions for swallowing, osteoradionecrosis of the mandible and teeth, fibrosis, trismus, laryngeal edema, difficulty in sensory and motor control of food are pointed out, in addition to, in some cases, vocal fold immobility, swallowing reflex dysfunction, and pharyngeal peristalsis, which can last for up to two years²³. The studies found in this review demonstrated that postoperative complications such as dehiscence and postoperative infections were also factors associated with the indication of AFR, and it can be inferred that long-term sequelae are also factors to be considered in the indication of AFR.

Given the disorders mentioned above, regardless of severity, they can cause significant changes and impacts on the individual's quality of life in the emotional, social, physical, and functional aspects, which makes it indispensable to design intervention plans so that dysphagia causes less repercussion on the quality of life during and after cancer treatment. Thus, the treatment for oral cavity cancer and speech therapy rehabilitation aim to simultaneously achieve the cure of the disease and good functional results²⁴.

Improvement of swallowing function and early restoration of eating and drinking after surgery or chemotherapy treatments can be achieved with swallowing rehabilitation exercises²⁵. Nevertheless, non-compliance to swallowing exercises in this population is high²⁶. The World Health Organization report defines patient compliance as "the extent to which a person's behavior matches the agreed recommendations of a health professional." This report highlights that multiple factors

influence compliance, and that increasing treatment compliance may have a greater impact on health than trying to improve the effectiveness of the treatment patients are encouraged to comply with²⁷. As a result, the studies of this systematic review showed that the non-progression of the diet was due to non-compliance to multidisciplinary treatment, both in the outpatient and home settings. However, it was pointed out that family and professional support factors contributed to better compliance with speech therapy rehabilitation, in addition to presenting better functional and quality of life results¹⁴.

In this perspective, Govender *et al.* (2017)²⁷, in their study, point out that Behavior Change Techniques can be used to improve compliance with multidisciplinary treatment. The behavioral strategies used to promote compliance to exercises are an essential group in Behavioral Science, as they portray the smallest observable and replicable components that can provoke a behavior change and, therefore, can be potentially active ingredients in an intervention since the success of exercises depends on good compliance.

Thus, behavioral strategies such as habit formation require the individual to repeatedly perform the behavior in the same context, becoming automatic. Given this, such automaticity can promote the maintenance of exercises since it can suppress conscious intentions and have a role to play in improving long-term swallowing results²⁸. Among the study's limitations, we can mention the small number of articles eligible for this review, given the heterogeneity of the studies and several methodological designs. It is suggested that new studies focus on the attention to the quality of life related to the diet of patients with tongue cancer for the best quality of treatment.

Conclusion

From the results of this review, it was found that the indication of alternative feeding route after tongue cancer was 19.3% to 68.2%. The factors associated with this indication of AFR were the general stage, surgery associated with adjuvant therapy, poor compliance to multidisciplinary treatment, complications, and low survival.

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