Lingual flap retraction and prevention of lingual nerve damage associated with third molar surgery: a systematic review of the literature
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Authors' objectives
To evaluate the incidence of lingual nerve damage after third molar surgery, and the effect of a lingual retractor on nerve damage.

Searching
MEDLINE, HealthSTAR, Current Contents, AMED, Life Sciences, ISIS Web of Science, CINAHL and the Cochrane Library were searched until May 1999 using the search terms listed in the paper. In addition, the reference lists of retrieved articles were examined, and the indexes of the journal 'Oral and Maxillofacial Surgery Clinics of North America' were handsearched from 1989 to 1998.

Study selection
Study designs of evaluations included in the review
Studies had to follow patients up for at least 6 months or until full recovery. The outcome data had to be presented separately for each surgical intervention. Articles with fewer than 10 case reports, or with duplicate study populations, were excluded. No further criteria specifying the type of study were reported a priori.

Specific interventions included in the review
Three different surgical methods were compared for the extraction of third molars: the buccal approach with lingual retraction (BA+), the buccal approach without lingual retraction (BA-), and the lingual split technique with lingual retraction (LS).

Participants included in the review
The participants were patients suffering from lingual nerve damage as a result of third molar extraction. No further criteria were specified a priori.

Outcomes assessed in the review
The incidence and spontaneous recovery of lingual nerve damage were evaluated. In the majority of cases, the incidence of nerve injury was assessed at approximately 1 week and was generally considered permanent if sensory impairment remained after 6 months. The outcomes had to be based on clinical objective sensory testing, such as light-touch or 2-point discrimination tests.

How were decisions on the relevance of primary studies made?
Each article was judged according to the predetermined selection criteria (original cases of lingual nerve damage caused by third molar surgery, reported with a follow-up of at least 6 months or until full recovery). It was unclear how many reviewers were involved in selecting the studies.

Assessment of study quality
No formal assessment of quality was undertaken.

Data extraction
Forms were developed to extract the data, and the authors were contacted for further information where necessary. It was unclear how many reviewers extracted the data. The following types of data were reported: bibliographic details; surgical interventions used; the number of procedures; the number and experience of surgeons; type of anaesthetic; time of first sensory assessment; incidence of injury; time when nerve injury was considered permanent; and the sensory
assessment methods used.

**Methods of synthesis**

How were the studies combined?

Risk ratios (RR) with confidence intervals (CIs) were calculated for the combined total incidences of lingual nerve injury for each surgical method. The RRs were calculated by dividing the proportion of patients with nerve injury from one surgical technique, by the proportion of patients with nerve injury from another surgical technique. The authors stated that because of the limited number of articles, and the differences in study design, it was not possible to assess the level of publication bias.

How were differences between studies investigated?

The authors stated that because of the limited number of articles, and the differences in study design, it was not possible to assess the level of heterogeneity between the studies statistically.

**Results of the review**

Eight studies were included: 1 randomised controlled trial and 7 prospective clinical series. In total, 3,040 BA+, 1,336 BA- and 2,077 LS procedures were performed.

Lingual nerve injury occurred in 9.6, 6.4 and 0.6% of the pooled LS, BA+ and BA- procedures, respectively. On the basis of the RR comparing combined temporary incidence rates, lingual nerve injury was 8.8 times more likely to occur in BA+ than in BA- procedures (CI: 4.3, 17.8), 13.3 times more likely to occur in LS than in BA- procedures (CI: 6.6, 26.9), and 1.5 times more likely to occur in LS than in BA+ procedures (CI: 1.2, 1.8). All of the comparisons were statistically significant (P<0.001). Permanent lingual nerve injury occurred in 0.1, 0.6 and 0.2% of the combined LS, BA+ and BA- procedures, respectively. The combined permanent incidence RRs were not calculated because of the low permanent incidence rates.

**Authors’ conclusions**

The use of a lingual nerve retractor during third molar surgery was associated with an increased incidence of temporary nerve damage. The lingual nerve retractor was neither protective nor detrimental with respect to the incidence of permanent nerve damage.

**CRD commentary**

This review was based on a wide search of the published literature using a clearly defined search strategy. However, the review suffered from a number of problems which were very likely to affect its validity. It was unclear from the search strategy whether attempts were made to locate unpublished data, and no comment was made regarding the inclusion of non-English publications; publication bias may, therefore, be an issue. The authors stated that the limited number of studies included in the review made the assessment of such bias difficult. In addition, aspects relating to the review methodology were not presented, e.g. it was unclear how many reviewers selected the studies and extracted the data. Study quality was not formally assessed, and only one of the included studies was randomised. The authors failed to report a priori decisions regarding the type of study design eligible for inclusion in the review.

Details of the studies were tabulated clearly. However, the review would have benefited from a more extensive reporting of the number and characteristics of the patients involved, although the number of procedures performed was stated. The lack of study details made it difficult to qualitatively assess the level of heterogeneity between the studies. It was, however, evident that both the study design and the definition of temporary lingual injury incidence varied. The authors stated that it was not possible to assess heterogeneity because of the limited number of studies and the differences in study design, yet they have still combined the studies in their analysis. Given that only one of the studies included a control group, it was unclear how the authors calculated the incidences or the combined RR values. Overall, the analysis would appear to be flawed. Hence, the findings and conclusions of the review should be interpreted with great caution.
Implications of the review for practice and research
The authors did not state any implications for further research and practice.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.