Recommendations for management of trigeminal nerve defects based on a critical appraisal of the literature

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Authors' objectives
To determine the optimal operative technique for managing defects involving the inferior alveolar (IAN) or lingual nerves when direct (i.e. primary) repair is not feasible.

Searching
MEDLINE was searched for articles of studies in humans, which were published in the English language between 1986 and 1996.

Study selection
Study designs of evaluations included in the review
Case series. No randomised trials or controlled trials were identified. Studies that had inadequate or no scoring of nervous recovery were excluded.

Specific interventions included in the review
Autogenous nerve grafts to repair IAN or lingual nerves compared with autogenous nerve grafts to reconstruct upper extremity nerves (median, ulnar or digital); tubulisation using autogenous (vein) conduits; tubulisation using alloplastic conduits.

Participants included in the review
People with trigeminal nerve defects. The participants included in all the studies were aged from 6 to 56 years.

Outcomes assessed in the review
The outcome was sensory recovery, as graded by the Medical Research Council (MRC) Scale and modified by Mackinnon and Dellon (see Other Publications of Related Interest). The scale ranged from 0 (no recovery) to 4 (complete recovery) by objective testing. For peripheral nerve injuries, a MRC score of 3 or higher was defined as useful sensory recovery.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the authors performed the selection.

Assessment of study quality
Validity was assessed on the basis of study design and sample size. The authors do not state how the papers were assessed for validity, or how many of the authors performed the validity assessment.

Data extraction
Data were collected on the following variables: injured nerve to be treated; study design; sample size; mean and range of the patients' age; defect size; time elapsed between injury and repair; and the duration of follow-up.

Methods of synthesis
How were the studies combined?
The studies were combined narratively.

How were differences between studies investigated?
Differences between the studies were investigated narratively.

Results of the review
Thirteen studies (12 case series and one case report) were identified and included in the review. There were 5 studies (n=260) of autogenous nerve grafts to repair upper extremity nerves, 3 studies (n=28) of autogenous nerve grafts to repair trigeminal nerves (n=28), 5 studies (n=47) of autogenous vein grafts, and 3 studies (n=21) of alloplastic conduits.

1. Autogenous nerve grafts.

Grafting in the upper extremity (5 studies, all case series): 85 to 94% of the patients were documented to have return of normal sensation (MRC greater or equal to S3) after autogenous grafting.

Grafting to repair IAN or lingual nerves (3 studies, all case series): 33 to 75% of patients were documented to have functional return of sensation after autogenous grafting.

2. Tubulisation (autogenous grafts) (5 studies, all case series).

Of all the nerves grafted, 61 to 90% were documented as having functional return of sensation.

3. Tubulisation (alloplastic conduits) (3 studies, 2 of which were case reports and one was a case series).

Eighty-six per cent of digital nerve patients had functional return of sensation, compared with 0 to 40% of the IAN or lingual nerve patients.

Authors’ conclusions
The evidence supported the use of either an autogenous nerve graft, or a conduit composed of a vein graft, to reconstruct a limited nerve defect (less than 3 cm) when it cannot be sutured primarily without tension. If the repair is immediate, or if the defect is larger than 3 cm, an autogenous nerve graft is indicated.

CRD commentary
The authors used an evidence-based approach to answer a clinical question on the reconstruction of the trigeminal nerve. A literature search was performed, but it was limited to MEDLINE and trials published in the English language. Searching other databases, such as EMBASE, and including non-English language trials may have produced more studies. The inclusion criteria were not defined clearly, and the methodology of the review (how articles were judged for relevance, how the inclusion criteria were applied) was not clearly described. As the authors pointed out, the conclusions must be interpreted with caution as the only evidence available was from case series.

Implications of the review for practice and research
The authors state that, based on the weakness of the current literature, recommendations for future research include the following:

- better standardisation and documentation of sensory deficits resulting from nerve injuries and their recovery;
- the use of multicentre studies to accumulate large samples of patients rapidly;
- the progression to randomised clinical trials, in order to ascertain the optimal operative management of nerve injuries.

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