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| Title | Influence of tongue perception alterations on oral and maxillofacial functions of patients with malignant/premalignant tongue tumors |
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| Note | |

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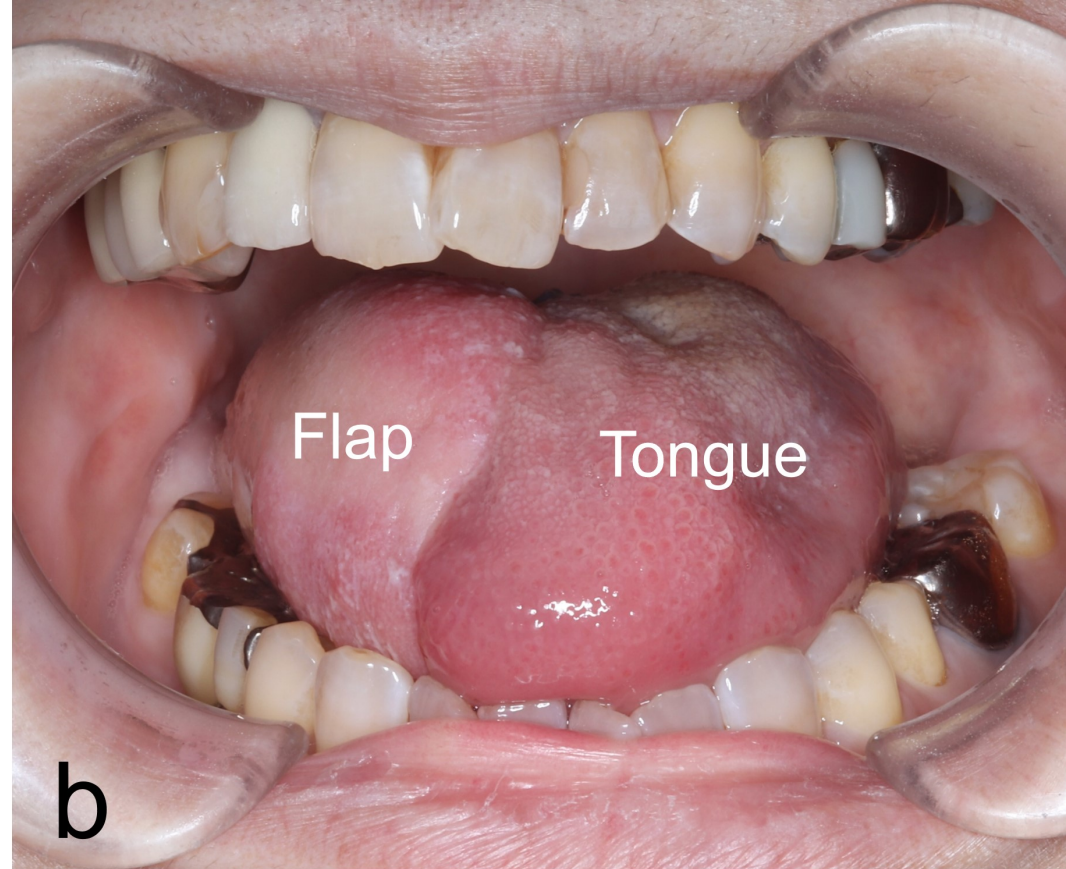
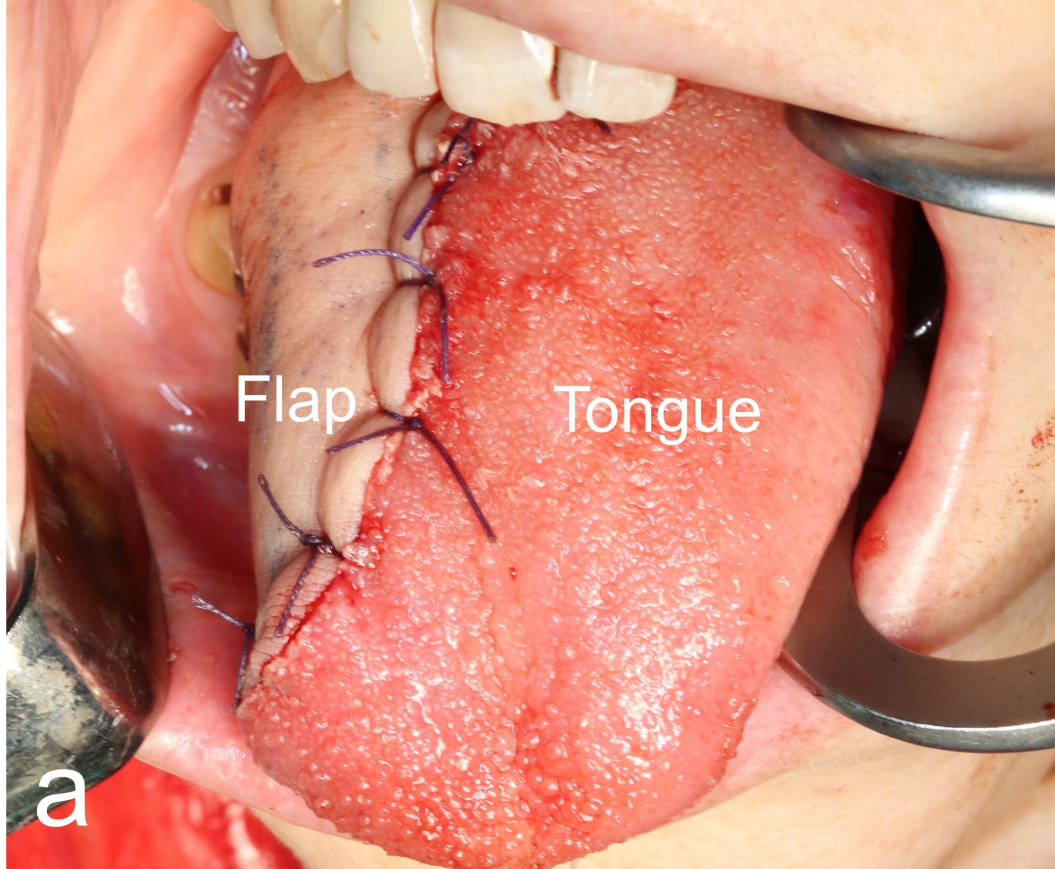


FIGURE 1 Intraoperative and postoperative photographs of a case in the flap group.

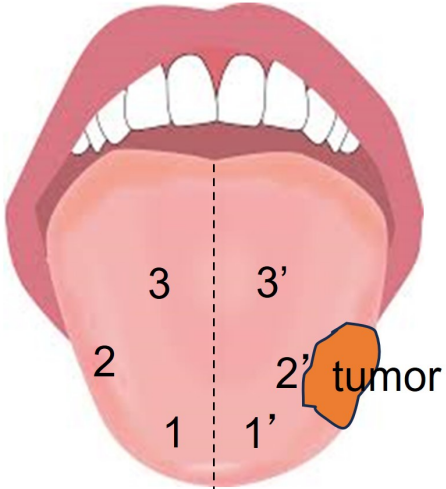
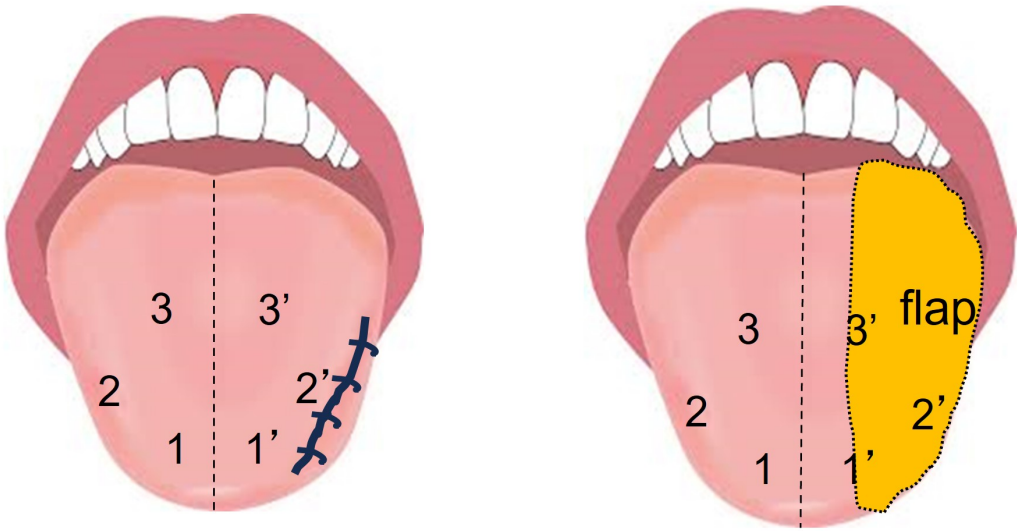
| | Preoperative | | Postoperative | |
|---------------------|---|--|---|--|
| Classification |  <p>nontumor side tumor side</p> | |  | |
| Surgical procedures | | | Partial resection and primary closure | Less than hemi-glossectomy and radial forearm flap |
| Group | Leukoplakia, T1, T2 and T3 group | | The closure group | The flap group |
| Evaluation period | Before surgery | | After surgery (1, 3, 6 and 12 months) | |

FIGURE 2 The evaluation sites of tongue perception in patients

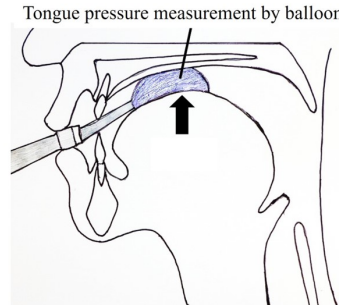
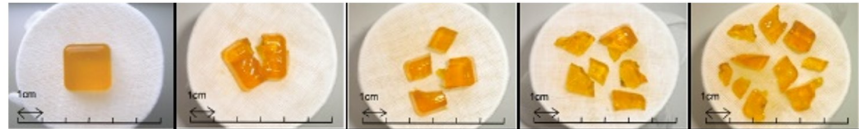
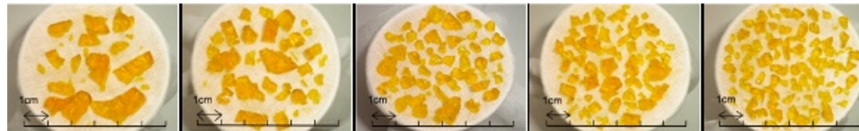

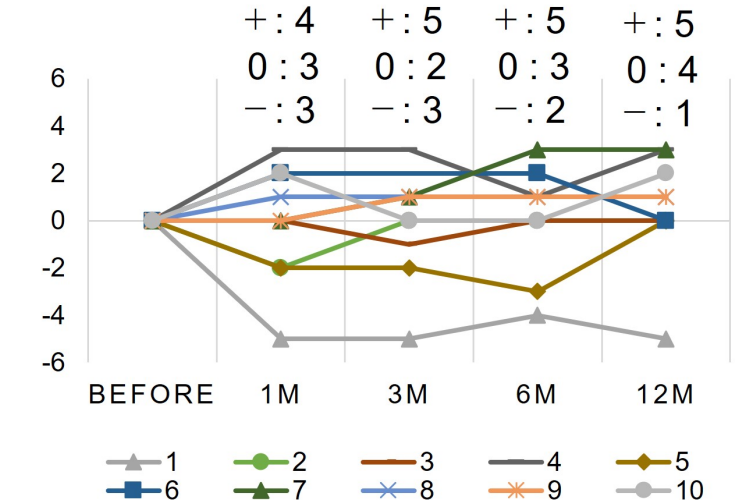
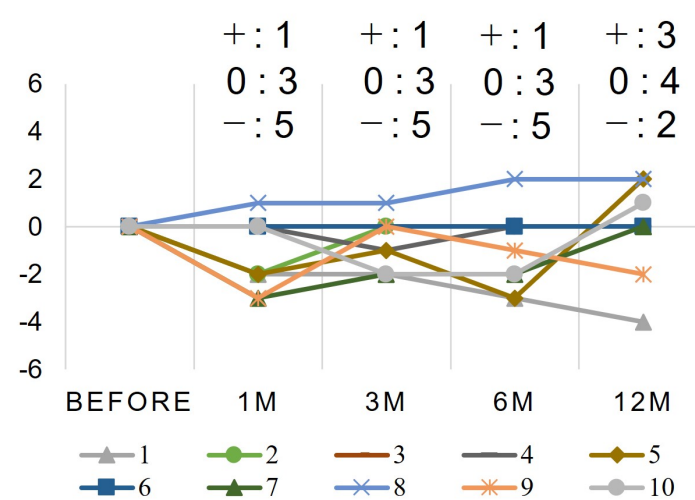
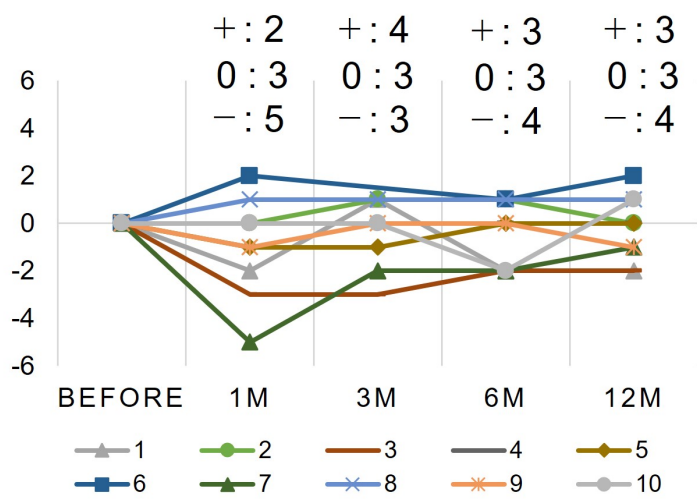
| Tongue Function | Tongue movement (Total score 7 points) (Matsunaga et al. 2002) | | Tongue pressure (kPa) (Aoki et al.2014) | | | | | | | | | | | | |
|---------------------|--|--|---|-------|---------------------|---|--|---|--|---|--|---|-------------------------------------|---|---|
| | <div><div>Forward movement</div><div>score</div><div><div>• Tongue apex exceeds the lower lip</div><div>• Tongue apex is within the lower lip</div><div>• Tongue apex exceeds dentition but does not reach lower lip</div><div>• Tongue apex is within dentition</div></div><div>3</div><div>2</div><div>1</div><div>0</div></div> <div><div>Upward movement</div><div>score</div><div><div>• Tongue apex reaches the palate</div><div>• Tongue apex does not reach the palate</div><div>• Tongue apex does not move</div></div><div>2</div><div>1</div><div>0</div></div> | | <div><div>Tongue pressure measurement by balloon</div></div> <div>Tongue pressure at the center of the tongue during tongue dorsal elevation</div> | | | | | | | | | | | | |
| Swallowing function | <div><div>The modified water swallowing test (Oguchi, et al,2021)</div><div>3 ml of cold water was poured using a syringe into the patient’s oral floor, and swallowing dynamics was evaluated during two repetitive swallows</div></div> <table><tr><th>score</th><th>Evaluation criteria</th></tr><tr><td>1</td><td>No swallow, cough,and/or respiratory urgency</td></tr><tr><td>2</td><td>Swallow, respiratory urgency(suspicion of silent aspiration)</td></tr><tr><td>3</td><td>Swallow, stable breathing, cough and/or wet hoarseness</td></tr><tr><td>4</td><td>Swallow, stable breathing, no cough</td></tr><tr><td>5</td><td>In addition to 4, repeated swallowing is possible twice within 30 seconds</td></tr></table> | | | score | Evaluation criteria | 1 | No swallow, cough,and/or respiratory urgency | 2 | Swallow, respiratory urgency(suspicion of silent aspiration) | 3 | Swallow, stable breathing, cough and/or wet hoarseness | 4 | Swallow, stable breathing, no cough | 5 | In addition to 4, repeated swallowing is possible twice within 30 seconds |
| score | Evaluation criteria | | | | | | | | | | | | | | |
| 1 | No swallow, cough,and/or respiratory urgency | | | | | | | | | | | | | | |
| 2 | Swallow, respiratory urgency(suspicion of silent aspiration) | | | | | | | | | | | | | | |
| 3 | Swallow, stable breathing, cough and/or wet hoarseness | | | | | | | | | | | | | | |
| 4 | Swallow, stable breathing, no cough | | | | | | | | | | | | | | |
| 5 | In addition to 4, repeated swallowing is possible twice within 30 seconds | | | | | | | | | | | | | | |
| Chewing function | <div>Chewing strength (Score: 0-9 points) (Nokubi, et al,2013)</div> <div><div><div>01234</div></div><div><div>56789</div></div></div> | | <div>Bite strength (N) (Shiga, et al,2020)</div> <div></div> <div>DENTAL PRESCALE II</div> | | | | | | | | | | | | |

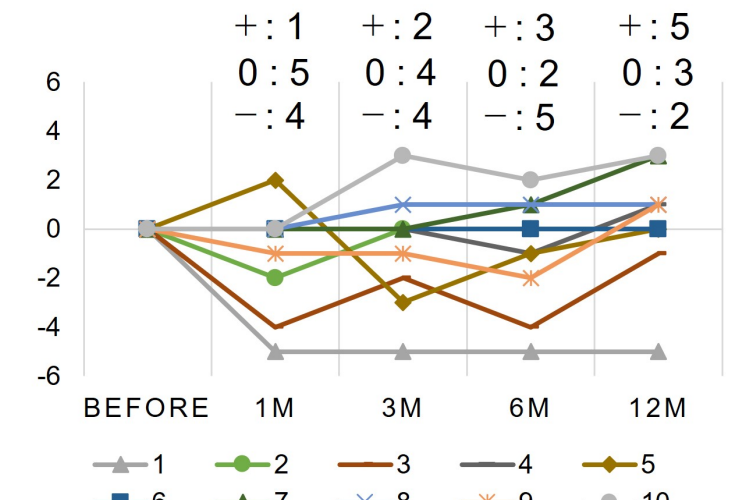
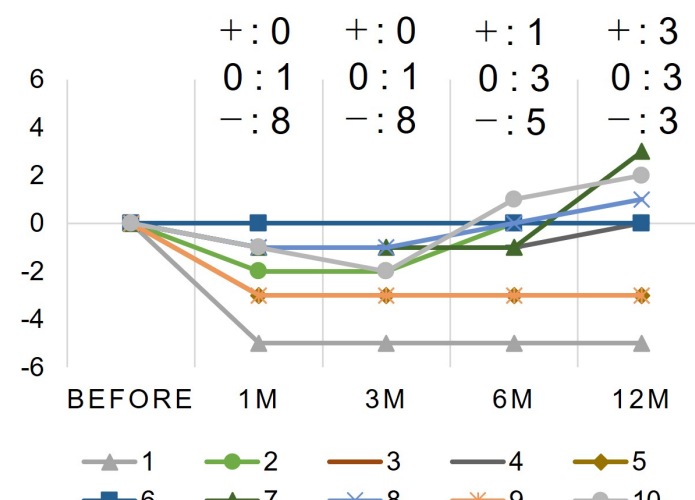
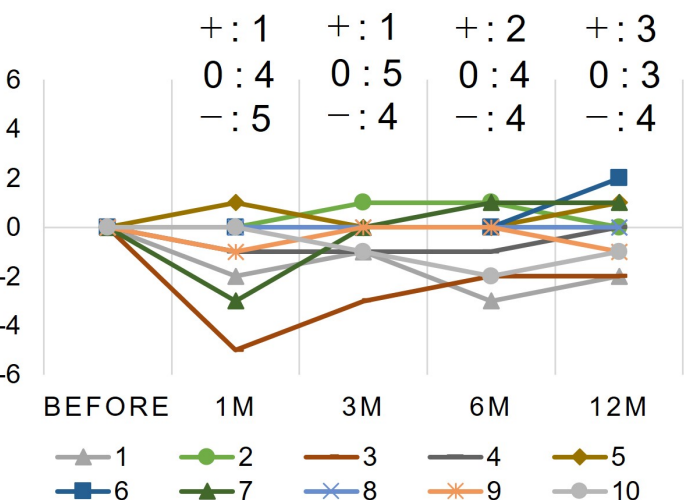
FIGURE 3 the assessment of oral and maxillofacial functions



1: tongue apex on the nontumor side

2: tongue margin on the nontumor side

3: tongue dorsum on the nontumor side



1': tongue apex on the tumor side

2': tongue margin on the tumor side

3': tongue dorsum on the tumor side

FIGURE 4 Changes in tongue perception scores in the closure group over time

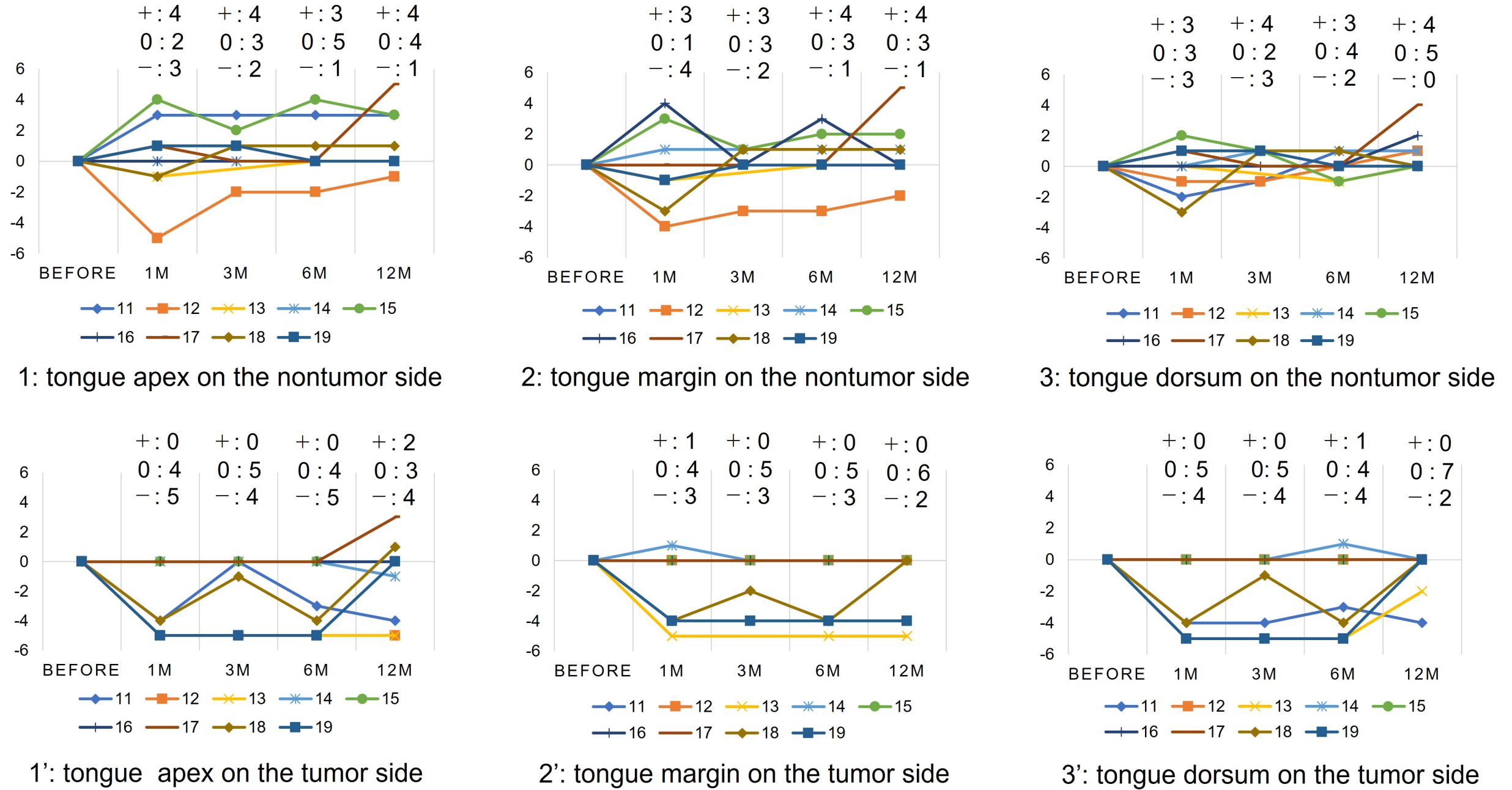
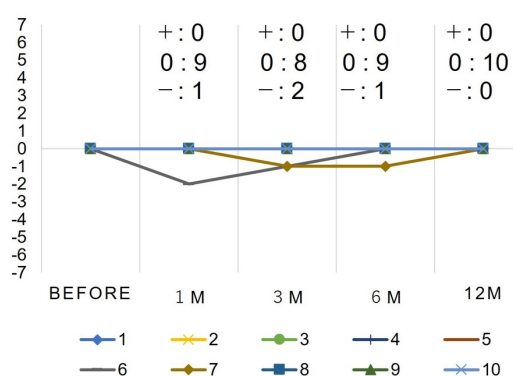
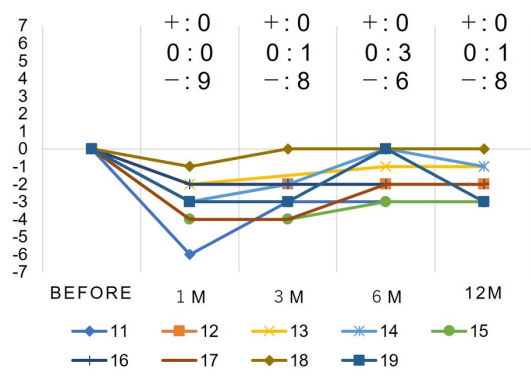


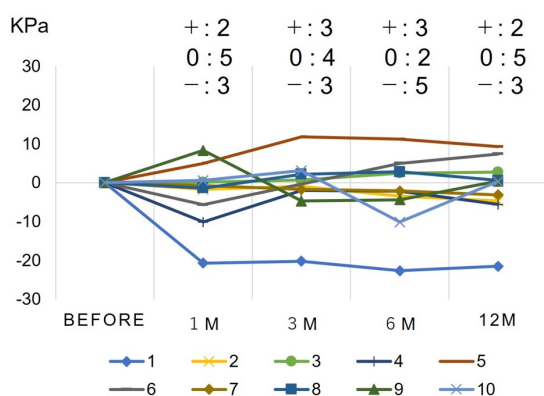
FIGURE 5 Changes in tongue perception scores in the flap group over time



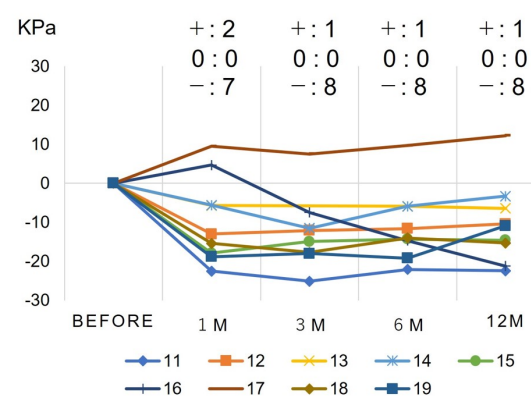
a: Tongue movement in the closure group



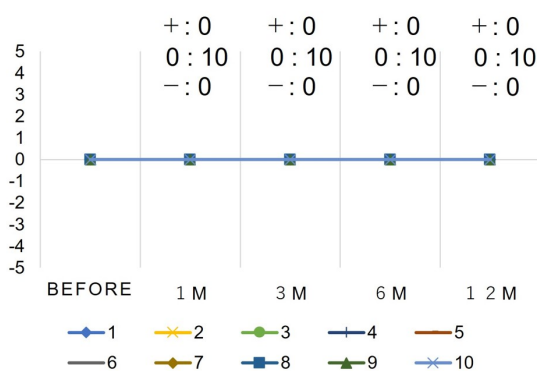
a': Tongue movement in the flap group



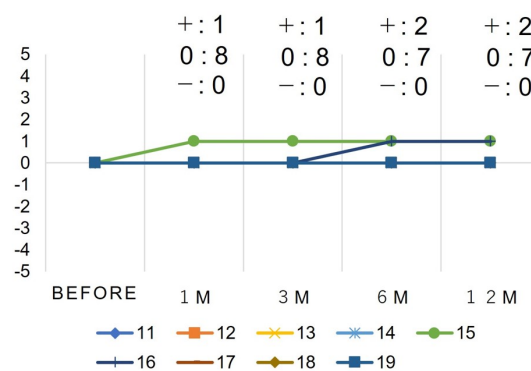
b: Tongue pressure in the closure group



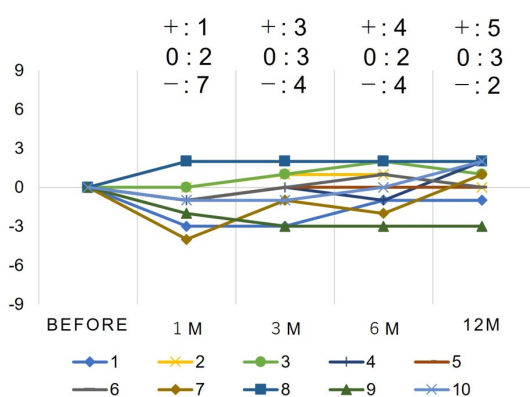
b': Tongue pressure in the flap group



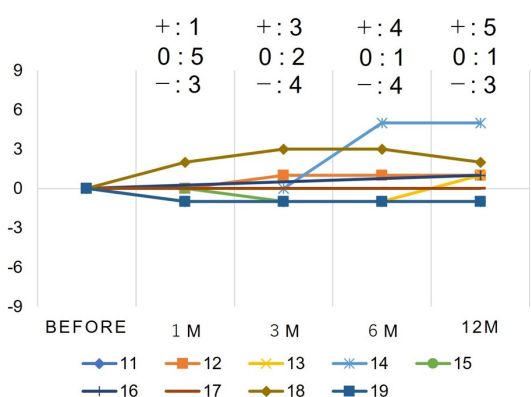
c: Water swallowing test in the closure group



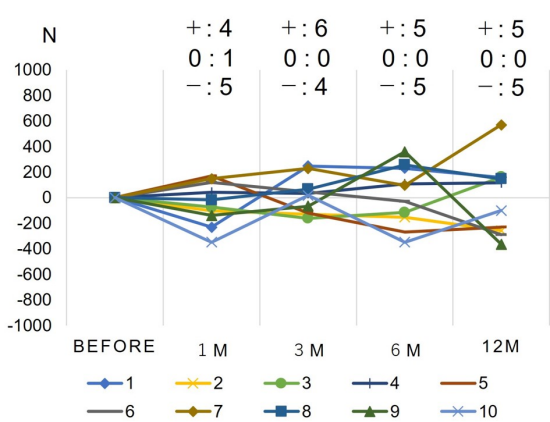
c': Water swallowing test in the flap group



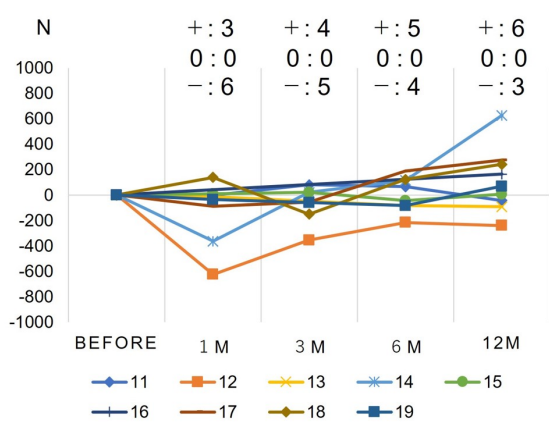
d: Chewing strength in the closure group



d': Chewing strength in the flap group



e: Bite strength in the closure group



e': Bite strength in the flap group

FIGURE 6 Changes in oral and maxillofacial functions over time