

# The most suitable types of obturator for stomatognathic system rehabilitation after maxillofacial surgery: A systematic review



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## Abstract

**Objective:** To find out the best type of obturator in the rehabilitation of stomatognathic system in patients after maxillofacial surgery.

**Methods:** Using MeSH (Medical Subject Headings) terms, an online search were conducted in PubMed database with keywords “maxillofacial surgery” and “obturator”. The search was limited to the articles that publish between 2013 to 2017. There are 74 journals found in initial search, but only 3 journals meet the inclusion criteria.

**Results:** The database search yielded 74 references from PubMed. The titles and abstract were reviewed afterward, and 22 studies were eligible for further analysis. The full-texts been reviewed by the

reviewer and yielded 3 articles which meet the inclusion criteria, with the total patients were 76 people. In those studies, they were using conventional obturator, cast partial obturator, hollow bulb obturator, magnet obturator, stud attachment retained obturator and implant-supported obturator. Obturator Function Scale (OFS) was used in this review as guideline to compare those studies' result.

**Conclusion:** Stud Attachment retained obturator has the best OFS rating in terms of aesthetics, nasal leakage, speech enhancement, and chewing / eating.

**Keywords:** Abnormalities stomatognathic system, Maxillofacial injuries, Maxillofacial surgery, Obturator, Palatal obturator

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## Introduction

Maxillofacial injuries can be caused by surgical removal of neoplasm tissue in the neck and head (facial) or repair of congenital / traumatic injuries that can lead to defects, such as face defects and abnormalities in mastication, swallowing, speech and other functions as also known as maxillofacial injuries.<sup>1</sup> This injuries happen due to the lifting of the soft tissue and its hard tissue which is the main support and can not undergo a reconstructive surgery, such as bone graft, bone transplantation or other alloplastic materials such as titanium, vitalium, silicon and others. Due to the loss of hard support, soft tissues such as the cheeks, lips, chin and other muscles will collapse or contract during healing periods that will resulted in face defects and cause disruption to that function.<sup>2</sup> There are various loss of body parts due to abnormalities or accidents that require restoration or rehabilitation with artificial materials. To overcome this, there are various prostheses, namely dental prosthesis, maxillofacial prosthesis, and supporting prosthesis (ancillary prosthesis).<sup>3</sup> After maxillectomy, patients need complex rehabilitation by means of surgery and prosthodontics. Concerning speech the decision is often difficult, as to whether surgical reconstruction is better than obturation.<sup>4</sup>

Rehabilitation using obturator is still the most

common choice worldwide.<sup>5</sup> Obturators are a viable option of restoring the sequelae of maxillary defects, hypernasal speech, namely loss of chewing ability, nasal fluid leakage, impaired deglutition, and impaired esthetics.<sup>6</sup> Obturator is a prosthesis used to close the gap between the oral cavity and the nasal cavity. The design of the obturator was based on the type of defect in the maxilla which is classified into the congenital defect and the defects caused by disease or accident. It can be used for permanent or temporary rehabilitation. Maxillectomy defects rehabilitation ascend from the surgical obturator to an interim during the healing phase at the time of surgery, and ended to the definitive or treatment obturator. Improvement of oral function can be obtained by using different design of obturator. The improvement can be based on the location and the size of the defect, available soft tissue undercuts, muscular control, and dentoalveolar condition. The obturators play a crucial and significant role in separating the oronasopharyngeal regions, permit intelligible speech, replace lost dentoalveolar structures, reinstate deglutition and mastication, reduce drooling, and ultimately improve the facial form and patient's self-esteem at each level of introspection.<sup>7</sup>

A prosthetic design that is suitable for specific oral conditions is important to the improvement of the stability, durability, and retention of the

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obturator prosthesis.<sup>8</sup> Recent studies on quality of life of patients with maxillectomies reconstructed with an obturator have shown a strong correlation between obturator function and quality of life.<sup>9</sup> The WHO defines quality of life as ‘the individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns’.<sup>10</sup> The clinician could identify patients who are likely to develop poor quality of life postoperatively, choose the appropriate means of rehabilitation, and provide sufficient preoperative consultation, adequate postoperative psychological support, prosthodontic followup care, pain management, and speech therapy.<sup>11</sup>

## Methods

This systematic review was written according to the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) guidelines to identify the best type of obturator in the rehabilitation of mastication function in patients after maxillofacial surgery.

### Search Strategy

The articles was search form pubmed data base to establish a study protocol. PICO question (Population (P), Intervention (I), Comparison (C), Outcomes and Study Design (O), defined the search strategy, where P = patients after maxillofacial surgery, I = obturator, C = the type of obturator, O = rehabilitation of stomatognathic system. The electronic databases were searched using of MeSH (Medical Subject Headings) terms, search terms and their combinations: “maxillofacial surgery” and “obturator”. There are 74 journals explained about this, with only 3 journals meet the inclusion criteria.

### Study Selection and eligibility criteria

All titles and abstracts of the selected journals were reviewed for the following inclusion criteria: english language article; any clinical study published between January 2013 to December 2017; that journal included information about maxillofacial surgery; that studies reports information about type of obturator should be used as rehabilitation after maxillofacial surgery; that journal reports information about Obturator Function Scale (OFS) of the types of obturator; that journal included information about efficacy of the treatments.

The exclusion criteria were all journals which did not satisfy the above mentioned criteria, such as animal studies, model studies are excluded in this study. After reading the full texts of the articles, the data evaluated to the previously

defined exclusion criteria. The eligibility criteria were used to identify articles that will be used for this systematic review.

### Extraction of Data

The data were reviewed by two reviewers (RR and ID) that regarding following parameters: type of obturator and stomatognathic system. All of the full text which meet the inclusion criteria were read independently and evaluated to formulated this systematic review.

## Results

The database search yielded 74 references from PubMed. The titles and abstract were reviewed afterward, and 48 studies were eligible for further analysis. The full-texts reviewed by the reviewer and yielded 5 articles which meet the inclusion criteria. The flow chart of article selection is shown in figure 1 with total 3 selected from initial yield of 74 studies by electronic literature search. After 22 titles of full text reviewed, 3 articles were selected for this systematic review inclusions, were the other 19 articles were excluded for some different reasons figure 1.

Table 1 showed some types of obturator in rehabilitation after maxillofacial surgery. The patient’s age of these studies were range between 30-81. Total patients of these studies were 76 people.

Feng Wang et al.<sup>12</sup> only using implant supported obturator.<sup>12</sup> Manish et al.<sup>13</sup> using four types obturator such as conventional obturator, cast partial obturator, hollow bulb obturator, and magnet obturator.<sup>13</sup> Cheng et al.<sup>7</sup> using 3 types obturator such as stud attachment retained obturator, conventional obturator, and magnet obturator.<sup>7</sup> Selection of the types of obturator in these studies depends on maxillofacial defects caused by congenital defects, disease, or accident.

Figure 2 showed chart of the total subjects by types of obturator. In those chart, implant supported obturator is the most widely used of total subjects and cast partial obturator is least of all.

Figure 3 showed OFS score based on obturator types. In those chart, OFS score is seen in terms of aesthetics, nasal leakage, speech enhanced, and chewing/eating.

## Discussion

Manish et al.<sup>13</sup> said the magnet obturator prosthesis subgroup demonstrated better scores in all domains of OFS, especially in chewing, swallowing liquid and solid, speech, pronunciation, and social interaction, followed by cast partial obturator prosthesis

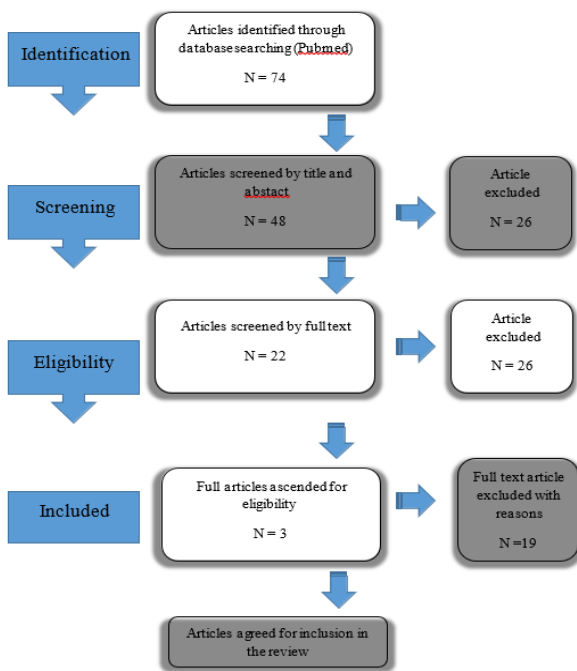


Figure 1. Article selection flow chart

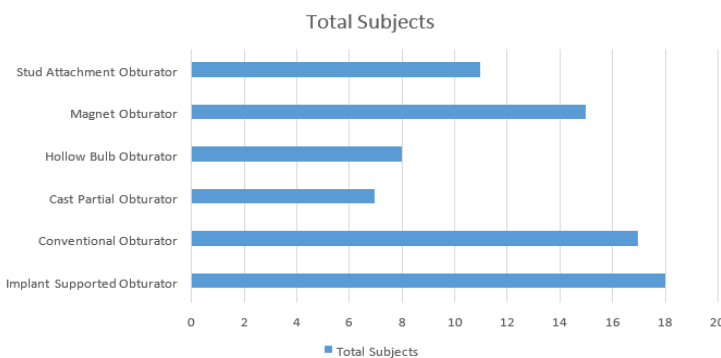


Figure 2. Total subjects by type of obturator

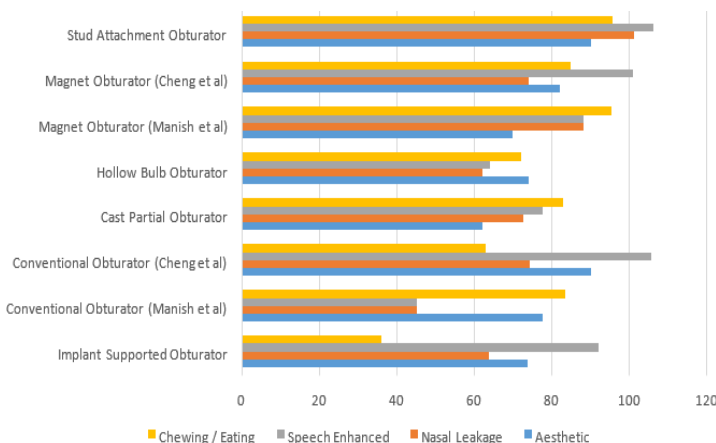


Figure 3. OFS score based on obturator type

subgroup. The problems of noticeable clasps on front teeth and difficult insertion were not associated with this subgroup.<sup>13</sup>

According Feng Wang et al.<sup>12</sup> the most important aspects of treatment after resection of the maxilla are to reconstruct the maxillary defects and restore oronasal functions and facial contours. Fabrication of obturator prostheses shortens the procedure time and offers the possibility of immediate and adequate dental rehabilitation. The surgical site can be easily examined after removing the obturator prosthesis, and tumor recurrence may be detected in time. Before the introduction of implants, retention of prostheses was enhanced by the use of wire clasps on the remaining natural dentition for patients who underwent a unilateral partial maxillectomy and those who underwent a bilateral partial maxillectomy.<sup>12</sup>

Argument Cheng et al.<sup>7</sup> after OFS was finished within the second year after rehabilitation to analyze the differences. In this study, compared with other groups, the AOP group demonstrated better scores in all domains of OFS, particularly in speech, chewing and swallowing. Patients with obturator prosthesis which was enhanced by stud attachment do better than conventional and magnetic retentive prosthesis in improving oral function, especially in speech and swallowing. Consistent with our reports, the function of obturator was enhanced when adding attachment reported by other investigators.<sup>7</sup>

### Conclusion

Obturator is a prosthesis used to close the gap between the oral cavity and the nasal cavity, the type of obturator is made to be based on the type of defect in the maxilla that is classified over the congenital defect and the defects obtained. In this study we get some kind of obturator such as conventional obturator, cast partial obturator, hollow bulb obturator, magnet obturator, stud attachment retained obturator and implant supported obturator. Obturator Function Scale (OFS) is used as a functional rating scale of some types of obturator. Stud attachment retained obturator has the best OFS rating in terms of aesthetics, nasal leakage, speech enhancement, and chewing/eating.

### Acknowledgment

Praise God Almighty, for the presence of plenty of mercy and his grace, so that the writer can complete the journal with the title: The Most Suitable Types of Obturator for Stomatognathic System Rehabilitation After Maxillofacial Surgery:

**Table 1** Descriptive data from the 3 included criteria studies that reported types of obturator in rehabilitation after maxillofacial surgery

Author	Subjects (n)	Age (years)	Type of Obturators (Total Subjects)	Aesthetic	Nasal Leakage	Speech Enhanced	Chewing / Eating
Feng Wang et al	18	30-69	Implant supported obturator (18)	3.0 ± 0.7	2.2 ± 1.0	3.8 ± 0.8	1.0 ± 0.8
			Conventional Obturator (8)	5.71 ± 2.05	3.57 ± 0.97	3.85 ± 0.69	6.32 ± 2.02
			Cast Partial Obturator (7)	4.87 ± 1.35	6.37 ± 0.91	6.75 ± 1.03	7.00 ± 1.30
Manish et al	30	32-78	Hollow Bulb Obturator (8)	5.75 ± 1.66	4.87 ± 1.35	5.50 ± 0.92	5.87 ± 1.35
			Magnet Obturator (7)	5.00 ± 2.00	7.71 ± 1.11	7.71 ± 1.11	8.57 ± 0.97
			Stud Attachment retained obturator (11)	68.18 ± 22.16	78.91 ± 22.45	91.00 ± 15.41	79.00 ± 16.65
Cheng et al	28	47-81	Conventional Obturator (9)	69.44 ± 20.83	59.44 ± 14.99	81.56 ± 24.22	40.67 ± 22.44
			Magnet Obturator (8)	56.25 ± 25.88	58.50 ± 15.73	83.0 ± 17.64	66.88 ± 17.91

**A Systematic Review.**

The final word the author realized that in the writing of this journal is still far from perfection. Therefore, the authors invoke suggestions and criticisms which is build for the sake of perfection and may be useful for all of us. Ameen.

**Conflict of Interest**

The authors report no conflict of interest.

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