Inferior Alveolar Nerve Repair Using An Umbilical Cord Membrane Nerve Wrap

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BACKGROUND

- Traumatic injuries to the inferior alveolar nerve (IAN) can result in a substantial decline in the patient's quality of life. Mandibular fractures may cause injury to the IAN, leaving a patient with lip and chin anesthesia or hypoesthesia. These types on nerve injuries may negatively impact speaking, chewing, drooling, and social interaction.
- With recent advancements in microneural surgery it is possible to achieve improved functional sensory recovery of the IAN.
- Minimally processed human umbilical cord can be used surgically as a resorbable soft tissue barrier and as a protective covering over the injured nerve to promote nerve healing and reduce recovery time.
- This study aimed to evaluate the recovery of the non-transected, traumatized IAN utilizing a minimally processed human umbilical membrane.

METHODS

- A case series was conducted, including 12 patients with a mandibular body or angle fractures plus an associated injury to the IAN. All 12 subjects presented with hypoesthesia around the distribution of the inferior alveolar nerve.
- Standardized neurosensory testing (NST) was performed at the initial presentation and reassessed for at least six months postoperatively. Sensory recovery was graded based on the Medical Research Council Scale (MRCS) and compared with NST at the initial presentation.
- Inferior alveolar nerve repair with umbilical membrane wrap was completed prior to open reduction and internal fixation of mandible fractures

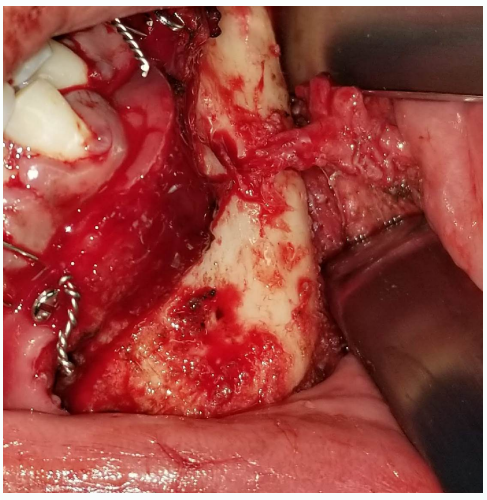

Figure 1: Intraoperative view of the mental nerve in a patient with reported nerve injury

Figure 2: close up view umbilical membrane wrap used for nerve repair

Figure 3: Intraoperative view of same case as Figure 1 after nerve wrap is applied

Results

Grade of Sensory Recovery	Clinical Examination Results
S_0	No sensory recovery in the autonomous zone of nerve
S_1	Recovery of deep cutaneous pain sensibility in autonomous zone of nerve
S_2	Recovery of superficial cutaneous pain sensibility
S_{2+}	Similar to S_2 with some touch sensibility
S_3	Recovery of pain and touch, two-point discrimination > 15 mm
S_{3+}	Similar to S_3 only with good localization of stimulation, 7 mm < two-point discrimination < 15 mm
S_4	Complete recovery, two-point discrimination < 7mm

MRCS: Medical Research Council Scale

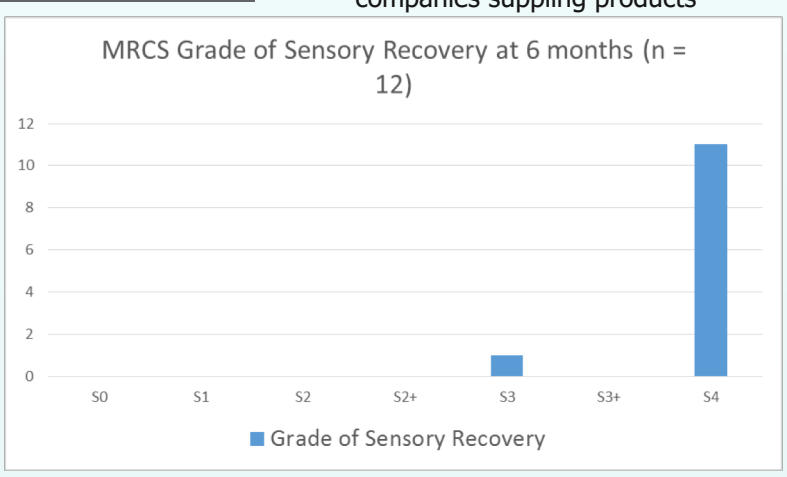

Table 1: Sensory recovery of patients (y-axis) after 6 months after nerve repair surgery.

DISCUSSION

- IAN injuries have been reported as a result of mandibular fractures. These injuries may be a result of indirect traumatic injury of the nerve bundle, compression from soft tissue edema, or direct trauma from fracture lines
- The prevalence of IAN injury after mandibular fractures in the posterior mandible was reported as 56.2% before treatment and 72.9% after treatment
- It has been previously documented that early intervention has been shown to reduce incidence of permanent neurosensory deficits when compared to delayed repairs
- After IAN injury, a number of patients may experience dysesthesia, characterized by abnormally painful stimulations. If left unrepaired, this can lead to a chronic pain disorder.
- After 6 months follow up, eight patients showed full recovery within three months, three patients had a full recovery within six months, and only one patient had a useful sensory function (S3 according to the MRC Grade) within six months
- In our study, the outcomes of nerve repair with a minimally processed human umbilical membrane showed improvement in neurosensory function 6 months postoperatively in all 12 subjects
- It is important to assess neurosensory testing at initial presentation and post-operatively, as altered sensation in the orofacial region can interfere with a variety of functions including eating and drinking, kissing, shaving, and speaking.

Conflict of Interest

we have no conflict of interest with any products used for this research as well as any financial relationships with any companies suppling products

CONCLUSION

- These results suggest that resorbable human umbilical cord membranes are a favorable treatment option to repair traumatized, non-transected inferior alveolar nerves to improve quality of life
- Future prospective randomized studies are recommended to further evaluate the outcomes