ROUNDUP360

Spine

A Japanese questionnaire at work in Iran

A major problem for many scoring systems is how well they work cross-culturally. A questionnaire first written in English may seem totally different when translated into Spanish, for example. Consequently, *360* found a study from **Tehran (Iran)** into the function of the Japanese Orthopaedic Association Back Pain Evaluation Questionnaire (JOABPEQ) very interesting. The JOABPEQ is a measure of health-related quality of life in patients with lumbar disc herniation and lumbar spinal stenosis, two of the most common diagnoses of low back and leg pain symptoms. This study aimed to cross-culturally translate and validate the JOABPEQ in Iran. This was a prospective clinical validation study. The translation and cross-cultural adaptation of the original questionnaire was performed in accordance with published guidelines. A total of 103 patients with lumbar disc herniation or lumbar spinal stenosis were asked to respond to the questionnaire pre-operatively and six months post-operatively. To test reliability, the internal consistency was assessed by Cronbach's alpha coefficient, and validity was assessed using convergent validity. Responsiveness to change was also assessed comparing patients' pre- and post-operative scores. The Cronbach's alpha coefficients for the JOABPEQ at pre- and post-operative assessments ranged from 0.71 to 0.81, indicating a good internal consistency for the questionnaire. In addition, the correlation of each item with its hypothesised subscale of the JOABPEQ showed satisfactory results, suggesting that the items had a substantial association with the subscale representing the concept. Further analysis also indicated that the questionnaire was responsive to change.[1] Consequently *360* was pleased to see that the Iranian version of the JOABPEQ performed well. It appears to be a reliable and valid measure of back pain for patients with lumbar disc herniation and lumbar spinal stenosis.

Curve progression in degenerative lumbar scoliosis

An interesting paper has appeared from **Wakayama (Japan)** in which the authors note that little information is available on the prevalence, incidence, and risk factors associated with curve progression in *de novo* degenerative lumbar scoliosis (DNDLS) in the general population. Clearly, the development of treatment guidelines requires further knowledge about the aetiology and natural history of DNDLS in the elderly. In order to identify the cumulative incidence and radiographic features of DNDLS in the elderly, the authors reanalysed the results of lumbar radiographic examinations from an earlier study, which was originally conducted in a Japanese rural community to determine the prevalence of vertebral fractures in the Japanese population. DNDLS was defined as a coronal curvature > 10° in the Cobb angle in this second survey and progression of > 5° compared with the curve's magnitude in the initial survey. The radiographic features of the new curves were documented. The DNDLS group was recruited in order to compare the risk of curve progression with that in a control group of participants who had no scoliosis during a 15-year follow-up. The authors measured ten radiographic features for analysis in order to determine the prognostic factors of curve progression. The cumulative incidence of DNDLS was 33/194 (17.0 %) in this cohort. There was a tendency for female predominance and frequency increased with age. However, the severity of the curves was relatively low and no curve developed a Cobb angle > 30°, with most in the range of 10° to 20°. However, the two groups differed significantly in lateral spondylolisthesis and vertebral rotation only at the L3 level. The radiographic features of DNDLS revealed mild scoliosis with minimal rotatory deformity. The authors commented that spinal decompensation by the upper lumbar segments of the asymmetrical anatomical deformity in the lower lumbar segments may induce *de novo* lumbar scoliosis.[2] So it appears, *360* notes, that a rotatory deformity and lateral spondylolisthesis of the L3 vertebra may be a prognostic factor for DNDLS in the elderly.

Spotting the cause of a foot drop

A foot drop is an unfortunate yet common problem, with a fair number of different causes. Perhaps the most common differential is between lumbar or peroneal aetiologies, so a paper from **Suwon (Korea)** has been particularly helpful in this regard. The authors undertook a prospective study of a diagnostic test in order to determine the usefulness of the assessment of hip abductor power in the differential diagnosis of foot drop created by either a lumbar radiculopathy or peroneal neuropathy. There are few reports regarding the validity of hip abductor power in the differential diagnosis of foot drop. The team looked at 61 consecutive patients who presented with tibialis anterior weakness (MRC grade < 3) and who then underwent a neurological examination including the assessment of hip abductor power. Patient demographics, mechanism and pattern of foot drop, neurological findings, and the diagnoses were recorded. The final diagnoses were made on the basis of clinical information, imaging studies, and electrophysiological investigation in some cases. The validity and reliability of the assessment of hip abductor power in the differential diagnosis of foot drop were then evaluated. Of the 61 patients, there were 44 men and 17 women, with a mean age of 46.8 years. The final diagnosis was peroneal neuropathy in 28 patients, lumbosacral plexopathy in nine, lumbar radiculopathy in 21, and sciatic nerve disorder in three. Concomitant hip abductor weakness was found in 85.7% of patients with lumbar radiculopathy and 3.6% of those with peroneal neuropathy. The sensitivity and specificity of hip abductor power in the differential diagnosis of a foot

drop created by either lumbar radiculopathy or peroneal neuropathy were 85.7% and 96.4%, respectively. Meanwhile, the positive and negative predictive values were 94.7% and 90%, respectively.[3] *360* confesses that we do not routinely measure hip abductor power when examining patients with a foot drop. However, in view of these authors' findings it is clearly high time that we did.

Avoiding the spinal cord at scoliosis surgery

■ Surgery for the adolescent idiopathic scoliosis is demanding, even in the best of hands. One concern for surgeons, of course, is where is that spinal cord? Work from **Royal Oak (USA)** has attempted to answer this, realising that although several authors have assumed that the spinal cord hugs the concave pedicles in a scoliosis, the position of the cord in adolescent idiopathic scoliosis has not been studied in depth. They thus reviewed 45 patients who were candidates for operative treatment for adolescent idiopathic scoliosis between August 2007 and October 2010 at their institution. Postero-anterior and lateral three-foot standing pre-operative radiographs of the spine were reviewed to determine the Cobb angle of the thoracic curves, the apex vertebra of the curves, and the end vertebrae. MRI films were retrospectively reviewed. The lateral cord space (LCS) ratio, which reflects the relative position of the spinal cord in the spinal canal, was calculated at each level for a thoracic curve. The mean LCS for thoracic curves of > 50° was 2.123. The mean LCS for thoracic curves of < 50° was 1.551. The LCS for the apex vertebra was 1.699 and for upper-end and lower-end vertebrae was 1.212 and 1.225, respectively. There was a significant difference between right and left thoracic curves regarding the LCS. In right thoracic curves the mean LCS was 1 while in left thoracic curves it was 0.761. This shows that in both curves the spinal cord moved to the concave side of the curve.[4] This is helpful work, we think at *360*, certainly for surgeons undertaking scoliosis surgery. The authors appear to have confirmed that the spinal cord in adolescent idiopathic scoliosis tends to follow the appearance of the curve and is tethered on the concave side. Meanwhile, the spinal cord is close to the pedicle around the apex area, so watch where you put those screws!

Ballistic injuries to the cervical spine

■ In these troubled and war-torn times, it is encouraging to find that the medical staff in support of combat troops are finding time to gather their data, as well as to use those data to educate the rest of us.

A fascinating paper has appeared from the Royal Centre for Defence Medicine in **Birmingham (UK)** that has reported on the outcomes from penetrating ballistic injuries to the cervical spine. These injuries have become a significant source of morbidity and mortality for a deployed UK soldier. The authors of this paper have documented a case series of ballistic cervical wounds in order to describe the pattern of these injuries and relate them to outcome. To do this they obtained the records of 75/76 UK service personnel who had sustained wounds to the neck in Iraq or Afghanistan between August 2004 and January 2008. Blunt or thermal injuries were excluded. Of the 75 casualties, 56 (75%) were caused by explosive fragmentation and the remainder from gunshot wounds. There were 33 (44%) soldiers who had sustained a vascular injury, 32 (43%) an injury to the spine or spinal cord, 29 (39%) an injury to the larynx or trachea and 11 (15%) an injury to the pharynx or oesophagus. There were 14 (19%) patients in this series that underwent surgery in a hospital facility for treatment of potentially life-threatening cervical injuries, with a survival rate after surgery of 12/14 (86%). The overall mortality from this series of battlefield penetrating neck injuries was 63%.[5] These figures are truly amazing, we think at *360*. As the authors conclude, penetrating cervical ballistic injury is a significant source of injury to deployed UK service personnel, predominantly because of neurovascular damage. Protective neck collars, if worn, would likely prevent many of these injuries but such protection is uncomfortable and may interfere with common military tasks. The authors conclude by recommending that newer methods of protecting the neck should be investigated that will be acceptable to a deployed UK soldier.

Minimally invasive oblique lumbar interbody fusion

■ As orthopaedic surgeons respond to the challenge to undertake surgical procedures through ever-smaller incisions, in some subspecialties a whole new world of post-operative complications has opened up. A paper from **Lyon (France)** has delved into this, with work on the complications and morbidities of a mini-open anterior retroperitoneal lumbar interbody fusion. To do this, the authors undertook a retrospective study of 179 patients who underwent an oblique lumbar interbody fusion (OLIF) at one institution. All the patients had received a previous posterior instrumented fusion. The authors describe the technique in terms of the number of levels fused, the operative time and blood loss. Per- and post-operative complications were noted. The mean age of the patients was 54.1 years with a mean BMI of 24.8 kg/m^2. The procedure was performed at L1/L2 in four patients, L2/L3 in 54, L3/L4 in 120, L4/L5 in 134, and L5/S1 in six. Surgery was directed at one level in 56 patients, two in 107, and three in 16. The mean operating time and blood loss were, respectively, 32.5 mins and 57 ml per level fused. There were 19 patients with a single complication and one with two complications, including two patients with post-operative radiculopathy after an L3 to L5 OLIF. There was no abdominal weakness or herniation.[6] Not so bad after all, we think at *360*. The authors appear to have mastered the art. In their hands it appears that minimally invasive OLIF can be performed easily and safely in the lumbar spine from L2 to L5, and at L1/2 for selected cases. Up to three levels can be addressed through a so-called sliding window. The procedure appears to be associated with little blood loss and a short operating time, as well as having a reduced risk of abdominal wall weakness or herniation. One more thing – this paper has free access.

Readmission rates after spinal surgery

■ How good it would be if complications did not exist. Just think how low our readmission rates after surgery would be. Indeed, how much of a problem is readmission after spinal procedures anyway? Well, surgeons from **New York (USA)** have looked at this with a retrospective review of the medical records of all early readmissions after elective spinal surgery at a single orthopaedic specialty hospital in order to analyse the causes of unplanned readmissions. Using the hospital's administrative database of patient records for a three-year period, all patients who underwent spinal surgery and were readmitted to the hospital within 30 days were identified and broadly categorised as planned (a staged or rescheduled procedure or a direct transfer) or unplanned. Unplanned readmissions were defined to have occurred as a result of either a surgical or a non-surgical complication. Analysis was focused on 12 com-

mon spinal procedures based on the principle procedure code for a patient's initial admission as shown in the International Classification of Diseases, Ninth Revision, Clinical Modification. The readmission rate was then calculated for each procedure. The authors identified a total of 156 early readmissions, of which 141 were unplanned. Of these, the most common causes were infection or a worry about an infection (45 patients, 32% of unplanned readmissions), non-surgical complications (31 patients, 22% of readmissions), complications requiring surgical revision (21 patients, 15% of readmissions), and wound drainage (12 patients, 9% of readmissions). Of the unplanned readmissions, 57% required a return to the operating theatre (76% of infections or concern for infection). The mean length of stay for the unplanned readmissions was 6.5 days. When using these 12 most common procedures, the early readmission rate was 3.8% (141 early readmissions in 3673 procedures). So it seems that infection, medical complications after surgery, and surgical complications requiring revision of implants are the primary causes of unplanned early readmissions after spine surgery.[7] *360* agrees that further studies are necessary to identify patients and procedures most likely to be associated with readmission.

Clinical complications and the severely injured cervical spine

With severe injuries to the cervical spine, our focus is sometimes so spine-orientated that we forget the other complications that can occur. *360* was thus pleased to see a paper from **São Paulo (Brazil)** that prospectively assessed 217 patients (191 men, 26 women) who had sustained a severe injury to the cervical spine between 1997 and 2006. The mean age of the patients was 36.8 years. However, of these 217 patients, 45% had medical complications. The most important risk factor was alcohol intake and the most important associated injury was head trauma. Patients with an American Spine Injury Association grade A or B injury had a 2.3-fold greater relative risk of developing complications. There were 33 (15.2%) patients who died. Those who had neurological deficit had a 16.9-fold higher risk of death although there was no influence of age and time between trauma and surgery and the presence of complications. Of the patients, 45% had clinical complications and 7.5% had associated injuries; pneumonia was the most important complication. The age of the patient and the time between trauma and surgery did not influence the development of medical complications. However, neurological status was the most important factor in determining morbidity and mortality.[8] This paper has free open access as well.

Stabilising the thoracolumbar burst fracture

Burst fractures of the thoracolumbar spine can be bad news, so it is natural for surgeons to aim for as much stability after fracture as possible. For example, a short-segment pedicle screw might treat a burst fracture, with the affected segment being fused at the same time. However, is fusion necessary? This has been investigated by a team from **Chandigarh (India)** who wished to establish whether patients with a burst fracture of the thoracolumbar spine treated by short-segment pedicle screw fixation fared better clinically and radiologically if the affected segment was simultaneously fused. The authors enrolled 50 patients in this prospective study and assigned them to one of two groups. After the exclusion of three patients, there were 23 patients in the fusion group and 24 in the non-fusion group. Follow-up was at a mean of 23.9 months and functional outcome was evaluated using the Greenough Low Back Outcome Score. Neurological function was graded using the American Spinal Injury Association Impairment Scale and radiographic outcome was assessed on the basis of the angle of kyphosis. Peri-operative blood transfusion requirements and duration of surgery were significantly higher in the fusion group. However, there were no clinical or radiographic differences in outcome between the groups. The results of this study suggest that adjunctive fusion is unnecessary when managing patients with a burst fracture of the thoracolumbar spine with short-segment pedicle screw fixation.[9] How good it is to see a negative result being published, we think at *360*. What a useful finding, too.

REFERENCES

1. **Azimi P, Shahzadi S, Montazeri A.** The Japanese Orthopedic Association Back Pain Evaluation Questionnaire (JOABPEQ) for low back disorders: a validation study from Iran. *J Orthop Sci* 2012;(Epub ahead of print) PMID: 22821408.
2. **Watanuki A, Yamada H, Tsutsui S, et al.** Radiographic features and risk of curve progression of de-novo degenerative lumbar scoliosis in the elderly: a 15-year follow-up study in a community-based cohort. *J Orthop Sci* 2012;(Epub ahead of print) PMID: 22760700.
3. **Jeon CH, Chung NS, Lee YS, Son KH, Kim JH.** Assessment of hip abductor power in foot drop patients: a simple and useful test to differentiate lumbar radiculopathy and peroneal neuropathy. *Spine (Phila Pa* 1976) 2012;(Epub ahead of print) PMID: 22805342.
4. **Smorgick Y, Settecerri JJ, Baker KC, et al.** Spinal cord position in adolescent idiopathic scoliosis. *J Pediatr Orthop* 2012;32:500-503.
5. **Breeze J, Masterson L, Banfield G.** Outcomes from penetrating ballistic cervical injury. *J R Army Med Corps* 2012;158:96-100.
6. **Silvestre C, Mac-Thiong JM, Hilmi R, Roussouly P.** Complications and morbidities of mini-open anterior retroperitoneal lumbar interbody fusion: oblique lumbar interbody fusion in 179 patients. *Asian Spine J* 2012;6:89-97.
7. **McCormack RA, Hunter T, Ramos N, et al.** An analysis of causes of readmission after spine surgery. *Spine (Phila Pa* 1976) 2012;37:1260-1266.
8. **Santos EA, Santos Filho WJ, Possatti LL, et al.** Clinical complications in patients with severe cervical spinal trauma: a ten-year prospective study. *Arq Neuropsiquiatr* 2012;70:524-528.
9. **Jindal N, Sankhala SS, Bachhal V.** The role of fusion in the management of burst fractures of the thoracolumbar spine treated by short segment pedicle screw fixation: a prospective randomised trial. *J Bone Joint Surg [Br]* 2012;94-B:1101-1106.