Spine Trauma

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Abstract This chapter deals with injury to the cervical and lumbar spine, setting out mechanisms of injury, the consequences of trauma for the skeletal and neurological structures and its implication for the patient. The rationale behind treatment options is presented, as well as the outcomes. Importantly, there are references on the general management of the spinal injury patient, for the non-specialist who will not be expected to operate on these patients, but who can so markedly influence outcome if initial management is suboptimal.

Keywords Spine trauma • Thoracolumbar burst fractures • Cervical spine fractures

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Thoracolumbar Burst Fractures

Gnanenthiran SR, Adie S, Harris IA. Non-operative versus operative treatment for thoracolumbar burst fractures without neurological deficit: a meta-analysis. Clin Orthop Relat Res. 2012;470(2):567–77.

This meta-analysis compared pain and function in patients with thoracolumbar burst fractures, without neurological deficit, treated non-operatively and surgically. Four trials, including two randomized controlled trials (RCTs) with a total of 79 patients, were identified. Follow-up ranged from 24 to 118 months. No difference was identified between the groups in pain, function and return to work. Surgery was associated with higher complication rates and higher costs.

Boerger TO, Limb D, Dickson RA. Does 'canal clearance' affect neurological outcome after thoracolumbar burst fractures? J Bone Joint Surg Br. 2000;82(5):629–35.

This paper reviewed the world literature regarding the surgical treatment of patients with thoracolumbar burst fractures with neurological deficit. Sixty publications met minimal inclusion criteria with only three being prospective studies. There was no apparent advantage of surgical over non surgical treatment as regards neurological improvement. Surgery, in the belief it might improve neurological deficit, could not be justified. They believed that the neurological damage occurred at the time of injury.

Denis F. The three column spine and its significance in the classification of acute thoracolumbar spinal injuries. Spine (Phila Pa 1976). 1983;8(8):817–31.

This classic publication introduces the concept of the middle column. A retrospective review of 412 thoracolumbar injuries, the paper goes on to explain the division of spinal injuries into minor and major. Major injuries were classified into compression fractures, burst fractures, seat-belt-type injuries and fracture dislocations.

Yi L, Jingping B, Gele J, Baoleri X, Taixiang W. Operative versus non-operative treatment for thoracolumbar burst fractures without neurological deficit. Cochrane Database Syst Rev. 2006;(4):CD005079.

This Cochrane review aimed to identify RCTs which compared operative versus non-operative treatment for thoracolumbar burst fractures without neurological deficit. They identified one trial. This did not show a statistical difference in pain or function, return to work rates, radiographic findings or average length of hospital stay. There was no correlation with degree of kyphosis or percentage of correction lost and any clinical symptoms.

Cervical Spine Fractures

Nourbakhsh A, Shi R, Vannemreddy P, Nanda A. Operative versus non-operative management of acute odontoid Type II fractures: a meta-analysis. J Neurosurg Spine. 2009;11(6):651–8.

This meta-analysis aimed to establish the appropriateness of criteria described in the literature as indications for surgery for these specific fractures. They identified a statistically significant higher fusion rate for the surgically treated group compared to external immobilization (halo vest or collar) in patients over the age range of 45–55. This was not the case in patients younger than this. Operative treatment is recommended for older patients and patients with significant posterior displacement (greater than 4–6 mm).

Koivikko MP, Kiuru MJ, Koskinen SK, Myllynen P, Santavirta S, Kivisaari L. Factors associated with non-union in conservatively-treated type-II fractures of the odontoid process. J Bone Joint Surg Br. 2004;86(8):1146–51.

The results of nearly 70 patients with type 2 odontoid peg fractures treated in halo vests were reviewed. 46 % had united. Factors associated with non-union included a fracture gap of more than 1 mm, posterior displacement of more than 5 mm, a delay of more than 4 days in the start of treatment and posterior redisplacement of more than 2 mm.