

Single Oral Z-plasty: A Clinical Validation of a Technique for Palatal Lengthening in Primary and Secondary Cleft Palate Repair

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BACKGROUND

Palate length is associated with improved speech outcomes in cleft palate repair. The Furlow double-opposing Z-plasty (2ZP) utilizes two Z-plasties to reorient palatal musculature and lengthen the velum. The overlapping intravelar veloplasty (IVV) achieves longitudinal closure of the nasal mucosa with a single oral Z-plasty (1ZP), responsible for lengthening the palate. It has been demonstrated in cadaver study that 1ZP is as effective as the Furlow double-opposing Z-plasty (2ZP) in lengthening the soft palate¹. We hypothesize that these 2 closure techniques will result in similar palatal lengthening using clinical pre-and postoperative measurements.

METHODS

A retrospective comparative study was conducted of patients undergoing primary repair of the soft palate. All included patients underwent either 2ZP or 1ZP. Pre-and post-operative measurements of the palate were recorded across various dimensions (Figure 1). The primary outcome of interest was anterior-posterior (AP) palatal length. Secondary outcome was posterior pharynx length given that this distance has been shown to vary inversely with palatal lengthening². Statistical analysis was conducted using the Mann-Whitney-Wilcoxon test for significance.

RESULTS

80 patients met inclusion criteria (2ZP = 14, 1ZP = 66). There was no significant difference in preoperative palatal length between patients who received 2ZP vs 1ZP ($p=0.16$)

Patients who underwent 2ZP exhibited an average increase in palatal length of 7.93 mm ($p < 0.05$), and 1ZP an increase of 7.23 mm ($p < 0.001$) (Figure 2). Patients who underwent 2ZP exhibited an average decrease in posterior palatal length of 6.71 ($p < 0.001$), and 1ZP a decrease of 9.4 ($p < 0.0001$) (Figure 3)

AP palatal lengthening was not significantly greater for 1ZP vs 2ZP (15.7% vs 16.2%; $P = 0.53$) (Table 1)

1ZP showed greater decrease in posterior pharynx, however this change was not significantly significant (-61.3% vs -36.5%, $p = 0.05$) (Table 1)

Table 1 Pre and Post-operative Change by Technique

	Measurement	Preoperative (mm)	Postoperative (mm)	Change (mm)	% Change
2ZP	AP Palate Length	52.85	60.78	7.93	16.2
	Posterior Pharynx Length	11.08	17.79	-6.71	36.5
1ZP	AP Palate Length	49.15	56.38	7.23	15.7
	Posterior Pharynx Length	16.2	6.8	-9.4	61.3

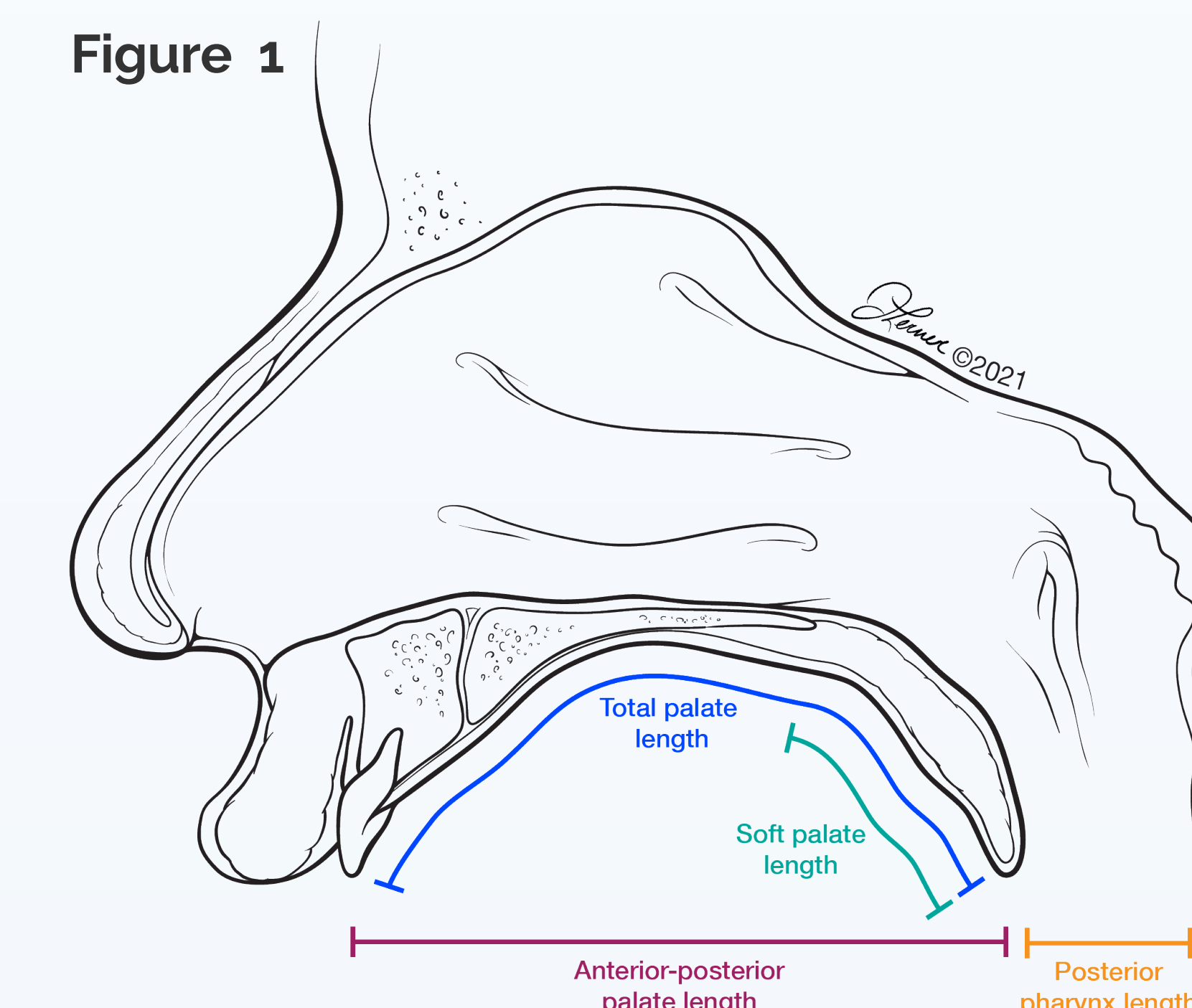


Figure 2 Anterior-posterior (AP) palate length

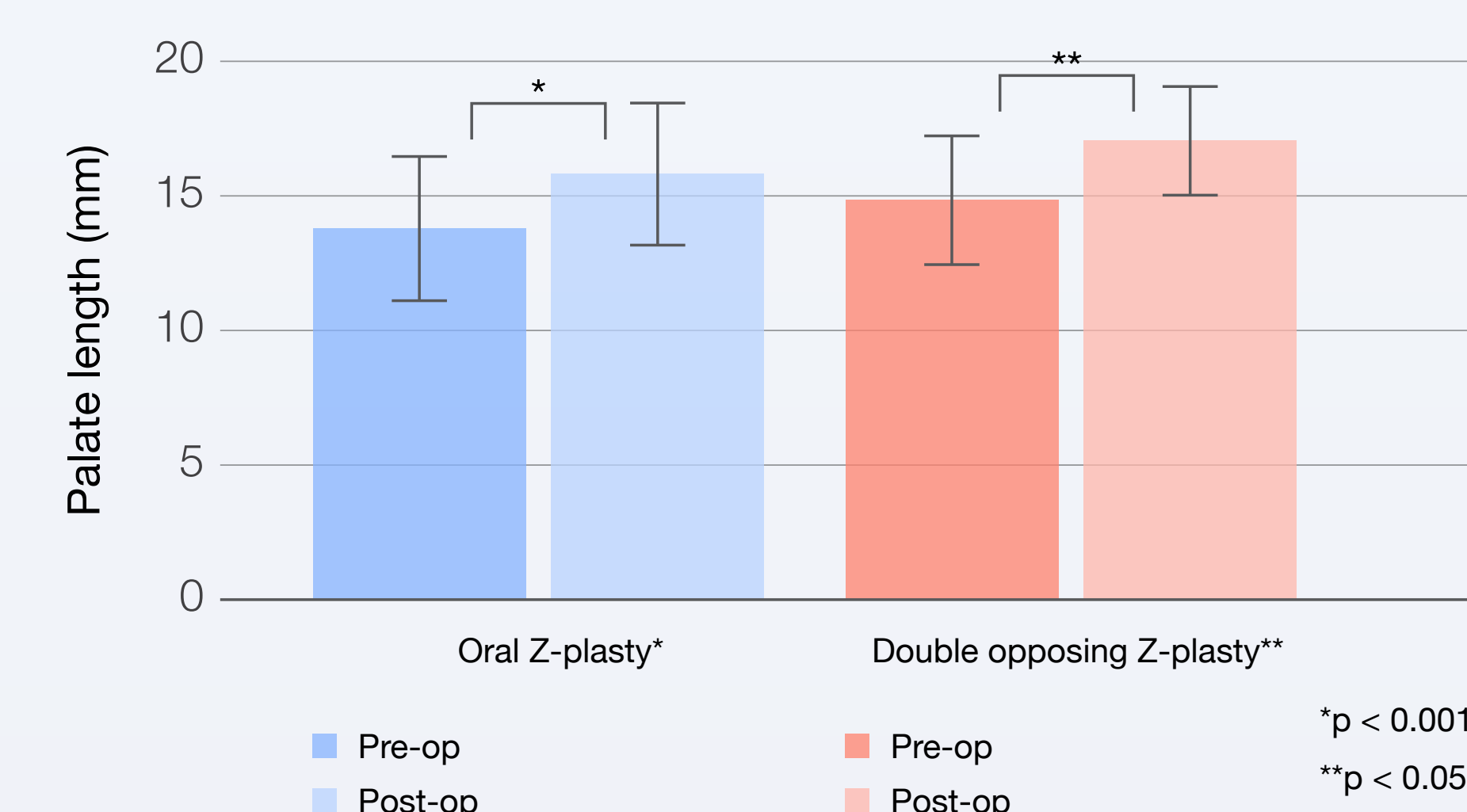
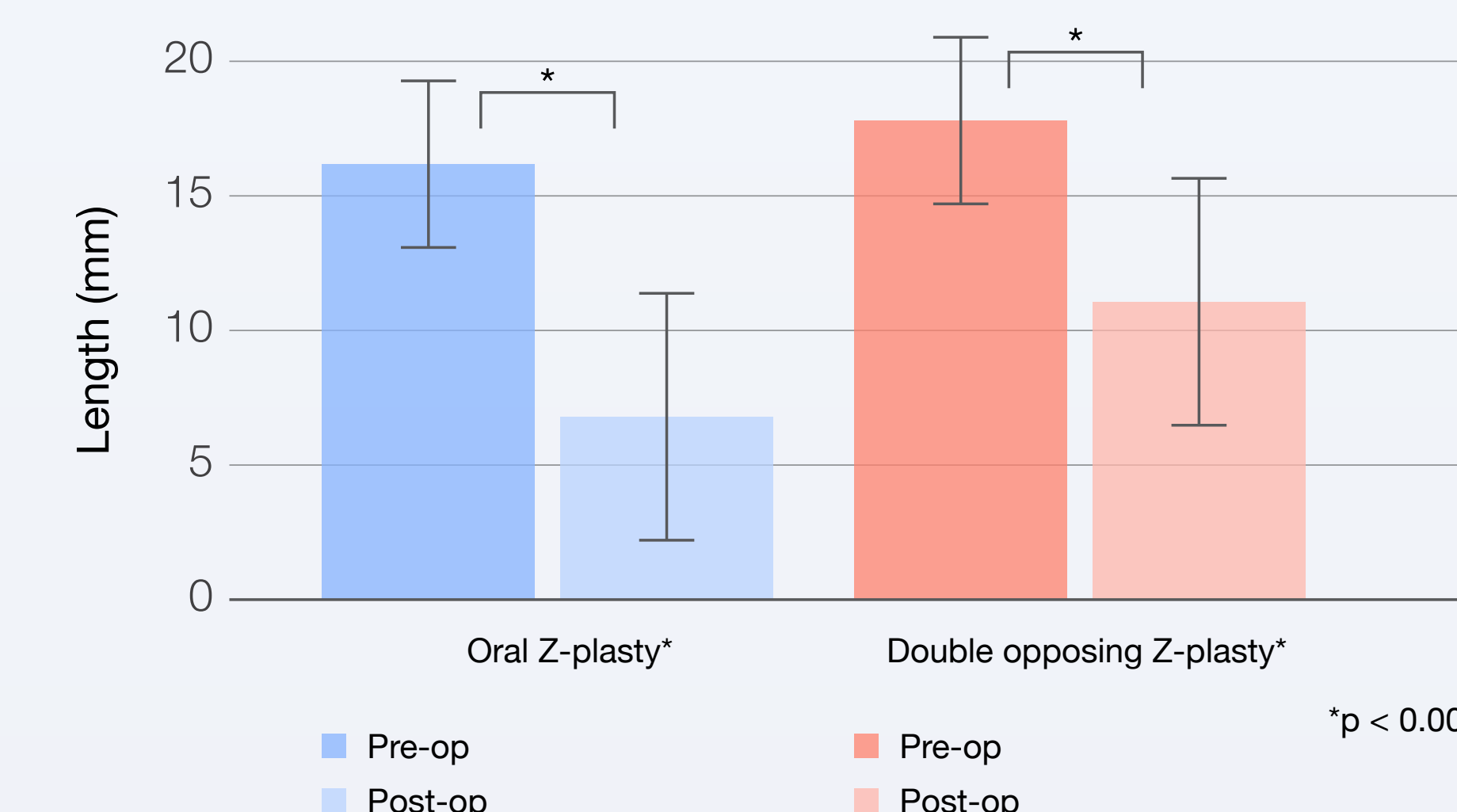


Figure 3 Posterior pharynx length



CONCLUSIONS

- A single oral Z-plasty results in statistically significant palatal lengthening in patients.
- There was no difference seen in the AP dimension of palate length between 2ZP and 1ZP techniques.
- The authors advocate the consideration of this approach due to its advantages of avoiding overlapping surgical scars between the nasal and oral sides of the palate, reducing the risk of fistula formation.
- Additionally, opting for straight-line closure of the nasal mucosa instead of a Z-plasty potentially decreases the operative time and limits handling of a thin, potentially friable mucosal layer.
- This technique should be considered in patients with cleft palate, especially in the settings of re-repair when a Furlow technique is not possible.

REFERENCES

- 1Yu, J. L et al. (2017). Single Z-Plasty Versus Double-Opposing Z-Plasty: A Cadaveric Study of Palatal Lengthening. *J Craniofac Surg*,
- 2Wang et al. (2020). The Effect of Zigzag Palatoplasty on the Repair of Cleft Palate and its Comparative Study With Sommerlad Palatoplasty and the Double Opposing Z Palatoplasty. *J Craniofac Surg*.