

# Comparison of Mastication Status in Ameloblastoma Patients Post-Mandibular Segmental Resection Operation with LC Type with Mandibular Reconstruction using Kirschner Wire and Plate Bone Graft in RSUD Dr. Soetomo

Asep Nasrullah\*, Dwi Hari Susilo\*\*, Marjono Dwi Wibowo\*\*, Sahudi\*\*

\*General Surgery Resident, Faculty of Medicine, Airlangga University / RSUD Dr. Soetomo Surabaya

\*\*SMF / Lab Teaching Staff. Surgery Faculty of Medicine, Airlangga University / Dr. Soetomo Surabaya

Corresponding Author: Asep Nasrullah

## ABSTRACT

**Introduction:** Ameloblastoma is a benign epithelial neoplasm and accounts for 10% of all odontogenic tumors. It is characterized by a slow growth pattern and can grow to a very large size and cause severe facial deformities. Radical resection with K-wire reconstruction and plate bone graft is the most effective method but can cause deformity and malfunction of the patient's jaw. Mastication status is an important indicator to assess a good quality of life in ameloblastoma patients undergoing mandibular resection.

**Methods:** data comes from primary data in the form of interviews and secondary data in the form of medical records of ameloblastoma patients who have undergone mandibular resection surgery with LC type defects and underwent mandibular reconstruction with Kirschner Wire or Plate-Bone Graft in the Head-Neck Surgery Division at Dr. Soetomo Surabaya. This study is an analytic study to see the mastication status of patients after mandibular resection and reconstruction. The research design is a Case Control Study.

**Results:** Based on a total of 80 research subjects consisting of 43 patients (53.8%) and 37 (46.3%). -60 years as many as 25 patients (31.3%), age 20 years as many as 18 patients (22.5%). and age 61 years as many as 5 patients (6.3%). Based on the type of reconstruction used, the results showed that 43 patients (53.8%) used plate bone graft and 37 patients

(46.3%) used Kirschner wire. there is a relationship between the type of reconstruction used and the mastication status of the research subjects with p value = 0.004 ( $p < 0.05$ ).

**Conclusion:** Patients who underwent reconstructive surgery with plate bone graft had 4 times better mastication status compared to patients who underwent reconstructive surgery using Kirschner wire.

**Keywords:** mastication status, mandibular reconstruction, K-wire, plate bone graft

## INTRODUCTION

Good masticatory status is something that must be taken into account in performing mandibular reconstruction<sup>1</sup>. Patients with mandibular resection can experience various complications, such as facial deformities, oronasal and oroantral discontinuities, articulation disorders, swallowing problems, tooth loss, and because the alveolar basal changes can cause severe chewing disorders<sup>2</sup>

The currently recommended reconstructive therapy is the use of bone graft, because it is considered to be able to restore the function and shape of the mandible as best as possible. However, for plate-bone graft reconstruction, adequate equipment and facilities are needed, the cost is not cheap, and the technique is complicated and complex requires

experienced specialists. Although K-wire is not the main choice for mandibular reconstruction, especially for large defects such as LC-type defects, k-wire has several advantages, namely it is more affordable compared to other reconstructive therapy modalities, and reconstruction techniques and tools are not too complicated<sup>3</sup>.

To assess the status of mastication, a measuring instrument in the form of a questionnaire made by several health organizations is used, one of which is the Tsuga questionnaire<sup>4</sup>. mandibular segmental resection surgery with Latero-Central (LC) type defect undergoing mandibular reconstruction with Kirschner Wire and Plate-Bone graft performed at the Head and Neck Surgery section of the Regional General Hospital (RSUD) Dr. Soetomo Surabaya.

## METHODS

This research is an analytic study to see the mastication status of patients after mandibular resection and reconstruction. The research design was a Case Control Study carried out at the Head-Neck Surgery Polyclinic, Department of Surgery, Dr. General Hospital. Soetomo (RSDS) Surabaya from January to June 2021.

The source of data comes from primary data in the form of interviews and secondary data in the form of medical records of ameloblastoma patients who have undergone mandibular resection surgery with LC type defects and underwent mandibular reconstruction with Kirschner Wire or Plate-Bone Graft in the Head-Neck Surgery Division and can be obtained from the Surgery Polyclinic. Hospital Dr. Soetomo Surabaya. Furthermore, the researcher will use questionnaire data in the form of mastication status, this is assessed using a mastication ability questionnaire obtained from personal interviews.

## RESULTS

Based on a total of 80 research subjects consisting of 43 patients (53.8%) and 37 (46.3%). -60 years as many as 25

patients (31.3%), age 20 years as many as 18 patients (22.5%). and age 61 years as many as 5 patients (6.3%). Based on the type of reconstruction used from the results of the study, 43 patients (53.8%) used plate bone graft and 37 patients (46.3%) used Kirschner wire.

**Table 1 Characteristics of research subjects**

Characteristics		Total
Age	≤ 20 year	18 (22,5%)
	21-40 year	32 (40%)
	41-60 year	25 (31,3%)
	≥ 61 year	5 (6,3%)
Sex	Man	43 (53,8%)
	Woman	37 (46,3%)
Reconstruction type	Kirschner wire	37 (46,3%)
	Plate bone graft	43 (53,7%)
Mastication status	Good	40 (50%)
	Bad	40 (50%)

In this study, most of the research subjects were aged 21-40 years, as many as 32 patients (40%) consisting of 17 patients (53.1%) with good mastication status and 15 patients (46.9%) with mastication status. bad. Age characteristics on mastication status were tested using Fisher's Exact test, it was found that there was no relationship between age and patient mastication status with p value = 0,581 (p > 0,05) which means that there is no statistically significant relationship between age and mastication status.

**Table 2 Relationship between age and mastication status**

Age	Mastication Status		Total	P value
	Good (%)	Bad (%)		
≤ 20 yr.	10 (55,5%)	8 (44,5%)	18 (100%)	0,581
21-40 yr.	17 (53,1%)	15 (46,9%)	32 (100%)	
41-60 yr.	12 (48%)	13 (52%)	25 (100%)	
>=61 yr.	1 (20%)	4 (80%)	5 (100%)	
Total	40 (50%)	40 (50%)	80 (100%)	

In this study, gender distribution was found mostly male as many as 43 patients consisting of 21 patients (48.8%) had good mastication status and 22 patients (51.2%) had poor mastication status. The characteristics of sex on mastication status were tested using the Chi-Square test, it was found that there was no relationship between gender and the patient's mastication status with a p value = 0.823 (p > 0.05), which means that there is no statistically significant relationship between the sexes. sex with mastication status.

**Table 3 Relationship of sex to mastication status**

Sex	Mastication	Status	Total	P value	OR
	Good (%)	Bad (%)			
Man	21 (48,8%)	22 (51,2%)	43 (100%)	0,823	0,904 (95% CI:0,375–2,179)
Woman	19 (51,3%)	18 (48,7%)	37 (100%)		
Total	40 (50%)	40 (50%)	80 (100%)		

The characteristics of the type of reconstruction on mastication status were tested using the Chi-Square test, it was found that there was a relationship between the type of reconstruction used and the mastication status of the research subjects with  $p = 0.004$  ( $p < 0.05$ ), which means there

is a statistically significant relationship between type of reconstruction with mastication status. Patients who underwent surgery with this type of reconstruction using a plate bone graft had a mastication status 4 times better than those using Kirschner wire.

**Table 4 Relation of type of reconstruction to mastication status**

Reconstruction	Mastication	Status	Total	P value	OR
Type	Good (%)	Bad (%)			
Plate Bone graft	28 (65,1%)	15 (34,9%)	43 (100%)	0,004	3,889 (95% CI: 1,53-9,87)
Kirschner Wire	12 (32,4%)	25 (67,6%)	37 (100%)		
Total	40 (50%)	40 (50%)	80 (100%)		

## DISCUSSION

Mastication status is an important indicator to assess the good quality of life in ameloblastoma patients undergoing mandibular resection. To assess mastication status, the Tsuga questionnaire was used<sup>4</sup>. Some of the goals and criteria of mandibular reconstruction can be said to be successful if they can maintain continuity, maintain alveolar height, maintain arch shape, maintain arch width, maintain bone and improve facial contours<sup>5</sup>

In this study, there were a total of 80 research subjects consisting of 43 patients (53.8%) male and 37 patients (46.3%) female with a male to female ratio of 1.2:1. In this study, the highest age group was 21-40 years, namely 32 patients (40%), followed by the age of 41-60 years as many as 25 patients (31.3%), age 20 years as many as 18 patients (22.5%) and age 61 years as many as 5 patients (6.3%). In another study it was said that the mean age was 31.4 years with the ratio between the sexes of men and women being 1.5:1.<sup>6</sup>

In this study, most of the research subjects were aged 21-40 years, as many as 32 patients consisting of 17 patients (53.1%) with good mastication status and 15 patients (46.9%) with poor mastication status. there is no significant relationship between age and mastication status with  $p$  value = 0.581

( $p > 0.05$ ). The same result was also reported in a study by Kazunori (2011) in Japan which explained that age does not have a direct effect on a person's performance in chewing. These findings indicate that occlusive function does not decrease with age<sup>6,7</sup>

In this study, the sex distribution was mostly male, as many as 43 patients (100%) consisting of 21 patients (48.8%) had good mastication status and 22 patients (51.2%) had poor mastication status. The results showed that there was no significant relationship between gender and the patient's mastication status with  $p$  value = 0.823 ( $p > 0.05$ ). This is in accordance with research conducted by Tada and Miura (2018) which found that there was no significant relationship between mastication status and gender (Tada and Miura, 2018). A study by Kazunori (2011) revealed that the strength of chewing and occlusion muscles in women is lower than in men.<sup>6</sup>

From the data of this study, it can be concluded that there is a significant relationship between the type of reconstruction used and mastication status with  $p$  value = 0.004 ( $p < 0.05$ ) and patients with the type of reconstruction using plate bone graft have a better mastication status of 4 times compared to those using Kirschner wire (OR = 3.887). This is in

accordance with the research conducted by Baba (2016) who performed reconstruction with plate bone graft which has advantages in masticatory function compared to using Kirschner wire.<sup>9</sup>

The advantages of Kirschner wire are that this tool is easy to obtain, relatively easy to install and very cheap. The drawback of Kirschner wire is that the reconstruction results are generally unsatisfactory, especially if the bone segment being cut is very long. Although the Kirschner wire technique is simple, it requires more exposure to the bone than the plate bone graft technique. The Kirschner wire technique can reconstruct the condition of the bone after segmental resection but the results are less rigid, tend to be loose and can cause movement when the mandibular bone is subjected to repeated pressure so that it can cause rotation, dislocation and migration, this is very risky for infection, osteitis and orocutaneous fistula. Another difficulty is inserting the wire between the two mandibular bone fragments and it must be repeated if the wire breaks during fixation<sup>9</sup>

## CONCLUSION

Patients who underwent reconstructive surgery with plate bone graft had 4 times better mastication status compared to patients who underwent reconstructive surgery using Kirschner wire.

**Acknowledgement:** None

**Conflict of Interest:** None

**Source of Funding:** None

**Ethical Approval:** Approved

## REFERENCES

1. Adeel, M. et al. (2018) 'Ameloblastoma: Management and Outcome', *Cureus*, 10(10), pp. 1–8. doi: 10.7759/cureus.3437.
2. Carini, F. et al. (2012) 'Implant-supported rehabilitation of a patient with mandibular ameloblastoma.', *Annali di stomatologia*, 3(2 Suppl), pp. 21–5. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/23285318><http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=PMC3512554>.
3. Lidders, J. N. et al. (2016) 'Complications and Risk after Mandibular Reconstruction with Fibular Free Flaps in Patients with Oral Squamous Cell Carcinoma: A Retrospective Cohort Study', *Journal of Reconstructive Microsurgery*, 32(6), pp. 455–463. doi: 10.1055/s-0036-1571794.
4. Utama, A. P., Wibowo, M. D. and Murtejo, U. (2019) 'Comparison of Mastication Status in Ameloblastoma Post Segmental Mandibula Resection Lc Type with Plate and Kirschner Wire Mandibular Reconstruction in Dr. Soetomo General Hospital', *Scientific Journal of Health Science*, 4(12), pp. 19–23. doi: 10.15373/22501991.
5. Mohan, S. R. et al. (2016) 'Mandibular Reconstruction: Overview', *Journal of maxillofacial and oral surgery*. 2015/04/19, 15(4), pp. 425–441. doi: 10.1007/s12663-015-0766-5
6. Kazunori. 2011. Association of masticatory performance with age, gender, number of teeth, occlusal force and salivary flow in Japanese older adults: Is ageing a risk factor for masticatory dysfunction. *Archives of Oral Biology*. Volume 56, Issue 10. Pages 991-996. ISSN 0003-9969. doi: 10.1016/j.archoralbio.2011.03.019
7. Ruslin M, Hendra FN, Vojdani A, Hardjosantoso D, Gazali M, Tajrin A, Wolff J, Forouzanfar T. The Epidemiology, treatment, and complication of ameloblastoma in East-Indonesia: 6 years retrospective study. *Med Oral Patol Oral Cir Bucal*. 2018 Jan 1;23 (1):e54-8
8. Tada, A., Miura, H. Association of mastication and factors affecting masticatory function with obesity in adults: a systematic review. *BMC Oral*

Asep Nasrullah et.al. Comparison of mastication status in ameloblastoma patients post-mandibular segmental resection operation with LC type with mandibular reconstruction using kirschner wire and plate bone graft in RSUD Dr. Soetomo.

Health 18, 76 (2018). <https://doi.org/10.1186/s12903-018-0525-3>

9. Baba, P. et. Al. 2016. Should wiring be replaced by miniplate of mandibular fracture even in poor developing countries. *International Surgery Journal*, 3(3). Pp 1585-92

How to cite this article: Nasrullah A, Susilo DH, Wibowo MR et.al. Comparison of mastication status in ameloblastoma patients post-mandibular segmental resection operation with LC type with mandibular reconstruction using kirschner wire and plate bone graft in RSUD Dr. Soetomo. *International Journal of Research and Review*. 2021; 8(7): 386-390. DOI: <https://doi.org/10.52403/ijrr.20210755>

\*\*\*\*\*