

Short communication

Thyroid cartilage fracture: Treatment with biodegradable plates

R.A. Tasca^a, I.W. Sherman^a, G.D. Wood^{b,*}

^a Department of Otolaryngology, Head and Neck Surgery, Arrowe Park Hospital, Upton, Wirral CH 49 5PE, United Kingdom

^b Department of Oral and Maxillofacial Surgery, Arrowe Park Hospital, Upton, Wirral CH 49 5PE, United Kingdom

Accepted 12 February 2007

Available online 28 March 2007

Abstract

A 29-year-old man fractured his thyroid cartilage while playing rugby. It was treated successfully with an Inion biodegradable plating system. Biodegradable plates are recommended for laryngeal reconstruction.

© 2007 The British Association of Oral and Maxillofacial Surgeons. Published by Elsevier Ltd. All rights reserved.

Keywords: Thyroid cartilage; Fracture; Surgical Procedures; Operative; Biodegradable

Introduction

Sports-related laryngeal injury is uncommon. Its initial management focuses on stabilisation of the airway and, later, treatment of limited vocal function.¹ Late management of a fractured thyroid cartilage aims to restore the integrity of the cartilaginous framework and its epithelial lining. Repair of the fracture includes sutures, stainless steel wire, metal alloy, and biodegradable miniplates.^{2–4}

We present the first use (to our knowledge) of the Inion biodegradable plate system in the late treatment of a fractured thyroid cartilage.

Case report

A 29-year-old male rugby player presented 2 days after an opponent had stamped on his throat; he complained of inability to swallow solids, lowering in the pitch of his voice, fremitus of the thyroid cartilage on swallowing, and pain at rest. He had no dyspnoea, haemoptysis, respiratory compromise, evidence of subcutaneous emphysema, bruising of the

neck, or hoarseness. There was clicking and instability on palpation of his laryngeal framework while fiberoptic flexible laryngoscopy showed normal laryngeal anatomy, normal mobile vocal cords, and no bruising.

A computed tomogram of his larynx showed a displaced vertical fracture of the thyroid cartilage, with shortening of the vocal cords (Fig. 1). Repair was undertaken at 3 weeks and at operation laryngoscopy confirmed a normal larynx with no injury of the epithelial lining. A midline horizontal neck incision was made to expose the fracture (Fig. 2), which was raised, and the reduction checked by palpation and direct vision. It was fixed with two Inion biodegradable plates (PLT 1038) with four screws in each (SCR 1224) (Fig. 3). A single intravenous dose of dexamethasone 8 mg was given during the operation, followed by and co-amoxiclav 375 mg three times daily for 10 days. The patient was discharged home the following day. At 3 weeks, he reported no further dysphagia or fremitus on swallowing, and the pitch of his voice was back to normal. He still had difficulty singing in the higher frequencies, but fiberoptic flexible laryngoscopy showed normal anatomy and movement of the vocal cords. At 1 year the biodegradable plates were not palpable, he had a good scar, and a normal larynx on endoscopy; he managed a stable fundamental frequency at 133 Hz, and was able to increase the pitch to 360 Hz with a normal stroboscopy waveform.

* Corresponding author. Tel.: +44 151 336 5568; fax: +44 151 336 5568.
E-mail address: GDW5568@aol.com (G.D. Wood).



Fig. 1. Computed tomogram showing the fractured thyroid cartilage.

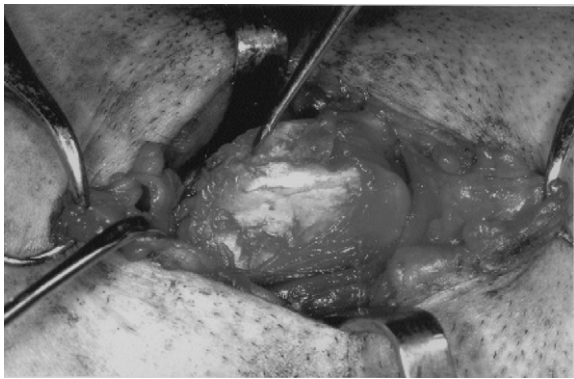


Fig. 2. Fractured thyroid cartilage.



Fig. 3. Thyroid cartilage with two Inion plates inserted.

Discussion

Acute laryngeal trauma was a common injury after car crashes, but is rarely seen since seat belts became com-

pulsory. It has been reported in “high velocity sports” and in a soccer player,⁶ but studies of injuries during rugby matches in Britain, New Zealand, and South Africa reported none.^{7–9}

Immediate management of laryngeal trauma is to secure the airway with later treatment of vocal function, as patients can develop secondary functional dysphonia as a result of limitation of vibration of the vocal cords months after the trauma.¹⁰ Our patient’s displaced fracture with distortion of the laryngeal anatomy required rigid internal fixation, which is usually done with stainless wires or sutures that produce less than rigid fixation. The use of miniplates in laryngeal reconstruction has been advocated, and they give immediate rigid stability as well as the ability to bridge large defects.^{2–4} However, titanium mini plates can often be palpated, and require removal later.

Inion biodegradable plates are made of lactic and glycolic acid polymers that degrade by diffusion-controlled hydration, the products of which are taken up by macrophages and eliminated through the Krebs’s cycle.⁵ This system enabled rigid fixation and healing of this fracture with no complications. The plates are radiolucent, do not interfere with computed tomography and magnetic resonance imaging, and give a clear view on plain radiographs.

References

- Hwang SY, Yeak SCL. Management dilemmas in laryngeal trauma. *Laryngol Otol* 2004;**118**:325–8.
- Pou AM, Shoemaker DL, Carrau RL, Snyderman CH, Eibling DE. Repair of laryngeal fractures using adaptation plates. *Head Neck* 1998;**8**:707–13.
- Woo P. Laryngeal framework reconstruction with miniplates. *Ann Otol Rhinol Laryngol* 1990;**99**:772–7.
- Bhanot S, Alex JC, Lowlicht RA, Ross DA, Sasaki CT. The efficacy of resorbable plates in head and neck reconstruction. *Laryngoscope* 2002;**112**:890–8.
- Wood GD. Inion biodegradable plates: the first century. *Br J Oral Maxillofac Surg* 2006;**44**:38–41.
- Rejali SD, Bennett JDC, Upile T, Rothera MP. Diagnostic pitfalls in sports related laryngeal injury. *Br J Sports Med* 1998;**32**:180–1.
- Roy SP. The nature and frequency of rugby injuries: a pilot study of 300 injuries at Stellenbosch. *S Afr Med J* 1974;**48**:2321–7.
- Inglis GS, Stewart ID. Rugby injury survey 1979. *N Z Med J* 1981;**94**:349–50.
- Davies JE, Gibson T. Injuries in Rugby Union football. *BMJ* 1978;**2**:1759–61.
- Brosch S, Johannsen HS. Clinical course of acute laryngeal trauma and associated effects on phonation. *Laryngol Otol* 1999;**113**:58–61.