asymmetrical pseudoarthrosis. The asymmetrical morphology of this lesion and lack of solid fusion may have contributed to the production of symptoms at this level. This would be consistent with the findings of Barzo et al, who showed that asymmetrical anomalies have greater clinical significance, and of Jonsson et al, who did not encounter patients with bilateral anomalous articulations seeking help for low back pain.

The bone scan (fig 2) and SPECT studies showed a focal area of increased uptake in the sacral wing ipsilateral to the left hemisacralisation. This finding of a sacral bone stress reaction in association with a TLSV has not previously been reported. Typically sacral wing fractures occur in one of two patterns. The first and more frequent is an insufficiency fracture in patients with osteopenia due to involutional osteoporosis, radiotherapy, or prolonged steroid use. The second less frequently reported group occurs as a fatigue fracture in healthy athletes or recruits following strenuous activity. The exact nature of the stress injury to the sacral wing in this case is conjectural. These findings may have been indicative of accelerated bone remodelling in the sacrum of an adolescent performing exercises which, through the asymmetric TLSV, placed abnormal stress on the sacral wing. The sparsely increased uptake on the bone scan was not accompanied by trabecular changes on a CT scan of the sacrum, which was performed seven months after the onset of symptoms, suggesting that the lesion had not progressed to a true stress fracture. Specific provocative tests of the sacroiliac joints were negative, lending credence to the suggestion that the pseudoarthrosis was not the sole cause of her symptoms. The final working diagnoses were back pain in association with a TLSV (Bertolotti's syndrome) and an ipsilateral sacral wing bone stress injury.

She was treated in a corset to limit motion at the TLSV; however, this was not tolerated and she instead elected to use an elastic support brace. Her symptoms slowly improved allowing a return to swimming. The prognosis is unclear, but as many individuals with a TLSV remain asymptomatic an optimistic outlook is warranted for conservative management. Surgery in cases of TLSV is recommended in very selected cases and has a variable success rate. The bone stress injury involving the ipsilateral sacral wing was not accompanied by trabecular changes on CT scan and with rest this lesion should resolve. Future studies are required to compare the specific symptoms and signs referable from the different morphological types of TLSV and investigate their relations to abnormal stress patterns in the sacrum.

This material was presented at The 42nd Annual Meeting of The American College of Sports Medicine, Minneapolis, Minnesota, June 1995.

Commentary

I find this an extremely interesting case. I would, however, like to propose an alternative explanation for the imaging findings. Hemi-sacralisation of the lumbosacral junction is common and symptomatic pseudoarthroses/impingement are also not rare. The ones I have personally seen in the past do not look like the current CT images. Also, on the initial radiograph, sclerosis would have been expected at that time at the site of impingement. The CT images performed seven months after initial onset of symptoms show quite profound sclerosis and a barely perceptible line across the centre of the sclerotic band in the region of the lateral bar. Indeed, the appearances of the sclerosis and the barely perceptible line are much more akin to the appearances found elsewhere in the CT images of healing or healed pars defect. The current CT looks much more like the latter than the former and therefore a partially healed stress injury across a lateral bar from hemi-sacralisation would seem to be more likely. Such a stress injury could presumably occur secondary to the asymmetrical mobility of the lumbosacral junction. Whereas symptomatic pseudoarthroses are not particularly uncommon, such a stress injury across the lateral bar of the hemi-sacralised vertebra would, I suspect, be exceptionally rare, which heightens the interest in this case. I think, however, that considering the lack of sclerosis on initial radiograph and the barely perceptible lucent line on delayed CT, that this latter diagnosis is more likely.

W W Gibbon