World Academy of Science, Engineering and Technology
International Journal of Sport and Health Sciences
Vol:12, No:06, 2018

A Proposed Treatment Protocol for the Management of Pars Interarticularis Pathology in Children and Adolescents

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Abstract : Background: Lumbar pars pathology is a common cause of pain in the growing spine. It can be seen in young athletes participating in at-risk sports and can affect sporting performance and long-term health due to its resistance to traditional management. There is a current lack of consensus of classification and treatment for pars injuries. Previous systems used CT to stage pars defects but could not assess early stress reactions. A modified classification is proposed that considers findings on MRI, significantly improving early treatment guidance. The treatment protocol is designed for patients aged 5 to 19 years. Method: Clinical screening identifies patients with a low, medium, or high index of suspicion for lumbar pars injury using patient age, sport participation and pain characteristics. MRI of the at-risk cohort enables augmentation of existing CT-based classification while avoiding ionising radiation. Patients are classified into five categories based on MRI findings. A type 0 lesion (stress reaction) is present when CT is normal and MRI shows high signal change (HSC) in the pars/pedicle on T2 images. A type 1 lesion represents the ‘early defect’ CT classification. The group previously referred to as a 'progressive stage' defect on CT can be split into 2A and 2B categories. 2As have HSC on MRI, whereas 2Bs do not. This distinction is important with regard to healing potential. Type 3 lesions are terminal stage defects on CT, characterised by pseudarthrosis. MRI shows no HSC. Results: Stress reactions (type 0) and acute fractures (1 and 2a) can heal and are treated in a custom-made hard brace for 12 weeks. It is initially worn 23 hours per day. At three weeks, patients commence basic core rehabilitation. At six weeks, in the absence of pain, the brace is removed for sleeping. Exercises are progressed to positions of daily living. Patients with continued pain remain braced 23 hours per day without exercise progression until becoming symptom-free. At nine weeks, patients commence supervised exercises out of the brace for 30 minutes each day. This allows them to re-learn muscular control without rigid support of the brace. At 12 weeks, bracing ceases and MRI is repeated. For patients with near or complete resolution of bony oedema and healing of any cortical defect, rehabilitation is focused on strength and conditioning and sport-specific exercise for the full return to activity. The length of this final stage is approximately nine weeks but depends on factors such as development and level of sports participation. If significant HSC remains on MRI, CT scan is considered to definitively assess cortical defect healing. For these patients, return to high-risk sports is delayed for up to three months. Chronic defects (2b and 3) cannot heal and are not braced, and rehabilitation follows traditional protocols. Conclusion: Appropriate clinical screening and imaging with MRI can identify pars pathology early. In those with potential for healing, we propose hard bracing and appropriate rehabilitation as part of a multidisciplinary management protocol. The validity of this protocol will be tested in future studies.

Keywords : adolescents, MRI classification, pars interticularis, treatment protocol
Conference Title : ICSMSS 2018 : International Conference on Sport Medicine and Sport Science
Conference Location : Paris, France
Conference Dates : June 25-26, 2018